title

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1 Abstract

This project investigates how the relationship between three-point shooting and team success in the NBA has evolved over the past two decades. Using team-level data from the 2003-04 and 2023-24 regular seasons obtained via the NBA API, we construct multiple linear regression models to examine the effects of three-point percentage (3P%), two-point percentage (2P%), and shot selection proportions on win rate. Our analysis reveals a statistically significant interaction between 3P% and era, indicating that the marginal impact of three-point accuracy on team success has increased substantially in the modern NBA. While 3P% showed no significant association with win rate in 2003-04, it has become a strong predictor in 2023-24—even after controlling for other efficiency metrics. This shift reflects a broader structural change in league strategy, marking the emergence of a "three-point era." Though based on observational data, the use of interaction terms allows for a quasi-causal interpretation of this evolving relationship.

2 Introduction

2.1 Motivation

Over the past two decades, the NBA has undergone a dramatic transformation in offensive strategy. The rise of "small-ball" systems and analytics-driven decision making has led to a surge in three-point attempts, reshaping how teams space the floor, select shots, and build rosters. Players like Stephen Curry have redefined the value of long-range shooting, prompting coaches and front offices to reconsider the role of the three-point shot in winning games. This project is motivated by a key question at the heart of this shift: Has the importance of three-point shooting truly increased over time, and if so, how does it compare to traditional metrics like two-point efficiency or shot selection

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proportions? By using regression analysis on team-level data from different seansons, we aim to quantify how the statistical relationship between shooting performance and win rate has changed. In the era of big data, we believe that understanding these evolving dynamics can help teams identify actionable areas for improvement and optimize offensive strategies for greater success.

2.2 Dataset

Our dataset is sourced from the NBA's public API, an online interface that provides comprehensive and standardized statistics for teams and players across multiple seasons. The NBA API offers detailed data covering a wide range of performance categories, including shooting statistics, rebounding, passing, turnovers, fouls, player efficiency metrics, and advanced team analytics.

The full dataset records team-level aggregates for each regular season, capturing key indicators such as field goal percentages, three-point and two-point shooting volume and accuracy, free throw statistics, rebound counts, assist counts, turnover rates, steal and block numbers, and overall team performance metrics like win-loss records and plus-minus ratings. The structure of the dataset is shown in the Figure 1, and the detailed explanation of each variable is shown in the Appendix.

Figure 1: The Description of The Original Dataset.

For our analysis, we primarily focus on shooting-related metrics, including three-point field goal percentage (3P%), two-point field goal percentage (2P%), three-point attempt rate (3PA rate), and two-point attempt rate (2PA rate). Three-point and two-point attempt rates are computed as the proportion of total field goal attempts originating from each respective shot zone. To control for other aspects of team strength that may confound the relationship between shooting performance and win rate, we also incorporate variables such as total rebounds, turnovers, and other team-level

performance indicators as covariates in our regression models. This approach allows us to better isolate the specific impact of shooting metrics on team success across different eras.

3 Data Analysis

3.1 Data Preprocess

3.2 Data Visulization

4 Model

4.1 Model Dianostic

5 Conclusion

References