Determination of Winning Baseball Strategies under MLB's Extra-Inning Rule Modifications

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In 2020, Major League Baseball (MLB) modified the regular season extra-innings rule: at the beginning of each half-inning beyond the 9th, a runner is placed at second base—this "designated runner" is designed to shorten games and reduce season-long player fatigue. It is generally accepted that the home team has an advantage in winning, since the home team will know exactly how many runs are needed to win. The visiting team should score as many runs as possible, not knowing how many runs might be required to win. Consequently, the home team can employ a tailored strategy—e.g., bunting, pinch-hitting, aggressive baserunning, sacrifice, etc.—to score enough runs to win.

The purpose of this paper is to query all baseball games since 2020 that went into extra-innings. Data is gathered from Retrosheet, a repository of play-by-play MLB game data maintained by a non-profit organization that has box score data from 1906 and play-by-play game data since 1930. Using an in-house Python-based game scraping tool, each extra-inning game is first summarized into whether the home or visiting team wins or loses.

More importantly, the strategies that were employed by both the home and visiting teams are detailed and analyzed. Under conditions of game situation, player types and strategy employed are articulated. For instance, the home team is at bat with 1 out and a runner on third, and a weak batter at the plate is facing the visiting team's closer. Based on situational data, summary statistics are aggregated to see whether the strategy employed resulted in a run and, more importantly, an increase in the win expectancy rate. These results prove to be relevant in the MLB's uber-competitive regular season format: for example, the 2025 New York Mets fell victim to notoriously abysmal late-game performances, resulting in failure to make the playoffs despite having the second-highest payroll in baseball.

Results have shown that a visiting team, in general, should not bunt or sacrifice; small ball strategies result in smaller win expectancy rates. Home teams should tailor their strategy to accumulate the needed runs to win. Interestingly, the batter type and placement within the batting order affect the strategy employed. Detailed data-driven decision tables are built for the interested reader to ascertain what historically has worked; for instance, probabilistically, for a slugger at the plate, should the home team swing away as opposed to bunting the ghost runner to third?

The goal of this research is to critique the consequences of the regular-season extra-innings rule. Is the perceived edge that the home team enjoys equitable? In addition, what modifications might MLB employ to lessen the competitive advantage that home teams enjoy? From an in-game perspective, are managers employing the best strategies to maximize their win expectancy rate?