

Quantifying and Comparing the Level of Success Achieved by NFL Teams

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Abstract

With five Super Bowl wins since 2001 the New England Patriots of the National Football League (NFL) have enjoyed good success during this time period. As New England and the Philadelphia Eagles prepare to meet in the Super Bowl, it is an opportunity to quantify three metrics of team success and analyze these metrics to understand the long-term success of not only these two teams, but of all NFL teams. This analysis is done for the 18 seasons played this century.

Results for the first metric of regular season wins show three teams from the American Football Conference—New England, Pittsburgh and Indianapolis—have enjoyed the most success. Green Bay and Philadelphia, both from the National Football Conference, have the next most wins. Cleveland and Detroit have been the least successful with the fewest regular season wins over this time.

Beyond this straightforward metric, we define a new success metric with levels that largely correspond to qualification and advancement in the playoffs. Using this metric, New England and Pittsburgh are again the two most successful teams with Green Bay ranked third. Philadelphia is currently ranked sixth, but would move to fifth with a Super Bowl Championship. Cleveland and Buffalo have had the least levels of post-season success, despite Buffalo making the playoffs this season.

The availability of these two success metrics allows for comparison of team performance between them. While there is a strong correlation between the two metrics, there is variation in the level of post-season success relative to regular season performance. In particular, despite having the best regular season performance, New England's level of post-season success has been even better than expected. Seattle's performance is next best for this relative metric. In contrast, Miami, Dallas and Buffalo have similar levels under-performance with regular season performance not leading to corresponding post-season qualification or advancement.

1 Introduction

With five Super Bowl wins since 2001 the New England Patriots of the National Football League (NFL) have enjoyed good success during this time period. As New England and the Philadelphia Eagles prepare to meet in the Super Bowl, it is an opportunity to quantify different metrics of team success and apply these metrics to understand the long-term success of not only these two teams, but of all NFL teams.

In looking at team performance, we use the 2000 NFL season as a starting point as it represents the 18 seasons of the current century during a period of time when the number and locations of NFL teams has been relatively stable. The only changes during this time are that the Houston Texans joined the league as the 32nd franchise in 2002 and two franchises—the Rams (from St. Louis) and the Chargers (from San Diego)—have relocated to Los Angeles in recent years.

Our work quantifies and analyzes three metrics for evaluation of team success:

1. regular season performance measured in the number of team wins,
2. post-season performance largely based upon levels of success for playoff qualification and advancement, and
3. relative performance of teams on the two prior metrics.

In carrying out this work, we first gathered data on regular and post season results for each team. We then analyzed the data for each of the three success metrics and present the results. We conclude with a summary of the work as well as directions for future work.

2 Results

2.1 Regular Season Success

The first success metric is to simply determine the number of regular season wins for each team over the 18 seasons. For purposes of analysis, games ending in a tie are treated as half of a win. Table 1 shows the rank-ordered results based upon the average number of regular season wins for each of the 32 NFL teams in a 16-game season. The median number of seasonal wins is also shown. Results for the Houston Texans are averaged across the 16 seasons of their franchise existence with results for different franchise locations combined for the Rams and Chargers.

The results show that New England, Pittsburgh and Indianapolis (all from the American Football Conference (AFC)) have averaged the most regular season wins during this time. New England has averaged 1.5 wins more per regular season than the second-ranked team. Green Bay and Philadelphia are top-ranked from the National Football Conference (NFC).

At the other end of the rankings, the Cleveland Browns have been the least successful NFL team this century averaging more than one regular season win less than the next lowest rank team, the Detroit Lions. Oakland, Jacksonville and Buffalo are the other teams with the worst regular season performance.

Table 1: Regular Season Wins

Rank	Team	Ave.	Median
1	New England Patriots (NE)	11.89	12.00
2	Pittsburgh Steelers (PIT)	10.47	10.75
3	Indianapolis Colts (IND)	10.00	11.00
4	Green Bay Packers (GB)	9.92	10.00
5	Philadelphia Eagles (PHI)	9.58	10.00
6	Denver Broncos (DEN)	9.39	9.00
7	Baltimore Ravens (BAL)	9.22	9.50
8	Seattle Seahawks (SEA)	8.97	9.00
9	New Orleans Saints (NO)	8.72	8.00
10	Atlanta Falcons (ATL)	8.36	8.50
11	Dallas Cowboys (DAL)	8.33	8.50
12	New York Giants (NYG)	8.28	8.50
13	Minnesota Vikings (MIN)	8.19	8.00
14	Carolina Panthers (CAR)	8.08	7.25
15	Los Angeles Chargers (LAC)	8.06	8.50
16	Tennessee Titans (TEN)	7.89	8.00
17	Kansas City Chiefs (KC)	7.89	8.50
18	Cincinnati Bengals (CIN)	7.69	8.00
19	New York Jets (NYJ)	7.61	8.50
20	Miami Dolphins (MIA)	7.61	7.50
21	Chicago Bears (CHI)	7.61	7.00
22	San Francisco 49ers (SF)	7.31	7.00
23	Arizona Cardinals (ARI)	7.19	7.25
24	Tampa Bay Buccaneers (TB)	7.00	7.00
25	Houston Texans (HOU)	6.88	6.00
26	Washington Redskins (WAS)	6.81	7.00
27	Los Angeles Rams (LAR)	6.81	7.00
28	Buffalo Bills (BUF)	6.72	7.00
29	Jacksonville Jaguars (JAX)	6.44	6.00
30	Oakland Raiders (OAK)	6.33	5.00
31	Detroit Lions (DET)	5.83	6.00
32	Cleveland Browns (CLE)	4.78	4.50

2.2 Post-Season Success

While the regular season success is important, the lasting impact for players and fans is what happens in the playoffs. Taking this viewpoint to the extreme, post-season success could simply be determined by the winner of the Super Bowl. While certainly the goal of all teams, using it as the only metric ignores season successes that other teams experience. In our work, we choose to define levels of success largely based on the post-season performance, but giving a small credit to teams with winning regular season records who do not qualify for the playoffs.

Using this approach we define six levels of success for a team based largely on the playoff round reached by a team:

1. Non-Playoff Team, but Winning Regular Season Record,
2. Wildcard Playoff Round,
3. Divisional Playoff Round,
4. Conference Final Game,
5. Super Bowl, and
6. Champion.

Teams with a non-winning regular season record and not reaching the playoffs have no level of success by this metric. The first level of success is reached by teams that have a winning regular season record, but do not qualify for the playoffs. In the 18 seasons we studied, there were between one and five teams in a given year that reached this level.

The remaining levels correspond to how far teams advance in the playoffs. Based on how the playoffs are structured, four teams reach the second level, four reach the third level, two the fourth level, one team reaches the Super Bowl and one team is the Champion.

In evaluating the success of each team for this metric, we associate the level number for each team in a given season with the Super Bowl Champion receiving a value of six. For purposes of analysis, in the current 2017 season with the outcome of the Super Bowl still to be determined we assigned a value of 5.5 to each of New England and Philadelphia as one will become the Champion and one will have reached the Super Bowl.

Similar to Table 1, Table 2 shows the rank-ordered results based upon the average level of post-season success reached for each of the 32 NFL teams. The median level of success is also shown.

Once again, New England is ranked first with the highest level of post-season success with an average and median level of reaching the Conference Final (level 4) each year. Pittsburgh has the next highest average level of success followed by Green Bay, Indianapolis, Seattle and Philadelphia (which would move up with a Super Bowl win).

Cleveland again has the least amount of post-season success based on this metric having only reached the playoffs once and having one other winning season this century. Buffalo is next lowest having reached the playoffs for the first time in the century this season with two previous winning seasons. Detroit, Jacksonville and Washington are the remaining lowest-ranked teams when considering post-season success despite Jacksonville reaching the Conference Final Game this year.

Table 2: Level of Post-Season Success

Rank	Team	Ave.	Median
1	New England Patriots (NE)	3.97	4.00
2	Pittsburgh Steelers (PIT)	2.56	2.50
3	Green Bay Packers (GB)	2.33	2.50
4	Indianapolis Colts (IND)	2.28	2.00
5	Seattle Seahawks (SEA)	2.22	2.50
6	Philadelphia Eagles (PHI)	2.19	2.00
7	Baltimore Ravens (BAL)	2.17	2.50
8	Denver Broncos (DEN)	1.83	1.50
9	New York Giants (NYG)	1.67	1.00
10	Atlanta Falcons (ATL)	1.50	0.50
11	New Orleans Saints (NO)	1.39	0.00
12	Carolina Panthers (CAR)	1.39	0.00
13	Minnesota Vikings (MIN)	1.28	0.50
14	Los Angeles Chargers (LAC)	1.22	1.00
15	New York Jets (NYJ)	1.17	0.50
16	Tennessee Titans (TEN)	1.11	0.00
17	Kansas City Chiefs (KC)	1.06	0.50
18	Dallas Cowboys (DAL)	1.06	0.50
19	San Francisco 49ers (SF)	1.00	0.00
20	Tampa Bay Buccaneers (TB)	0.94	0.00
21	Chicago Bears (CHI)	0.94	0.00
22	Los Angeles Rams (LAR)	0.83	0.00
23	Arizona Cardinals (ARI)	0.83	0.00
24	Houston Texans (HOU)	0.81	0.00
25	Oakland Raiders (OAK)	0.78	0.00
26	Cincinnati Bengals (CIN)	0.78	0.00
27	Miami Dolphins (MIA)	0.67	0.00
28	Washington Redskins (WAS)	0.56	0.00
29	Jacksonville Jaguars (JAX)	0.56	0.00
30	Detroit Lions (DET)	0.44	0.00
31	Buffalo Bills (BUF)	0.22	0.00
32	Cleveland Browns (CLE)	0.17	0.00

2.3 Comparing Regular and Post Season Success

Comparison of ranking results in Tables 1 and 2 shows an expected correlation between teams experiencing regular and post season success as the former is needed before the latter is possible. However, there is some variance in the relative ranking of teams between the two metrics, which we explore as a third metric of comparison.

The approach we use is to compare the average number of regular season wins from Table 1 with the average level of post-season success from Table 2. These values are plotted for each team in Figure 1. A line showing the expected best fit correlation between these values for the 32 teams is shown for reference.

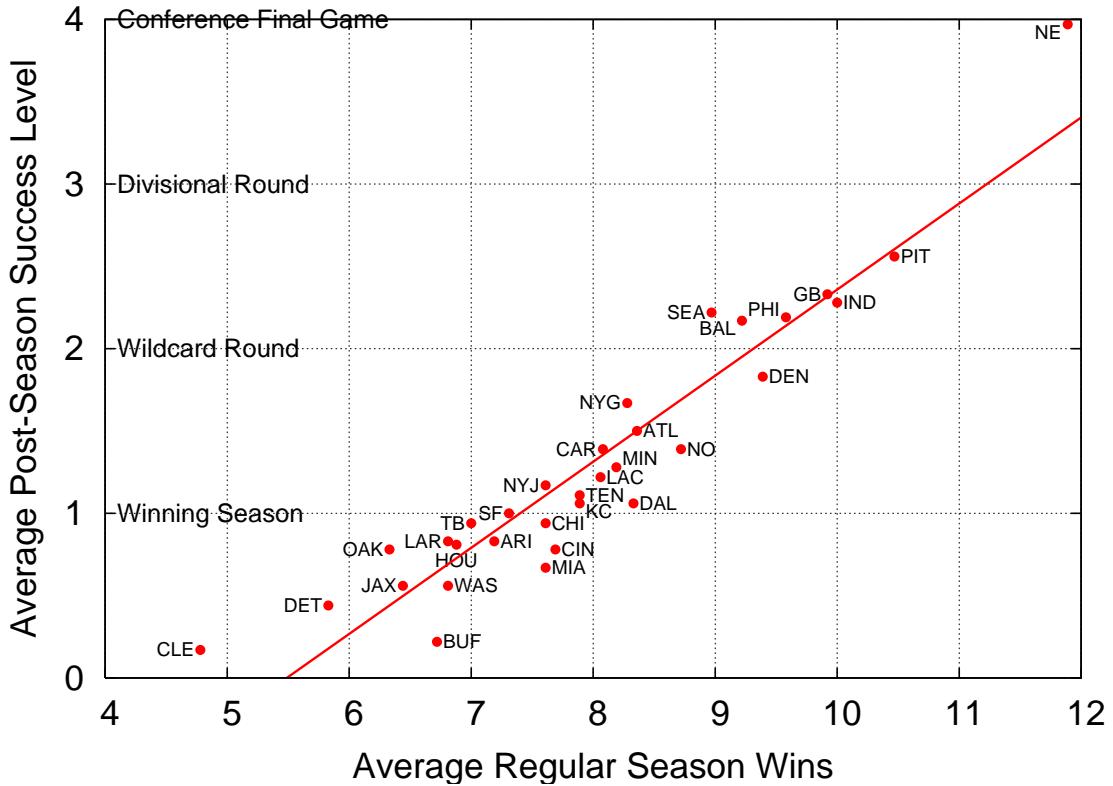


Figure 1: Comparison of Regular Season Wins and Level of Success

The figure shows that New England is a positive outlier in the graph as its performance for each metric is distinguished from the other teams. Pittsburgh is the next best team for each metric. There is then a cluster of teams including Indianapolis, Green Bay, Philadelphia, Baltimore, Seattle and Denver that have the next best performance when considering each of the two metrics. Cleveland's position in the graph is a negative outlier from all other teams with Detroit as the next worse.

These results are interesting because they show how teams compare across the two metrics and reveal clusters of teams with similar performance. The addition of the best fit line also allows us to identify teams that have performed relatively better or worse on level of post-season success as would be predicted based on regular season wins. These are the teams that are furthest above and below the best fit line in Figure 1.

Table 3 shows the top-five most successful teams relative to regular season performance. This metric is based on the difference between the actual level of post-season success and the predicted value based on the best fit line. The table shows that despite having the best regular season performance, New England's level of post-season success has out-performed expectations. In terms of Figure 1, New England is the furthest vertically from the best fit line. Seattle's performance is next best for this metric thanks to three Super Bowl appearances including one championship. Despite low regular season performances, Oakland and Detroit have done relatively better for post-season success. The Giants and Ravens have done better than expected in the post season with each having two Super Bowl championships and the Giants another appearance.

Table 3: Top-Five Most Successful Post-Season Teams Relative to Regular Season Performance

Rank	Team	Diff
1	New England Patriots (NE)	0.63
2	Seattle Seahawks (SEA)	0.40
3	Oakland Raiders (OAK)	0.34
4	Detroit Lions (DET)	0.26
5	New York Giants (NYG)	0.21
5	Baltimore Ravens (BAL)	0.21

This metric also allows teams to be identified that have under-performed in the post-season relative to their regular season performance. Table 4 shows the top-five least successful post-season teams relative to regular season performance and furthest below the best fit line in Figure 1. It shows that Miami, Dallas and Buffalo have similar levels under-performance with regular season performance not leading to corresponding post-season qualification or advancement. Cincinnati and New Orleans round out the lowest ranked teams for this metric.

Table 4: Top-Five Least Successful Post-Season Teams Relative to Regular Season Performance

Rank	Team	Diff
1	Miami Dolphins (MIA)	-0.44
2	Dallas Cowboys (DAL)	-0.43
3	Buffalo Bills (BUF)	-0.42
4	Cincinnati Bengals (CIN)	-0.38
5	New Orleans Saints (NO)	-0.30

3 Summary

In this work we have quantified and examined three metrics of success for NFL teams using results from the 18 seasons played this century, including the current one where the outcome of the Super Bowl is still to be determined.

In terms of regular season wins, three teams from the AFC, New England, Pittsburgh and Indianapolis, have enjoyed the most success. Green Bay and Philadelphia, both from the NFC, have the next most wins. Cleveland and Detroit have been the least successful with the fewest regular season wins over this time.

Beyond this straightforward metric, we define a new success metric with levels that largely correspond to qualification and advancement in the playoffs. Using this metric, New England and Pittsburgh are again the two most successful teams with Green Bay ranked third. Philadelphia is currently ranked sixth, but would move up with a Super Bowl Championship. Cleveland and Buffalo have had the least levels of post-season success, despite Buffalo making the playoffs this season.

Finally the availability of these two success metrics allows for comparison of team performance between them. While there is a strong correlation between the two metrics, there is variation in the level of post-season success relative to regular season performance. In particular, despite having the best regular season performance, New England's level of post-season success has been even better than expected. Seattle's performance is next best for this relative metric. In contrast, Miami, Dallas and Buffalo have similar levels under-performance with regular season performance not leading to corresponding post-season qualification or advancement.

The defined metrics and analysis could also be extended. For example, analysis for the NFL could go further back in time to include all Super Bowl seasons. It could also be applied to other sports where advancement through rounds of playoffs allows finer levels of measuring success rather than only counting championships. This approach could be used as a basis to compare the relative dominance (or futility) of teams across different sports and eras.

In closing we note that this year's Super Bowl match-up between New England and Philadelphia pits the most successful NFL team of this century across all success metrics with another one of the most successful teams during this time.