

# Inverse Fair Taxation

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# Aim of the paper

- Combine **inverse optimal tax** and **fair taxation** literature
- Inverse optimal (income) taxation:
  - assumes that the actual tax-benefit scheme in a country is optimally set by a planner
  - **Inversion allows to deduce some of the underlying parameters of interest**, e.g., the implicit marginal social welfare weights (as a function of earnings)
  - Inverting Mirrlees (1974): Bourguignon & Spadaro (2010), Lockwood & Weinzierl (2014), Zoutman et al. (2014), Lorenz & Sachs (2015)
  - Inverting Saez (2002): Blundell et al. (2009), Bargain & Keane (2010), Bargain et al. (2014), Hermle & Peichl (2017)

# Fairness and economics

- Fairness literature adds **responsibility** (to ability):
  - **circumstances** versus **ambitions** (individual held responsible for A but not C), i.e. fairness requires that  $\Delta$  outcome caused by C (A) to be compensated (preserved)
- Fairness plays a role in preferences for redistribution:
  - people are willing to compensate others for 'misfortunes',
  - but they also grant each other the fruits of personal effort.
- Fairness has been introduced in
  - public policy design, mainly income taxation (see Fleurbaey and Maniquet (2011) for an overview),
  - inequality (of opportunity) measurement (see Roemer and Trannoy (2015) for an overview)

# Sharp cut between compensation and responsibility

- Pragmatic empirical approaches
  - link the outcome of interest to observable factors, and
  - make a *sharp* cut between compensation/responsibility.
  - [say,  $y = f(x)$ , and  $x = (c, r)$ ]
- Fairness requires that the effect of
  - $c$ -factors on outcomes is 'compensated', and
  - $r$ -factors on outcomes is 'preserved'.
  - [only possible if  $f$  separable, e.g.,  $f(c, r) = g(c) + h(r)$ ]
- A *sharp* cut is often difficult in practice ...

# Illustrating some difficulties for sharp cut

Suppose

$$test = \alpha + \beta \times ses + \gamma \times time + \delta \times ses \times time + \epsilon,$$

then

- the effect  $\beta$  may mix ambitions & circumstances,
- the factor  $time$  may mix ambitions & circumstances,
- the factor  $ses \times time$  mixes circumstances & ambitions,
- the residual  $\epsilon$  is probably a mix, via omitted  $c/r$  factors.

# A pragmatic solution: partial control

- Introduce *soft*, rather than sharp cut: factors can be partly compensation, partly responsibility:
  - in between full compensation and full responsibility.
  - Ooghe (2014) introduces partial control in a first-best 'equality of opportunity' setting.
  - Ooghe and Peichl (2014) discuss partial control in a second-best 'equality of resources' setting.

# Notation

- $y_i = f(x_i)$  is the gross income of individual  $i = 1, 2, \dots, I$
- The factor vector  $x_i$  is decomposed as  $(x_i^1, x_i^2, \dots, x_i^J)$
- Each group  $j = 1, 2, \dots, J$  has a degree of compensation  $\gamma^j$ 
  - between no ( $\gamma^j = 0$ ) and full compensation ( $\gamma^j = 1$ )
  - the degree of responsibility is therefore  $1 - \gamma^j$
- We look for a fair net income scheme, satisfying budget balance, equal treatment of equals, and partial solidarity

# A partial sharing rule

A net income scheme satisfies all properties if and only if

- 1 the function  $f$  is additively separable ( $f(x_i) = \sum_{j=1}^J f^j(x_i^j)$ ),
- 2 the 'fair' net income of individual  $i$  must be equal to

$$\frac{1}{I} \sum_{i=1}^I \underbrace{\sum_{j=1}^J \gamma^j f^j(x_i^j)}_{\text{compensation part}} + \underbrace{\sum_{j=1}^J (1 - \gamma^j) f^j(x_i^j)}_{\text{responsible part}}.$$



# Stated versus revealed

- Stated attitudes towards social spending
  - show a stable *ranking* of 'factors' over countries and time
  - age  $\succ$  sickness/disability  $\succ$  needy families  $\succ$  unemployed
  - ranking suggests  $\neq$  degrees of compensation
- Structured questionnaires also reveal that partial  $c/r$  is closer to people's opinions on distributive justice
- Are these attitudes/opinions also revealed in social policy?

# From theory to empirics

- Suppose
  - we observe an outcome before and after policy intervention
  - partial  $c/r$  underlies the policy intervention
- Can we estimate the degrees of compensation?
- If the pre-intervention outcome is given by

$$y_i = \alpha + \beta'x_i + \epsilon_i, \quad (1)$$

then the 'fair' post-intervention outcome must be

$$n_i = \text{constant} + (1 - \gamma)'(\beta \otimes x_i) + (1 - \delta)\epsilon_i. \quad (2)$$

- Estimate (1) via OLS and calculate  $\hat{\beta} \otimes x_i$  and  $\hat{\epsilon}_i$ .
- Plug in in (2), estimate (2) by OLS, and adjust s.e.'s.

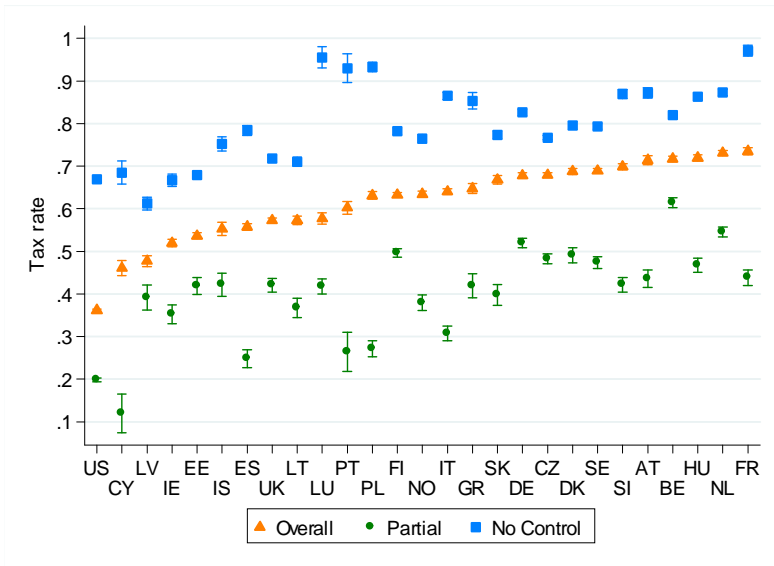
# The data

- 26 European countries (EU-SILC) & the US (CPS) in 2007
- outcome is pre/post tax equivalent hh income, i.e.,
  - pre/post tax hh income, divided by
  - the (modified) OECD equivalence scale.
- Roughly, we define (at hh level)
  - pre-tax = gross earnings and capital rents,
  - post-tax = pre-tax + benefits - taxes - contributions,
  - scale =  $1 + 0.5 \times (\#\{age \geq 14\} - 1) + 0.3 \times \#\{age < 14\}$ .

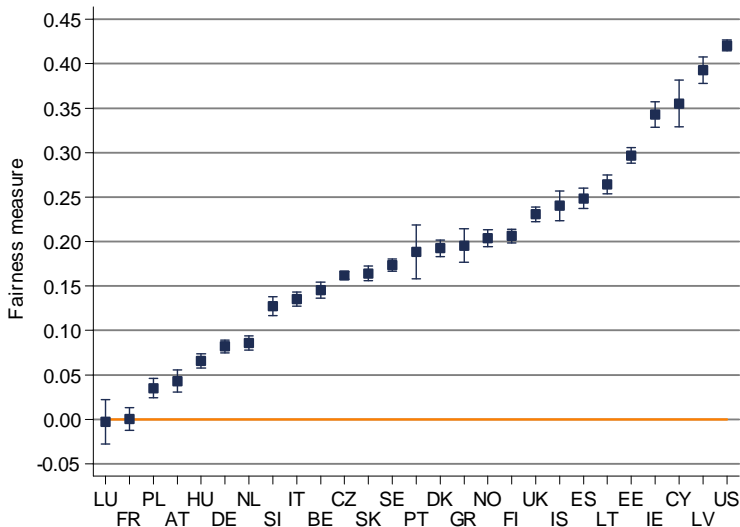
# How much do countries compensate?

	age	disa	unem	kids	migr	educ	sex	mar	Mean
US	0.70	0.54	0.60	0.14	0.24	0.41	-0.10	0.15	0.34
IT	0.89	0.89	0.40	0.32	0.27	-0.40	0.32	0.38	0.40
EE	0.73	0.57	0.39	0.56	0.44	0.50	0.27	0.12	0.45
UK	0.74	0.75	0.53	0.49	0.31	0.51	.	0.45	0.54
DE	0.84	0.76	0.64	0.54	0.30	0.08	0.77	0.32	0.54
FR	1.01	0.90	0.67	0.51	0.34	0.16	0.26	0.39	0.54
BE	0.85	0.79	0.75	0.58	0.39	0.52	0.48	0.37	0.60
SE	0.79	0.85	0.66	0.45	0.58	.	0.56	0.30	0.61
DK	0.78	0.95	0.74	0.40	0.50	0.58	0.57	0.40	0.62
NL	0.88	0.80	0.75	0.51	0.47	.	.	0.53	0.66
Mean	0.82	0.76	0.55	0.42	0.36	0.35	0.35	0.24	0.50

# Do countries compensate more for non-controllable?



# What is the total effect of non-controllable?



# Summary

- We bring together the inverse optimal tax literature and the fairness literature
- Theory: partial control
- Empirical implementation possible
- More to come ....