Being up front about Income Inequality

Brian Hill

hill@hec.fr

www.hec.fr/hill

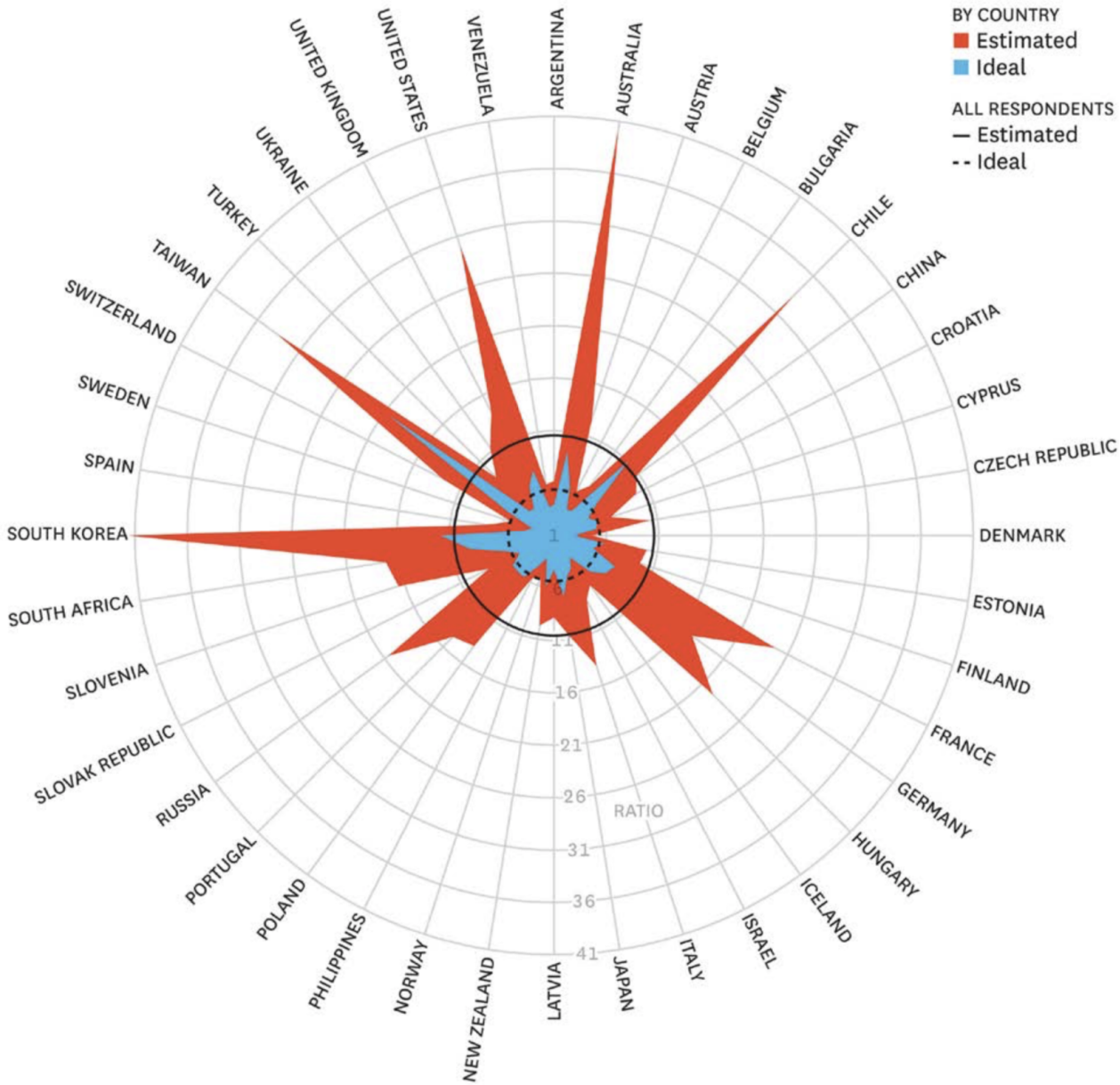
CNRS & HEC Paris

AFSE Congress
June 2023

Opinions on CEO-unskilled worker pay ratio

Estimated / Ideal

$$\frac{\text{CE0 pay}}{\text{unskilled worker pay}}$$

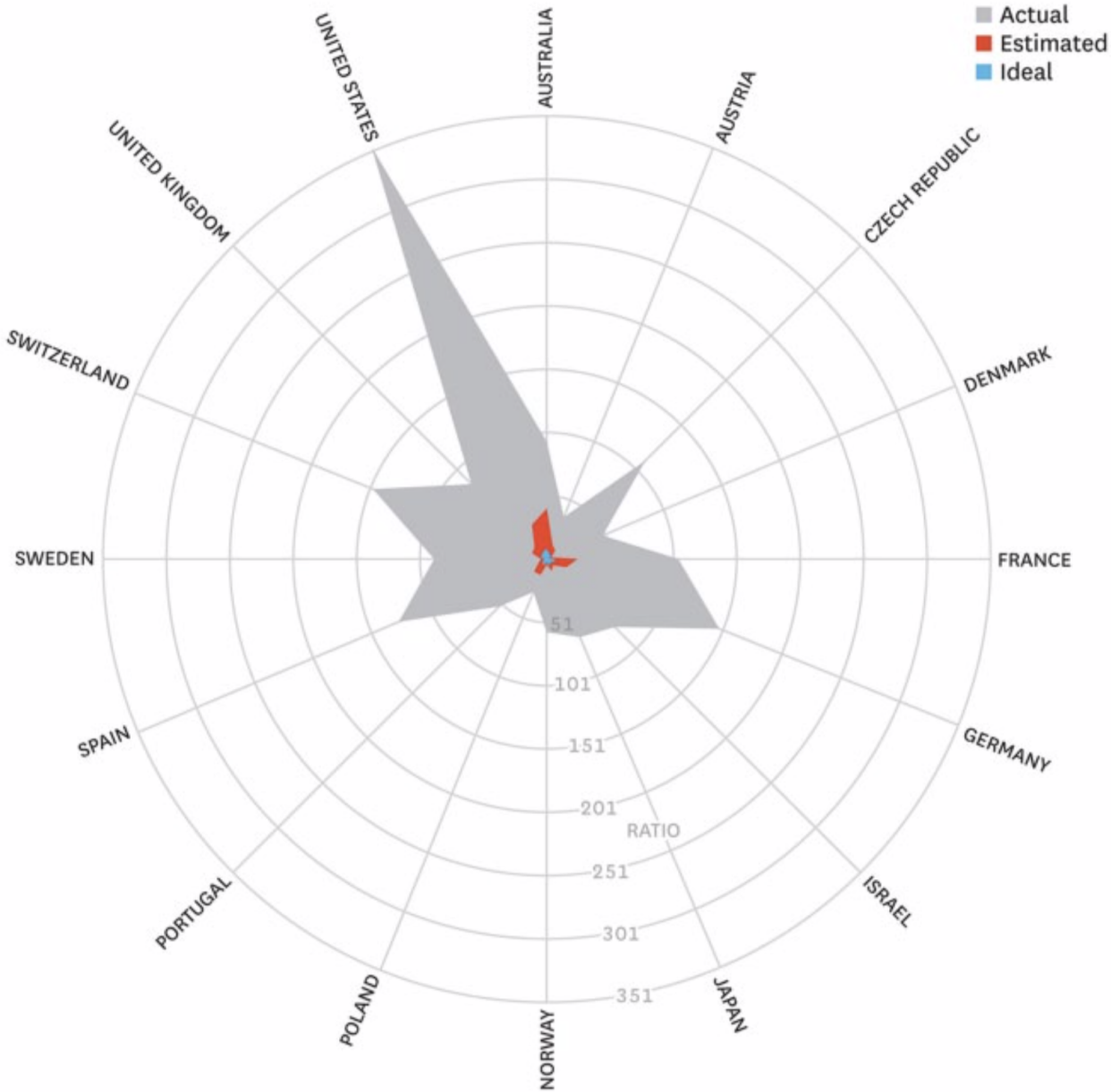


International Social Survey Programme 2009 Data (Kiatpongsan and Norton, 2014)

Opinions on CEO-unskilled worker pay ratio

Estimated /
Ideal /
Actual

$$\frac{\text{CE0 pay}}{\text{unskilled worker pay}}$$



International Social Survey Programme 2009 & AFL-CIO Data (Kiatpongsan and Norton, 2014)

Opinions on CEO-unskilled worker pay ratio

Take-aways On average, people:

1. have definite views on how much inequality is acceptable
2. think current income inequality levels aren't
3. but underestimate them

Opinions on CEO-unskilled worker pay ratio

Take-aways On average, people:

1. have definite views on how much inequality is acceptable
2. think current income inequality levels aren't
3. but underestimate them

- inequality-sensitive preferences

Opinions on CEO-unskilled worker pay ratio

Take-aways On average, people:

1. have definite views on how much inequality is acceptable
2. think current income inequality levels aren't
3. but underestimate them

- inequality-sensitive preferences
- not fully taken account in the market

Opinions on CEO-unskilled worker pay ratio

Take-aways On average, people:

1. have definite views on how much inequality is acceptable
2. think current income inequality levels aren't
3. but underestimate them

- inequality-sensitive preferences
- not fully taken account in the market

$\Rightarrow$ **Income inequality (in firms / producers): an externality**

Opinions on CEO-unskilled worker pay ratio

Take-aways On average, people:

1. have definite views on how much inequality is acceptable
2. think current income inequality levels aren't
3. but underestimate them

Income inequality (in firms / producers): an externality

Policy tool:

Opinions on CEO-unskilled worker pay ratio

Take-aways On average, people:

1. have definite views on how much inequality is acceptable
2. think current income inequality levels aren't
3. but underestimate them

Income inequality (in firms / producers): an externality

Policy tool:

Opinions on CEO-unskilled worker pay ratio

Take-aways On average, people:

1. have definite views on how much inequality is acceptable
2. think current income inequality levels aren't
3. but underestimate them

Income inequality (in firms / producers): an externality

Policy tool:

$\Rightarrow$ Information!

Opinions on CEO-unskilled worker pay ratio

Take-aways On average, people:

1. have definite views on how much inequality is acceptable
2. think current income inequality levels aren't
3. but underestimate them

Income inequality (in firms / producers): an externality

Policy tool:

$\Rightarrow$ Information!

I.e. Inform potential consumers, at the point of purchase, of the income inequality across all those involved in the conception, production, financing, marketing and logistics leading to the existence of the good on the market.

Information and income inequality

Income inequality (in firms / producers): an externality

As a policy tool, information is:

Information and income inequality

Income inequality (in firms / producers): an externality

As a policy tool, information is:

- non-invasive
- market-based

Information and income inequality

Income inequality (in firms / producers): an externality

As a policy tool, information is:

- non-invasive
- market-based
- More Coasian than Pigouvian (à la taxation)

Information and income inequality

Income inequality (in firms / producers): an externality

As a policy tool, information is:

- non-invasive
- market-based
- More Coasian than Pigouvian (à la taxation)
- efficiency / inequality trade-off:
  - consumers decide!

This paper

Aim Evaluate impact of universal provision of income inequalities involved in product creation.

This paper

Aim Evaluate impact of universal provision of income inequalities involved in product creation.

On a simple economic model, ask:

- what impact does information provision have on income inequality?
- and on social efficiency?

This paper

Aim Evaluate impact of universal provision of income inequalities involved in product creation.

On a simple economic model, ask:

- what impact does information provision have on income inequality?
  - Theoretical results & calibration with experimental data on consumer inequality attitudes
- and on social efficiency?

This paper

Aim Evaluate impact of universal provision of income inequalities involved in product creation.

On a simple economic model, ask:

- what impact does information provision have on income inequality?
  - Theoretical results & calibration with experimental data on consumer inequality attitudes
- and on social efficiency?

Also discuss:

- how could this be implemented?

Plan

- Model
- Questions:
  - what impact does information provision have on income inequality?
  - and on social efficiency?
- Discussion
  - implementing information provision

Model: basics

2 perfectly competitive markets / 3 players:

- 'Labour' market
  - firms recruit workers
- 'Good' market
  - firms sell (single good) to consumers

All goods identical except for the inequality (involved in production) and price.

Consumers

Continuum of consumers.

- price-takers
- purchase one or zero units of the good

Consumers

Continuum of consumers.

- price-takers
- purchase one or zero units of the good

Preferences Consumer j:

$$u_k(i, n) = n + (v_k - \psi_k(i)) \tag{1}$$

- $i \in I, n \in \mathbb{R}_{\geqslant 0}$: inequality, numéraire
- v_k: 'intrinsic' value of (one unit of) the good
- $\psi_k(i)$: disutility of obtaining the good with inequality i

Consumers

Continuum of consumers.

- price-takers
- purchase one or zero units of the good

Preferences Consumer j:

$$u_k(i, n) = n + (v_k - \psi_k(i)) \tag{1}$$

- $i \in I, n \in \mathbb{R}_{\geqslant 0}$: inequality, numéraire
- v_k: 'intrinsic' value of (one unit of) the good
- $\psi_k(i)$: disutility of obtaining the good with inequality i

NB: sensitive to the inequality in the production of the good (not to inequality in society etc.)

Extreme-inequality aversion

$$\psi_k(i) = \begin{cases} 0 & i \leqslant \theta_k \\ \eta_k(i - \theta_k) & i > \theta_k \end{cases} \tag{2}$$

Extreme-inequality aversion

$$\psi_k(i) = \begin{cases} 0 & i \leqslant \theta_k \\ \eta_k(i - \theta_k) & i > \theta_k \end{cases} \tag{2}$$

- θ_k: **justifiable-inequality threshold**
  - inequalities below this 'ideal' level potentially justified

E.g.

- Some inequalities are potentially justified by e.g. fairness
- But not **extreme inequalities**

Extreme-inequality aversion

$$\psi_k(i) = \begin{cases} 0 & i \leqslant \theta_k \\ \eta_k(i - \theta_k) & i > \theta_k \end{cases} \tag{2}$$

- θ_k: **justifiable-inequality threshold**
  - inequalities below this 'ideal' level potentially justified
- η_k: **extreme-inequality aversion**
- $\eta_k = 0$: extreme-inequality neutral / insensitive

Extreme-inequality aversion

$$\psi_k(i) = \begin{cases} 0 & i \leqslant \theta_k \\ \eta_k(i - \theta_k) & i > \theta_k \end{cases} \tag{2}$$

- θ_k: **justifiable-inequality threshold**
  - inequalities below this 'ideal' level potentially justified
- η_k: **extreme-inequality aversion**
- $\eta_k = 0$: extreme-inequality neutral / insensitive

Assume:

- same v, θ for all consumers
- distribution of η:
  - $K > 1$ levels: $\eta_1 > \cdots > \eta_K = 0$
  - **Extreme-inequality aversion distribution**: $\mu = (\mu_1, \ldots, \mu_K)$
    - μ_j consumers have extreme-inequality aversion η_j.
  - μ^0: everyone extreme-inequality neutral.

Workers

2 types:

- low L
- high H:
  - skill level $f \in [\underline{f}, \overline{f}]$

Workers

2 types:

- low L
- high H:
  - skill level $f \in [\underline{f}, \overline{f}]$: units produced

Workers

2 types:

- low L
- high H:
  - skill level $f \in [\underline{f}, \overline{f}]$: units produced

Wages depend on type and level:

- L: 1
- f: $w(f) \geqslant 0$ (w continuous)

Workers

2 types:

- low L
- high H:
  - skill level $f \in [\underline{f}, \bar{f}]$: units produced

Wages depend on type and level:

- L: 1
- f: $w(f) \geqslant 0$ (w continuous)

Labour supply given by function X for each $f \in [\underline{f}, \bar{f}]$:

- $X(f, x)$: supply of H-type f-level labour at wage x
  - X diffble; $\frac{\partial X}{\partial x} > 0$ wherever non-zero
  - $X(f, 1) = 0$ for all f

Firms

Each firm

- recruits one unit of *L*-type labour and one unit of *H*-type labour at a single skill level
- chooses skill level
- price-takers

Firms

Each firm

- recruits one unit of *L*-type labour and one unit of *H*-type labour at a single skill level
- chooses skill level
- price-takers

Inequality for firm's good:

- max-min ratio:

$$\frac{\text{wage of H-type recruited}}{\text{wage of L-type}} = w(f)$$

Equilibrium

Perfect competition, with free entry (of firms).

Equilibrium:

- set of prices $p^* : I \to \mathbb{R}_{\geqslant 0}$
- wage schedule $w^* : [\underline{f}, \bar{f}] \to \mathbb{R}_{\geqslant 0}$
- $J^* : [\underline{f}, \bar{f}] \to \mathbb{R}_{\geqslant 0}$: active firms recruiting at skill level f

such that optimise and markets closed.

See paper for details.

Equilibrium

Perfect competition, with free entry (of firms).

Equilibrium:

- set of prices $p^* : I \to \mathbb{R}_{\geqslant 0}$
- wage schedule $w^* : [\underline{f}, \bar{f}] \to \mathbb{R}_{\geqslant 0}$
- $J^* : [\underline{f}, \bar{f}] \to \mathbb{R}_{\geqslant 0}$: active firms recruiting at skill level f

such that optimise and markets closed.

- Inequality determined by: w^* and J^*

See paper for details.

Plan

- Model
- Questions:
  - what impact does information provision have on income inequality?
  - and on social efficiency?
- Discussion
  - implementing information provision

Equilibrium wage schedules

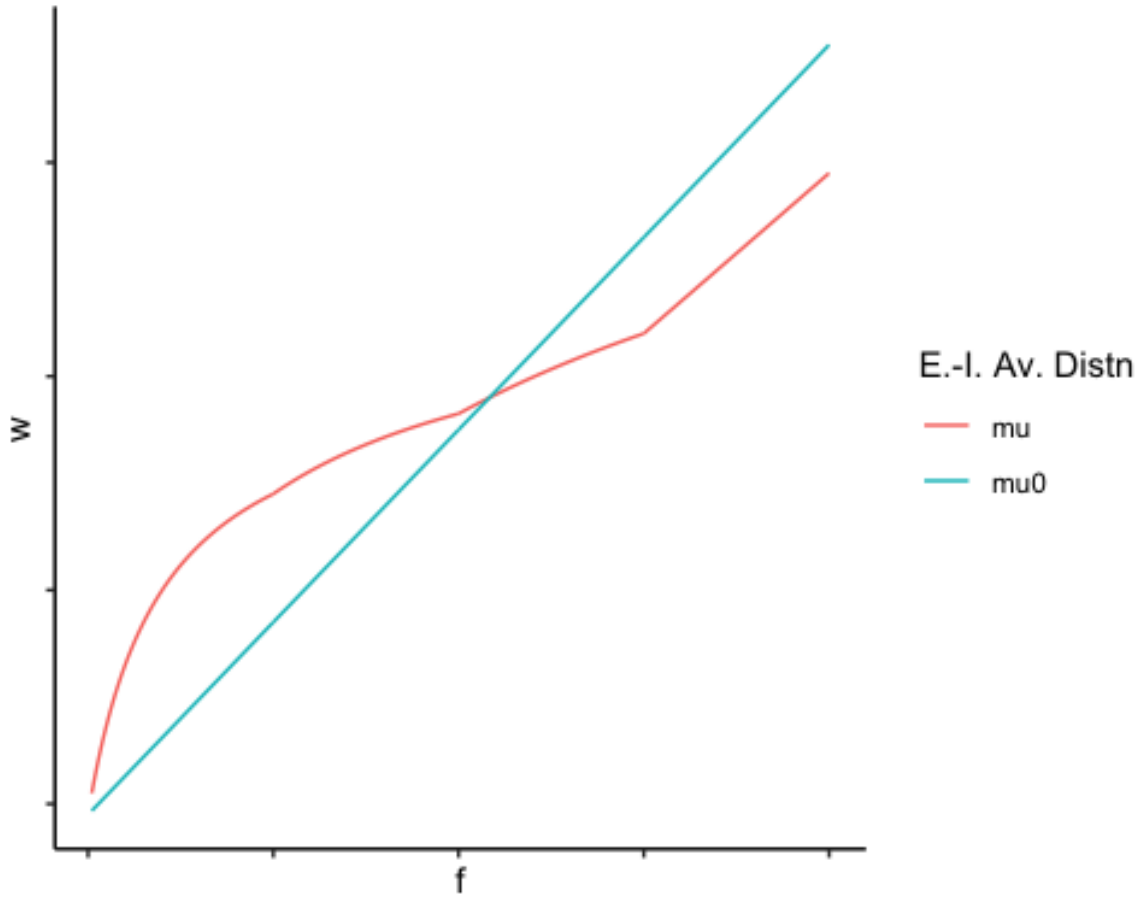


Figure: Sample equilibrium wage schedules, for two extreme-inequality aversion distributions

See paper for details.

Effect of Extreme-inequality aversion

Base result

μ Inequality Aversion Dominates μ':

- for every $1 \leqslant j \leqslant K$, $\sum_{i \leqslant j} \mu_i \geqslant \sum_{i \leqslant j} \mu'_i$.

(Recall: lower j, higher extreme-inequality aversion.)

Effect of Extreme-inequality aversion

Base result

μ Inequality Aversion Dominates μ':

- for every $1 \leqslant j \leqslant K$, $\sum_{i \leqslant j} \mu_i \geqslant \sum_{i \leqslant j} \mu'_i$.

Theorem

If μ Inequality Aversion Dominates μ', then the max-min wage ratio across all workers in equilibrium is lower under μ.

It is strictly lower if and only if the number of consumers purchasing the good at an inequality level higher than θ in equilibrium under μ' is strictly greater than $\sum_{i \geqslant \bar{j}} \mu_i$ where $\bar{j}$ is such that $\mu_{\bar{j}} \neq \mu'_{\bar{j}}$ and $\mu_i = \mu'_i$ for all $i > \bar{j}$.

$$\text{Max-min wage ratio} = \frac{\text{Max wage}}{\text{Min wage}}$$

Effect of Extreme-inequality aversion

Base result

μ Inequality Aversion Dominates μ':

- for every $1 \leqslant j \leqslant K$, $\sum_{i \leqslant j} \mu_i \geqslant \sum_{i \leqslant j} \mu'_i$.

Theorem

If μ Inequality Aversion Dominates μ', then the max-min wage ratio across all workers in equilibrium is lower under μ.

It is strictly lower if and only if the number of consumers purchasing the good at an inequality level higher than θ in equilibrium under μ' is strictly greater than $\sum_{i \geqslant \bar{j}} \mu_i$ where $\bar{j}$ is such that $\mu_{\bar{j}} \neq \mu'_{\bar{j}}$ and $\mu_i = \mu'_i$ for all $i > \bar{j}$.

I.e. Virtually every extreme-inequality-aversion increasing shift $\Rightarrow$ less inequality

Inequality Information Provision

Market with no inequality information:

- all consumers inequality neutral; μ^0

Inequality Information Provision

Market with no inequality information:

- all consumers inequality neutral; μ^0

Corollary

For any μ, the max-min wage ratio in equilibrium is lower under μ than under μ^0.

Moreover, it is strictly lower if and only if:

$$\#\begin{array}{l}\textit{extreme-inequality averse}\\ \textit{consumers under } \mu\end{array} > \#\begin{array}{l}\textit{consumers purchasing at}\\ \textit{a price below } \theta \textit{ under } \mu^0\end{array}$$

I.e. providing inequality information $\Rightarrow$ income inequality $\downarrow$

- Strict $\downarrow$ if enough extreme-inequality averse consumers

Other Inequality Measures

Theorem

For any μ, wage inequality in equilibrium is lower under μ than under μ^0.*

Moreover, it is strictly lower if and only if:

$$\#\begin{array}{l}\textit{extreme-inequality averse}\\ \textit{consumers under } \mu\end{array} > \#\begin{array}{l}\textit{consumers purchasing at}\\ \textit{a price below } \theta \textit{ under } \mu^0\end{array}$$

* Inequality measure: appropriate

- Quantile measures ($= \frac{a\% \text{ highest}}{b\% \text{ lowest}}$)
- Share measures ($= \frac{\text{share of top } a\%}{\text{share of bottom } b\%}$)

Inequality Information Provision

Robustness & Extensions

Universal Information Provision vs. Voluntary Labelling

- Firms choose to release inequality information
- Consumers have default inequality expectations

Inequality Information Provision

Robustness & Extensions

Universal Information Provision vs. Voluntary Labelling

- Firms choose to release inequality information
- Consumers have default inequality expectations

Proposition

For any μ, the max-min wage ratio in equilibrium is lower under universal information provision than under voluntary labelling.

Moreover, it is strictly lower whenever there is an extreme-inequality averse consumer who buys the unlabelled good in equilibrium under voluntary labelling.

I.e. Universal information provision more effective than voluntary labelling

Inequality Information Provision

Robustness & Extensions

Summary

- Universally providing inequality information $\Rightarrow$ income inequality $\downarrow$
- Strict $\downarrow$ if enough extreme-inequality averse consumers

Are people extreme-inequality averse?

Inequality aversion & fairness studies (Fehr and Schmidt, 2003; Almås et al., 2020, e.g.):

- Some inequality aversion, tempered by fairness attitudes

Are people extreme-inequality averse?

Inequality aversion & fairness studies (Fehr and Schmidt, 2003; Almås et al., 2020, e.g.):

- Some inequality aversion, tempered by fairness attitudes

But:

- Consumer choice with differing product-level inequality?
- Extreme inequalities?

Are people extreme-inequality averse?

Inequality aversion & fairness studies (Fehr and Schmidt, 2003; Almås et al., 2020, e.g.):

- Some inequality aversion, tempered by fairness attitudes

But:

- Consumer choice with differing product-level inequality?
- Extreme inequalities?

Hill and Lloyd (2023):

- willingness to pay for inequality reduction in purchased goods
- incentivised
- representative samples: England & US.

Are people extreme-inequality averse?

Extreme-inequality averse: Over 80% of the population

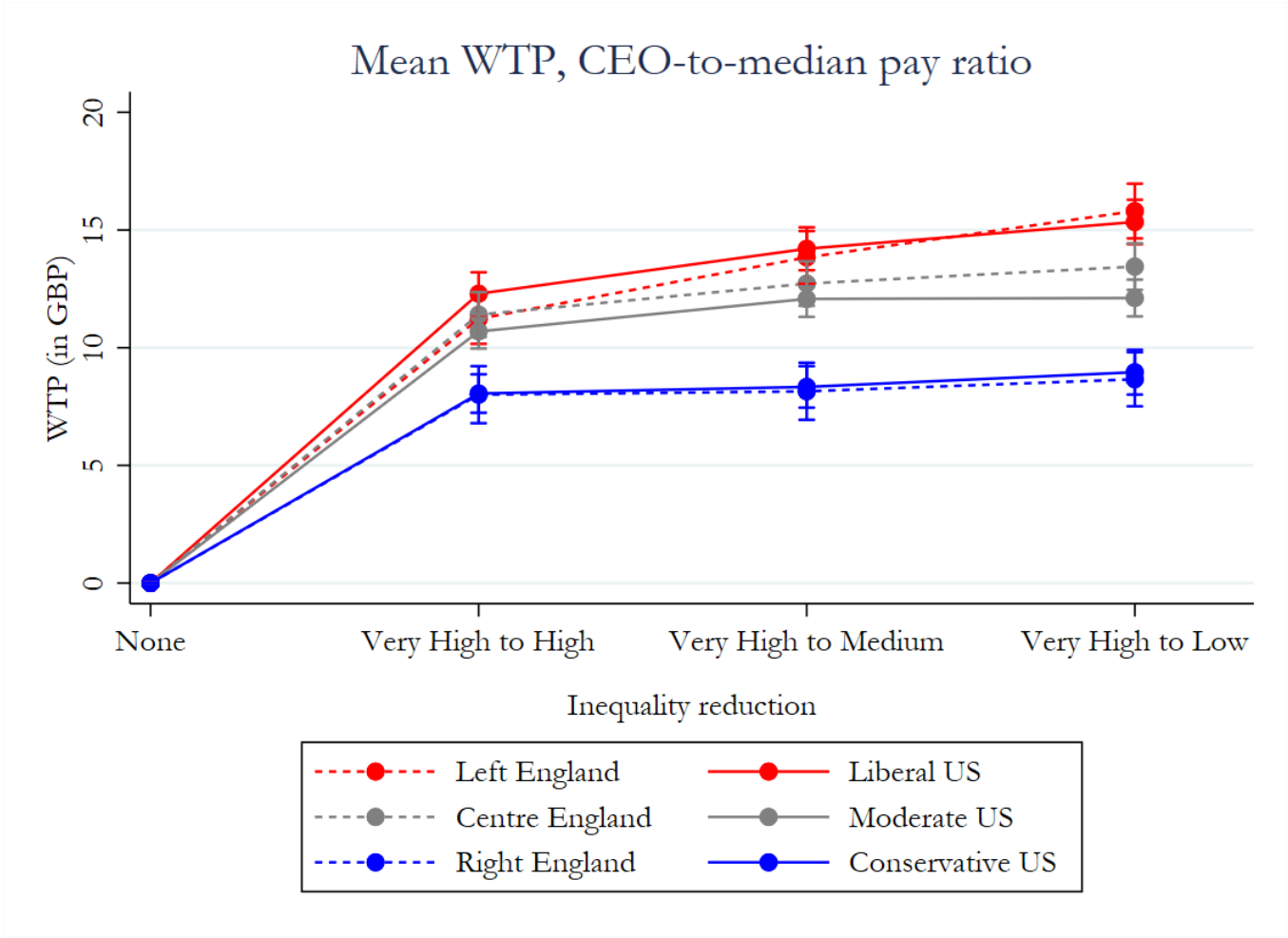


Figure: Mean WTP for inequality reductions (Hill and Lloyd, 2023)

Are people extreme-inequality averse?

Extreme-inequality averse: Over 80% of the population

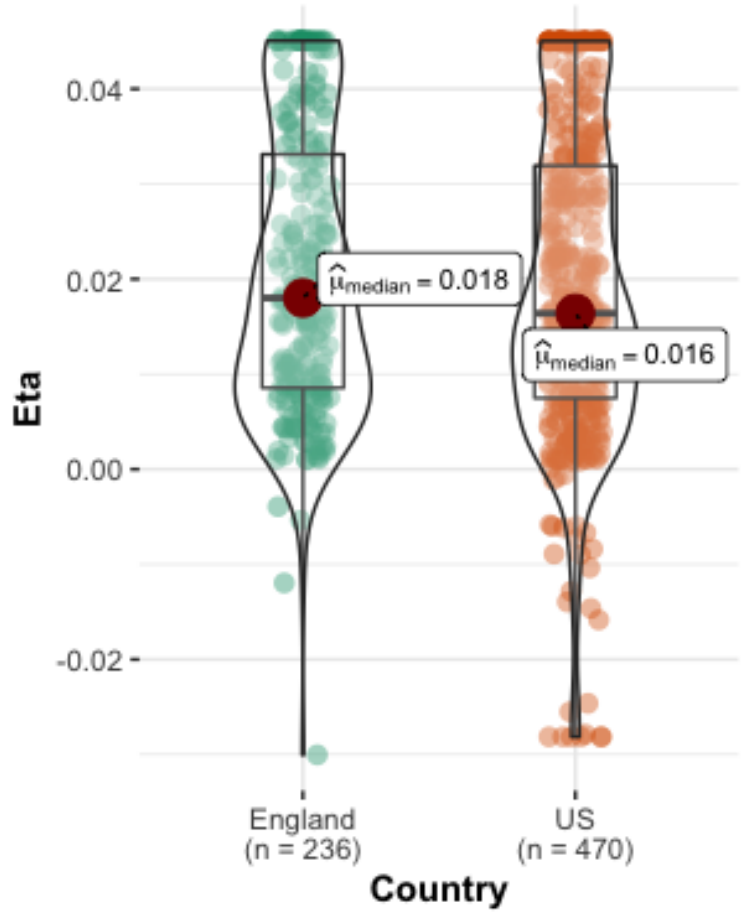


Figure: Subject level estimates for η, using Hill and Lloyd (2023) data

Simulation

Consumers:

- $\theta = 10$
- $(100 - p)\%$ extreme-inequality neutral
- rest: extreme-inequality aversion η

Labour supply (Card et al., 2018):

$$X(f, x) = A\mathcal{P}(f)(x - b)^{\beta_f}$$

- Elasticity: Card et al. (2018)
- Productivity: Gabaix & Landier (2008)

Simulation

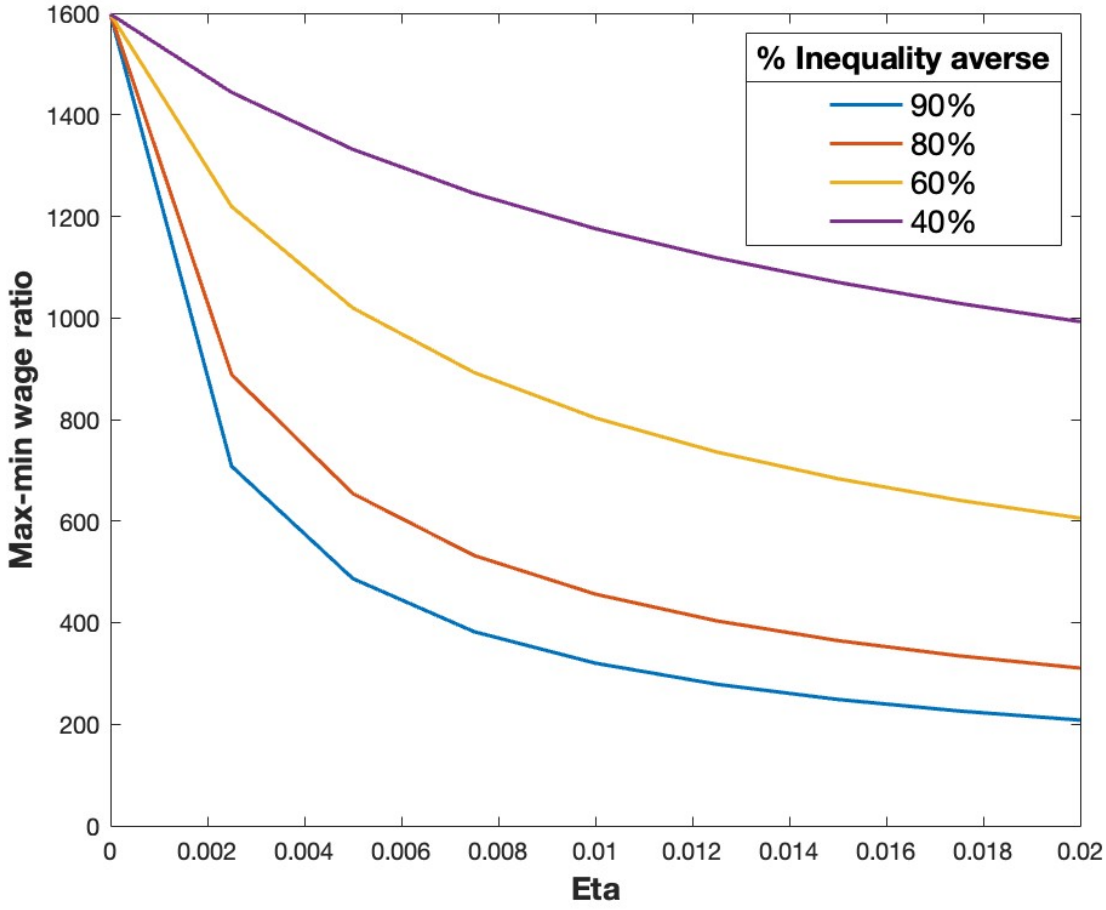


Figure: Inequality vs. extreme-inequality aversion, by proportion of extreme-inequality averse consumers

Simulation

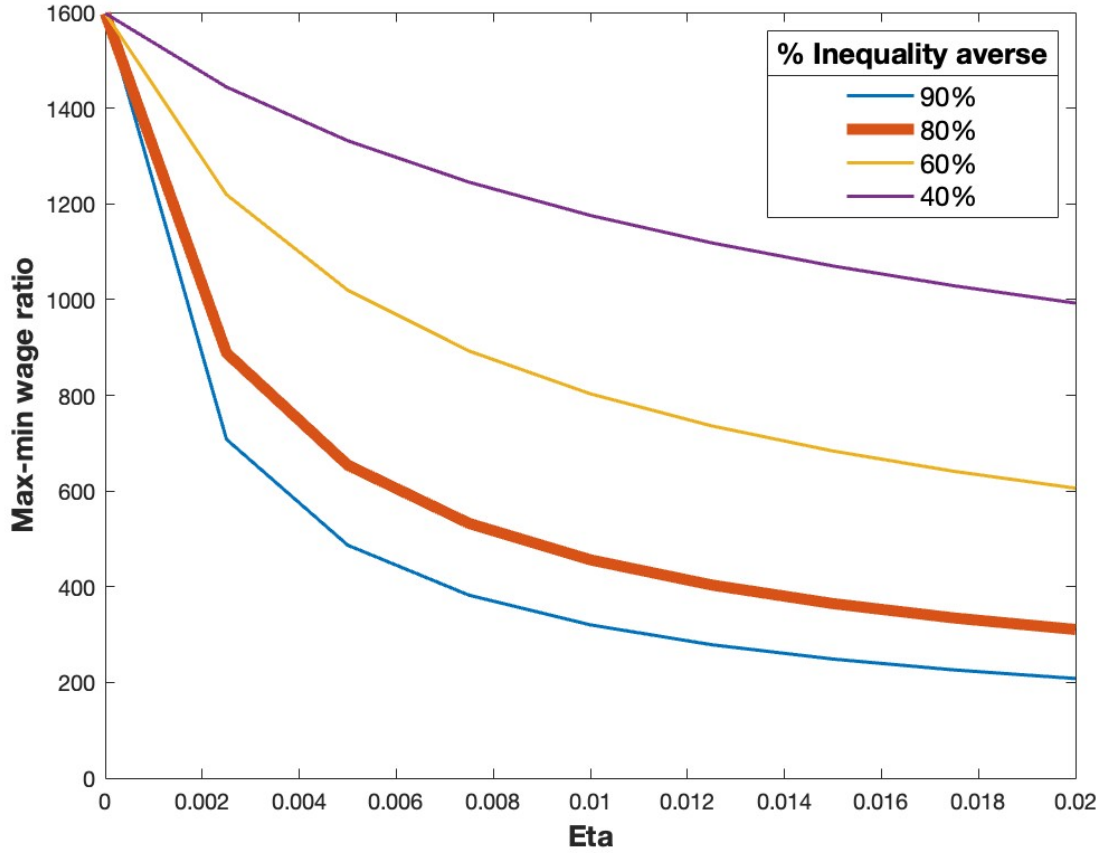


Figure: Inequality vs. extreme-inequality aversion, by proportion of extreme-inequality averse consumers

Simulation

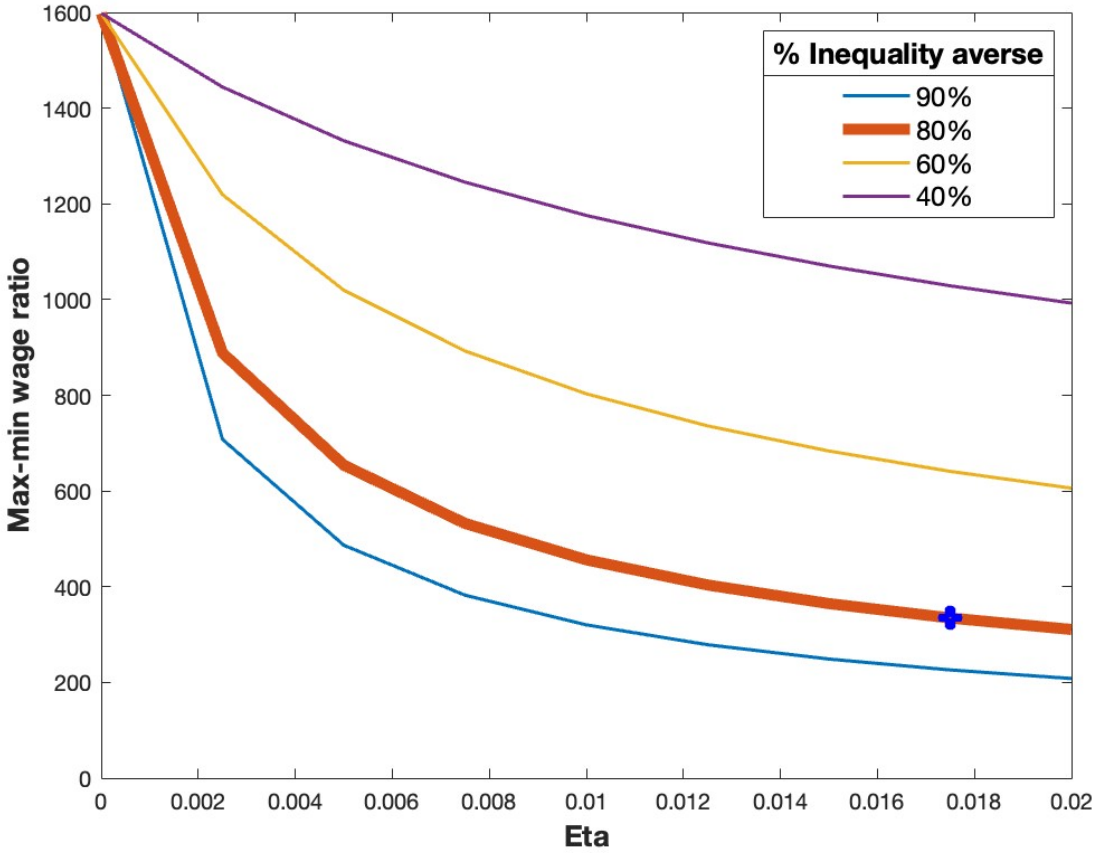


Figure: Inequality vs. extreme-inequality aversion, by proportion of extreme-inequality averse consumers

Simulation

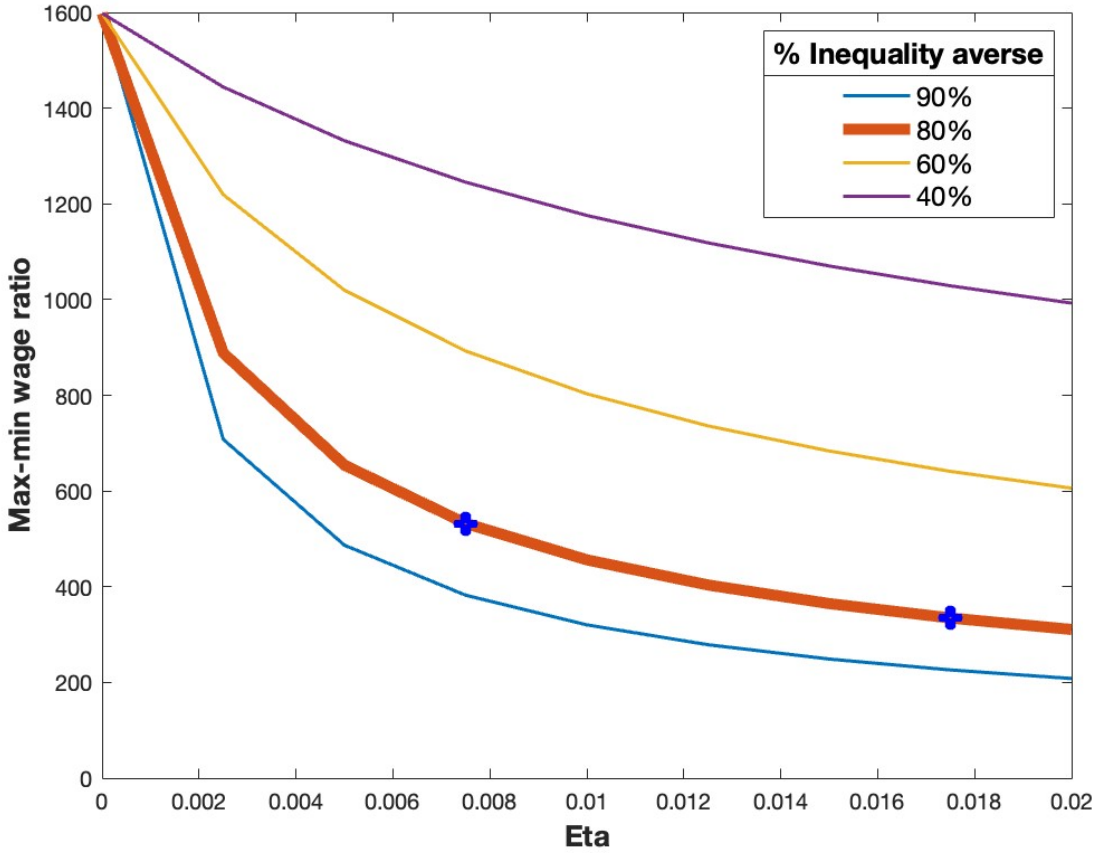


Figure: Inequality vs. extreme-inequality aversion, by proportion of extreme-inequality averse consumers

Plan

- Model
- Questions:
  - what impact does information provision have on income inequality?
  - and on social efficiency?
- Discussion
  - implementing information provision

Social efficiency

Social efficiency

Theorem

Any feasible allocation generated by a competitive equilibrium is Pareto optimal.

I.e. Informing about inequality $\Rightarrow$ socially efficient outcome in terms of the consumers' (potentially extreme-inequality averse) preferences

Social efficiency

Proposition

For μ such that information provision has an impact: any feasible allocation consistent with the wage schedule under no information is Pareto dominated.

I.e. Absence of information $\Rightarrow$ socially inefficient outcome

Also Voluntary labelling $\Rightarrow$ socially inefficient outcome

Social efficiency

Summing up

- providing inequality information $\Rightarrow$ Pareto improvement
  - inequality averse consumers prefer sacrificing productivity (and lower prices) for reduced inequality

Skip to end

Plan

- Model
- Questions:
  - what impact does information provision have on income inequality?
  - and on social efficiency?
- Discussion
  - implementing information provision

Implementation

Two phases

Implementation

Two phases

Information collation

Information provision

Implementation

Two phases

Information collation

Challenge:

- Transparent, freely available, comprehensive source

N.B. Much relevant data already exists (e.g. firms, governments)

Information provision

For details (and FAQ):

- https://people.hec.edu/hill/social-cost/

Implementation

Two phases

Information collation

Challenge:

- Transparent, freely available, comprehensive source

Information provision

For details (and FAQ):

- https://people.hec.edu/hill/social-cost/

Implementation

Two phases

Information collation

Challenge:

- Transparent, freely available, comprehensive source

Information provision

Challenge:

- available in convenient, understandable format at point of purchase

For details (and FAQ):

- https://people.hec.edu/hill/social-cost/

Implementation

Two phases

Information collation

Challenge:

- Transparent, freely available, comprehensive source

Information provision

Challenge:

- available in convenient, understandable format at point of purchase

→ **mobile app**

For details (and FAQ):

- https://people.hec.edu/hill/social-cost/

In summary

Key points:

- Income inequality as an externality
- Information provision as a tool to correct it

Findings: information provision

- reduces income inequality
- re-establishes social efficiency

Further details:

- https://people.hec.edu/hill/social-cost/

In summary

Key points:

- Income inequality as an externality
- Information provision as a tool to correct it

Findings: information provision

- reduces income inequality
- re-establishes social efficiency

Further details:

- https://people.hec.edu/hill/social-cost/

Thank you!!

Being up front about Income Inequality

Brian Hill

hill@hec.fr

www.hec.fr/hill

CNRS & HEC Paris

AFSE Congress
June 2023

References I

Almås, I., Cappelen, A. W., and Tungodden, B. (2020). Cutthroat Capitalism versus Cuddly Socialism: Are Americans More Meritocratic and Efficiency-Seeking than Scandinavians? *Journal of Political Economy*, 128(5):705551.

Card, D., Cardoso, A. R., Heining, J., and Kline, P. (2018). Firms and labor market inequality: Evidence and some theory. *Journal of Labor Economics*, 36(S1):S13–S70. Publisher: University of Chicago Press Chicago, IL.

Fehr, E. and Schmidt, K. M. (2003). Theories of fairness and reciprocity-evidence and economic applications. In Dewatripont, M., Hansen, L. P., and Turnovsky, S. J., editors, *Advances in Economics and Econometrics*, volume 1 of *Econometric Society Monographs*, pages 208–257.

References II

Gabaix, X. and Landier, A. (2008). Why has CEO pay increased so much? *The Quarterly Journal of Economics*, 123(1):49–100.

Hill, B. and Lloyd, T. (2023). Are People Willing to Pay for Reduced Inequality? HEC Paris Research Paper Series ECO/SCD-2020-1392, HEC Paris.

Kiatpongsan, S. and Norton, M. I. (2014). How Much (More) Should CEOs Make? A Universal Desire for More Equal Pay. *Perspectives on Psychological Science*, 9(6):587–593.