Score Effects by Pressure

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Score Effects

- Trailing teams get most of the shots and the goals.
Score Effects

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  - 25% more shots, 1% more goals
Score Effects

- Trailing teams get most of the shots and the goals.
  - 25% more shots, 1% more goals
- But they usually still lose.
Causes of Score Effects

What causes score effects?
  - Bench-shortening?
Causes of Score Effects

What causes score effects?
- Bench-shortening?
  - No. (around 10%)
Causes of Score Effects

What causes score effects?
  ▶ Bench-shortening?
    ▶ No. (around 10%)
  ▶ Trailing teams pushing? Leading teams sitting back?
Causes of Score Effects

What causes score effects?

- Bench-shortening?
  - No. (around 10%)
- Trailing teams pushing? Leading teams sitting back?
  - Leading teams sit back, but home teams push.
Big Idea

*Problem:* Score effects vary over time.
Big Idea

Problem: Score effects vary over time.
Solution: Consider pressure as the independent variable instead of time itself.
By looking at shot rates as a function of pressure, we can learn:

- Who is responsible for score effects.
- Make adjustments that better reflect what we see.
- Make adjustments that better correlate to future winning.
Big Idea

By looking at shot rates as a function of pressure, we can learn:

- Who is responsible for score effects.
  - Mostly the home team (but also leading teams)
- Make adjustments that better reflect what we see.
  - Yes (a tiny bit)
- Make adjustments that better correlate to future winning.
  - Not really (the same)
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.
Game Pressures

Pressure state space

Defensive Pressure (home team)

Offensive Pressure (home team)

Up 1+

Up 2+

Down 1

Down 2+
Home team down a goal
Away team down a goal

5v5 Shots rates when home lead is 1

Away

Home
5v5 Shots rates when home lead is 0

- **Home**
- **Away**

- **Shots per hour**
- **Home Pressure (offensive - defensive)**
Home team down a goal

5v5 Goals rates when home lead is -1

Home

Away
Away team down a goal

**5v5 Goals rates when home lead is 1**

- **Home**
- **Away**

![Graph showing 5v5 goals rates when home lead is 1.](image)
Ties

5v5 Goals rates when home lead is 0

Home

Away
Sources of Variation

How do shot and goal rates change when the score difference is one, compared to average?

<table>
<thead>
<tr>
<th></th>
<th>Leading</th>
<th>Trailing</th>
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<tbody>
<tr>
<td><strong>Shots</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Home</td>
<td>-10</td>
<td>+8</td>
</tr>
<tr>
<td>Away</td>
<td>-10</td>
<td>+2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Leading</th>
<th>Trailing</th>
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<tbody>
<tr>
<td><strong>Goals</strong></td>
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<td></td>
</tr>
<tr>
<td>Home</td>
<td>+0.6</td>
<td>+0.9</td>
</tr>
<tr>
<td>Away</td>
<td>+0.2</td>
<td>+0.8</td>
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</table>
Correlations

Is it better to adjust for pressure?
## Correlations

Is it better to adjust at all?

<table>
<thead>
<tr>
<th></th>
<th>Score and Home</th>
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<tbody>
<tr>
<td></td>
<td>Raw</td>
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<tr>
<td>Auto-correlation</td>
<td>0.66</td>
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<tr>
<td>To winning (in-sample)</td>
<td>0.28</td>
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<tr>
<td>To winning (in the future)</td>
<td>0.34</td>
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</table>

Definitely better.
Is it better to adjust for pressure?

<table>
<thead>
<tr>
<th></th>
<th>Raw</th>
<th>Score and Home Adjusted</th>
<th>Also Pressure Adjusted</th>
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<tbody>
<tr>
<td>Auto-correlation</td>
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<td>0.72</td>
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<tr>
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<tr>
<td>To winning (in the future)</td>
<td>0.34</td>
<td>0.39</td>
<td>0.39</td>
</tr>
</tbody>
</table>

Two two adjustments are the same.
Next

- Publicize adjustments to make them more descriptive.
- Rework predictive models to see what shifts.
- Examine specific teams in specific score states to make diagnoses.
Thanks!