College Football Playoff Expansion: A Statistical Analysis via Monte Carlo Simulation

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The goal of my project is to evaluate multiple college football playoff formats involving different numbers of teams using the Monte Carlo simulation method. The computer simulation generates probabilities for top-ranked teams winning the national championship and being selected for the playoffs under different formats. Such statistical information provides critical insight for setting up a “fair” playoff system that strikes a balance between minimizing the number of playoff teams and maximizing the inclusion of legitimate title contenders. Here I simulated 1,000,000 college football seasons using parameters determined through comparison to actual 2013-2017 season results. At the end of each season, the teams are sorted based on their win-loss records adjusted by their strengths of schedule, and the top two, four, six, eight, twelve, or sixteen teams go through a single-elimination playoff to determine the national champion. The simulation shows that, according to teams’ true strength rankings, the probabilities for teams winning the championship and being selected for the playoffs both decrease with the ranking as expected. However, a total of seven teams have at least 25% as much chance as the best team to win, and 15 teams have at least 10% as much chance to win. In a four-team playoff, at least three of the four best teams are excluded in 62% of the simulated seasons, which can be significantly reduced to 27% with expansion to an eight-team playoff. Further expansion to 16 teams gives a 51% chance to include at least six of the eight best teams.