**The Effect of an Elite Goal Scoring Presence on NHL Playoff Success**

Like other major sports leagues, the NHL is based on a very simple premise: score more than the other team, and success awaits. Teams are organized through trades and signings by general managers (GMs). The goal of NHL GMs is to build well-rounded teams that have enough depth to overcome injuries and survive the grueling but rewarding journey to the Stanley Cup. This task has been further complicated due to league expansions since 1967, increasing the number of teams and league-wide parity (Sports Reference LLC. 2020). GMs are also held in check by a salary cap, which restricts the amount of money they are permitted to spend on players in a season. They must routinely weigh statistical and monetary information to strike a successful balance. Overpaying for a player can saddle a team for years afterward, since contracts commonly span over multiple seasons. Several studies (Chan et al. 2012; Demers 2015; Gramacy et al. 2013) have tried to quantify whether certain players are appropriately paid given their on-ice performance. One considered players independently of their teammates to get an unbiased representation of their abilities. Another divided them into broad groups and assessed salaries based on average performance within the classification. The merit of these studies is clear: if a GM can locate players that the NHL market has undervalued, they can build a roster much more efficiently.

**Objectives**

In this study, however, we are not explicitly interested in appropriately assigning salaries to players. Our intent is adjacent: we will consider teams that feature a certain class of player, “elite” goal scorers, and examine the contributions of this class to the playoff success of their respective teams. We will examine the following more specific inquiries, in the context of the NHL expansion era:

1. Given that an NHL team has made the playoffs, how does the presence of an elite goal scorer affect the number of wins the team attains?
2. Does having two or more elite goal scorers on one roster provide any additional impact?

**Implications**

The offensive schemes of NHL teams tend to fall into one of two groups: more centralized with one or two great goal-scorers, or a more homogeneous approach where it is much harder to pick out one dominating force. This study will attempt to support or refute the first of these in a playoff context, perhaps indicating a preferred approach to team structure based on our results. GMs may have more incentive to build a team around a player, rather than adopting a more piecemeal strategy.

The results of this study could also trigger additional analyses related to salary. Although the research presented here does not directly deal with monetary figures, it is still a practical component to consider. GMs may well choose to reallocate some money to other player types if the payoffs are not high enough from our target group. It is possible they may spend more money on a goalie then on offensive players, for example. If the results of this study point toward the shocking conclusion that elite goal scorers are not as valuable as they seem, then some teams may seriously reconsider their strategy. After all, elite goal scorers are faces of franchises, and if it would really be more optimal to adapt a more low-key approach, the NHL team building dynamic would be greatly altered.

**Method**

The purpose of this research is to quantify the effects of great goal scorers on a team’s success. Namely, we are interested in the playoff impact, measured in wins, that such a player provides. This study will simultaneously control for other variables to determine if great goal scorers still have an impact even once other important factors have been considered. Additionally, we will consider the effect of having additional great goal scorers on a team and whether this improves a team’s playoff performance. The research questions of interest for this study are:

1. Given that an NHL team has made the playoffs, how does an elite goal scoring presence affect the number of wins the team attains, once we account for:
   1. Luck, measured by PDO
   2. SRS

Under this question, we will test the following hypotheses:

: Elite goal scorers have no impact on a team’s playoff success once other variables have been considered.

: Elite goal scorers have an impact on a team’s playoff success once other variables have been considered.

1. Given that an NHL team has made the playoffs and rosters one elite goal scorer, how does the additional of at least one such player to the team affect the number of wins the team attains, once we account for:
   1. Luck, measured by PDO
   2. SRS

Under this question, we will test the following hypotheses:

: Additional elite goal scorers have no impact on a team’s playoff success once other variables have been considered.

: Additional elite goal scorers have an impact on a team’s playoff success once other variables have been considered.

**Population**

In this study, each observation will consist of a playoff team and some accompanying statistics, like the team’s regular season shooting percentage, for example. We will not need to worry about sampling: we will have access to the population, since there are records of every NHL playoff team. This population will be broken down into two groups: teams that have an elite scoring presence, and those that do not. “Elite scoring presence” indicates that the team rosters a player who recorded 50 or more adjusted goals during the corresponding regular season.

This study is only interested in considering playoff teams from the 1987 season onward. This is the first year that the NHL made all series best-of-seven, which is the current playoff format. Previously, the first round was best-of-five, while the remaining three were best-of-seven. This off-by-one error would unfairly devalue older observations in the population. This modification ensures that the results of the study are more generalizable to present-day NHL. Due to this subsetting, the dataset of interest will contain XXX observations as opposed to YYY. Although there were only 21 teams in 1987, compared with 31 today, the analysis should still hold because the same number of teams make the playoffs today, 16, as did in 1987.

**Collection**

The data for this study were gathered from the Hockey-reference.com database. The website compiles accurate data by using sportradar, quoted as “the official stats partner of the NHL”, in the footer of the Hockey-reference homepage. For the particular interest of this study, Hockey-Reference provides annual regular season data for each team (Sports Reference LLC. 2021b). Given the restrictions previously described, we will only consider NHL seasons post-1986. There should be no concerns regarding the completeness of the data: no missing data occurs in any of these tables. This may have been a concern in earlier NHL seasons, since data collection was not as robust, but by 1987 strategies were in place to consistently the statistics we are interested in.

As far as cleaning the data, a three-step process was required. First, any team data before 1987 was not considered since the playoff format is not the same as it is today. We also eliminated any team that did not make the playoffs, as clearly an elite goal scorer could not help their team win any playoff games if they did not make the tourney. Lastly, any statistic that was not considered in our model was consequently removed from our data set. Since these measures had no bearing on our analysis, their presence would only serve to complicate the data. The result is a table where each row is a unique observation, namely, a team and its regular season performance in a year, in addition to how many playoff games it won.

**Variables**

This study will control for the following predictors of playoff success, to discern the impact of elite scoring presence:

* Elite scoring presence: Categorical variable that takes on 0 if team rosters no players with 50 or more adjusted goals in the relevant regular season, 1 if one such player is rostered, 2 if two such players are rostered, etc.
* PDO: Continuous variable meant to measure luck as a percentage, with 100% representing the average. Computed as the sum of save percentage and shooting percentage and is based on the idea that regression towards the mean is inevitable in hockey (Sports Reference LLC. 2021a). Any team with a PDO drastically higher than 100% is said to experiencing good luck, and vice versa for bad luck.
* SRS: Continuous variable with units of goals that can be either negative or positive. Represents the weighted average margin of victory of a team, which takes into account not only average margin of victory (difference between goals scored and goals given up, divided by games played) but also strength of schedule, or how good the team’s opponents were (Sports Reference LLC. 2021c).

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