

Risky Business Week 3

“Know the Enemy and Know Yourself” Sun Tzu

When making decisions to optimize GWC, it is not only essential to assess the comparative strengths and weaknesses of the opposing teams, but also to anticipate their future behavior. Sunday afternoon provided three excellent examples of the importance of this process. Because the EdjSports’ simulation model is fully customizable, we can generate very reliable GWCs as a function of match-up and game state. By simulating games to conclusion beginning with a particular play choice, we can compare the relative effect of a decision on winning prospects. Of course, these simulations are only as good as the underlying assumptions, so it is sometimes important to stress-test the model’s recommendations as a function of those very assumptions.

Situation 1: At 6:07 of the first quarter in a scoreless game, the Kansas City Chiefs’ defense had just stopped Justin Herbert and the Arizona Cardinals two yards short of the first down on a 3rd and 11 keeper from his own 17 yard line. When a flag was thrown for offensive holding, the Chiefs were faced with a difficult decision. Should they accept the penalty and back the Chargers up to a 3rd and 21 from their 7 yard line, or decline the penalty leaving them with a 4th and 2 from the 26 yard line? The Chiefs correctly assumed the Chargers would punt the ball, but did they make the right choice with respect to the penalty? Well, perhaps it depends.

| Chiefs’ Penalty Action | Chargers’ Response | Chiefs’ Resulting GWC |
|------------------------|-------------------------------------|-----------------------|
| decline | 4 th and 2 Go! | 75.9% |
| decline | 4 th and 2 punt | 78.5% |
| accept | 3 rd and 21 pass attempt | 79.2% |

Assuming the Chargers would punt, the decision for the Chiefs was very close but slightly in favor of accepting the penalty. However, the Chargers had an excellent opportunity to exploit the Chiefs’ penalty decision. They could have boosted their GWC by nearly 3% if they would have chosen to attempt a first down on the 4th and 2.

Situation 2: With the score still 0-0, the Chargers faced a 3rd and 1 at the Chiefs 42 yard line with 1:35 remaining in the 1st quarter. Justin Herbert snuck the ball forward for a gain of two yards and a first down. It is very common in these situations for teams to treat a 3rd and 1 like a 4th and 1 with a conservative play choice. We can’t be sure if the Chargers would have attempted another quarterback sneak if they were stuffed on third down, but it raises some interesting questions. If you know you are going to attempt 4th and 1 anyhow, should you use your third down in such a transparent way, or attempt a pass that might produce a more favorable field position at the expense of the conversion rate. To examine this further, let’s look at a hypothetical example and assume the Chargers attempt a passing play that nets exactly 12 yards and succeeds 30% of the time. We will also assume the quarterback sneak will net two yards 75% of the time and that the Chargers will not attempt a 60 yard field goal on 4th

down. Both empirical data and simulations suggest these success rates are reasonable estimations. Appropriate clock advancements for each play are also considered.

| Chargers' Action | Chargers' Follow Up | Chargers Resulting (pre-snap) GWC |
|-------------------------|--|-----------------------------------|
| Pass attempt complete | 1 st down, Chiefs' 30 yard line | 39.2% |
| Pass attempt incomplete | 4 th and 1 Go | 35.4% |
| Pass attempt incomplete | Punt | 29.1% |
| QB sneak unsuccessful | 4 th and 1 Go | 35.9% |
| QB sneak unsuccessful | Punt | 29.3% |
| QB sneak successful | 1 st down, Chiefs' 40 yard line | 37.9% |

Again, assuming a 30% pass completion rate and going for it on 4th down, the Chargers would have a weighted GWC of 36.5%. On the other hand, the weighted GWC for the 3rd down sneak is 37.4%. While the choice seems close, it appears to favor the Chargers' actual choice. It should be noted that the quarterback sneak does not provide any opportunity for long gains while the passing play does. Under the assumption of punting on 4th down, the 3rd and 1 sneak now becomes the clear choice with a difference of nearly 3% GWC. This is a topic that deserves some deeper study, but it could well be that a standard rushing play is the optimal choice as it has the benefit of high conversion rates (approaching that of the QB sneak) and still provides opportunities for excess yardage.

Situation 3:

Perhaps the most exciting play of the weekend was the 109 yard touchdown return by Jamal Agnew of the Jaguars at the end of the first half after the Cardinals' Matt Prater's attempted a 68 yard field goal that came up short. This is a fascinating study in the relative merits of outliers. Both 68 yard field goals and 109 yard returns from the end zone are rare occurrences indeed. It helps to first understand what was at stake on this last play of the half and the resulting game states. For simplicity, we will assume there are only three possible outcomes to end the half.

- Matt Prater successfully kicks a 68 yard field goal, Arizona leads 10-7 at the half.
Arizona GWC = 73.2%
- Matt Prater misses the field goal and the clock runs out without subsequent scoring, or Arizona simply takes a knee to end the half with the score 7-7
Arizona GWC = 64.1%
- Jamal Agnew returns the missed field goal for a touchdown and Arizona trails (assuming successful extra point) 14-7 at the half.
Arizona GWC = 37.3%

Arizona stands to gain 9.1% GWC from a made field goal and risks 26.8% GWC from a returned touchdown. Therefore, the Cardinals must be 26.8/9.1 or 2.95 times more likely to make the field goal than to allow a touchdown return. For a point of reference, since 2000 attempted

kickoff returns from the endzone have resulted in a touchdown about 0.7% of the time. It is difficult to say how this field goal situation compares to a typical kickoff as the coverage team is starting at midfield but not in their typical formation. If we use this historical figure as a proxy, Prater's success rate would need to be about 2% to justify the attempt. Although Prater's career long is 64 yards, an EdjSports simulation estimates his success rate to be closer to 3%. We have also seen estimates from other analysts that were significantly higher. It appears the Cardinals made a very defensible decision to attempt the field goal.