NFL Hedge Strategy

Markus Fiordaliso

## Contents

1 Data

1.1 Missing Data

Bovada seems to be missing the most data. I will leverage Pinnacle due the legitimacy of the book, coupled with the relatively low levels of missing data.

Some scores are missing. After doing some research on a few of these instances, it looks like sportsbookreview is missing these scores even though the game took place. This can be expected to some degree since I didn't pay for the data. I will factor these out of the analysis
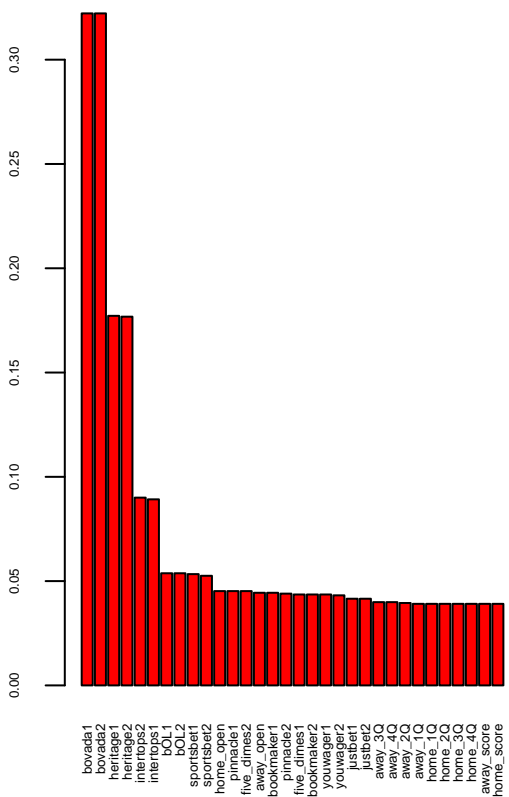
Combinations
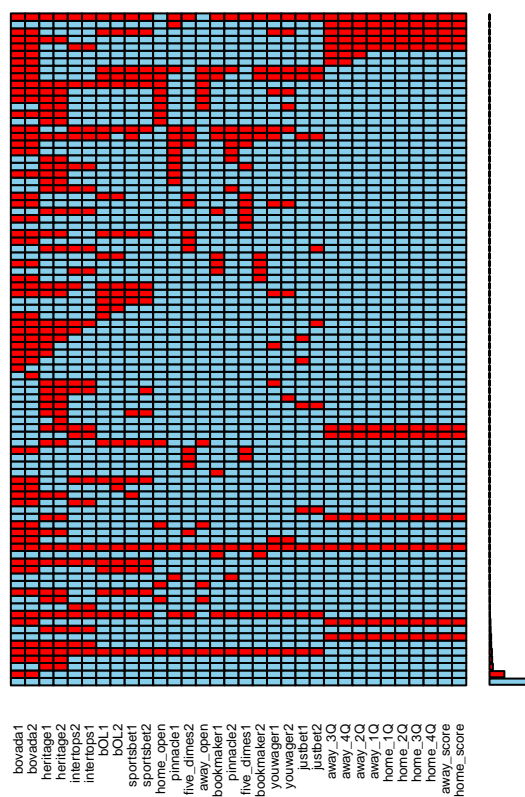
```
##
##  Variables sorted by number of missings:
##      Variable     Count
##       bovada1 0.32219959
##       bovada2 0.32219959
##      heritage1 0.17718941
##      heritage2 0.17678208
##     intertops2 0.09002037
##     intertops1 0.08920570
##           bOL1 0.05376782
##           bOL2 0.05376782
##     sportsbet1 0.05336049
##     sportsbet2 0.05254582
##      home_open 0.04521385
##       pinnacle1 0.04521385
##    five_dimes2 0.04521385
##      away_open 0.04439919
##     bookmaker1 0.04439919
##       pinnacle2 0.04399185
##    five_dimes1 0.04358452
##     bookmaker2 0.04358452
##      youwager1 0.04358452
##      youwager2 0.04317719
##       justbet1 0.04154786
##       justbet2 0.04154786
##        away_3Q 0.03991853
```

```
##      away_4Q 0.03991853
##      away_2Q 0.03951120
##      away_1Q 0.03910387
##      home_1Q 0.03910387
##      home_2Q 0.03910387
##      home_3Q 0.03910387
##      home_4Q 0.03910387
##   away_score 0.03910387
##   home_score 0.03910387
```

1.2 Tidy

2 Odds Overview

Exploring the frequency each odd occurs, as this will give me a better feel on how often I can execute strategies that might target specific odd thresholds. -200:200 is the most frequent odds, which is what I would expect.
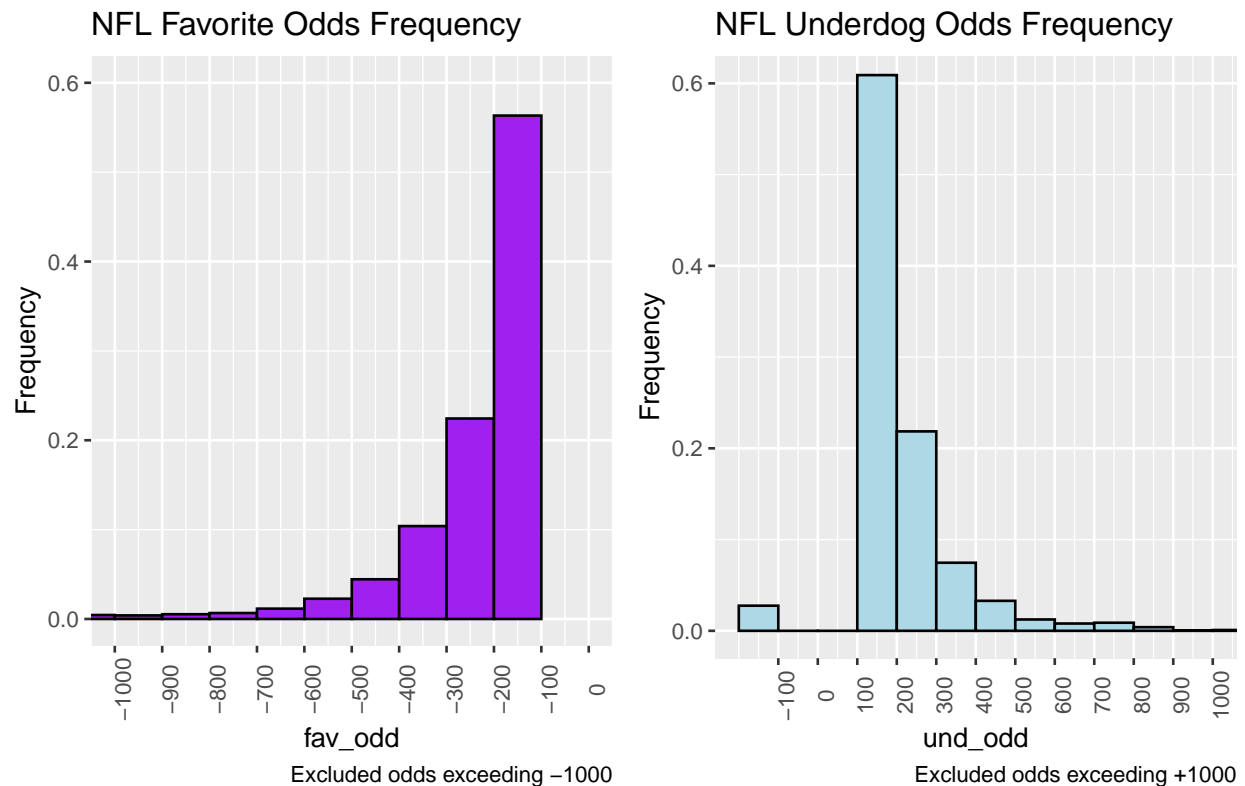

Books do not offer true odds since they are the ones who bear the risk. The books take a 5-10% cut on most bets as seen below. However, as the odds gap between teams increases, so does the cut that the book takes. This is to make up for the lack of liquidity on both sides of the bet, and reduce the overall risk that the book takes on.

Sports Book Spread per $1

Book Spread vs Odds Relationship
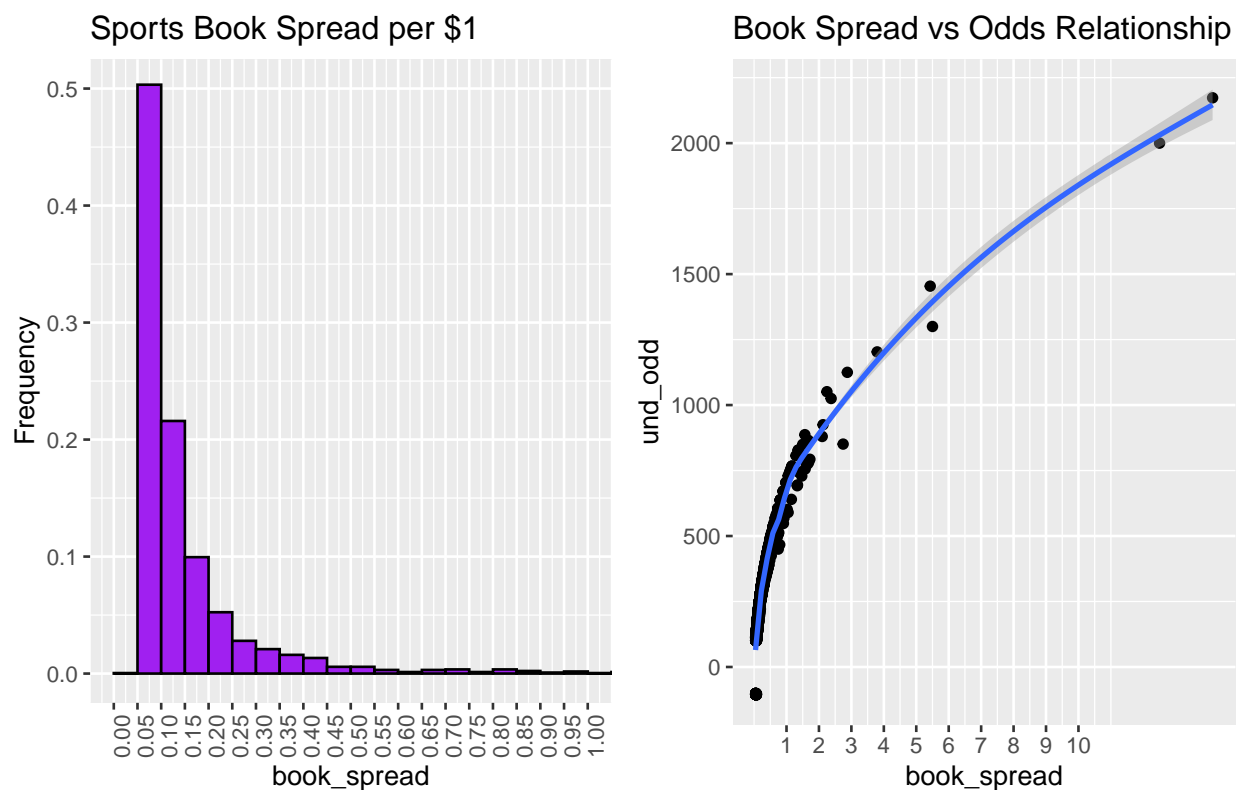
3   Score Volatility Strategy

Picking outright winners can be a challenging feat to generate sustainable profits. Instead I want to focus around hedging a bet during the game to lock in a profit, regardless of outcome. The hypothesis is that if a money line position is taken before a game, at some point the odds will improve and an opportunity will present itself to lock in a profit. Specifically, I want to focus on underdogs as this will provide more upside to guarantee a profit as seen below. However, I will look at both sides when digging into lead changes.

Odd & Profit Tradeoff
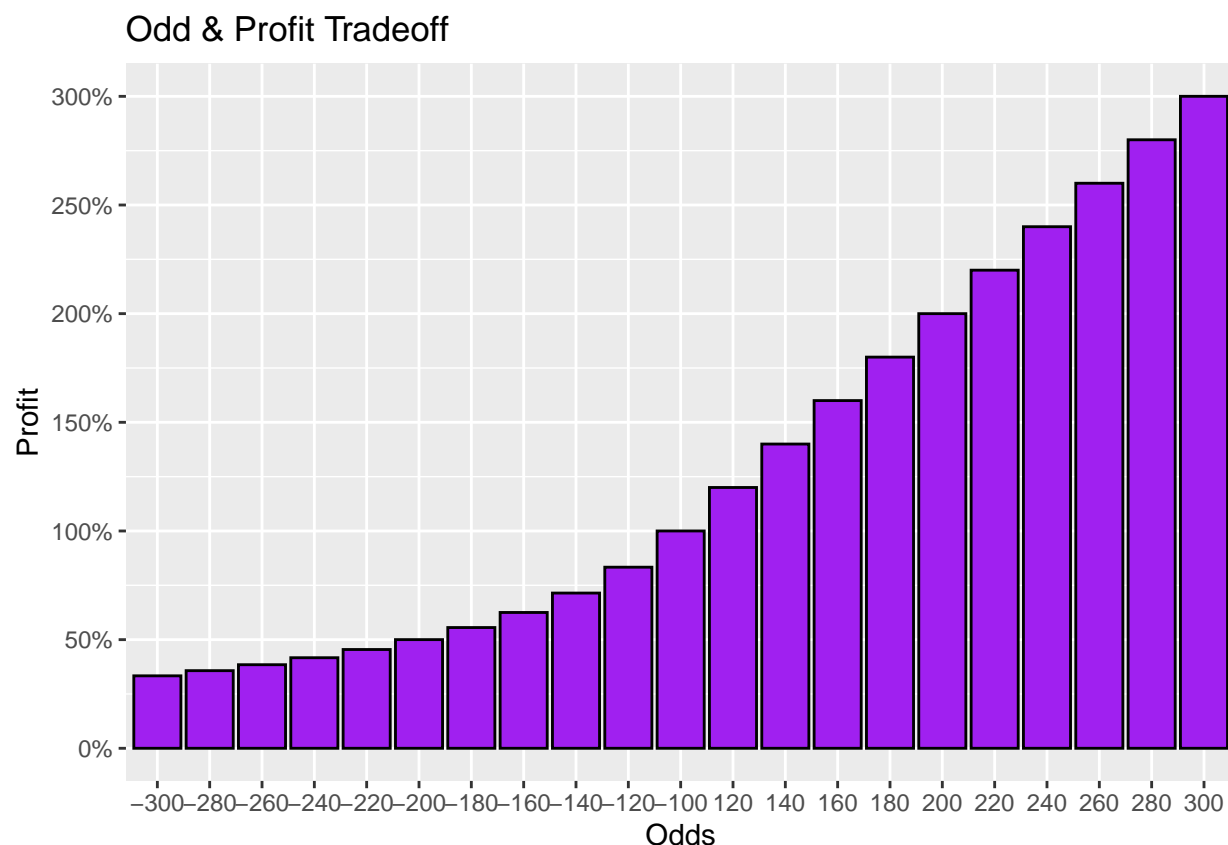

3.1 Lead Changes

Since I don't have access to historical live odds, I will use lead changes as a proxy to determine changes in odds. The magnitude of the change will be impossible to confirm with this data/approach, but directionally this should give me an idea on how successful this strategy may be. Also, it is important to note that I only have access to scores at the end of each quarter. As a result the true success of this strategy will be limited as I will not be able to capture all lead changes.

3.1.1 Quarters led per game

When looking at all games in this data set, there are a few important things to call out:

- 42.7% chance that the underdog doesn't lead a quarter
  - This means that an opportunity to hedge may not present itself
- 79.5% chance that the favorite leads at least 1 quarter
  - Opting to hedge the favorite would requires substantial success, because the margin for profit is significantly lower relative to betting the underdog

Baseline: Quarters led per game
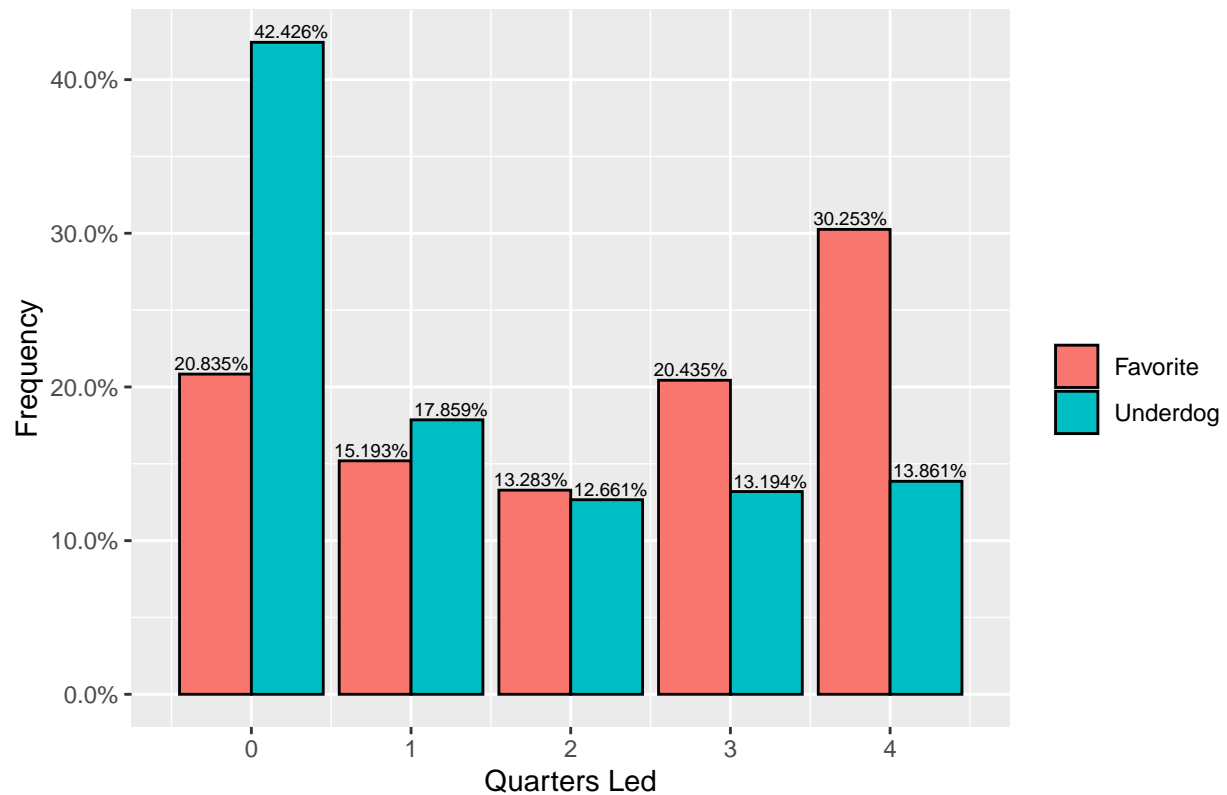
In the initial cut, I was looking at all odds and favorites. Now I will narrow the range to see if that improves the underdog's potential to lead for at least 1 quarter.

Unsurprisingly, the proportion of games that an underdog doesn't lead at least 1 quarter decreases significantly. Conversely, the proportion of games that a favorite leads all quarters also decreases significantly. As the odds range narrows, I would expect there to be closer games and more volatility throughout the game with respect to score.

Range: Quarters led per game
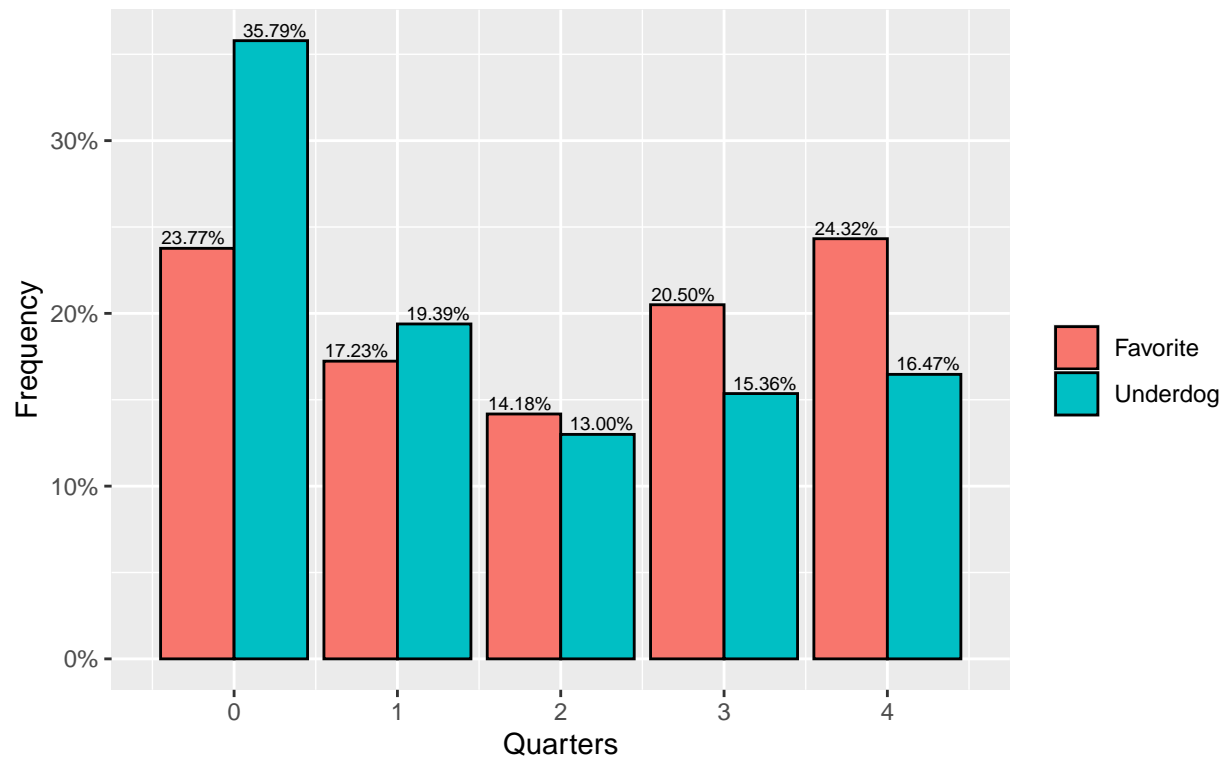
Only using odds −200 to 200

Range variance to Baseline
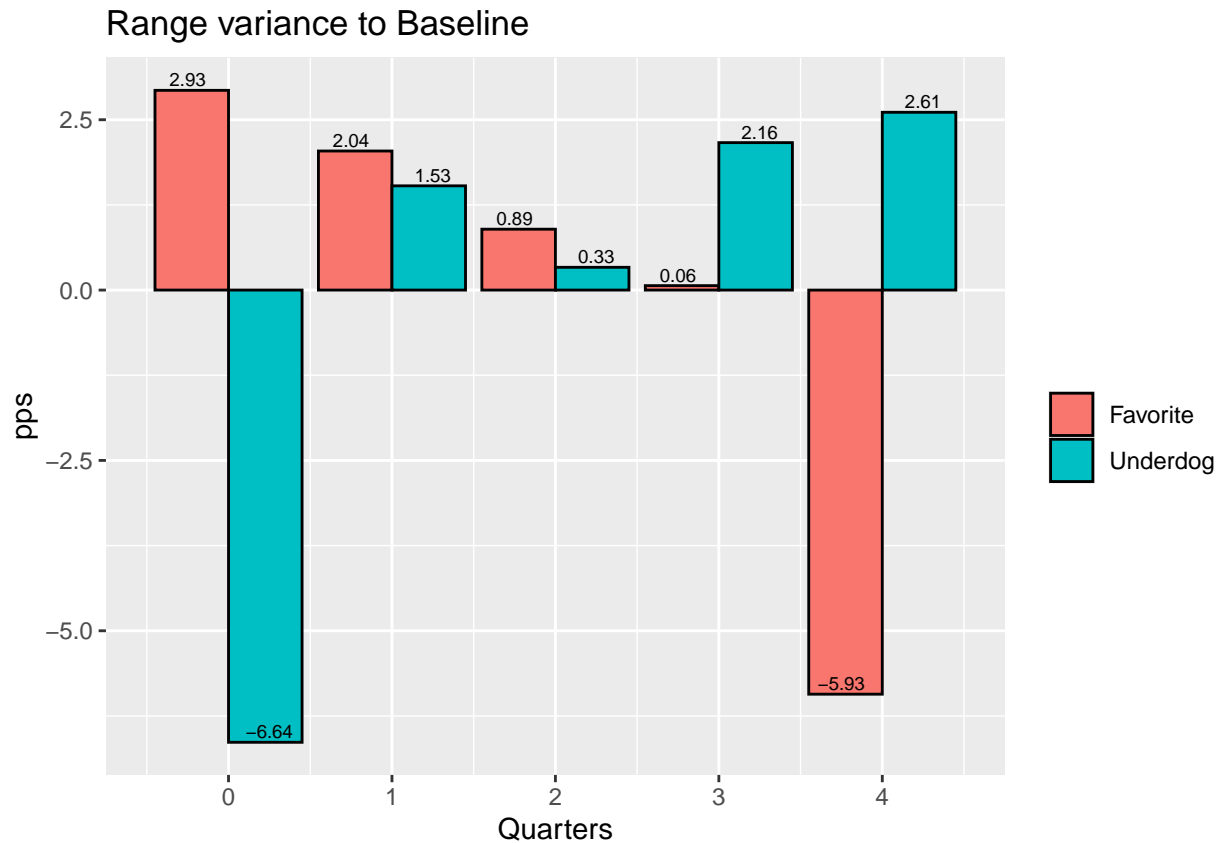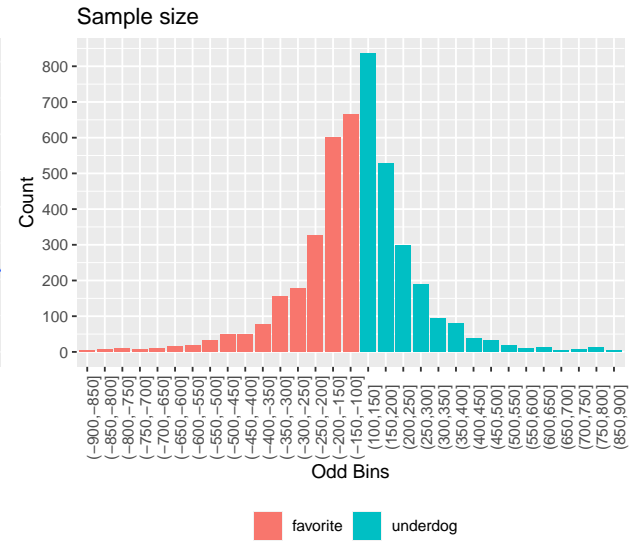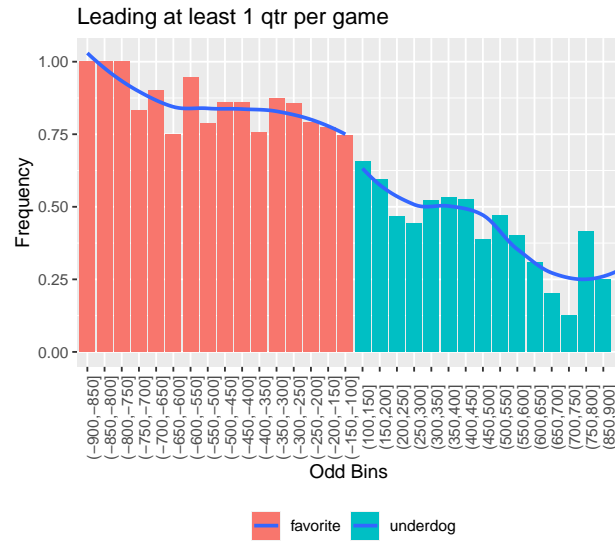

Lead at least 1 quarter

Since I don't care about the outright winner for this strategy, I only need 1 lead change to shift the odds in the favor of a bet to offer a hedge opportunity to lock in a profit.

```
##  [1] -900 -850 -800 -750 -700 -650 -600 -550 -500 -450 -400 -350 -300 -250 -200
## [16] -150 -100
```

To better see trends amongst the odds, I'm going to bucket the odds into bins and see how they perform.

As expected, there is a strong inverse relationship between the odds group and probaility that the group led at least 1 quarter. The correlation is -0.94. Overall, this relationship appears to be somewhat linear.

Given limited upside when betting large favorites, I want to focus on small favorites and small to medium underdogs. Also, the lack of a sample size with some of the more extreme odds is a factor into this decision.

3.1.2 When does lead change occur