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Public Finance

Fiscal Reforms during Fiscal Consolidation

Assessing the Distributional Effects of Housing Taxation: From the Actual Tax Code to Imputed Rent

The 2007 Personal Income Tax Reform in Italy: Effects on Potential Equity, Horizontal Inequity and Re-ranking

Tax Systems and Tax Reforms in New EU Members
The Tax System in Italy

Sources of law:

D.P.R. 22 Dicembre 1986, n.917

a.k.a. "Testo unico delle imposte sui redditi" (TUIR)
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+ several fantasticatrillions of revisions
The Tax System in Italy
The Tax System in Italy

Personal Income Tax (PIT)

• Structure defined by Parameters
  • marginal tax rates
  • thresholds
  • allowances and deductions
  • tax credits
  • …

(more than thirty parameters)
Micromodel data

Empirical data:
Bank of Italy Survey on Households Income and Wealth (BI-SHIW 2012)
representative weighted sample

~8,000 households, ~20,000 individuals
(out of ~24 m, ~60 m)

Disposable income data
(PIT taxable income only)

Post- to Pre-tax procedure:
Imputation of Gross Amounts from Net Incomes in Households Surveys

Figure 1: Frequency density function for all individual taxpayers
## The Tax System in Italy (F.Y. 2010)

### Table 3: Present and computed parameters of the tax

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Present value</th>
<th>Best Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>$t_1$</td>
<td>0.23</td>
<td>0.208939</td>
</tr>
<tr>
<td>$t_2$</td>
<td>0.27</td>
<td>0.292568</td>
</tr>
<tr>
<td>$t_3$</td>
<td>0.38</td>
<td>0.376198</td>
</tr>
<tr>
<td>$t_4$</td>
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<td>0.404304</td>
</tr>
<tr>
<td>$t_5$</td>
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<td>0.428702</td>
</tr>
<tr>
<td>$UL_1$</td>
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<td>19,521.3</td>
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<td>75,000</td>
<td>59,560.9</td>
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<tr>
<td>$m_1$</td>
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<td>13,664.9</td>
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<td>$m_2$</td>
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</tr>
<tr>
<td>$m_3$</td>
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<tr>
<td>$m_4$</td>
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<td>7,489.4</td>
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<td>2,078.6</td>
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<tr>
<td>$C_i^{2/in}$</td>
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### Tenants
- Tenants 1: 300
- Tenants 2: 150
- Tenants 3: 992

### Expenditures
- Expenditures 1: 0.19
- Expenditures 2: 0.36

Source: Own elaborations based on II-SHHW.
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**Tenants 1**
- 300  
- 201.2

**Tenants 2**
- 150  
- 201.2

**Tenants 3**
- 992  
- 201.2

**Expenditures 1**
- 0.19  
- 0.185513

**Expenditures 2**
- 0.36  
- 0.406797

*Source: Own elaborations based on II-SSW.*
Goals:

- Maximize redistributive effect
- Minimize worse-off taxpayers
- Hit an (exogenously) given tax revenue
Given tax revenue

Alternative scenarios:

- Ante reforms: ~148 bn €
- 2014 tax cut (8 months): ~7 bn € less
- 2015 tax cut (whole F.Y.): ~10.5 bn € less [expected]
Redistributive effect

Overall situation:

- Average tax rate = 18.7%

Inequality indices:

- Gini coefficient
  - 0.4433 Gross income distribution
  - 0.3914 Net income distribution

- Redistributive Effect = 0.0519

- Concentration coefficient
  - 0.3908 Net income distribution
  - 0.6722 Net tax liability distribution

- Reynolds-Smolensky = 0.0526

- Kakwani = 0.2288

- Atkinson-Plotnik-Kakwani = 0.00062
Redistributive effect

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Optimum search

- Micromodel
  - *Pypy, numpy, pandas*
- Genetic Algorithm (RCGA)
  - *Pyevolve* (a few bugs fixed in the process)
- (tedious) trimming of GA parameters
  - *Roulette wheel selection, low mutation rate, high crossover rate*
- Observe sizeable convergence
- Done (2.000 ind. X 1.000 gen.)
Enter agents

Until here, real-world accurate empirical data

From now on, (slight) departure from strict adherence to faithful detail

- Best-effort estimates of (group) **elasticities**
  - labor supply (Saez et al. 2009), check
Enter agents

- Facts
  - higher income deciles respond more
  - retired people: no control on income from pension

- Issues
  - women labor participation
  - top individual tax rate vs corporate tax rate
  - charitable donations
  - people hires more skilled tax consultants
  - tax avoidance/evasion
  - shifts from taxable income to untaxable benefits
  - income/substitution effects neglected
Elasticity is really HARD to capture.

Extra problem: intertemporal features

short-term knee-jerk reactions vs long-term planning

- anticipation! Shifting earnings before the change
Reactions as elasticity

- Elasticity estimates: 0.12 - 0.40
- Made proportional to incomes
- Some random dispersion added
Reactive agents

- Assuming (heroically) constant pre-tax incomes across years
- Agents compare their Post-tax income from year n-1 and year n
- Agents adjust their income according to their elasticity \( \varepsilon \leq 0 \)

**Elasticity** of reported incomes with respect to the "net-of-tax rate" defined as the percent change in reported income when the net-of-tax rate increases by 1%

Optimal taxation structure becomes a moving target to the GA
Incremental optimization

Iterative process:

1. GA optimization step ($n$ generations)
2. taxpayers' reaction

Repeat ad libitum

Two alternative interpretations
Introducing an interaction space:

- No "social" data available
  - (it's either households or individuals)

- Synthetic networks

- Imitation, influence
What now?

Can the very existence of social networks lead to cascading effects?

Thank you.

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