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NHL SHOOTOUTS?**

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Following the National Hockey League's (NHL's) 301-day lockout in 2004-2005, the league made several rule changes to entice fans back to the arenas. One such change was the adoption of Olympic-style shootouts at the end of a tie overtime game to determine a winner. In the NHL, during regular-season games, teams play three twenty-minute periods. If the score is tied at the end of regulation, the teams play an additional overtime period of not more than five minutes with the team scoring first the winner. If the game remains tied at the end of a single five-minute overtime period, the teams proceed to a shootout. During the shootout, teams alternate shots. If the outcome is still not determined after each team takes three shots, then the shootout period proceeds to a "sudden death" format until one shooter scores. The game does not end until each team has taken the same number of shots.

In the 2009-2010 NHL season there were 184 shootouts, 91 of which were won by the home team. Six of these games were scoreless ties at the end of regulation. On eighty-seven occasions (about half of the 178 games in which both teams had scored at least one goal), the team that scored last in regulation (at any point during the game) to tie the game (and force an overtime period and ultimately a shootout) went on to win the shootout. The purpose of this brief research note is to gauge the importance of momentum carrying the team that scores last late in regulation (to tie the game) to a shootout victory. If the home team is the last to score and tie the game in regulation in the third period or even during the final five minutes of the third period, is the home team more likely to win the shootout than a visiting team which accomplishes the same feat? The data on NHL shootouts in the 2009-2010 regular season and box score summaries (including the time of each goal scored in each period) are from www.nhlshootouts.com and www.nhl.com.

All 178 shootouts (in which the game was tied at the end of regulation, other than 0-0) have been classified into four categories, as shown in Table 1. The team that scored last in

regulation during the third (and final) period of play won the shootout 38.2 percent (or 68/178) of the time. The assumption that there is no relationship between the two classification criteria can be put in the form

H_0 : Winning at home and scoring last in the third period of regulation are independent

H_1 : H_0 is false

If H_0 is false and there is a home ice advantage to the team that draws even in the final period of play and wins the shootout, then the observed frequencies will tend to be larger than the expected frequencies along the diagonal of the two-way classification table. The calculated (χ^2) statistic on the data presented in Table 1 is 2.165. The probability that the chi-square test statistic will be as large as this (if H_0 were true) is .141, and therefore H_0 cannot be rejected. That is, there is no conclusive evidence (with $\alpha = .05$) of a home-ice advantage to a shootout victory (after the home team scores last in regulation during the third period to draw even). If, however, the eventual shootout winner tied the game in the final five minutes of regulation, we see in Table 2 that the eventual shootout winner is more than likely the *visiting* team ($p = .049$). Inspection of the several contributions to the calculated chi-square statistic ($\chi^2 = 3.860$) shows that the observed frequency is greater (less) than the expected frequency in row 2, column 1 (row 1, column 1), enough to favor H_1 at customary levels of significance.

Concluding Remarks

Momentum is crucial to winning. When an ice hockey team gives up a goal in the last five minutes of the third (and final) period of regulation, we find that the team that surrendered the game-tying goal nonetheless ends up winning the shootout more than 75 percent of the time. But, given the eventual shootout winner did score last in the final five minutes of regulation, we find that 60 percent of the time the shootout winner (and hence the winner of the game) is not the home team, but the visiting team.

**Table 1. Two-Way Classification of Shootouts, 2009-2010,
Eventual Shootout Winner Scored the Tying Goal in the Third Period**

Home Team Win?	Did the Shootout Winner Score the Tying Goal in the Third Period?	
	Yes	No
Yes	30	61
No	38	49

**Table 2. Two-Way Classification of Shootouts, 2009-2010,
Eventual Shootout Winner Scored the Tying Goal
in the Final Five Minutes of the Third Period**

Home Team Win?	Did the Shootout Winner Score the Tying Goal in the Final Five Minutes of the Third Period?	
	Yes	No
Yes	15	76
No	25	62
