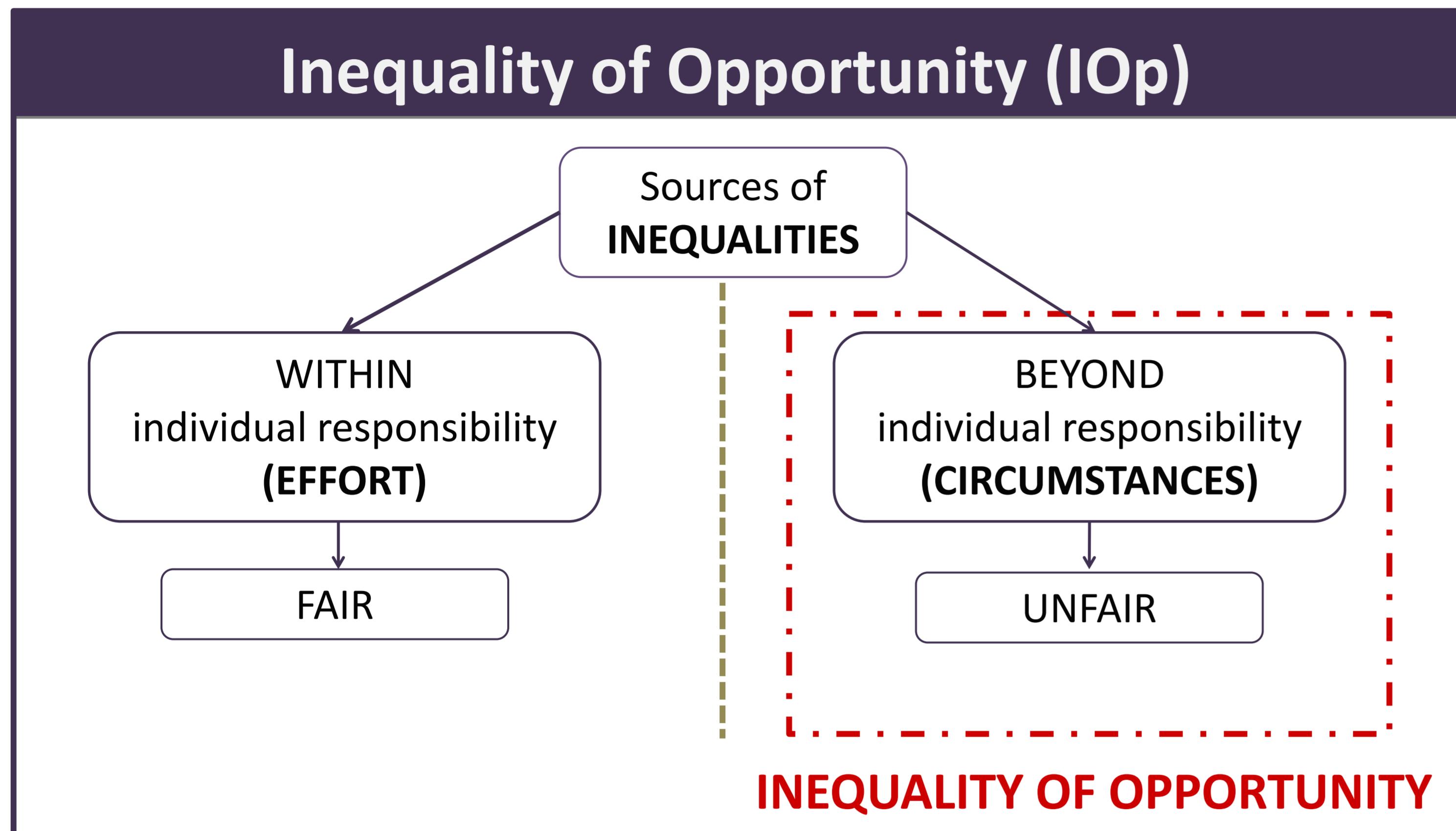


Analyzing Inequalities of Opportunities in Educational Achievements



Research Question

WHAT IS THE DEGREE OF INEQUALITY OF OPPORTUNITY IN EDUCATIONAL ACHIEVEMENTS IN EUROPEAN COUNTRIES?

Literature Review

- **J. Roemer (1998): Theories of Distributive Justice**
- **F. Ferreira and J. Gignoux (2014): The measurement of educational inequality: Achievement and opportunity**

Methodology

Data set

Program for International Student Assessment
PISA 2012

21 European countries

15 year-old students

Variables

Dependent

Explanatory

Circumstances

Effort

Achievements in mathematics tests

Individual	Family	School
<ul style="list-style-type: none"> • Gender • Immigration background 	<ul style="list-style-type: none"> • Parents' education • Parents' occupation • Home possessions 	<p>School</p> <ul style="list-style-type: none"> • Educational resources • Extracurricular activities <p>Teachers</p> <ul style="list-style-type: none"> • Morale • Climate • Shortage

Model I

Overall inequality in educational achievements (y_i) is disentangled in two **uncorrelated** components:

- Inequalities due to circumstances (y_i^C)
- Inequalities due to effort (y_i^E)

Problem: Circumstances and effort are **correlated**.

Solution: two ways to clean the correlation

1. **ROEMER'S** point of view: treat correlated part as **circumstances**
2. **SWIFT'S** point of view: treat correlated part as **effort**.

Model II

PROCEDURE

1. Imputation of missing values
2. Estimate the models
3. Construct **counterfactual** distributions where the only inequalities are due to circumstances (y_i^C).
A **parametric approach** is used to construct counterfactuals.
4. Measure IOp

$$y_i = \alpha + \beta \vec{C}_i + \gamma \vec{E}_i + u_i$$

ROEMER

$$\rightarrow y_i = \alpha + \beta^R \vec{C}_i + \gamma^R \vec{E}_i + u_i$$

SWIFT

$$\rightarrow y_i = \alpha + \beta^S \vec{C}_i + \gamma^S \vec{E}_i + u_i$$

Counterfactual

$$y_i^C = \hat{\alpha} + \hat{\beta}^R \vec{C}_i + \hat{\gamma}^R \vec{E}_i + \hat{u}_i$$

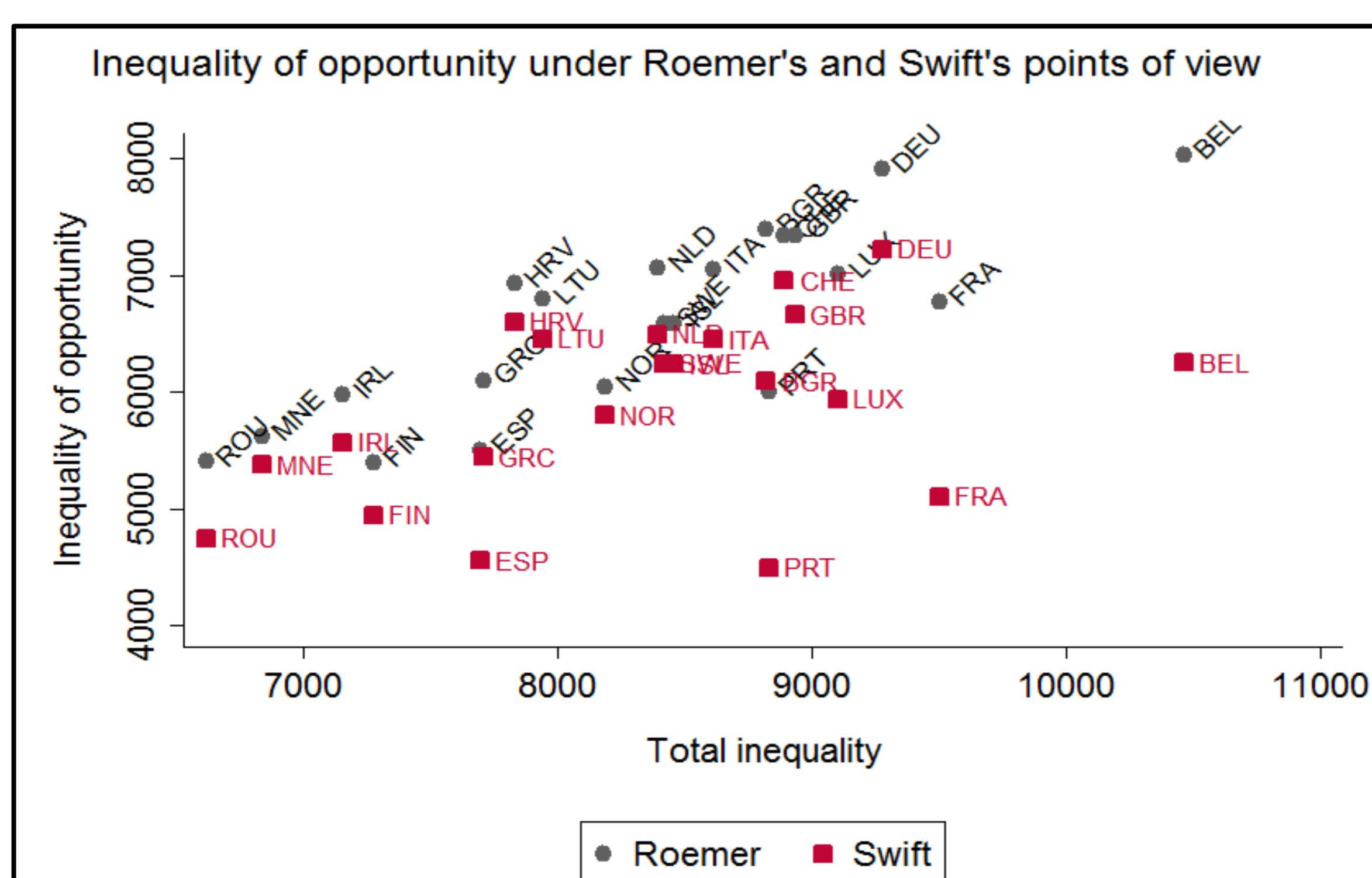
$$y_i^C = \hat{\alpha} + \hat{\beta}^S \vec{C}_i + \hat{\gamma}^S \vec{E}_i + \hat{u}_i$$

IOp measurement

$$IOp^R = \text{var}(\hat{\beta}^R \vec{C}_i) + \text{var}(\hat{u}_i)$$

$$IOp^S = \text{var}(\hat{\beta}^S \vec{C}_i) + \text{var}(\hat{u}_i)$$

Results



- **Lowest IOp and total inequality** in Romania, Montenegro, Ireland, Finland and Spain.
- **Highest IOp and total inequality** in Belgium, Germany, United Kingdom, Switzerland, Bulgaria
- **High total inequality but Low IOp:** in Portugal and France
- **Large influence of the correlation between circumstances and effort in IOp measures** in Belgium, France, Portugal, Luxembourg and Bulgaria