

MICROREG

The Multiregional Microsimulation Model for Italy

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Background and objectives

- **MicroReg** is a static tax-benefit microsimulation model constructed by Irpet for the Tuscan Region
- **Main objective:** to provide the regional policy maker (Regione Toscana) an internal tool for policy evaluation and design
- **Main feature:** covers all the Italian regions
- **Basic outputs:** distribution of gains and losses among households; impact on measure of poverty and inequality; effects on government revenue; between-region differences in the cost and benefit of reforms

- Direct taxes and cash benefits only, no indirect taxes or noncash benefits
- Static calculations only (first round effects)
- No changes in the composition of the population, nor in the behaviours
- Tax benefit systems from 2003 to 2009
- Imputation tax evasion: comparing total net income reported by aggregated tax form data with those calculated by microReg (obtaining percentages of tax evasion for 36 classes of income)

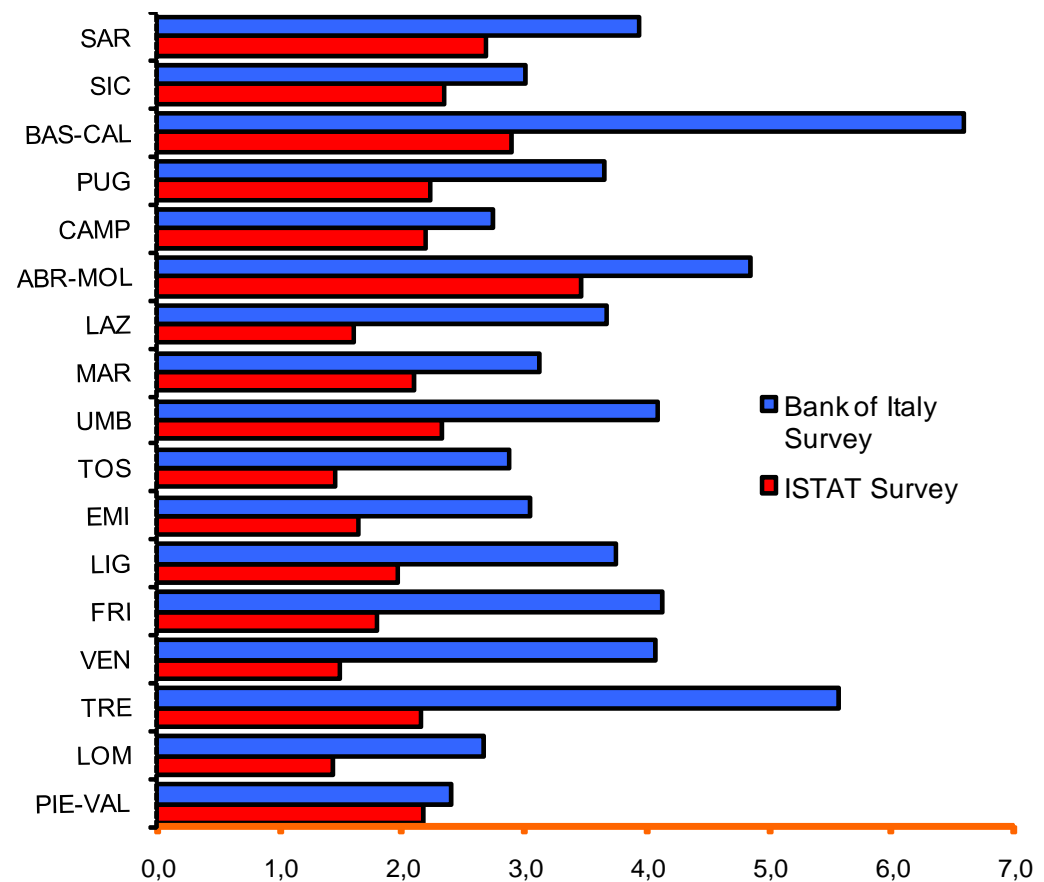
Building microReg: the database

- **Survey on Household Income and Wealth** carried out by **The Bank of Italy**: began in the 1960s; the sample used in the most recent surveys comprises about 8,000 households
- **Survey on Income and Living Conditions** carried out by **The Italian National Institute of Statistics (Istat)**: began in the 2004; the sample used in the most recent surveys comprises about 24,000 households
- **We have chosen the Istat survey**

Building microReg: the database

Regions	Sample size	
	ISTAT Survey	Bank of Italy Survey
PIE-VAL	2,141	802
LOM	2,855	905
TRE	989	129
VEN	1,929	521
FRI	1,140	236
LIG	1,154	372
EMI	1,813	716
TOS	1,746	559
UMB	1,049	270
MAR	1,136	379
LAZ	1,969	457
ABR-MOL	990	316
CAMP	1,296	703
PUG	1,007	413
BAS-CAL	1,151	281
SIC	1,170	655
SAR	669	297
ALL	24,204	8,011

Bootstrap coefficient of variation of the average income estimator



Building microReg: from net to gross income

- Gross income is obtained as a function of net income using individual effective tax rates
- At the zero iteration, tax rates are set arbitrarily in order to obtain some initial estimates of gross incomes
- Tax rules are applied to gross incomes obtaining net incomes
- Estimated gross incomes are modified on the base of the difference between obtained net incomes and survey's net incomes.
- The process iterates until the difference between survey's net incomes and estimated net incomes is lower than an arbitrary small value.

Building microReg: from net to gross income

$$[1] \quad y_{i,s}^{gross} = \frac{y_{i,original}^{net}}{(1 - t_{i,s})}$$

Iteration x=0;
individuals=1,...n

$$t_{i,0} = \bar{\tau}$$

$$[2] \quad y_{i,s}^{net} = \varphi(y_{i,s}^{gross})$$

Iteration x=1;
individuals=1,...n

$$(y_{i,original}^{net} - y_{i,s}^{net}) \leq |\varepsilon|$$

$$[3] \quad t_{i,s} = t_{i,(s-1)} \times \left(\frac{y_{i,original}^{net}}{y_{i,s-1}^{net}} \right)$$

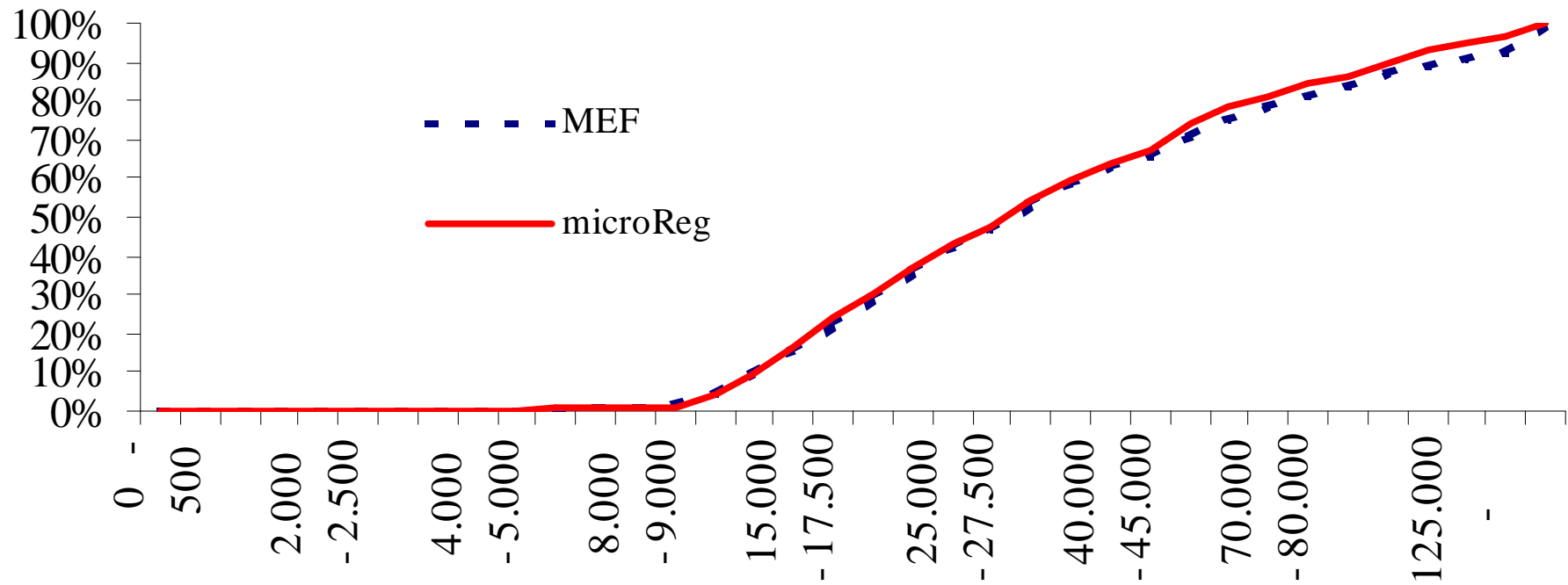
i=1,...n individuals;
s>1

Building microReg: validation

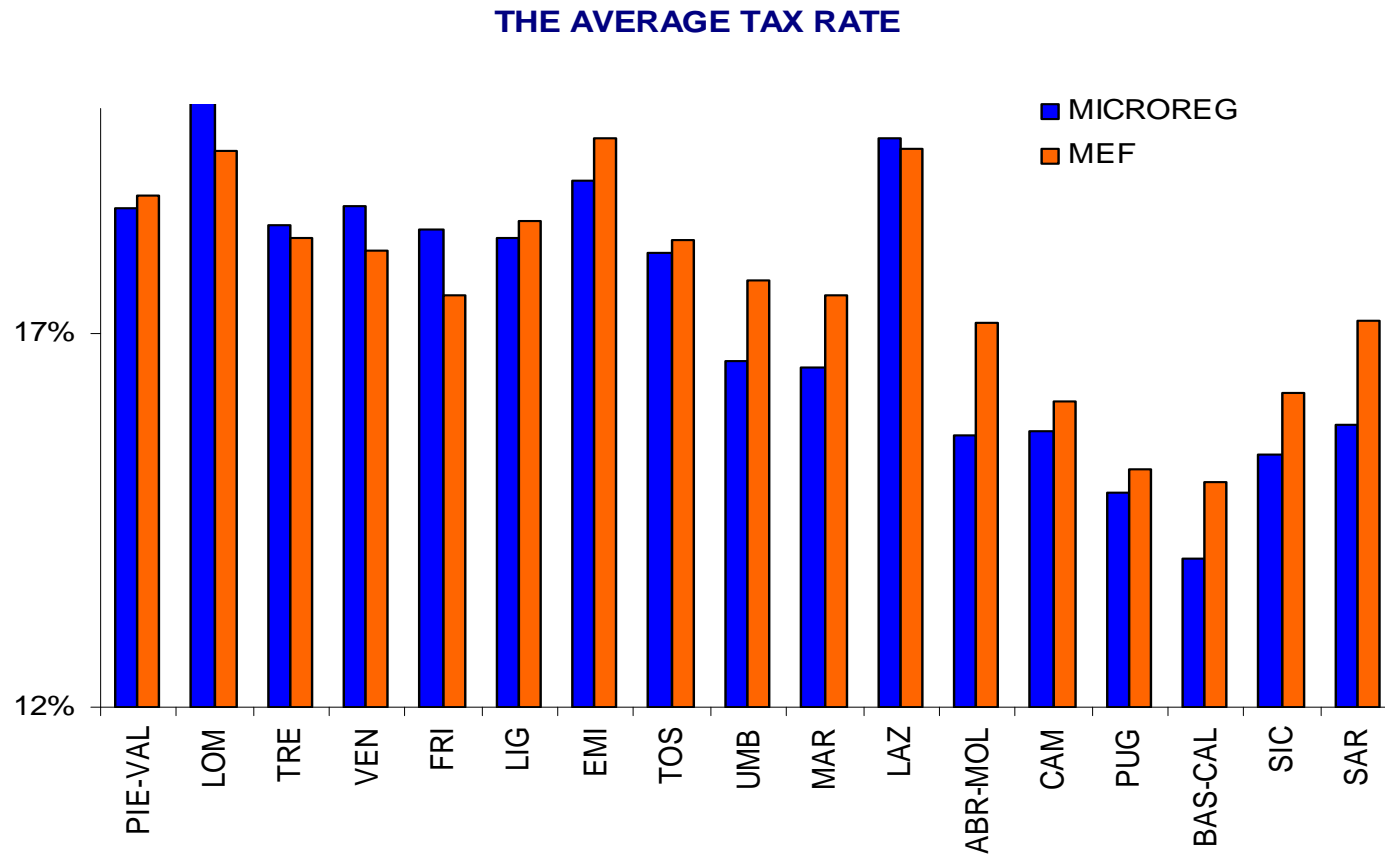
Tax year 2005	MEF	microReg	Var%
Total income	676,633	684,287	1.10%
Taxable income	512,976	509,030	-0.80%
Gross income tax	139,294	137,358	-1.40%
Net income tax	124,016	123,390	-0.50%
Disposable income	552,617	552,583	-0.01%

Building microReg: validation

CUMULATIVE DISTRIBUTION OF THE NET INCOME TAX



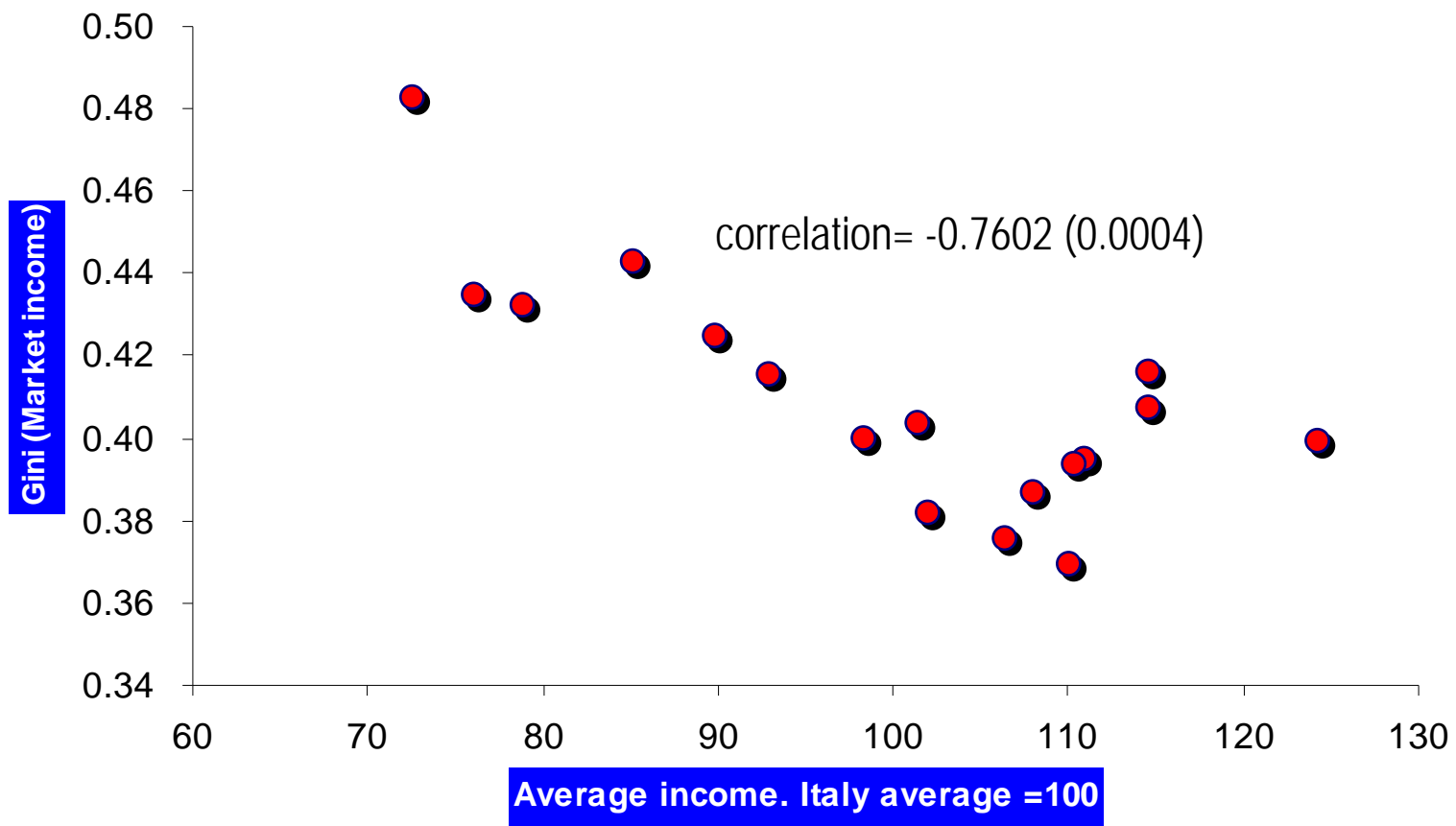
Building microReg: validation



The correlation coefficient is 0.934 and statistically different from zero for $\alpha=0.0001$ significance level

Using microReg: what can it tell us? (1)

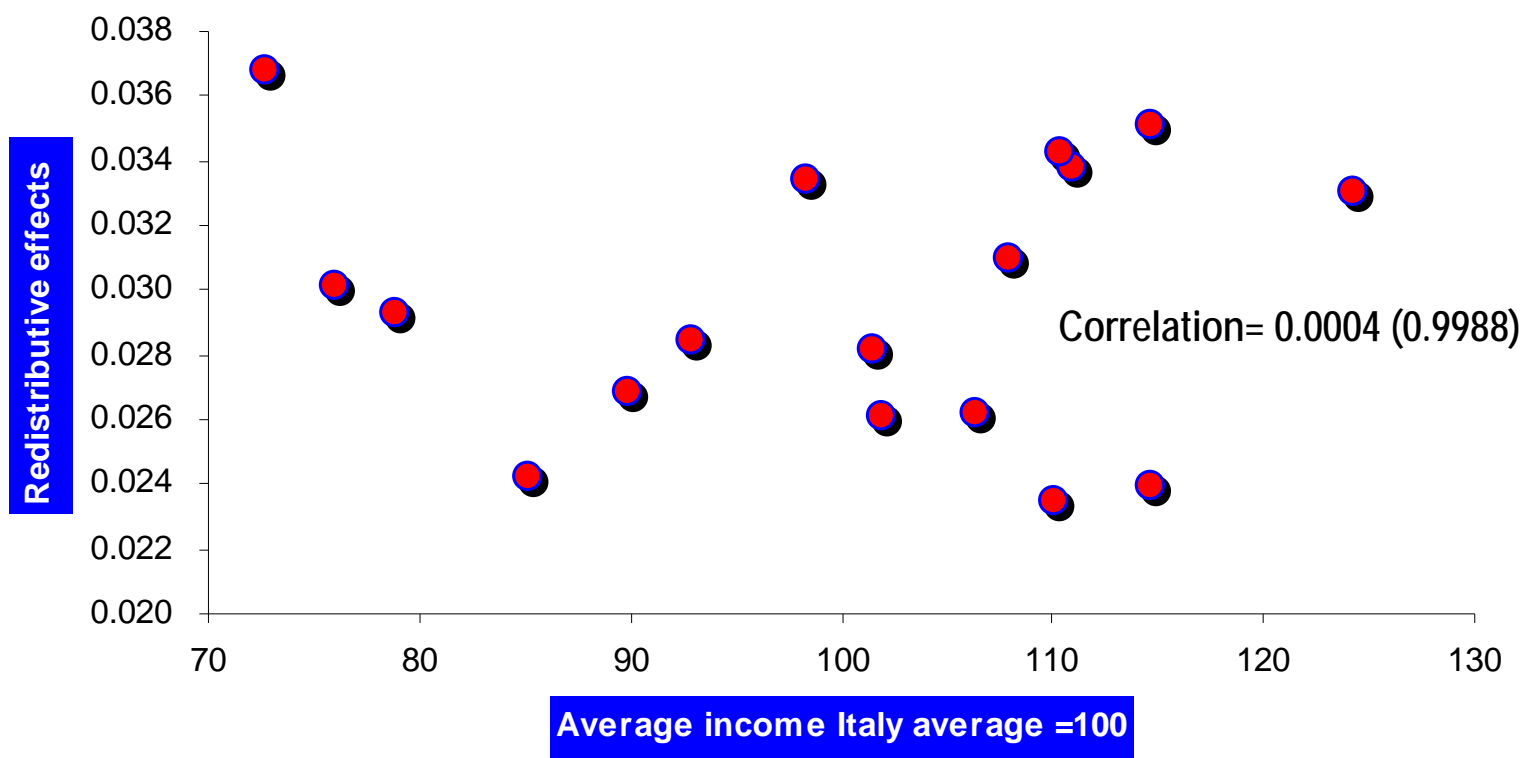
The correlation between gross inequality levels and the average regional market income is negative



Using microReg: what can it tell us? (1)

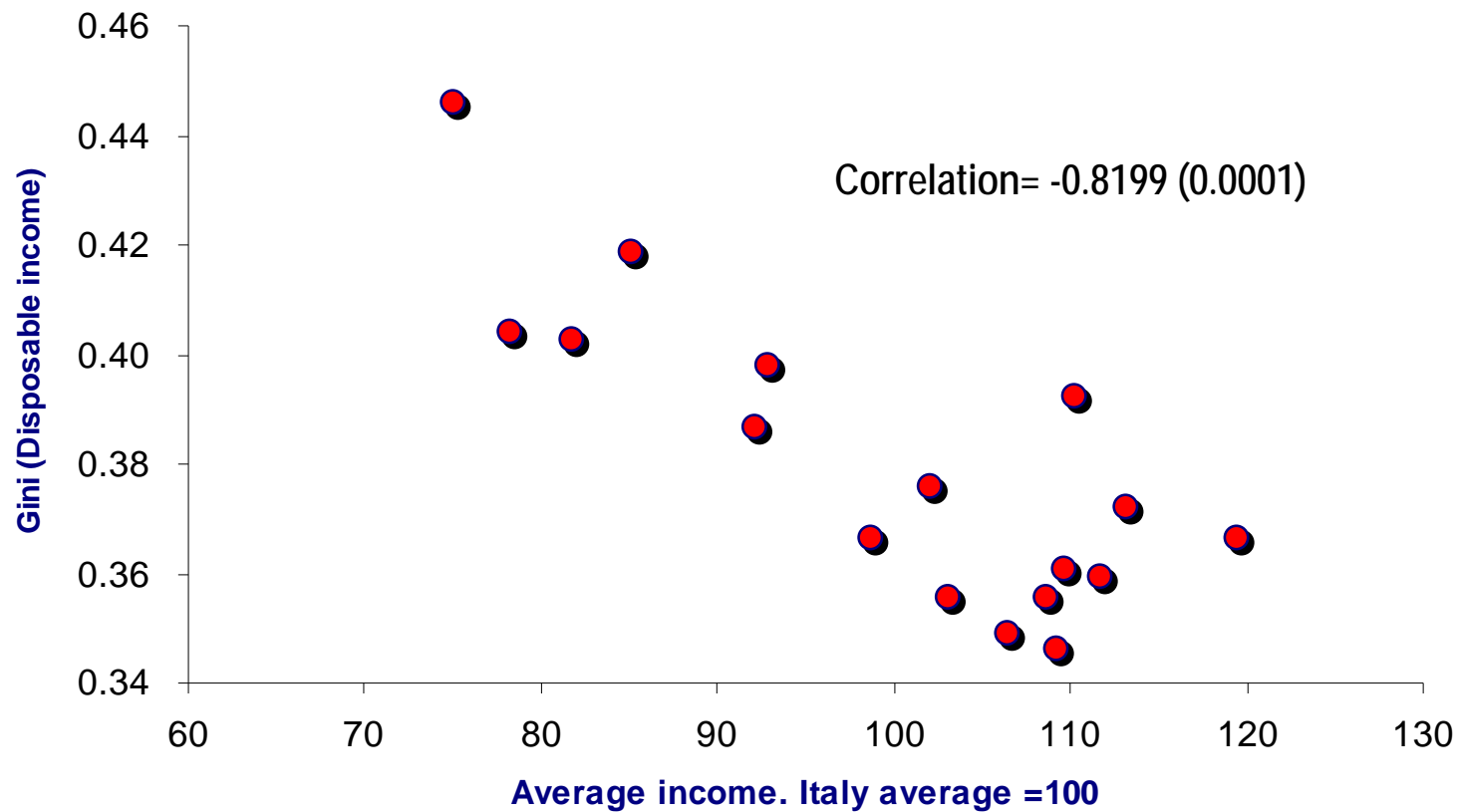
The tax and social cash transfer system reduces inequality in each Italian region, but there is not correlation between the **redistributive effect** and the relative **average regional income**

Redistributive effect = Difference between market and disposable income inequality



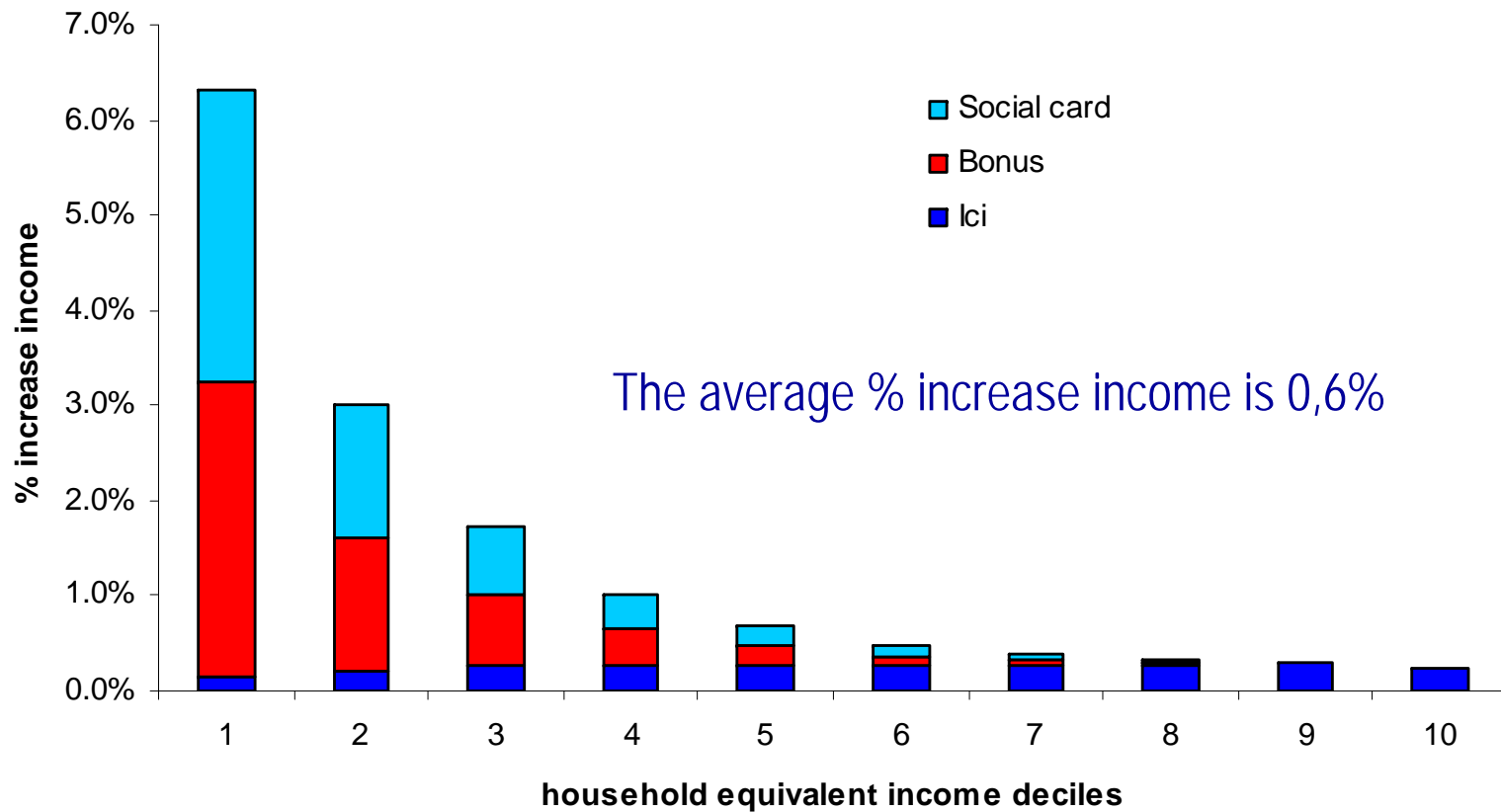
Using microReg: what can it tell us? (1)

The correlation between disposable inequality levels and the relative average regional disposable income is negative



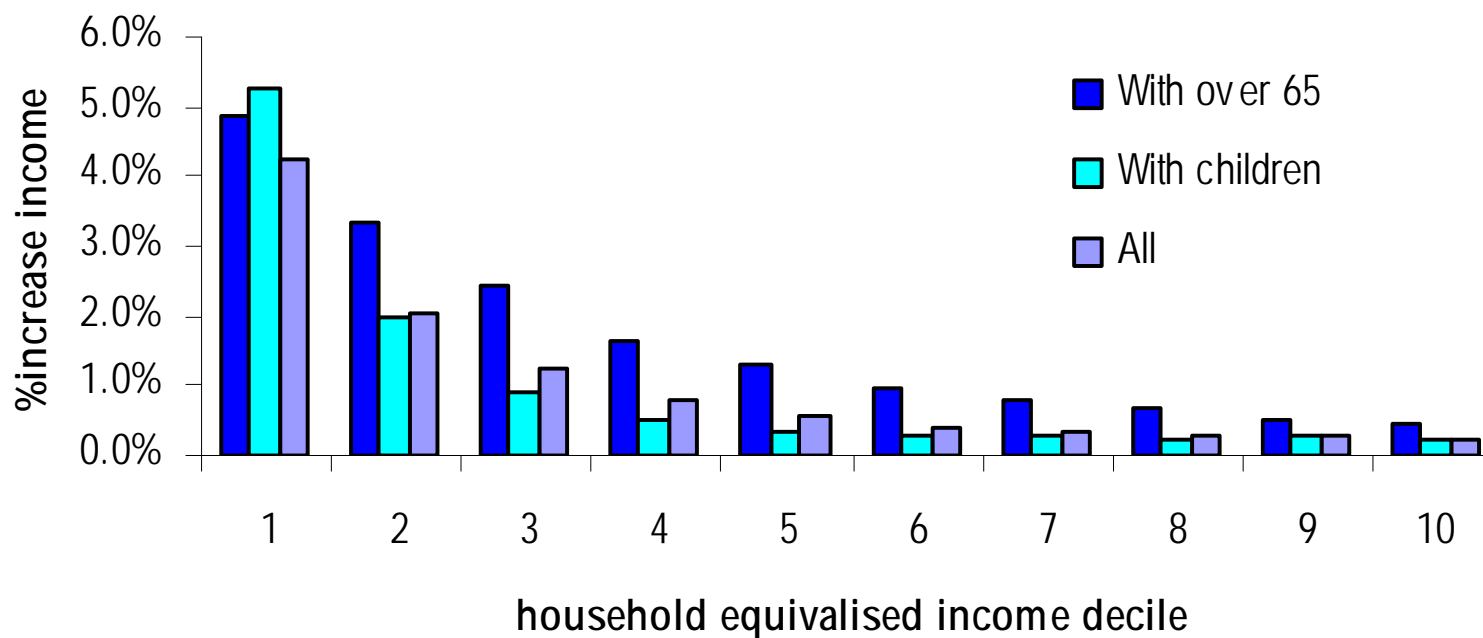
Using microReg: what can it tell us? (2)

Impact on the household income distribution- Italy



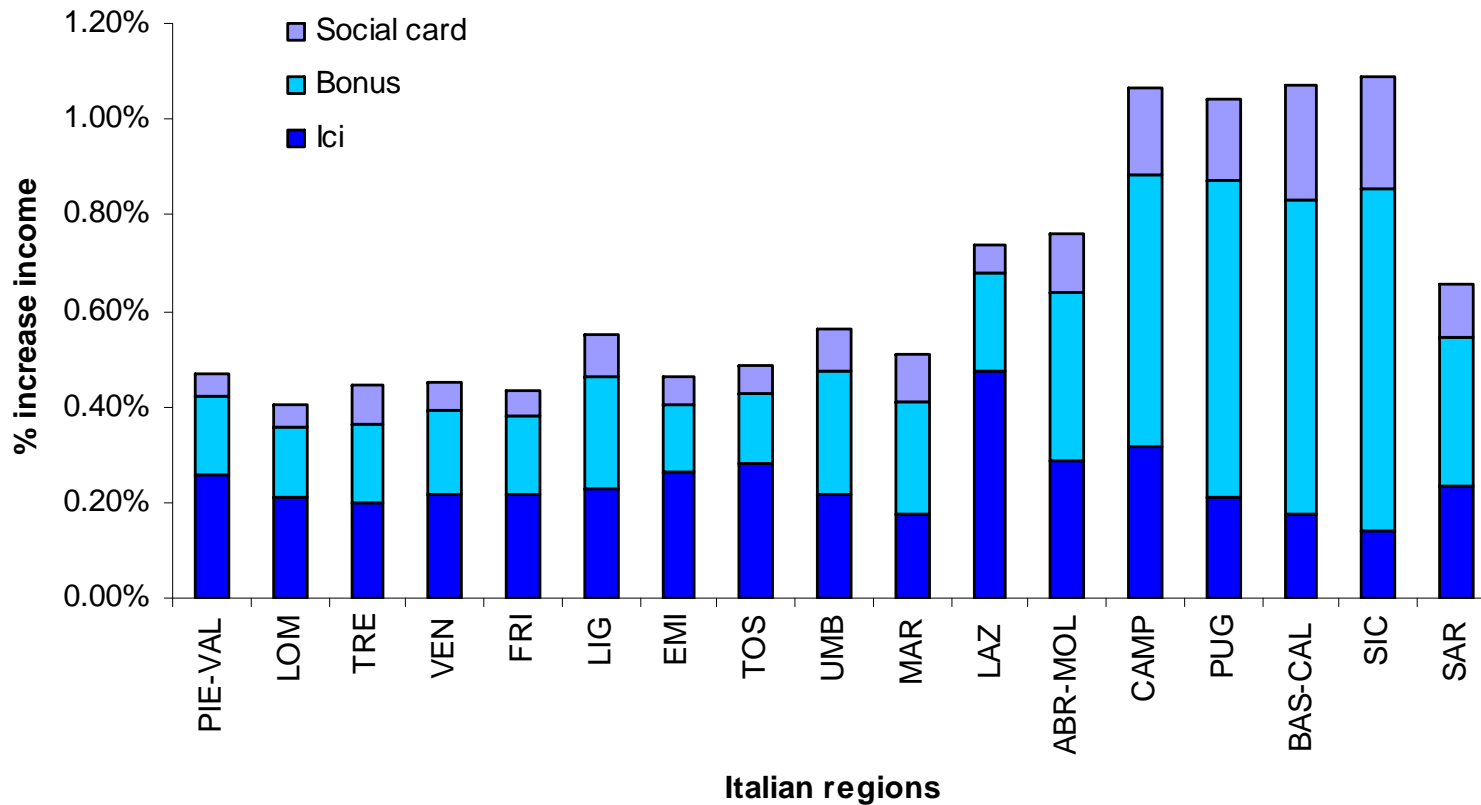
Using microReg: what can it tell us? (2)

Impact on the household income distribution- Italy



Using microReg: what can it tell us? (2)

Impact on the regional average household income



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