

5th SHARE User Conference

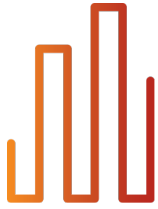
11/12/2015

---

# Inequity in Unmet Medical Need among the Elderly in Europe

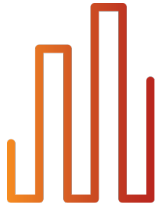
**Bora KIM**

(PhD candidate, LISER & KU Leuven)

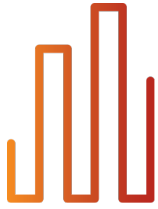


# Table of contents

1. Motivation
2. Data
3. Model
4. Results
  1. Estimation results
  2. Inequity in access across countries
5. Summary of findings and conclusion

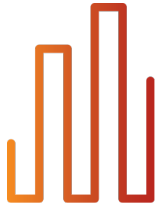


# 1. Motivation

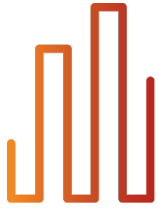


# Motivation

- Literature mostly focus on inequality in utilized medical service (doctor visit, medical expenditure, etc.).
  - Pro-rich inequality in specialist contact: PT, FI, IE, IT and DK (Van Doorslaer et al., 2000; 2004); EL and AT (Bago d'Uva & Jones, 2009)
  - Pro-rich inequality GP contact: PT, SE, AT and EL (Van Doorslaer et al., 2000; Bago d'Uva & Jones, 2009)
- Limitation: incomplete information about actual need, preference, supplier's characteristics, and policy environment
- If forgone care is negligible, this approach misinforms the current situation.
- Instead, we focus on self-reported unmet medical need caused by policy relevant reasons (e.g. cost or waiting time).
- Enjoying barrier-free access to health care should be considered as a right. Therefore, inequity in terms of forgone service (unmet medical need) has direct policy relevance.
- Two different policy goals: Equalization of medical use vs. Equalization of medical access
- Inequity rather than socioeconomic inequality
  - Unfairness from the overall inequality that should be intervened by public policy.



## 2. Data



## Data

- Self-reported unmet need for medical service
  - Cross-country variation in unmet need is more visible in Wave 5 compared to Wave 1.
  - Except for EE and IT, less than 5% people have given up seeing a doctor due to cost or waiting time between 2012-2013.
- Comparison with external data
  - Reporting bias
  - EU-SILC (2012) : self-reported unmet need
  - OECD (2013) : financing health care expenditure, and waiting time

Table 1: Unmet need due to cost in SHARE and external data

	Individual survey data			Aggregated data (OECD, 2012)				
	Unmet need(%)			Population with public insurance(%)	Financing of health expenditure(%)			
	SHARE (2013)	SHARE (2004)	SILC (2012)		Gov't	Social security	OOP	Insurance
EE	15.2	n.a.	0.7	93.3	10.5	69.1	18.4	0.3
IT	12.2	5.1	4.7	100	77.0	0.3	18.8	1.0
DE	4.8	5.5	n.a.	88.9	6.8	70.4	12.2	9.6
FR	4.6	6.6	1.3	99.9	3.9	73.8	7.8	13.8
BE	4.0	3.3	1.5	99	10.9	64.3	20.4	4.2
LU	4.0	n.a.	0.6	97	8.6	74.0	11.6	4.6
ES	3.3	3.1	0.4	99	67.0	4.7	22.1	5.8
CZ	3.2	n.a.	0.6	100	4.5	79.2	15.3	0.2
AT	2.1	2.8	0.3	99.9	32.6	44.6	16.7	4.8
CH	1.8	3.6	0.6	100	20.3	45.5	26.0	7.2
SI	1.3	n.a.	0	100	3.2	68.6	12.5	14.6
NL	1.3	2.0	0.2	99.8	7.5	78.3	6.0	5.5
SE	0.9	2.8	0.1	100	81.2	0.0	17.4	0.3
DK	0.6	1.5	0.3	100	85.2	0.0	12.9	1.8

\*Note: Only those aged over 50 are considered for comparison between two survey datasets.

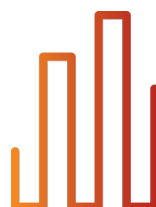


Table 2: Unmet need due to waiting time in SHARE and external data

	Unmet need(%)			Self-reported waiting time (SHARE, 2004)			
	SHARE (2013)	SHARE (2004)	SILC (2012)	Emergency consulta- tion (day)	Non- emer. consult. (week)	Inpatient surgery (month)	Outpatient surgery (month)
EE	19.4	n.a	5.7	n.a	n.a	n.a	n.a
IT	17.5	3.4	1.0	6.4	2.8	2.6	3.1
FR	6.5	2.2	0.3	10.8	3.2	2.3	1.3
CZ	4.9		0.2	n.a	n.a	n.a	n.a
DE	4.7	1.5	n.a	0.9	1.8	1.5	0.6
BE	4.4	0.9	0	5.1	1.7	1.3	0.7
LU	4.2	n.a	0.1	n.a	n.a	n.a	n.a
SE	4.1	3.3	0.6	8.8	9.7	6.9	4.3
SI	3.8	n.a	0.1	n.a	n.a	n.a	n.a
ES	3.8	2.0	0.3	9.7	5.4	5.8	3.6
AT	3.0	0.7	0	4.1	1.8	2.0	0.6
DK	2.9	2.1	0.6	12	5.8	2.2	2.6
CH	0.7	0.8	0	1.7	1.4	1.4	0.8
NL	0.7	0.6	0.2	7.5	3.6	2.7	1.8

\*Note: Percentages in parentheses are based on patients' waiting time since being listed.



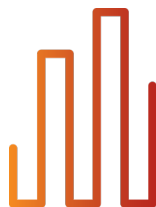
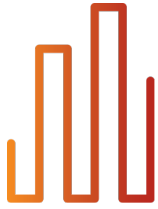


Table 3: Objective data on actual waiting time

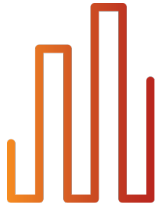
	Patients who waited longer than 3 months(%)					
	after being accessed			after being listed		
EE	52.7	52.7	74.9	90.4	90.4	91.7
SE	n.a	n.a	n.a	9.5	8.6	9
ES	56.1	69.1	77.4	34.8	50.6	53.9
DK	31.7	14.3	16.2	n.a	n.a	n.a

\* Source: OECD (2014)

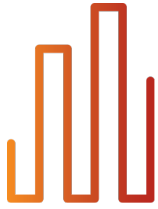


## Data

- SHARE vs. EU-SILC: Formulation of questions plays a critical role.
  - High unmet need due to cost in Italy are consistently supposed.
- SHARE vs. OECD: Non-negligible discrepancy in terms of waiting time suggests reporting bias.
- Future researches are required to investigate the issue of waiting time when better measures are available.
- We use self-reported unmet need due to cost as an outcome variable.



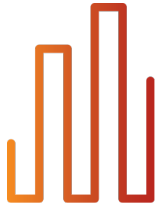
## 3. Model



## Model

$$Unmet = g(e, \varepsilon, s, a, r, U, I, z)$$

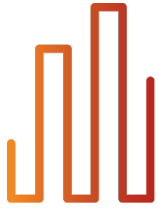
- Fleurbaey et al. (2009)'s stylized model of medical consumption
  - $e$ : innate health
  - $\varepsilon$ : stochastic shock on health
  - $s$ : social background
  - $a$ : innate ability
  - $r$ : risk preference
  - $U$ : unobserved preferences
  - $I$ : information on own health technology
  - $z$ : market(policy) environment



## Model

$$Unmet = g(e, \varepsilon, s, a, r, U, I, z)$$

- *e*: innate health
  - $\varepsilon$ : stochastic shock on health
  - *s*: social background
  - *a*: innate ability
  - *r*: risk preference
  - *U*: unobserved preferences
  - *I*: information on own health technology
  - *z*: market(policy) environment
- } Need (age, gender, childhood health )
- } SES (parental education, childhood wealth, own education)
- } Preferences\*

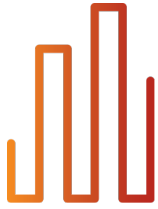


## Model

- Effort-related components are not directly measured.
- Instead of  $r$ , however, we observe individual purchasing behavior of a supplementary insurance.

$$si = S(e, r, a, s)$$

- Question: Should we interpret  $si$  as Illegitimate(circumstance) or legitimate(effort) factor?
- A normative judgement is required.
- Common practices in empirical application
  - **Preference view** (Rawls, 1971; Dworkin, 1981)
  - **Control view** (Arneson, 1989; Cohen, 1989; Roemer 1998)
  - **Harmonization is possible.**



## Model

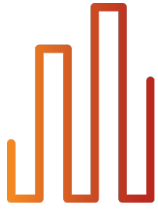
- **Preference view** : individuals are responsible for their choice made based on their preference.
  - SI is fully respected as effort.

$$Unmet_i = \alpha + \beta \cdot age_i + \gamma \cdot fe_i + \delta \cdot pedu_i + \eta \cdot room_i + \theta \cdot edu_i + \lambda \cdot \boxed{si_i} + u_i$$

- **Control view**: Individual responsibility is limited to extent what falls under an individual's genuine control.
  - Residualized si (relative effort) is considered as pure effort.

$$\hat{si}_i = \dot{\alpha}_{si} + \dot{\beta}_{si} \cdot age_i + \dot{\gamma}_{si} \cdot fe_i + \dot{\delta}_{si} \cdot pedu_i + \dot{\eta}_{si} \cdot room_i + \dot{\theta}_{si} \cdot edu_i + re_i$$

$$Unmet_i = \dot{\alpha} + \dot{\beta} \cdot age_i + \dot{\gamma} \cdot fe_i + \dot{\delta} \cdot pedu_i + \dot{\eta} \cdot room_i + \dot{\theta} \cdot edu_i + \dot{\lambda} \cdot \boxed{re_i} + \dot{u}_i$$



## Model

- **Harmonization (Genuine preference/control)**

- We can rather explicitly identify genuine preference or control in decision on  $si$ .

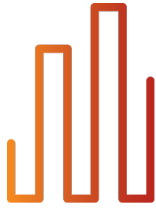
$$Unmet_i = \ddot{\alpha} + \ddot{\beta} \cdot age_i + \ddot{\gamma} \cdot fe_i + \ddot{\delta} \cdot pedu_i + \ddot{\eta} \cdot room_i + \ddot{\theta} \cdot edu_i + \ddot{\lambda} \cdot si_i + \ddot{u}_i$$

$$si_i = \ddot{\alpha}_{si} + \ddot{\beta}_{si} \cdot age_i + \ddot{\gamma}_{si} \cdot fe_i + \ddot{\delta}_{si} \cdot pedu_i + \ddot{\eta}_{si} \cdot room_i + \ddot{\theta}_{si} \cdot edu_i + \ddot{\sigma}_{si} \cdot Genuine_i + \ddot{u}_{si,i}$$

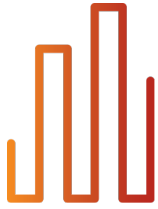
- **Criteria for *Genuine preference/control* variables**

- It is assumed to be correlated with unmet need only through  $si$ .
- It reflects individual genuine preference which also falls under her control.
- We use
  - Participation in volunteer activity
  - Marriage experience (0: ever married before, 1: never)
  - Childless status (0: at least one, 1:none)



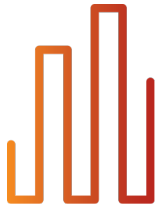


## 4. Result

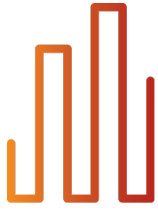


## Estimation result

- Considering different motivations and requirements for having  $si$ , we separate the sample into three groups of countries by the proportion of people with  $si$ .
  - Group 1 : CZ, EE, IT, ES ( $si$ =less than 10%)
    - Genuine: volunteer & unmarried
  - Group 2: AT, DE, DK, SE ( $si$ =10%-40%)
    - Genuine: volunteer & childless
  - Group 3: LU, CH, NL, SI, FR, BE ( $si$ =above 70%)
    - Genuine: volunteer & childless
- Individual country dummies are controlled.

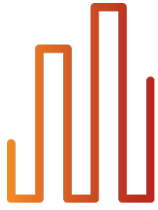


1) Unmet need	Group 1	Group 2	Group 3
Age			
Female			
Disease at 10			
Illness at 10			
Father's edu			
Room at 10			
Education			
SI (Preference)			
SI_re (Roemer)			
SI_IV (Genuine)			
2) SI			
Volunteer			
Unmarried			
No child			



# Inequity in access

- Disentangle unfairness from overall inequality
  - Direct standardization: Direct unfairness
  - Indirect standardization: Fairness gap
- Counterfactual IOP
  - Assume that the elderly population could have attained at least primary level education. (education=middle)
- Variance as an indicator
  - Translation invariance
  - Mirror property
    - inequality/inequity in attainment and shortfall coincide with each other.
  - Sub-group decomposable



# Inequity in access

- Reward (or responsibility) principle
  - Unequal outcomes among individuals with the same circumstances but different efforts are equitable.
  - Direct unfairness :  $\hat{y}_{DU} = P(y_i = 1 | C_i, E^*)$
  - $E^*$  is reference effort. Remained inequality is driven by C only.
- Compensation principle
  - Individuals exerting the same efforts should enjoy the same outcomes regardless of their circumstances.
  - A fair society enables this equitable situation by compensating disadvantageous backgrounds.
  - Fairness gap:  $\hat{y}_{FG} = P(y_i = 1 | C_i, E_i) - P(y_i = 1 | C^*, E_i)$
  - Actual outcome conditional on C and E-Counter-factual outcome at reference C with same E

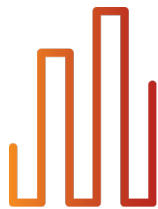
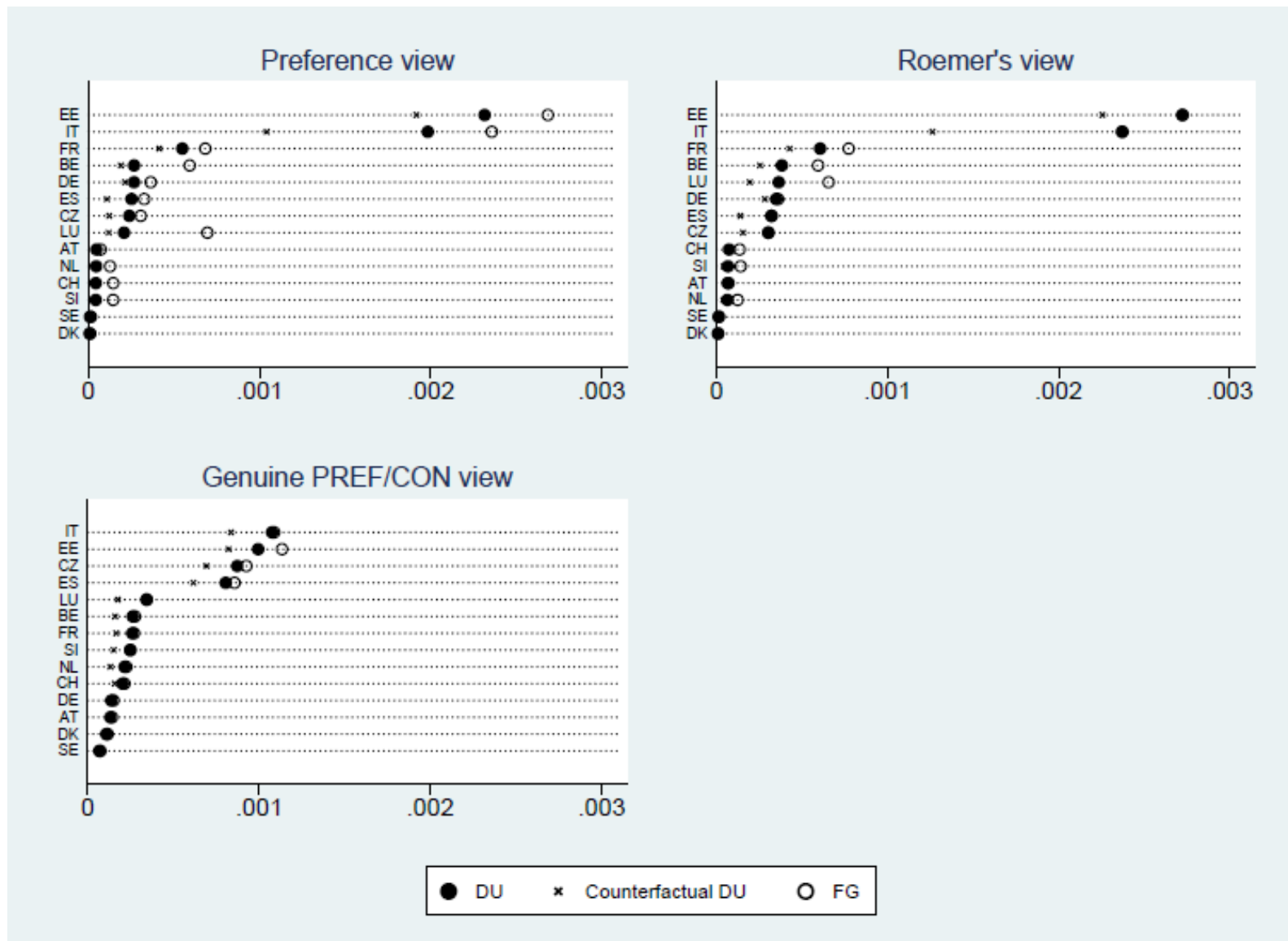
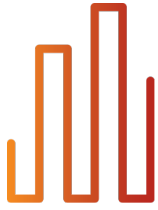


Figure 1. Inequity in unmet need due to cost





## 5. Summary of finding and conclusion

- Countries with low equity: EE, IT
  - The highest IOP in Italy seems to be mainly driven by educational disparity.
- Countries with high equity: SE, DK, NL, CH, AT
- Visible gap between DU and FG in BE and LU is due to strong correlation between *circumstances* and *si*. (Figure 2)
- The normative consideration about individual responsibility matters in policy evaluation. (e.g. DE, FR and CZ)
- Policy makers may choose an appropriate philosophical approach, depending on their own insurance policy and public consensus.

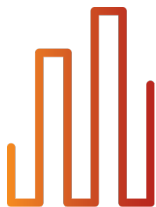
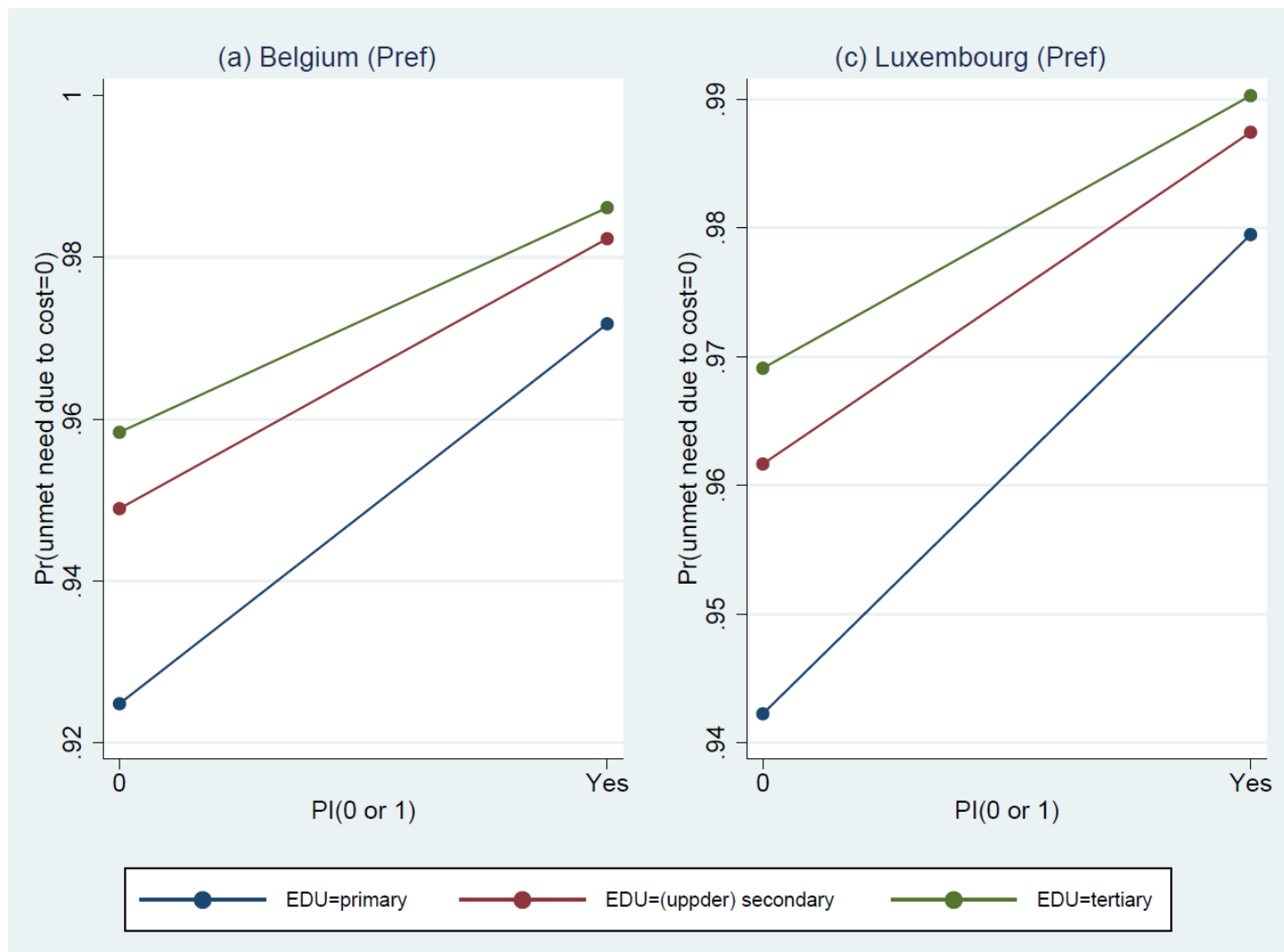
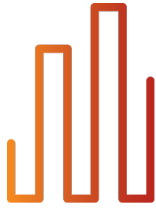


Figure 2. Interaction between education and si







Thanks for your attention