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

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A paraître dans *Research on Economic Inequality*

Inequality of opportunities

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
- Inequalities linked to determinants that are exogenous (*Circumstances*) are considered as illegitimate

⇒ recognised as inequalities of opportunities

The achievement of equality of opportunities implies to respect 2 principles

- The principle of natural reward: the respect of the impact of effort on outcomes
- The principle of compensation: compensation to individuals for unfair inequalities (linked to circumstances)

The implementation of equality of opportunities policy requires identifying the contribution of circumstances and effort to overall inequality

Inequality of opportunities in health

- 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

- In this literature:
  - social and family backgrounds constitute relevant circumstances since they are not chosen by the individuals
  - lifestyles (not smoking, not drinking, exercising, balance diet, not being obese) are recognised as efforts

- 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

Two alternative views on the correlation between effort and circumstances

• Debate in the literature on the precise definition of the effort which should be rewarded since these two determinants cannot be assumed to be independent

➡ Sons of parents who were smokers are more frequently smokers

➡ Do we held sons of smokers less responsible to smoke than sons of non-smokers ?

• John Roemer said that we should respect the individual effort *"if we could somehow disembody individuals from their circumstances"* : sons of smokers are less responsible to smoke than sons of non smokers

• For Brian Barry, the full effort should be respected: sons of smokers are as responsible to smoke than sons of non smokers

• But few empirical consequences on inequalities of opportunity in France (Jusot et al. 2013)

The aim of the paper

- To quantify inequalities of opportunity in health and legimitate inequalities in health in Europe at the whole and in each country

- To assess whether it empirically matters to stick to one or the other view on the measurement of inequalities of opportunity in health and legimitate inequalities in health

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

Estimation strategy (1)

- 4 groups of variables:
  - Outcome variable = health (H)
  - Circumstances (C) = characteristics of the previous generation
  - Effort variables (E) = lifestyles
  - Demographic variables (D) = biological determinants
  - Error term (e) = Pure luck and unobserved circumstances and efforts

$$H = f(C, E, D, \varepsilon)$$

- A reduced form model because :
  - primarily interested in capturing correlations between health and effort and circumstances respectively
  - not aiming the understanding of causality links existing between determinants

In particular, the child SES in adulthood is not included as it could be endogenous to health status, and be also determined by parent's characteristics and individual effort

Estimation strategy (2)

• 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

⇒ All models are estimated for Europe at the whole with country dummies and separately for each country

Decomposition of inequality in health

- 4 sources of inequalities in health: circumstances (H_C), effort (H_E), demographics (H_D), errors term (Hres)

- Inequality to be measured using an inequality index decomposable by sources

- According to Shorrocks (1982), the natural decomposition of variance satisfies a list of good properties

- In each scenario k (k=B,R), the decomposition of the variance of health status is given by:

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

Measuring inequalities of opportunity in health and legitimate inequalities in health

- The contribution of *circumstances* is given by : $IOP^k = \text{cov}(\hat{H}_C^k, H^k)$ with k=B, R

where (k= B, R) and gives a measure of illegimate inequalities in health

- The contribution of *efforts* is given by : $IEF^k = \text{cov}(\hat{H}_E^k, H^k)$ with k=B,R

and gives a measure of legimate inequalities in health

- The share of inequalities of opportunities in health in health inequalities explained by the two main sources of interest from a normative point of view:

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

- The difference between scenarios: $Diff^{R-B} = \frac{IOP^R - IOP^B}{IOP^B}$

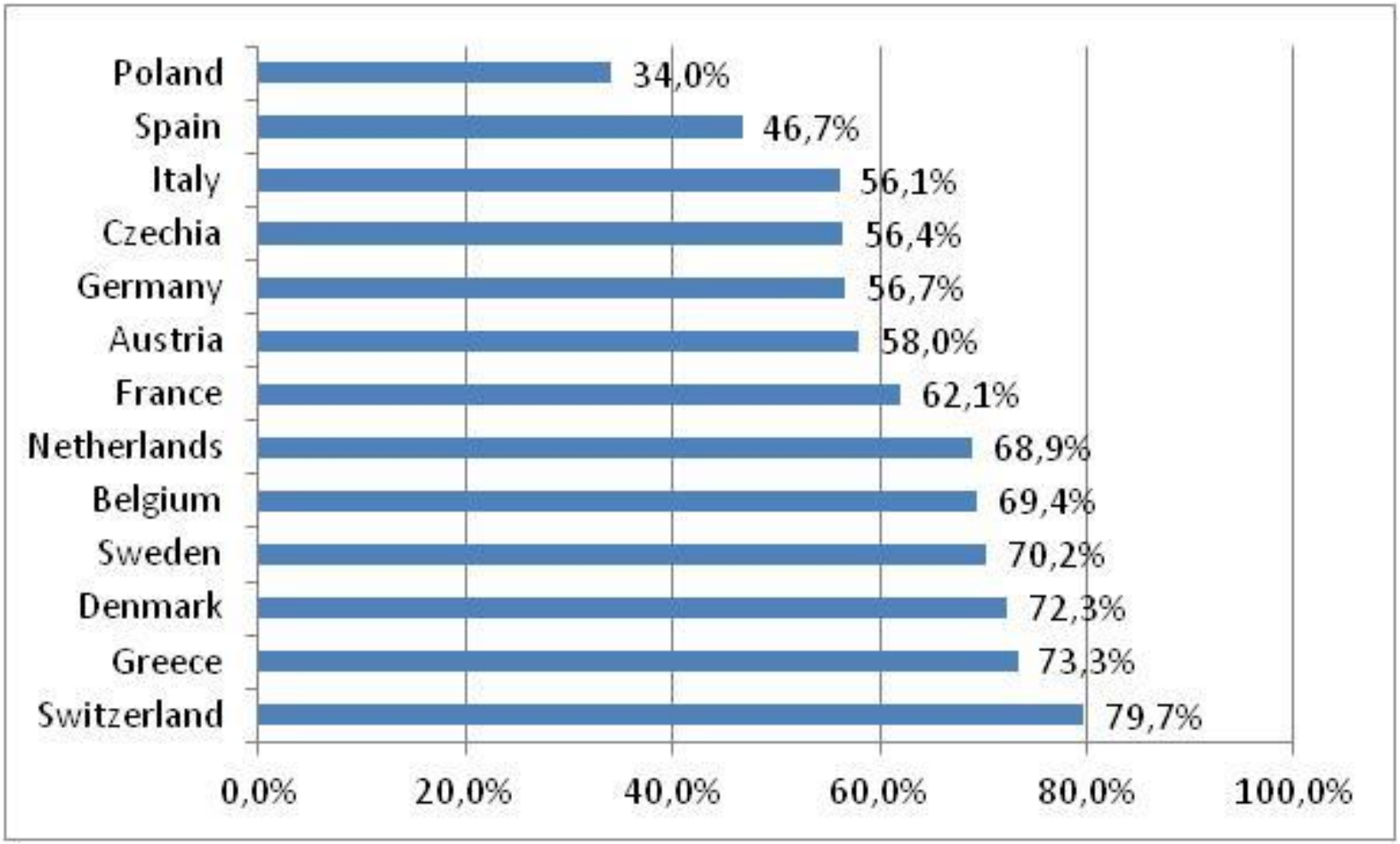
Data - SHARELIFE: The Retrospective Survey

- Third wave of data collection for SHARE, focus on people's life histories
- Sample: 20.946 individuals (9.447 men and 11.499 women) of age 50 to 80
- Representative for the European population aged 50 and over in 13 countries: Scandinavia (Denmark and Sweden),Central Europe (Austria, France, Germany, Switzerland, Belgium, and the Netherlands), and the Mediterranean (Spain, Italy and Greece), as well as two transition countries (the Czech Republic and Poland)
- The variable of interest is health in adulthood as measured by SAH:

  Would you say your health is "excellent", " very good", "good", "fair", "poor"

- Three sets of variables are considered
  - Circumstances that matter for health collected in SHARELIFE
  - Health related behaviours collected in the previous waves of SHARE
  - Demographic characteristics (age and sex)

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



Circumstances

Circumstances are measured by a large set of variables:

- Social background:
  - Father's professional status
  - Number of books at home as a proxy of parents' educational level
  - Living conditions (number of rooms/household members ; number of basic amenities)
  - Periods of difficulties (economic harships ; hunger)

- Parents health status:
  - Longevity based on vital status at the time of the survey and age at death

- Parents' health-related behaviours :
  - Parents' smoking
  - Parents' alcohol consumption
  - Use of care for their children (regular dentist visits)

Circumstances in Europe

Main breadwinner occupation	
Senior managers and professionals	8.1
Technicians, associate professionals and armed forces	6.1
Office clerks, service workers and sales workers	13.5
Skilled agricultural and fishery workers	26.8
Craftsmen and skilled workers	26.2
Elementary occupations and unskilled workers	17.7
No main breadwinner	1.6
Number of books at home :	
None or very few (0-10 books)	43.2
Enough to fill one shelf (11-25 books)	22.6
Enough to fill one bookcase (26-100 books)	21.5
Enough to fill two or more bookcases (more than 100 books)	12.7

Circumstances in Europe

Number of rooms per household member (mean)	0.72
Number of facilities at home:	
None	26.7
One	19.7
Two or three	29.0
Four or five	24.6
Period of difficulties during childhood	
Economic hardships	2.3
Hunger	5.9
Parent's longevity	
Mother prematurely deceased	38.6
Mother deceased in later ages	35.2
Mother alive	26.3
Father prematurely deceased	47.6
Father deceased in later ages	42.0
Father alive	10.4
Parent's health-related behaviours	
No regular dentist visits for their children	47.9
Parents' smoking	63.6
Parents' alcohol consumption	8.4

Lifestyles

3 different behaviours 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

Considered as binary variables

Lifestyle/Effort variables	
Reported smoking status at least once in the past waves	21.3
Obesity at least once in the past waves	18.9
Reported sedentary lifestyles at least once in the past waves	8.7

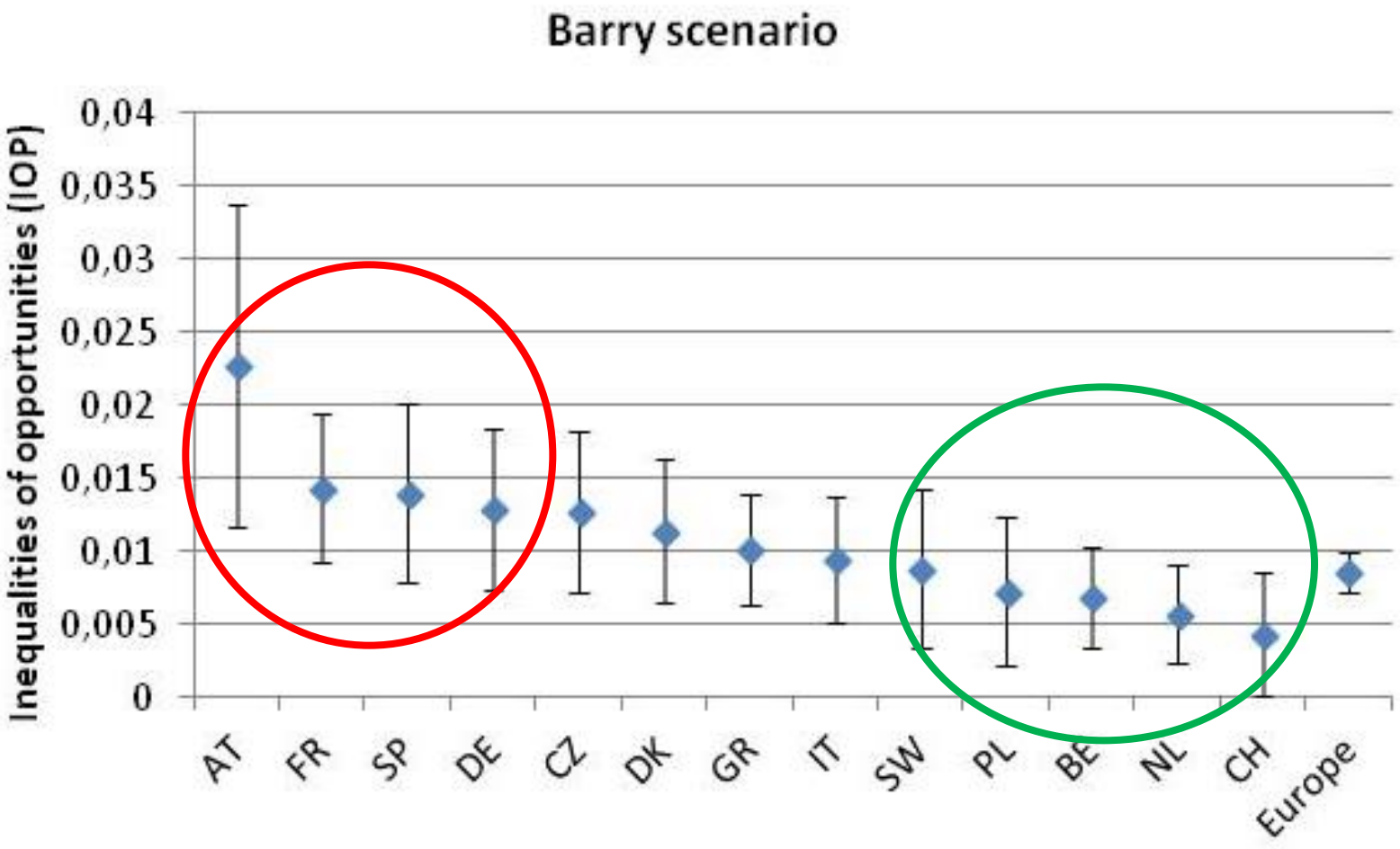
Results: probability of reporting good health status in Europe

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	***

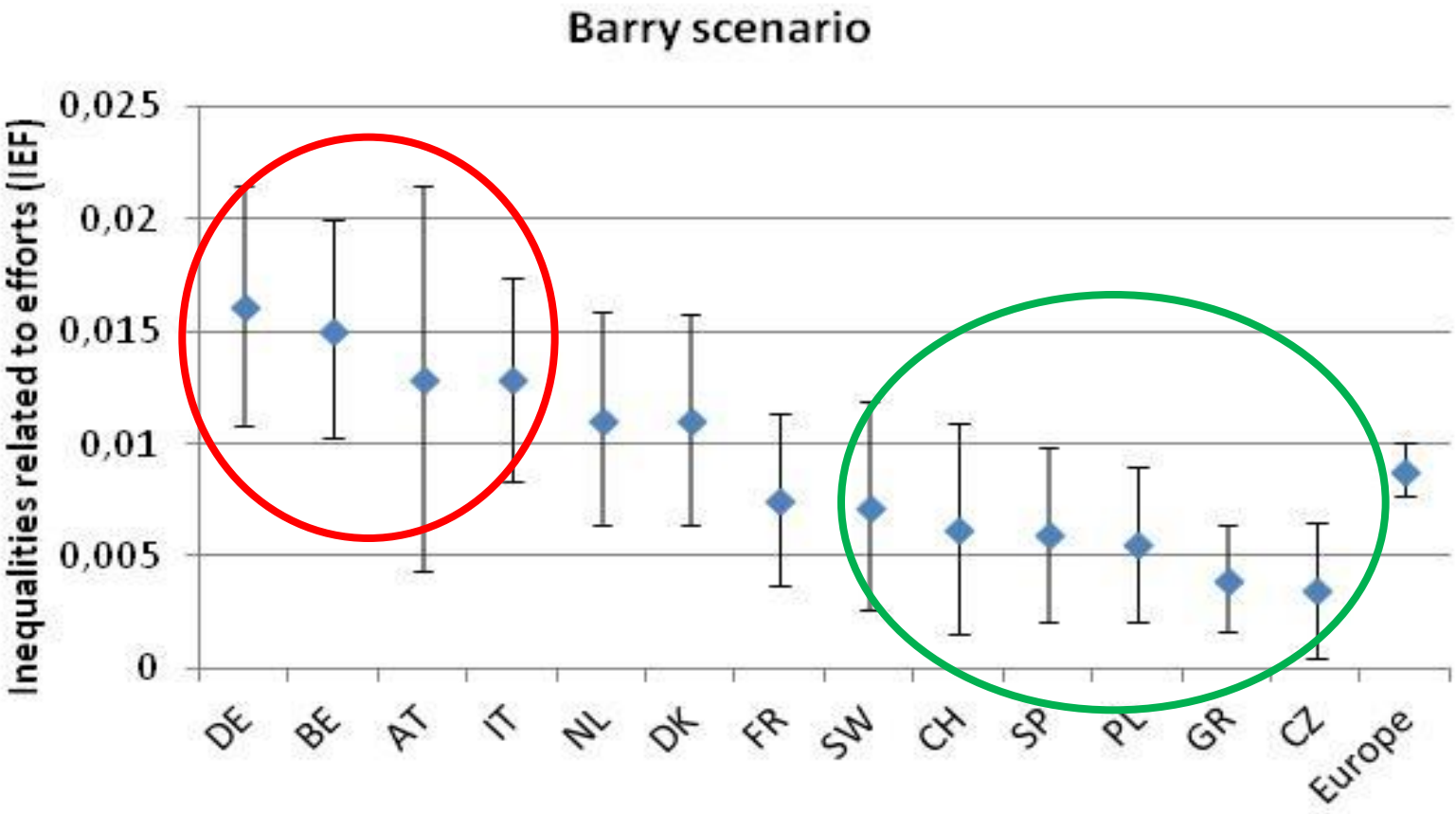
Variables	Barry model		Roemer model	
Father's longevity (ref: father prematurely deceased)				
Father deceased in later ages	0.035	***	0.041	**
Father alive	0.038	***	0.047	***
Parents' health related behaviours				
No regular dentist visits	-0.029	***	-0.035	***
Parents' smoking	-0.017	***	-0.019	***
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	***

	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)

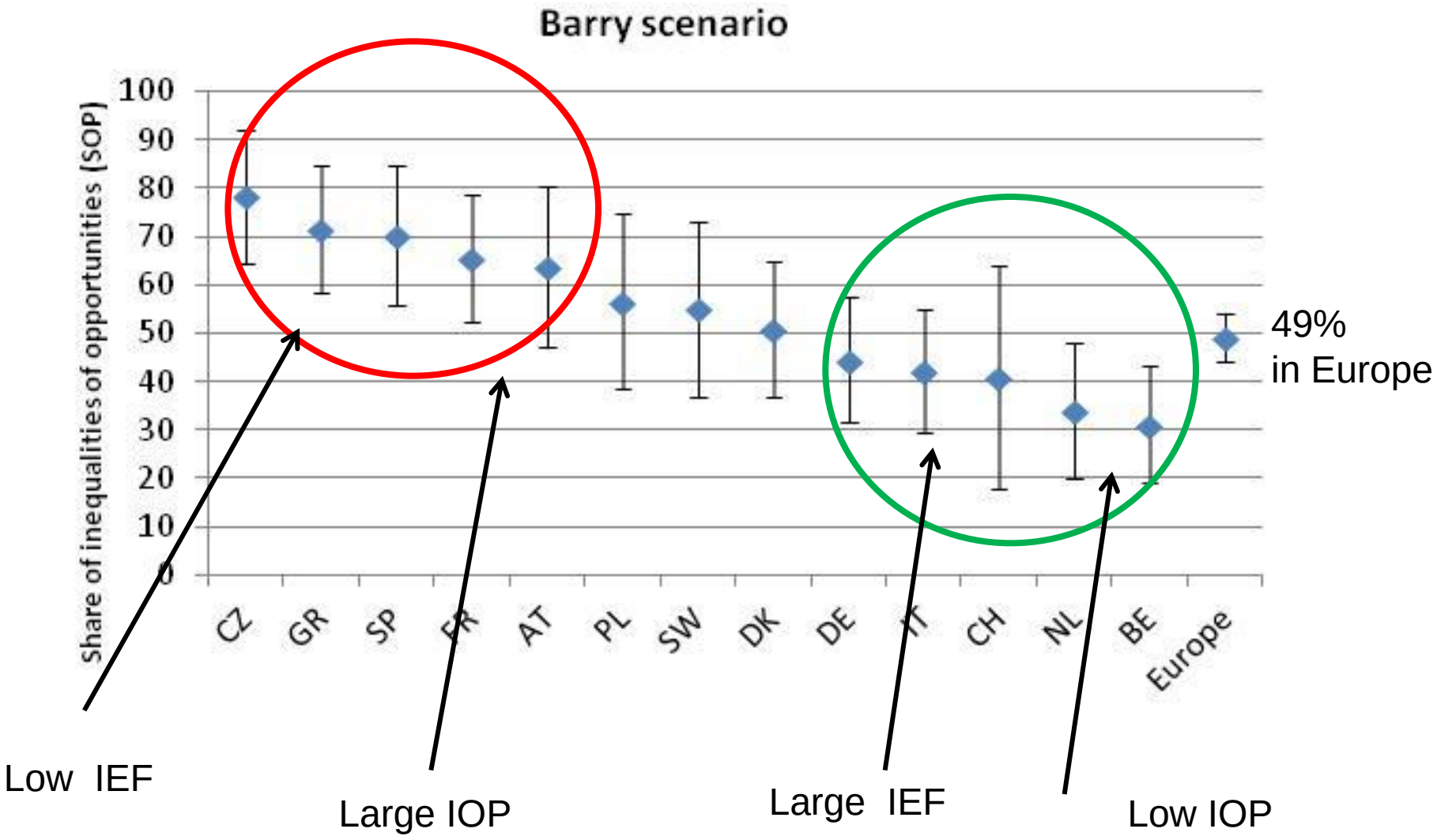
IOP in health in Europe



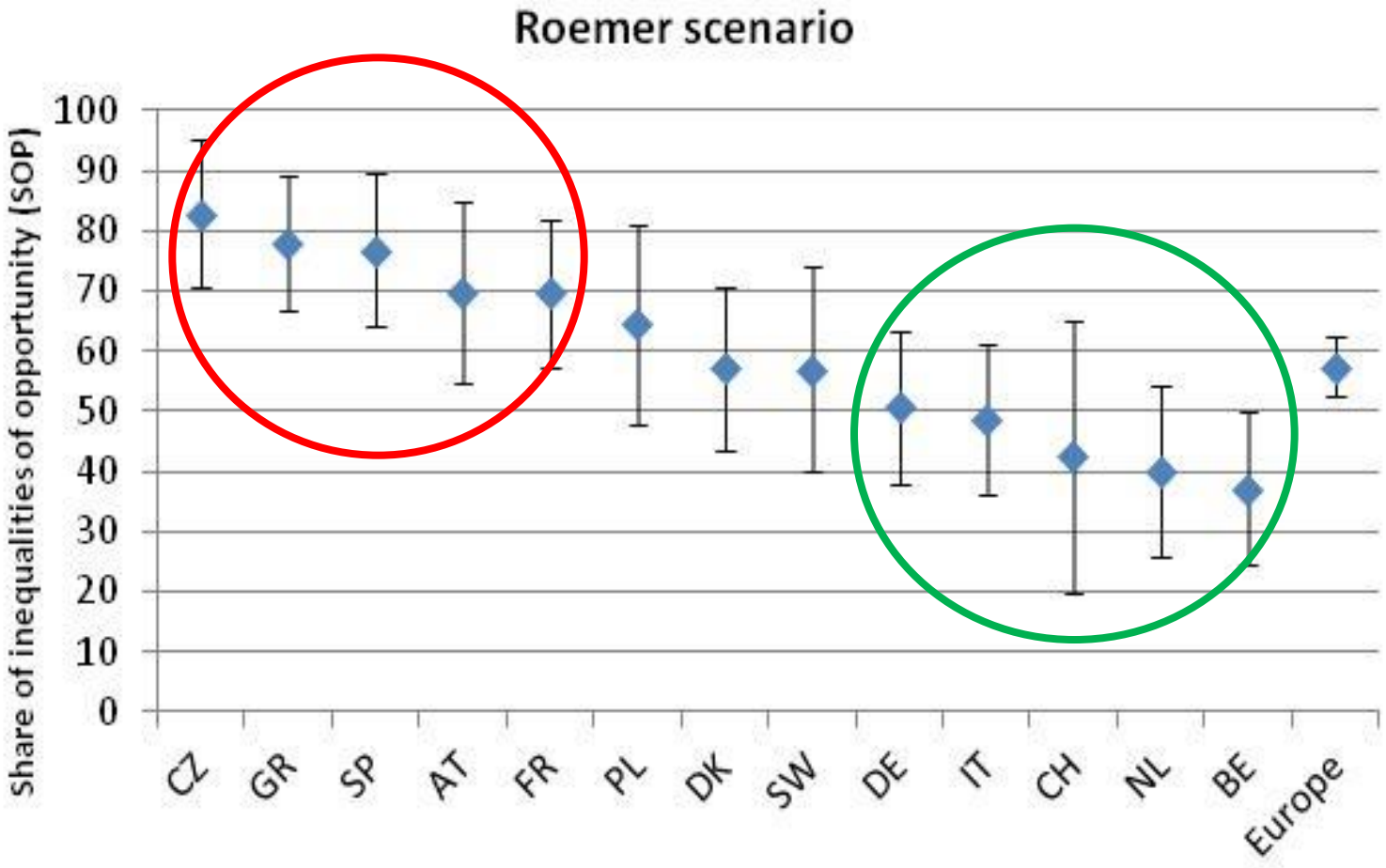
IEF in health in Europe



SOP in health in Europe

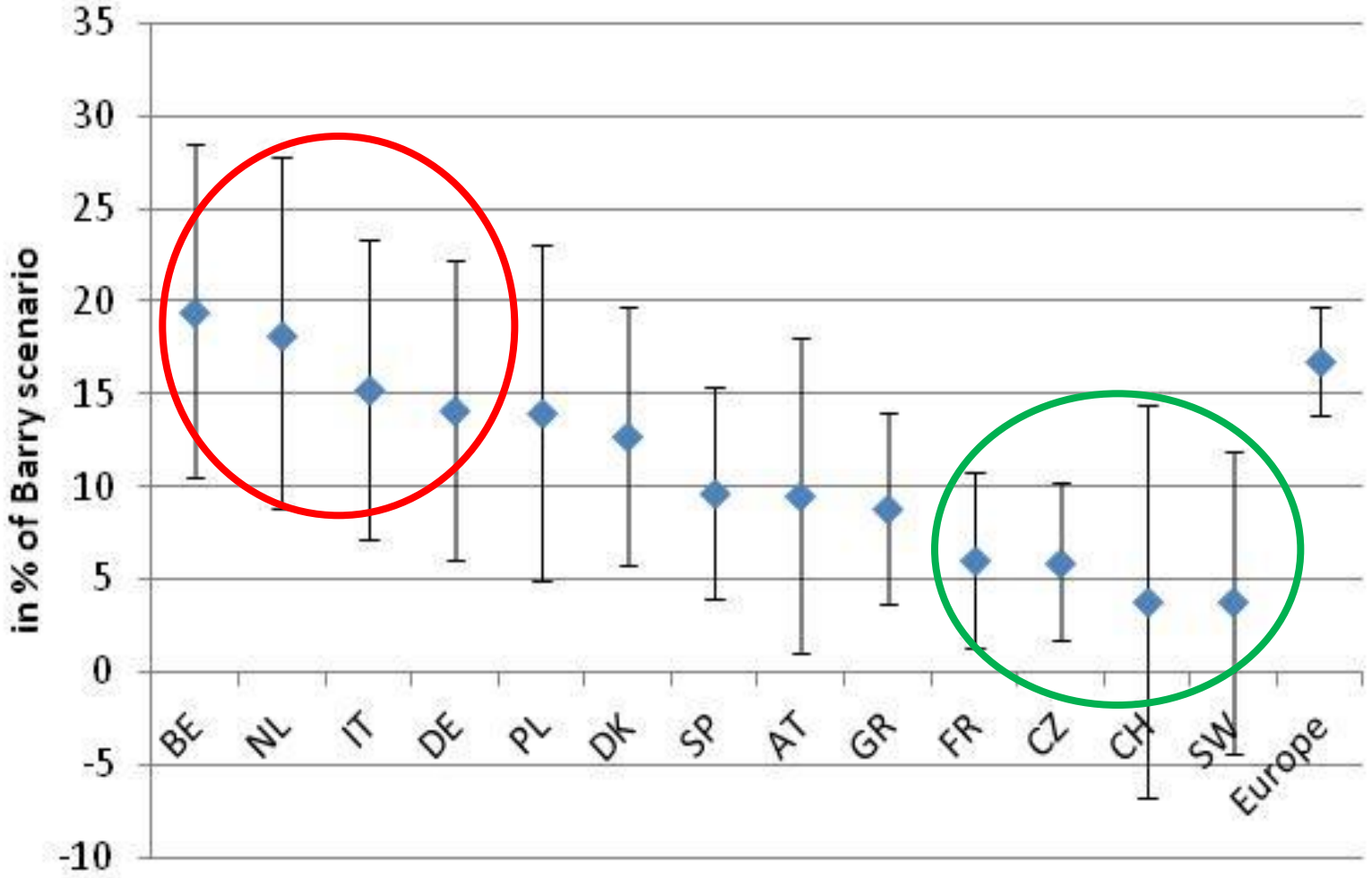


SOP in health in Europe



57%
in Europe

DIFF between scenarios



Conclusion

- With a large set of information on circumstances, this study provides evidence on the existence of inequalities of opportunities in health in all European countries according to social background, parents' health status and parents' health-related behaviours

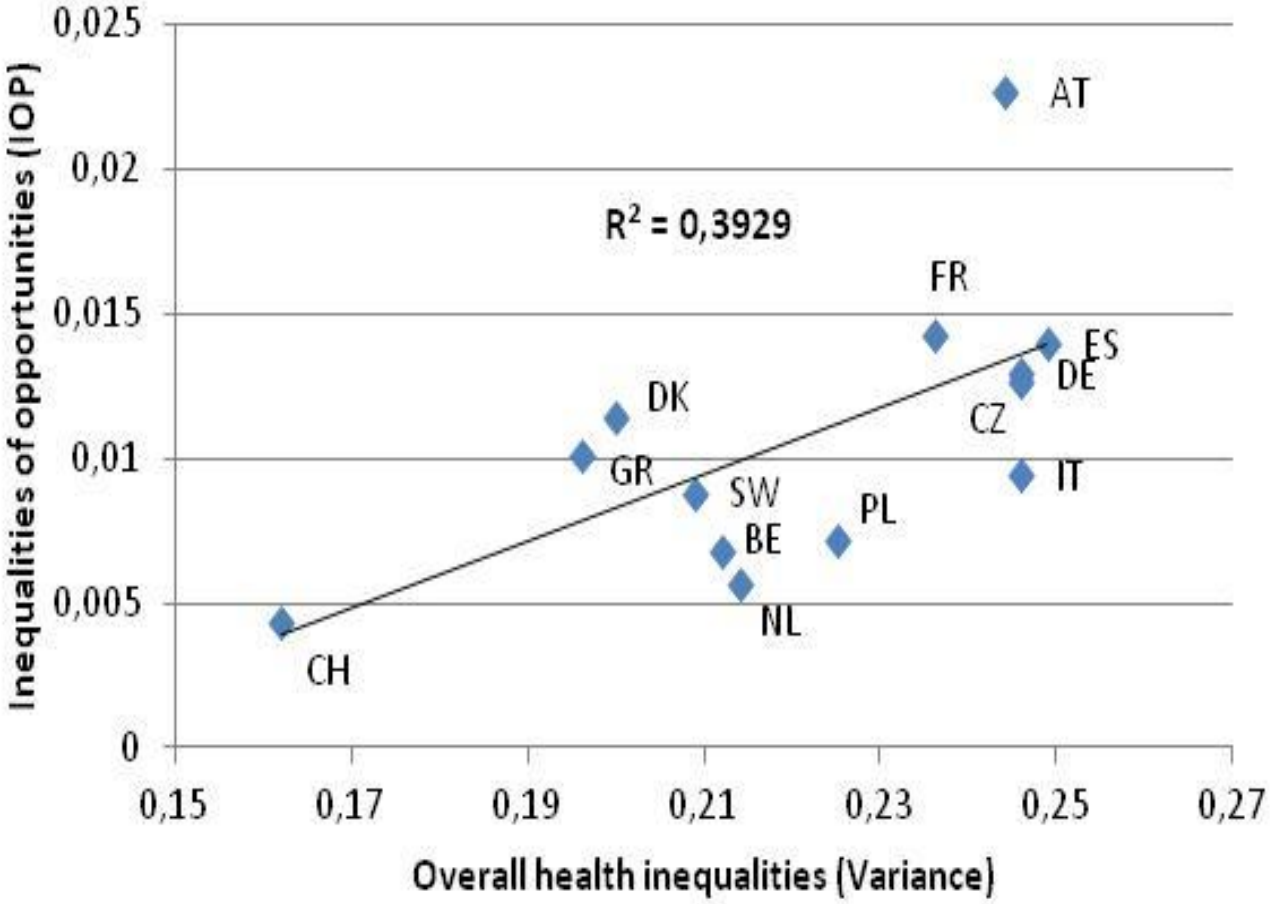
- Lifestyles are a source of legitimate inequalities in health in all countries

- The magnitude of IOP and IEF varies between countries

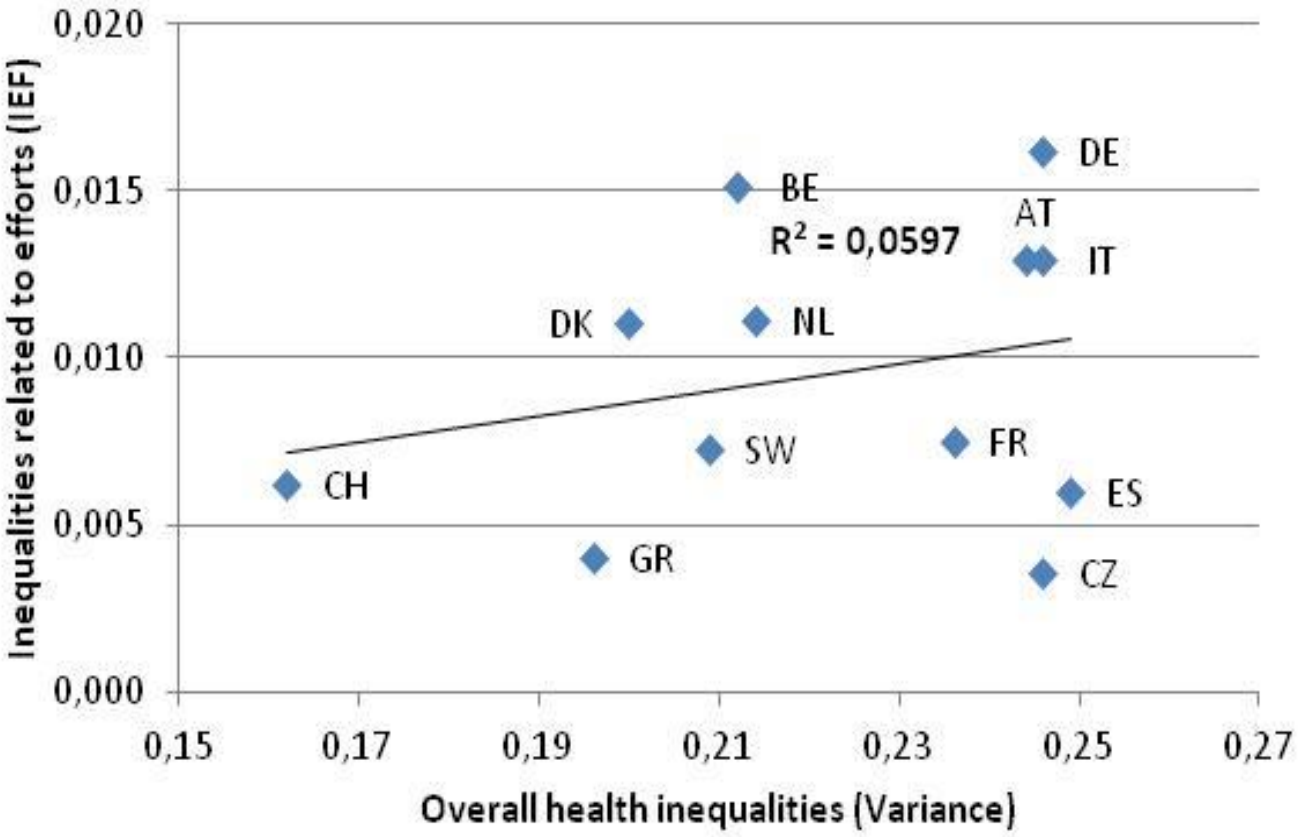
- The share of inequalities in health explained by circumstances in inequalities due to circumstances and efforts varies from 30% to 80%

- Lifestyles are correlated to circumstances in all countries: the measurement of inequalities of opportunities in health is sensitive to the ethical point of view chosen, in particular in Belgium, the Netherlands, Germany and Italy where legitimate inequalities are important

IOP and inequalities in health



IEF and inequalities in health



Thank you

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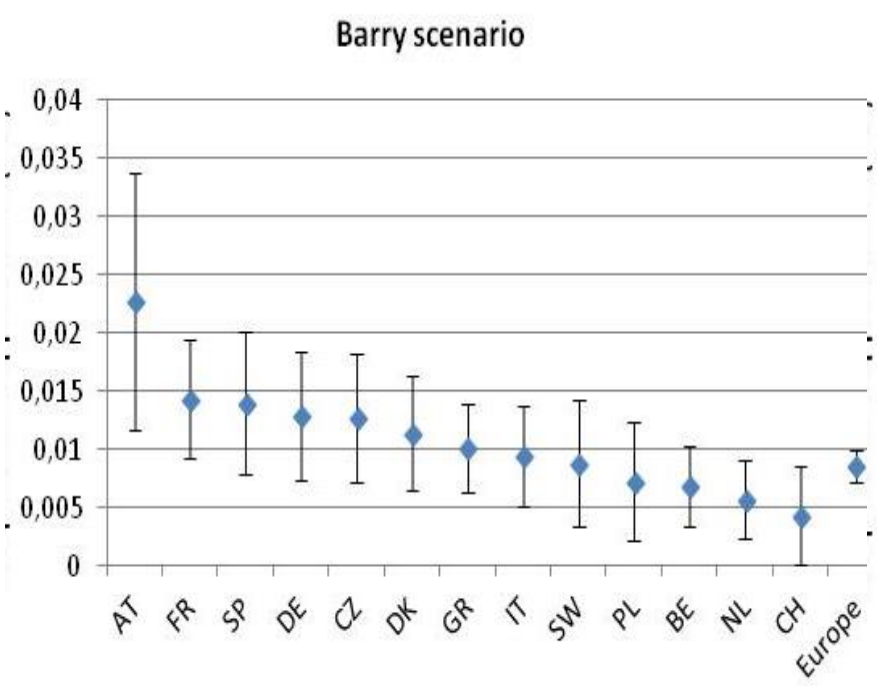
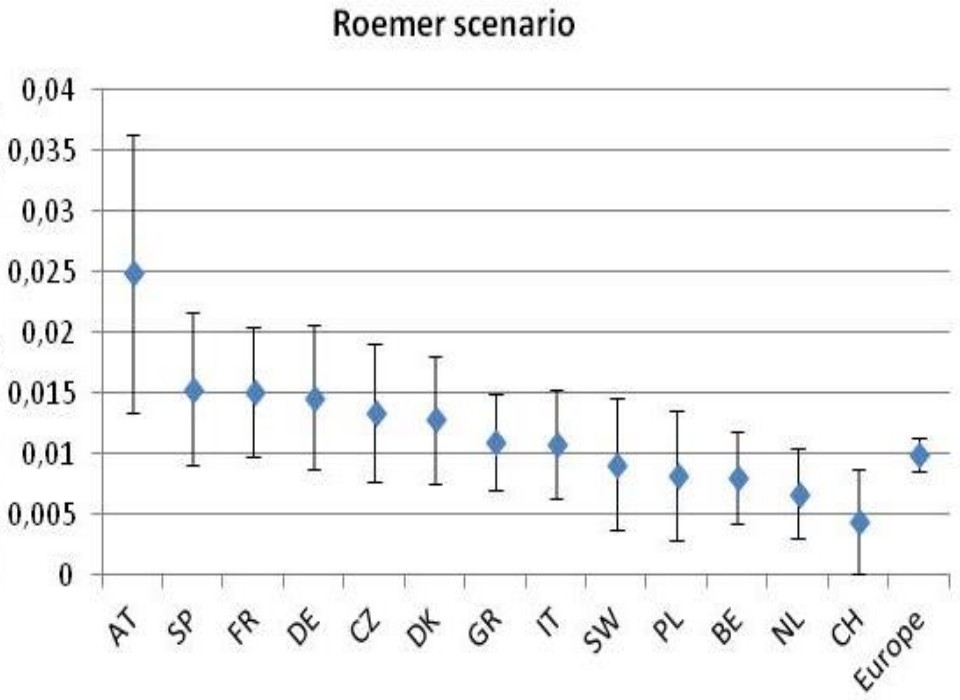
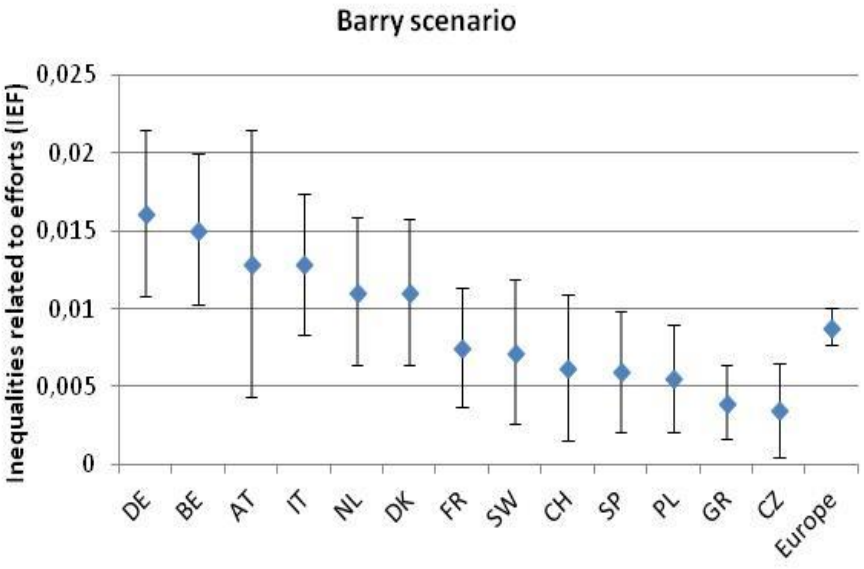
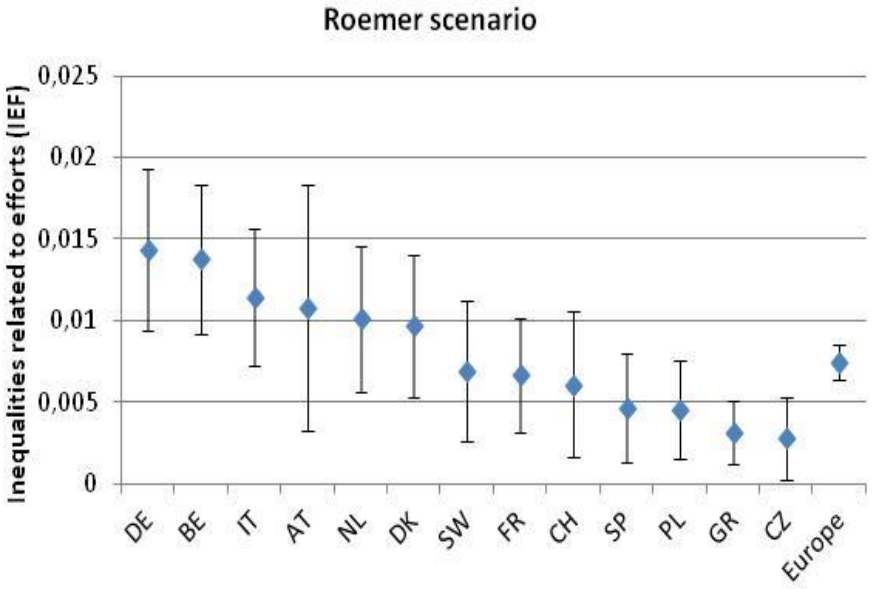
IOP in health in Europe





IEF in health in Europe





Results : Inequalities indices (Europe)

IOP^B	IEF^B	SOP^B	IOP^R	IEF^R	SOP^R	Diff
0.009***	0.009***	49.172***	0.010***	0.007***	57.424***	16.782***