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

$$SWF(y) = \sum_{i=1}^{n} \left[ \frac{y_i^{1-\gamma}}{1-\gamma} \right]$$

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

Egalitarian Equivalent

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

$$(y_1, y_2, \ldots, y_n)$$

and

$$(\mathcal{E}, \mathcal{E}, \ldots, \mathcal{E}).$$

$\text{n-times}$
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

\[(ℰℰ^1(y), ..., ℰℰ^m(y))\]

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.

\[
\tau(\hat{s}) = ℰℰ^{\hat{s}}(y(1)) - ℰℰ^{\bar{s}}(y(0))
\]

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.
- Meager 2022.

Intellectual merit

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

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!!