Referee Biases in English Premier League Soccer

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Importance of yellow cards
Home Bias
Balancing Bias
A ‘natural experiment’ in referee status
Data
Methodology
Results
Conclusion
Yellow cards and match outcome

Sample size: 2660 matches

Number of yellow cards

Frequency (%)

- 0
- 1
- 2
- 3
- 4
- 5
- 6
- 7

- losses
- draws
- wins
Home Bias

- Extra time (Garicano et al. 2004)
- Incentives help (Rickman and Witt, 2007)
- Yellow cards
  - in lab (Nevill et al. 2002)
  - on field (Dawson et al. 2005)
- Reason: crowd noise
Balancing Bias

• Cards in lab (Plessner and Betsch, 2001)
• Field in NHL (Abrevaya and McCulloch, 2004)
• Judgement error (P&B, 2001)
• Game management (Mascarenhas et al. 2001)
• Lab evidence for latter in basketball (Brand et al. 2006)
Questions

• Can we reduce yellow cards home bias?
• Balancing bias in yellow cards?
• Why do referees balance?
• Can/should we reduce balancing?
Status of English football referees

• 2001-2002: Referees made pro
• Incentives - £265 → £900 /match + £33k
  - sanctions e.g. no games
• Training & Monitoring → fitness, match behaviour, video analysis.
Data

- All matches Premier League 1997-2003
- 2660 matches
- Match-level data (need intra-match ideally)
- Variables include: team, referee, cards, goals, odds of winning, and crowd size.
Methodology (Home Bias)

- Use crowd noise as a proxy to identify bias
- If ↑ crowd → ↑ (away - home yellows) = Home Bias
- Referee or players?
- Compare before and after 2001 – no change in player behaviour
- Decline after 2001 = referee bias
<table>
<thead>
<tr>
<th>Change in equality of yellows</th>
<th>Balancing?</th>
<th>Reason</th>
<th>Motive</th>
<th>Pros help?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increase</td>
<td>Yes</td>
<td>Referees</td>
<td>Game management</td>
<td>No</td>
</tr>
<tr>
<td>Decrease</td>
<td>Yes</td>
<td>Referees</td>
<td>Judgement error</td>
<td>Yes</td>
</tr>
<tr>
<td>Same</td>
<td>?</td>
<td>?</td>
<td>?</td>
<td>?</td>
</tr>
</tbody>
</table>
Econometric issues

• Discrete variables (Poisson QMLE)
• Endogeneity (IV)
• Heterogeneity in referees and teams (FE Panel model)
• An example model,

\[
ayell_{\hat{r}} = \alpha + x_{krhat} \beta_k + \gamma_1 prorefcrowd_{\hat{r}} + \gamma_2 prorefhyell_{\hat{r}} + \lambda_r + \psi_a + \varepsilon_{\hat{r}}
\]
Results

• Can we reduce yellow card home bias?
  YES – by at least 1/3

• Balancing bias in yellow cards?
  YES – balancing due to referees

• Why do referees balance?
  Judgement Error

• Can we reduce balancing?
  YES – by at least 1/5
Conclusion

- Professionalisation has a (surprisingly?) large effect on reducing referee biases
- Incentives/training work – no need to alter rules to improve the game.
Thank you.
Any questions?