

An Exploration of the Kickoff Phase of NFL Games and their Impact on Subsequent Possessions

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Introduction

As the field of data analytics continues to expand throughout American professional football, kickoffs remain a controversial and largely unstudied aspect of the game. Criticized for lack of action and high injury rates on plays that do result in returns, kickoffs seem like plays with largely random outcomes. Teams now want to understand the potential impact of kickoffs on the other phases of the game and whether strategies can be employed to turn these impacts to their advantage.

Objectives

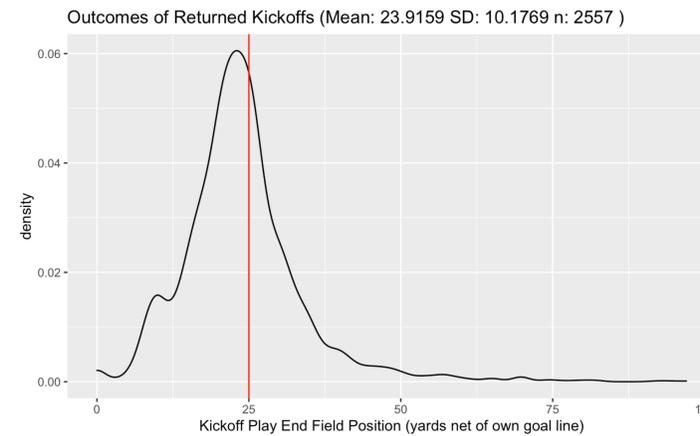
To provide the Baltimore Ravens analytics department with insights into current trends in NFL kickoff plays and their potential to add or subtract value from subsequent offensive drives. These insights are meant to inform potential personnel and kickoff strategy decisions.

Materials and Methods

Our dataset was provided in part courtesy of PFF and contained play-level data from every regular season NFL game occurring between 2017 and 2019. This included data from approximately 8,000 kickoff plays. Fields included, but were not limited to: drive number, play type and result, kick and return distances, and penalties incurred. The data also included an expected points metric, which used the current game state to estimate the expected points resulting from the drive. Our team used analytical tools in Python, R, Excel, and Tableau to manipulate the dataset and gain insights into current trends in kickoff outcomes, focusing on where the ball was kicked to, significance of the event that started the drive (to see if momentum from the play carried over into the drive) and the impact of potential penalties that occur during returns. To measure the quality of drives, we developed three metrics: Drive Points (points scored on that drive), Peak Expected Points Improvement (the maximum expected points the offense gained during that drive), and the probability of achieving at least one first down on the drive (to attempt to measure short-term momentum effects).

Results

Figure 1—Field Position Outcomes from Kickoff Returns



On average, a kickoff return yields a starting field position about 1 yard behind the position automatically awarded on a touchback (red line). The distribution is right-skewed because the sample space has more outcomes ahead of the 25 yard line than behind, but such outcomes are very unlikely.

Most kicks fielded 3 yards or fewer deep in the end zone are returned. This could be interpreted as a leaguewide sentiment that most returners believe that the point at which they won't be able to return a kick past the 25 yard line falls around 2-3 yards deep in the end zone.

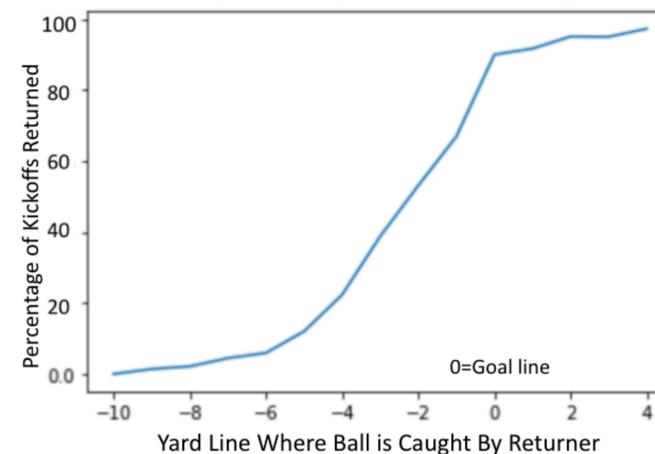


Figure 2—Current Kickoff Return Decisions

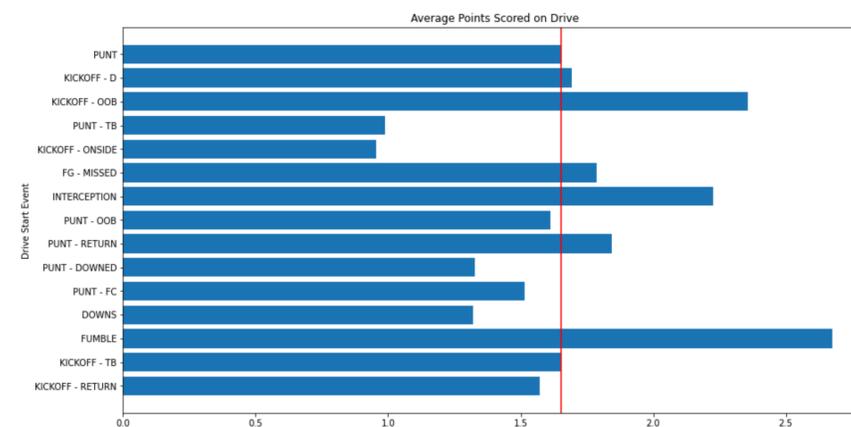


Figure 3—Scoring Outcome Differences

This graph illustrates the differences in points scored based on the event that started the drive. Kickoffs that are returned result in drives scoring about 0.1 fewer points on average than ones beginning with touchbacks.

Points Scored by Drive-Initiating Kickoff Situation

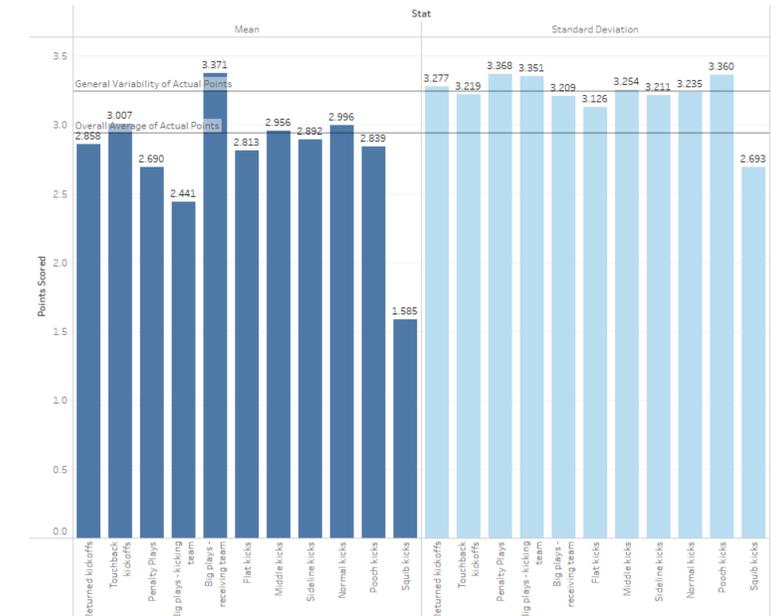


Figure 4—Drive Scoring for Different Kick Results

Returned kickoffs result in drives scoring an average of 0.15 points less than drives beginning with a touchback. The average NFL team receives 5.08 kickoffs per game, so returning all kicks rather than taking a touchback has the potential to swing the average game by a maximum of 0.76 points, or 14% of the average margin of victory.

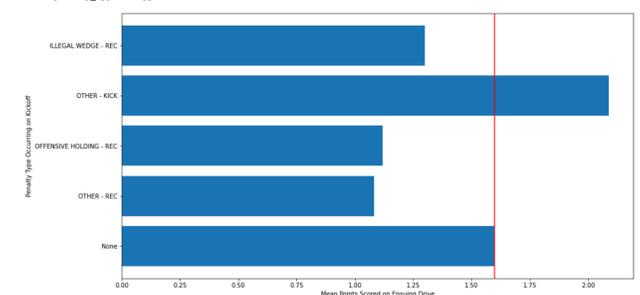


Figure 5 – Effect of Kickoff Penalties on Scoring

Receiving team committing a penalty on the kickoff costs them 0.29-0.51 points on the subsequent drive, while the kicking team committing a penalty gifts them 0.49 points.

Conclusion

In aggregate, there does not appear to be a long-run advantage gained by returning or not returning kickoffs at a higher rate. Returns come with a larger downside due to penalties, and yards gained from a longer return are not obviously more valuable than gaining the yards on offense. Despite this, most teams will still let their returners return a ball if it is kicked up to 3 yards deep into the endzone.