Inequality Sensitive Treatment Effect Estimation

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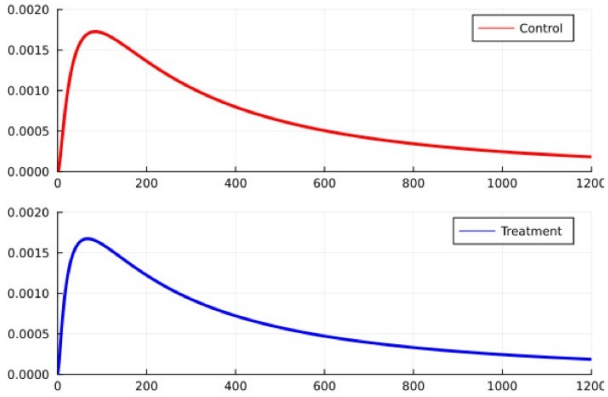
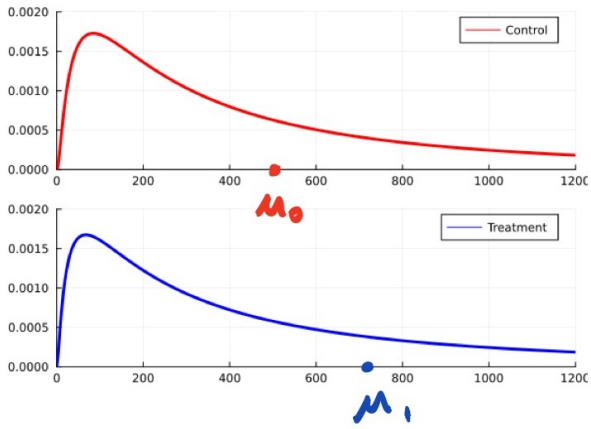
Roadmap

- Compare outcome distributions associated with different treatments when the evaluator is `inequality averse`
- Extend the comparison to the case when there is `uncertainty about the outcome distributions` associated with each treatment
- Incorporate these considerations into an empirical strategy based on the theory of `optimal treatment assignment`

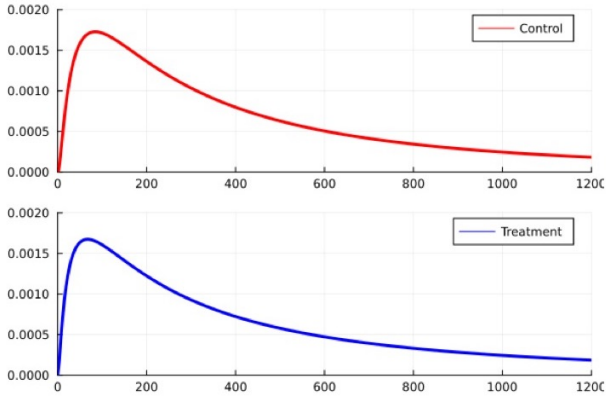
Two treatments and their outcome distributions



An inequality neutral evaluator



Inequality aversion



Calibrating inequality aversion

- **Setting**: Everyone's income (but person 1's) is growing without bound.
- `Result 1` (with Marc Fleurbaey): In this setting, if an evaluator will always protect a fraction $\lambda \in (0,1)$ of person 1's income, the evaluator's Social Preferences admit the representation

$$SWF(y) = \sum_{i=1}^{n} \boxed{\frac{y_i^{1-\gamma}}{1-\gamma}},$$

with $\gamma = 1 - \frac{1}{\log_n \lambda}$.

Egalitarian Equivalent

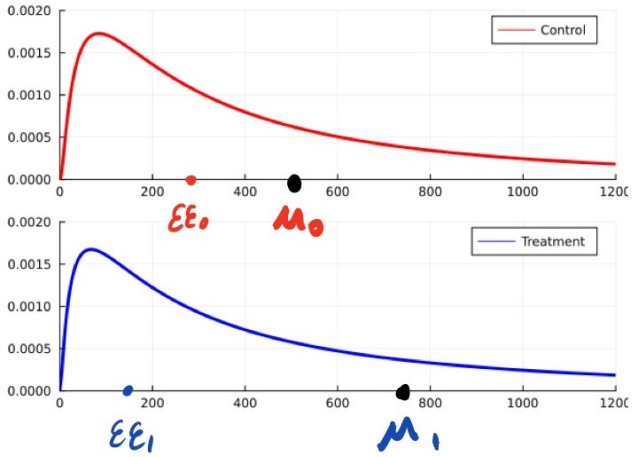
- Let $\mathcal{EE} = \mathcal{EE}(y)$ be such that the evaluator is indifferent between

$$(y_1, y_2, ..., y_n)$$

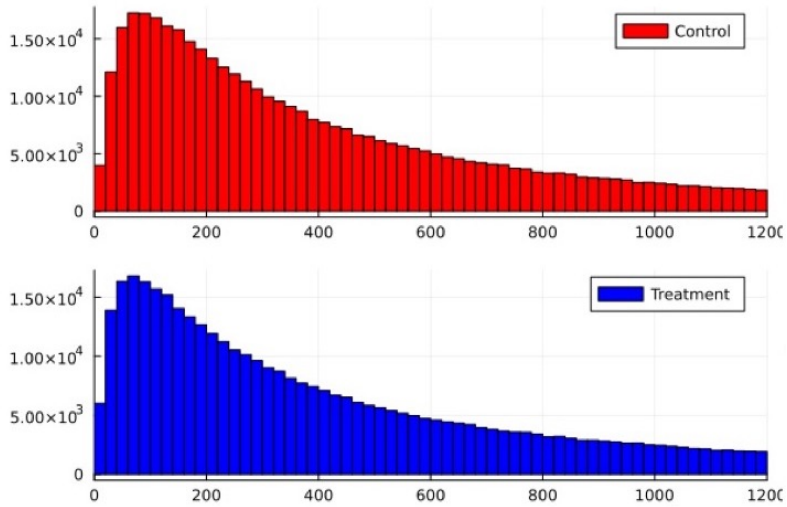
and

$$(\underbrace{\mathcal{EE}, \mathcal{EE}, ..., \mathcal{EE}}_{n-times}).$$

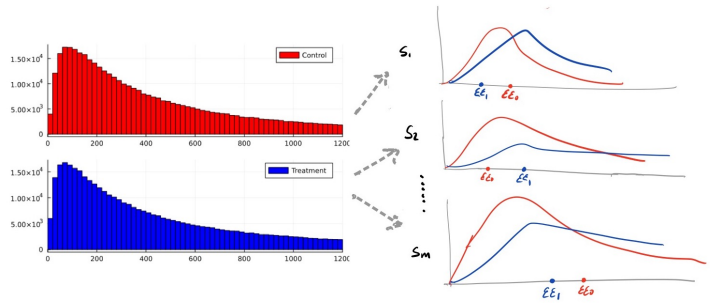
Egalitarian Equivalent



Incorporating uncertainty



Incorporating uncertainty



Statistical extension

- **Setting**: Absent inequality, the evaluator acts as if there is only one (representative) individual.

- `Result 2`: In this setting, the evaluator chooses among treatments by comparing the profiles

$$(\mathcal{EE}^1(y), ..., \mathcal{EE}^m(y))$$

across treatments.

Incorporating data

- `Result 3`: If the evaluator's identification strategy allows the state to be *point-identified*, the problem reduces to the comparison of point estimates of the egalitarian equivalent for each treatment.

Egalitarian Equivalent Treatment Effect (EETE) at $\hat{s}$

$$\tau(\hat{s}) = \mathcal{EE}^{\hat{s}}(y(1)) - \mathcal{EE}^{\hat{s}}(y(0))$$

Under *partial identification*, the evaluator selects the treatment with the most favorable egalitarian equivalent profile across the set of partially identified states.

Empirics

- Angrist 1990.
- Bloom et. a. 1997.
- Meager 2022.

Intellectual merit

- Guidance for the choice of `W`
- Guidance for how to incorporate `W` into an econometric framework
- Understanding the potential problems associated with using non-$\mathcal{EE}$ representations of `W` in the econometric framework
- Understanding how optimal treatment assignment varies with the choice of `W`

Broader impact

- Inequality matters!
- Development of ready-to-use code in `R` and other languages
- Exposing undergraduate and MS students in my MSI to frontier research topics

Thank you!!