Policies of income redistribution in Italy

An introduction to tools for the analysis tax-benefit redistributive policies

Carlo Fiorio
University of Milan

INPS Metropolitan Directorate of Milan

October, 24th 2018

Policies of income redistribution

- Redistribution among individuals can occur in terms of various assets, often we focus on redistribution of income and wealth.
- Redistribution occurs at the household level, from parents to kids, from healthy individuals to sick relatives.
- Here we focus on redistributive **policies promoted or enforced by the state**. This can happen in terms of
  - **taxation** (of income, wealth, consumption)
  - **in-kind services** provision (welfare state, such as pensions, education, healthcare, infrastructures)
  - **regulation** (e.g. tarifs, confiscation, tort laws, divorce regulation)

Redistributive policies **aim at changing distribution** of resources

The focus on tax-benefit redistributive policies

Here we focus on income redistribution through the **tax and benefit system** and will focus on the Italian system

- Main **revenues** include:
  - Personal income tax (PIT)
  - Company income tax
  - Capital income tax
  - Indirect taxation (VAT)
  - Social security contributions
- Main **expenditures** are in terms of:
  - Social assistance
  - Transfers and pensions

  What are the **effects of total revenues** of the tax and benefit system? What are the **effects on the distribution** of income? Who are **gainers and losers** of reforms?
  - To quantify these effects, we use **tax-benefit microsimulation models**. They are the focus of this lecture.

A standard formulation of the PIT

- In general, the **After (personal income) Tax** of individual i can be formulated as follows:

$$y_i^A = y_i^B - (\underbrace{y_i^B - yex_i - d_i}_{yc_i})t_i + D_i + Dy_i$$

where y^B is **Before Tax income**, t_i is the **bracket structure** of the gross tax applied to taxable income, yc_i is taxable income, where exempt incomes are yex_i and tax allowances are d_i; Dy_i and D_i are tax credits that depend and do not depend on income, respectively.

The tax bracket system in Italy

income brackets	tax rates	due tax
0-15,000	23%	23% above no tax area
15,001-28,000	27%	3.450 + 27% above €15,000
28,001-55,000	38%	6.960 + 28% above €28,000
55,001-75,000	41%	17.220 + 41% above €55,000
over 75,001	43%	25.420 + 43% above €75,000

Table: Structure of 2018 IRPEF tax brackets in €

Income analysis

- The analysis of income as a proxy of welfare implies an analysis at the family level, which often happens by using **equivalence scales**, assuming:

1. equal distribution of resources among individuals of the same family
2. economies of scale

Equivalence scales

- In Italy we use the a scale derived from the Engel law (*scala Carbonaro*).
- Alternativaly, the **OECD scale** is often used (e.g. by Eurostat):
  - By giving 1.0 to the first adult; 0.5 to the second and each subsequent person aged 14 and over; 0.3 to each child aged under 14, one obtains m_h the family dimension
  - Equivalent income is X_h:

$$X_h = \frac{Y_h}{m}$$

    where Y_h is the sum of all incomes in the h family.
- Often there is need to analyze incomes in different periods and this might call for the need of correcting monetary values (correction for **inflation**).
- Microsimulation involves the construction of **countefactuals**.

What is (micro)simulation

- Simulation can be described as a **process of imitating the behavior of complex systems** (e.g. economic or biological systems, a set of tax rules or the computer network of a large firm)
- Given a set of available information, simulation allows one to build a system that **imitates the "reality"**.

Simulation a word for many uses

- Simulation models are often used as conditional **forecasting tools** to forecast the effect of shocks or policies on individual units or larger systems.
- Simulation can be **ex ante** or **ex post**
- Simulation can be performed at **macro** or **micro** level.
  - Macrosimulation models analyze relationships between national economic sectoral and aggregate variables.
  - Microsimulation models focus directly on micro units such as individuals, households and firms.
  - Microeconomic models of firms are relatively less common, the main limitation being in the availability of data for firms.

Static models

- The structure of a simulation model is principally expressed in terms of **logical mathematical relations**: a simulation model is a set of algebraic equations and decision structures, which can be characterized as a complex set of "if... then" relations.
- These models are called static or arithmetic or deterministic or "morning-after effects" models
- The main aim of microsimulation models based on individual or household data is to analyze the impact of policy **changes on the distribution of some target variables** rather than on their mean, as it happens using regression techniques.
- The development of microsimulation models on households goes together with increasing **availability and reliability of micro data** sets and improving **computer capacity**.

Static models

- Static models generally are based on **sample surveys**, which provide detailed information about individual and family characteristics, labor force status, housing status, earnings.
- With a microsimulation model the **immediate distributional impact** of fiscal policies, such as an increase in child benefit, in income tax rates or in the minimum wage, can be modelled, and estimates of the characteristics of **winners and losers** and total cost can be computed.
- Microsimulation models can also be used to project into the future and to assess the socio-economic consequences of an **ageing population**, or of changes in educational structure and in marriage patterns.

Static models

- Static MSMs (also called arithmetic MSMs) are based on **instantaneous pictures** of characteristics of a sample of population in a given period.
- In static MSMs behavioral relations and institutional conditions are varied exogenously. Micro-data bases are comprised of a cross-section of micro units in a given period.
- These micro units are generally assigned a sampling weight, which allows one to infer about the population of origin.
- Static microsimulation is first developed for the specific period to which the data relate.

Static models and increasing interest by policy makers

- Government agencies are increasingly interested in in developing microsimulation models, as representative household analysis is unable to give a broad picture of the effect of the policy on the whole population.
- In the European Union the **EUROMOD project** (more on this later) developed a 15-country Europe-wide microsimulation model to provide estimates of the distributional impact of changes to personal tax and transfer policy each taking place at either the national or the European level (Sutherland and Figari, 2013).

Behavioural models

- One of the shortcomings of static MSMs is the assumption that **individual behavior is exogenous**
- However, many tax and benefit policies are designed **specifically to have behavioral effects** (e.g. to encourage more labor force participation; to encourage more supply of labour).
- Government revenue and expenditure calculations may be misleading if potential behavioral responses are not properly taken into account and estimated.

Behavioural models

- Behavioural models hold certain characteristics fixed (such as family composition) but allow other characteristics to change, like **labor force participation** and, consequently, earnings.
- To include behavioral response it is necessary to handle **complex budget constraints** that allow each individual's constraint to be unique, along with the desire to model heterogeneity.

Issues in microsimulation modelling

- grossing-up;
- validation;
- reliability.

They have been studied mainly in the context of static MSM, though they are of relevance for all types of microsimulation models.

Issues in microsimulation modelling

- The procedure of **grossing-up** is concerned with generating figures to cover the population being modelled from the data set under use.
- The procedure should adjust for differences between the sample data and the characteristics of the population to be modelled at the date of sampling.
- Model **validation** involves looking at the results of the model's output and analyzing them in relation to estimates published elsewhere. If the external source for validation is using the same sample this validation ends up in a comparison of different models.
- Although MSMs are widely used nowadays few authors working in this field have paid explicit attention to the statistical reliability of MSM output.

Issues in microsimulation modelling

- Microsimulation models and, in particular tax-benefit microsimulation models are powerful tools for analyzing effects of demographic trends or to assess the effects on living standards of various public policies.
- However they **cannot provide an answer for every question** and must be **handled with care**. A great deal of attention should also be devoted to the presentation and analysis of data.
- Microsimulation modelling requires a large effort in programming but its aims should never be just the production of numbers: grossing-up, validation procedures and confidence interval estimation should be carefully addressed.
- A great deal of attention should also be devoted to improve data collection, since **quality of the data** sets is the key ingredient for a reliable MSM.

EUROMOD (EM): what is it and how does it work?

- 28 EU countries in a common framework: unique
- Static model with elements of dynamic modelling (i.e. labour market adjustment) and can be linked to behavioural models
- Freely available for research purposes:
  - Data access managed separately
  - Regular updates to policy rules and input micro-data
- Highly flexible, but organised, documented, validated and transparent
  - Purpose-built software: "tax-benefit modelling" language; user interface; "plug-ins" and "add-ons" for special purpose analysis
  - Easy to simulate major reforms to policy structures
  - Platform for other models (spin-offs)

EUROMOD (EM): an introduction

- Typical features but unique for its **multi-country dimension**:
  - Designed for comparative analysis of the effects of policies on household income
  - Harmonised data and simulations
  - Achieved through maximising user choice and model flexibility
  - Tax-benefit modelling language: universal
  - Library of policies
  - Short cut to model building (Serbia, Macedonia, South Africa, Namibia, Russia, TREMOD, ...)
- **Consistent results across countries** allow:
  - Comparative analysis
  - EU-level analysis
  - Implications of common changes or changes with common objectives
  - Policy learning across countries (also "policy swaps")

Policies simulated in EUROMOD

- Income taxes
- Employee, self-employed and employer Social Insurance Contributions
- 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
- (Selected countries): Indirect taxes, non cash incomes (imputed rent, public education, public health and child care services)
- Benefit non take-up and tax evasion are considered in some countries

What can EUROMOD do?

- Simulate previous, current, future and "potential" tax-benefit rules
- Distributive analysis
- Budgetary effects
- Indicators of work incentives
- Complex policy reforms (e.g. revenue-neutral)
- Policy swapping
- Counterfactual ("what if") scenarios (e.g. stress test)
- EU-wide policy reforms
- Legal taxes/benefits: estimate evasion and non-take-up

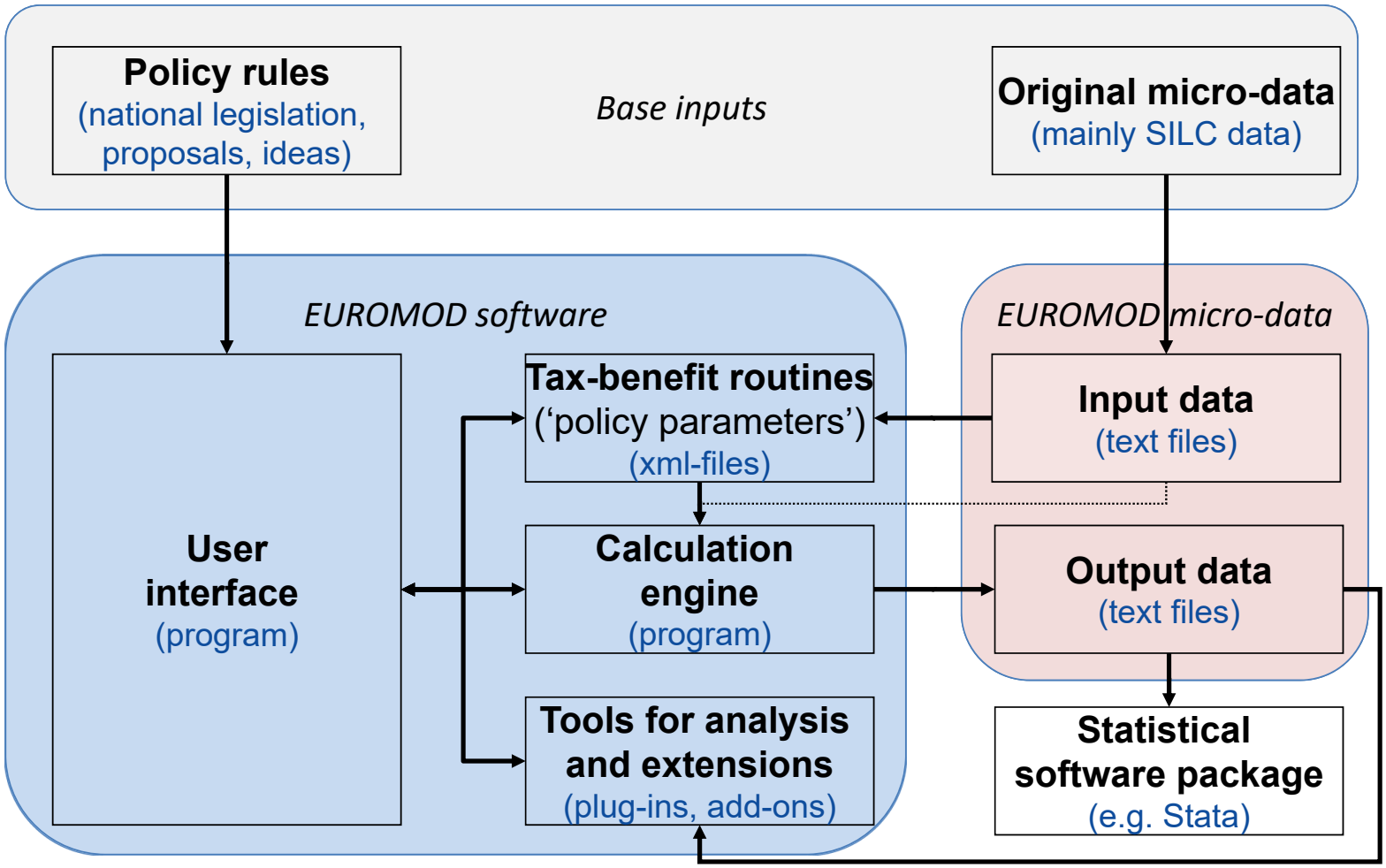
EUROMOD: why it is unique

- A programming language specific to (static) tax-benefit calculations
- ... yet generic to accommodate different countries
- Typically much more flexible than national models
  - Flexibility vs complexity
- A framework for building new country models:
  - a short cut Library of tax-benefit routines (i.e. a combination of EM functions)
  - South-Africa, Serbia, Australia, Turkey, Russia, Trento (Italy)
- EM work-in-progress: continuously being developed and improved

What can EUROMOD do?

- Many countries in a common framework
- Highly flexible and transparent
  - Comparability
  - Easy to simulate major structural reforms
  - Short cut to model building (non-EU)
- Core EUROMOD: effects of policy changes on income (+ effects of other changes on impact of policy)
  - First round budgetary, distributional and incentive effects
  - Cross country comparisons, EU-level analysis, "policy swaps"
- Up to the model user to (e.g.)
  - Link to labour supply (or other behavioural) or macro models
  - Extend policy scope (input data issues)
  - Re-weight or adjust data in other ways
  - Make adjustments for non take up or tax evasion
  - Build proper extensions and linkages (EM "talks" to Stata)

EUROMOD structure



EUROMOD extensions

- Extending policy scope with additional micro-data
  - indirect taxes (EU-SILC + HBS data)
  - wealth and property taxes (HFCS data)
  - child-care related policies
  - in-kind benefits
- Linkage to other models
  - Behavioural Labour Supply models
  - QUEST (EC macro model)
- State-of-the-art Hypothetical Household Tool (HHoT)
- Improved integrated output summary statistics and graphical tool
- Effective Marginal Tax Rates, Participation Tax Rates, Replacement Rates (with simulation of unemployment benefits)

Italy: data and policy systems

- Data: IT-SILC 2007, 2008, 2010, 2012, 2014, (2015)
- Policy systems: 2001, 2005-2016, (2017)

Italy: policy scope

- Social Insurance Contributions: Employer, Employee, Self-employed
- IRPEF: national and regional
  - Imputed and simulated deductions
  - Tax structure
  - Imputed and simulated tax credits
  - Regional surcharge
  - Bonus "80 euro"
- Tax on capital incomes
- Tax on immovable properties (ICI, IMU, TASI)
- Social pension
- Family allowances

Italy: policy scope. Extensions

- Childcare related policies
  - Parental fees for pre-primary schools
  - In-kind value of education services
  - H-2020 funded project
- Indirect taxes
  - VAT
  - Excises
  - EC-JRC funded project
- Wealth related taxes
  - Recurrent tax on immovable properties (IMU)
  - Tax on immovable property transfers
  - Tax on financial assets
  - ECB (SHIW) data: 2010 (2014)
  - EC-JRC funded project

Italy: macro validation - 2013

- Italy Country Report 2013-2016

https://www.iser.essex.ac.uk/euromod/resources-for-euromod-users/country-reports

Income sources included and not simulated

	Recipients (unit)			Amount (unit)		
	EUROMOD	External source	Ratio	EUROMOD	External source	Ratio
Employment income and Unemployment benefits	23,495,418	20,871,131	1.13	444,326,644,620	424,676,074,000	1.05
Self-employment income	7,211,666	7,348,584	0.98	105,885,021,586	105,119,339,000	1.01
Property income	30,944,157	- - -	- - -	51,244,800,823	44,029,895,222	1.16
Pensions	14,727,859	14,963,459	0.98	245,744,596,586	243,617,069,000	1.01

Italy: macro validation - 2013

Income taxes

	Taxpayers (unit)			Revenue (unit)		
	EUROMOD	External source	Ratio	EUROMOD	External source	Ratio
Total taxable income	42,860,284	40,399,823	1.06	833,664,464,446	810,756,719,000	1.03
Deduction for main residence	28,785,932	-	-	12,275,552,407	12,275,538,516	1.00
Imputed deductions	10,245,363	10,071,034	1.02	1,755,360,550	1,775,895,000	0.99
Total deductions	17,678,517	10,071,034	1.76	25,767,694,096	24,089,696,000	1.07
Net taxable income	39,031,795	39,706,498	0.98	795,546,480,290	777,118,247,000	1.02
Gross tax (IRPEF)	38,932,976	38,732,142	1.01	214,562,776,128	209,525,072,000	1.02
Family tax credits	10,695,175	12,774,407	0.84	13,365,118,331	13,115,038,000	1.02
Tax credits for income sources	36,088,701	36,112,930	1.00	40,955,509,699	40,791,113,000	1.00
Tax credits for mortgage interest (at 19%)	3,725,259	3,760,293	0.99	1,554,621,193	1,032,383,050	1.51
Tax credit for health related expenditures	16,943,707	16,731,808	1.01	2,997,186,178	2,960,352,950	1.01
Other tax credits	20,134,229	19,781,073	1.02	1,618,482,534	1,552,324,760	1.04
Tax credit on life insurance	5,716,775	5,634,701	1.01	378,199,861	366,702,280	1.03
Tax credit on educational expenditures	2,843,990	1,957,681	1.45	260,365,736	336,045,590	0.77
Tax credits on refurbishment (at 36%)	14,611,821	10,002,233	1.46	5,283,346,116	5,283,162,000	1.00
Total tax credit	63,975,782	38,691,189	1.65	66,412,829,649	64,406,485,000	1.03
Net tax (IRPEF)	30,809,697	31,019,713	0.99	154,164,497,963	152,238,194,000	1.01
Regional additional income tax (IRPEF)	30,731,274	30,135,709	1.02	11,466,137,728	11,178,998,000	1.03
Tax on capital income	18,042,429	- - -	- - -	2,062,975,949	- - -	- - -
Propery tax on other buildings (IMU seconda casa)	- - -	- - -	- - -	17,502,431,392	- - -	- - -

Italy: macro validation - 2013

Social Insurance Contributions

	Contributors (unit)			Revenue (unit)		
	EUROMOD	External source	Ratio	EUROMOD	External source	Ratio
Employer SICs	18,192,383	- - -	- - -	142,131,003,489	162,219,000,000	0.88
Employee SICs	18,188,624	- - -	- - -	47,028,368,898	41,631,000,000	1.13
Self employment SICs	7,211,666	- - -	- - -	20,605,229,145	18,906,653,000	1.09

Italy: macro validation - 2013

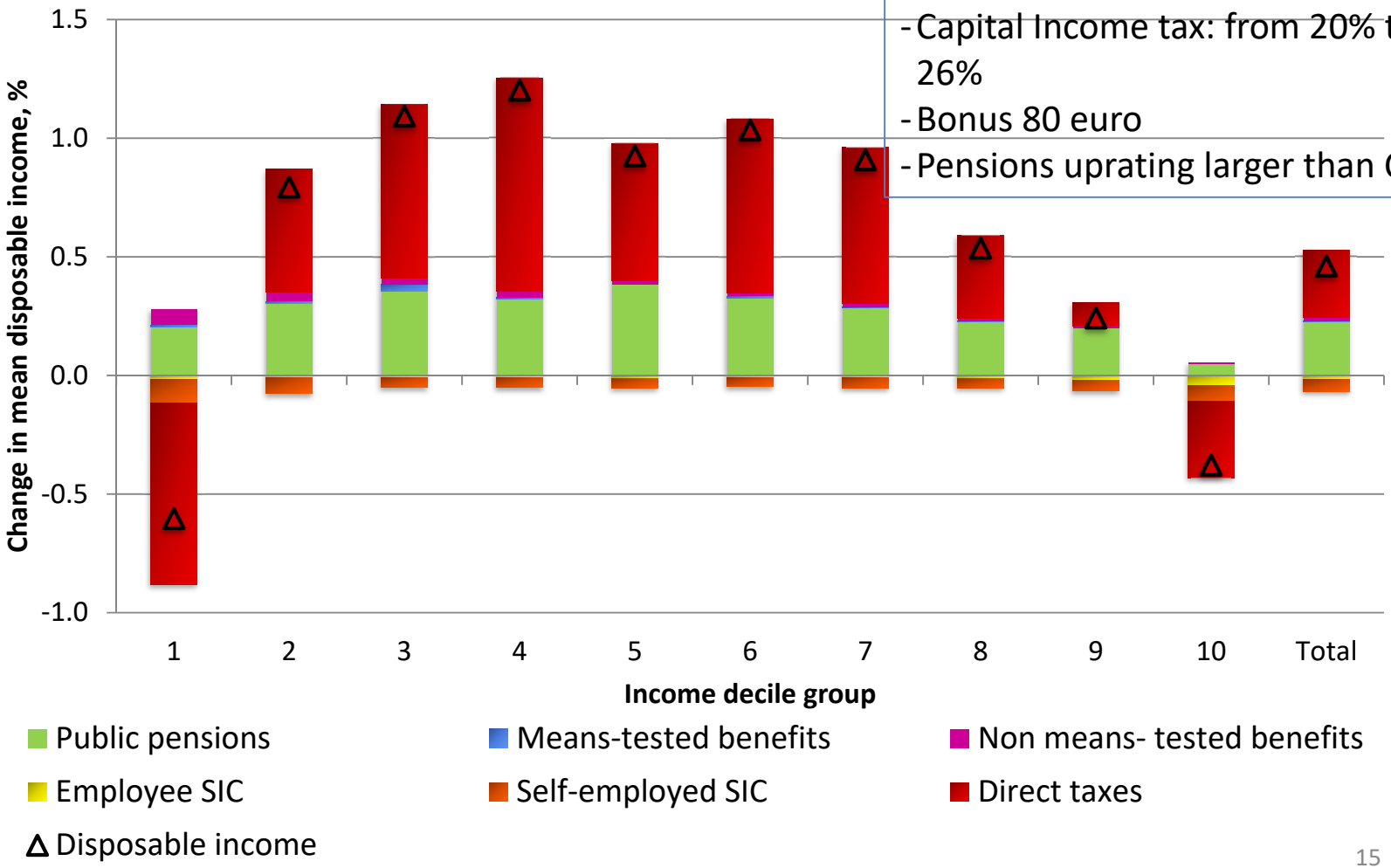
Social Benefits

	Recipients (unit)	Expenditure (euro)		
	EUROMOD	EUROMOD	External source	Ratio
Included				
Old age pension and early retirement	11,256,634	189,393,936,979	208,669,000,000	0.91
Sickness and invalidity pension	4,369,738	28,990,938,551	28,423,000,000	1.02
Survivor pension	4,525,490	41,986,568,759	42,351,000,000	0.99
Unemployment	2,601,007	9,740,057,516	11,309,000,000	0.86
Supplementation wage scheme	550,019	1,257,061,409	3,841,000,000	0.33
Severance pay	4,109,956	20,904,495,510	25,184,000,000	0.83
Other allowances - assistance	846,775	2,446,914,566	3,657,000,000	0.67
Simulated				
Family allowances	6,793,446	6,324,984,831	6,310,000,000	1.00
Social pension	1,148,778	4,438,724,538	4,393,000,000	1.01
Data variable				
Family allowances	6,403,650	6,083,654,476	6,310,000,000	0.96
Social pension	822,032	4,233,017,239	4,393,000,000	0.96

Sources: ISTAT, *Conti della protezione sociale*

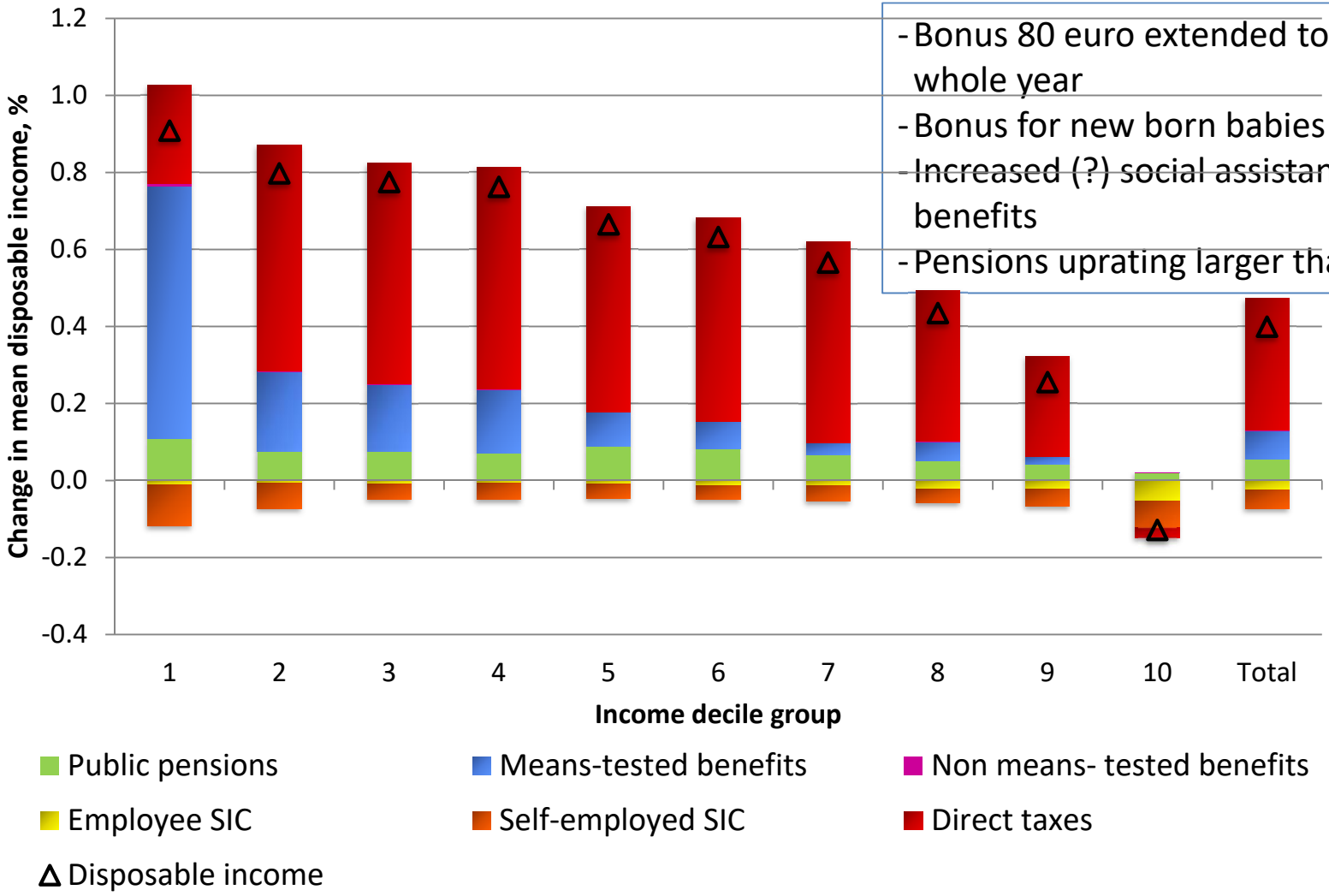
Policy effects 2013-2014

- TASI on main residence
- Capital Income tax: from 20% to 26%
- Bonus 80 euro
- Pensions uprating larger than CPI

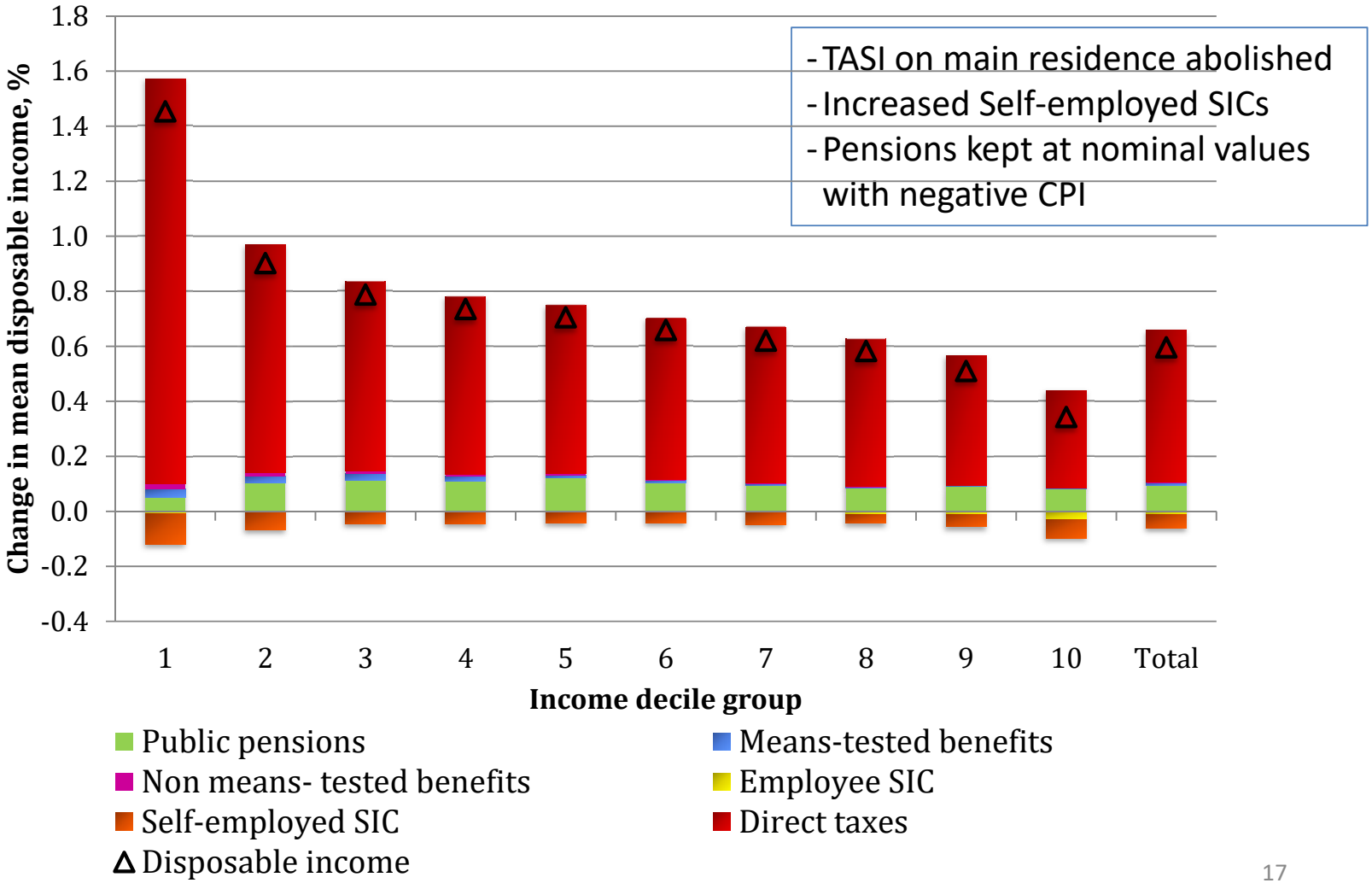


Policy effects 2014-2015

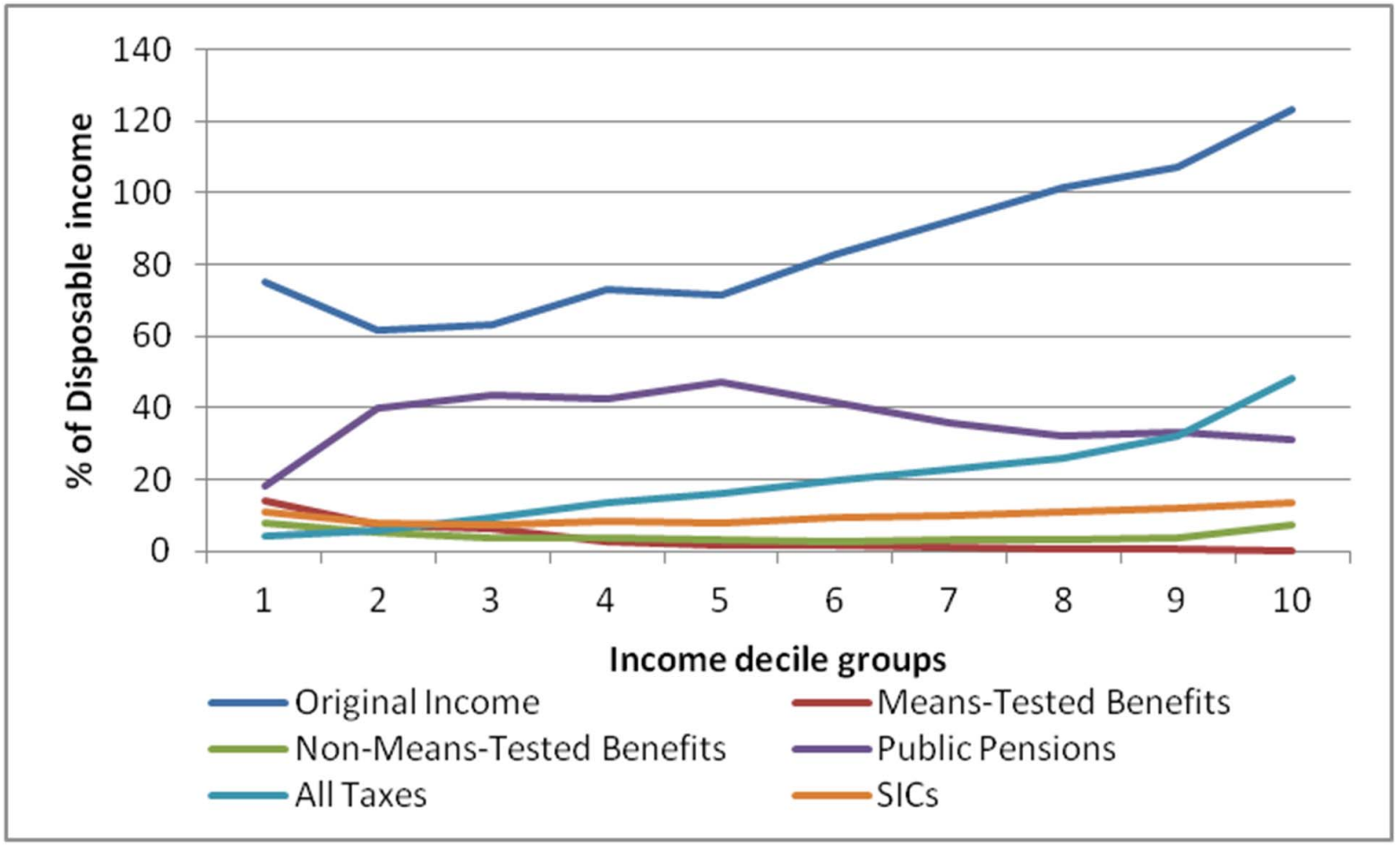
- Bonus 80 euro extended to the whole year
- Bonus for new born babies
- ~~Increased (?) social assistance benefits~~
- Pensions uprating larger than CPI



Policy effects 2015-2016



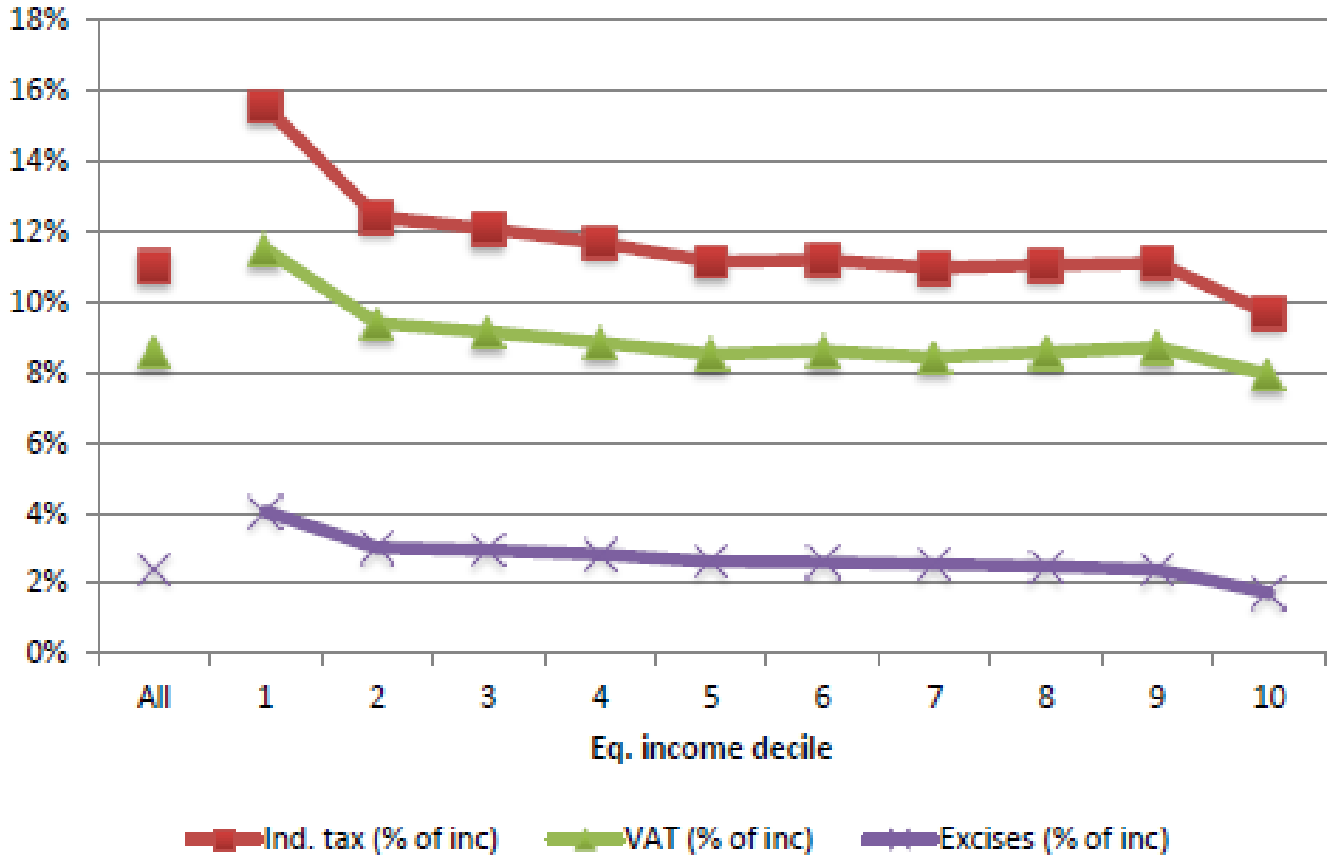
Italy – Distributive effects - 2016



Indirect taxes - 2011

	Expenditures	Expenditures as % of GDP	Indirect taxes	VAT	Excises
Italy (2011)					
EUROMOD	574,440	35.08%	81,976	63,864	18,112
External Statistics	999,772	61.06%	138,022	99,147	38,875
% coverage	57.45		59.39	64.41	46.59

Indirect taxes - 2011



Wealth related taxes - 2010

Only households with positive amount of taxes paid included in the graphs. Unweighted observations: Real estate tax: 1933, Net wealth tax: 7951

Italy: behavioural Labour Supply model

- Discrete choice structural choice model (Van Soest 1995, Aaberge et. al 1996)
  - Figari, 2015, *From Housewives to Independent Earners: How the Tax System Can Help Women to Work in a Context of Strong Familialism*, Journal of Social Policy, 44(1): 63-82.
    - Tax credit for dependent spouse replaced by family base\individualised in-work benefits. Revenue neutrality.
  - Coda Moscarola, Colombino, Figari & Locatelli, 2014, *Shifting taxes from labour to property. A simulation under labour market equilibrium*, EM WP 20/14
    - IMU 2012 and tax credits for employment\self employment income made refundable and more generous. Revenue neutrality. Labour demand and supply in equilibrium.
  - Figari & Nazarani, 2015, The joint decision of labour supply and childcare in Italy under costs and availability constraints, ImPRovE WP 15/09
    - Childcare availability up to 30% (or childcare costs reduced)

Access to model and data

Web http://www.iser.essex.ac.uk/euromod

- Summary statistics
- Documentation: Country Reports, Working Papers ….

Model is freely available for non-commercial use

- Contact euromod@essex.ac.uk to obtain the link for downloading (incl. manuals)

Data access conditions are set by the original data provider

- EU-SILC (UDB): EUROMOD users need to have Eurostat permission to use EU-SILC for this purpose
- Other data for some countries: relatively straightforward procedures

Free training courses

Main references

Sutherland, H. and Figari, F. (2013). EUROMOD: the European Union tax-benefit microsimulation model. *International Journal of Microsimulation*, 1(6):4–26.