





**can nfl elo be used to predict point  
differentials?**

 **Why does point  
differential matter?**

**Sports Betting.**





**Oddsmakers in the NFL betting scene use point differential in betting lines, so being able to effectively predict point differential would allow an educated statistician to win lots of money in the betting market.**



**What is an elo  
rating?**

# What is an elo rating?

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- Elo is a measure of strength based on head-to-head results and quality of opponent
- Elo can be used in any head-to-head zero-sum game
- Used originally in chess
- Also used in:
  - Video games/board games
  - NFL, MLS
  - Curling
- An Elo rating is a comparative rating only, and is valid only within the rating pool where it's established.

# Elo in the NFL

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- Elo in the NFL
  - Adjustments
  - K-Factor
  - Forecast Delta
  - Quarterback adjustment
    - Pass Attempts, Completions, Passing Yards, Passing TDs, Interceptions, Times Sacked, Rush Attempts, Rushing Yards, Rushing TDs
  - **Margin-of-victory multiplier**
- Used to generate win probabilities that are surprisingly accurate for an oft random sport like football, scoring an 0.889 on a chi-squared test from the past three nfl seasons

**What is point  
differential?**

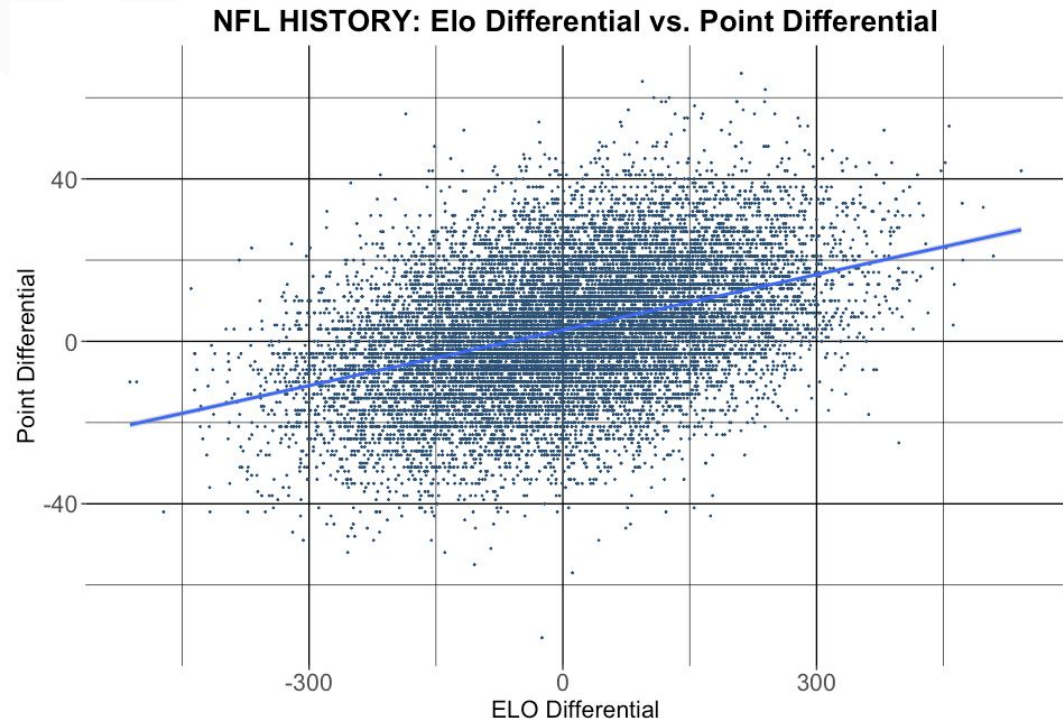
# point differential

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- Point differential is a measure of the difference between a teams points allowed and points scored.
  - Point differential is an important complimentary stat to win-loss, as it is the most basic predictor of future performance
- Point differential affirms the efficacy of win-loss
- There are a lot of things that we can ascertain by comparing win-loss to point differential
  - If Point Differential  $>$  Win-Loss, the team should have a higher win-loss
    - They are closely losing some games and winning some games by a large margin
  - If Point Differential  $<$  Win-Loss, the team should have a lower win-loss
    - They lost some games by a lot, and barely won some games



# nfl history data



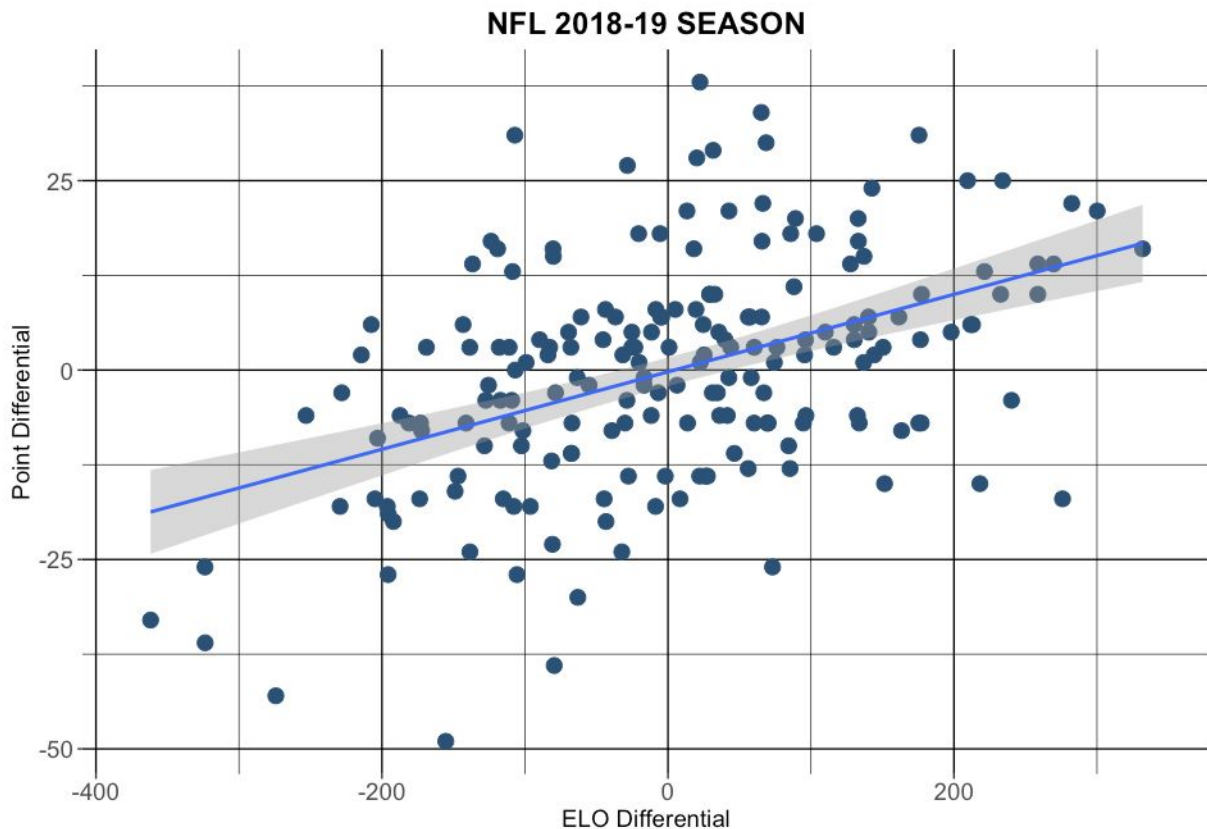
# 2018-19 season data

A small but noticeable  
correlation between point  
differential and elo differential

Logical thought that bigger elo  
differential = bigger point  
differential

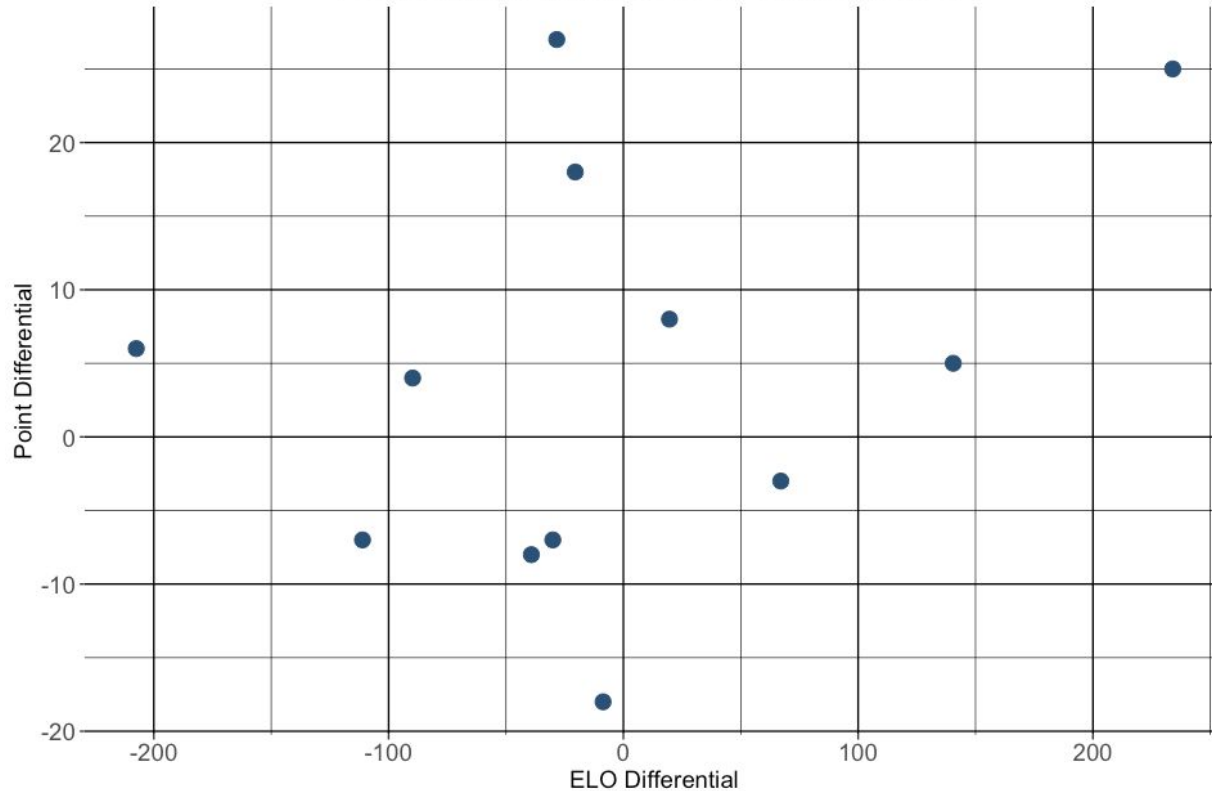
While there is a correlation, there  
is no data accuracy

No specific elo differentials lend  
themselves to any specific point  
differentials



# 2018-19 eagles snapshot

Phillidelphia Eagles 2018-19 Season, 9W-7L



Elo differential and  
point differential  
have seemingly no  
correlation with each  
other on a single  
small scale

Average team in an  
average year.

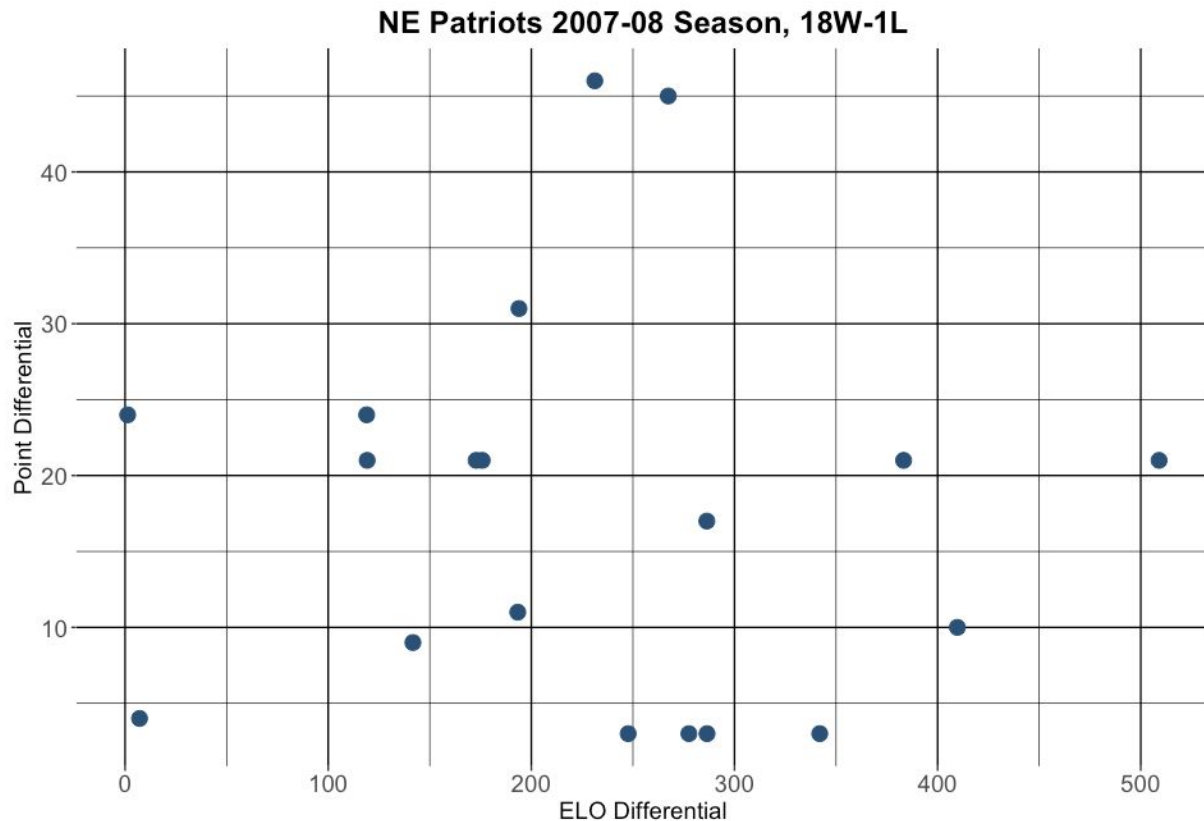
# 2007 pats snapshot



One of the best modern seasons of NFL Football.

They never lost (until the superbowl) and were never a lower rated team, making our data much easier to interpret.

Even here, there's no correlation between Elo Differential and Point Differential



# context for the 2007 pats

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- 16 wins and **no losses** in the regular season
- Higher elo than opponent in every game
  - Higher QB elo than opponent in every game
- Won first two rounds of the playoffs, lost in Superbowl
- Demolished numerous NFL records
  - including those for touchdowns (75)
  - points scored (589)
  - **point differential (+315)**
- Two 50+ point wallops
  - 52 - 7 vs. Washington Redskins
  - 56-10 vs. Buffalo Bills

what does this  
mean

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# what does this mean

While we can confidently say that bigger elo differentials means bigger point differentials, there is no evidence that this matters on a smaller scale.

The only application of point differential predictions is to sports betting, and without fairly pinpoint accuracy, any statistics are rendered useless.

# sources

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fivethirtyeight nfl elo history: <https://github.com/fivethirtyeight/data/tree/master/nfl-elo>

fivethirtyeight nfl elo 2018-19 season: <https://github.com/fivethirtyeight/data/tree/master/nfl-elo-latest>

pro football reference dataset: <https://www.pro-football-reference.com>

Wadsworth, Christina, and Francesca Vera. "Predicting Point Spread in NFL Games."

Vaziri, Baback, et al. "Properties of sports ranking methods." Journal of the Operational Research Society 69.5 (2018): 776-787.

Ziemba, William T., and Leonard C. MacLean. "Elo Team Strength Ratings: Two Versions." World Scientific Book Chapters (2018): 73-82.



thanks for listening

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any questions?