

Health effects of OOP

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Work in Progress

Outline

Health insurance

- ▶ healthcare costs increase in all developed countries
- ▶ health insurance can cause moral hazard
- ▶ oop payments is one way to mitigate this
- ▶ if a deductible increase reduces expenditure, we view this as welfare enhancing
 - ▶ trade off: risk aversion
- ▶ what if oop cause people to postpone *valuable* treatments?
- ▶ can we identify this effect across countries?

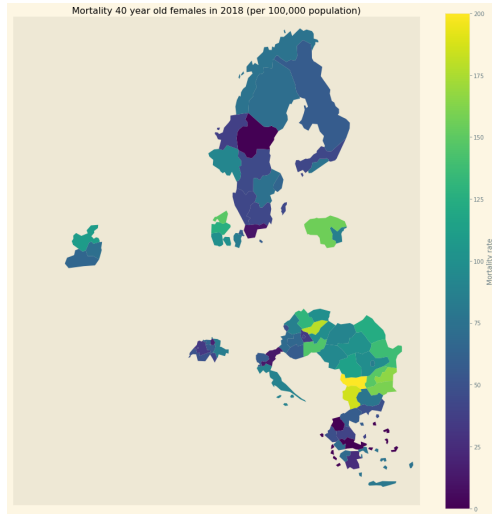
Health effects

- ▶ postponing/forgoing valuable care has health effects
- ▶ measuring health effects is not easy
- ▶ we use mortality per NUTS 2 region/year/age/gender in European countries
- ▶ fixed effects to control for non-observed variables

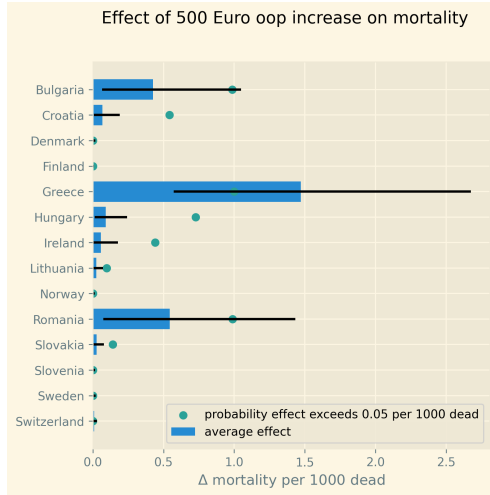
Insurance generosity

- ▶ comparing insurance generosity across countries is not straightforward
- ▶ how to compare a system with high deductible but low coinsurance rate or many treatments exempted from oop with a low deductible system?
- ▶ we use variable OOP: % oop in total health expenditure in a country
- ▶ high oop is especially problematic for people on low income
- ▶ they could forgo valuable treatment if it is expensive
- ▶ if this mechanism exists: higher mortality in regions where OOP × Poverty is high

NUTS 2 regions in Europe



summary



Literature: individual level data

- ▶ recent literature on relation oop and mortality
- ▶ US individual level data
- ▶ e.g. Miller et al. (2021) on Medicaid eligibility expansion:
 - ▶ introduced in different states at different times
- ▶ Chandra et al. (2021) Medicare part D prescription drug coverage
 - ▶ enrollment month
- ▶ behavioral hazard: Baicker et al. (2015)

This paper

- ▶ European regional data
- ▶ more broad brush: cannot capture effect of 1% increase in deductible
- ▶ compare health insurance systems that are more/less generous
- ▶ more variation in OOP than with Dutch individual level data
- ▶ European health insurance more homogeneous across regions in a country

theory

- ▶ using a theoretical model we derive two equations to be estimated:
 - ▶ probability of death as a function of Unmet medical needs
 - ▶ probability that someone forgoes treatment because it is too expensive as a function of OOP and Poverty

Number of deaths

- ▶ per age, gender, year, nuts 2 region
- ▶ k deaths out of n population: $\binom{n}{k} m^k (1 - m)^{n-k}$

$$m_{ga2t} = \frac{e^{\beta_{ag}}}{1 + e^{\beta_{ag}}} e^{\left(\mu_2 + \gamma \ln \left(\frac{m_{a-1,g,2,t-1}}{\bar{m}_{a-1,g}} \right) + \beta_{poverty} \text{Poverty}_{2t} + \beta_{unmet} \text{Unmet}_{2t} \right)}$$

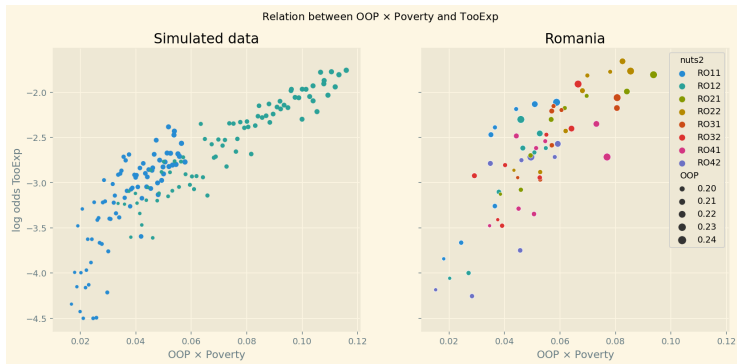
Too expensive

- ▶ one motivation for unmet medical needs is that treatment is too expensive
- ▶ fraction of people in a region indicating that they postponed/forgone treatment because it was too expensive:

$$\text{TooExp}_{2t} = b_{0,2} + b_{0,t} + \text{OOP}_{ct} \bar{x}_{ct} (b_{oop,c} + b_{interaction,c} \text{Poverty}_{2t})$$

- ▶ equation is derived by varying co-insurance and deductible

Relation OOP and TooExp



Eurostat data: 2009-2019; ages 35-85

Table: Summary statistics main variables

	count	mean	std
population	52612.00	7491.28	4805.28
deaths	52612.00	103.19	126.49
mortality	52612.00	2.12	2.94
poverty	52612.00	16.47	6.50
deprivation	52612.00	11.23	12.78
too exp.	52612.00	2.00	3.09
unmet	52612.00	4.93	3.73
out-of-pocket	52612.00	22.03	8.88
voluntary	52612.00	3.12	3.07
expend. per head	52612.00	3379.56	2688.57

Estimation technique

- ▶ Bayesian analysis: are we 95% sure that the following chain of effects is present:
 - ▶ higher oop leads to higher unmet needs in areas with high poverty
 - ▶ which then leads to higher mortality

Fit

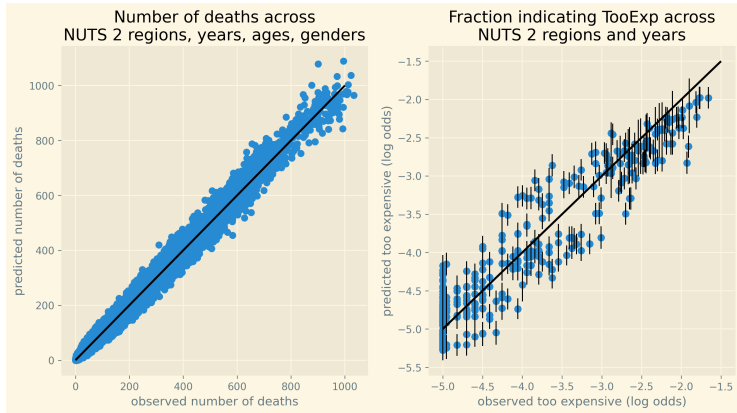
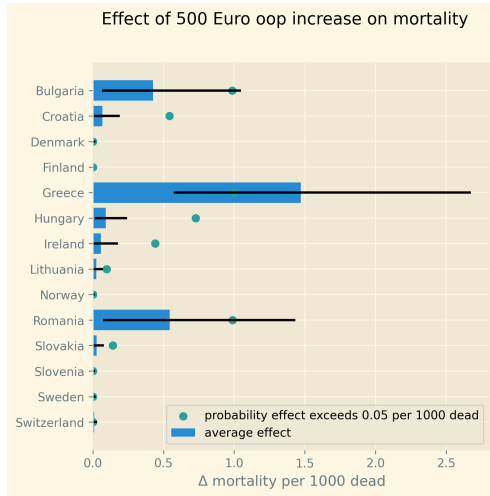


Figure: Fit of estimated and observed mortality across all observations.

size of effects



other causes of deaths

Table: Number of people dying by cause

icd-10	per 1000
Tuberculosis	0.93
HIV	0.72
Malignant melanoma of skin	4.20
Diseases of the blood and blood-forming organs	2.69
Leukaemia	10.15
Influenza (including swine flu)	1.18
Alzheimer disease	13.08

Robustness analysis

- ▶ include voluntary health insurance payments in OOP measure
- ▶ at risk of poverty as poverty measure
- ▶ separate effect of TooExp and other unmet medical needs on mortality

Policy implications

- ▶ increasing oop leads to more costs than just risk aversion
- ▶ doing without oop is not an option:
 - ▶ means tested oop
 - ▶ let copayments vary with cost effectiveness of treatments