The Evolution of Belief Ambiguity during the Process of High-School Choice
by Pamela Giustinelli and Nicola Pavoni

Discussion by Marco Bassetto

Federal Reserve Bank of Chicago and IFS

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The Big Picture

- How should we represent information frictions?
- What are their costs?
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- What are their costs?
- What assumptions do we need to make progress?
Some Theory: Simplified Setup

- Two types of high school, “classical” (C) vs. scientific (S)
- Characteristics of S perfectly known (probability of success at S)
- Two children, Alice (A) and Beth (B)
- Care about probability of success (finishing high school on time)
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- Set of states of nature: $\Omega_1 \times \Omega_2$
- $\Omega_1 = \{\text{Both pass, Both fail, Only Alice passes, Only Beth passes}\}$
- $\Omega_2 = \{\text{Lots of math, Little math}\} \times \{\text{Ancient greek offered, not offered}\} \times \{\text{Will be stuck on drawing homework every Sunday morning, not stuck}\}$
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- Alice and Beth ex ante identical:
  - Same prior $\mu_0$ or set of priors $M_0$
  - Probability of success is the same conditional on any $\omega_2 \in \Omega_2$. 
Alice and Beth as Bayesians

- Observe $A$ and $B$’s posterior beliefs at 3 stages, $\mu_{ij}$, $i = 1, 2, 3$, $j = A, B$
- Evolution of beliefs dictated by learning about $\omega_2 \in \Omega_2$
- Learning may be idiosyncratic, beliefs may be different...
- ... but they should converge if $\omega_2$ becomes known.
Alice and Beth meet Gilboa and Schmeidler (or Epstein and Schneider)

- $A$ and $B$ have a range of beliefs about success given each $\omega_2$.
- $A$ and $B$ have a range of beliefs over which $\omega_2$ is true.
- Updating: Bayesian belief by belief.
- Belief range should converge as $\omega_2$ becomes known.
- Convergence might be messy.
Example of Messy Convergence

- Alice and Beth have 90% chance of passing if Greek is not part of curriculum
- With Greek, they have no idea (support [0,1])
- Prior: 50% that Greek is offered.
- Prior range: [45%, 95%]
- Posterior range: 90% or [0, 1]
A Way to Make Progress

- Assume that all uncertainty is about learnable characteristics ($\omega_2$)
- or, follow alternative approach to updating (Hansen and Sargent)
- Then range of beliefs will shrink with learning
- Will also converge across $A$ and $B$ in the limit
What can I identify?

- Suppose I have panel with short time dimension, many \textit{ex ante} identical people with i.i.d. learning process
- Individual learning does not converge, but cross-section informative of true state
- Example: under no ambiguity econometrician learns true probability of success

For each student, observe belief,(choice)\[= \Rightarrow \text{Infer preferences}\[= \Rightarrow \text{Infer measure of people that made wrong choice}\]
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Identification under ambiguity

- Cannot learn true probability in general
- Can get bounds that are tighter than individual students’
- For each student, observe range of beliefs, choice
  \[ \Rightarrow \]
  - Set identification of preferences
  \[ \Rightarrow \]
  - Bounds on measure of people that made wrong choice
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- Might also quantify role of forgetfulness (assuming that it is forgetfulness)
Problem: People are Different

- Try matching over observable characteristics
- Impose monotonicity restrictions (better GPA makes certain schools more desirable)