



Analyzing Fantasy Football Player Value

Abstract

In Fantasy Football, players begin each season with an assigned value based on their prior performances and perceived potential. As the season progresses, some players outperform or underperform relative to this preseason valuation. Quick reassessments are often made, either elevating a player's value due to hot streaks or reducing it due to poor performance. This study utilizes the `nfl_data_py` library to analyze player performances throughout the 2023 season on a week-by-week basis. Our goal is to determine the number of weeks a player must consistently perform above or below their preseason value before a reassessment is justified, establishing new thresholds for player valuation.

Background

In the world of Fantasy Football, players enter each season with an arbitrary value assigned to them based on their past success and projected potential. These values, often reflected in draft positions or rankings, serve as a baseline for how players are expected to perform during the season. However, as the season unfolds, it becomes clear that some players either exceed or fall short of these expectations. Whether through hot streaks, injuries, or unexpected declines, players' weekly performances can significantly diverge from their initial value.

Despite this, fantasy football managers are often quick to draw conclusions, either upgrading a player's value after a series of strong games or downgrading them after underwhelming performances. However, the question remains: how long does a player need to consistently perform above or below their initial value before we can justifiably reassess their worth?

In this report, we use the `nfl_data_py` package to track player performances across the 2023 season. By examining their weekly fantasy football output, we aim to identify the number of weeks it takes for a player's value to shift, allowing us to establish a new threshold for evaluating whether a player's early performance is a true indicator of their season-long value.

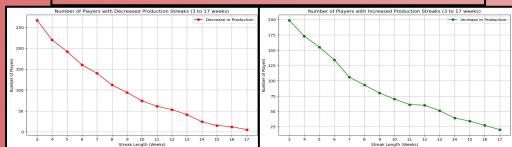


Fig 1

Methods

Data Filtering

We used '`nfl_data_py`' to gather fantasy football data from the 2022 and 2023 NFL seasons. The dataset was filtered to include only players who participated in both seasons.

Data Manipulation

New columns were created:
- 2022 Season Average: Average fantasy points per game for each player in 2022.
- 2023 Weekly Net Points: Difference between each player's weekly fantasy points in 2023 and their 2022 season average.

Threshold Calculation

We chose to use a logarithmic threshold to identify performance streaks:

- Increase Threshold = $(6.8) * \log(\text{avg_fantasy_points_2022}) - 0.5$
- Decrease Threshold = Inverse of the increase threshold.

Streak Analysis

Rolling averages of weekly fantasy points were calculated over streak lengths from 1 to 17 weeks. Players were flagged for streaks where their rolling average exceeded the increase threshold or fell below the decrease threshold.

Probability Calculation

The probability of maintaining a streak for the entire 2023 season was calculated as the percentage of players who met the threshold and sustained the streak over the season.

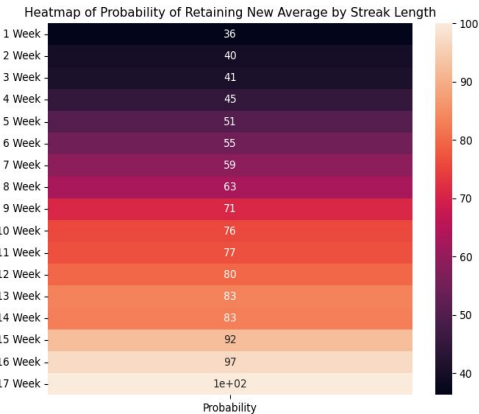


Fig 4

Results

Based on Figure 4, we observe that as the length of a player's performance streak increases, the probability of continuing that performance trend for the remainder of the season also increases. This aligns with expectations, as longer streaks typically indicate a sustained level of play. However, we initially anticipated an exponential increase in this probability, but instead found that it rises at a nearly linear rate.

In Figure 3, it is evident that once a player has a streak of 5 weeks where their performance is either above or below the calculated threshold, we can be 51% confident that this trend will persist for the rest of the season. This suggests that at this point, we can begin reassessing the player's value. As streak lengths increase, this probability rises, reaching approximately 80% after 12 weeks and eventually 100% by the end of the season for the longest streaks of 17 weeks as we can see in the heatmap as well.

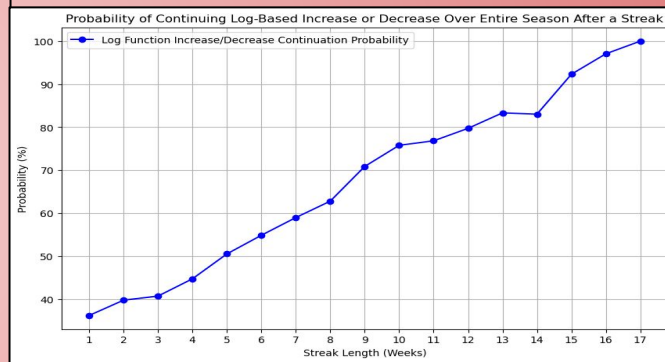


Fig 3

Discussion

This analysis provides valuable insights for fantasy football managers making decisions about adding, dropping, or trading players based on streaks of over- or under-performance relative to their expected value. This information can be crucial when deciding whether to hold onto or move a player in your roster. Managers should use these probabilities as a tool to make more informed decisions about player value reassessment based on streak lengths.

Moving forward, it would be beneficial to extend this analysis across more seasons to reduce data variance and increase reliability. Additionally, breaking down these streak probabilities by position could provide even more refined insights, allowing managers to better evaluate players in specific roles.

References

- * Authors: Luke Hamm and Noah Husted
- * Kirby, Derek. `nfl_data_py`: A Python Package to Access NFL Data. GitHub, 2022, https://github.com/derek-kyler/nfl_data_py.