

**The efficiency and distributive effect of  
local taxes:  
Evidence from Italian municipalities**

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# MOTIVATION

## Research questions:

- How do local taxes affect income reporting behavior?
- Can more progressive local taxes redistribute incomes?

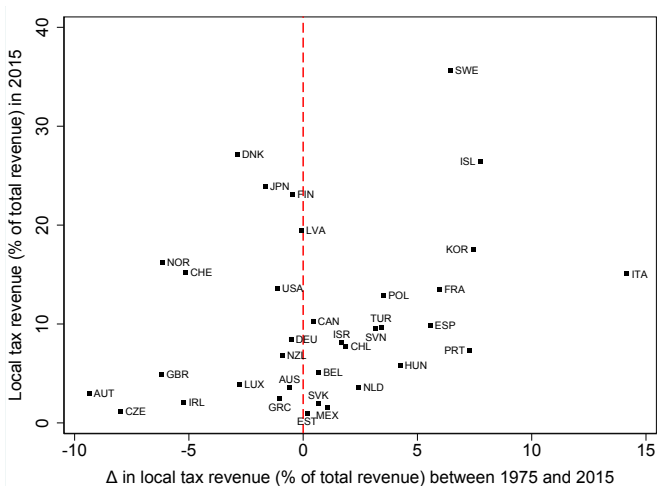
*“Policies to adjust the distribution of income among individuals must be conducted on a nationwide basis [...] Regional measures are self-defeating, as the rich will leave and the poor will move to the more egalitarian-minded jurisdictions. Progressive income taxation at the upper as well as transfers at the lower end of the scale — if substantial in scope — must be uniform within the entire area over which there is a high degree of capital and labor mobility, which means they have to be a function of the national government.”*  
(Musgrave, 1971, p.7).

## MOTIVATION

- Classic public finance literature (Musgrave, 1959; Oates, 1972; Stiglitz, 1988; Feldstein and Wrobel, 1998) provides a clear answer to these questions: If individuals can migrate across jurisdictions, more progressive local taxes would result in efficiency losses without achieving any net redistribution of income in the long-run.
- Different levels of tax progressivity may distort economic choices and thereby reduces total reported incomes.
- In setting optimal local tax policy, the extent to which people flee local jurisdictions that attempt to impose relatively larger tax burdens on them is a crucial consideration (Mirlees, 1982; Lehmann et al., 2014).

# MOTIVATION

FIGURE 1: Fiscal decentralization in developed countries



Source: Author's elaboration on data from the OECD tax statistics.

## OVERVIEW

This paper studies the effect of local income tax policy on taxable income and its distribution using panel data from municipality-level tax returns over the 2001-2015 period.

- **Progressive tax reform:** it granted municipalities the authority to switch from the existing flat tax schedule to a system of multiple rates and tax exemption for low incomes.
  - The introduction of a progressive local tax scheme significantly reduced taxable income (-7%) and the income share held by the Top 1 (-3%); no effect on the Gini index.
- Exploiting within-municipality variations in tax rates and taxable income/inequality, I estimate the **net-of-tax elasticity**.
  - Taxable income elasticity of 0.56; Top 1 elasticity of 0.49.
- I combine administrative data on transfers of residence with the differential in tax rates across fiscal jurisdiction to test whether taxpayers actively **move their (fiscal) residence** across borders to minimize their tax liability.
  - Migration elasticity of 2.4.

# INSTITUTIONAL BACKGROUND

- **Personal income tax**

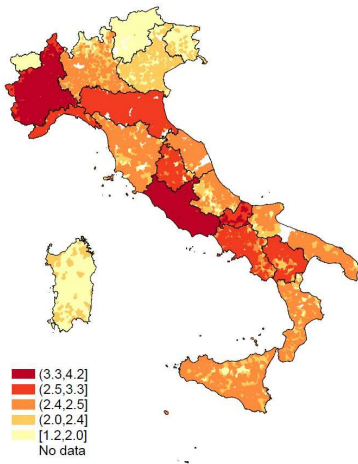
- In addition to the progressive PIT set by the central government, since 1998 (decree 360/1998) taxes on personal income are levied by the 20 regions and around 8,000 municipalities.
- Municipality can choose to levy a surtax on personal income with a cap on 0.8%, while regions can set their surtax on personal income with a cap on 3.3%.

- **Progressive tax reform**

- Since 2007, the legislator has allowed municipalities to introduce an exemption threshold conditional on specific income requirement (decree 296/2006).
- From 2011 (decree 138/2011), the law has granted municipalities the opportunity to switch from the existing flat tax schedule to a system of multiple tax rates (see Figure A2 for trends and Figure A3 for a geographical representation).

# INSTITUTIONAL BACKGROUND

FIGURE 2: Local top MTR on personal income



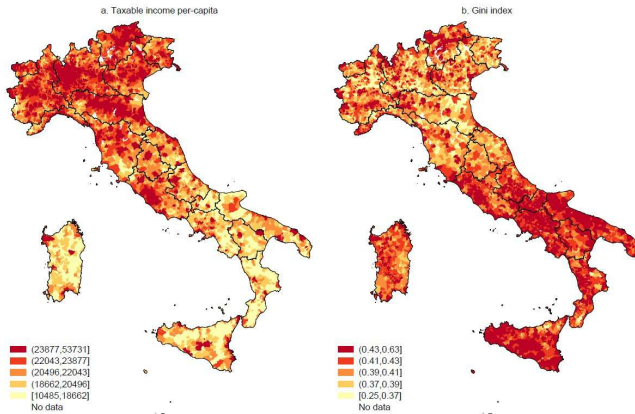
Source: Author's elaboration on data from the Italian Ministry of Economy and Finance.

# DATA

- **Income data** from municipality-level tax returns provided by the Ministry of Economy and Finance (MEF) for each municipality over the 2001-2015 period (see table A1 for an example).
  - The definition of income is taxable income (e.g. gross income minus deduction) which includes positive income from all sources (labor, including pensions, business, capital).
- **Inequality indexes** are constructed for each municipality over the period of interest using interpolation technique (Milanovic, 1994; Piketty, 2003) from grouped data.
  - I derive Gini index and the income share held by P0-90, P90-99, P99-100.
- **Tax, control variables and transfers of residence data** from other administrative sources (National Institute of Statistics Italian Institute of Finance and Local Economy, Ministry of Interior, Ministry of Revenue).



FIGURE 3: A map of taxable income and Gini index, 2015



Source: Author's elaboration on data from the Italian Ministry of Economy and Finance.

# EMPIRICAL STRATEGY

- **Net-of-tax rate elasticities**

$$\log(y_{i,t}) = \epsilon \times \log(1 - \tau_{i,t}) + \beta X_{i,t} + \gamma_i + \delta_t + t \times \mu_{p(i)} + u_{i,t} \quad (1)$$

- **Progressive tax reform**

$$\log(y_{i,t}) = \epsilon \times Reform_{i,t} + \beta X_{i,t} + \gamma_i + \delta_t + t \times \mu_{p(i)} + u_{i,t} \quad (2)$$

- **Identifying assumptions:**

1.  $(y_{1,t}, y_{0,t}) \perp Reform_{i,t} | X_{i,t} \rightarrow$  Matching on the propensity score (Heckmann et al., 1997), see Table A2 for balancing test and Figure A1 for overlapping condition;
2.  $E(Reform_{i,t} | u_{i,t}) = 0$  and  $E(\log(1 - \tau_{i,t}) | u_{i,t}) = 0 \rightarrow$  Instrumental variable strategy;
3. Parallel trend assumption  $\rightarrow$  Leads and lags of the reforms (see Figures A4 and A5).

TABLE 1: Baseline results

	log(TI)		log(Gini)		log(P0-90)		log(P90-99)		log(P99-100)	
	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
a. Net-of-tax rate elasticities										
$\log(1 - \tau_{i,t})$	0.643*** (0.069)	0.555*** (0.070)	0.092** (0.041)	0.075* (0.041)	-0.089** (0.038)	-0.100** (0.039)	0.030 (0.077)	0.005 (0.083)	0.531*** (0.191)	0.494** (0.204)
Observations	115,230	115,230	115,230	115,230	114,930	114,930	95,751	95,751	95,751	95,751
b. Progressive tax reform										
$Reform_{i,t}$	-0.001 (0.001)	-0.077*** (0.013)	0.000 (0.001)	-0.000 (0.004)	0.001** (0.001)	0.005 (0.003)	-0.002** (0.001)	0.010 (0.008)	-0.003 (0.003)	-0.029* (0.016)
Observations	115,230	115,230	115,230	115,230	114,930	114,930	95,751	95,751	95,751	95,751
Municipality FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Time FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Election-year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Controls	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
t × Province	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Mean dependent	93,598	93,598	0.397	0.397	67.658	67.658	25.483	25.483	7.693	7.693

*Note:* Panel a shows the net-of-local tax elasticities, while panel b shows the effect of switching from a flat to a progressive local personal income tax scheme. The model controls for municipality fixed effects, year fixed effects, election-year fixed effects, province-specific time trend and the following municipality-specific time-varying variables: town councils characteristics (mayor sex, mayor age, mayor degree, town council average age, proportion of women in town council, share of graduated in town council), expenditure shares (share of spending in administrative services, justice and law services, educational services, development activities, social services), demographic variables (population, share of young, share of old, share of foreign), fiscal imbalances, and province-level unemployment rate. The sample is composed of 7,682 municipalities over the 2001-2015 period. Standard errors clustered at municipality-level in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

TABLE 2: Heterogeneity analysis

	log(TI)				log(P99-100)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$\log(1 - \tau_{i,t})$	0.556*** (0.070)	0.211** (0.097)	0.740*** (0.099)	0.488*** (0.076)	0.494** (0.204)	-0.012 (0.285)	1.044*** (0.259)	0.545** (0.212)
... $\times$ <i>Large</i> <sub><i>i</i></sub>	-0.005*** (0.001)				0.001 (0.002)			
... $\times$ <i>Small</i> <sub><i>i</i></sub>	0.000 (0.001)				-0.008** (0.003)			
... $\times$ <i>Rentier</i> <sub><i>i</i></sub>		0.619*** (0.125)				0.841** (0.338)		
... $\times$ <i>Coop</i> <sub><i>i</i></sub>			-0.343*** (0.115)				-1.100*** (0.304)	
... $\times$ <i>Border</i> <sub><i>i</i></sub>				0.357** (0.158)				-0.279 (0.436)
Observations	115,230	115,230	115,230	115,230	95,751	95,751	95,751	95,751
Municipality FE	YES	YES	YES	YES	YES	YES	YES	YES
Time FE	YES	YES	YES	YES	YES	YES	YES	YES
Election-year FE	YES	YES	YES	YES	YES	YES	YES	YES
Controls	YES	YES	YES	YES	YES	YES	YES	YES
t $\times$ Province	YES	YES	YES	YES	YES	YES	YES	YES
Mean dependent	93,958	93,958	93,958	93,958	7.693	7.693	7.693	7.693

Note: This table shows the taxable income (columns 1-3) and top percentile (columns 4-6) elasticities from 2SLS regressions and the interaction between net-of-local top marginal tax rate and dummy variables for municipalities whose population size is lower than 1,000 inhabitants (*Small*), larger than 50,000 inhabitants (*Large*), those having a share of rental income larger than the median value (*Rentier*), those having a share of non-profit organizations larger than the median value (*Cooperation*), and those with a bordering municipality located in a different region (*Border*). Standard errors clustered at municipality-level in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

# MECHANISMS: TAX-INDUCED INTERNAL MIGRATION

$$\log\left(\frac{P_{o,d,t}}{P_{o,o,t}}\right) = \epsilon \times \log\left(\frac{1 - \tau_{d,t}}{1 - \tau_{o,t}}\right) + \mu_d + \mu_o + \mu_{o,d} + u_{o,d,t} \quad (3)$$

TABLE 3: Tax-induced migration

	OLS (1)	OLS (2)	OLS (3)	OLS (4)	OLS (5)	2SLS (6)
$\log(1 - \tau_{d,t})/(1 - \tau_{o,t})]$	5.327*** (1.381)	2.400* (1.279)	3.708*** (1.327)	3.708*** (1.350)	2.910* (1.661)	2.349* (1.403)
Observations	91,957	91,957	91,957	83,724	61,247	61,247
O × d pair FE	YES	YES	YES	YES	YES	YES
Time FE	NO	YES	YES	YES	YES	YES
t × Province	NO	YES	YES	YES	YES	YES
Δ in controls	NO	NO	YES	YES	YES	YES
Sample restriction	NO	NO	NO	YES	YES	YES
Mean dependent (%)	0.129	0.129	0.129	0.136	0.157	0.157

*Note:* This table shows the share of movers elasticity with respect to the differential in the average tax rate between destination and origin province. The sample is composed of 10,707 origin and destination provincial pair over the 2007-2015 period. Standard errors in parentheses, with three-way clustering by origin-province × year, destination-province × year and province-pair. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

- See Table A3 for the analysis on who moves.

# MECHANISMS: INCOME SHIFTING

$$\log(y_{i,t}) = \epsilon_1 \times \log(1 - \tau_{i,t}) - \epsilon_2 \times \log\left[\left(1 - \sum_{j \neq i} w_{i,j} \tau_{j,t}\right) / (1 - \tau_{i,t})\right] + \beta X_{i,t} + \gamma_i + \delta_t + t \times \mu_{p(i)} + u_{i,t} \quad (4)$$

TABLE 4: Income shifting

	log(Taxable income)					
	OLS (1)	OLS (2)	OLS (3)	2SLS (4)	2SLS (5)	2SLS (6)
$e_1$	0.643*** (0.069)	0.666*** (0.077)	0.252*** (0.067)	0.555*** (0.070)	0.615*** (0.080)	0.296*** (0.072)
$e_2$		-0.062 (0.189)	-0.866*** (0.185)		-0.106 (0.192)	-0.830*** (0.188)
Observations	115,230	106,800	111,929	115,230	106,800	111,929
Municipality FE	YES	YES	YES	YES	YES	YES
Time FE	YES	YES	YES	YES	YES	YES
Election-year FE	YES	YES	YES	YES	YES	YES
Controls	YES	YES	YES	YES	YES	YES
$t \times$ Province	YES	YES	YES	YES	YES	YES
Competitor $\tau$	NO	Neigh.	LLM	NO	Neigh.	LLM

*Note:* This table compares the baseline taxable income elasticities (columns 1 and 4) with those estimated controlling for the difference between the (log of) net-of-local tax rate set by municipalities sharing a border (columns 2 and 5) or belonging to the same local labor market (columns 3 and 6) and the (log of) net-of-own local tax rate.

# CONCLUSIONS

- This paper studies the effect of local income tax policy on taxable income and its distribution using panel data from municipality-level tax returns.
- The results suggest that local taxes significantly affect taxable income and its distribution.
  - The introduction of a graduated tax scheme has significantly reduced taxable income and pre-tax inequality.
  - On average, a 10% increase in the net-of-local income marginal tax rate is associated with a 5% increase in taxable income and a nearly equal increase in the income share held by the Top 1.
- Implications:
  - Optimal tax design.
  - Determination of the optimal provision of public goods (Oates, 1972).

TABLE A1: Income tax data, Rome in 2015

Income class (€)	Total taxpayers	Income assessed (€)
1 - 10,000	547,176	2,353,967,201
10,001 - 15,000	207,374	2,353,967,201
15,001 - 26,000	465,392	9,523,343,768
26,001 - 55,000	513,087	18,438,065,283
55,001 - 75,000	77,506	4,944,213,442
75,001 - 120,000	62,438	5,743,228,043
> 120,000	32,888	7,545,279,203

*Note:* Income data from Italian Ministry of Economy and Finance on reported taxable personal income for the year 2015 in Rome.



TABLE A2: Balancing test for pre-reform values

Variable	Group			t-test	
	Treated	Unmatched control	Matched control	Treated vs Unmatched	Treated vs Matched
	(1)	(2)	(3)	(4)	(5)
Taxable income per-capita	21.462	19.223	21.458	0.000	0.959
Gini index	0.395	0.397	0.396	0.022	0.502
P0-90 (%)	66.853	68.310	66.971	0.000	0.249
P90-99 (%)	25.268	25.419	25.215	0.019	0.419
P99-100 (%)	8.117	7.130	8.073	0.000	0.461
Population	12,911	4,141	12,254	0.000	0.674
Share of 65+	20.564	22.884	20.331	0.000	0.092
Share of 15-	13.708	13.065	13.791	0.000	0.196
Share of foreign	5.141	3.935	5.179	0.000	0.672
Mayor age	48.825	48.514	48.665	0.071	0.401
Mayor sex	0.110	0.082	0.117	0.000	0.288
Mayor graduated	0.449	0.398	0.458	0.000	0.430
Average age in town council	44.373	43.622	44.443	0.000	0.403
Proportion of women in town council	0.183	0.172	0.182	0.000	0.624
Proportion of graduated in town council	0.289	0.222	0.289	0.000	0.894
Crisis	0.001	0.001	0.001	0.729	0.991
Unemployment rate (%)	6.629	7.471	6.695	0.000	0.542
Budget deficit	0.103	0.060	0.100	0.000	0.438
Administration expenses (%)	21.933	22.348	21.917	0.008	0.917
Development expenses (%)	0.378	0.283	0.327	0.000	0.003
Justice expenses (%)	0.082	0.045	0.084	0.000	0.724
Education expenses (%)	6.418	4.728	6.391	0.000	0.724
Social expenses (%)	7.643	4.839	7.622	0.000	0.890
Urban	0.696	0.383	0.713	0.000	0.165
Density	0.010	0.026	0.011	0.000	0.463

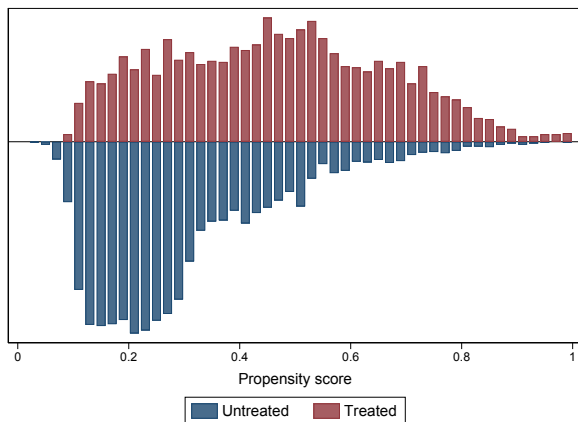
*Note:* This table compares the mean value of the variables for treated, unmatched control, and matched control municipalities over the pre-reform period. Columns 4 and 5 show p-values from a t-test where the null hypothesis is of equality of coefficient between treated and unmatched control group (column 4) and treated and matched control group (column 5).

TABLE A3: Tax-induced migration, who moves?

	$\log \frac{Gini_{d,t}}{Gini_{o,t}}$		$\log \frac{P_{0-90,d,t}}{P_{0-90,o,t}}$		$\log \frac{P_{90-99,d,t}}{P_{90-99,o,t}}$		$\log \frac{P_{99-100,d,t}}{P_{99-100,o,t}}$	
	OLS (1)	2SLS (2)	OLS (3)	2SLS (4)	OLS (5)	2SLS (6)	OLS (7)	2SLS (8)
$\log[(1 - \tau_{d,t})/(1 - \tau_{o,t})]$	0.425*** (0.162)	0.424*** (0.167)	0.011 (0.094)	-0.006 (0.059)	0.230 (0.184)	0.232 (0.189)	0.936*** (0.319)	1.129*** (0.333)
Observations	61,247	61,247	61,247	61,247	61,247	61,247	61,247	61,247
O × d pair FE	YES	YES	YES	YES	YES	YES	YES	YES
Time FE	YES	YES	YES	YES	YES	YES	YES	YES
t × Province	YES	YES	YES	YES	YES	YES	YES	YES
Δ in controls	YES	YES	YES	YES	YES	YES	YES	YES
Sample restriction	YES	YES	YES	YES	YES	YES	YES	YES

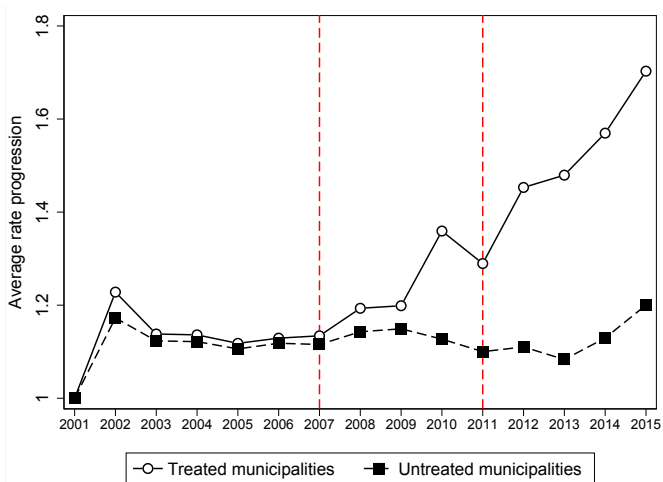
Note: This table shows the inequality elasticity (differential between destination and origin province in the (log of) Gini index, share of income held by the bottom 90 percent, Top 10-1, and Top 1 of the pre-tax income distribution) with respect to the differential in the average tax rate between destination and origin province. The sample is composed of 10,707 origin and destination provincial pair over the 2007-2015 period. Standard errors in parentheses, with three-way clustering by origin-province × year, destination-province × year and province-pair. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

FIGURE A1: Propensity score distribution



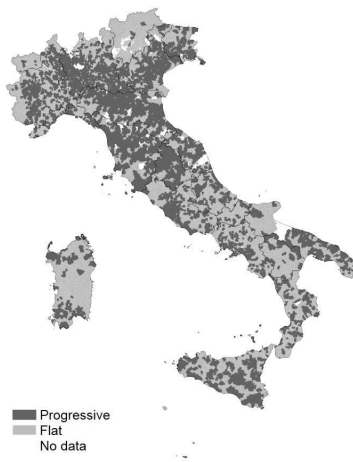
Note: Distribution of the estimated propensity score between treated and untreated municipalities.

FIGURE A2: Tax progressivity trends



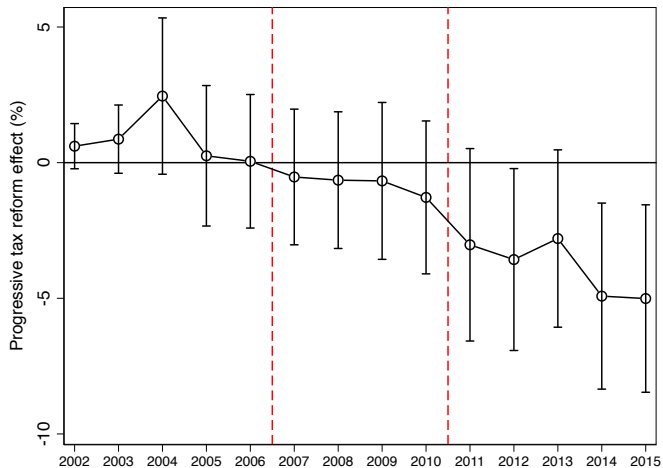
Source: Author's elaboration on data from the Italian Ministry of Economy and Finance.

FIGURE A3: Municipal tax scheme, 2015



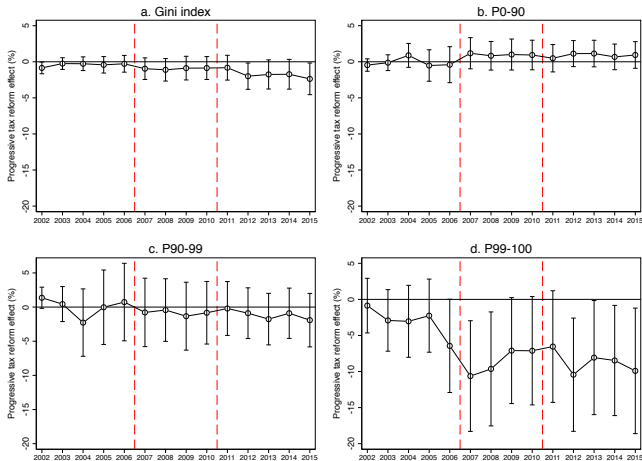
*Note:* Author's elaboration on data from the Italian Ministry of Economy and Finance.

FIGURE A4: Leads and lags of the tax reforms, taxable income



Note: This figure displays effects on (log of) taxable income of the 2007 and 2011 tax reforms and their leads and lags.

FIGURE A5: Leads and lags of the tax reforms, inequality



Note: This figure displays effects on (log of) inequality indexes of the 2007 and 2011 tax reforms and their leads and lags.