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Income tax rate increases and heterogeneous taxpayers' reactions:
a spatial regression discontinuity design

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Abstract: This paper exploits a sudden increase in the regional surcharge on the income tax rate in Lazio, one of the most populated regions of Italy, to compare taxpayers' reported income in Lazio's municipalities with those in the municipalities located in six neighboring regions. To this end, we have built a new yearly dataset (2012-2018) at municipal level containing the reported income of different categories of taxpayers and employ a spatial regression discontinuity design to estimate the response to an increase of the marginal tax rate in terms of reported taxable income by different types of taxpayers. We find a sizable and persistent decrease in reported income only for the self-employed and entrepreneurs, while the employees respond by slowly reducing their declared incomes. As expected, the retirees do not exhibit any response.

Keywords: Income tax; taxpayers' responses; spatial regression discontinuity design

JEL codes: C21; H26; J21

1. Introduction and related literature

How different categories of taxpayers react to an income tax rate increase? Who bears the additional tax burden? These questions have been largely addressed in the last decades by the theoretical and empirical literature on the elasticity to individual income taxation in the framework of the optimal tax theory (Mirrlees, 1971; Diamond and Saez, 2011), where behavioral elasticity is considered a measure of the deadweight loss of taxation.

As regards labor supply, for example, taxpayer's responses may vary in the short- and long-run and be different: intensive, i.e. expressed in terms of hours of work on the job, occupational choice; or extensive, i.e. about the decision - whether to work or not – made by heterogeneous taxpayers (married women, single parents who need child care, retired people and migrants) (Saez et al., 2012).

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Indeed, the heterogeneity of taxpayers result in different reactions to income marginal tax rates' variations: while pensioners and employees hardly change their tax-related behavior, the self-employed and entrepreneurs can reduce their tax liabilities by deciding to work fewer hours or by evading (more) taxes (Klemm et al. 2018).

Most empirical papers focused on a single economy and generally on single reforms while others made comparisons over time (for the US, Saez et al., 2012; for the UK, Brewer et al., 2010; for Denmark, Kleven and Schultz, 2014). Only a few studies estimated income tax elasticities for a large sample of economies and years (Piketty et al., 2014; Klemm et al., 2018). The evidence about the magnitude of the elasticity of taxable income is mixed[1].

Recently Neisser (2017) performed a meta-analysis finding that most estimates range from 0 to 1, with a peak at around 0.3; Saez et al. (2012) in his review showed that empirical estimates range from no effect to very sizeable responses. For instance, the value of this elasticity is close to zero for prime-age males while for married women, it turns out significant. Using a rich Argentinian administrative and taking advantage of a discontinuous change in tax liabilities, Tortarolo (2019) provides evidence that labor supply of upper-wage earners to temporary tax rates' changes is not responsive, notwithstanding the importance and magnitude of the change. Possible explanations are that there are high adjustment costs, slow dynamic individual responses and difficulty of coordination by employers that mediate tax responses of employees. This result is consistent with the evidence provided by Saez (2010), Saez et al. (2012), Bastani and Selin (2014), while Sigurdsson (2019), comparing high (large tax rates' reduction) vs low earners (small tax rates' reduction), finds larger response among high earners. Yang and Heim (2017) examine the responses in taxable incomes to tax rate changes at the county level in Indiana, including changes in actual income, changes in the composition of taxable versus nontaxable income, and timing of income. They find that income tax rates have little impact on the aggregate taxable income. On the contrary, Spreen (2018) finds that Illinois taxpayers responded to the 2011 income tax rate increase by reducing their reported incomes.

We contribute to the existing literature by exploiting a sudden increase in the regional surcharge on the income tax rate in Lazio, one of the most populated regions of Italy, to compare taxpayers' declared income in Lazio's municipalities with those in the municipalities located in six neighboring regions. To this end, we build a new yearly dataset (2012-2018) at the municipality level containing the reported income of different categories of taxpayers, i.e. employees, retired people, self-employed and entrepreneurs and employ a spatial regression discontinuity design (spatial RDD) to estimate the

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[1] For recent reviews see Saez et al. (2012); Whalen and Reichling (2017).

response to an increase of the marginal tax rate in terms of reported taxable income by the abovementioned taxpayers.

Our estimates show that the employees responded to the personal income tax increase by slowly reducing their reported incomes in the per capita declared income in 2017 and 2018, while the retirees did not exhibit any response. Instead, we have detected a sizable and statistically significant decrease in reported income of the self-employed and entrepreneurs.

The paper is organized as follows: Section 2 illustrates the Italian institutional context; Section 3 presents the methodology and the dataset; Section 4 discusses the empirical results and Section 5 provides some concluding remarks.

2. Institutional context and policy

Italy is a federal country consisting of the central government, 20 regions whose 15 are "regions with ordinary statute", 5 are "regions with special statute" which enjoy more autonomy because of geographic, historical, and linguistic reasons; 10 metropolitan cities; 84 provinces; 7904 municipalities. Since the mid-1990s a gradual process of fiscal decentralization occurred, accomplished through several legislative acts and constitutional reform in 2001, aimed at increasing the fiscal autonomy of the regional governments and reducing differences in competencies between the RSO and RSS. At present, regions have major responsibilities in several functions (culture and tourism, environment, health care, economic development) and municipalities are in charge of the management of the public utilities (local roads, water, sewage and garbage collection), housing, local transportation, social services. Tax autonomy at the sub-national level, which is more limited than the expenditures competences, consists of a few own-taxes and several shared taxes, surcharges, fees and user charges (De Paulis, 2015).

The central government levies a progressive Personal income tax, IRPEF (Imposta sul reddito delle persone fisiche), which applies to the majority of incomes taking into account some specific features of the taxpayer, such as the taxpayer's occupation and household composition. Since 1998, regions and municipalities are entitled to levy a surcharge on the personal income tax consisting of a mandatory flat rate of 0.9% and an additional discretionary rate of up to 0.5%. From 2010 on, the phasing-in of fiscal federalism has been accompanied by repeated increases of the discretionary component of the regional income tax surcharge. The tax rate is decided annually by the Regional Council at the end of each year. It applies to the taxable income as determined by the National Law and has the same tax base of the national personal income tax. The rate is based on the fiscal residence in that year, regardless of where he or she works (Rubolino, 2019).

In Italy, about 40 million taxpayers pay the personal income tax according to the brackets (Table 1) for an overall reported amount of 833 billion euros.

Table 1 – The Italian personal income tax rates

Threshold	Rate (%)
Up to €15,000	23
Up to €28,000	27
Up to €55,000	38
Up to €75,000	41
Above €75,000	43

Source: Italian Ministry of Economy and Finance

In addition, according to Italy's intergovernmental financial arrangements, the central government is entitled to require regions to raise the surcharge rates in order to cover the health system's deficits. In this perspective, Lazio, one of the most populated regions of Italy, raised by 1.6 percentage points the regional surcharge on the income tax rate for the incomes above €15,000 (from 1.73% to 3.33%) between 2013 and 2015.[2] Therefore, a taxpayer whose taxable income is €100,000 was liable to pay 1,360 € more in 2015 than two years before. Instead, the six neighboring regions did not experience relevant changes in their surcharge, as reported in Table 2. This tax differentiation resulted in a geographic discontinuity, which allows us to estimate the impact of a sudden increase in the personal income tax rate on taxpayers' behavior.

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[2] The tax rate increase did not affect individuals with a taxable income that does not exceed €50,000 and with three dependent children. The taxable income threshold is increased by €5,000 for each dependent child over the third. The same exception applies to individuals with one or more disabled children. From 2015 onwards, individuals with an overall income of less than €35,000 are exempted from the additional personal income tax increase.

Table 2 – Regional surcharges from 2011 to 2018

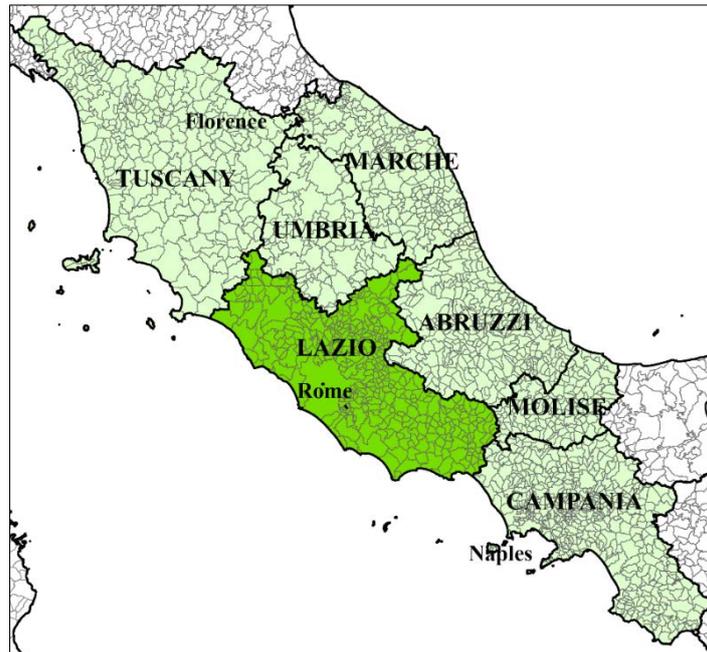|	2011		2012		2013		2014		2015		2016	
Region	**Thresholds**	**Surcharge (%)**	**Thresholds**	**Surcharge (%)**	**Thresholds**	**Surcharge (%)**	**Thresholds**	**Surcharge (%)**	**Thresholds**	**Surcharge (%)**	**Thresholds**	**Surcharge (%)**
Lazio	Unique	1.73	Unique	1.73	Unique	1.73	Up to €15,000 Above €15,000	1.73 2.33	Up to €15,000 Above €15,000	1.73 3.33	Up to €15,000 Above €15,000	1.73 3.33
Abruzzi	Unique	1.73	Unique	1.73	Unique	1.73	Unique	1.73	Unique	1.73	Unique	1.73
Campania	Unique	2.03	Unique	2.03	Unique	2.03	Unique	2.03	Unique	2.03	Unique	2.03
Marche	Up to €15,000 Up to €31,000 Above €31,000	1.23 1.53 1.73	Up to €15,000 Up to €31,000 Above €31,000	1.23 1.53 1.73	Up to €15,000 Up to €28,000 Up to €55,000 Up to €75,000 Above €75,000	1.23 1.53 1.70 1.72 1.73	Up to €15,000 Up to €28,000 Up to €55,000 Up to €75,000 Above €75,000	1.23 1.53 1.70 1.72 1.73	Up to €15,000 Up to €28,000 Up to €55,000 Up to €75,000 Above €75,000	1.23 1.53 1.70 1.72 1.73	Up to €15,000 Up to €28,000 Up to €55,000 Up to €75,000 Above €75,000	1.23 1.53 1.70 1.72 1.73
Molise	Unique	2.03	Unique	2.03	Unique	2.03	Up to €15,000 Up to €28,000 Up to €55,000 Up to €75,000 Above €75,000	2.03 2.23 2.43 2.53 2.63	Up to €15,000 Up to €28,000 Up to €55,000 Up to €75,000 Above €75,000	2.03 2.23 2.43 2.53 2.63	Up to €15,000 Up to €28,000 Up to €55,000 Up to €75,000 Above €75,000	1.73 1.93 2.13 2.23 2.33
Tuscany	Unique	1.23	Up to €75,000 Above €75,000	1.23 1.73	Up to €15,000 Up to €28,000 Up to €55,000 Up to €75,000 Above €75,000	1.42 1.43 1.68 1.72 1.73	Up to €15,000 Up to €28,000 Up to €55,000 Up to €75,000 Above €75,000	1.42 1.43 1.68 1.72 1.73	Up to €15,000 Up to €28,000 Up to €55,000 Up to €75,000 Above €75,000	1.42 1.43 1.68 1.72 1.73	Up to €15,000 Up to €28,000 Up to €55,000 Up to €75,000 Above €75,000	1.42 1.43 1.68 1.72 1.73
Umbria	Up to €15,000 Above €15,000	1.23 1.43	Up to €15,000 Above €15,000	1.23 1.43	Up to €15,000 Above €15,000	1.23 1.43	Up to €15,000 Up to €28,000 Up to €55,000 Up to €75,000 Above €75,000	1.23 1.63 1.68 1.73 1.83	Up to €15,000 Up to €28,000 Up to €55,000 Up to €75,000 Above €75,000	1.23 1.63 1.68 1.73 1.83	Up to €15,000 Up to €28,000 Up to €55,000 Up to €75,000 Above €75,000	1.23 1.63 1.68 1.73 1.83

Notes: In 2017 and 2018 there was a slight decrease in the regional surcharge of Lazio: 1.73 up to €15,000; 2.73 up to €28,000; 2.93 up to €55,000; 3.23 up to €75,000; 3.33 above €75,000. In those years, the surcharge did not change in the neighboring regions.

3. Data and method

We employ a spatial RDD, first proposed by Holmes (1998), to estimate the response to marginal tax rates' variations in terms of reported taxable income using yearly data on the reported income by residents' taxpayers at the municipal level. Our estimation strategy allows us to control for confounding unobservable factors that smoothly evolve over space. Locations separated by a regional border share the same geography, access to transportation and specialized labor and supplies; the key feature that sets these locations apart is indeed the difference in regional income tax surcharge on the two sides of the border.[3]

The Italian Ministry of Economy (MEF) limits the access to individual-level data, which would have been our first best; however, as a second-best alternative, we use municipality-level data, which are, as we mentioned above, the lowest tier of government in Italy. We have collected data on the full population of the Italian municipalities of interest: 378 treated municipalities in Lazio and 1,598 control municipalities in Lazio's neighboring regions. Figure 1 maps all the municipalities under analysis and the regional borders of Lazio and the neighboring regions.

Figure 1 – Municipalities map and regional borders

Since 2012, MEF's data report the overall reported income and the number of taxpayers split by three categories of income: i) employment, ii) retirement, iii) self-employment and entrepreneurship. This disaggregation allows us to take into account the taxpayers' heterogeneity which may result in different reactions to income marginal tax rates' variations. In addition, we have collected data from the Italian National Statistical Institute on the density of both population and economic activities that, together with the per capita income and proportion of self-employment and entrepreneurial incomes drawn from the MEF archive, are used as pre-treatment variables in the empirical analysis.

Table 3 reports the pre-treatment variables by treatment status in 2012. Looking at the first two columns, we notice that Lazio's municipalities are more affluent and less densely populated. Besides, they show a smaller density of economic activities and report a smaller share of self-employment and entrepreneurial incomes. In the columns from (3) to (8) we report the same variables but only for municipalities which are closer to the geographic border (within 50, 20 and 5 km, respectively). The pre-treatment differences between treated and control municipalities become smaller as we move closer to the boundary and are negligible for municipalities within 5 km from the border. Our balance analysis, performed in the spirit of Keele and Titiunik (2015), confirms that balance considerably improves when analyzing municipalities that are spatially proximate. This result validates the use of a spatial RDD in our context.

Table 3 – Pre-treatment differences between treated and control municipalities

Variable	All observations		Within 50 km from the border		Within 20 km from the border		Within 5 km from the border	
	Lazio	Neighboring regions	Lazio	Neighboring regions	Lazio	Neighboring regions	Lazio	Neighboring regions
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Population density	0.00020	0.00038	0.00018	0.00029	0.00010	0.00006	0.00007	0.00005
Density of economic activities	0.05709	0.06884	0.05642	0.06724	0.05619	0.06621	0.05575	0.06236
Per capita nominal income (€)	15,756	14,317	15,726	13,949	15,123	14,493	14,756	14,712
Proportion of self-employment and entrepreneurial incomes	0.06946	0.07998	0.06914	0.07483	0.06897	0.07284	0.06799	0.07283
Number of observations	378	1,586	360	582	230	175	69	54

Notes: Distance to the border is computed using the centroids of the municipalities and the Naïve distance, i.e., the perpendicular distance to the boundary.

Our spatial RDD retrieves the local average treatment effect (LATE) β of the increase in personal income tax on different types of taxpayers. To do so, we run the following equation:

$$\Delta y_{irb} = \alpha + f(geographic\ location_{ir}) + \beta D_r + X'_{irb}\gamma + \phi_b + \varepsilon_{irb}$$

where Δy_{irb} is the log change in the outcome variable between 2012 and each one of the years between 2013 and 2018 of the ith municipality in region r along segment b of the treatment boundary. D_r is the binary indicator variable for treatment which is unity in case of Lazio and zero else, X'_{irb} are pre-treatment covariates, ϕ_b is a set of boundary segment fixed effects,[4] ε_{irb} is the error term and $f(geographic\ location_{ir})$ is the RDD polynomial. In the specification of $f(\cdot)$ we use the two-dimensional RDD in latitude-longitude space proposed by Dell (2010).[5] We employ a 2nd order polynomial in latitude and longitude, which allows comparing observations very close to each other and absorbs all smooth variation in the outcome. Even if the balance test reported in Table 3 suggests the validity of the spatial RDD approach in our context, we use the log change in the outcome variable to make sure that our design remains valid also in a situation of pre-treatment imbalance in unobserved covariates. The standard errors have been obtained with the estimator proposed by Conley (1999) that correct for spatial dependence of unknown form. These standard errors are generally larger than those computed by adjusting for heteroskedasticity without taking into account the spatial dimension of the data.

By evaluating the impact of the personal income tax increase over a 6-year time window, we are able to retrieve the short-term as well as the medium-term taxpayers' response. Besides, as there was no change in the personal income tax rate in 2013, we test whether our identification strategy picks up any spurious relationship. Indeed, as each increase of the regional surcharge was made public a few days before the beginning of the tax year, we should expect no change in behavior from taxpayers in the year before the tax rate change.

4. Results

We begin this section with a descriptive table (Table 4) which shows the overall regional reported income for each taxpayer category for the period 2012-2018.

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[4] Each boundary segment dummy denotes which segment of the Lazio boundary is the closest to the municipalities' centroids.

[5] A potential alternative is to use the Euclidean distance to the boundary (i.e., the shortest distance to the boundary from each municipality centroids) as forcing variable. However, as shown by Keele and Titiunik (2015), using a one-dimensional distance metric can lead to bad matches.

Table 4 – Regional reported income for each taxpayer category

|		2012	2013	2014	2015	2016	2017	2018
Lazio	Employment	45,018	44,780	44,327	45,247	46,046	46,771	48,084
	Retirement	23,998	24,425	25,076	25,251	25,413	25,523	25,877
	Self-employment and entrepreneurship	6,532	6,421	6,423	6,314	6,118	5,917	6,228
Tuscany	Employment	26,939	27,024	26,967	27,706	28,196	28,909	29,791
	Retirement	16,895	17,201	17,450	17,541	17,637	17,731	17,975
	Self-employment and entrepreneurship	4,684	4,642	4,669	4,648	4,565	4,370	4,713
Umbria	Employment	5,839	5,799	5,748	5,883	5,967	6,116	6,315
	Retirement	3,974	4,050	4,089	4,114	4,140	4,159	4,229
	Self-employment and entrepreneurship	909	884	878	866	842	793	860
Marche	Employment	10,483	10,412	10,335	10,570	10,742	11,056	11,347
	Retirement	6,382	6,531	6,618	6,666	6,722	6,779	6,909
	Self-employment and entrepreneurship	1,799	1,755	1,768	1,743	1,684	1,607	1,740
Abruzzi	Employment	8,093	7,992	7,905	8,134	8,268	8,409	8,638
	Retirement	4,835	4,940	5,000	5,030	5,063	5,097	5,198
	Self-employment and entrepreneurship	1,285	1,246	1,256	1,224	1,190	1,098	1,188
Molise	Employment	1,668	1,627	1,582	1,630	1,651	1,679	1,723
	Retirement	1,133	1,156	1,168	1,176	1,183	1,185	1,206
	Self-employment and entrepreneurship	265	256	255	250	236	208	233
Campania	Employment	26,654	26,454	26,312	27,241	27,896	28,368	29,128
	Retirement	15,581	15,946	16,120	16,194	16,268	16,301	16,594
	Self-employment and entrepreneurship	4,090	4,035	4,088	4,025	3,878	3,496	3,824

Notes: This is nominal income and is expressed in millions of € There are 378 municipalities in Lazio, 274 in Tuscany, 92 in Umbria, 229 in Marche, 305 in Abruzzi, 136 in Molise and 550 in Campania.

This table shows that nominal income from employment and retirement steadily increased in all regions over the period 2012-2018. A different trend emerges for self-employment and entrepreneurship income, which is decreasing in all regions except Tuscany. Such a decrease appears particularly pronounced for Lazio. However, this descriptive evidence can be influenced by several confounding factors, such as the presence of large cities (e.g., Rome, Florence and Naples) in the sample or the occurrence of exogenous shocks such as disruptive natural disasters.[6] That is why, in

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[6] Between 24 August 2016 and 18 January 2017, several earthquakes caused deaths, injuries and major damages in a wide array of localities distributed across Lazio, Umbria, Marche and Abruzzi.

the following, we will use a counterfactual method to test taxpayers' response to the increase in the personal income surcharge tax rate.

Figure 2 – Spatial RDD estimates

Panel A – Employment

Panel B – Retirement

Panel C – Self-employment and entrepreneurship
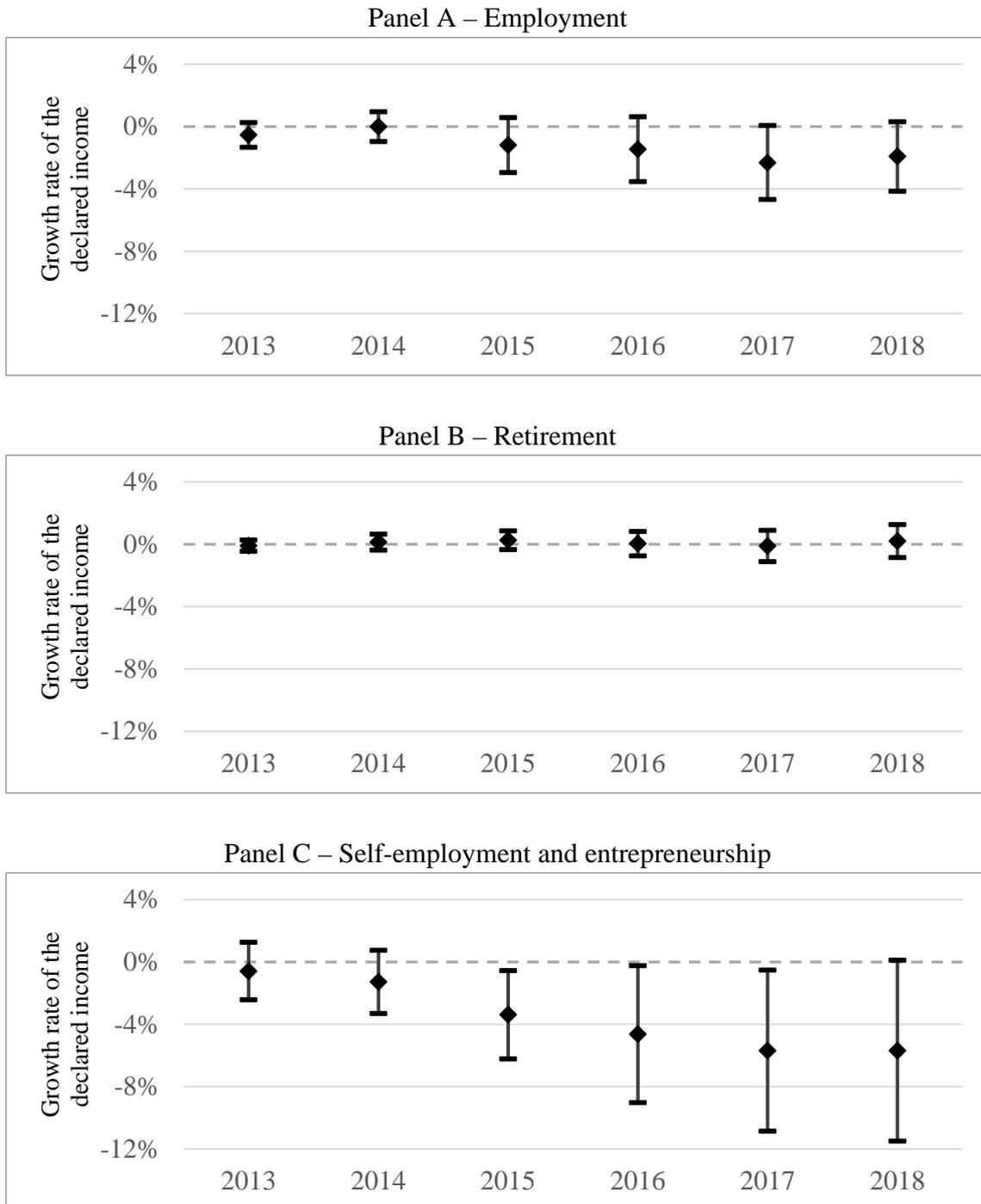
Notes: All specifications include border-segment fixed effects. 95% confidence intervals are computed by using Conley (1999) standard errors, which are robust to heteroscedasticity and spatial correlation in the error term.

Figure 2 graphically shows the spatial RDD estimated impact of the tax rate increase on employees' (Panel A), retirees' (Panel B) and self-employed and entrepreneurs' reported incomes (Panel C). The

estimates in Panel A show that employees reacted to the income tax increase by slowly reducing their reported incomes. The reduction of 2 percentage points in the per capita declared income in 2017 and 2018 is statistically significant at the 10% level. The estimates reported in Panel B shows, as expected, the absence of any reaction of retirees. On the contrary, when we isolate self-employment and entrepreneurial reported incomes, we detect a sizable and statistically significant decrease up to -5.7%. The estimates are statistically different from zero since 2015 at the 5 or 10% level.

We check the robustness of our findings in many ways and summarize the results of interest in Table 5. The robustness tests reported in rows (1) and (2) show that the use of different polynomials of the spatial RDD does not substantially affect the extent of the estimates. We note that the use of a 1st order RDD polynomial brings to smaller coefficients concerning the self-employment and entrepreneurship reported income, while the opposite holds when using the 3rd order polynomial. As the 1st order polynomial consists of the use of only the centroids, it might not absorb all smooth variations in the outcome. Moreover, in Row (3), we drop municipalities affected by the L'Aquila earthquake in 2009 and/or the Central Italy earthquake in 2016. Due to the disruption caused by these natural disasters, these municipalities might not represent a valid counterfactual to the treated municipalities of Lazio. However, we confirm the results reported in the primary analysis.

Then in order to take into account the small changes in the regional surcharge experienced by Umbria, Molise and Tuscany over the period under analysis, we drop municipalities located in Umbria, Molise and Tuscany in Rows (4), (5) and (6), respectively. Our main findings hold in all the specifications. Lastly, we drop the municipalities that increased or decreased the municipal surcharge in the period under analysis by at least 20% (Row 7). Even in this latter specification, our results are confirmed.

Table 5 – Robustness checks

		2013	2014	2015	2016	2017	2018
Main estimates	Employment	-0.54%	-0.02%	-1.19%	-1.46%	-2.32%*	-1.92%*
	Retirement	-0.10%	0.14%	0.26%	0.04%	-0.11%	0.20%
	Self-employment and entrepreneurship	-0.58%	-1.27%	-3.38%**	-4.63%**	-5.69%**	-5.69%*
(1) Use of 1st order RDD polynomial	Employment	-0.56%	-0.29%	-1.48%*	-1.25%	-2.07%*	-1.71%
	Retirement	-0.06%	0.23%	0.40%	0.14%	0.05%	0.36%
	Self-employment and entrepreneurship	-0.27%	-0.90%	-3.60%***	-4.48%**	-4.54%*	-3.59%
(2) Use of 3rd order RDD polynomial	Employment	-0.34%	-0.04%	-1.64%	-2.01%	-3.03%**	-2.51%*
	Retirement	0.00%	0.32%	0.47%	0.43%	0.35%	0.75%
	Self-employment and entrepreneurship	-0.05%	-1.75%	-3.87%**	-6.37%**	-7.34%**	-6.89%**
(3) Removal of municipalities hit by an earthquake in 2009 or 2016	Employment	-0.39%	0.15%	-0.83%	-1.13%	-2.04%*	-1.58%
	Retirement	-0.11%	0.32%	0.53%	0.24%	0.19%	0.59%
	Self-employment and entrepreneurship	-1.50%	-1.39%	-3.08%**	-4.17%*	-5.06%*	-6.65%**
(4) Removal of municipalities located in Umbria	Employment	-0.29%	0.23%	-0.70%	-0.69%	-1.41%	-1.10%
	Retirement	-0.12%	0.06%	0.17%	0.01%	-0.22%	0.11%
	Self-employment and entrepreneurship	-1.21%	-1.85%	-3.84%**	-6.33%**	-6.90%**	-6.90%*
(5) Removal of municipalities located in Molise	Employment	-0.50%	0.02%	-1.23%	-1.62%	-2.45%**	-2.28%**
	Retirement	-0.09%	0.16%	0.38%	0.22%	0.09%	0.44%
	Self-employment and entrepreneurship	-0.25%	-1.34%	-2.94%**	-4.14%*	-5.42%**	-5.15%*
(6) Removal of municipalities located in Tuscany	Employment	-0.73%	-0.25%	-1.58%	-1.96%	-2.67%*	-2.18%
	Retirement	0.00%	0.33%	0.54%	0.33%	0.16%	0.53%
	Self-employment and entrepreneurship	0.56%	-0.74%	-2.88%*	-4.08%*	-5.81%*	-6.41%*
(7) Removal of municipalities which substantially increased or decreased the municipal surcharge between 2012 and 2018	Employment	-0.67%	-0.22%	-1.22%	-1.66%*	-2.46%**	-2.15%**
	Retirement	-0.03%	0.22%	0.44%	0.17%	-0.04%	0.43%
	Self-employment and entrepreneurship	-0.76%	-2.05%*	-3.29%**	-3.73%*	-5.37%**	-5.57%*

Notes: All specifications include border-segment fixed effects. Standard errors are computed by using Conley (1999) standard errors, which are robust to heteroscedasticity and spatial correlation in the error term. Asterisks denote statistical significance at the 1% (***), 5% (**), and 10% (*) levels

5. Concluding remarks

This paper contributes to the empirical literature on the rate elasticity of taxable income exploiting a sudden increase in the regional surcharge on the income tax rate in Lazio. To the best of our knowledge, this is the only piece of empirical evidence on Italian municipal data, based on a sound counterfactual analysis, which allows us to capture the responses of heterogeneous taxpayers and their persistence through time. We have built a new yearly dataset (2012-2018) at municipal level containing the reported income of different categories of taxpayers and employ a spatial RDD to compare different types of taxpayers' responses to an increase of the marginal tax rate in Lazio's municipalities with those in the municipalities located in six neighboring regions. We find that a one percentage point increase in the income tax rate engendered a sizable and persistent decrease in self-employment and entrepreneurial incomes and a modest reduction in those of the employees and a sizable. The retirees do not exhibit any response. Our results are robust to several sensitivity analyses.

The paper suggests that, from the regional government perspective, the measure of increasing the income tax surcharge turned out successful as resulted in the expected increase of the tax revenues. This result is mainly due, in our opinion, to the circumstance that in 2015 self-employment and entrepreneurial incomes made up only 8.2% of the overall reported income. From an equity standpoint, however, such a measure further distorted and undermined the equitable nature of the Italian personal income tax, since the employees and the pensioners, whose incomes represent about 85% of the taxable personal income, have borne almost entirely the additional tax burden.

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