How Important Is Week One of the NFL Season?

A Probability Model and Simulation

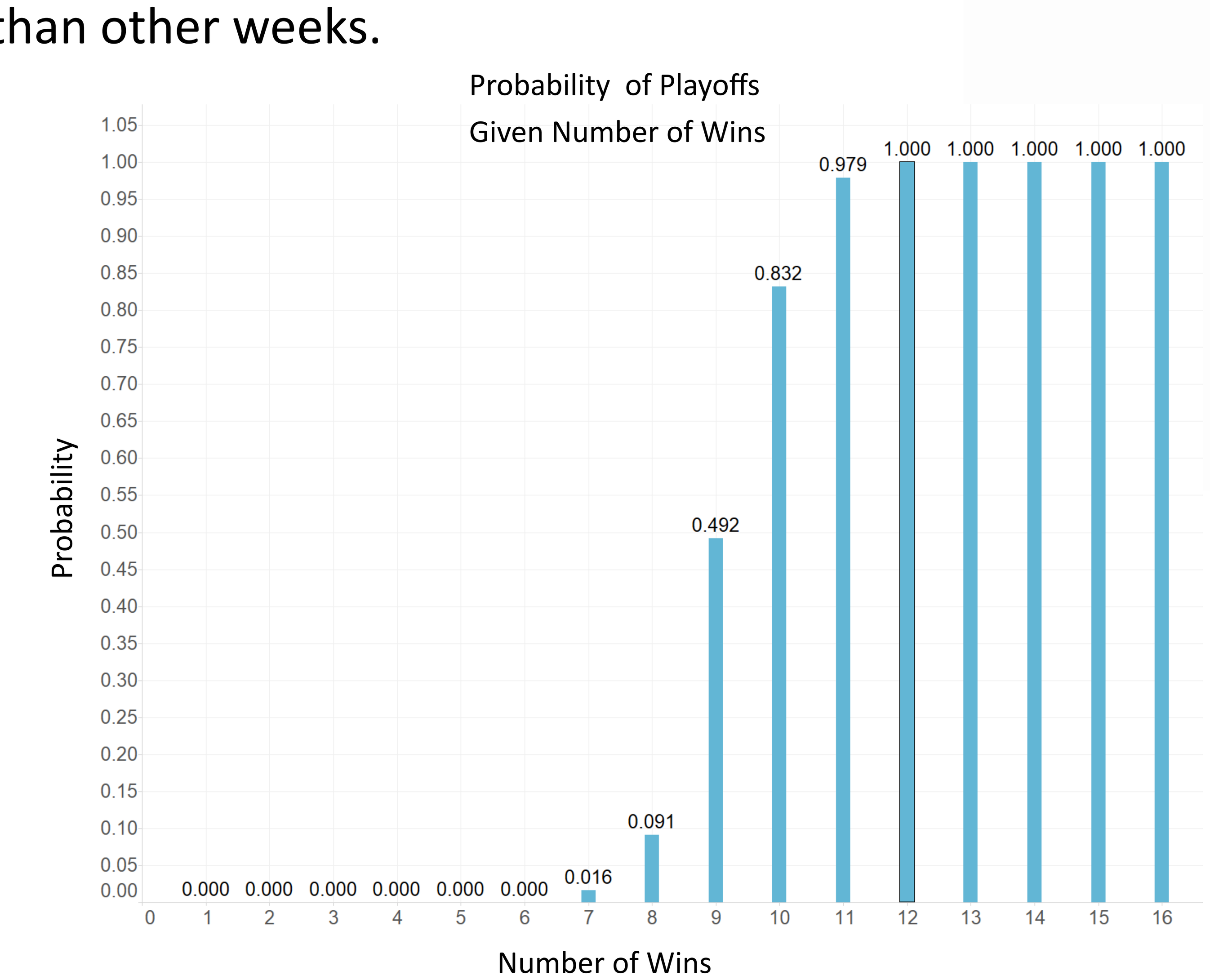
Statistical Analysis

Using data from 1978-2014, we calculated the probabilities that a team makes the playoffs given that they won in week one and the probability that they made it to the playoffs given they lost in week one.

Week	P(playoffs|win)	P(playoffs|loss)	chi square
1	0.532727273	0.24	98.1612
2	0.513661202	0.255009107	76.5211
3	0.54	0.21	114.7563
4	0.50712831	0.232179226	78.4736
5	0.512295082	0.256147541	66.5867
6	0.517525773	0.257731959	67.8606
7	0.526859504	0.22107438	95.3518
8	0.505175983	0.250517598	65.5435
9	0.530487805	0.243902439	83.9477
10	0.535573123	0.227272727	100.6195
11	0.519408503	0.249537893	82.1099
12	0.531992687	0.237659963	98.8462
13	0.515426497	0.254083485	78.3895
14	0.520072993	0.255474453	79.6937
15	0.528130672	0.245009074	91.9367
16	0.529945554	0.239564428	96.9126

The probability of playoffs given week one win averages 52.3% and probability of playoffs given week one loss averages 24.2%, both with little variance.

We performed a Chi Square test for independence and concluded that you are more likely to make it to the playoffs by winning in any week. Week One does not have any more significance than other weeks.



In the plot above, we see the probability of making it to the playoffs given that you won a certain number of games, which provides an interesting threshold; teams winning 10 games will most likely make the playoffs, while teams with 11 or more wins almost certainly reach the postseason.

In 2012, NFL Media Senior Analyst Gil Brandt stated:

"How important is Week 1? Since 1978, when the NFL went to the 16-game schedule, teams that are victorious on Kickoff Weekend are more than twice as likely to reach the playoffs than losers of the opening game."

The presentation of this statistic seems to imply that winning in week one is more important than winning in other weeks with respect to making the playoffs. This begs the question: is week one truly unique, or is this statistic something we could find across all weeks?

We consider two possible explanations to this statistic:

1) A **head start**: Teams that win in week 1 (or any other week) have a one game advantage over teams that lose in that week.

2) **An updated opinion**: Prior to the season starting, no one knows for sure how good a team will be. Teams that win in week one are more likely to be one of the strong teams than those who lost in week one.

Conclusion

Through our analysis and simulation, we were able to answer our initial question of the uniqueness of week one in that week one is not statistically different than other weeks. A win in week three, although it does not offer a significant increase, is most indicative of a team's probability of reaching the playoffs.

We found the probability that a team makes the playoffs given that they won week one was 0.5327 for past data and 0.5254 for our simulation, suggesting a reasonably accurate model.

While winning in week one will surely offer a higher probability of a playoff appearance based simply on the principle of a "head start", as shown in the simulation, an "updated opinion" affects the outcome of the playoff teams by suggesting the overall ability of the team.

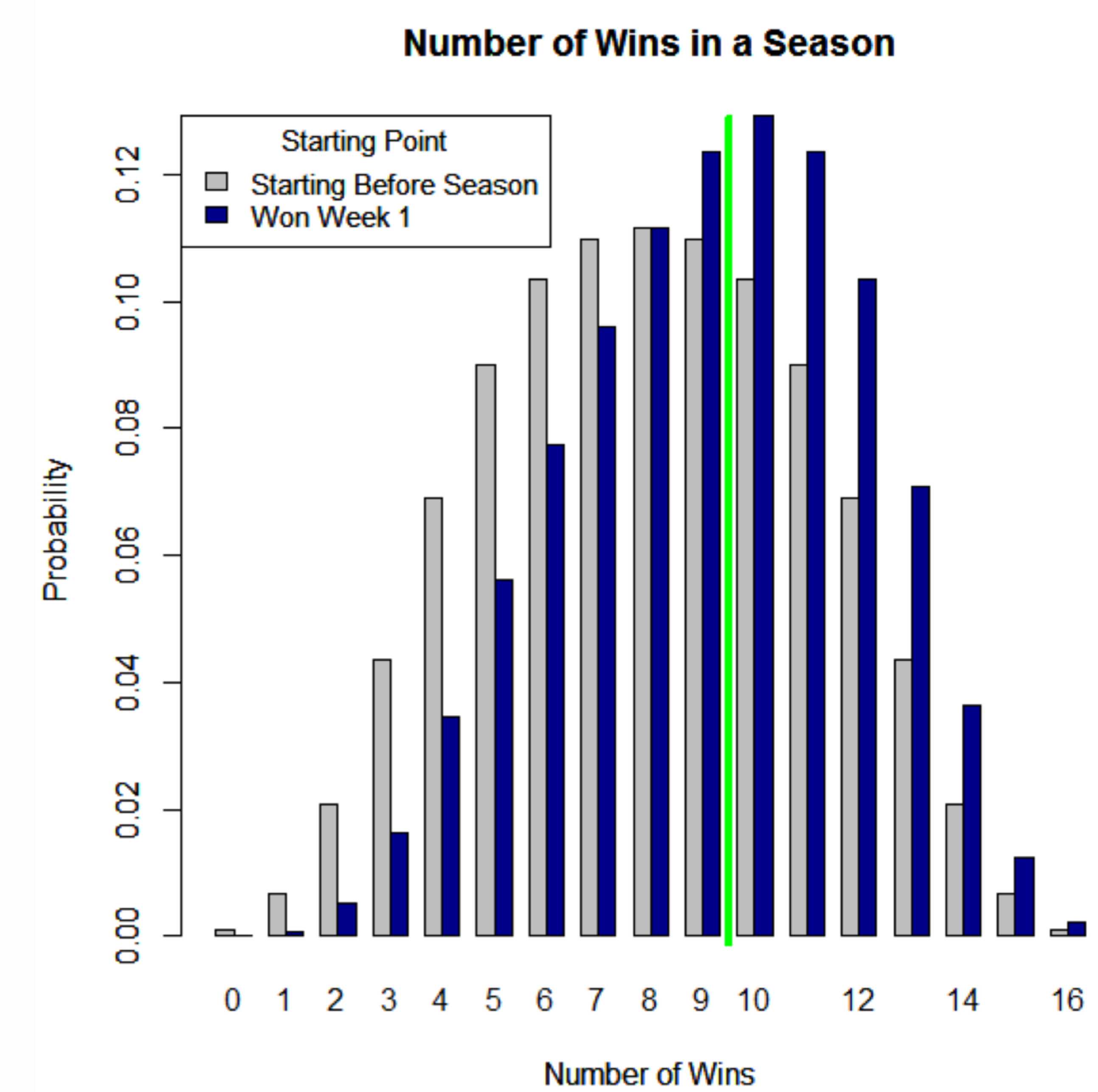
While a team that wins in week one has a greater probability of a playoff appearance than losing teams, we determined that Brandt's statement is indeed misleading, suggesting that week one can be used as an indicative metric for a team's playoff likelihood.

Simulation

In order to compare our analysis of the data and predictively model seasons, we constructed a win probability function that predicts the probability of a team ranked j to win against a team ranked k. We hypothesized that a team's win probability could be modeled by the equation below.

$$P_k(j) = \frac{j-k}{64} + \frac{1}{2}$$

By using the above function, we find the plot below, which compares probabilities of winning a certain number of games by assigning the above function given that they won week one (blue) to an assumed binomial distribution before the start of the season (gray).



By implementing a simulation of a regular season in which each team plays 16 randomly assigned games, we find the following probabilities of making the playoffs, given that a team won in week one.

Probability of Making the Playoffs Given Week One Win

Wins	0 wins	1 win	2 wins	3 wins	4 wins	5 wins	6 wins	7 wins
Probability	0	0	0	0	0	0	0	0
8 wins	9 wins	10 wins	11 wins	12 wins	13 wins	14 wins	15 wins	16 wins
0.0107	0.4194	0.9574	1.0	1.0	1.0	1.0	1.0	1.0