NFL Point Spreads and Game Scores - Identification

Review of inference for means and proportions

20 Questions:

1. What proportion of the time does the favored team actually win the game outright?

   CI for a proportion (one sample)

2. Is the chance the favorite covers the spread discernibly different from 0.50?

   Test for proportion (one sample)

3. How different is the average point spread when the favored team is playing at home as compared to the favorite playing on the road?

   CI for a difference in means (two samples)

4. Many football fans say that the home field advantage is about a field goal (three points). Is the average home margin (*HomeDiff*) discernibly different from three points?

   Test for a mean (one sample)

5. Is there convincing evidence that the average point spread assigned to the home team (*HomePts*) is different from three points?

   Test for a mean (one sample)

6. Estimate the mean difference between the point spread (*Pts*) and the actual margin for the favored team (*FavDiff*). Note that the margin will be negative if the favored team loses.

   CI for difference in means (paired data)

7. Is there convincing evidence that point spreads (*Pts*) tend, on average, to underestimate the margin for the favored team (*FavDiff*)?

   Test for a difference in means (paired data)

8. What is the average absolute value of the difference between the point spread (*Pts*) and the actual game margin (*FavDiff*)?

   CI for a mean (one sample)

Do point spreads get more accurate as the season goes along? Address this in two ways:

9. Is the proportion of games where the favored team wins higher during the second half of the season (weeks 10-18) than the first half of the season (weeks 1-9)?

   Test for a difference in proportions (two samples)

10. Refer to the absolute value of the difference between the point spread (*Pts*) and the actual game margin (*FavDiff*) from question #8. Is the average discrepancy smaller in the second half of the season than the first half?

    Test for a difference in means (two samples)

11. Some fans say they avoid choosing a favorite when the spread is double digits (more than 10 points). Is the proportion of favorites who cover discernibly less than 0.50 when the spread is more than ten points?

    Test for a proportion (one sample)

12. How often is the away team favored to win the game?

    CI for a proportion (one sample)

13. Is the mean number of points scored by the favored team higher in 2024 than in 2023?

    No statistical inference needed. We know the means in 2023 and 2024 exactly!

14. What is the average number of points scored by the winning team in NFL games?

    CI for a mean (one sample)

15. The weather is often more of a factor later in the season. How much does the mean number of points scored (both teams combined) compare between the first half of the season (weeks 1-9) and the second half (weeks 10-18)?

    CI for a difference in means (two samples)

16. The most common scoring events in football are a field goal (3 points) and a touchdown with an extra point (7 points). What proportion of point spreads are within ½ point of either 3 or 7 (i.e., 2.5, 3.5, 6.5, or 7.5)?

    CI for a proportion (one sample)

17. How much more (or less) often do favorites cover the spread when playing at home vs. favorites on the road?

    CI for a difference in proportions (two samples)

18. How often does the favorite win the game, but fail to cover the point spread?

    CI for a proportion (one sample)

Is there a home field advantage? Address this in two ways:

19. Compare the mean points scored by home teams to the mean points scored by away teams.

    Test for a difference in means (paired data using *HomeScore* and *Away Score*) or

    Test for a single mean (using *HomeDiff*)

20. Use how often the home team wins the game outright.

    Test for a proportion (one sample)