Risky Business Week 16

An Analytical Perspective – Why is Football Unique?

There are many factors that affect the game state of an NFL game and have a direct influence on the GWC. Football is different in this way from many other sports. Each down represents a unique situation that is defined by score, ball position, yards to first, clock, timeouts and the match-up of the team's strength and weaknesses. It is like a book of problems where each turn of the page reveals a new game state we have literally never seen before. We may be able to reference a similar situation that has occurred in the past, but it will not properly account for the astronomical number of combinations that define the play at hand.

The GWC of many free-flowing games such as soccer, hockey and basketball are largely defined by possession, score, clock and match-up. This is similar to football but without the added layer of discreet downs that have the additional variables of ball position and yards-to-first. Consider baseball, which has been a sabermetrician's dream since Bill James began publishing his "Baseball Abstract" in the 1970s. The way teams think about line-ups, shifting, pitching rotations and on-base percentage has revolutionized the game. Despite all of the beautiful complexity of baseball, it is missing two key ingredients that distinguish it from football: the running clock and variable scoring increments. In baseball, you are generally trying to produce runs and to keep your opponent from producing runs. The utility of those runs may change as a function of the game state, but typically teams will be compelled to improve or protect their score at all phases of the game. Football is different in that points can be scored in 1s, 2s, 3s and 6s and the impact of that scoring on GWC can change dramatically as a function of the clock and the score. There are times when a field goal is worthless, or a touchdown is too much. And as we have seen this season, it can even be correct to voluntarily reject scoring or conversely allow your opponent to score.

As the Pittsburgh Steelers were putting the finishing touches on an impressive 2nd half comeback against the Colts yesterday, they faced a 4th and 1 with on their own 44-yard line. With a 28-24 lead and only 2:18 separating him from a divisional title, Mike Tomlin decided to do what most NFL coaches would do, he punted the ball. This choice is more complex than it may appear on surface. When the goal is to improve GWC, every important variable that defines the game state must be considered. Ultimately, the Steelers were able to squelch a game winning drive by Philip Rivers and the Colts but according to a detailed simulation by the EdjSports' model, they would have won more often on average by attempting a first down rather than a punt. At -4.5% GWC, this was one of the largest fourth down errors of the week, and likely went unnoticed as the Steelers were celebrating their victory.

While this error is significant, it is certainly not anywhere near the worst we have seen this season. That is reserved for Kliff Kingsbury at -21% GWC *(insert Kinsbury analysis RB here)*. However, this decision by Tomlin serves as an excellent example of the complexity of football analytics and how changing the game state impacts the correct choice.

Impact of Game State on a Critical 4th down Decision

- Steelers lead 28-24 with 2:18 remaining in the game, 4th and 1 on their own 44-yard line, Colts have no timeouts.

GWC Difference of Punt vs Go when Adjusting for Score Only:

Trailing by 1	Tied	Leading by 1	Leading by 3	Leading by 4 (actual)	Leading by 7	Leading by 10
-21%	-9.2%	-14.3%	-7.2%	-4.5%	-1.7%	+0.2%

GWC Difference of Punt vs Go when Adjusting for Yards-to-First Only:

4th and 1 (actual)	4th and 2	4th and 3	4th and 4
-4.5%	-1.6%	-0.6%	+0.5%

GWC Difference of Punt vs Go when Adjusting for Game Clock Only:

2:18 (actual)	1:59	1:00	0:20
-4.5%	-3.8%	+4.9%	+1.6%

The simulation is accounting for some fascinating nuance. When leading by 1 it becomes far more correct to attempt the first down than the actual case. This may seem counter-intuitive, but I suspect the model is picking up on the fact that when the Steelers fail on 4th down the Colts will not necessarily burn all of the clock to get a field goal. After the punt, the Colts will only need a field goal of course, but now they are more likely to milk the entire clock in doing so. Surprisingly, the model also slightly favors going for it even on 4th and 3. This illustrates the importance of retaining possession and keeping the ball away from the opposing offense. Finally, it may seem odd that the GWC difference actually drops when adjusting the clock from 1:00 to 0:20 but this is simply a function of the overall GWC approaching 100% for both choices.

It is insightful to see how small changes in game state variables can affect whole percentage points of GWC. As we often say, just 6% of GWC per game is an expected difference of an entire game over a 16-game season, and often the difference between making the playoffs or not.