

The effects of the 2022 Italian tax-benefit reform at local level using a spatial microsimulation model

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The problem ⁽¹⁾

- Most of EUROMOD-based research at **national level**
 - Enabling **cross-country comparisons** key motivation for creating the model in the first place
 - **Policy-making powers** overwhelmingly rest with national governments
 - Sample size of SILC and similar datasets used in EUROMOD designed to ensure **statistical representativeness at national**, NUTS-1 (macro areas), or in some cases NUTS-2 level (IT: *Regioni*; ES: *Comunidades Autónomas*), but no further

The problem (2)

- **Growing importance of local level** as the focus of analysis
 - Effects of the same macro-economic shock typically vary by small areas, **changing the geography** of prosperity, employment, poverty, inequality etc.
 - Spatial inequalities occasionally erupt on the national scene: Brexit / Trump / *Gilets jaunes* (see Rodríguez-Pose's 2018 paper "The revenge of the places that don't matter")
 - **Devolution of tax-benefit policies** from central to local (i.e. regional or municipal) authorities

The problem (3)

- In order to make MSM or EUROMOD more ‘granular’, enabling analysis at the small area level, we would ideally need a dataset which can be used both:
 - to **explore spatial variation** in living conditions
 - and
 - to **monitor the effects of changes** in tax-benefit policies
- Such a dataset **does not currently exist**

Solutions (1)

- What are the remedies?
- The obvious solution would be to **increase the sample size of SILC** to ensure statistical significance at NUTS-3 level (in IT, ES: provinces), or conceivably even lower
- Disadvantages:
 - Prohibitive cost
 - SILC already now enables analysis at NUTS-2 level only in some countries (IT, ES)

Solutions (2)

- An alternative might be to run EUROMOD on **registry data** (e.g. tax returns)
- Registry data could well be the future: high accuracy, granular at local level, large number of observations (big data)
- Disadvantages:
 - **Privacy concerns**
 - **Limited coverage** of some vulnerable populations (e.g. non-tax payers)
 - **Limited access**

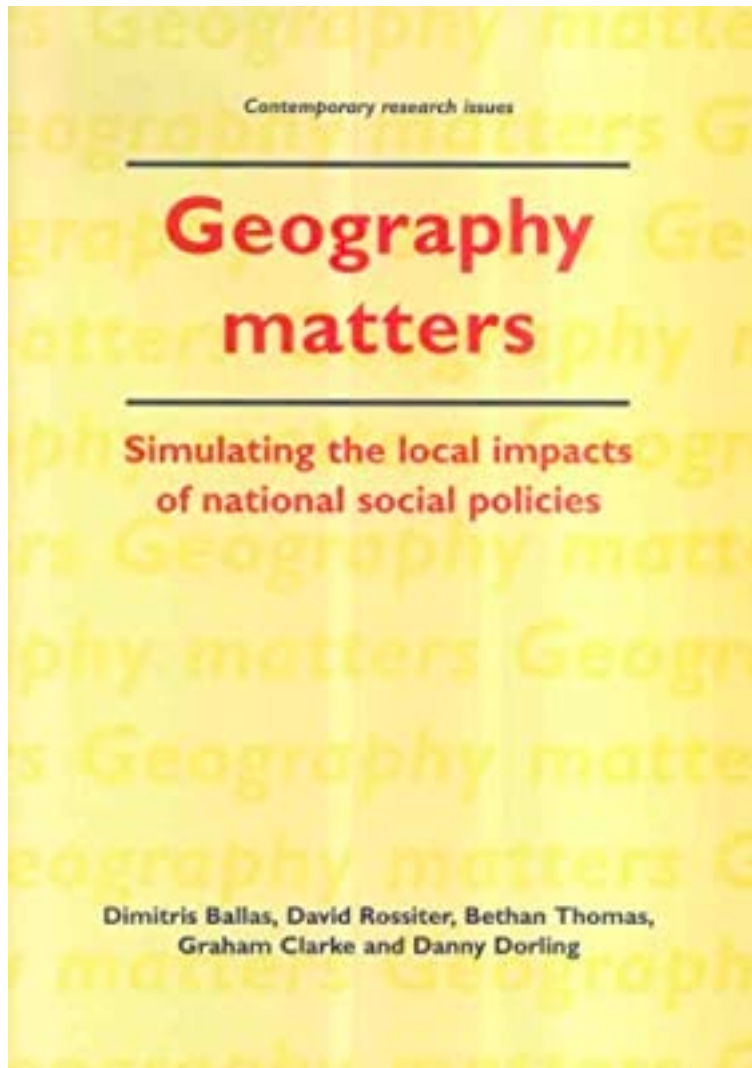
Solutions (3)

- Another option is to impute into population census data an outcome variable (e.g. equivalised disposable income; poverty status) from household survey data—whose sample size is too small for small area disaggregation
 - World Bank method based on regressions (Elbers et al. 2003)
 - M-quantile approach (Chambers and Tzavidis 2006; Giusti et al.)
 - Empirical Best Prediction approach (Molina and Rao, 2010)
- However, in order to adapt the multiple outcomes of a tax-benefit microsimulation model to small areas we need to retrieve the whole information set from surveys

Solutions (4)

- Spatial microsimulation is the third solution
 - **Create a synthetic dataset**
 - ... in order to augment the power (and local granularity) of the income survey routinely used for distribution analysis
 - ... by drawing on publicly-available information (e.g. cross-tabulations) on the characteristics of the local communities of interest
 - **Geographers** have been using this approach for **over twenty years** (Ballas, 2001)

SimBritain (1)

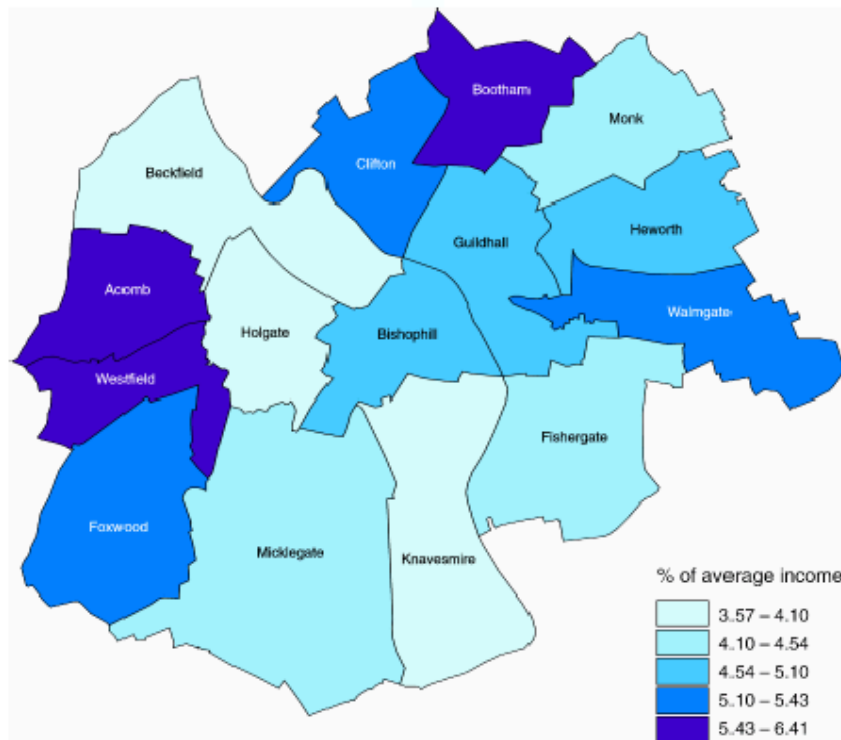


- Early example of spatial microsimulation: **SimBritain** was produced by combining the Census small-area population data with the British Household Panel Survey (BHPS)
- Joseph Rowntree Foundation report (2005)
- *“This report explores how to develop new spatial microsimulation techniques to combine census small area data with the British Household Panel Survey in order to build and update a small area population microdata set in Britain at various geographical scales between 1991-2021.”*

SimBritain (2)

- *SimBritain* was adapted for local use in various UK settings:
 - *SimYork* (for the analysis of population dynamics in the city of York)
 - *SimLeeds* (for the analysis of the labour market in the city of Leeds)
 - *SimAlba* (for the analysis of health policy in Scotland)
 - ... and possibly others

Figure 40 Spatial distribution of additional income per household as a proportion of average household income by ward, after the implementation of the April 2003 Tax Credits



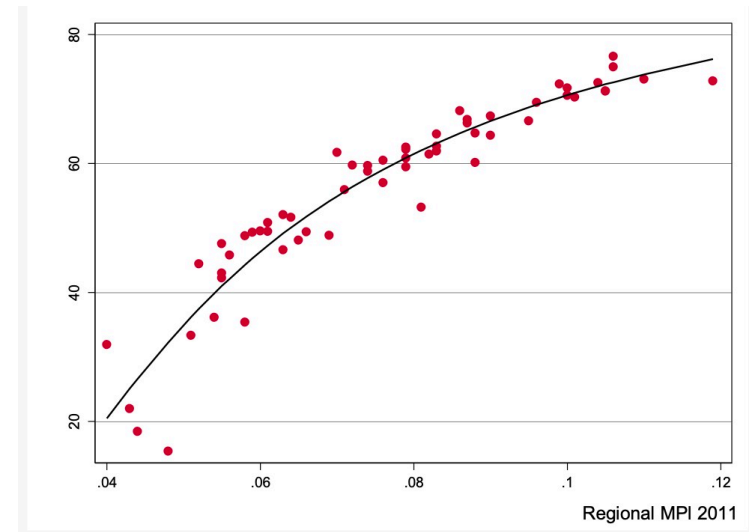
- Effects of a UK tax-benefit reform (2003)
- ... in the city of **York**
- ... by electoral **ward**
- *(average size: 5,500 individuals)*

SMILE and SimAthens

- *SMILE (Simulation Model for the Irish Local Economy)* was another such offshoot
- ✓ *Ballas D., Clarke G.P. & Wiemers E. (2005) Building a dynamic spatial microsimulation model for Ireland. Population Space and Place.*
- *SimAthens based on ECHP/EU-SILC and Census data*
- ✓ *Panori A., Ballas D. & Psycharis Y. (2016) SimAthens: A spatial microsimulation approach to the estimation and analysis of small area income distributions and poverty rates in the city of Athens. Computers, Environment and Urban Systems.*

“The revenge of the places that don’t matter” Greek-style

Multiple Poverty Index value in 2011 vs. share of “No” vote at the 2015 referendum by municipality in Greater Athens



EUROMODspatial Italy ⁽¹⁾

- *EUROMODspatial Italy* is the latest addition
- The model
 - ... is based on EUROMOD to simulate the 2022 tax-benefit reform
 - ... uses cross-tabs from the 2018 Census and income tax returns
 - ... to reweight the IT-SILC dataset EUROMOD currently runs on
 - ... so it is representative at NUTS-3 level (107 Italian provinces)

- A static multi-country tax-benefit microsimulation for the EU (Sutherland and Figari, 2013)
- 27 countries [+ UK] (mainly) using the EU-SILC as input data
- Yearly update (policy and data, up to very recent policy system)
- Simulation of
 - Income taxes, employee and employer SICs, benefits that depend on current income and observed characteristics
 - Plus unemployment benefits, with assumptions
 - Remaining benefits (e.g. contributory pensions, disability benefits) taken from input data and updated to policy year where necessary
 - (non cash income and indirect taxes for selected countries)
- Free for research purposes subject to obtaining microdata access permission (European Commission JRC Seville and Eurostat)

Italy's 107 provinces



EUROMODspatial Italy (2)

- Small-area constraint variables at individual level
 - from the Census:
 - gender (2)
 - age (17)
 - marital status (4)
 - education (5)
 - main economic activity (5)
 - from tax return data:
 - number of taxpayers by income class (8)
- Small-area constraint variables at household level
 - from the Census:
 - Number of components in the household (7)
 - Housing tenure (3)

EUROMODspatial Italy ⁽³⁾

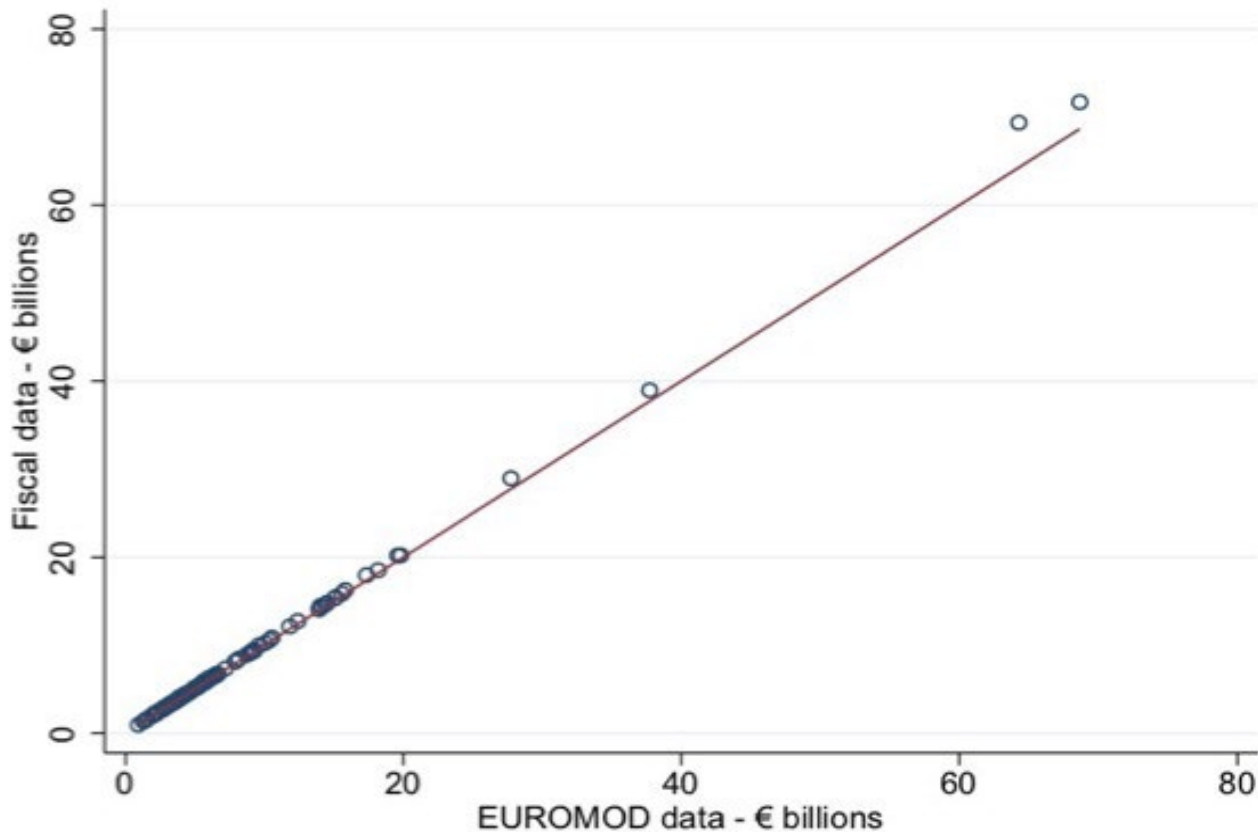
- Reweighting approach
 - start from the IT-SILC sample for a given region (**NUTS-2**)
 - **match** the aggregate IT-SILC variables **to the Census** variables
 - assign to every record a **new weight** for every province (municipality) to make it representative of that small area
 - Example: the 5,000 observations of the IT-SILC sample for Lombardy (NUTS-2) are reweighted to create 12 synthetic micro datasets – one for each of Lombardy's 12 provinces (NUTS-3)

Final sample contains 277,286 observations

- Reweighting approaches
- **probabilistic**, which typically reweight an existing national microdata set to fit a geographical area description on the basis of random sampling and optimisation techniques
- **deterministic**, which reweight a non geographical population microdata set to fit small area descriptions, but without the use of random sampling procedures. Such approach uses the iterative proportional fitting (IPF) technique to give a weight to each individual, by adjusting for each constraint variable the initial weight through a **reweighting algorithm**

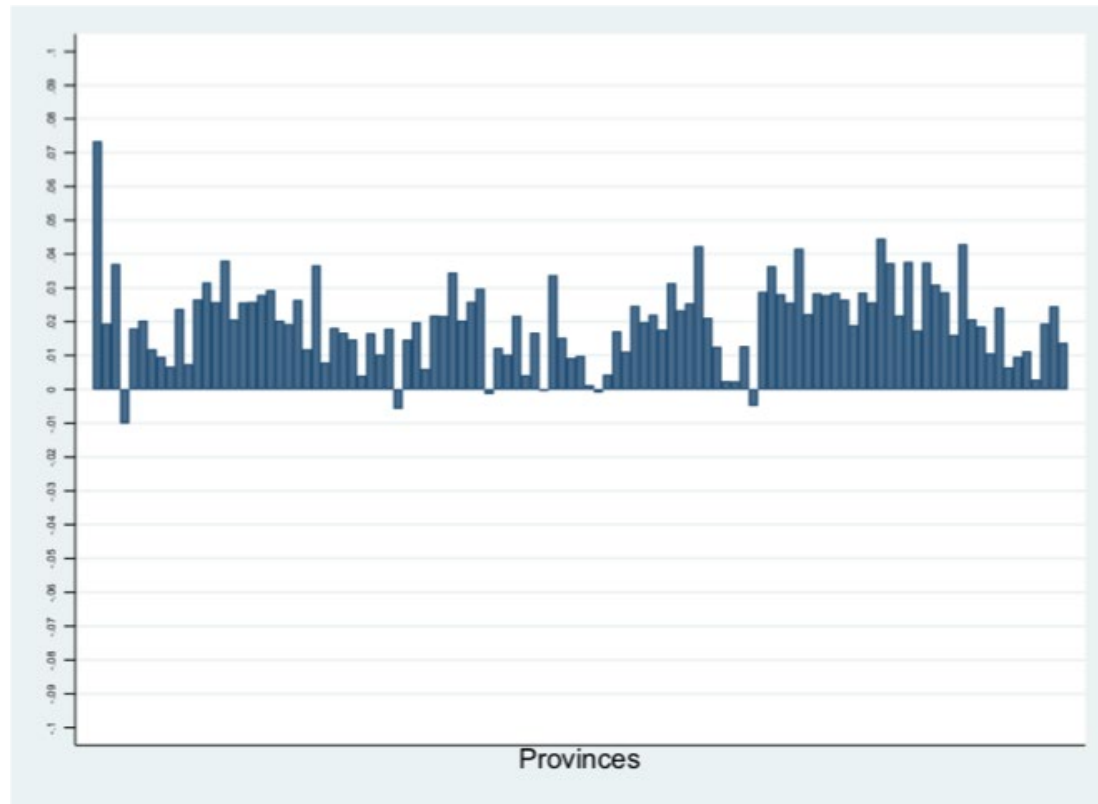
EUROMODspatial Italy (5)

External validation: estimates of total taxable income by province from *EUROMODspatial* remarkably close to registry data (income tax returns)



EUROMODspatial Italy ⁽⁶⁾

External validation: *EUROMODspatial* underestimates total taxable income by province with respect to registry data mostly in a range between 1%-3%



- Simulation of 2022 policy changes: **income taxes and social contributions**
- PIT reform
 - no. of tax brackets reduced
 - tax rates reduced
 - tax credits made more generous
 - (except for child tax credits, which were abolished)
- EESIC cut
 - Employee social contribution rate reduced by 0.8 pp (January-June 2022) and by a further 1.2 pp (July-December 2022) if labour income below €35,000 p.a.

EUROMODspatial Italy ⁽⁸⁾

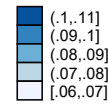
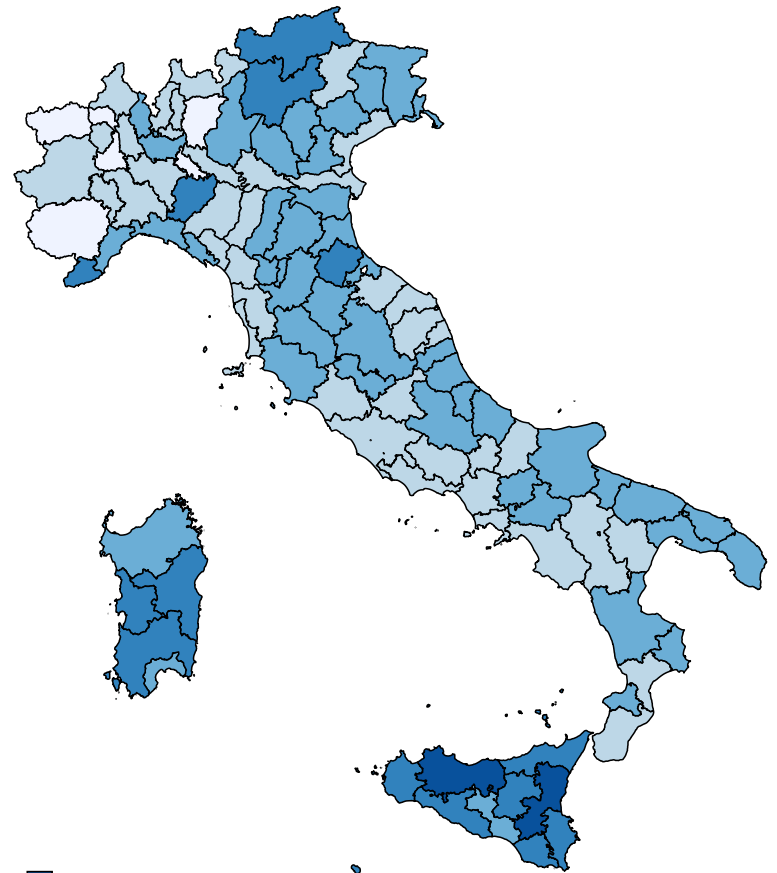
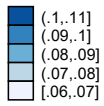
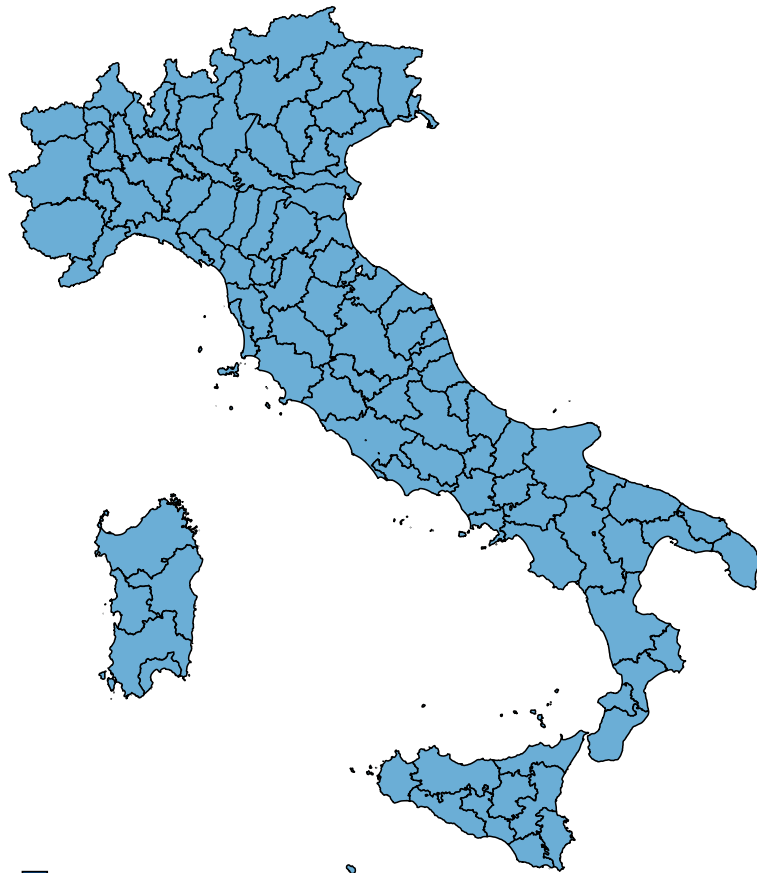
- Simulation of 2022 policy changes: **social benefits**
- Introduction of new child benefit (*Assegno unico e universale per i figli a carico AUU*)
 - **non-categorical**: replaces contributory family allowance (*Assegno per il nucleo familiare*) only available for children of employees (incl. retired ones)
 - **universal**: all eligible for at least the minimum rate (€50 pcm per child)
 - **means-tested** supplements available (up to the maximum benefit rate of €175 pcm)

EUROMODspatial Italy ⁽⁹⁾

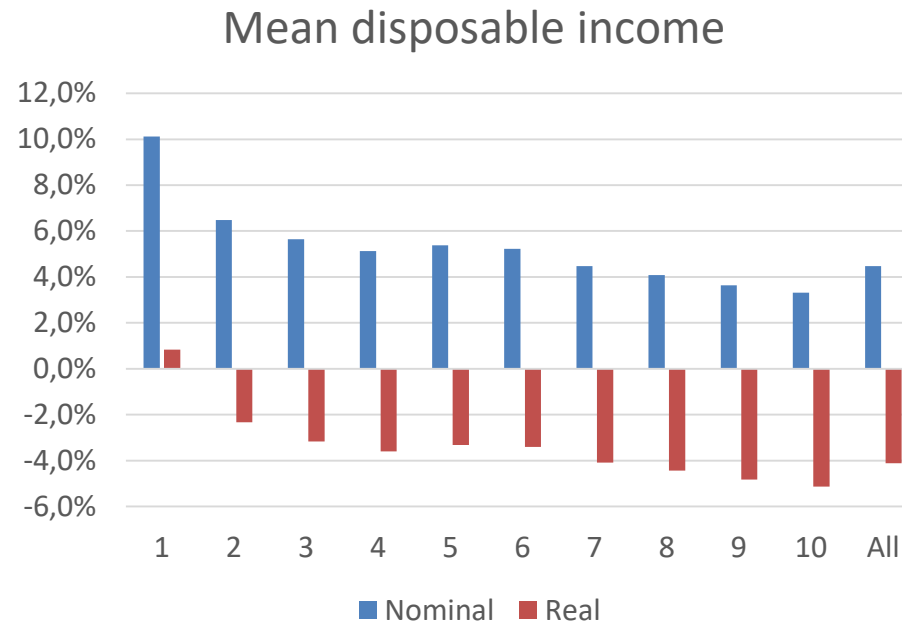
- Simulation of 2022 tax-benefit reform: **Main results** (at national level with fixed nominal incomes)
 - *Net reduction in PIT revenue: €2.5 billion*
 - *Net reduction in SIC revenue: €2.3 billion*
 - *Net cost of new child benefit: €9.8 billion*
 - *Inequality of disposable income (Gini): from 0.3278 (2021) to 0.3219 (2022)*
 - *Poverty rate (poverty line anchored to 2021): from 18.9 (2021) to 16.5 (2022)*
 - *Child poverty rate (poverty line anchored to 2021): from 23.89 (2021) to 18.78 (2022)*
- ✓ **But what about effects in real terms and at local level?**



Consumer price index at provincial level

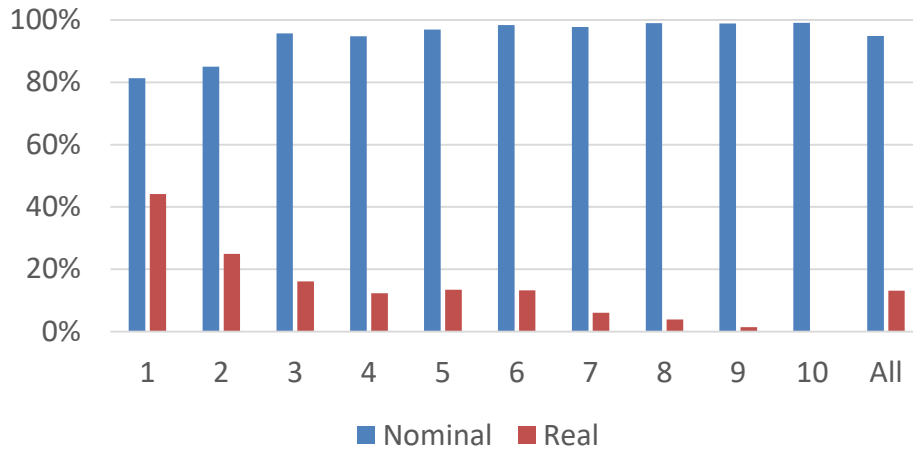


Nominal vs real effects, national level

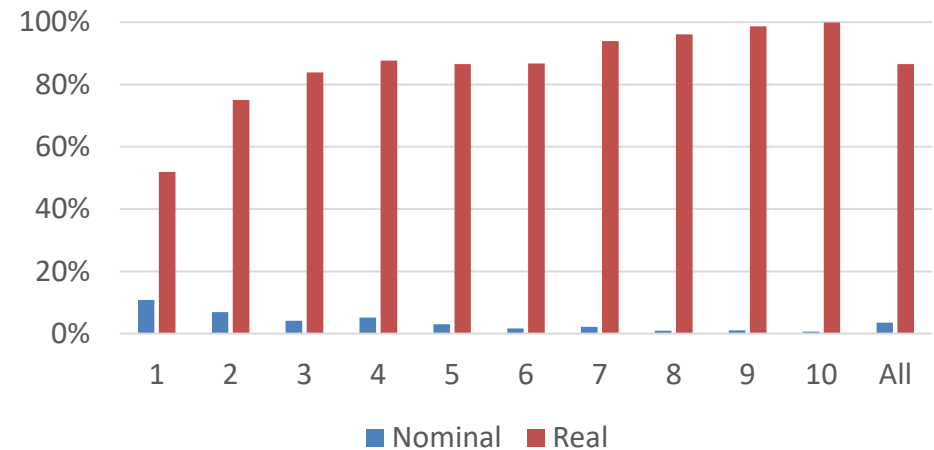


Nominal vs real effects, national level

Winners

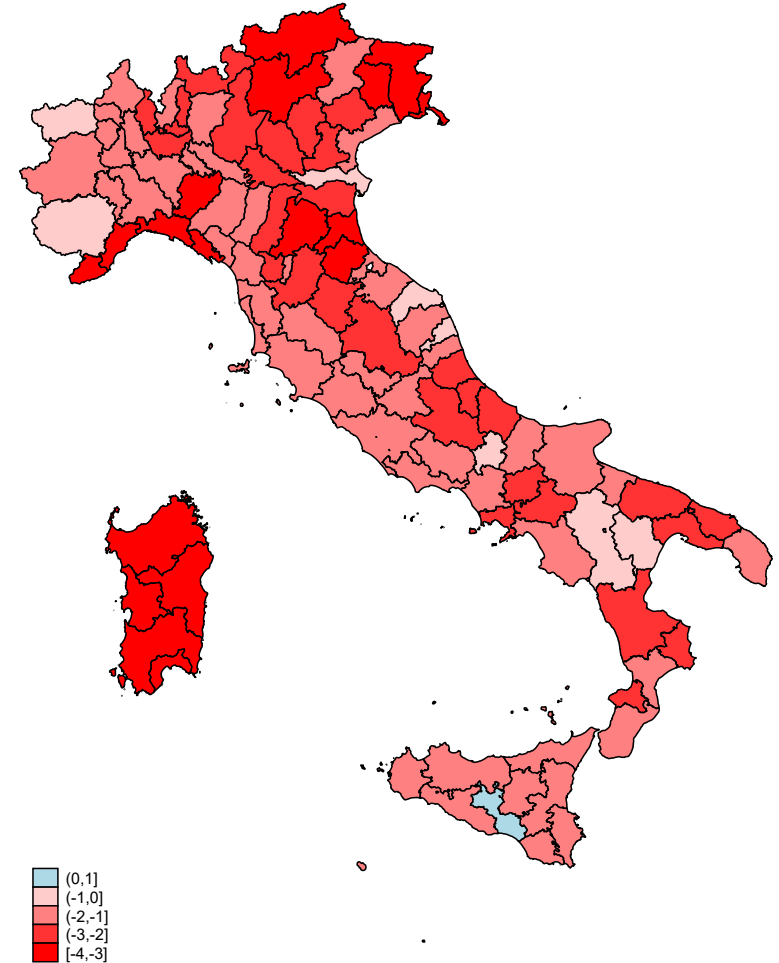
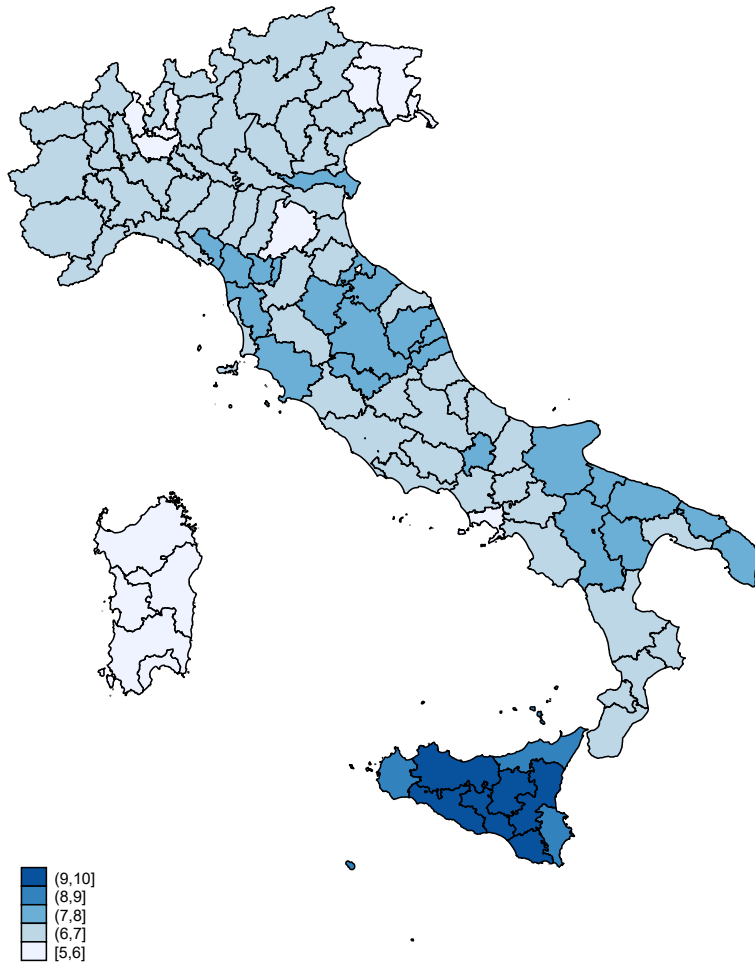


Losers



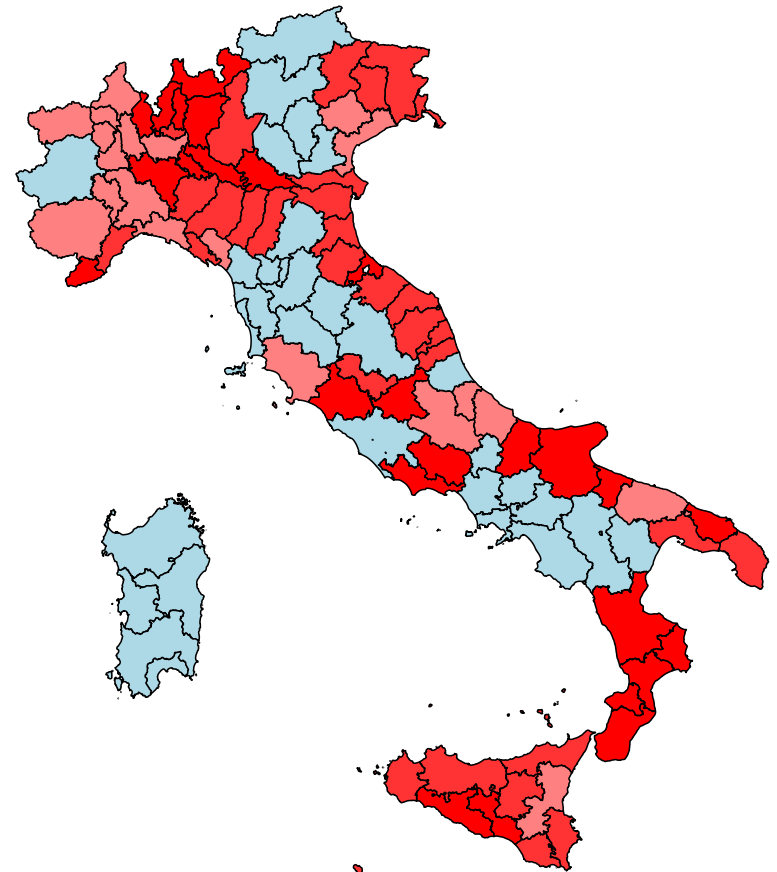
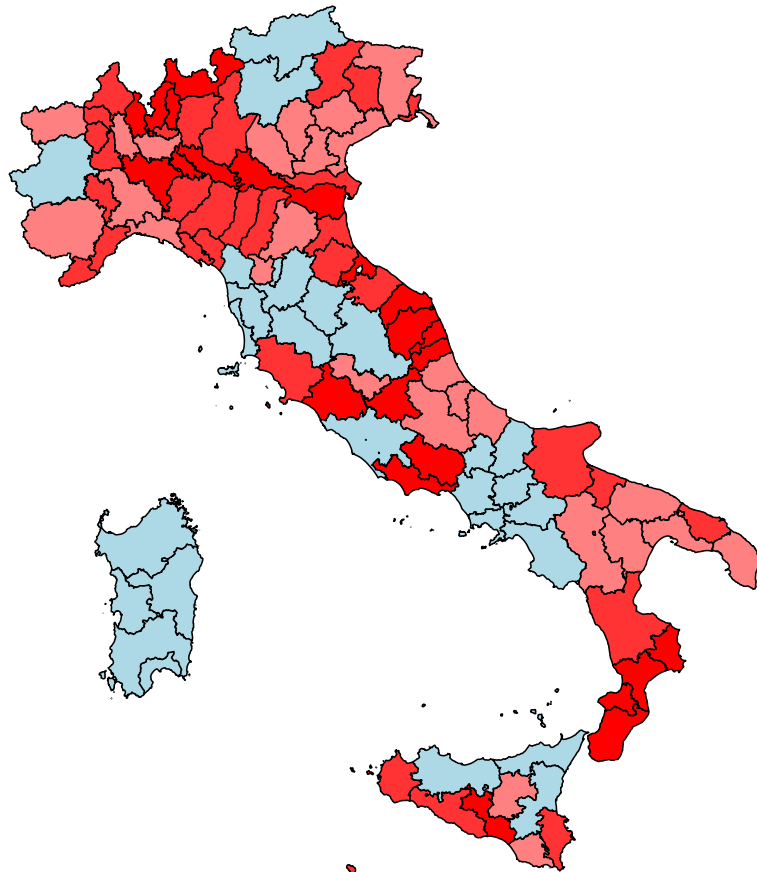


Change in disposable income - Nominal vs real effects





Change in poverty rates (all(sx) and children(dx)), REAL



Concluding remarks (1)

- Previous research has demonstrated the added value of spatial microsimulation as a useful extension to the scope of a national model
 - ✓ It adds a small-area dimension to EUROMOD that has eluded us for long
 - ✓ ... at a time of growing interest in the local effects of national policies
 - ✓ ... and of tax-benefit policies that have been devolved to sub-national level

Concluding remarks (2)

- The underlying methodology
 - ✓ has been validated (in the geography literature)
 - ✓ appears to produce perfectly plausible results
 - ✓ ... and is sufficiently honed for its application to be relatively straightforward
- However
 - ✓ Reweighting needs to consider individual and household level constraints (and joint distributions)
 - ✓ Point estimates needs to be accompanied by confidence intervals
 - ✓ Temporal price indexes are a second best given the lack of spatial price indexes