Behavioral Economics

Lecture 9: Quasi-Bayesian Updating

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Introduction

$$p^B(\omega \mid e) = \frac{\Pr(e \mid \omega)\Pr(\omega)}{\sum_{\omega' \in \Omega} \Pr(e \mid \omega')\Pr(\omega')}$$

- Bayes' Rule is the benchmark for updating beliefs
- But observed departures from Bayes can come from different sources
- An agent may look "non-Bayesian" because they:
  1. distort probabilities,
  2. use the wrong model of how signals are generated, or
  3. misread or misremember the signal itself

Quasi-Bayesian idea: keep the discipline of probabilistic updating, but allow one or more ingredients of Bayes' Rule to be wrong.

Quasi-Bayesians

- Mis-Functional Bayesians: distort probabilities or weights
  - Use the right prior and the right evidence, but combine them incorrectly
  - Examples: Tversky and Kahneman (1974), Grether (1980), and Rabin (2002)
- Warped-Model Bayesians: false but internally consistent model
  - Update correctly relative to a subjective likelihood that is wrong
  - Examples: Barberis et al. (1998), Rabin (2002), and Rabin and Vayanos (2010)
- Information-Misreading Bayesians: misread, miscode, or misremember signals
  - Update correctly conditional on a perceived signal that differs from the true one
  - Examples: Rabin and Schrag (1999) and Mullainathan (2002)

Three Formal Representations

1. Mis-Functional Bayesians

$$\hat{p}(\omega \mid e) \propto D_L(\Pr(e \mid \omega))\ D_P(\Pr(\omega))$$

where $D_L(\cdot)$ and $D_P(\cdot)$ distort the likelihood and prior

2. Warped-Model Bayesians

$$\hat{p}(\omega \mid e) \propto \tilde{\Pr}(e \mid \omega)\, \tilde{\Pr}(\omega)$$

where the agent is Bayesian relative to a subjective model $\tilde{\Pr}$, not the true one

3. Information-Misreading Bayesians

$$\hat{p}(\omega \mid e) = p^B(\omega \mid \tilde{e}(e))$$

where $\tilde{e}(e)$ is the signal as perceived, remembered, or encoded by the agent

References I

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