Evaluating Key Performance Metrics in NBA Scoring Efficiency

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Introduction

The National Basketball Association (NBA) stands as a cornerstone of professional sports entertainment, captivating millions of fans worldwide with its electrifying displays of athleticism, skill, and strategy. Beyond its sheer entertainment value, the NBA offers a rich amount of data for analysis, providing insights into player performance, team dynamics, and the evolving landscape of the sport.

At the heart of NBA data analysis lies the exploration of player performance. With a massive number of statistics ranging from points scored, rebounds grabbed, assists dished out, and blocks swatted, we can dive into player metrics and create a nuanced understanding of individual contributions to team success. By dissecting player performance data, we can identify key performance indicators, uncover hidden patterns, and assess the impact of players on team outcomes.

NBA data analysis serves as a powerful tool for informing strategic decision-making across various facets of the sport, from player personnel decisions and roster construction to in-game tactics and player development strategies. Data-driven insights empower teams, coaches, and front offices to make informed choices to maximize and achieve competitive advantage. For us, it is more of a curiosity as to what makes a good basketball player, what the average basketball player should focus on if they wanted to score more or impact their team more. For this report I wanted to analyze various statistics of NBA players to gain a deeper understanding of what makes a good player.

As the NBA continues to evolve and adapt to changing trends and technologies, the role of data analysis in the sport becomes increasingly prominent. From unlocking the secrets of player performance to informing strategic decision-making and engaging fans in new and innovative ways, the exploration of NBA data offers boundless opportunities for discovery, innovation, and appreciation of the game we love.

Primary Question 1: Which statistic contribute most to a player's point production and what evidence or rule changes support this?

Using the scraped NBA dataset containing player statistics from the 2023-2024 regular season, I conducted a regression analysis to determine which stats had the largest impact on a player's scoring output.

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Call:
lm(formula = pts ~ fgper + threeptper + minutes_played + assists +
    freethrowsmade + rebounds + steals + blocks, data = NBA_averages_per_game_by_points)

Residuals:
    Min      1Q  Median      3Q     Max
-3.9782 -0.8511  0.0645  0.9829  4.4964

Coefficients:
               Estimate Std. Error t value Pr(>|t|)
(Intercept)    -1.21713    7.14092  -0.170   0.8655
fgper          -0.09223    0.09464  -0.975   0.3355
threeptper      0.22103    0.08682   2.546   0.0148 *
minutes_played  0.27971    0.15692   1.783   0.0821 .
assists         0.24682    0.16026   1.540   0.1312
freethrowsmade  1.49107    0.20439   7.295 6.33e-09 ***
rebounds        0.02001    0.18678   0.107   0.9152
steals          1.83593    0.95754   1.917   0.0622 .
blocks          0.01256    0.65732   0.019   0.9848
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Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1
```

From the regression, each coefficient estimate represents the change in PPG for each unit increase in the predictor. For example, for each additional minute played, a player is expected to score an additional 0.27971 points per game. Similarly, as a player records one more block, one can expect that they will score an additional 0.01256 points. However, the p-value for blocks is not exactly small, indicating that this relationship might not be significant in our analysis.

Speaking of p-values, the number of free throws made by a player has the largest role in determining PPG (by a large margin). There are many reasons for this being the case. Firstly, players who touch the ball more and run the team’s offense also touch the ball more, leading to more fouls drawn, and thus leading to more points scored from foul shots. In the NBA, free throws are guaranteed points for many players. With a league average percentage at around 75 percent, players who have high PPG capitalize on these uncontested shots to boost their scoring averages. From the dataset, the top 3 scorers this season average more than 7 free throws made per game, which is higher than every other player in this dataset.

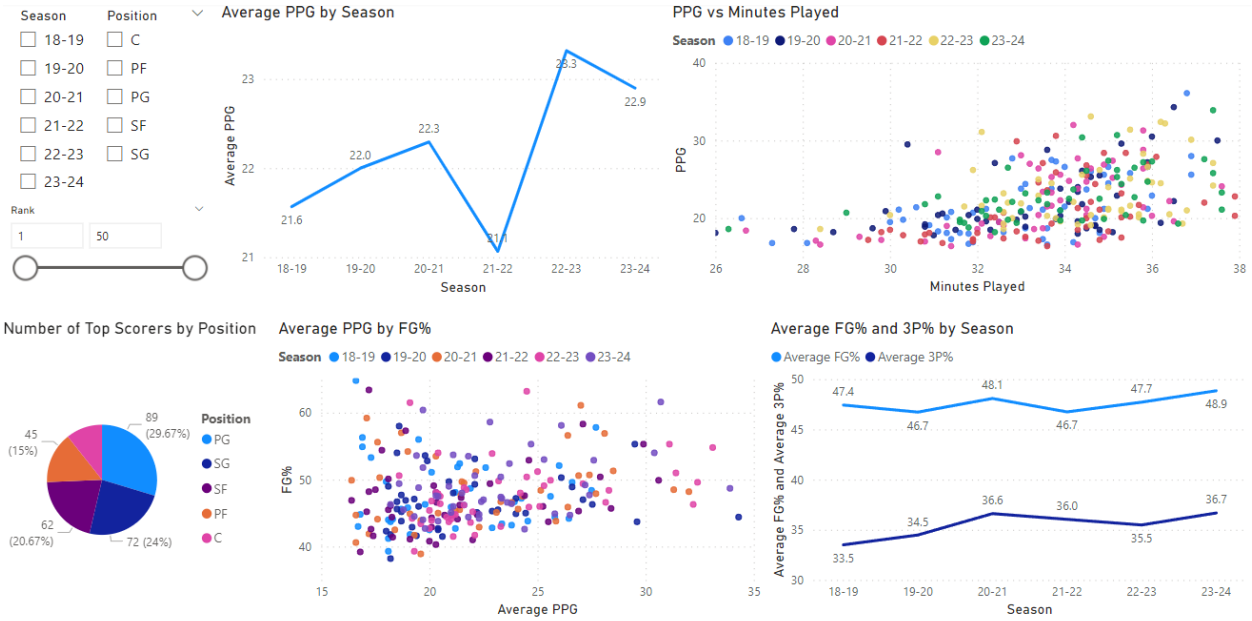
The second most significant factor is three-point percentage, with a p-value of 0.0148. Typically, players who are efficient and shoot well from beyond the arc also tend to score more. Nowadays, NBA teams have started incorporating the three-point shot more into their offenses, resulting in a three point heavy league. Along with three pointers being worth more than the typical layup or mid-range shot, being able to convert those shots at a high percentage can lead to a significant contribution to a player’s PPG.

Some other stats that contribute to PPG but are not as significant are steals and minutes played. With p-values slightly greater than 0.05, they are not the biggest contributors to PPG but are still worth discussing. Although it is common sense, players who play more also should score more. If this dataset contained all NBA players and not just the top 50 players, I believe that minutes played would be the most significant stat in determining a player’s PPG. Since top 50 players all

play many minutes for their teams, the effect of minutes played is likely diminished in the regression. Moving on to steals, I believe that the reason that this stat is significant is because of transition points. Steals often lead to fast breaks opportunities, where teams get easy layups as a result. Players who record more steals may see an increase in their PPG due to their ability to capitalize on their transition scoring opportunities.

Primary Question 2: Who have been the best and most efficient scorers throughout the past 5 seasons and how have 3-point percentages, field goal percentages, and positions changed among top scorers?

To answer this question, I created a Power BI dashboard to visualize our data. Through the dashboard I can filter by season, position, and ranking.



From the dashboard, the average PPG of the top 50 scorers each season has fluctuated slightly. The 21-22 season had the lowest average scoring (21.07 PPG), while the 22-23 season had the highest scoring (23.32 PPG). The same can be said with regards to the average field goal percentage each season. Although the field goal percentage has been quite stagnant, the 3-point percentage has overall been increasing each season. A 3 percent increase may not seem like a lot, but in the NBA, it can be quite significant. Given the importance of the 3-point shot in the modern NBA, even a slight rise in this percentage can mean a noticeable impact on a player's scoring, especially since the dataset is only considering the top 50 scorers.

Looking at the pie chart and filtering by season, the top 50 scorers throughout the past seasons have mostly been point guards (accounting for almost 30 percent of players). Point guards have been historically known to be the best playmakers and passers on a team, so to some it may be

surprising that many point guards are the best scorers. However, the role of point guards has changed throughout the years from a “pass-first” mentality to “score-first”. In the past, teams placed a high value on ball movement and unselfish basketball. In the modern NBA, teams have transitioned to a more “positionless” style of basketball. Players now have the skills to do everything and anything, whereas 20 years ago big men weren’t expected to shoot, and point-forwards didn’t exist.

Looking at the PPG by minutes played scatterplot, we are able to identify how well certain players score based on their time played. In the 18-19 season, James Harden averaged 36.1 PPG, the highest out of any player in the past 6 seasons. However, he also averaged 36.8 minutes per game, one of the highest in the league. The Average PPG by FG% scatterplot shows the most efficient scorers throughout each season. We can see that the most efficient scorers are often big men, which makes sense considering that post shots have a higher chance of being made than outside shots. Harden, who was at the top of the previous chart, is shown on this chart as having a relatively low field goal percentage when compared to other stars in the league (44.40%). I can see that although he is a talented scorer, he is not the most efficient. From this dataset, the best scorer is Giannis this season, averaging more than 30 points on 61.60% from the field.

Conclusion

Through a combination of statistical modeling and data visualization, this analysis has provided valuable insights into the factors that drive scoring performance in the NBA. The regression analysis revealed that free throws made and three-point percentage are the most significant contributors to a player’s points per game, emphasizing the importance of efficiency and opportunity in today’s game. Meanwhile, historical data visualized through the PowerBI dashboard highlighted the evolution of scoring trends and the transformation of traditional roles—particularly the rise of score-first point guards. These findings line up with how the NBA has changed in recent years and highlight just how useful data can be when it comes to understanding player impact. As the game continues to evolve, it will be important to keep analyzing new trends and getting a deeper look at what really makes certain players stand out on the court.