Fairness and limited information: Are people Bayesian meritocrats?

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Introduction

Q: Do individuals distort relevant information when allocating resources?

Two individuals have a performance p_i and a random factor ε_i.

Their earnings are $x_i = p_i + \varepsilon_i$.

An impartial spectator has to allocate $X = x_i + x_j$ between the two individuals:

- he might have full information $p_i, p_j, \varepsilon_i, \varepsilon_j$;
- or limited information x_i, x_j.

Spectator preferences

Denote with m_i what the spectator deems the moral allocation of i.

He chooses transfer y_i to maximise

$$U_{\text{spectator}} = -\left(y_i - m_i\right)^2$$

Implemented inequality is

$$I = \frac{\mid y_i - y_j \mid}{y_i + y_j}$$

Fairness views

$$U_{\text{spectator}} = -(y_i - m_i)^2$$

Egalitarian: the total earnings are divided equally between the two individuals, $m_i = \frac{1}{2} \cdot X$.

Meritocratic: the total earnings are divided proportional to performance, $m_i = \frac{p_i}{p_i + p_j} \cdot X$.

Libertarian: the individuals receive their earnings, $m_i = x_i$.

Under limited information, the spectator has to form beliefs:

$$EU_{\text{spectator}} = -E\left(y_i - m_i\right)^2$$

His optimal choice is $E\left(m_i\right)$.

Performance-ranking uncertainty: Given a signal x_i, x_j, the spectator's posterior beliefs reflect performance-ranking uncertainty if and only if both $p_i > p_j$ and $p_j > p_i$ are in their support.

Result: Theory

Egalitarians: they always divide equally.

Libertarians: they always give the earnings to the individuals.

Meritocrats:

Proposition

A Bayesian meritocratic spectator implements in expectation the same level of inequality with limited information and full information if limited information does not cause ***performance-ranking uncertainty****, and strictly less inequality with limited information than with full information if limited information causes performance-ranking uncertainty.*

Non-Bayesian updating

Signal-neglecter: posterior beliefs are equal to the prior.

The same result on performance ranking uncertainty holds.

Base-rate neglecter: disregard the prior and use the likelihood of the signal.

PROPOSITION

A base-rate-neglecting meritocratic spectator implements in expectation strictly more inequality with limited information than with full information under some assumptions.

Experiment

Under the assumptions, posterior can be written as follows:

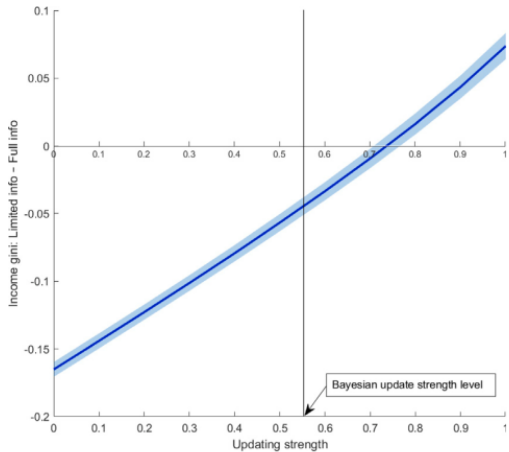
$$E\left(p_i \mid x_i\right) = (1 - \rho_B) \cdot \mu_p + \rho_B \cdot x_i$$

Bayesian updating: $\rho_B = 0.56$

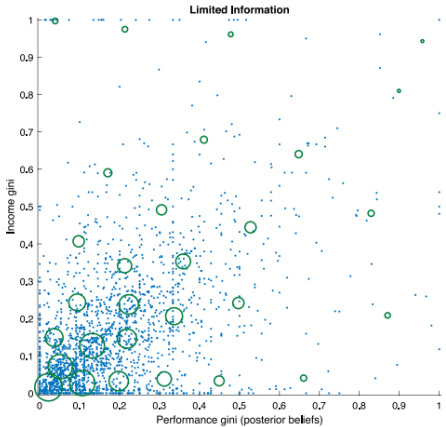
Signal neglecting: $\rho_B = 0$

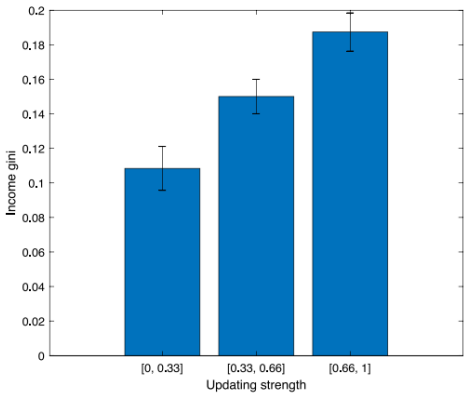
Base-rate neglecting: $\rho_B = 1$

Experiment: meritocrats prediction

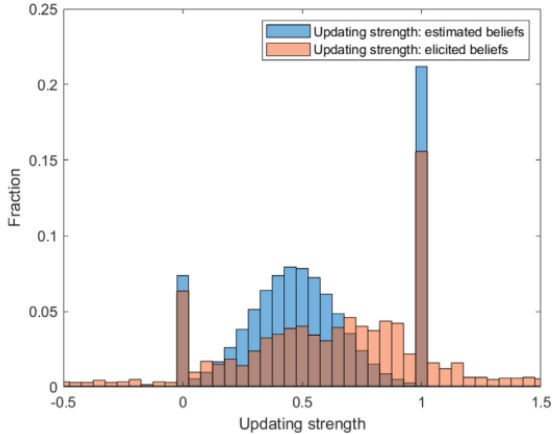


Experiment: implemented inequality

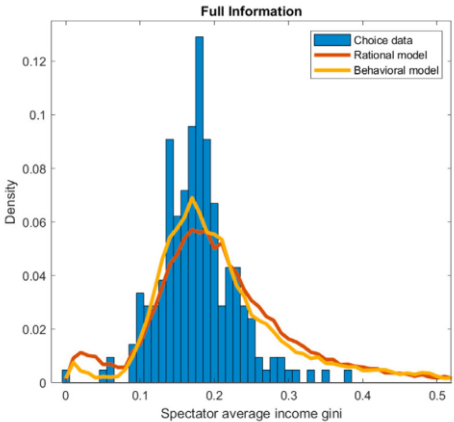


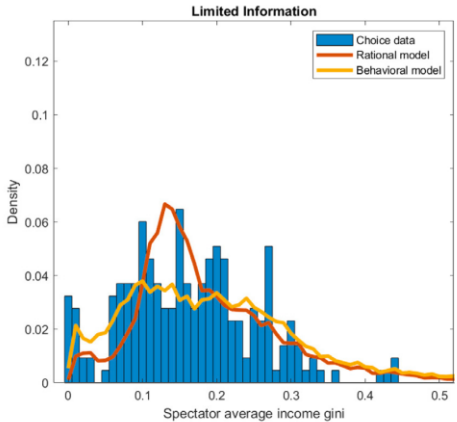


Experiment: elicited and estimated beliefs



Experiment: structural model vs data





Experiment: structural analysis

Structural analysis.

	Full Information treatment	Rational model	Behavioral model
$\lambda^{Meritocrats}$	81.05% (3.04%)	64.82% (2.58%)	81.22% (2.87%)
$\lambda^{Egalitarians}$	4.34% (1.76%)	11.18% (1.71%)	3.87% (1.28%)
$\lambda^{Libertarians}$	14.6% (2.66%)	24.00% (2.25%)	14.91% (2.68%)
ζ_{β}	−3.6351 (0.1064)	−3.6420 (0.0968)	−3.0636 (0.1093)
σ_{β}	1.8738 (0.0622)	2.2278 (0.0893)	2.8841 (0.0855)
μ_{ρ}			0.4678 (0.0234)
σ_{ρ}			0.1842 (0.0216)
$\theta_{signal\ neglect}$			0.0993 (0.0403)
$\theta_{base-rate\ neglect}$			0.2864 (0.0916)
Log likelihood		−11,956	−11,783
Log likelihood FI	−5,867	−5,891.1	−5,903
Log likelihood LI		−6,064.6	−5,879.8

Discussion

Language: Luck egalitarianism vs Meritocracy.

Underlying motivation: Why individuals distort information as they do?

Method: Impartial spectator.