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Metrics to Millions: Understanding the Drivers of NBA Player Salaries

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Abstract

This research analyzes how NBA player performance metrics: age, points, assists, and rebounds per 36 minutes affect player salaries. The results indicate that scoring (points per 36 minutes) is the strongest determinant of salary, and the playmaking ability is less strong than scoring but also significantly affect the salary (assists per 36 minutes). While age has a moderate yet noteworthy influence, rebounding (rebounds per 36 minutes) has minimal impact. These findings indicate that modern NBA salary structures highlight skills, particularly scoring and playmaking, over the traditional contributions during the game like rebounding. The study offers valuable industry insights for players, agents, and team managers, aims to guiding better understand the metrics that most influence salary negotiations and the industry dynamics.

Key Words NBA, Salaries, Performance, Linear Regression

I. Introduction

In the highly competitive nature of professional basketball, it is crucial to identify the key factors that influence NBA player salaries is essential for teams, agents, and analysts to better understand the dynamics of this sport. Among all the factors, salaries are depended on various of elements: performance metrics, personal attributes, and market forces, highlighting the need to pinpoint which factors carry the most weight in contract negotiations.

This study analyzed the impact of specific performance indicators on player compensation. The selected indicators are age, points per game, assists, and rebounds. This study aims to offer insights into how these metrics shape the final financial valuation reflected by salary across various player positions. The focus of the study is to find out which metrics most significantly affect salaries and how these trends are different on player categories.

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In the previous study, Wu et al. (2020) found that total statistical metrics had played a dominant role in determining salaries for low- and mid-income players. However, metrics such as Value Over Replacement Player (VORP) are more critical for top-tier players. For instance, Berri et al. (2005) highlighted the significance of individual performance statistics in determining player compensation, noting that metrics such as points per game (PPG) often receive disproportionate emphasis in salary negotiations. Similarly, Rosen and Sanderson (2001) examined the economics of superstars and found that top-tier players often receive compensation that far exceeds their contribution relative to replacement-level players, suggesting that marketability and star power can inflate salaries.

In contrast, Stiroh (2007) argued that traditional metrics like points, rebounds, and assists remain central to salary determination, particularly for mid- and lower-tier players. This discrepancy suggests a stratified approach to player valuation, where advanced metrics are more influential for elite players, while traditional statistics dominate for others. Additionally, Hill et al. (2019) observed that team success and contextual factors, such as a player's role within the team system, also impact salary negotiations, reflecting the complex interplay between individual and team-based performance.

Expanding on prior research, this paper further explores the relationship between player statistics and salaries. Focusing on commonly used metrics (points, assists, and rebounds), this study aims to provide a broader understanding of salary dynamics while addressing gaps in the existing literature. This research aims to enhance the understanding of player valuation and offering practical applications for the overall basketball industry. This study will be helpful for general managers and agents to improve strategies for player recruitment and contract negotiations. Additionally, analyzing salary's determinants can further reveal NBA's dynamics and future trends, such as changes in player roles and evolving priorities in performance evaluation.

This structure of the research are as follows: After the introduction and literature review, I outlined the methodology for analyzing salary determinants. A detailed data analysis is applied to examine the relationship between performance metrics and player salary. The results explanation followed by a conclusion and discussion of the practical application and study limitations.

II. Methodology

Null Hypothesis*:* Age, points per 36 minutes, assists per 36 minutes, and rebounds per 36 minutes are not the key variables that affect the salaries of NBA player.

Alternative Hypothesis: Age, points per 36 minutes, assists per 36 minutes, and rebounds per 36 minutes significantly affect the salaries of NBA players.

In this research, I investigate the relationship between NBA player performance metrics and salaries, using data from the 2024–2025 NBA season. The dataset is sourced from Kaggle website (Kaggle, 2025), offering extensive details on player's performance and salary information. Multiple linear regression analysis is applied to evaluate the impact of age, points per game, assists, and rebounds on player salaries.

a. Data Preprocessing

Technium Business and Management (TBM)
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I filtered the dataset by excluding players who had zero recorded minutes during the season or already retired to ensure only active players are selected in this study. I then conducted data cleaning: remove duplicate entries and standardize variable formats. The finalized dataset focuses on four independent variables: age, points per 36 minutes, assists per 36 minutes, and rebounds per 36 minutes. These variables serve as the primary predictors of the dependent variable, player salaries.

b. Analytical Approach

I applied a multiple linear regression model to analyze the relationship between performance metrics and player salaries. This model quantifies the impact of each independent variable on salaries. The regression analysis applies various evaluation metrics: R-squared to measure the proportion of variance in salaries explained by the model; the F-statistic and p-values to assess the overall and individual significance of predictors; and regression coefficients to explains the magnitude and direction of each variable's impact on salaries.

c. Tools and Implementation

The analysis was conducted using Python on Google Colab, leveraging libraries such as pandas for data manipulation, stats models for regression modeling, and matplotlib for visualization.

III. Data Analysis

The descriptive statistics reveal key characteristics of the dataset, providing an overview of player performance and salary distribution. The average salary is approximately $17.94 million, with a standard deviation of $10.54 million, reflecting significant variability in player earnings. Players' ages range from 19 to 38 years, with an average of 28.86 years, suggesting a concentration of mid-career athletes. Points per 36 minutes have a mean of 16.46, indicating that, on average, players are moderately effective scorers. Assists and rebounds average 3.95 and 6.77 per 36 minutes, respectively. These metrics highlight the diverse skill sets of players and their varying contributions on the court.

Graph 1: Descriptive Statistics of Variables

Metric	**Mean**	**Std Dev**	**Min**	**Max**
Salary (USD)	$17,938,966	$10,543,421	$2,165,000	$55,761,216
Age (years)	28.86	4.12	19	38
Points per 36 minutes	16.46	5.01	2.4	31.5
Assists per 36 minutes	3.95	2.08	0.3	10.8
Rebounds per 36 minutes	6.77	3.12	0.5	15.9

Technium Business and Management (TBM)
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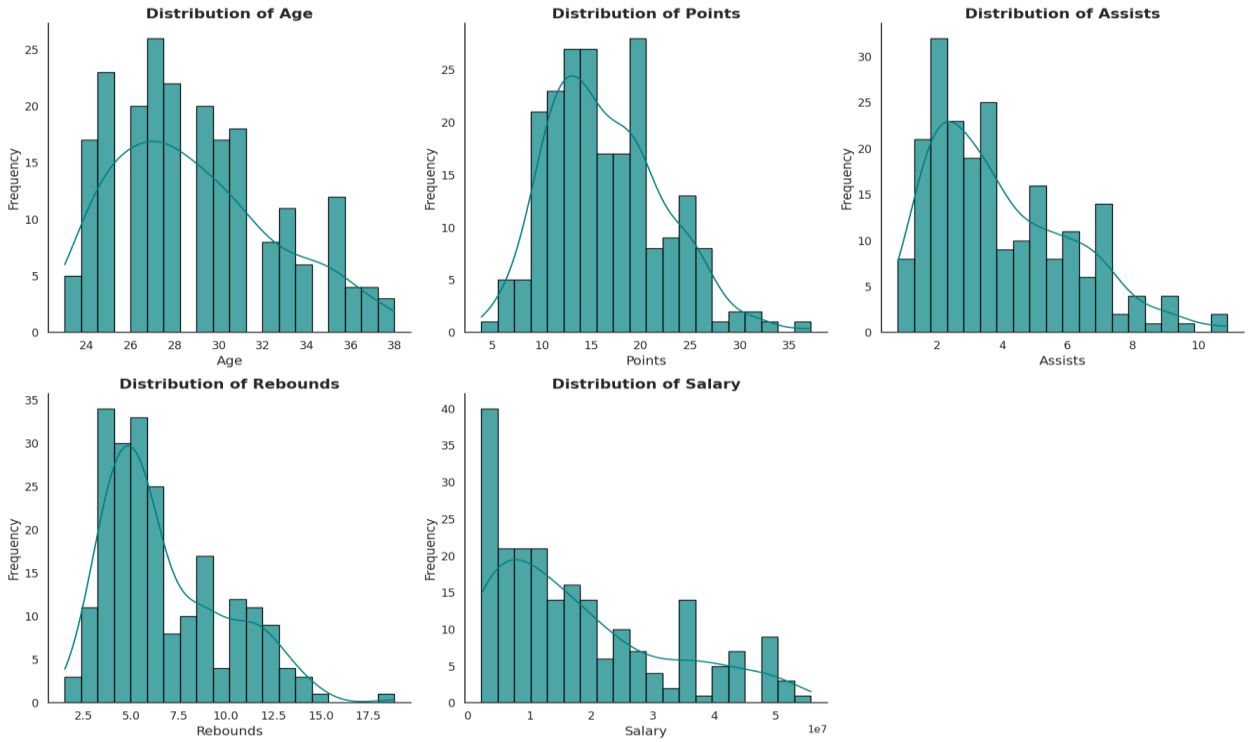
The distributions of the independent variables (age, points, assists, rebounds) and the dependent variable (salary) were analyzed using histograms.

- Age: Most players are in their late 20s, with a small representation of players over 35.
- Performance Metrics: Points per game show a moderately right-skewed distribution, while assists and rebounds exhibit a more balanced distribution.
- Salary: Highly right-skewed, indicating a concentration of lower salaries and a few exceptionally high earners.

Graph 2: Visualization of Distributions



Age Distribution: The histogram indicates that most players are in their late 20s. There is a significant decrease in the number of players over the age of 35. From the age distribution, it is found that most professional players are likely in their physical prime.

Points Distribution: The histogram of point distribution exhibits a moderately right-skewed distribution. Most players scored between 10 and 25 points. Only a small proportion of players score over 30 points.

Assists Distribution: The histogram of assist distribution shows a relatively balanced distribution. Most players recording between 2 and 6 assists. This indicates that playmaking is an important, yet less ubiquitous skill compared to scoring.

Rebound Distribution: The histogram of rebounds follows a relatively normal distribution. The distribution centered around 5 to 9 rebounds. This indicates the significant contribution of big men and forwards to rebounding efforts.

Technium Business and Management (TBM)
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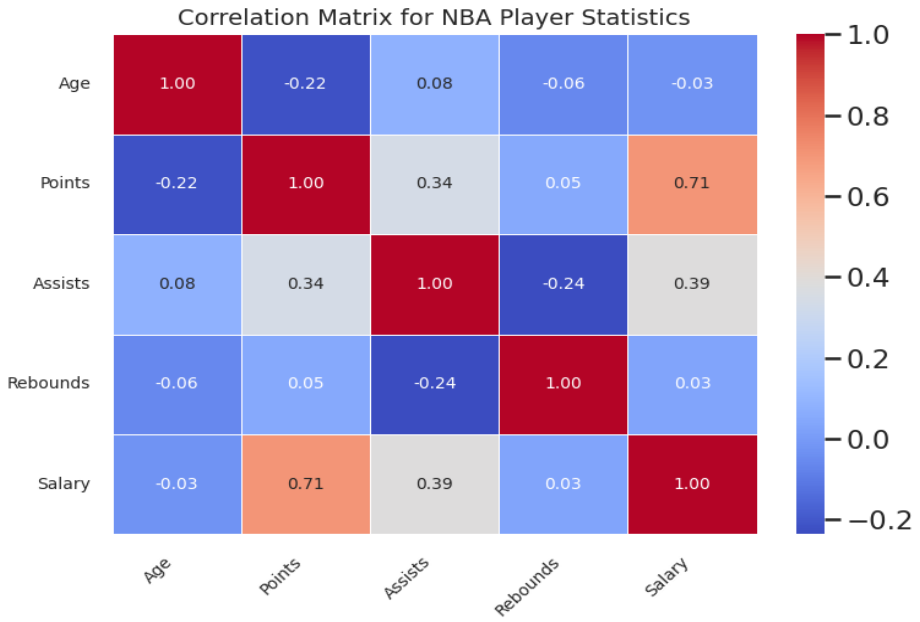
Salary Distribution: The histogram of salary distribution is highly right skewed. Most players earning between $2 million and $20 million annually. A smaller proportion of players earns over $30 million, representing the NBA's top-tier earners. The above right skewness reflects a relatively hierarchy in pay structure: only a select few receive premium compensation, while the majority earn closer to the median.

Graph 3: Correlation Analysis Between Dependent Variable and Independent Variables

Variable	Correlation with Salary (r)
Points per 36 Minutes	0.71
Assists per 36 Minutes	0.39
Rebounds per 36 Minutes	0.03
Age	-0.03

The correlation analysis shows the relationships between key performance metrics and player salaries. Points per 36 minutes exhibit the strongest positive correlation with salary ($r = 0.71$), indicating the critical role of scoring ability in financial valuation. The factor Assists per 36 minutes shows a moderate positive correlation ($r = 0.39$), indicating the value placed on playmaking roles. In contrast, rebounds per 36 minutes show a negligible correlation ($r = 0.03$), suggesting the relatively small influence on salary determination. On contrary, the factor age exhibits a slightly negative correlation ($r = -0.03$), showing that younger players may earn salaries comparable to their more experienced counterparts. This correlation may be due to the emphasis on performance indicators rather than experience.

Graph 4: Correlation Matrix among Variables



Technium Business and Management (TBM)
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The above correlation matrix indicates that scoring is the most significant factor influencing player salaries: there is a strong positive correlation between points and salary ($r = 0.71$). Assists and rebounds distribution show weaker correlations with salary, suggesting that while these metrics contribute to a player's overall value, they are less significant in affecting a player's compensation. Age shows minimal correlation with both performance metrics and salary ($r \approx 0.00$), indicating that experience alone does not strongly predict earnings. Overall, the matrix shows the significance of offensive contributions, particularly scoring, in deciding salary negotiations for NBA players.

Graph 5: Key Model Metrics

R-squared: 0.53
Adjusted R-squared: 0.52
F-statistic: 60.65 ($p < 0.001$)
Number of Observations: 216

The regression model shows a solid explanatory power. An R-squared value of 0.53 indicating that 53% of the variation in salaries is explained by the selected metrics. The Adjusted R-squared of 0.52 further confirms a strong model fit, accounting for the number of predictors. Additionally, the F-statistic of 60.65 ($p < 0.001$) further help to validate the statistical significance of the overall model. The analysis is based on 216 observations, representing the total number of players included in the study.

Graph 6: Regression Results

Variable	Coefficient (USD)	P-Value
Points per 36 Minutes	1,654,345	<0.001
Assists per 36 Minutes	1,039,484	0.003
Rebounds per 36 Minutes	192,273	0.377
Age	433,176	0.023

Technium Business and Management (TBM)
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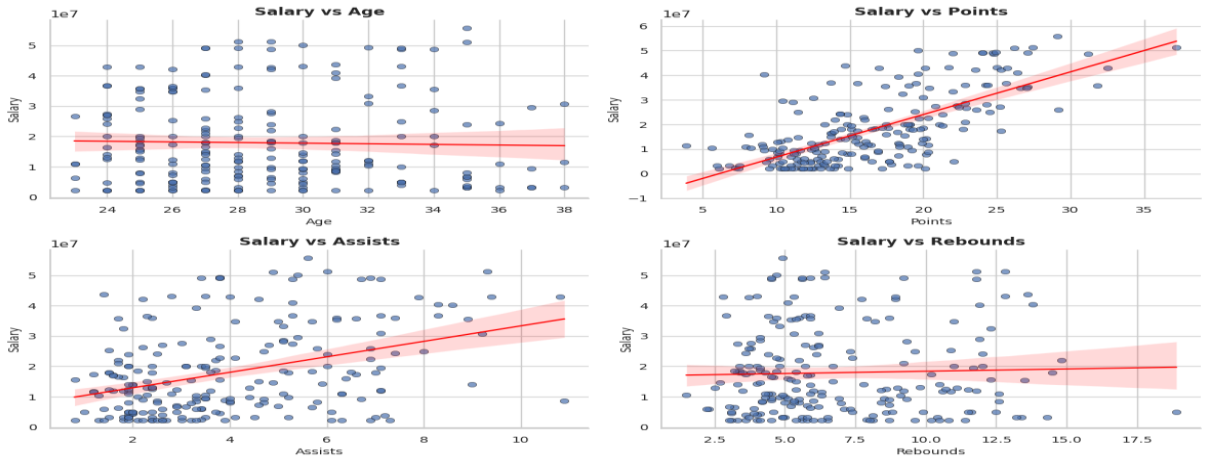
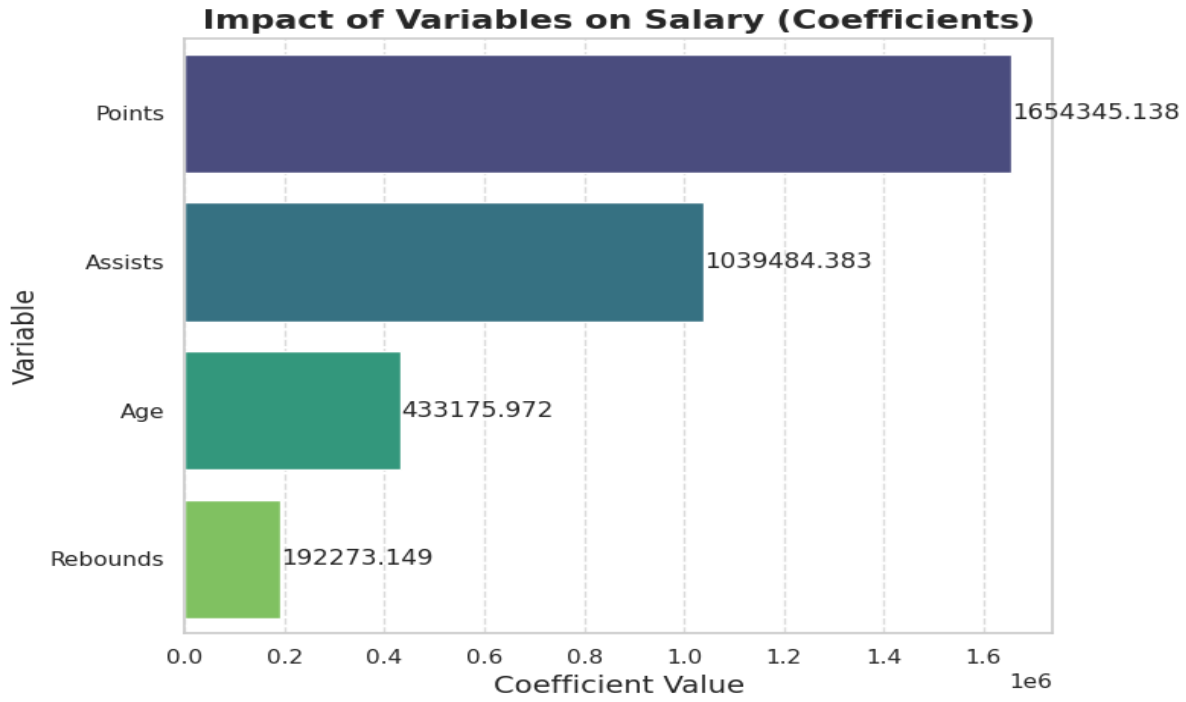
Graph 7: Relationship between Dependent Variable and Independent Variable



The regression analysis quantifies the impact of performance metrics on player salaries. From the above graphs, we can see that Points per 36 minutes have the largest coefficient ($1,654,345, $p < 0.001$), which again confirms this factor's critical role in salary determination. Assists per 36 minutes also significantly affects salaries ($1,039,484, $p = 0.003$), showing the importance of facilitating team offense. In contrast, rebounds per 36 minutes ($192,273, $p = 0.377$) shows a positive coefficient; however, their lack of statistical significance suggests a limited impact on salary determination. Age ($433,176, $p = 0.023$) had a modest but statistically significant effect, reflecting the value of experience in certain contexts.

Graph 8: Impact of Variables on Salary (Coefficients)



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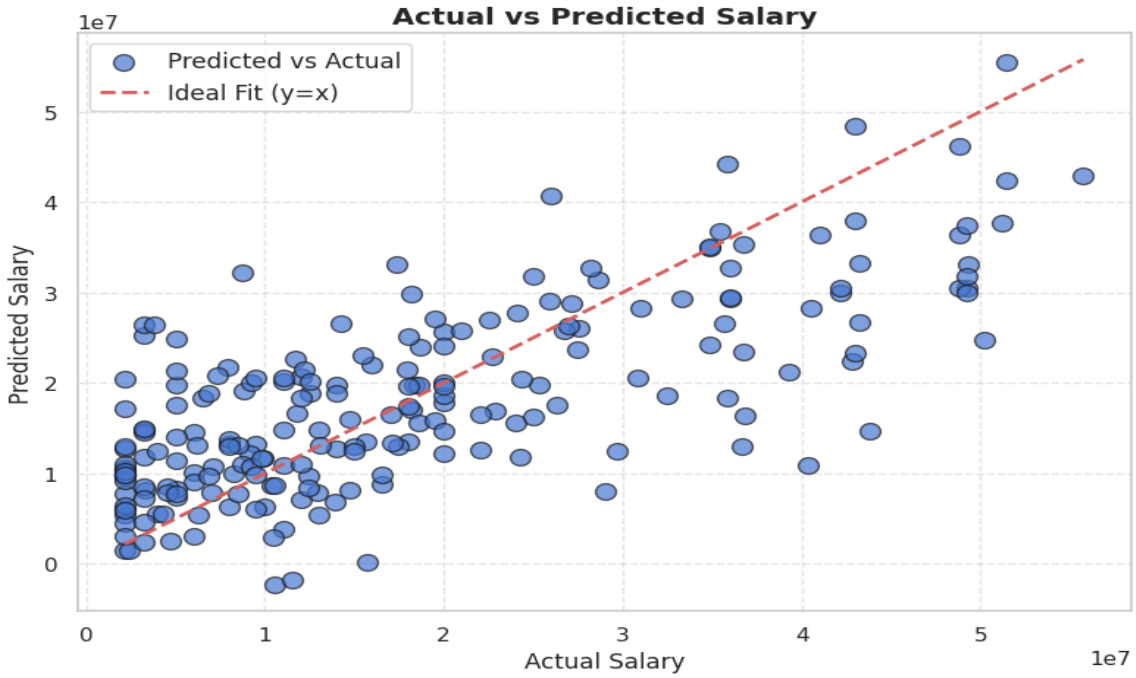
To evaluate the model's performance in this research, I compare the actual salaries to the predicted salaries. According to the scatterplot below, we can see that as most of the data points are tightly clustered around the ideal fit line (y = x). However, we can see that there are some deviations among high-salary groups. Further model could potentially incorporate additional metrics like VORP or defensive stats to for further research improvement.

Graph 9: Actual vs Predicted Salary



IV. Discussion and Interpretation

The analysis offers the key insights on how performance metrics affect NBA player salaries. The results provide significant implications for NBA players, agents, and team management.

I examined in this study the association between the five main factors—Points per 36 Minutes, Assists per 36 Minutes, Age, and Rebounds per 36 Minutes—and NBA player salary. Among all the selected predictors of pay, points per 36 minutes is the strongest. One finds that player value is mostly influenced by scoring ability. Particularly in positions where team success depends on offensive ability, high-scoring individuals are much sought for. Player value also showed to be influenced by playmaking, which is expressed by assist every 36 minutes. A high score for this element guarantees effective ball movement and suggests the players have great power in supporting team offensive. Although age has a quite minor influence, the positive coefficient also suggests that more years of expertise can improve the appraisal of players. Those experienced players who regularly perform at a high level will find this effect more noticeable. The lack of importance for rebounding points to modern NBA pay systems giving scoring and playmaking top priority above conventional big-man abilities.

The preceding numbers provide understanding of NBA salary trends. The results expose a positional bias: the league has been moving toward more guard-heavy, score-oriented gameplay. The points and assists are given greater weight than conventional rebounding measures. Moreover, elite pay is associated with players

that shine in certain criteria. These athletes are appreciated for their stats as well as for their intangible qualities including marketability, leadership, and playoff success.

Still, this investigation did run against some possible constraints. Though the model effectively explains over half the variance in compensation, (R-squared = 0.53), the remaining unexplained variance implies that there are other factors, like defensive contributions, club market size, team reputation, and injury history, may have an influence on prices. Furthermore, anomalies in the model suggest that non-statistical elements like popularity or team-specific requirements influence the pay of some players.

The findings of the study have more general relevance and can be used by other NBA stakeholders. These observations can help athletes and agents concentrate on performance criteria with the most importance during talks on agreements. Using the study, general managers can spot underpriced players depending on performance criteria, therefore maximizing the use of the pay cap. Future studies could improve these models by adding sophisticated measures like Value Over Replacement Player (VORP) or defensive win shares together with non-statistical elements like leadership abilities. This would raise predictive model accuracy and offer a more complete knowledge of pay factors.

V. Conclusion

This study analyzed the impact of NBA player performance metrics—age, points, assists, and rebounds per 36 minutes—on player pay. Among the selected variables, scoring serves as the most potent predictor, succeeded by playmaking, with assists being essential. Age exerts a modest yet positive influence. Nonetheless, rebounds exert minimal impact, indicating a transition towards offensive analytics. The findings provide pragmatic insights for practical applications. Players may concentrate on enhancing essential indicators, while teams might utilize performance data to optimize recruitment methods. The study indicates the NBA's increasing emphasis on scoring and playmaking rather than conventional positions such as rebounding.

The research is limited as it has not explored advanced metrics such as defensive performance and non-statistical elements like marketability. Subsequent research may incorporate these factors to develop a more comprehensive model of pay determinants. In conclusion, scoring and playmaking are crucial in determining NBA salary, mirroring the league's evolving objectives. These insights can assist stakeholders in adjusting to changing player valuation trends.

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