Analyzing NFL Statistics from Offensive and Defensive Perspectives

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Abstract

- o Key Motivation: Assist offensive and defensive coordinators in the NFL with their respective game plans using various statistics.
- o Arguments:
  - ➢ Offenses should prioritize pass-heavy over run-heavy game plans to win more games.
  - ➢ Defenses should expect and prepare for more pass-focused offenses throughout the season.
- o Results:
  - ➢ Passing yards contribute to more points being scored than rushing yards.
  - ➢ Passing yards contribute to more first downs being gained than rushing yards, and more first downs are leading to more wins.
  - ➢ Defenses should focus more on game-planning how to defend the pass rather than the run.
  - ➢ Teams across the NFL are, on average, calling more pass plays on offense than run plays.

Introduction

- o The main motivation behind this project was to analyze different statistics of NFL teams and help coaching staffs (primarily offensive and defensive coordinators) when developing their game plans.
- o Throughout this poster, you will see the argument that teams, on offense, should utilize more pass plays on offense than run plays. On defense, teams should focus more on limiting the damage done through the air compared to on the ground.
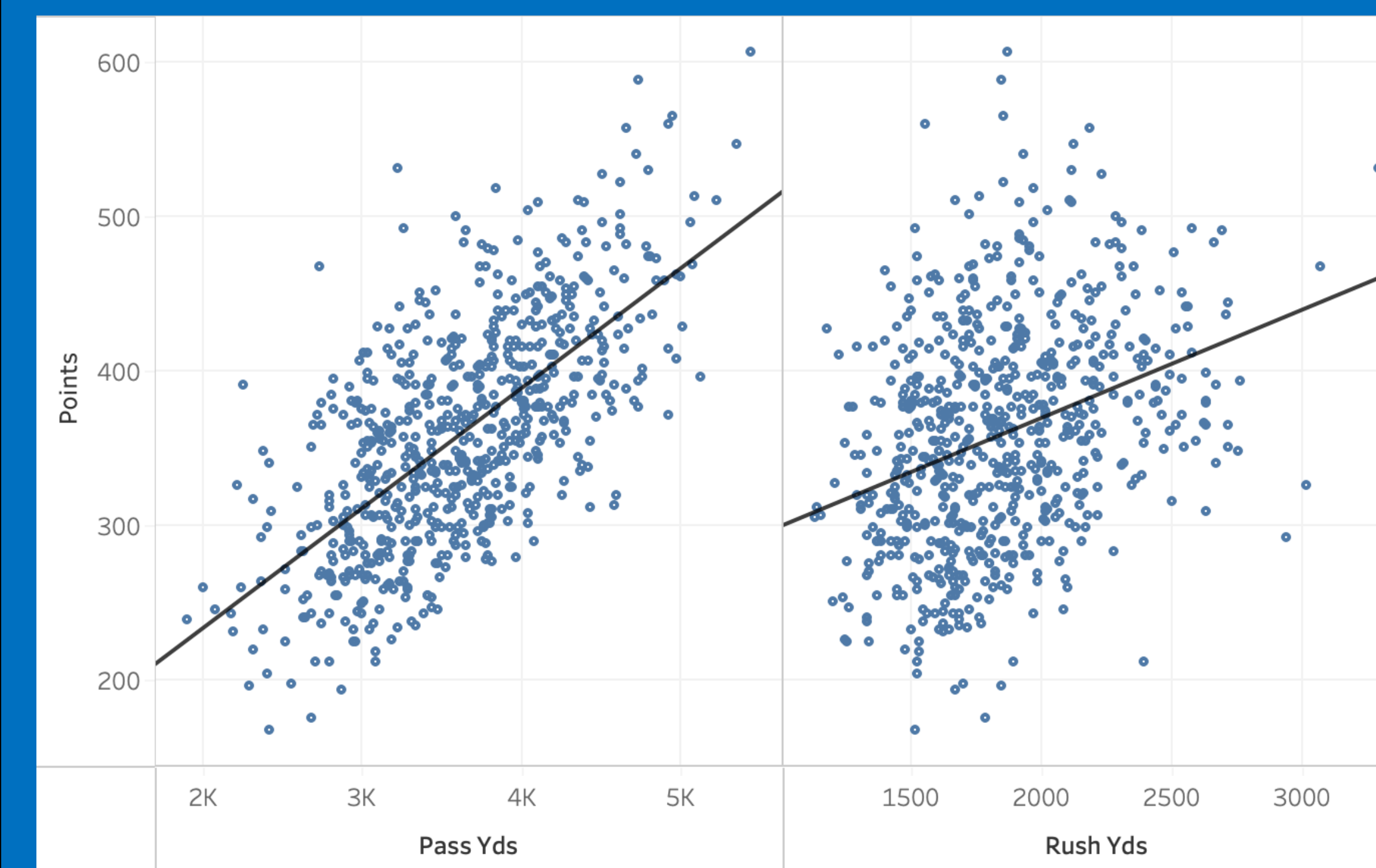
Methodology

- o I used a dataset from Kaggle (found here) which contains statistics about each NFL franchise from the 2003 to 2023 seasons.
- o My data analysis involved...
  - ➢ Utilizing Python to clean the data and generating visualizations using Matplotlib plus Tableau.
  - ➢ Checking to see how many missing values were present, and there were none.
  - ➢ Ensuring consistency by converting all former team names to their current names so that the statistics only reflect the existing 32 NFL franchises. (Example: Oakland Raiders are now the Las Vegas Raiders since 2020)

Results for Offensive Coordinators

Passing and Rushing Yards Impact on Total Points Scored (Linear Trendline)

- – This image shows how the quantity of passing/rushing yards versus the number of points scored over the past 20 years.

Passing and Rushing Yards Impact on Number of First Downs (Linear Trendline)

- – This image shows how the number of first downs gained relates to the amount of passing/rushing yards.

Number of Wins due to First Downs Gained

- – This image illustrates how the number of first downs gained relates to a possible range of wins (0–2, 3–5, 6–8, 9–11, 12–14, 15–17) a team may have when the regular season concludes.

Results for Defensive Coordinators

Pass TD-Int and Rush TD–Fumbles Lost Impact on Number of Loses

- – This image shows a possible range of losses (0–2, 3–5, 6–8, 9–11, 12–14, 15–17) due to their passing touchdown-interceptions and rushing touchdown-fumbles lost ratios on offense.

Total Number of Pass Plays from 2021–2023 for Each Franchise

- – These bar charts show the number of pass and run attempts for each team, from each division, over the past three years.

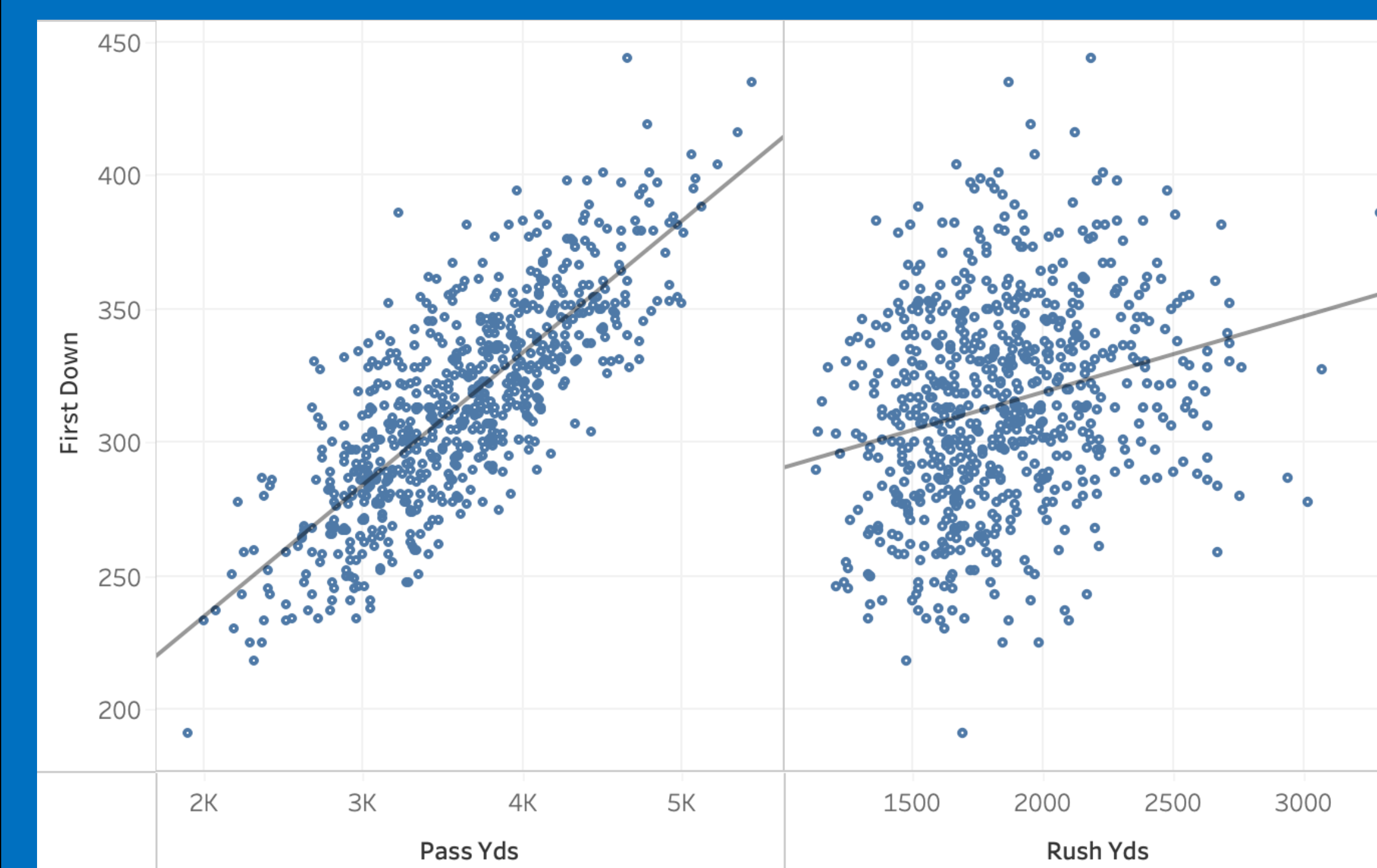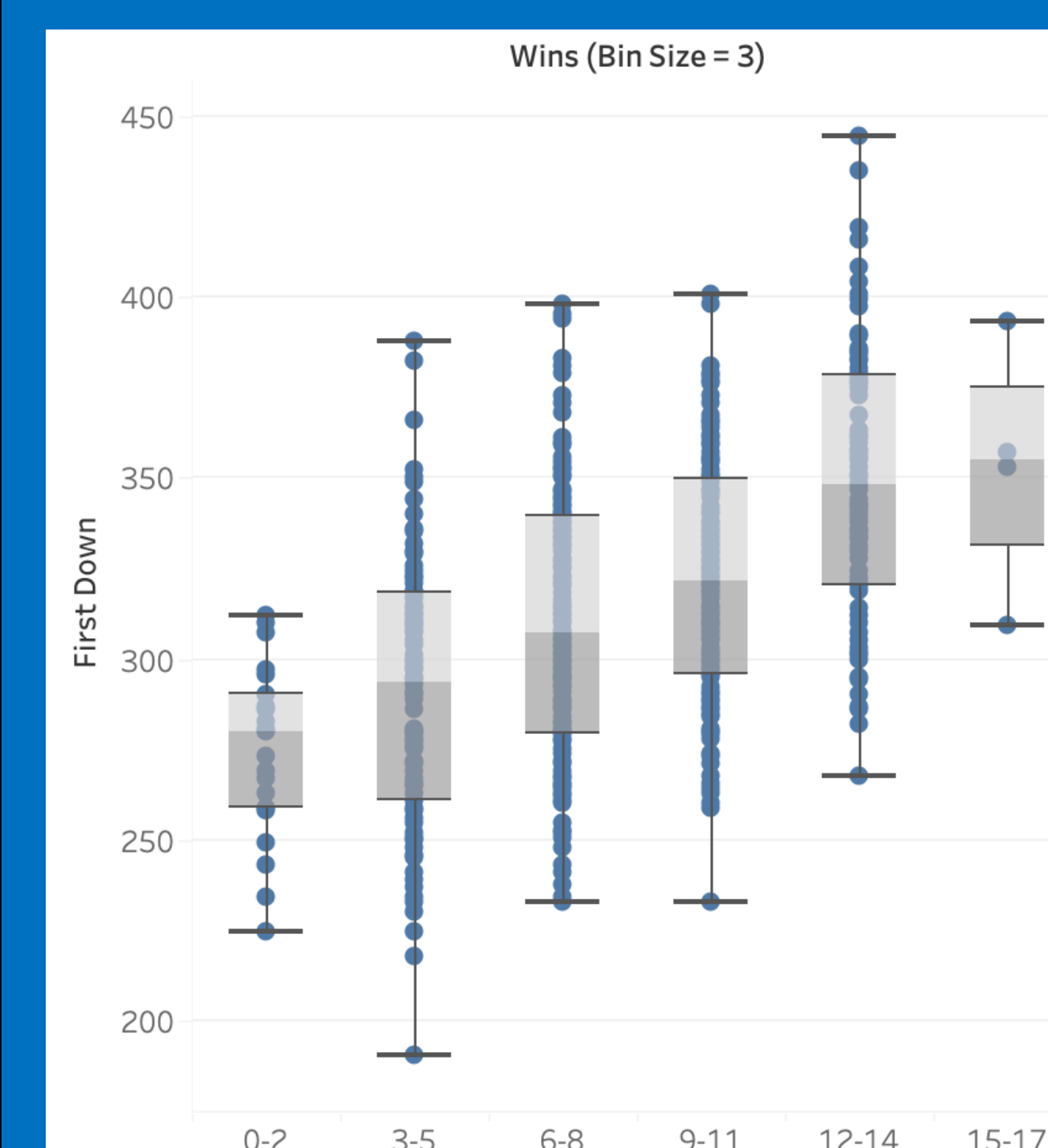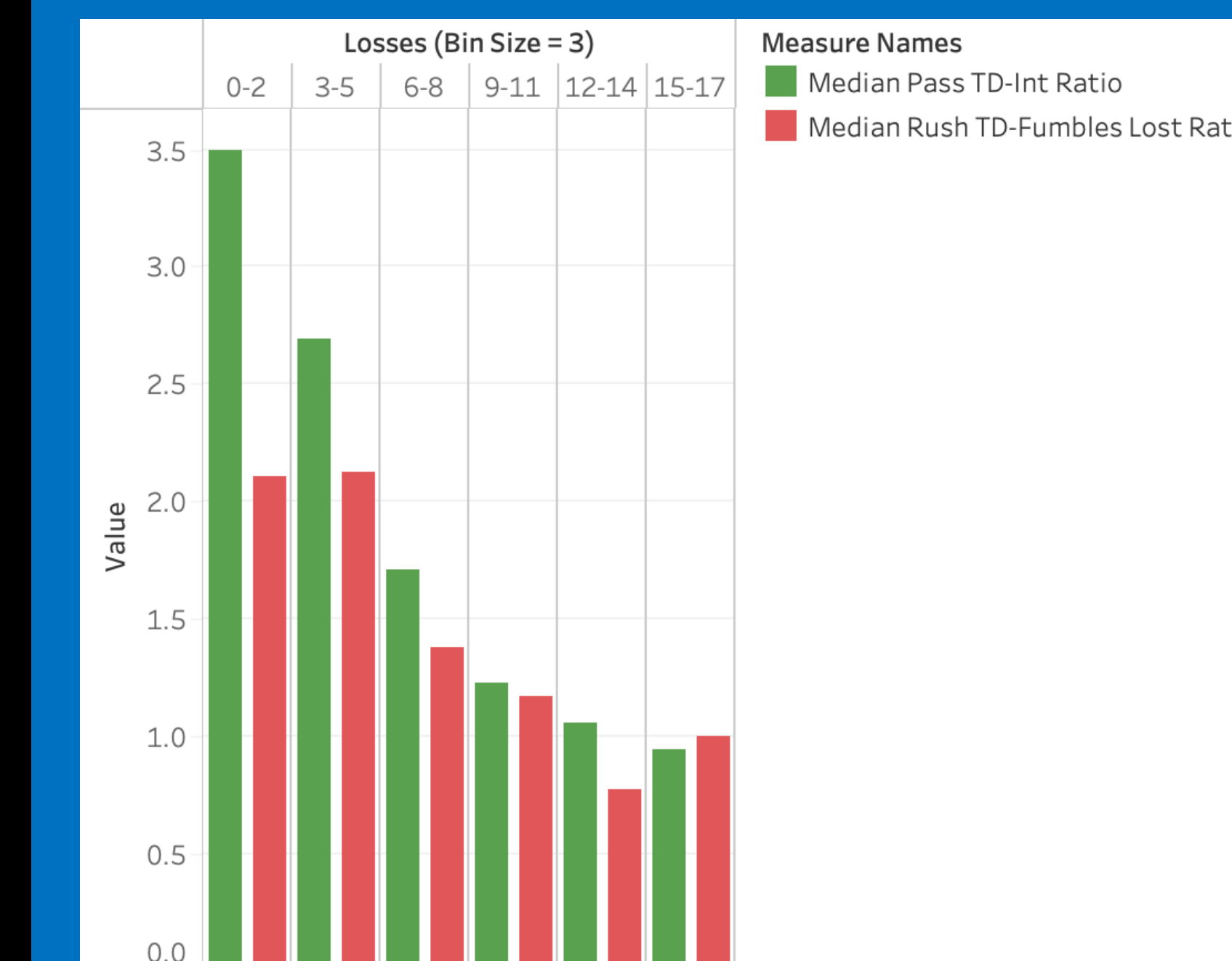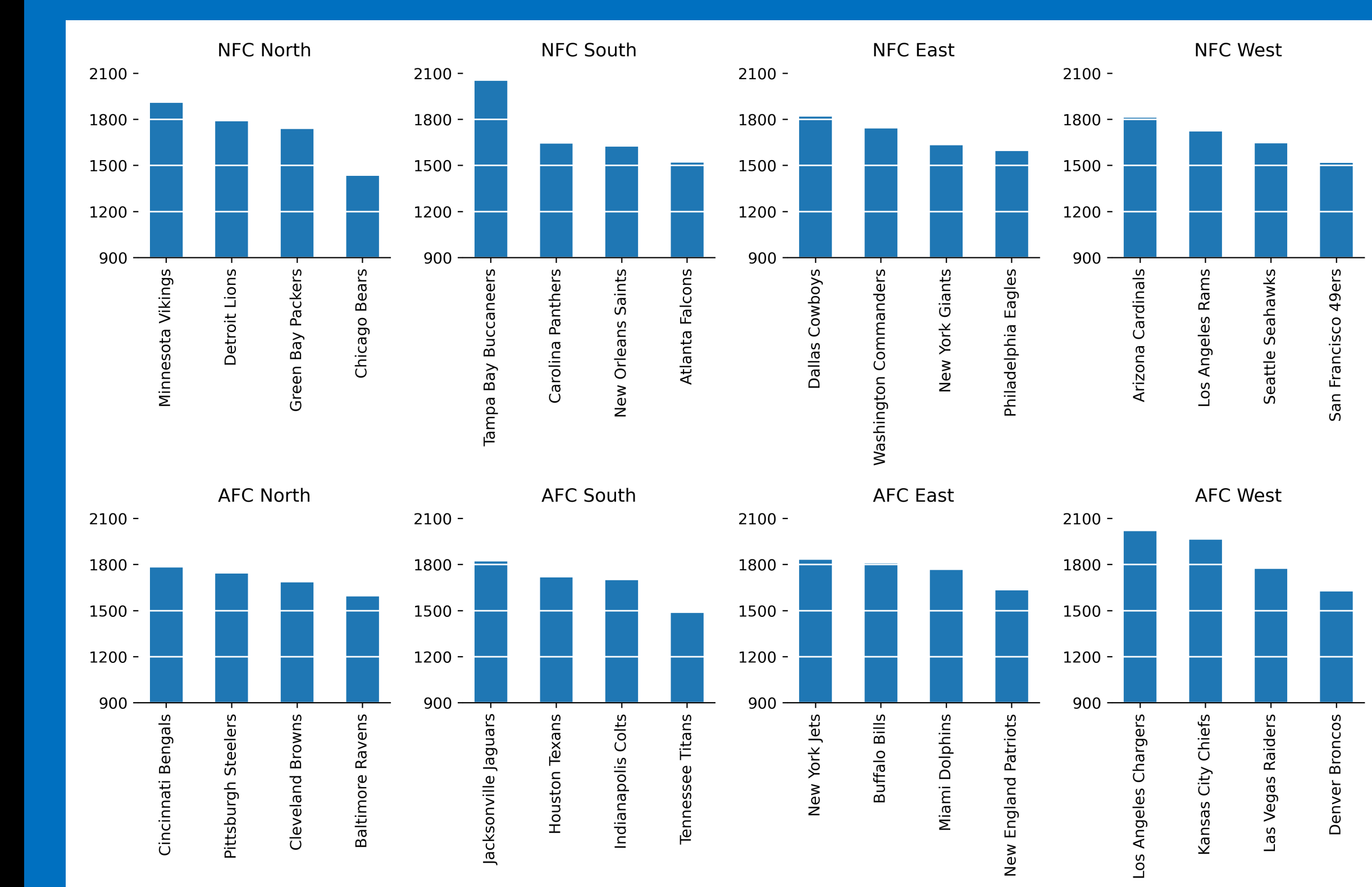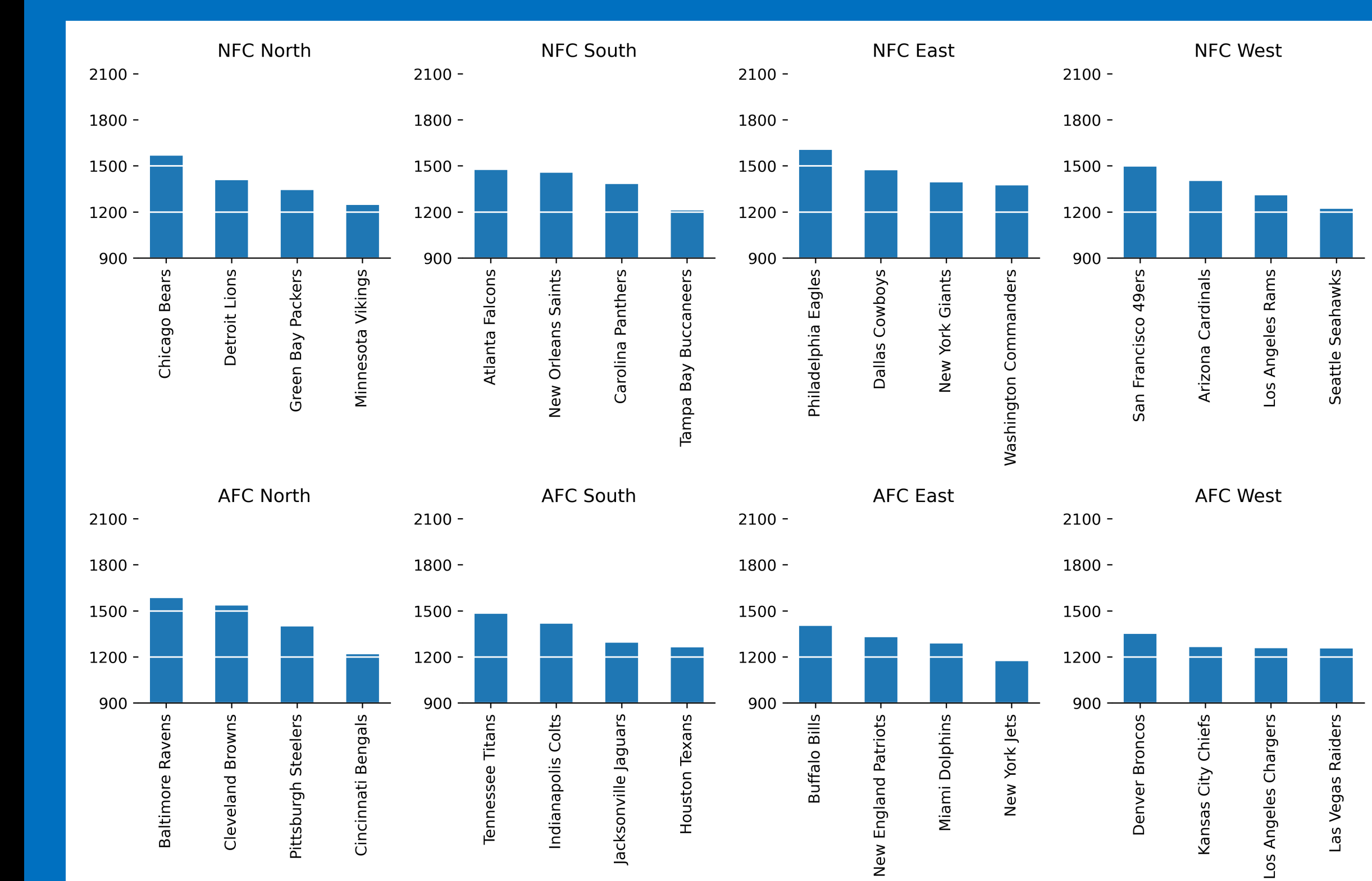Total Number of Run Plays from 2021–2023 for Each Franchise

Conclusion

1) One can argue that passing yards contribute to more points being scored than rushing yards.
2) Prioritizing passing plays, over rushing plays, tends to lead toward more first downs, which results in a higher chance of winning more games.
3) No matter the level of competition, prepare defenses for a more volatile and effective passing offense than a rushing offense.
4) On a week-by-week basis, defenses in today's NFL are more likely to face an offense that runs more pass plays rather than run plays.

For NFL offensive coordinators, (1) and (2) from the left show why offenses should prioritize pass-oriented offenses (over rush-oriented offenses) to have better chances at winning seasons.

For NFL defensive coordinators, (3) and (4) show that defenses should prepare more for the pass than the run as teams are throwing the ball in more quantity and with more efficiency.