

Behavioral Economics

Lecture 9: Quasi-Bayesian Updating

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Introduction

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

- ▶ 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

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

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

2. Warped-Model Bayesians

$$\hat{p}(\omega | e) \propto \tilde{\text{Pr}}(e | \omega) \tilde{\text{Pr}}(\omega)$$

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

3. Information-Misreading Bayesians

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

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

References I

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