

Household tax–benefit microsimulation models at PBO

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- PBO ex-ante policy evaluation tasks
- Data issues
- PBO approach in building representative population
- PBO household tax – benefit family of models main features and future developments
- Some applications

- Assess official estimates of the impact on revenues and expenditures
 - First order impact
 - static impact - no behavioral reactions (to assess static government estimates)
 - Second order effects
 - behavioral reactions that may affect revenues and expenditures in the short run
- Clear picture of the overall impact of the reforms may improve the quality of decisions
 - Distributive analysis (can reveal the effective nature of a tax reform)
 - Analysis of the incentives (measure the impact of tax reform on decisions)
 - Indirect effects (tax incidence effects)
 - General equilibrium impact (interactions between markets in the economy)

- **Precision** → need for a very good representation of actual tax liabilities and benefit received
 - i.e. fiscal variables, net of tax evasion and erosion
- **Comprehensiveness** → need for a wider set of information, beyond actual tax bases
 - «real» economic conditions gross of tax evasion and erosion, to determine real distributive effects
 - Need for several context variables to model complex phenomena, as incentives, behavioral reactions and so on
- Key issue: selection of data sources to build a representative population

- If a microsimulation model is used to reproduce effective tax liabilities (costing analysis), relying only on survey data causes several drawbacks:
 - Measurement errors (of fiscal aggregates)
 - Evasion
 - Sampling distortions (concerning fiscal distributions)
 - Sampling design does not control for dimensions that are relevant for tax calculations (non response bias)
 - Incomplete information
 - Erosion
 - Indeductible costs
 - Individual choices
 - Income definitions
 - Other issues (cadastral values, imputed incomes)

- On the contrary, if a microsimulation model is only based on administrative registers data, it will be highly reliable reproducing actual tax yield but:
 - registers are conditioned by actual legislation (exclusion of potential taxpayers or incomes)
 - Problems in simulating law changes: missing information on «new tax bases» that potentially may be involved in new tax regimes
 - Difficulties to get “real” distributive effect, because of evasion and implicit erosion
 - Limited set of information on socio – economic context

- In order to overcome these problems and to fulfill both goals of precision in estimation of actual tax liabilities and comprehensiveness of analysis, we perform an integration of survey data with administrative registers on the same population
- Data availability to PBO is guaranteed by law (affiliation to National Statistical System – SISTAN, under general rule of confidentiality)
 - Direct linkages via administrative id allowed for:
 - surveys on households (income and consumption) provided by ISTAT
 - administrative registers provided directly by public bodies managing the archives (Ministry of Economy, National Social Security Institution - INPS)

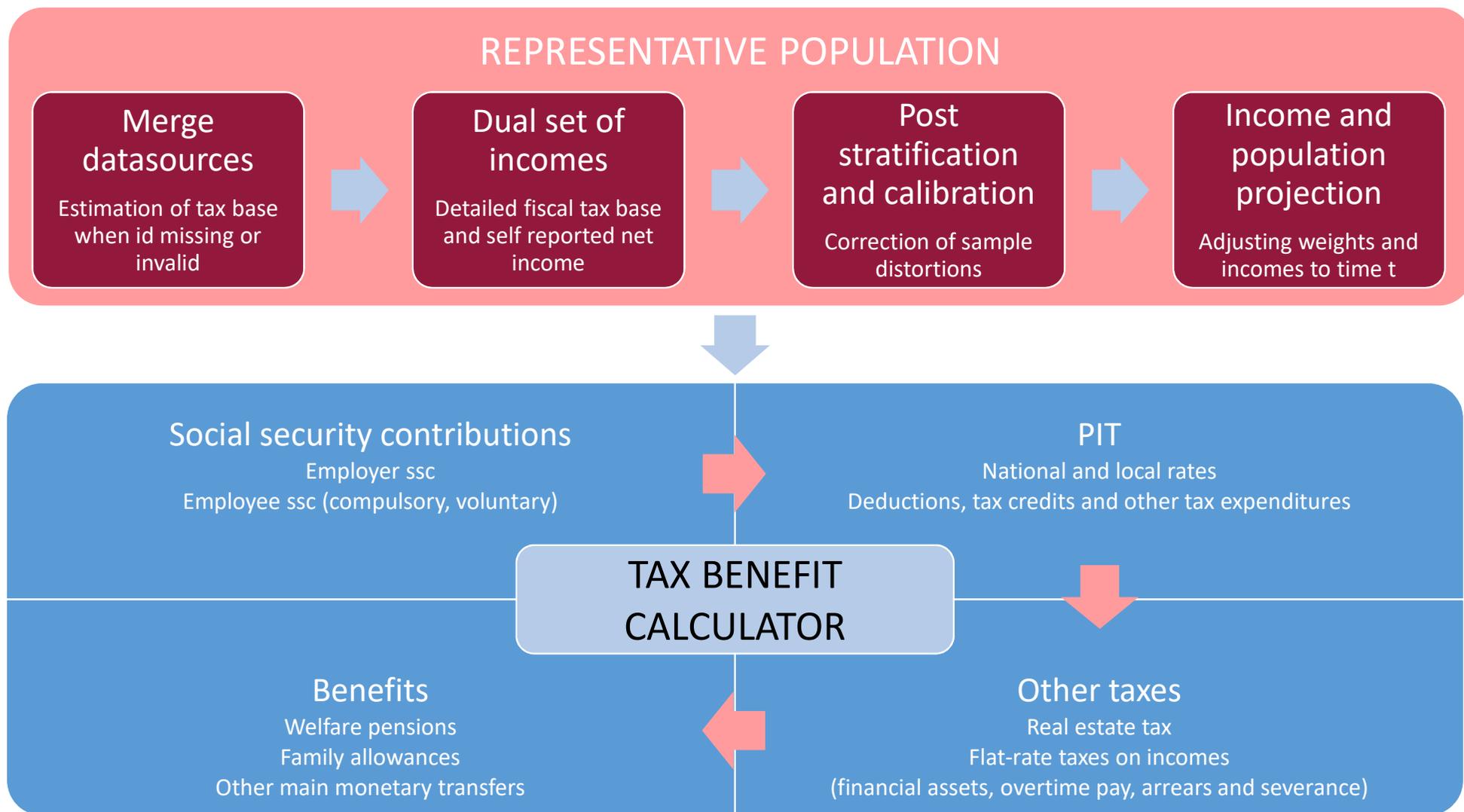
- Our approach therefore differs from the traditional estimation techniques of fiscal incomes from survey data
 - Use of registers data to get actual tax bases (get rid of measurement error of fiscal variables)
 - However in some cases answers to survey are helpful to estimate missing administrative information
 - Correction of sample distortion (with respect to fiscal distributions) with post stratification techniques to reproduce actual figures
 - Calibration of survey weights, controlling their variability (R-package: *ReGenesees* Zardetto - 2013)
 - Estimation of «actual» economic conditions by survey self-reported net incomes, gross of evasion and erosion, useful to identify «real» distributive effects (hypothesis of no under reporting in answers to the survey)
- Integration of administrative data overcomes misrepresentation of «fiscal world»
 - Ability to identify (and to correct separately) measurement errors and sample distortion that affect survey answers with respect to declared tax bases

- A form of integration of administrative data with survey data is already performed by Istat (and other SNAs) in the SILC income estimations
- The purpose however differs from our:
 - *“The aim [...] is to improve data quality on income components [...] by means of imputation of item non-responses and reduction of measurement errors [of actual incomes]”*. (Consolini P. Donatiello G. - 2015).
- In other words the aim is to use administrative sources to get a better representation of “actual” incomes, rather than a precise measurement of fiscal aggregates:
 - *“when the net administrative incomes are higher than the survey incomes, the net and gross incomes completely arise from administrative data. On the opposite, [...] the net incomes are those taken from the survey”*
- Since it is not possible to go back to administrative values from publicly distributed data set, we perform a new integration procedure

- **Surveys (ISTAT)**
 - **IT-SILC**
 - Detailed information on economic condition
 - Linkable to income tax returns and (in progress) with Social Security database and ISEE
 - **Household budget survey**
 - Detailed consumption behavior
 - Linkable to income tax returns and (in progress) with Social Security database and ISEE (not to IT-SILC)
- **Administrative registers**
 - **Income tax returns #1**
 - Non linkable very large sample (4/365 share of the whole population).
 - **Income tax returns #2**
 - Linkable samples (to both surveys)
 - Taxable PIT incomes (gross)
 - Some exclusions
 - **Social security database**
 - Linkable to both surveys (in progress)
 - Pension and welfare benefits, helps filling gaps in income tax returns
 - History of past incomes (very useful in a life cycle perspective), some incompleteness
 - **Means tested benefits (ISEE) #1**
 - Non linkable large sample of ISEE statements 2016 - 2018
 - **Means tested benefits (ISEE) #2**
 - Linkable samples of ISEE statements (to both surveys - in progress)
 - Useful to model take up

- A family of models, based on combinations of data sources, with different tasks
 - DTB – **Direct taxation and benefits** (static + extensions)
 - IT-SILC (S) + income tax returns (A) + social security and pensions (A)
 - DITB – **Direct and indirect taxation and benefits**
 - Family expenditures (S) + income tax returns (A) + social security and pensions (A)
 - MIB – **Minimum income and other mean tested benefits**
 - ISEE dataset (A – linked soon with SILC)
 - PIT – **IRPEF calculator on a large sample of tax returns** (A - not linked), for robustness analysis

- Higher detail of income variables from integrated administrative data → greater range of analysis options
- Tax return income taxonomy + separate taxation and exempted incomes
 - Most of them with specific fiscal treatment
 - PIT calculated generally on income drawn from administrative sources, with some exception
 - Survey data are used to estimate PIT incomes not included in tax returns
 - Non PIT incomes drawn from other administrative sources (pensions) or survey
- Calibration of weights respect to marginal distribution taken from the large sample of PIT returns



- Short run behavioural reactions (costing purposes)
 - Modelling consumption reactions to price (indirect taxation) shocks and income shocks (direct tax + indirect tax + ssc effects on disposable income)
 - Estimation of demand system (substitution elasticities between groups of goods / services)
 - Estimation of MPCs to evaluate consumption reactions to shocks on income.
 - Integration with PBO macroeconomic model (memo.it) in order to estimate short term effects on economic system
- Other behavioural reactions (long run impact on economic system)
 - Joint project with JRC, providing assistance to develop a model to assess the impact of reforms on labour supply
 - Integration with general equilibrium model (PBO version of Quest) to estimate long run effects

- Discrete choice model
 - Easier to run than other approaches (non linear budget constraint, household level utility optimization)
- Estimation steps
 - Heckman estimation of w (missing information for unemployed)
 - Building set of alternatives, $\{\bar{w}(h) - t(\bar{w}(h)), h \in H\}$
 - H : discrete set of hours worked (0,...,k);
 - $\bar{w}(h)$: estimated salary
 - $t(\bar{w}(h))$: microsimulated tax & benefit
 - Conditional logit estimation of the alternatives probabilities (given disposable income)
 - Estimation of the work supply (weighted average of hours in the set with estimated probabilities)
- Simulation
 - Recalculation of the work supply, given changes in disposable income due to changes in tax/benefit scheme

- Simulation of indirect and direct taxes on the same household
 - Exact match between household expenditure survey, tax returns and pensions of household members via administrative id
 - Vat and excises paid by households on the basis of HBS survey
 - Breakdown of VAT rates for Coicop classification of expenditure items
 - PIT estimated from tax returns, limited simulation capability of other income taxes
 - Simplified tax calculator
 - Simplified income taxonomy (no income information from survey)
 - Some sources of income will be estimated to get a broad view of disposable income
- Pasty history of incomes (drawn from social security records) will give a life cycle perspective

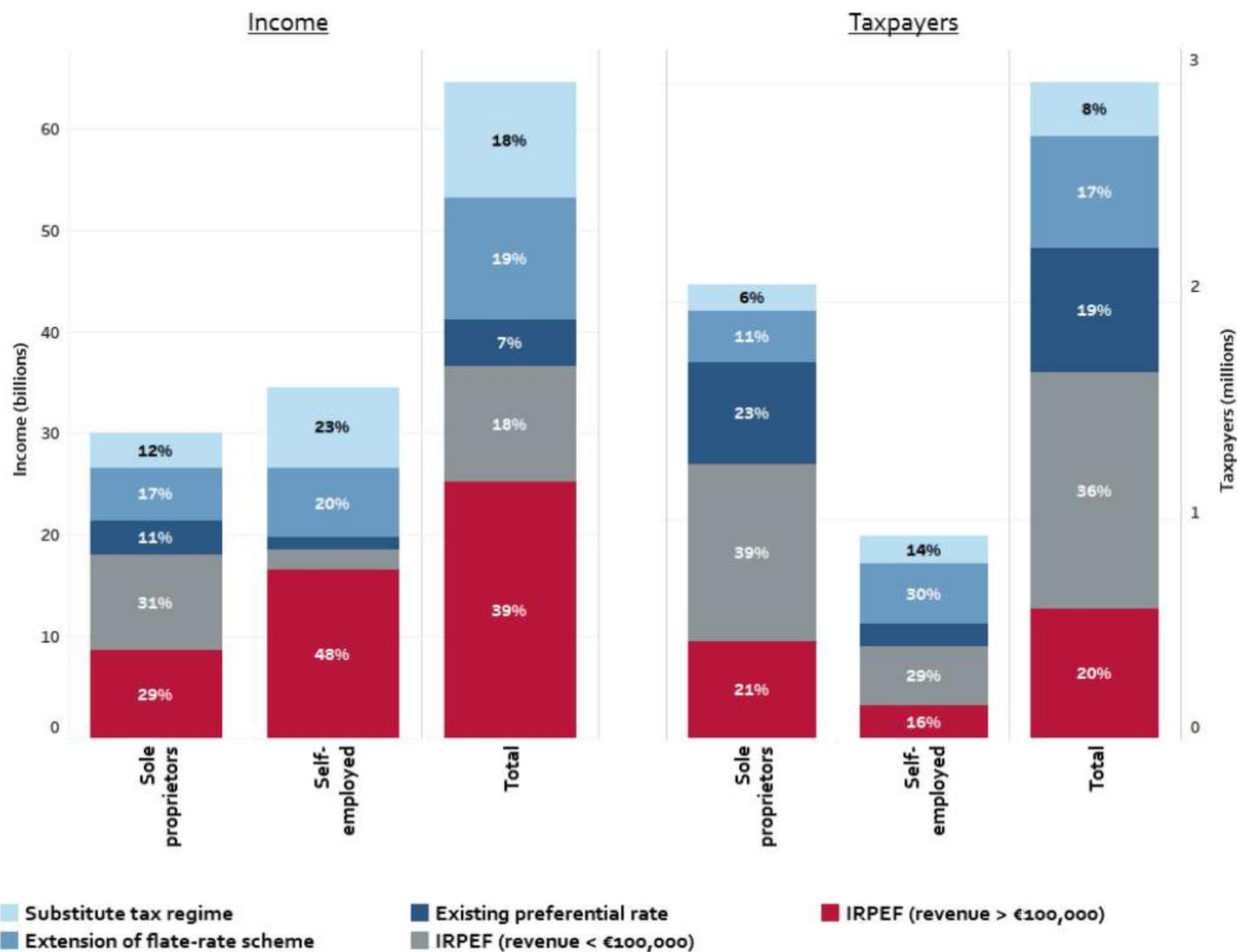
- Simulations of welfare policies ruled by ISEE
- Sample of 2% of the ISEE statements submitted from 2016 to 2018 (~1mln individuals)
 - Income (PIT taxable base and other exempted or separated taxation income), financial and housing wealth, household characteristics
- Simulations estimates the number of previous recipients of ISEE – ruled benefits that would be eligible to the new policy criteria
 - Obvious limitation: no information on “new” potential beneficiaries. But at the same time this allows to take into account current take – up.
 - Robustness estimations performed on the whole population
 - Future development: modelling of take up on the joint sample SILC – ISEE.

- Abolition of service tax
 - Parliamentary hearing, November 2015, PBO Budgetary Policy Report for 2016
 - PBO Focus 6/2015
- Reform of household related allowances and benefits
 - Parliamentary hearing, October 2016, PBO Budgetary Policy Report for 2017
- Reddito di inclusione
 - Parliamentary hearing, November 2017
- Self employed «flat tax»
 - Parliamentary hearing, November 2018, PBO Budgetary Policy Report for 2019
- Reddito di cittadinanza
 - Parliamentary hearings, November 2018, February, March and July 2019
 - PBO Flash 1/2019

- PBO Budgetary Policy Report for 2019: evaluation of the extension of the flat-rate scheme reserved for low turnover taxpayers to those with turnover of up to €65,000
 - Optional regime: tax rate of 15 per cent; income determined by profitability coefficient; VAT exemption; 35 per cent discount on social security contributions.
 - The law also introduces a 20 per cent flat rate tax for self employed with turnover of between €65,000 and €100,000 (starting from 2020)
- PBO microsimulation analysis
 - Modelling the option for the new regime (appraisal of the economic payoff)
 - Costing analysis
 - Distributive analysis

- Taxpayers who opt for the new regime do not apply VAT to sales, but cannot deduct VAT paid on purchases
 - VAT effect: If the self-employed is able to charge a price higher than the previous net price, he will increase revenues.
 - PIT effect: 15% rates in spite of progressive tax rate, no tax allowances. Balance may be positive or negative.
 - The balance between PIT effect, SSC discount, increase in revenue due to VAT exemption and costs (VAT paid on purchases) determines the individual payoff of the new regime.
- The simulations assumes that:
 - sales to final consumers are concluded at previous price (the percentage increase in revenues equals the VAT rate),
 - sales to enterprises subject to VAT is equal to the net price previously charged (no increase in revenues).
 - Turnover, costs, income came from tax returns
 - The share of sales to final consumers has been estimated by sector on the basis of information drawn from VAT returns. The same source was used to determine the average sectoral VAT rates on sales to buyers subject and not subject to VAT obligations and on purchases.

Self employed «flat tax»: results



- 80% of total self – employed potentially excluded from PIT
 - 44% should opt for flat regimes.
 - Higher share of self-employed
- Share of income excluded from the progressive IRPEF regime from the current 7 to 43 %

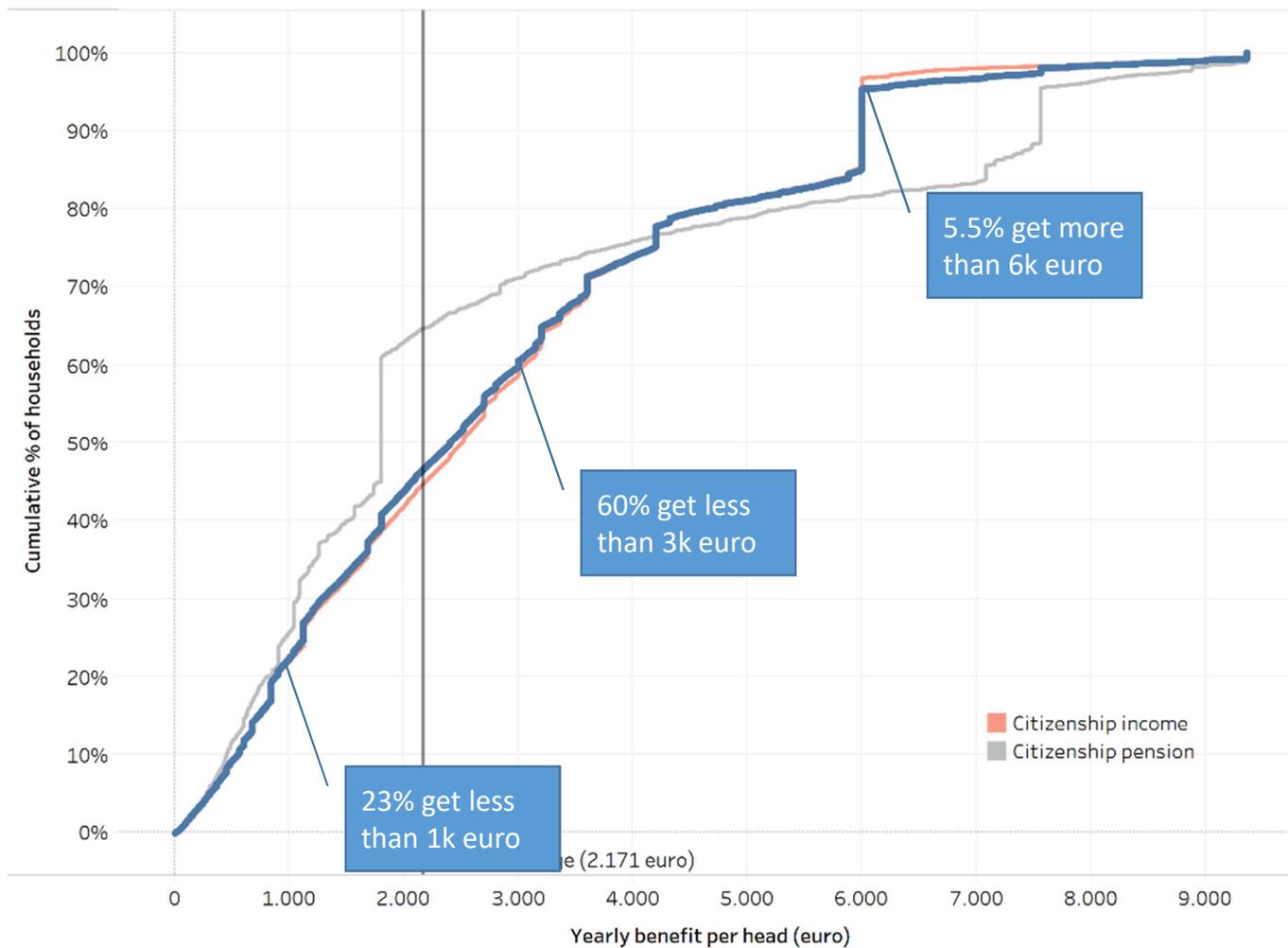
- Means tested transfer to households with equivalised income below specific thresholds.
 - Additional limitations for financial and housing wealth.
 - The transfer equals the difference between equivalised income and the threshold.
- Simulations performed on administrative dataset of ISEE statements and on integrated SILC – tax returns dataset.
 - ISEE archive (~1mln individuals) simulation assumptions:
 - the large part of RC appliers made an ISEE statement in the near past. Estimation of RC take up with observed
 - scenario hypothesis: the share of the new applicants equals the share of ISEE population that won't apply for RC (as in official evaluation)
 - Drawback: the simulation ignore who are eligible and didn't made ISEE statement in the past. Risk of underestimation, given the higher benefit granted by RC.
 - SILC/TR model assumptions:
 - All the eligible household apply for RC. Higher bound costs estimation

	Reddito di cittadinanza	Pensione di cittadinanza	Totale
Costo totale 2019 (<i>milioni</i>)	5.610	269	5.879
Costo totale a regime (<i>milioni</i>)	748	359	7.839
Nuclei beneficiati (<i>migliaia</i>)	1.180	120	1.300
Individui beneficiati (<i>migliaia</i>)	3.474	136	3.610
Beneficio medio annuo per nucleo	6.337	3.004	6.030
Beneficio medio annuo <i>pro capite</i>	2.153	2.641	2.171
Beneficio medio annuo equivalente (scala ISEE)	3.362	2.409	3.275

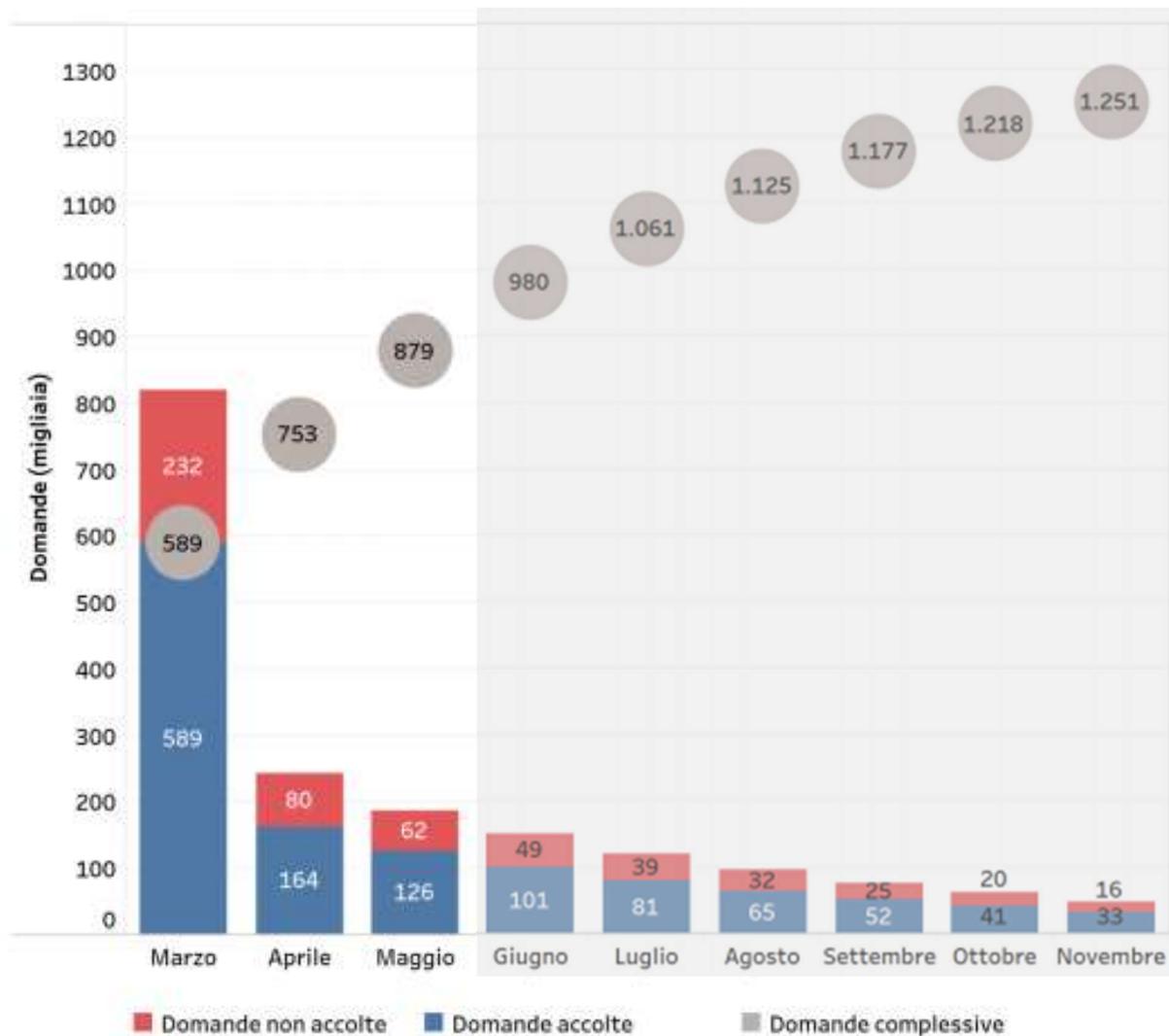
- Cost estimation 5.9 billions euro for 2019 (7.8 onwards)
- 1.3 household (3.6 individuals)
- 6k euros per household per year on average
- SILC/TR estimation: 1/3 higher than ISEE archive estimation

Yearly benefit distribution

Average yearly benefit per head
(euro)



Actual applications for RC March – May and projections for 2019

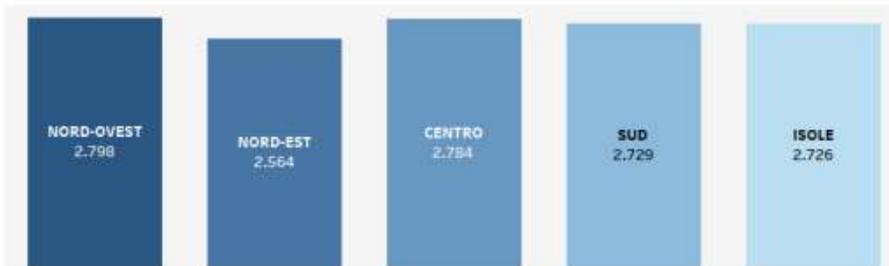


- Actual applications March – May and 2019 projections
 - Scenario hypothesis: decay of applications by 20% each month
 - At the end of 2019 the estimated number of beneficiaries would be reached
 - But evidences from June and July applications show a faster pace of decay
- Overall cost will be under the estimations because of the progression in application

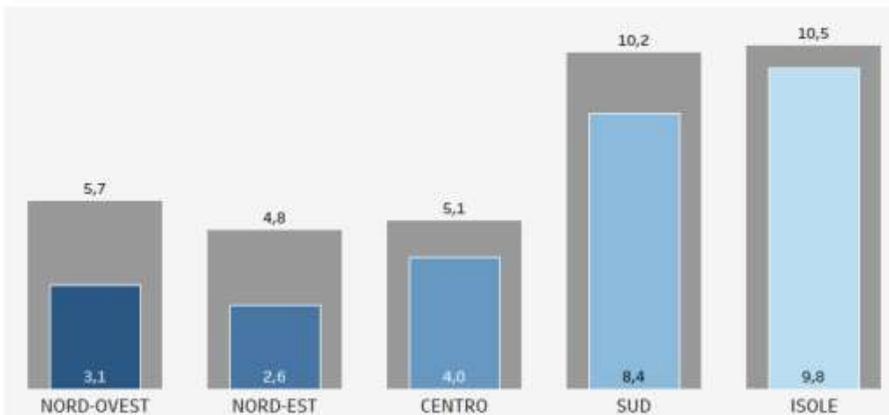
Distribuzione delle famiglie beneficiarie del RdC per area geografica



Beneficio medio equivalente
(euro/anno)



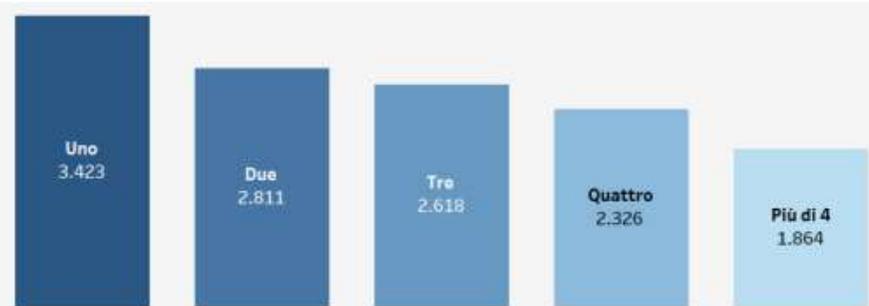
Famiglie povere e famiglie beneficiarie RdC sul totale (%)



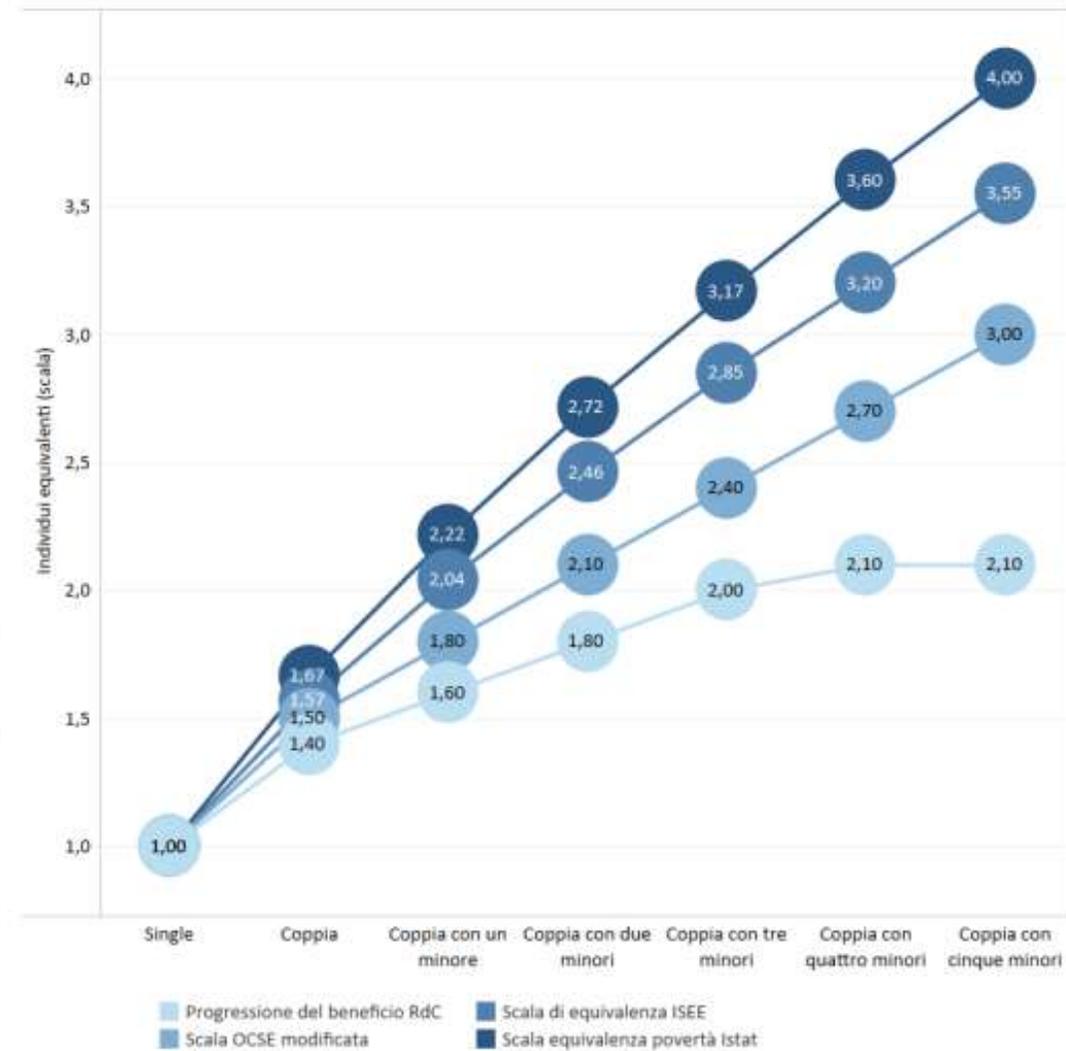
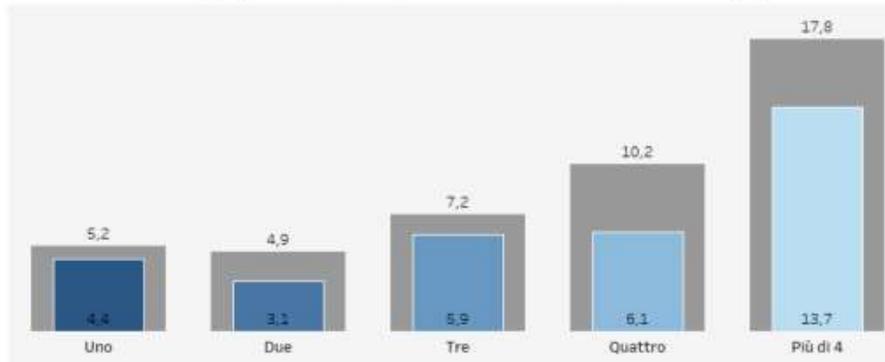
Distribuzione delle famiglie beneficiarie del RdC per numero di componenti



Beneficio medio equivalente (euro/anno)



Famiglie povere e famiglie beneficiarie RdC sul totale (%)



Thanks for your attention !



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