

## Risky Business Week 11

### The Value of Optionality

The stage was perfectly set for Aaron Rodgers on Sunday in Indianapolis. Trailing by three points with 1:25 remaining in the game and just one timeout, the Packers began their final drive in regulation with their backs to the goal line. Facing a desperate 3<sup>rd</sup> and 6 from their own 6 yard line, Rodgers connected with Marquez Valdes-Scantling at midfield. After using their final timeout, the Packers now found themselves with 1<sup>st</sup> and 10 at the Colts' 47 yard line with 1:10 of game clock. A subsequent strike to Davante Adams for another first down, now put the Packers in a very advantageous position at the Colts 33 yard line and with 57 seconds remaining. This is where things get interesting.

Having an option is a valuable resource when used properly. An option is typically defined as a right and not necessarily an obligation. For instance, imagine you have the right to purchase Apple stock at 5% above the current price any time between now and July of 2021. This would be a valuable asset because the price could increase greatly during that time and the option could be 'struck' for profit. If the advantageous circumstance does not occur, then the option simply goes unexercised. As experienced financial traders know well, exercising an option too early is a suboptimal strategy as it squanders value. What does all of this have to do with an NFL game between the Packers and the Colts? Quite a bit actually.

As Aaron Rodgers and the Packers were orchestrating the final minute of their game winning drive, they were in possession of two important types of options.

1. Although they were already within field goal range with the ability to tie the game and send it into over-time, they were exercising their **option** to score a touchdown and win outright
2. The Packers also had the **option** to sacrifice a down in exchange for preserving clock by spiking the ball. This could be exercised on any down at their discretion.

The first option presents a pretty straightforward strategy. The Packers will use as much clock as possible to score a touchdown while retaining the option to kick a high percentage field goal if necessary. When the Packers finally arrived at 4<sup>th</sup> and 3 on the Colts' 8 yard line it was time to correctly exercise their right to kick the field goal.

The option to spike the ball is much more complicated. Twice during the final minute of regulation, the Packers chose to spike the ball on first down. There are two main considerations with this strategy. Not only does it stop the clock, but it also allows the Packers to be more prepared for the next play. It is difficult to assess the value of having more time to choose a play as it also affords the Colts' defense more time to respond. We can, however, look at the respective value of preserving clock vs sacrificing a down by simulating the relevant game states.

With 57 seconds remaining at the Colts' 33 yard line:

- 1<sup>st</sup> and 10: Packers GWC = 54.1%
- 2<sup>nd</sup> and 10 (after spiking ball): Packers GWC = 49.8%
- Cost = -4.3% GWC

With 42 seconds remaining at the Colts' 15 yard line:

- 1<sup>st</sup> and 10: Packers GWC = 66.1%
- 2<sup>nd</sup> and 10 (after spiking ball): Packers GWC = 60.7%
- Cost = -5.4% GWC

At face value, it looks like the Packers may have unnecessarily lost nearly 10% of GWC in the final crucial moments of regulation. As already mentioned, the value of setting the offense also must be considered. Additionally, the two scenarios of spiking the ball are not necessarily independent as the first decision may directly affect the circumstances of the second decision. What is clear is that the Packers prematurely exercised their options in both scenarios. By spiking the ball on first down, they guarantee only getting two opportunities for a first down or touchdown before they face a field goal decision. If they run a play on first down, they may have as many as three total opportunities before facing a field goal decision and can always retain the option of spiking the ball on 2<sup>nd</sup> or 3<sup>rd</sup> down if necessary.

While we can't justifiably say the Packers tossed away a full 9.7% of GWC by spiking the ball twice, it is very likely they reduced their winning prospects by a significant margin with these two hasty decisions.