Creating a European microsimulation to assess the effects of socio-economic policies on health and health inequalities: challenges, solutions and limitations.

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Motivation

Health is a major topic, very complex, influenced by:

- Healthcare quality
- Healthcare accessibility
- Healthcare costs
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- Social conditions
- Economic conditions
- ...
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→ Impact of different policies
Goal

Research question

Analyse the possibility to create a European microsimulation to assess the effects of socio-economic policies on health and health inequalities.
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Analyse the possibility to create a European microsimulation to assess the effects of socio-economic policies on health and health inequalities.

→ Complexity :

Social conditions ➔ Economic conditions ➔ Health ➔ Social conditions

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Context

- **EUROMOD**:
  
  Holly Sutherland and Francesco Figari, (2013), EUROMOD: the European Union tax-benefit microsimulation model, International Journal of Microsimulation, 1, (6), 4-26
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Linkage between EUROMOD and LIAM2:

Virtual Belgium in Health:
Morgane Dumont (2021), Microsimulation in time and space: applications and challenges, PhD thesis

...
EUROMOD

- Tax-benefit microsimulation model (static)
- for the European Union
- enabling to calculate the effects of taxes and benefits on household incomes and work incentives
- in a comparable manner.
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There are three key components to EUROMOD:

- The coded policy rules,
- The input micro-data and
- The software.
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Instruments simulated: income taxes, social contributions (paid by the employees, self-employed and employers), family benefits, housing benefits, social assistance and other income-related benefits.
EUROMOD

Strengths:
- Free
- European
- Modelling very complex tax’s system
- Flexible
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Weaknesses:

- Static
- Changes in policies, without adapting the input variables
- Accessibility to input microdata
- Not really adapted to be called from other codes
Linkage with LIAM2

- LIAM2 (esp. MIDAS_LU)
- Dynamic in Static (Nowcasting)
- Expanded initial input population (from sample)
- Discrete time (image per period)
- Modules: Ageing, Migrations, Education/Unemployment/Working/Retirement statuses, Gross income, Gross pension rights, Reporting (including yearly exhaustive populations as inputs for the static side)
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- → the output of EUROMOD not in the dynamic
- → Health absent
Our proposition: discrete time dynamic microsimulation with EUROMOD as module.

- Static in Dyn
- Discrete time
- Starting from a complete synthetic population (>> sample)
- including all interactions with dynamical loop
- Possible addition of variables not available in EUROMOD
- Each module could use different hypothetical policies
Algorithm chart

**Initialization (static)**
- Start: demographic population for initial year (y0)
- EUROMOD (Static) + Income
- Health model + Self-assessee Health

**Dynamical loop**
- Health model
  - Net income
  - EUROMOD
    - Gross income
    - Gross income model
    - Work status
    - Participation model
  - Self-assessed health
  - Year = year + 1
  - Final year reached?
    - Yes: STOP
    - No: Demographic update
      - Updated population structure
Initial synthetic population
1. Initial synthetic population

2. Demographic update: Ageing, death, birth, union of HH, separation of HH, moves, migrations
1. Initial synthetic population

2. Demographic update: Ageing, death, birth, union of HH, separation of HH, moves, migrations

3. Participation model: Probability to be active or inactive depending on: Age, gender, household, health
Possible model description: !! work in progress !!

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4. Gross income model: gross income depending on: Age, gender, household, health and work status
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5. EUROMOD: used output = net income
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1. Initial synthetic population
2. Demographic update: Ageing, death, birth, union of HH, separation of HH, moves, migrations
3. Participation model: Probability to be active or inactive depending on: Age, gender, household, health
4. Gross income model: gross income depending on: Age, gender, household, health and work status
5. EUROMOD : used output = net income
6. Health model: self assessed health depending on: Age, gender, household, work status and disposable income
Challenges and limitations

Challenges :
- Transparence
- Level of complexity
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- Code easily adaptable to other countries
- Join different data sources

Limitations:
- Stability? Combining many different modules
- First call of EUROMOD needed, change in the tax policy?
- "Garbage in, garbage out"
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Methodologically and technically challenging

Details count

Need of several models/modules

Very flexible (code in R)

Helpful for decision makers

! Versions of EUROMOD

To be continued...
Collaboration

Nizamul Islam and Marc Suhrcke
Thank you for your attention.
Questions?