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The Impact of Defensive Pressure on NFL Win Probability

Stakeholders

The primary stakeholders are NFL defensive coordinators and analytics staff. Defensive coordinators and analysts need clear evidence on which defensive actions meaningfully change win probability. With every win affecting playoff odds and job security, understanding the true value of sacks, turnovers, and home-field context is critical.

Problem and Decision

The core question is: How do defensive sacks and defensive turnovers increase a team's likelihood of winning an NFL game, and does home-field advantage meaningfully change the picture? The decision informed by this analysis is how much emphasis teams should place on generating pressure and turnovers when building defensive strategy. A good decision would correctly weigh each defensive lever and adjust game plans.

Data

Using the cleaned CP4 dataset, each row represents a team game from the 2020-2024 regular season NFL games, with no major filters applied.

Approach

I ran a logistic regression predicting whether a team won the game using three inputs: sacks, turnovers, and home/away status.

Key Result

Turnovers increase win probability by ~9 percentage points, and sacks add ~7 percentage points each, while home-field advantage provides an additional ~5-point boost. These are large enough effects that a coach can change win probability by emphasizing pressure and takeaway-focused defensive schemes.

One Key Exhibit

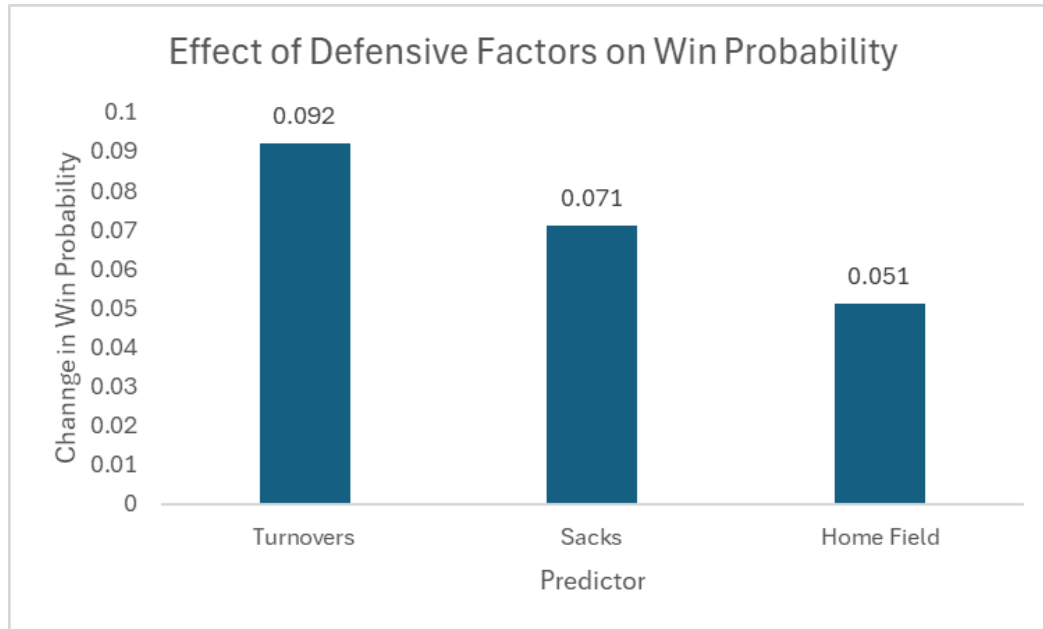


Figure 1. Effect of Defensive Factors on Win Probability

Turnovers are the strongest driver of wins, followed by sacks and home-field advantage.

Recommendation

Increase emphasis on defensive strategies for generating takeaways and consistent pass rush pressure. Start by integrating takeaway and pressure scenarios/drills in weekly practices. Success can be measured by improvement in sack rate and takeaway count over the next 4-6 games.

Risk & Limits

- Offensive context missing
 - The model excludes offensive performance, which could influence how impactful defensive stats appear
- Turnovers treated equally
 - Interceptions and forced fumbles are grouped together, though their win impact likely differs

Next Steps

1. Add the win probability taken before each game to see how the defensive predictors affect it
2. Refine the model by separating turnovers into interceptions vs. forced fumbles to see which truly drives win probability