Risky Business Week 15

The Two Score Dilemma

With 2:08 remaining in the game and trailing by 11 points to the Green Bay Packers, the Carolina Panthers found themselves in the desperate predicament of needing two scores. Even though they had a 1st and 10 at the Packers' 15-yard line with one timeout and the benefit of the two-minute warning, this was a tall order indeed. Matt Rhule decided to take the unconventional approach of kicking a field goal on first down. This seems to play into the classic bias of risk aversion, or more specifically the postponement of disappointment. Knowing he needs two scores, a coach will often take the easier (higher percentage) option first. This one is worth a closer look.

A custom simulation by the EdjSports model reveals that an immediate field goal attempt reduces the Panthers' GWC from 3.3% to 0.5%. This difference of -2.8% GWC may not seem very significant but it represents 85% of their available equity! Imagine the outrage if the Panthers were trailing by 6 points with 45 seconds remaining and no timeouts from their own 1-yard line and resigned the game. That would be essentially the same cost. We are not suggesting Matt Rhule intentionally threw in the towel with his misguided field goal attempt, but you get the idea.

It helps to further breakdown this odd choice with the aid of some empirical data and a decision tree. While historical averages do not speak directly to the Packers-Panthers matchup, they serve as a helpful reference. Here are some key assumptions, some of which are derived from NFL play-by-play data from 2000 – present along with model generated assumptions per the custom match up where noted in bold.

- Scoring a touchdown from the 15-yard line with a full set of downs: ~54%
    - **Carolina per advantageous matchup: ~74%**
- Successful two-point conversion: ~48%
- Forcing a 3 and out: ~49%
    - **Green Bay per advantageous matchup: ~31%**
- Scoring a touchdown with 1 minute and no timeouts from own 30-yard line: ~15%
- Score a field goal with 40 seconds and no timeouts from own 30-yard line: ~28%
- Winning in overtime: ~50%
    - **Carolina per disadvantageous matchup: ~42%**
- Successful 33-yard field goal: ~94%
- Average clock usage of (multi) touchdown attempt: ~20 seconds
- Average clock usage of 3 and out: ~1 minute (with 2 min warning), 1:40 without
- Onside kick recovery rate: ~11%
- **Panthers' GWC down 3 after onside kick recovery: (1:37 remaining): ~41%**
- **Panthers' GWC down 8 after onside kick recovery: (2:01 remaining): ~9%**
- **Panthers' GWC down 8 starting at own 15-yard line: (0:50 remaining): ~2%**

Using these assumptions, we can get a rough idea of the comparative choices. We can then insert more customized matchup numbers to get a truer sense of why the model strongly disagrees with Rhule's decision.

Field goal attempt parlay:

(successful field goal) x (force 3 and out) x (score last drive touchdown) x (successful 2PAT) x (win in OT)

NFL Average Assumptions (kick deep):
.94 x .49 x .15 x .48 x .5 = 1.6% GWC

Matchup Based Assumptions (kick deep):
.94 x (.31) x .15 x .48 x (.42) = 0.9% GWC

Matchup Based Assumptions (onside kick):

((successful field goal) x (onside kick recovery) x (Panthers' resulting GWC)) + ((successful field goal) x (unsuccessful onside kick) x (force 3 and out) x (1:00 no timeouts at own 15-yard line))

(.94 x (.11) x (.09)) + (.94 x (.89) x (.31) x (.02)) = 1.0%

Touchdown attempt parlay:

(successful touchdown) x (successful 2 PAT) x (force 3 and out) x (score last drive field goal) x (win in OT)

NFL Average Assumptions (kick deep):
.54 x .48 x .49 x .28 x .42 = 1.5%

Matchup Based Assumptions (kick deep):
(.74) x .48 x (.31) x .28 x .42 = 1.3%

Note: Additional residual value exists for the Panther's to score a second touchdown rather than a field goal. In this instance that would raise their GWC to ~2%.

Matchup Based Assumptions (onside kick):
(successful touchdown) x (successful 2 PAT) x (onside kick recovery) x (Panthers' resulting GWC)

.74 x .48 x .11 x .41 = 1.6%

Additionally, the Panthers can now win on a failed two-point conversion (52%) when they recover the onside kick down 5 and score a touchdown with a GWC of ~33%. This is a flashback to the value of optionality (insert RB link) that we discussed in a prior Risky Business column.

.74 x .52 x .11 x .33 = 1.4%

This now gives the Panthers a GWC total of ~3% which is consistent with the simulation.

Note: The decision tree explanations are approximations and do not account for the proper weighting of all the scenarios that are captured in the simulation. In some instances, such as after an onside kick attempt the GWC values are recognized without all of the resulting branches.

As it turns out, the Panthers had four distinct paths to an improbable victory.

1. Kick field goal and kick deep
2. Kick field goal and onside kick
3. Attempt touchdown and kick deep
4. Attempt touchdown and onside kick

Interestingly, it was not the Packers offensive skill difference that was the distinguishing factor in this very complex decision. As indicated in the original customized simulation, the touchdown attempt was best, and the Panthers' actual choice was the worst of the four. However, it was the model's surprising revelation of the effectiveness of an onside kick in combination with a touchdown attempt that made all the difference.