Ranking Health Equality of Opportunity in Europe

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1. Inequality of health opportunity

Health inequality of opportunity (IOPH) is health inequality due to circumstances beyond individual control.

Following Vam de gaer (1993) and Roemer (1998) IOPH is measured identifying types, groups of individuals sharing same circumstances, and calculating between-type inequality.

Inequality of opportunity curve generalizes Li Donni et al. (2015) approach. Types are latent groups whose membership explains the covariance of observable circumstances.

2. Estimation

Our focus: inequality systematically correlated with circumstances beyond individual contol.

More than one econometric approach: Checchi and Peragine (2010), Ferreira and Gignoux (2011), Brunori, Hufe and Mhaler (2018).

Implemented for health among others by: Rosa Dias (2009, 2010), Trannoy et al. (2010) Jusot et al. (2013) , Bricard et al. (2013), Li Donni et al. (2014), Carrieri and Jones (2016).

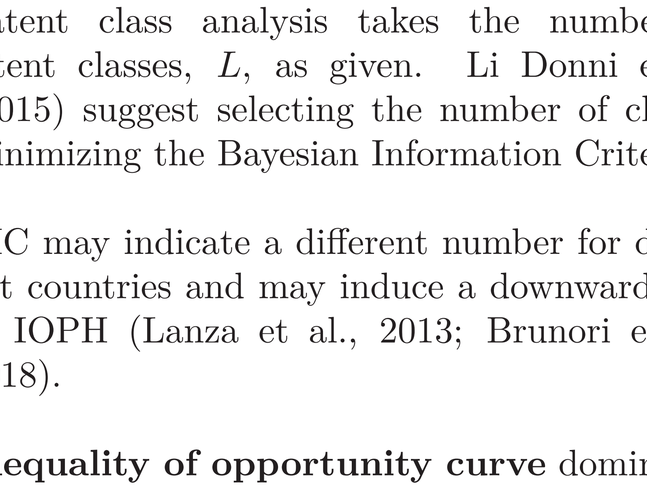
We adopt and generalyze the method proposed by Li Donni et al. (2015) to estimate IOPH.

4. IOP curve

Latent class analysis takes the number of latent classes, L, as given. Li Donni et al. (2015) suggest selecting the number of classes minimizing the Bayesian Information Criterion.

BIC may indicate a different number for different countries and may induce a downward bias in IOPH (Lanza et al., 2013; Brunori et al., 2018).

Inequality of opportunity curve dominance is a criterion that mitigates the problem of comparing countries when available information differs.

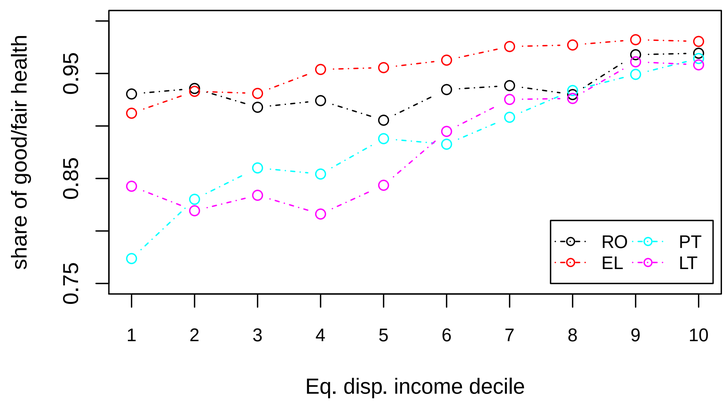


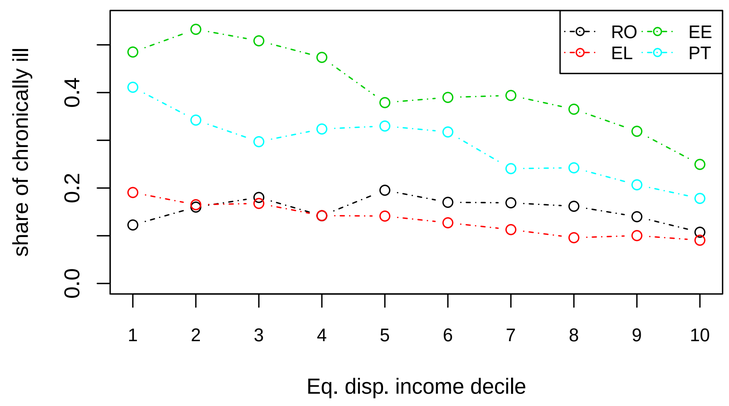
Dominance is evaluated for $L = 1, ..., L^{\star}$ latent types. $L^{\star}$ is selected by 5-fold cross validation in order to maximize the share of total inequality explained by between-type inequality.

The integral of the opportunity curve provides a complete ranking in terms of IOPH.

1. Social gradients in health

EU-SILC data show heterogeneity across European countries in the degree of association between self-reported health conditions and income.





3. Latent types

Li Donni et al. (2015): types, groups of individuals with access to same opportunities, are unobservable. Observable circumstances beyond individual control are manifest variables of latent membership to a type. Individuals are assigned to latent types to maximize **local independence**:

population

father education	father occuapation: low	father occuapation: high	tot
low	26	14	50
high	24	36	50
tot	50	50	

Father's occupation and education are dependent in the population: for those with low education the probability of having low occupation is 26/50=0.52, for those with high education is 14/50=0.28.

type 1: few opportunities

father education	father occuapation: low	father occuapation: high	
low	24	6	30
high	16	4	20
	40	10	

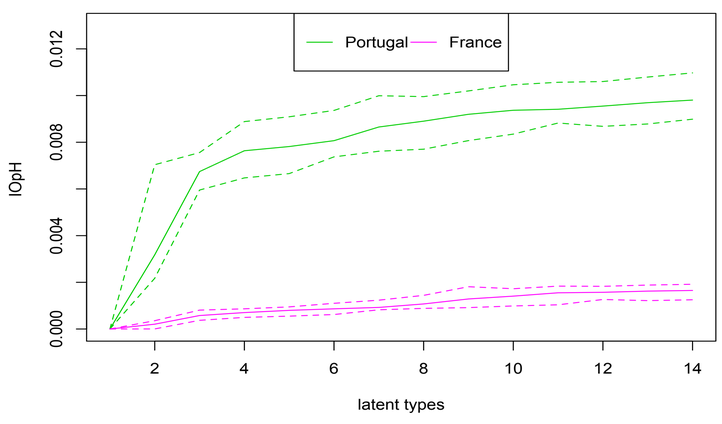
type 2: many opportunities

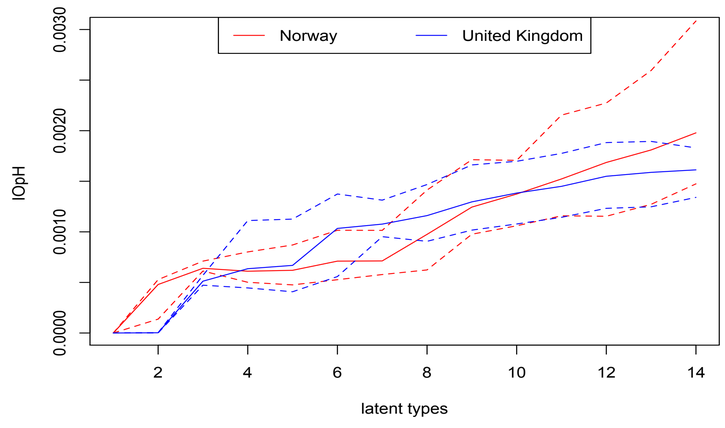
father education	father occuapation: low	father occuapation: high	
low	2	8	10
high	8	32	40
	10	40	

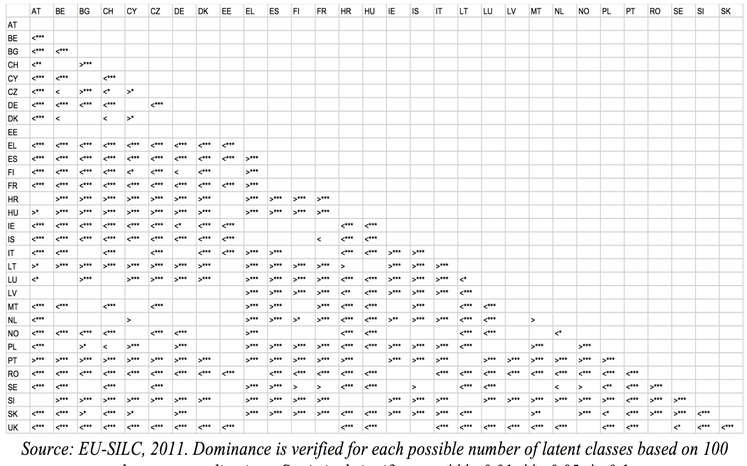
Conditional on type membership father's characteristics are independent: in type 1 a low education father has a probability 24/40=0.6 to have low occupation, exactly as a high education father 6/10=0.6.

Types' membership fully explains the correlation between circumstances. Latent types are assigned maximizing the likelihood of local independence. IOPH is between-type inequality.

5. IOPH in Europe (EU-SILC 2011)







*Source: EU-SILC, 2011. Dominance is verified for each possible number of latent classes based on 100 bootstrap replications. Statistical significance: ***=0.01, **=0.05, *=0.1*