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MicroReg: a traditional static microsimulation model extended to indirect taxes and in-kind transfers

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Model's structure

Database choice

- EUSILC vs SHIW → EUSILC for the sample size

- Missing data estimation
  - Gross income → with an iterative algorithm
  - Cadatastral value of buildings → with external data on municipal balance sheets

- Sample weights calibration
  - To make estimates of gross income more similar to Minister of Finance → tax gap
- Validation
- New modules
  - Indirect taxes
  - In-kind transfers

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Indirect Taxes

Objectives and problems

- We need an **integrated database on household consumption and income**

- EUSILC does not collect consumption → more in general it **does not exist a unique** survey **which collects both income and consumption** with a minimum level of accuracy and details

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Italian surveys

SHIW (Survey of Households Income and Wealth) - **Bank of Italy**

- Details and accurate information on **income and wealth** with only **aggregate information on consumption**

EUSILC (European Union Survey on Income and Living Conditions) - **Eurostat**

- Details and accurate information on **income and wealth, with no information on consumption**

HBS (Italian Household Budget Survey) - **ISTAT**

- Details and accurate information on **expenditures**

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Objectives and problems

- We need an integrated database on household consumption and income

- EUSILC does not collect consumption → more in general it does not exist a unique survey which collects both income and consumption with a minimum level of accuracy and details

- Given Y, X and Z it is necessary to integrate Y and Z by assuming that X is sufficient to jointly determine Y and Z

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Our strategy

- Our objective is to link to each household in EUSILC an household in HBS, conditioning on a common set of variables through a statistical matching

- Two important conditions
  - The two samples extracted randomly from the same population
  - It must exist a set of common variables to the two surveys on which conditioning the matching

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Choice of variables on which conditioning

Variable	Parameter estimate	Standard Error	T statistic	Pr > |t|
Intercept	9.08	0.02	483.94	<.0001
number of rooms	0.04	0	10.78	<.0001
In property	-0.26	0.01	-22.41	<.0001
Vhs	0.08	0.01	9.54	<.0001
Loan	0.11	0.01	8.43	<.0001
Box	0.13	0.01	14.37	<.0001
Pc	0.14	0.02	8.9	<.0001
Car	0.27	0.01	23.11	<.0001
Internet	0.09	0.02	5.7	<.0001
Dishwasher	0.18	0.01	19.54	<.0001
Number of members <5 years old	0.03	0.01	2.49	0.013
Number of members 6-17 years old	0.03	0.01	4.26	<.0001
Number of members 18-24 years old	0.05	0.01	3.93	<.0001
Number of members 25-34 years old	-0.01	0.01	-0.74	0.461
Number of members 34-69 years old	0.03	0.01	3.93	<.0001
Householder with low education	-0.08	0.01	-5.66	<.0001
Number of males	0.02	0.01	2.91	0.004
Number of job seeckers	-0.07	0.01	-5.71	<.0001
Number of retired	0.04	0.01	4.52	<.0001
Number of not employed	0	0.01	0.23	0.82
Number of managers	0.12	0.02	5.4	<.0001
Number of self-employed	0.08	0.01	5.22	<.0001
Number of members with high education	0.11	0.01	10.78	<.0001
Number of members with medium education	0.04	0.01	4.82	<.0001
Number of earners	0.08	0.01	7.45	<.0001

A regression to improve the matching

- We use SHIW which collects both income and consumption, even if aggregated, to estimate a regression of total consumption on disposable income, separately for each income quintile

$$\log(c) = \beta_o + \beta_1 \log(y) + \varepsilon$$

- Coefficients are then applied to EUSILC households

- We obtain an estimate of total consumption to add to variables common to HBS on which conditioning the matching

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Distance function and matching criteria

- Exact matching for geographical area and number of components
- For the other variables we use this proximity function:

$$s(x,y) = \max \sum_{j=1}^{N} \sum_{i=1}^{P} s_i(x_{ij}, y_{ij}) \quad \forall j \in N$$

$$s_i(x_{ij}, y_{ij}) = \begin{cases} 1 \text{ if } x_{ij} = y_{ij} \\ 0 \text{ otherwise} \end{cases}$$

- Total consumption is considered equal if difference < 1.000€
- When 2 HBS households have the same distance, the one with the lower difference in total consumption is used

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In-Kind Transfers

Aims and objectives

To estimate **secondary income distribution** taking into account also **in-kind transfers** in **education and health** in order to:

- analyse the **distributive impact of in-kind transfers**, also with respect to **in-cash** transfers
- study the impact of spending review → public spending cuts

✓ Give a monetary value to benefits

✓ Impute consumption to individuals and households

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Our strategy

- The monetary value of in-kind transfers is computed with the **public cost of production**
  - **Implicit assumptions:** no inefficiency, no differences in quality, no differences in individuals preferences

- The imputation of consumption is done through the **actual consumption approach**

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School and higher education

Benefits

- The **monetary value** is estimated with data from **government/universities balance sheets**
- A **per student cost** is obtained with the ratio with respect to the number of students
  - ➢ For **university a net of fees value** is obtained after having estimated ISEEU (Italian means test for tuition fees)

Consumption

- By **age** until middle school
- By **the indication to be registered** until university

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Health

Benefits

- We used **administrative regional data** to estimate a **cost for type of service**
  - SDO (from cards hospital discharges): hospital services
  - SPA: outpatient services
  - Pharmaceutical services and rehabilitation services

Consumption

- **Monte Carlo method to assign consumption of services**
  - On **regional administrative data** estimation of the **probability to use** each service **by socio-demographic characteristics**
  - A random number is extract from a uniform distribution
  - The consumption is assigned when the number is lower than the probability

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An application

Simulated policies

- **Fiscal bonus** (low 190/2014 so called Stability Low for 2015) → so called **80 euro bonus for employees**
  - fixed amount of 960 euro for employees with gross income under 24.000 euro
  - decreasing amount for employees with gross income between 24.000 and 26.000 euro
- **Increase of VAT (safeguard clause)** (low 190/2014 so called Stability Low for 2015)
  - from 10% to 12% in 2016
  - from 22% to 24% in 2016
- **Forecast change of public expenditure in education and health**
  - decrease in education
  - increase in health

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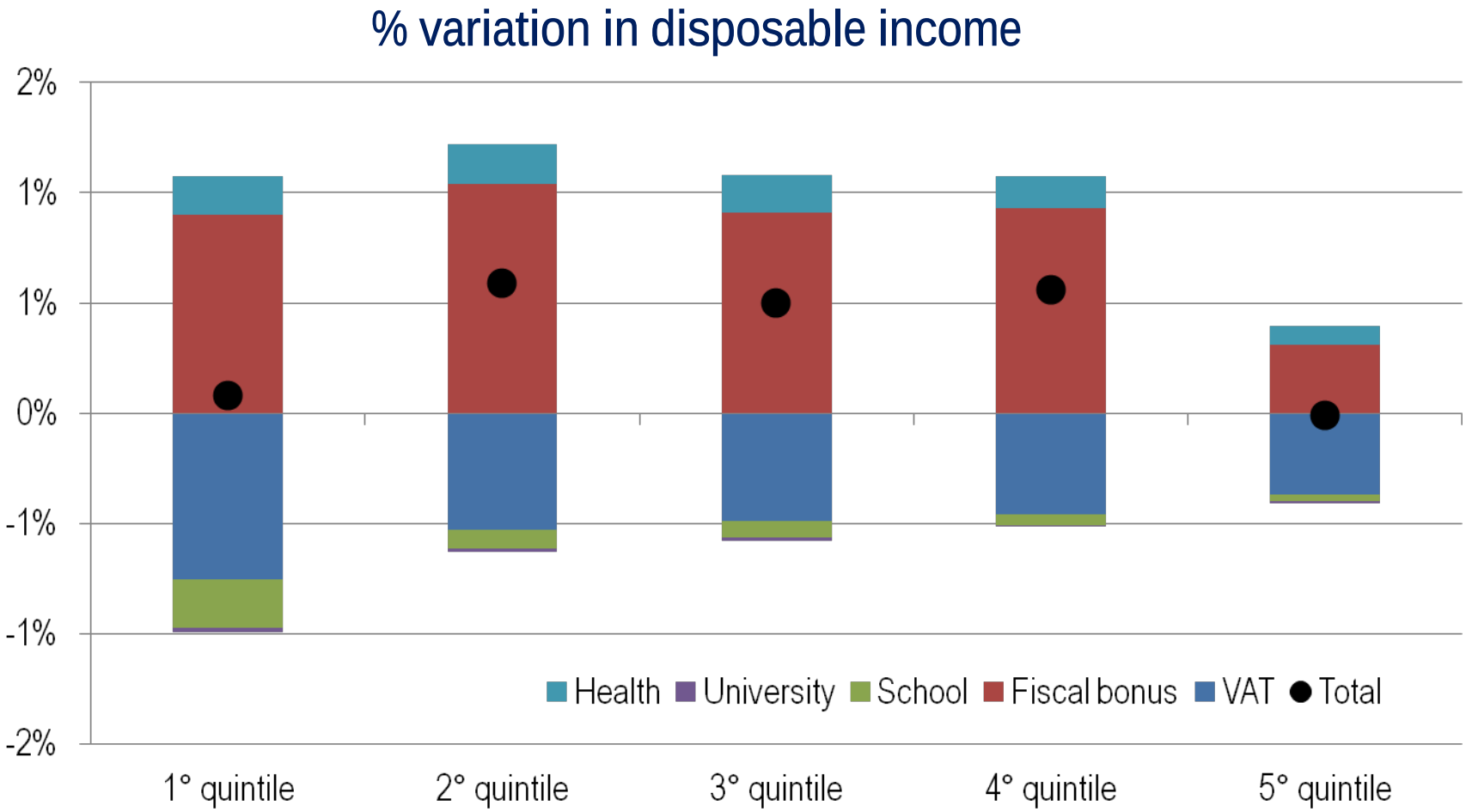
Distributive effects



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Thanks for your attention

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