Pressure

- Does pressure vary over the course of a hockey game?
- Do certain players play under more pressure than others?
- If so, is this because of coaching decisions?
- Do some players perform better under pressure than others?
Does pressure vary over the course of a hockey game?
  ▶ Yes.

Do certain players play under more pressure than others?
  ▶ Yes.

If so, is this because of coaching decisions?
  ▶ Yes.

Do some players perform better under pressure than others?
  ▶ I don’t know yet.
Outline

- Expected Points model.
- Pressure comes mostly from icetime.
- Deployment varies significantly after controlling for icetime.
Pressure Definition

- *Defensive* Pressure is how much you lose if you’re scored on.
- *Offensive* Pressure is how much you gain if you score.
Pressure Definition

- *Defensive* Pressure is how much you lose if you’re scored on.
  - *(Expected)* Standings points lost.
- *Offensive* Pressure is how much you gain if you score.
  - *(Expected)* Standings points gained.
Philadelphia Rout Columbus 6-0

Goals in 4th, 12th, 38th, 38th, 51st, 51st minutes.
Minnesota Buffalo 2-2 with shootout.

Expected Points over time, MIN at BUF, Sat Mar 05, 2016

- Blue line: BUF
- Green line: MIN
Model Definition

For a given:

- Home Score
- Away Score
- Home Skater Number
- Away Skater Number

Fit a pair of cubics which are constrained to end at the right place. Also various other shenanigans.
Game Pressures

[Plot showing the relationship between Defensive Pressure and Offensive Pressure with different colored dots representing Wins, Losses, and OT/SA]
Pressure Over Time

Average Pressure, 2015-2016

Instantaneous Pressure (standings points)

Game Time (minutes)

- Defensive (away)
- Defensive (home)
- Offensive (away)
- Offensive (home)
Incentives

Road teams, on average, are rewarded less for scoring than they are punished for being scored on \textit{at all times}. For home teams the same is true except for the first two (!) minutes.
Pressure is Mostly Icetime
Random Distribution of Shifts

Consider “randomly” distributing a given player’s icetime within a game, keeping the total constant, to give an idea of how much choice coaches have.
Aggregate z-scores

Aggregate all of the deviations-from-expected:

\[ z = \frac{1}{\sqrt{|I|}} \sum_{i \in I} z_i \]

and test for normality:

- Offence \( p = 0.058 \)
- Defence \( p = 0.004 \)
Distribution of coaching choices

2015-2016 Pressure

Defensive Pressure (Standard Deviations)

Offensive Pressure (Standard Deviations)
Pattern of coaching choices

Coaching adjustments to pressure are more about sheltering weak players than deliberately using strong players in high pressure situations.
## High Offensive Pressure Players

<table>
<thead>
<tr>
<th>Player</th>
<th>Standard Deviations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Offensive Pressure</td>
</tr>
<tr>
<td>Ribeiro</td>
<td>4.9</td>
</tr>
<tr>
<td>Hudler</td>
<td>4.6</td>
</tr>
<tr>
<td>Gaudreau</td>
<td>4.4</td>
</tr>
<tr>
<td>Landeskog</td>
<td>4.2</td>
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</table>
## High Defensive Pressure Players

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<tr>
<td></td>
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</tr>
<tr>
<td>DeKeyser</td>
<td>-0.2</td>
</tr>
<tr>
<td>Hjalmarsson</td>
<td>-1.0</td>
</tr>
<tr>
<td>Methot</td>
<td>-1.2</td>
</tr>
<tr>
<td>Larsson</td>
<td>-1.7</td>
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</table>
**Most extreme usages**

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<tr>
<td></td>
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</tr>
<tr>
<td>Gostisbehere</td>
<td>+4.1</td>
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<tr>
<td>Suter</td>
<td>+3.5</td>
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<tr>
<td>Nick Schultz</td>
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<tr>
<td>Max Talbot</td>
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<td></td>
<td>Defensive Pressure</td>
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<td>-4.3</td>
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</tbody>
</table>
Future Work

- Do some players play *better* under pressure?
- Expand to include regular season and playoffs.
Thanks!