

**THE CAREER SAVE PERCENTAGE PROFILE  
OF NHL GOALIES**

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Paul M. Sommers  
And  
Douglas A. Raeder

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DEPARTMENT OF ECONOMICS  
MIDDLEBURY COLLEGE  
MIDDLEBURY, VERMONT 05753

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Douglas A. Raeder  
Paul M. Sommers

Department of Economics  
Middlebury College  
Middlebury, Vermont 05753  
[psommers@middlebury.edu](mailto:psommers@middlebury.edu)

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For most professional athletes, productivity increases rather quickly, tops off, and then declines as skills diminish or health declines with age. Career length and the point where productivity “tops off” varies with one’s sport. And, even within a given sport, the point where one reaches his or her prime may not be well-defined.

In this brief note, we endeavor to show how a representative goalie’s save percentage varies with years in the National Hockey League (NHL). To do this, we will regress the save percentage<sup>1,2</sup> of a goalie in the NHL against his career save percentage (through the 2008-09 season), years in the NHL, and years squared for all 75 goalies who played a minimum of five games in 2008-09. These seventy-five goalies had a combined total of 373 years of playing experience.<sup>3</sup> For a goalie (like Chris Osgood of the Detroit Red Wings) with, say, 15 years of playing experience (as of 2008-09), there would be 15 observations (of the 373 total) for that particular player. For a goalie with a given career save percentage, we should be able to show that the season-to-season save percentage rises at a diminishing rate for several seasons and reaches a peak. Thereafter, the save percentage declines. Of particular interest is the point where the performance profile peaks for an NHL goalie.

### *The Model*

A goalie’s save percentage in year  $t$  [  $SVP_t$  ] for each of his  $n$  years in the NHL (with a minimum of ten games played per season before 2008-09) was regressed against career year (which for a representative goalie varies from 1 to  $n$ ) [  $Year_t$  ], career years squared [  $Year_t^2$  ], and his lifetime or career save percentage [  $Lifetime\_SVP$  ] through the 2008-09 season, as follows:

$$(1) \quad SVP_t = \beta_0 + \beta_1 Year_t + \beta_2 Year_t^2 + \beta_3 Lifetime\_SVP + \varepsilon_t$$

where  $\varepsilon_t$  denotes a stochastic disturbance (or error) term which may take on positive or negative values. If a goalie's save percentage rises with career year and then falls after a point, then  $b_1$ , the least squares estimate for  $\beta_1$ , should be positive and  $b_2$ , the least squares estimate for  $\beta_2$ , should be negative.<sup>4</sup> The peak point is found by taking the partial derivative of  $SVP_t$  with respect to  $Year_t$ , setting this derivative equal to zero, and solving for  $Year_t$  in terms of  $b_1$  and  $b_2$ . That is,

$$(2) \quad \frac{\partial SVP_t}{\partial Year_t} = b_1 + b_2 Year_t = 0$$

or  $Year^* = -b_1 / 2b_2$ , where  $Year^*$  denotes the career year where save percentage peaks. All performance data are from [www.nhl.com](http://www.nhl.com).

### *The Results*

The 2008-09 regression equation is as follows ( $t$ -values in parentheses):

$$(3) \quad SVP_t = -0.057 + .0009212 Year_t - .000077 Year_t^2 + 1.059 Lifetime\_SVP$$

(-0.80)      (1.83)                      (-2.15)                      (13.51)

$$R^2 = .345$$

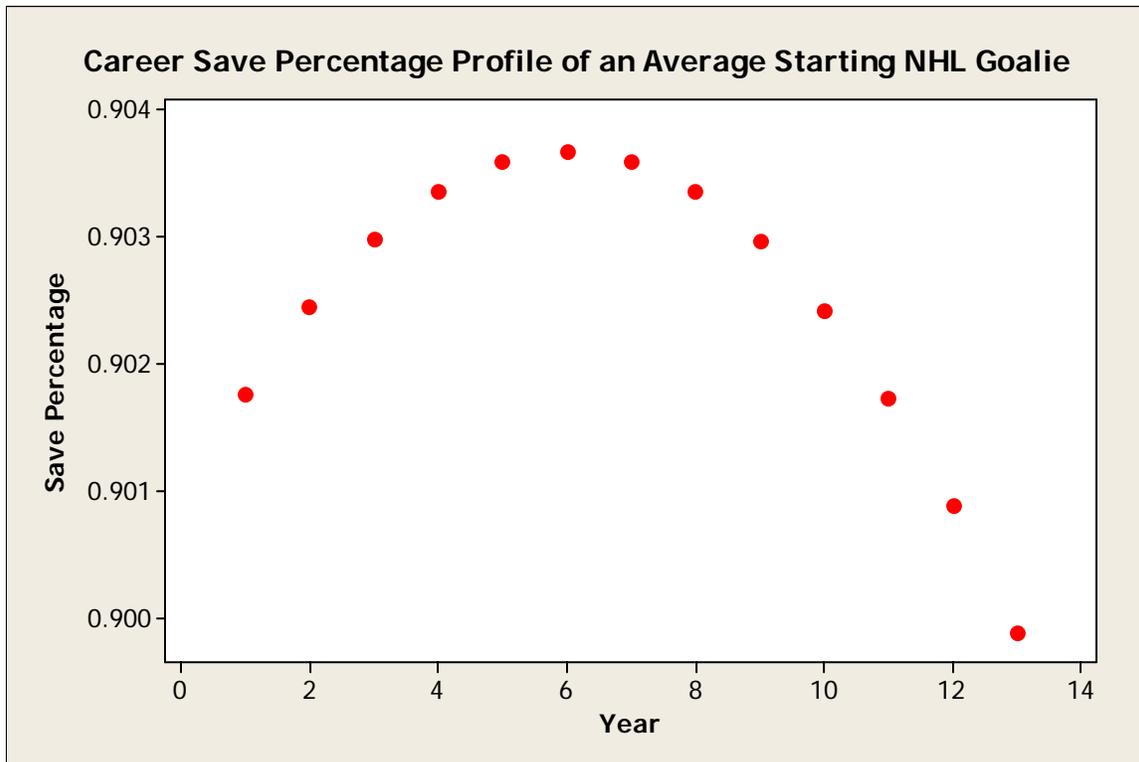
For this regression,  $Year^* = 5.98$ , that is, the point in a goalie's career where the save percentage peaks. Figure 1 shows the profile of a goalie whose career save percentage was equal to the average of the seventy-five goalies in the sample (.904).

*Concluding Remarks*

The save percentage profile of a representative NHL goalie is derived for all goalies in 2008-09. The profile typically rises, at least up to a point, and then falls (sometime around their sixth year in the league).

Interested readers might be curious to see how this profile has changed (if at all) from one decade to the next. Are goalies peaking later in their career than did their counterparts one or two decades earlier? If NHL goalies now benefit more than their predecessors from off-season training and better conditioning, not to mention the improvements in sports medicine and physical therapy, are performance profiles now flatter or higher beyond the peak point than they used to be?

Figure 1.



### Footnotes

1. A goalie's save percentage is found by dividing the number of saves (i.e., the number of shots on goal a goaltender stops) by the total number of shots on goal. A 90 percent save percentage is here expressed as .900.
2. Goals against average (another common measure of a goalie's performance) is more heavily influenced by his teammates' defensive efforts. Save percentage is regarded to be a better measure of the goalie's own performance in net.
3. In seasons prior to 2008-09, we required the goalie to play a minimum of ten games for the season to count as a "year of playing experience."
4. The coefficient on *Lifetime\_SVP* should be close to 1.0. The estimated coefficient  $b_3$  could be greater than 1.0 since seasons with fewer than 10 games played (usually in a rookie's first year or two in the NHL with typically little ice time) can result in uncharacteristically good save percentages and hence raise the goalie's lifetime save percentage.