Being up front about Income Inequality

Brian Hill

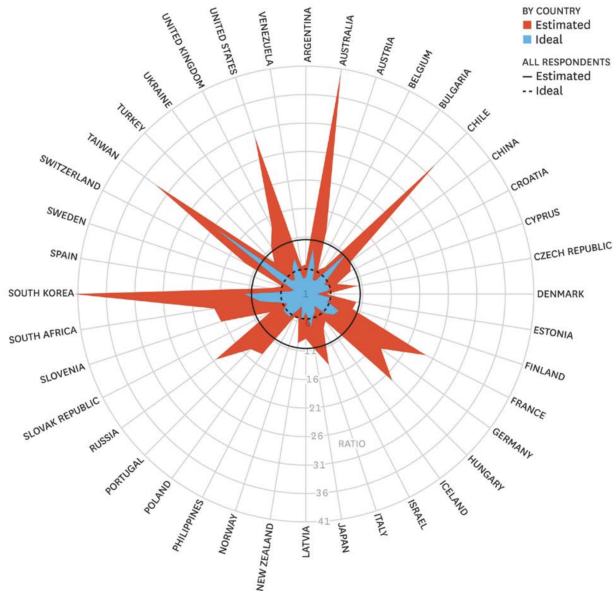hill@hec.fr

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CNRS & HEC Paris

12th World Congress of the Econometric Society
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Opinions on CEO-unskilled worker pay ratio

Estimated / Ideal

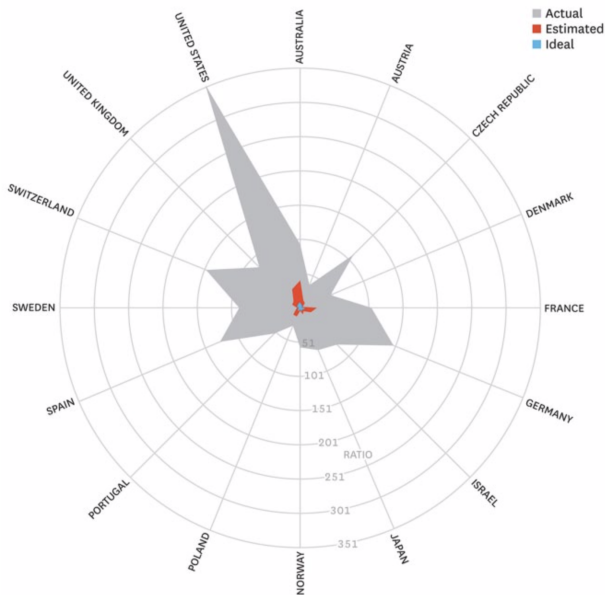$$\frac{\text{CE0 pay}}{\text{unskilled worker pay}}$$

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

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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

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⇒ **Income inequality (in firms / producers): an externality**

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Income inequality (in firms / producers): an externality

Policy tool:

⇒ 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

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- ‣ but does it work?

This paper

Aim (Theoretically) evaluate impact of blanket reporting of income inequalities involved in product creation.

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On a simple economic model, ask:

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- and on social efficiency?

Also discuss:

- are people inequality averse? How much etc?
- how could this be implemented?

Plan

- Model
- Theoretical questions:
    - what impact does information provision have on income inequality?
    - and on social efficiency?
- Discussion
    - experimental evidence on inequality aversion
    - 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 $P = [0, N] \subseteq \mathbb{R}_{\geqslant 0}$ of consumers, with measure N.

- price-takers
- purchase one or zero units of the good
- all same endowment of numéraire $\hat{n}$

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(Potentially) inequality-averse preferences Consumer j:

$$u_j(p, i) = (\hat{n} - p) + v_j - \psi_j(i) \tag{1}$$

- p, i: price, inequality
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NB: Preferences sensitive to the inequality in the production of the good (not to inequality in society etc.)

Inequality aversion

$$\psi_j(i) = \begin{cases} 0 & i \le \theta_j \\ \eta_j(i - \theta_j) & i > \theta_j \end{cases} \tag{2}$$

- θ_j: **justifiable-inequality threshold**
  - inequalities below this 'ideal' level potentially justified
- η_j: **degree of inequality aversion** (above threshold)
- $\eta_j = 0$: inequality neutral / insensitive

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Assume:

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

Workers

2 types:

- ‣ low *L*
- ‣ high *H*:
    - ‣ several levels $[\underline{s_H}, \overline{s_H}]$

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	Interpn 1	Interpn 2
L	factory worker	labour
H	manager	capital
s	skill	attractiveness

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Wages depend on type and level:

- ‣ *L*: 1
- ‣ *s*: $w(s)$

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Labour supply given by function X_s for each $s \in [\underline{s_H}, \overline{s_H}]$:

- ‣ $X_s(x)$: supply of *H*-type *s*-level labour at wage *x*
    - ‣ X_s continuous and strictly increasing for each *s*
- ‣ $X_s(1) = 0$ for all *s*: no *H*-type worker would work for the *L*-type wage.

Firms

Each firm

- ▸ recruits one unit of *L*-type labour and one unit of *H*-type labour at a single skill level
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Production

- ‣ production function: (continuous, differentiable) $F : [\underline{s_H}, \overline{s_H}] \to \mathbb{R}$
  - ‣ $F(s)$: quantity of the good produced with one unit of *L*-type labour and one unit of *H*-type labour of skill level *s*.
- ‣ $F' > 0$: skill favorable to production

Firm's inequality

Inequality for firm's good:

‣ max-min ratio:

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

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Summing up Firms' profit maximization problem:

$$\max_{s \in [\underline{s_H}, \overline{s_H}]} p(w(s)).F(s) - (w(s) + 1) \tag{3}$$

Equilibrium

Perfect competition, with free entry (of firms).

Equilibrium:

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

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such that:

1. firms / consumers maximise profits / utility
2. Labour market closed, for each skill level
3. Good market closed, for each inequality level
4. Free entry condition

See paper for details.

Plan

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- Discussion
    - experimental evidence on inequality aversion
    - Implementation . . .

Equilibrium wage schedules

Equilibrium wage schedules
When everyone is inequality neutral:

$$w^*(s) = C_K F(s) - 1 \qquad s \in [\underline{s_k}, \overline{s_K}]$$

For C_K, $\underline{s_k}$, $\overline{s_K}$ satisfying certain conditions.

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Equilibrium wage schedules
In general:

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For $C_k, \dots, C_K, \underline{s_k}, \overline{s_k}, \underline{s_K}, \overline{s_K}$ satisfying certain conditions.

- wage strictly increasing in the skill level
- price decreasing in inequality
- both vary according to inequality aversion distribution
- 'sorting' or 'self-selection': more inequality averse consumers buy from firms employing lower skilled workers

See paper for details.

Inequality aversion and inequality

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 inequality aversion.)

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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 whenever $\mu_j \neq \mu_j'$ for some type j which, in equilibrium under μ', buys the good at an inequality level greater than θ.

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

Social efficiency

Allocation (in the goods market):

- ▸ of good w. inequality level & wealth to each consumer
- ▸ of number of hiring firms & wage for each skill level
- ▸ feasible if satisfy market clearing conditions

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Any allocation generated by a competitive equilibrium is Pareto optimal.

> NB Standard version of Pareto optimality for continuum of consumers (e.g. Hammond, 1979).

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I.e. Informing about inequality ⇒ socially efficient outcome in terms of the consumers' (potentially inequality averse) preferences

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- all consumers: inequality neutral ($\eta = 0$)

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Impact First Theorem

- providing inequality information $\Rightarrow$ income inequality $\downarrow$

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- full information provision under perfect competition: Pareto optimal

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- providing inequality information $\Rightarrow$ Pareto improvement

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Social efficiency Second Theorem

- full information provision under perfect competition: Pareto optimal
- providing inequality information $\Rightarrow$ Pareto improvement
  - inequality averse consumers prefer sacrificing productivity (and lower prices) for reduced inequality

How much impact? I

Example: Gabaix & Landier specification

Plugging in:

- all consumers: inequality aversion η
- $[\underline{s_H}, \overline{s_H}] = [1, 1000]$: skill level = productivity
- labour supply:

$$X_s(w(s)) = \underbrace{\frac{1000 \max\{w(s) - 1, 0\}}{F(s)}}_{\text{propensity to accept wage}} \cdot \underbrace{\frac{(T(\overline{s_H}) - T(s))^{\frac{1}{2}}}{\int_{\underline{s_H}}^{\overline{s_H}}(T(\overline{s_H}) - T(s))^{\frac{1}{2}} ds}}_{\substack{\text{CEO talent distrn} \\ \text{(Gabaix and Landier, 2008)}}}$$

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Existing studies (psychology / marketing) generally:

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Sister paper (Hill & Lloyd, 2020):

- willingness to pay for inequality reduction
- incentivised
- binary choice purchasing questions
- representative sample; England.

Are people inequality averse?

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Yes: many are!

Figure: Median, 25%, 75% quantile WTPs

Are people inequality averse?

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In fact:

- ‣ 12% population with WTP=0
- ‣ positive WTP across the political spectrum
- ‣ WTP generally increasing in the inequality reduction

Implementation

Two phases

Implementation

Two phases

Information collation

Implementation

Information collation

Challenge:

- ▸ Transparent, freely available, comprehensive source

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

For details (and FAQ):

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

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→ **mobile app**

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In summary

Key points:

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

Theoretical findings: information provision

- ‣ reduces income inequality
- ‣ re-establishes social efficiency

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References

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