

Inequality of opportunity in health and the Principle of natural reward: Evidence from European countries

Damien BRICARD

PSL, Université Paris-Dauphine, LEDA-LEGOS

Florence JUSOT

Université de Rouen, CREAM & PSL, Université Paris-Dauphine, LEDA-LEGOS

Alain TRANNOY

Aix-Marseille University (Aix-Marseille School of Economics), CNRS et EHESS

Sandy TUBEUF

Academic Unit of Health Economics, University of Leeds

Forthcoming in *Research on Economic Inequality*

Inequality of opportunity

Some inequalities are more objectionable than others (Dworkin, Cohen, Arneson, Roemer, Fleurbaey)

- Inequality linked to determinants that belong to individual responsibility (*Effort*) are considered as legitimate → natural reward
- Inequalities linked to determinants that are exogenous (*Circumstances*) are considered as illegitimate → compensation

→ recognised as inequality of opportunity

→ Interest in the contribution of circumstances and effort to overall inequality

Debate in the literature on the precise definition of the effort (example of health and smoking):

- Efforts are fully respected even if correlation with circumstances (**preference approach**) : Barry's view
- Efforts correspond to what is not correlated with circumstances (**control approach**) : Roemer's view

Literature and aim of the paper

- A growing interest for the principle of equality of opportunity in the case of health in the literature:

Sen 2002 ; Fleurbaey 2006 ; Rosa-Dias and Jones 2007 ; Rosa-Dia Dias 2009 ; Fleurbaey 2008 ; Fleurbaey and Schokkaert 2009 ; Rosa-Dias 2010 ; Trannoy et al. 2010; Fleurbaey and Schokkaert 2012 ; Tubeuf et al. 2012 ; Jusot et al. 2013

- But empirical evidence remain scarce due to the lack of information on circumstances and efforts in most of surveys

- UK: Dias 2009 ; Dias 2010 ; Tubeuf et al. 2012
- France: Trannoy et al. 2010; Jusot et al. 2013

- To compare European countries in terms of:
 - magnitude of inequalities of opportunity in health
 - legitimate inequalities in health
 - difference induced by the normative view point chosen

Estimation strategy

Reduce form models to capture correlations between health and effort and circumstances respectively :

- For Barry's view, we directly estimate:

$$H_i^B = \alpha^B . C_i + \beta^B . E_i + \gamma^B . D_i + \varepsilon$$

- For Roemer's view, we firstly estimate an auxilliary equation to purge effort from the influence of circumstances:

$$E_i = \delta . C_i + e_i$$

And we then estimate the health equation using the estimated residual:

$$H_i^R = \alpha^R . C_i + \beta^R . \hat{e}_i + \gamma^R . D_i + \varepsilon$$

➡ All models are estimated with linear probability modelling

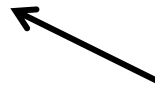
Decomposition of inequality in health

- Inequality to be measured using an inequality index decomposable by sources with good properties (Shorrocks, 1982)
- In each scenario k ($k=B,R$), the decomposition of the variance of health status is given by:

$$\sigma^2(H) = \text{cov}(\hat{H}_C^k, H) + \text{cov}(\hat{H}_E^k, H) + \text{cov}(\hat{H}_D^k, H) + \text{cov}(\hat{H}_{res}^k, H)$$



Contribution of circumstances : IOP



Contribution of efforts : IEF

- The share of inequality of opportunity :

$$SOP^k = \frac{IOP^k}{IOP^k + IEF^k} = \frac{\text{cov}(\hat{H}_C^k, H^k)}{\text{cov}(\hat{H}_C^k, H^k) + \text{cov}(\hat{H}_E^k, H^k)} \text{ with } k=B,R$$

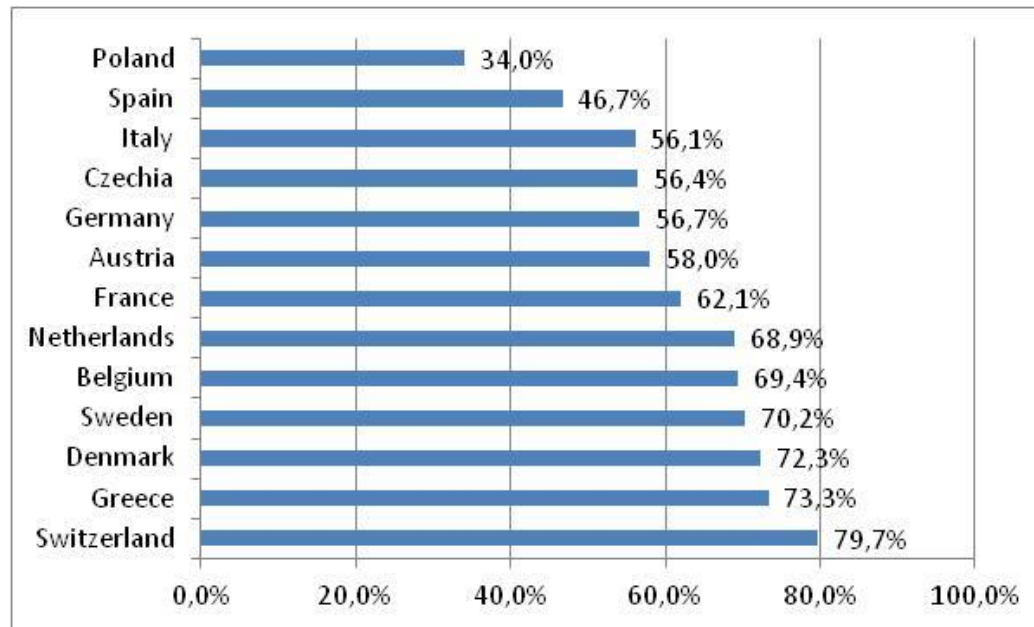
- The difference between scenarios:

$$Diff^{R-B} = \frac{IOP^R - IOP^B}{IOP^B}$$

Data - SHARELIFE: The Retrospective Survey

- Third wave of data collection for SHARE, focus on people's life histories over 13 countries : Sample: 20.946 individuals (9.447 men and 11.499 women) of age 50 to 80
- The variable of interest is health in adulthood as measured by SAH:
Would you say your health is “excellent”, “very good”, “good”, “fair”, “poor”

Proportion of individuals who report good, very good or excellent health status



Variables : Circumstances and efforts

- Three sets of variables are considered :
 - Circumstances that matter for health collected in SHARELIFE :
 - ***Social background***
 - ***Parents health status*** : longevity based on vital status and age at death
 - ***Parents' health-related behaviours***
 - Health-related behaviours collected in the previous waves of SHARE, partly determined by individual effort :
 - ***Smoking*** : to be a smoker in one of the past two waves
 - ***Obesity*** : to be obese in one of the past two waves
 - ***Sedentary lifestyle*** : to be hardly ever or not at all engaged in activities that require a moderate level of energy in one of the past waves
 - Demographic characteristics (age and sex)

Results: Probability of reporting good health status in Europe as a whole



Variables	Barry model	Roemer model
Main breadwinner (ref : Elementary occupations and unskilled workers)		
Senior managers and professionals	0.054 ***	0.061 ***
Technicians, associate professionals and armed forces	0.019	0.025 *
Office clerks, service workers and sales workers	0.029 ***	0.033 ***
Skilled agricultural and fishery workers	0.006	0.013
Craftsmen and skilled workers	0.010	0.012
No main breadwinner	0.028	0.027
Number of books at home (ref: None or very few (0-10 books))		
One shelf (11-25 books)	0.049 ***	0.056 ***
One bookcase (26-100 books)	0.060 **	0.071 ***
Two or more bookcases (> 100 books)	0.050 ***	0.058 ***
Number of room/household member	0.026 ***	0.037 ***
Number of basic amenities (ref: None)		
One	0.005	0.015
Two or three	0.025 **	0.032 ***
Four or five	0.037 ***	0.046 ***
Periods of difficulties during childhood		
Economic Hardships	-0.117 ***	-0.119 ***
Hunger	-0.056 ***	-0.057 ***
Mother's longevity (ref: mother prematurely deceased)		
Mother deceased in later ages	0.018 **	0.024 ***
Mother alive	0.029 ***	0.036 ***

Variables	Barry model	Roemer model
Father's longevity (ref: father prematurely deceased)		
Father deceased in later ages	0.035 ***	0.041 **
Father alive	0.038 ***	0.047 ***
Parents' health related behaviours		
No regular dentist visits	-0.029 ***	-0.035 ***
Parents' smoking	-0.017 ***	-0.019 ***
Parents' alcohol consumption	-0.066 ***	-0.072 ***
Lifestyle variables/ residuals		
Smoking	-0,056 ***	-0,056 ***
Obesity	-0,130 ***	-0,130 ***
Sedentary lifestyles	-0,206 ***	-0,206 ***
Countries (ref: Austria)		
Germany	-0,064 ***	-0,064 ***
Sweden	0,025	0,025
Netherlands	0,038 *	0,038 *
Spain	-0,076 ***	-0,076 ***
Italy	0,013	0,013
France	-0,002	-0,002
Denmark	0,054 **	0,054 **
Greece	0,154 ***	0,154 ***
Switzerland	0,129 ***	0,129 ***
Belgium	0,076 ***	0,076 ***
Czechia	-0,069 **	-0,069 **
Poland	-0,202 ***	-0,202 ***

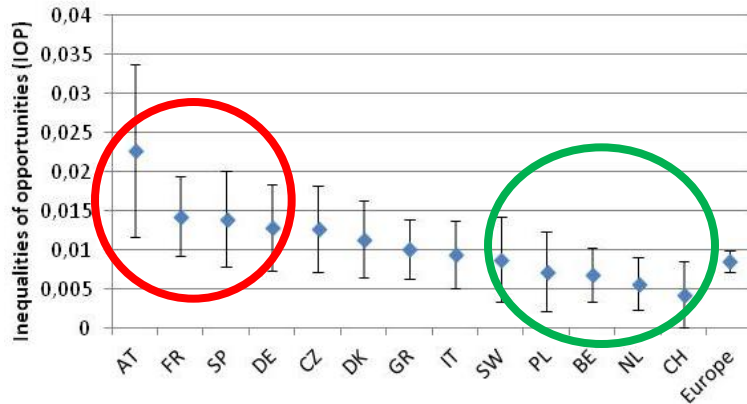
Results: Auxiliary equations in Europe as a whole

Variables	Smoking		Obesity		Sedentarity	
Main breadwinner (ref : Elementary occupations and unskilled workers)						
Senior managers and professionals	0.008	(0.013)	-0.055***	(0.013)	-0.001	(0.009)
Technicians, associate professionals and armed forces	-0.002	(0.014)	-0.034**	(0.013)	-0.007	(0.009)
Office clerks, service workers and sales workers	0.015	(0.011)	-0.027***	(0.010)	-0.003	(0.007)
Skilled agricultural and fishery workers	-0.019**	(0.009)	-0.029***	(0.008)	-0.009	(0.006)
Craftsmen and skilled workers	0.009	(0.009)	-0.020**	(0.009)	0.001	(0.006)
No main breadwinner	-0.009	(0.023)	0.003	(0.022)	0.005	(0.016)
Number of books at home (ref: None or very few (0-10 books))						
Enough to fill one shelf (11-25 books)	-0.012	(0.008)	-0.013*	(0.007)	-0.023***	(0.005)
Enough to fill one bookcase (26-100 books)	-0.015*	(0.009)	-0.020**	(0.008)	-0.037***	(0.006)
Enough to fill two or more bookcases (more than 100 books)	0.005	(0.011)	-0.018*	(0.011)	-0.030***	(0.008)
Number of room/household member	-0.020***	(0.007)	-0.035***	(0.007)	-0.027***	(0.005)
Number of facilities (ref: None)						
One	0.002	(0.009)	-0.018**	(0.008)	-0.040***	(0.006)
Two or three	0.036***	(0.008)	-0.034***	(0.008)	-0.022***	(0.006)
Four or five	0.056***	(0.010)	-0.052***	(0.010)	-0.026***	(0.007)
Period of difficulties during childhood						
Economic hardships	-0.025	(0.019)	-0.020	(0.018)	0.029**	(0.013)
Hunger	-0.071***	(0.012)	-0.003	(0.012)	0.024***	(0.008)
Mother's longevity (ref: mother prematurely deceased)						
Mother deceased in later ages	-0.028***	(0.007)	-0.018***	(0.006)	-0.007	(0.005)
Mother alive	0.040***	(0.007)	-0.031***	(0.007)	-0.021***	(0.005)
Father's longevity (ref: father prematurely deceased)						
Father deceased in later ages	-0.036***	(0.006)	-0.016***	(0.006)	-0.011**	(0.004)
Father alive	-0.013	(0.010)	-0.021**	(0.010)	-0.023***	(0.007)
Parents' health-related behaviours						
No regular dentist visits for their children	0.027***	(0.006)	0.006	(0.006)	0.019***	(0.004)
Parents' smoking	0.075***	(0.006)	-0.006	(0.006)	-0.007*	(0.004)
Parents' alcohol consumption	0.043***	(0.010)	0.029***	(0.010)	0.000	(0.007)
Constant	0.164***	(0.012)	0.296***	(0.012)	0.154***	(0.008)

Decomposition results 1

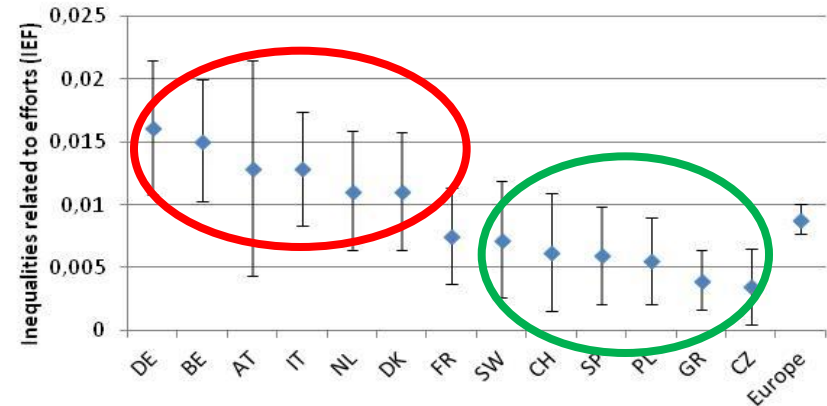
IOP in health in Europe

Barry scenario



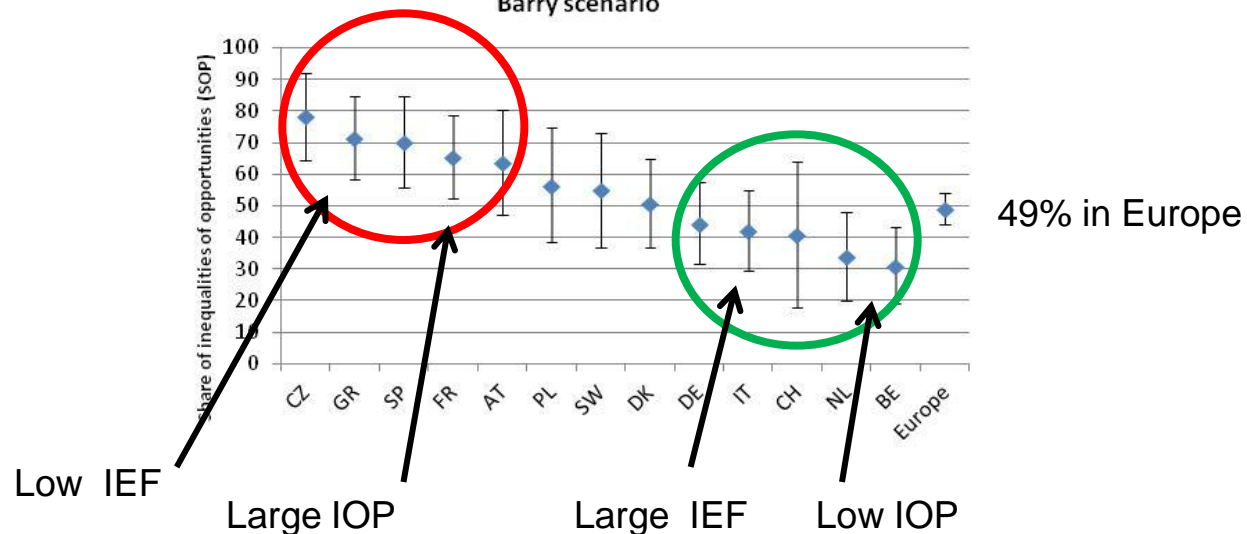
IEF in health in Europe

Barry scenario



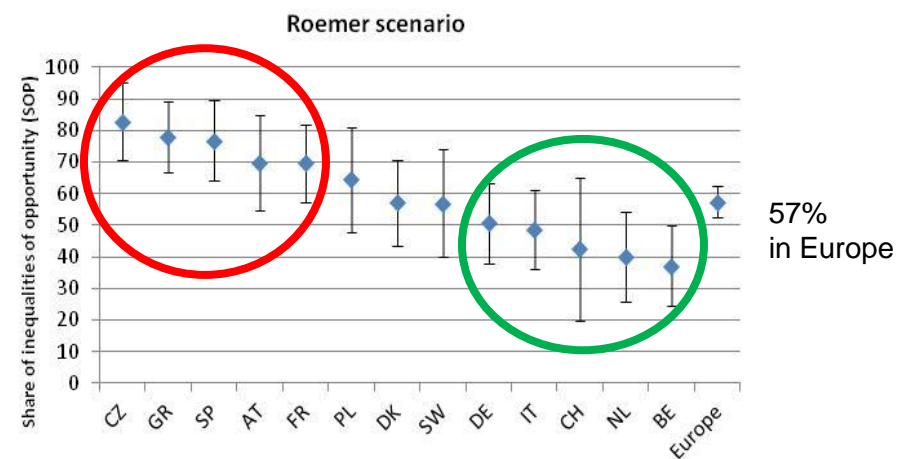
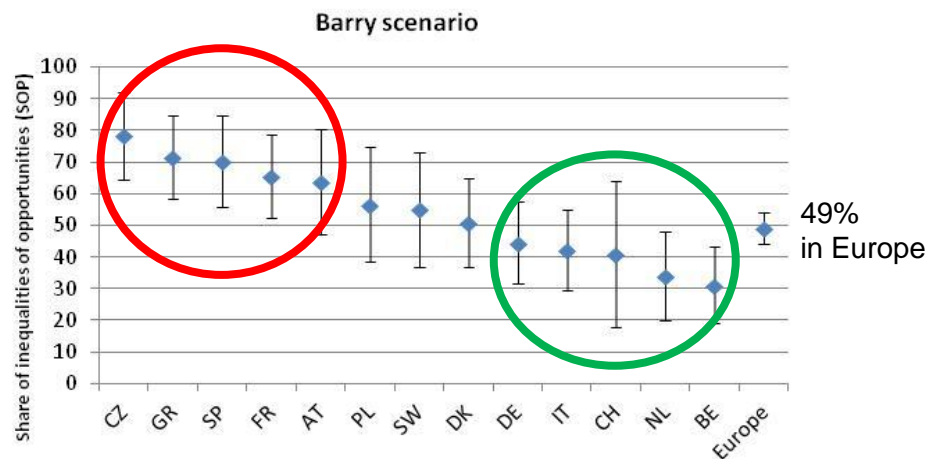
SOP in health in Europe

Barry scenario

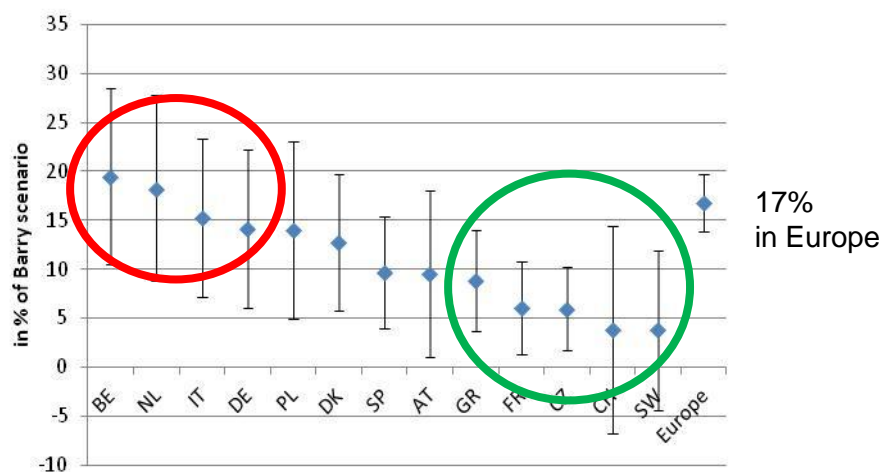


Decomposition results 2

SOP in health in Europe

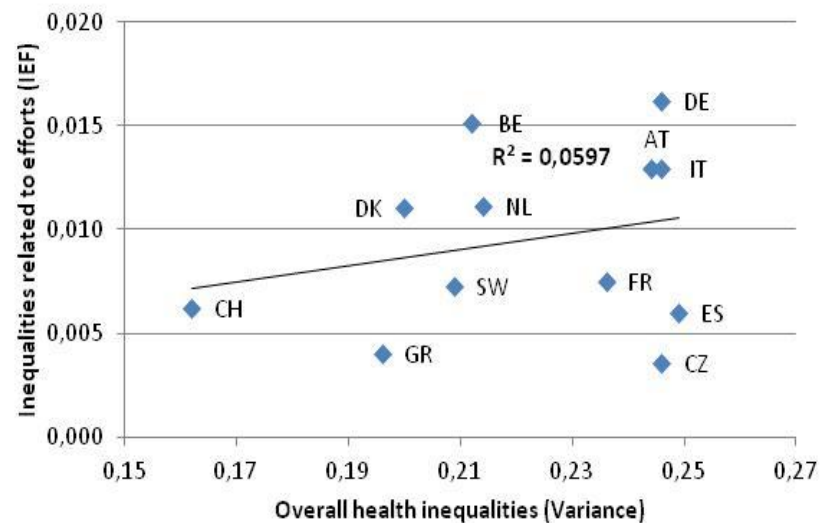
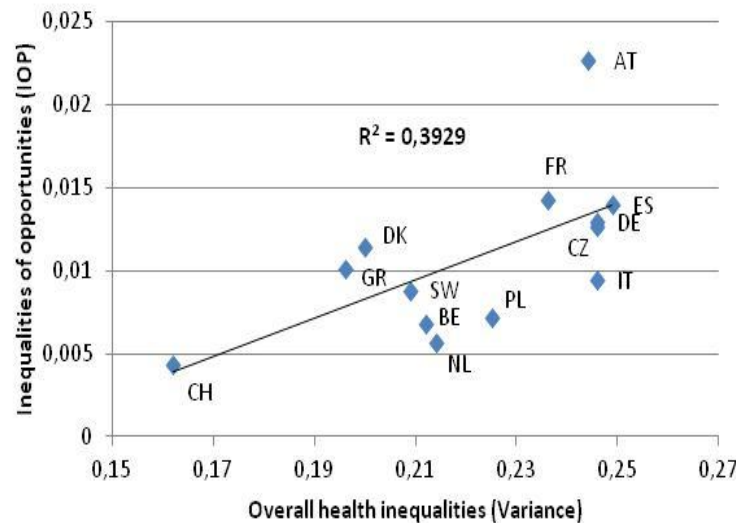


DIFF between scenarios



To sum up

- Existence of inequality of opportunity in health in all European countries according to social background, parents' health status and parents' health-related behaviours
- Lifestyles are correlated to circumstances in most of the countries → the measurement is sensitive to the ethical point of view chosen



- Need to study what is driving differences across countries (preliminary results : infant mortality in the 80's, income inequality, GDP)

Thank you

Damien BRICARD damien.bricard@dauphine.fr

Florence JUSOT florence.jusot@univ-rouen.fr

Sandy TUBEUF S.Tubeuf@leeds.ac.uk

Alain TRANNOY Alain.Trannoy@eco.u-cergy.fr