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Downside Risk on Your TV Screen

Richard Q. Wendt

	Average Gain for Running or Completed Pass	Percentage of Pass Completions	Average Gain per Pass Attempts or Runs
Quarterback sneak	1	N/A	1
Running play	3.5	N/A	3.5
Short pass	8	75	6
Long pass	15	33	5
"Hail Mary"	75	5	4

Now that we've gotten past the season of football playoffs, bowl games, and the Super Bowl, I'm reminded that football contains excellent examples of downside risk. While some analysts may dismiss downside risk as purely an "ivory tower" exercise, it does have very practical application in the real world.

Assume that you are the statistical consultant for the Schaumburg Actuaries (my apologies to non-football fans for the statistical analysis and to football fans for creating such a team name), and your computerized database shows the statistics in the table to the right. Based on that data, a statistician (not an actuary, of course) might advise the use of short passes, because that strategy has the highest expected result per play. In real life, we know that teams use a variety of plays, depending on the down and distance and game situation and a number of other factors.

But when it's fourth down and a yard to go for a first down and the coach decides to try for the first down, a very common strategy is the quarterback sneak, even though it has a lower expected result than the other strategies. Why does that make sense? Well, it's downside risk raising its head; the quarterback sneak has the highest probability of achieving the immediate goal, a first down. It doesn't get you much further down the field, but it is effective for its purpose.

Similarly at the end of the game, with Schaumburg 90 yards away from the goal line and time running out, a common strategy is the "Hail Mary" option—a very, very long pass, with a low probability of success. If the expected result is only a four-yard gain, how can that strategy make sense? Once again, as you guessed, it's downside risk. The Hail Mary play has the highest probability of getting the touchdown. Completing a short pass will fail to score a touchdown, because time will run out.

These two examples illustrate a simple axiom of downside risk: if the target is easy to attain (for example, one yard away), then a conservative strategy gives the best chance of success; if the target is difficult to attain (for example, 90 yards away), then the most aggressive and risky strategy gives the best chance of success.

So as you sit back and enjoy the Schaumburg Actuaries in the next Super Bowl, be sure to watch downside risk in action.

Richard Q. Wendt, FSA, is Principal at Towers Perrin in Philadelphia, Pennsylvania and Co-editor of Risks and Rewards.

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Phone: 847–706–3500 Fax: 847–706–3599 World Wide Web: http://www.soa.org

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