Research on the Influencing Factors of NBA Players' Salaries

Keyan Wei *

HangZhou Foreign Language School, Hangzhou, China

*Corresponding author: 631301120432@mails.cqjtu.edu.cn

Abstract. Currently, most of the studies are discussing the imbalance of NBA salaries, and only a few will actually take a closer look at what aspects of a player's capability can significantly affect their salary, which is what would be mainly discussed in this report. For NBA this mature business league, earning high salaries is the common goal of all players. However, due to the limitations such as the NBA salary cap, each team is limited in the total amount of salary they can allocate to their players. For team owners, determining a player's value through scoring, defenses, and shooting percentage is vital. Players, need to learn what they can do to earn more, such as improving their defensive efficiency or grabbing more rebounds. Each team needs different types of players, such as three-point shooters, organizers, or players who own leadership. Next season, the salary cap for NBA teams will be around $123 million and each team will have around 13 players. Team management will need to evaluate the value of every individual. For example, they will evaluate a three-point shooter in terms of three-point percentage, percentage of shots taken, number of threes per game, etc. The main purpose of this paper is to analyze the potential reasons for the income distribution of the league, which is conducive to enhancing the understanding of the pattern for the player side, and help the owners to take advantage of it, and better allocate their resources.

Keywords: Basketball; Salaries; Determinants; Influencing factors.

1. Introduction

It is generally acknowledged that the National Basketball Association is one of the biggest business leagues, and NBA players' salaries are gradually increasing every year, while their incomes already reached an extremely high level compared to the public. Nevertheless, there is still an enormous gap from players to players. For instance, in 2021-2022, Golden State Warriors's Stephen Curry earned $48 million the last season, while fellow teammate Kevon Looney earned only $8 million [1]. This shows that the huge difference in the salaries of different players even exists when they are on the same team. In the same year, the Brooklyn Nets' Kevin Durant was paid $44 million, compared to the Dallas Maverick's Luka Doncic only got $37 million, even though they both had similar stats. It presents the fact that players on different teams with similar abilities are earning various levels of salaries. There is no denying that the NBA is one of the most profitable sports leagues in the United States, especially in the last decade, and most of the NBA's players are already millionaires. Next season's top salary will be $52 million for Stephen Curry, incredibly, the highest salary in the NBA ten years ago was $28 million from Kevin Garnett, twenty years ago it was $33.14 million from Michael Jordan (the second highest was $20.5 million from Patrick Ewing, Michael Jordan is clearly the exception to the rise in NBA player salaries) and thirty years ago it was $20.5 million from Patrick Ewing [2]. The highest salary thirty years ago was $3.25 million from Patrick Ewing. What is clear is that in the last thirty years, the US economy has been growing at a rapid pace and players' salaries have risen dramatically [3]. Moreover, except for the economic boom, other decisive factors for their incomes should be considered at the same time. In this study, determinants like points per game, assists per game, rebounds per game, true shooting percentage,3 points field goals percentage, plus or minus will be the independent variables, and players' salaries will be the dependent variables [4,5]. As stated in an article published in the sport journal. With the burgeoning field of sport analytics, teams are focusing on a multitude of metrics and developing formulas to determine player efficiency. Thus, it is necessary to do this study.

2. Methods

There are hundreds of datasets taken from the official NBA data site included in this study, and these were populated into Execl tables. The next step was to use a linear regression model on a scientific website called SPSSAU to analyse which basketball factors had a greater impact on NBA players' salaries and to draw conclusions. Among the many statistics available, sifting out the less significant ones was necessary to avoid, as much as possible, the distraction of exceptions to the overall study. For example, it was not meaningful to count players who made fewer than 15 appearances in the regular season [6]. Because the NBA rules change every year, and the rule changes can have an impact on player salaries [7]. To make sure that there are not too many external factors influencing this article, it is all set in the context of the 2021-2022 season. After ranking, a total of 528 players were included in the statistics, and in the following, their technical data is also used as a technical basis. In this study, all data were obtained from the official NBA statistics website [8]. however, there is no record of players' salaries on this website, which can only be found on the official ESPN website [9]. The data analysis and iconography are from the SPSS software [10]. The data is analyzed mainly using a linear regression model.

3. Results and Discussion

3.1 Points per Game

The first point is the most intuitive and significant factor, is the points per game. Even for some viewers who don't understand the pattern of the game of basketball, they know that the most important factor in judging a player's ability is his scoring average. However, in 2007, Berri, Brook, and Schmidt posed the question: “Does scoring translate directly into team wins”. After their research, they found that this could not be achieved. That’s one of the points this article is trying to make. Scoring doesn't mean everything on the basketball court. Last season the average scoring of all players was about 9.3 points, with 200 players averaging more than 9.3 points per game and the rest below average. And the average player salary last season was $8,325,000. There are about 13% of players who are paid above average, but have a scoring average below 9.3, and they are the ones whose ability does not match their salary, and who are at risk of losing their jobs next season. The 18% of players who are above 9.3 points per game, but are not paid at the average level, are more cost effective. The p-value for the effect of field goal percentage is about 0.002 and the regression coefficient is about 204.4. The regression coefficient for field goal percentage is the highest among the data this paper has studied. In other words, the most significant and important factor in determining a player's salary is field goal percentage, this view was echoed by Kevin Sigler.

Figure 1 is a scatter plot based on player wages and points per game for the 2021-2022 season. What is clear is that the scatter points in the graph form a slight diagonal line. These scatter points represent a player's points per game and salary for the year. This diagonal line also represents the average player in the NBA league. When the scatter appears to be above the diagonal line, the player represented by the scatter cannot match their salary for last year's performance, and when the player is performing above his value, the player represented by the scatter is below the diagonal line, for example, Rudy Gobert, who was paid $41 million last season with the Utah Jazz, only averaged 15.6 points per game. He represents a much higher scatter plot than the slash line. So, with just the factor of points per game, Rudy Gobert was not worth that much salary.

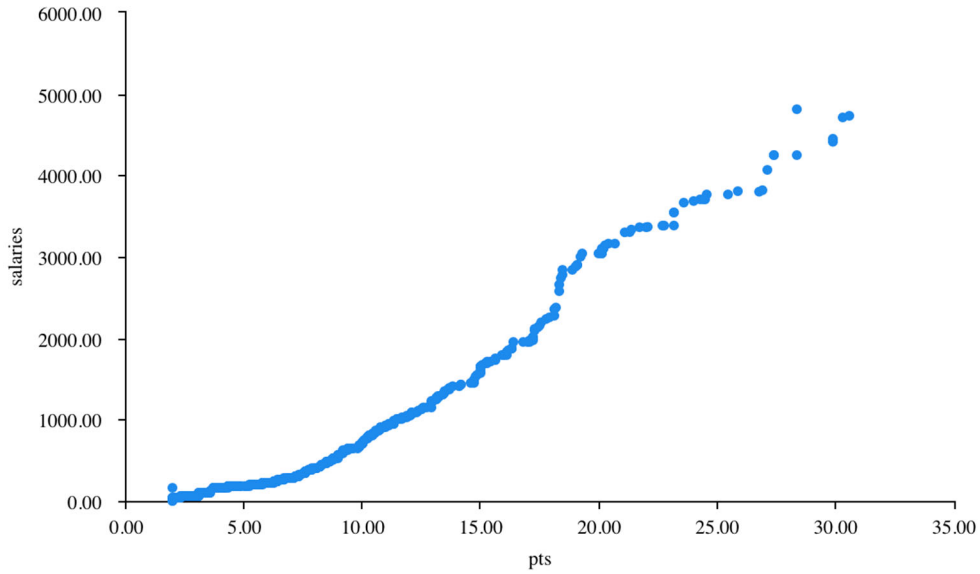

Fig. 1 Scatter plot on salary and points per game

3.2 Three-point Shooting Percentage

The second point is a player's three-point shooting percentage, which has a low p-value of 0.11. While it is larger than the p-value derived from including field goal percentage in the linear regression model (where field goal percentage is more meaningful), he is still a very informative factor. As an example, the Nets' Joe Harris is averaging about 10.5 points per game, but he's shooting 46.6% from 3-point range. That's why he made about $20 million last season. An efficient, non-possession player who hits a high percentage of his three-point shots can very easily be overpaid in the NBA. However, in the NBA of the last century, people didn't pay a player very much just because he was good at shooting threes. The rise of the three-point shooter thanks to the greatest shooter in NBA history, Stephen Curry, is proof that the wheels of the times are rolling faster. As the three-point shot gains in stature, it is hard to deny that a good three-point shooter is more likely to be paid more in the future. However, it is very easy for researchers to dispute on the factor of three-point shooting percentage. This is because the number of three-pointers made can have a big impact on this factor. For example, there may be a bench player (Player A) who only shoots one three in a season and makes it. Then his three-point percentage is 100 per cent, but his salary is very low. Whereas some player (Player B) may have taken 800 shots in a season, but shot 40% from three, no doubt a very good three-point shooter. But Player B loses out to Player A in the low 3-point percentage comparison. So, to avoid a player of Player A's type, I have excluded some of the data that I thought would cause a large margin of error for the experiment and have plotted the graph below.

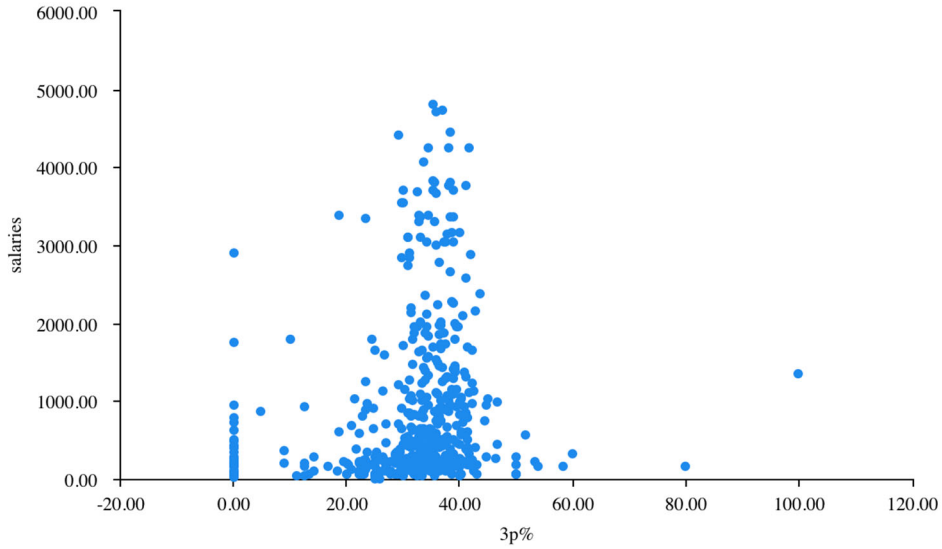

Fig. 2 Scatter plot on salary and three-point shooting percentage

As figure 2 shows, what is striking through this scatter plot is that most of the points are concentrated in the 30% to 40% of the x-axis and that we cannot find a line to analyze the individual data as we did in Figure 1. This is why we cannot use three-point field goal percentage to make a very specific analysis of NBA players' salaries, only to make more reasonable speculations.

3.3 Salary and Assists per Game

Basketball is a team sport and a very important statistic on the court is assists, players go through a whole season of games and come up with their average. However, a successful team's organizer will average a little more assists than a consistently poorer team, even if the organizer on the worse team is a little more capable individually. And for assists per game, I think it is a very good factor to look at, especially for the guards, because the main role of the guards on the court is to organize the whole team's offense, so for the guards, assists per game is the most intuitive statistic. For the forward players, the assists per game are also of some value. In the linear regression analysis between the independent variable (assists per game) and the dependent variable (salary), the p-value is 0.008 (less than 0.01) and the regression coefficient is 15.45, indicating that there is a relationship between assists per game and salary, with a positive effect. However, in comparison, the assists per game are not as convincing as the points per game, but he is still a very valuable reference factor. The table below shows my scatter plot based on assists per game and salary for all players' last season.

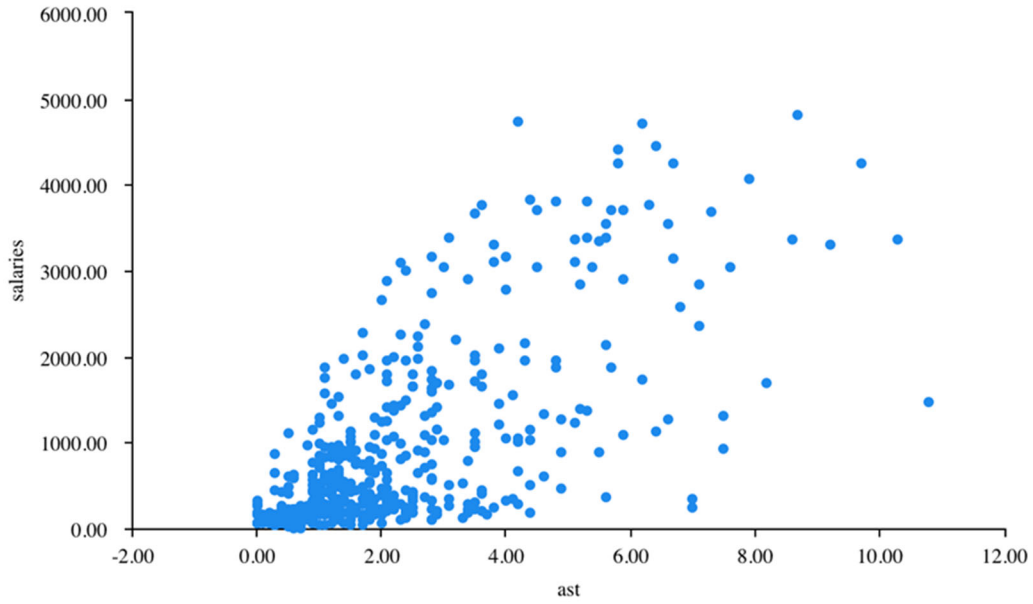

Fig. 3 Scatter plot on salary and assists per game

In figure 3, we can find a general trend and plot a sloping line. The majority of the data set is not on this sloping line, meaning that the fluctuations in assists per game are relatively large, which is why the regression coefficients are small. But the overall trend can still be analyzed. Around 40 of the players have 0 assists per game, all of which cannot be represented in the scatter plot. At the same time, 40% of the data set is concentrated above the diagonal line, indicating that around 190 players are below where they should be in terms of assists per game, and 53% of the data set is below the diagonal line, indicating that these 260 players are meeting or even exceeding the standard in terms of assists on the field. Of the 190 players not meeting the standard, 145 of them are forwards or centers. This makes their failure to meet the standard sensible, as their main task on the floor is to score and grab rebounds. At the same time, 200 of the 260 players who met the standard were all guards. To sum up, a guard player who averages a high number of assists per game is more likely to be paid a high salary. And in general, forwards and centers don't need to pay much attention to this statistic, except in some special cases (where the center plays the role of organizer on the team, such as Nikola Jokic of the Denver Nuggets)

3.4 Average Scoring

If scoring average is an assessment of a player's ability, then plus/minus average is a reflection of a player's efficiency and attitude when he is on the floor. For instance, if a player has a plus/minus of +6 at the end of a game, it means that the team has scored 6 more points than the opponent during the time the player has been on the court for the day. There are more things that can change the plus/minus than just points scored. More than points scored, there are rebounds and steals that can change the game. These factors require more of a professional attitude than talent. Chris Paul, from the Phoenix Suns, who averaged only 14.7 points per game last season (just about average), has the fourth highest plus/minus average in the league. And the Suns' management has offered Paul a top salary contract. So a player can help his team in more ways than just scoring, and scoring high points doesn't necessarily win games. At the same time, the plus/minus is a very important indicator for coaches and management to help them determine whether the players present are taking the game seriously and to analyse each player tactically after the game to help them find out where the team stands. At the same time, it is one of the indicators that can help players to sign players. A linear regression analysis of the relationship between plus/minus and salary leads to the conclusion that the p-value is less than 0.05 (0.048) and that the factor is significant for salary. The regression coefficient is then

also significant, at 117.92. This figure is smaller than that calculated using points per game and larger than that calculated using assists per game, indicating that plus/minus is more.

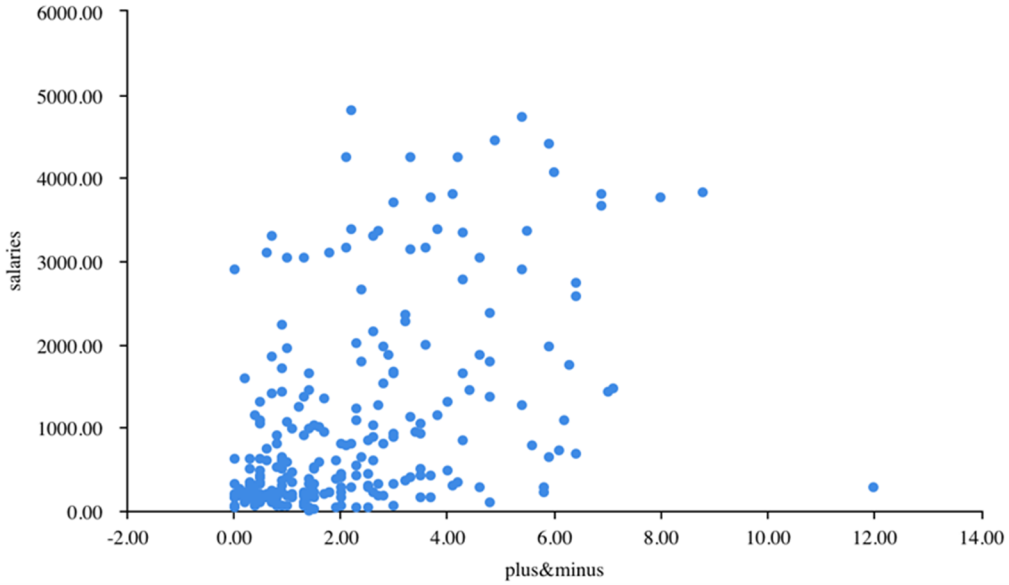

Fig. 4 Scatter plot on salary and plus/minus average

As figure 4 shows, the purpose of this experiment is to analyze the factors that lead to players receiving high salaries, so in the factor of positive and negative values, only positive and negative values of positive or zero are considered. According to this scatter plot, it is clear that most of the data set is concentrated between positive and negative values 0-4. Also, the regression line in this graph is on an upward trend. However, there are some exceptions to the numerous data. For example, there is a player who misses a large part of a season, but who performs well in the games he does play in. This also has a big impact on the analysis of the overall plus/minus average. On a side note, the current all-time leader in plus/minus is also the record holder in three-pointers, Steph Curry, which is why the projections above include that a good three-point shooter is increasingly likely to be overpaid, because it has been found through the research of those involved in contemporary basketball that the three-point shot is more efficient than the two-point shot.

3.5 Free Throws

Free throws are the most direct result of an opponent's foul week and the easiest way to score in basketball. For the NBA, the world's top basketball league, every player needs to shoot a very high percentage of free throws as it directly affects the game. Each team has around 30 free throw attempts in a game, and if a team is good, they can add 25 points to their total score, which can completely change the final outcome of the game. In some crucial games, free throws are one of the weapons that can make the difference between winning and losing. This is why some teams sign players with a very high free throw percentage to play when the opponent has to foul in order to save time and ensure that their team can hold on to the lead. In the linear regression analysis of free throw shooting and salary, the p-value of 0.039 is also below 0.05, indicating that this factor is significant in terms of player salary and gives a significant regression coefficient (98.77), which is a high value.

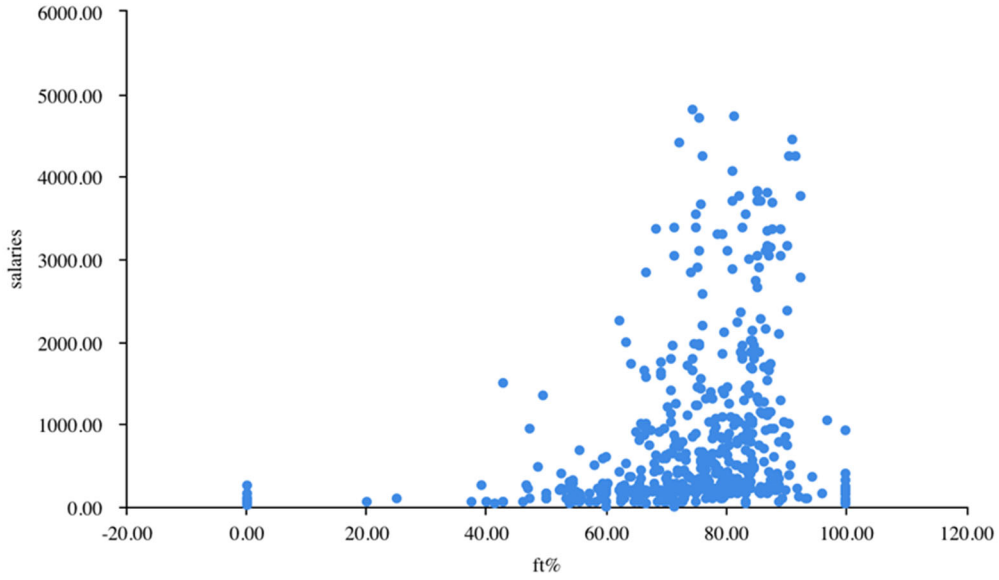

Fig. 5 Scatter plot on salary and free throw shooting percentage

Based on figure 5, we can see that the shape is very similar to that of the scatter plot for three-point shooting percentage. The scatter points represented by most players are concentrated between 70% and 90%. And even if a player has a very high free throw shooting percentage but he may not be paid much, this further shows that free throw shooting is just a basic skill for NBA players and it is something that every player needs to practice. And there are some that can't be avoided as well. There are some teams that have bench players that may only make 5 free throws a season and it is a common occurrence, which is why there are so many players in the chart that appear on 100% shooting. These players are of little reference value for research then. The highest number of players with two hundred or more free throws last season was Jordan Pugh from the Golden State Warriors. And he is about to sign a ten million dollar a year contract with the Warriors, which is an increase of about 400% compared to his last contract.

3.6 Average Rebounding

The last factor to analyze is the rebounding average. There is a quote in Dunk Tank that says, "Whoever controls the rebounding controls the game." There is no arguing with the fact that on the basketball court, players who are taller and have longer arms have a greater probability of grabbing rebounds. There are a percentage of players whose coaches put them on the court for the very reason of protecting the basketball. Such an analysis is very unfair to smaller players who are on the smaller side of the scale. But there will also be a percentage of smaller players who are very attractive to the basketball and so will also do well at rebounding. In this analysis, the p-value is 0.049, just enough to make this analysis worthwhile. As with several other factors, this is also positively correlated.

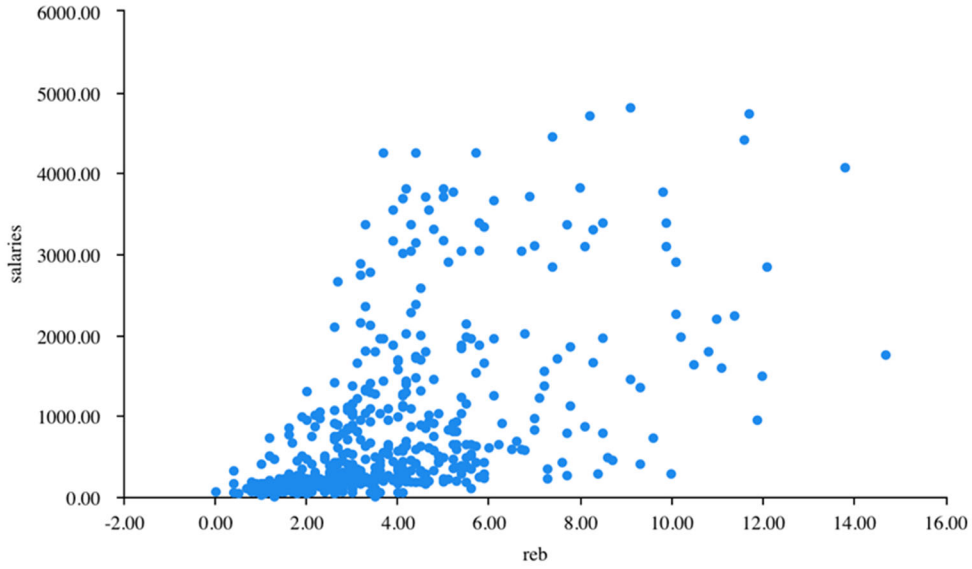

Fig. 6 Scatter plot on salary and rebounds per game

In figure 6, most players average less than 6 rebounds per game. Once a player is averaging more than 6 rebounds per game, it is very easy for him to get a high paying job. Because traditional centers are becoming fewer and fewer, the number of rebounds across the league has declined in recent years to varying degrees, it is a symbol of development of basketball.

4. Conclusion

In conclusion, most of the factors have a significant impact on a player's salary. Among the factors that caused significance in the experiments conducted in this study were a player's points per game, assists per game, rebounds per game, free throw shooting percentage, plus/minus. Of these, the most significant factor was field goal percentage and the second most significant was plus/minus. If an NBA player wants to earn himself a higher salary next season, then the player should improve in these two areas. And, even in the previous season three-point shooting percentage was not significant for player salary. But it is worth speculating that this statistic will become more and more important in the next few years.

References

[1] Robert Lyons, et al. Determinants of NBA Player Salaries. The Sports Journal, 2015.

[2] Mahmoud M., et al. The Impact of NBA New Rules on Games. The Sports Journal, 2020.

[3] NBA official data. Retrieved from https://www.nba.com/stats/players/traditional/?sort=FT_PCT&dir=-1&Season=2021-22&SeasonType=Regular%20Season.

[4] ESPN NBA (2021). NBA player salaries 2021-2122. Retrieved from http://www.espn.com/nba/salaries.

[5] Scientific statistical analysis website. Retrieved from https://spssau.com/indexs.html.

[6] Berri D. J., Brook S. L., Schmidt M. B. Does one simply need to score to score? International Journal of Sport Finance, 2007: 190-205.

[7] Dao-de. Selection of the Linear Regression Model According to the Parameter Estimation. Wuhan University Journal of Natural Sciences, 2000, 5(4):400-405.

[8] Kevin Sigler. Are NBA Players Paid to Perform in the Clutch? The Sports Journal, 2018.

[9] Anthony J., et al. Factors Associated with Success Among NBA Teams. The Sports Journal, 2008.

[10] Jacqueline Agesa, et al. NBA Salaries: Role Players and Superstars. The Sports Journal, 2005.