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Andrea Cerrato, Francesco Filippucci

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Abstract

Fiscal consolidation is often a necessity for local governments, but the cost of austerity for local economic activity is an open empirical question. Quasi-experimental estimates of local fiscal multipliers range between 1.5 and 1.8, but most of them are obtained from expansionary shocks. We study the extension of tighter budget rules in 2013 to Italian municipalities below 5,000 inhabitants, which generates a persistent increase of about 100 Euros per capita (0.5% of local income) in municipal net budget surplus, mostly driven by a cut in capital expenditures. We find no decrease in local income over a eight-year horizon. The estimated multiplier is always not significantly different from zero, and we can exclude it is above 1.5 with 95% confidence within 4 years from the shock. We find no evidence of spillovers to neighboring municipalities. These results suggest that the cost of fiscal consolidation can be lower than what currently prevailing estimates of local multipliers imply.

Keywords: fiscal consolidation, fiscal policy, budget deficit, local economy multiplier

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*University of California, Berkeley

†Paris School of Economics

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1 Introduction

Fiscal consolidation is often a necessity for central and local governments, but the impact of austerity policies on local economic activity is an open empirical question. Most estimates of local fiscal multipliers range between 1.5 and 1.8. Such estimates are usually obtained from expansionary shocks (e.g., increased military spending, countercyclical government spending shocks, etc.). However, it is reasonable to hypothesize that central and local governments endogenously seek to minimize their impact on the economy when implementing fiscal consolidation and to maximize it when implementing a fiscal expansion. Moreover, significant differences might be present between local fiscal multipliers generated by windfall spending vs. policies that maintain intertemporal budget balance. As a consequence, fiscal multipliers could be asymmetric in times of fiscal consolidation vs. fiscal expansion or in windfall vs. intertemporal budget balance scenarios. How do estimated multipliers from the imposition of contractionary fiscal rules compare to the ones previously estimated in the literature? How do local austerity policies impact local income and through which channels?

This paper seeks to answer these questions, studying the extension of a tight budget rule to Italian municipalities below 5,000 residents in 2013. Figure 1 compares mean municipal surplus per capita for treated municiaplities (i.e., with 2011 population between 1,000 and 5,000 inhabitants) and control municipalities (i.e., with 2011 population between 5,001 and 9,000 inhabitants). The red line indicates the year in which tight fiscal rules are extended to municipalities with less than 5,000 inhabitants. As the figure shows, the regulation permanently increases budget surplus per capita in treated municipalities, relative to the pre-shock period.

Figure 1: Per capita surplus and surplus net of central government transfers by municipality population

Notes. The graph reports budget surplus per-capita defined as fiscal, non-fiscal and capital revenues minus current and capital expenditures. The two series correspond to the average for municipalities having population between 1000 and 5000 and between 5001 and 9000 in 2011.

We provide three main results. First, treated municipalities comply to the newly introduced fiscal rule increasing municipal budget surplus by 100 Euros per capita (i.e., about 0.5% of municipal income). To reach this objective, treated municipalities mostly decrease municipal capital expenditures. Second, municipal fiscal consolidation has no impact on municipal income, over a eight-year horizon. The estimated local fiscal multiplier is always not significantly different from zero, and we can exclude it is above 1.5 with 95% , within 4 years from the shock. Finally, we find no evidence of spillovers to neighboring municipalities.

This paper relates to three main streams of literature. First, the literature on local fiscal multipliers. This literature has mostly focused on the impact of expansionary fiscal shocks, and has reached a wide consensus on estimates ranging between 1.5 and 1.8 for local fiscal multipliers (Chodorow-Reich, 2019). Such consensus is based on a number of studies that estimated the impact of the American Recovery and Reinvestment Act (i.e., ARRA) after the Great Recession exploiting heterogeneity of Federal spending across locations. A comprehensive list of these studies include Chodorow-Reich et al. (2012), Conley and Dupor (2013), Dube et al. (2018), Dupor and McCrory (2018), Dupor and Mehkari (2016), Feyrer and Sacerdote (2012), and Wilson (2012). Other studies exploiting non-ARRA induced geographical variation in spending find overall similar estimates. For instance, Nakamura and Steinsson (2014) exploit state-level variation in US military spending, estimating a local fiscal multiplier of 1.5. Other important contributions in this literature include Acconcia et al. (2014), Adelino et al. (2017), Corbi et al. (2019), Shoag (2013), Leduc and Wilson (2013), and Serrato and Wingender (2016). Our baseline 3-year-horizon point estimates for the local austerity multiplier range between -0.31 and 0.06, consistent to what Clemens and Miran (2012) find. The difference between our estimates and the ones prevailing in the literature can be rationalized by asymmetric optimization of government spending between contractions and expansions, as well as by the presence of "Ricardian" effects which differentiate persistent local budget shocks from transitory windfalls induced by central government fiscal policy. An important takeout from the literature on local fiscal multipliers is that researchers should be cautious when comparing estimates of the cross-sectional multiplier to estimates of the aggregate multiplier. Indeed, the presence of labor market or goods market spillovers across regions could make the local fiscal multiplier larger or smaller than its aggregate counterpart. This concern motivates our analysis of spatial spillover effects of austerity policies.

Second, the paper relates to the literature on local public finance shocks in Italy, exploiting discontinuities induced by changing fiscal rules. Our exercise is similar to Grembi et al. (2016), Coviello et al. (2017), and Daniele and Giommoni (2021). Grembi et al. (2016) study a relaxation of fiscal rules for Italian municipalities below 5,000 inhabitants, finding that treated municipalities run higher budget deficits and decrease taxes as a result of the shock. Coviello et al. (2017) exploit a tightening of the Domestic Stability Pact in Italy occurring in 2008, when only muncipalities with population above 5,000 inhabitants were subject to the Pact. They find that budget tightening resulted in lower infrastructure spending and unchanged current expenditures. They also find that affected firms in the upstream sector react to the negative demand shock by cutting capital rather than labor. Daniele and Giommoni (2021) use the same discontinuity we exploit to show that tightening municipal budgets results in lower capital expenditures, which in turn reduced corruption cases at the local level without significantly affecting local amenities. Our results are consistent with Daniele and Giommoni (2021) and document that tightening municipal budgets induce a different response than relaxing municipal budgets. We expand this literature providing an estimate of the dynamic effect of austerity policies on local income and testing spatial spillovers.

Finally, this paper relates to the literature on the impact of austerity policies. Alesina et al. (2019) provides an extensive review of this literature. One important caveat to keep in mind when relating our results to the ones in this literature is that we estimate an income multiplier, while macroeconomics literature usually estimates output multipliers. To the extent that fiscal consolidation induces a decrease in corporate profits, the income multiplier will be downward biased relative to the output multiplier. However, many papers exploiting cross-sectional variation to properly identify the parameter of interest use income or employment as proxies for value added (see Chodorow-Reich (2019)).

The reminder of the the paper is structured as follows. In the first part, we describe the institutional setting

in which our quasi-experimental study takes place. Specifically, we discuss the role of municipalities in Italy and the historical evolution of the fiscal rules to which Italian municipalities have been subject since 1999, including the discontinuity we exploit for our study. In the second part of the paper, we discuss the data sources and the identification strategy we use to estimate the parameter of interest. The extension of fiscal rules around the 5,000 residents population threshold makes a difference-in-discountinuity approach (Grembi et al. (2016)) appealing in our setting. Then, we present our main findings on the direct impact of austerity policies on the municipalities forced to implement them, as well as the spillover effects on neighboring municipalities. Finally, we conclude discussing the implications of our results.

2 Empirical Strategy

2.1 Institutional Setting

In Italy, municipalities are the lowest level of subnational government. There are roughly 8,000 municipalities, with a median population around 2,500 and mean around 7,400 in 2011. Each municipality is administered by an elected mayor, an executive body appointed by the major, and an elected council. The total amount of municipalities' budgets was around 75 billions in 2004 (5.2 % of GDP) and went down to 57 billions in 2018 (3.2 % of GDP). Municipalities use such budget to cover services of their responsibility, which include local administration, utilities and waste management, municipal roads and transportation, schools building, social housing and services, and small services for tourism and economic development. Revenues come in large part from own fiscal revenues (32%), i.e., property tax and a surcharge on the income tax, and from non-fiscal revenues (21%), such as fees from building permits, traffic fines, parking and utilities fees. The upper levels of administration – regions and the central state – contribute to the financing of municipalities by covering on average 37% of municipal revenues with current and capital transfers. Finally, municipalities are also allowed to borrow, as 10% of the budget on average is raised through loans (historically from the Italian Public Investment Fund, but increasingly also by private banks) or issuing bonds[1].

Since 1999, Italian municipalities were subject to the so-called Domestic Stability Pact (DSP), with the purpose of containing municipal budget deficits. In fact, European treaties considered local government deficits as part of general government ones, which are in turn subject to common limits at the European level. Hence, not only Italy but several European countries tried to regulate local administrations' deficits[2]. Yet, in Italy the need for a deficit reduction was particularly salient in the second half of 1990s – when the country struggled to comply with requirements of the European Monetary Union and the DSP was introduced – and after the crisis of Sovereign Debts, when the country debt-to-GDP ratio reached 135%. Beside debt reduction and compliance with European rules, the central government also aimed at preventing moral hazard from lower levels of government (Alesina and Tabellini, 1990). Bail-out or default of lower administrations is in fact not uncommon in Italy[3], and the risk is worsened by the low salience of municipal finances (Murtinu et al., 2021) or even by criminal infiltration (Acconcia et al., 2014).

[1]The remaining revenues are accounted by clearing entries and transactions on behalf of others such as retained social security contributions from employees.

[2]For example, similar mechanisms are in place in Germany, Spain, Austria and Belgium. In some countries the introduction of the rules is relatively recent, such as the *objectif d'évolution des dépenses locales (ODEDEL)* adopted in 2018 in France.

[3]For example, in the case of Rome (Law 122/2010), and recently during the Covid pandemic (Law Decree 73/2021). In 2013, the European Court for Human Rights has even imposed to the Italian state remarkable liability for credits of defaulted municipalities (De Luca vs. Italy, 2013).

The precise rules of the DSP varied over time, as summarized by Table 6 in the Appendix. Initially, between 1999 and 2004 included, the DSP targeted deficit growth, either imposing zero or minimal growth with respect to two years before. A notable exception are 2005 and 2006, in which a stricter joint threshold on current and capital expenditure was implemented, just to go back to the zero-growth in budget deficit in 2007[4]. Importantly, from 2011 onward, the DSP became more and more restrictive, requiring a structural zero-deficit level goal, to be pursued through a yearly budget deficit proportional to a moving average previous ones. Municipalities which did not comply with DSP were subject to mandatory measures, including a cap on the growth of current expenditures, ban on new hires and on borrowing to finance investment, a cut in administrators' bonus and wages, and a reduction of central government transfers. Crucially for our identification, while municipalities below 5000 inhabitants were exempted from the DSP since 2001, the DSP was extended to all municipalities above 1,000 inhabitants in 2013[5]. Finally, starting in 2016 the DSP was "abolished", although this meant that it was simply replaced by a zero-deficit requirement on an accrual basis.

2.2 Data, Sample Selection and Variables of Interest

We use two administrative sources. The first one are balance sheets from Italian municipalities collected by the Italian Ministry of Interior, which contain detailed information of all revenues and expenditures for Italian municipalities from 1998 to 2018. From the dataset, we extract the total capital and current revenues and expenditures on an accrual basis, the breakdown of revenues into fiscal vs. non-fiscal revenues, borrowing and transfers, and the breakdown of expenditures by functional destination. The format of the balance sheet used by Italian municipalities underwent a change in 2015, which modified the way some of our variables of interest are reported. We provide a correspondence between variables from the old and new format in Table 7 in the Appendix, and in Figure 4 we plot the average value for all our variables of interest across the 2015 discontinuity. No clear discontinuity appears in the relevant variables.

The second source are data on income tax declarations at the municipality level elaborated by the Italian Ministry of Finance. This source covers all income subject to the standard income tax in Italy declared yearly by individuals, hence it fails to cover individuals with only income from capital invested in firms with more than one employee, capital income from housing rents, or the informal sector. On average, income reported in income tax declarations corresponds to roughly half of Italian GDP. The information in the dataset includes the total number of declarations, total income declared, income tax due, income from different sources (labor, self-entrepreneur, rents, pensions) and from declarations belonging to different tax brackets.

Table 8 in the Appendix reports descriptive statistics of the dataset obtained by merging our sources. We split descriptives for the 2007-2012, which is our pre-shock period; for 2013-2015, i.e. three years after the shock; and for 2016-2018, i.e. after the format change in balance sheet data, including also 2019 and 2020 for income data. For balance sheet data, we report information on all municipalities for which it was possible to recover their fiscal code. In fact, the correct association of balance sheets to municipalities requires using correspondence tables between municipality balance sheet code and fiscal code, provided by the Italian ministry of interior, which fail to cover older municipalities and determines a substantial loss of

[4]Note that from 2008 to 2015, the deficit considered for assessing the respect of DSP rules started being calculated on a "Mixed basis", meaning that current revenues and expenditures were accounted for on an accrual basis while capital revenues and expenditure were accounted on a cash basis.

[5]Municipalities between 3000 and 5000 inhabitants were initially foreseen to be subject to the DSP in 2005 and 2006, but their inclusion was suspended and never reconsidered in mid 2005.

municipalities in earlier periods. Table 9 in the Appendix reports instead the same descriptive statistics, this time restricting the sample to the one we use for our analysis. This sample is the result of three restrictions. First, we drop municipalities that were not subject to the DSP, namely those from Valle d'Aosta and Bozen autonomous province[6]. Second, we drop municipalities that were merged, and restrict to municipalities with no missing information in either balance sheet or income data between 2007 and 2018, so as to obtain a balanced panel. Finally, we keep municipalities having a number of inhabitants between 2,000 and 8,000 in the 2011 census, which comprise all the municipalities in the different bandwidths around the threshold of 5,000 we are going to use.

Our main outcomes of interest are total income in the municipality and net surplus. We observe income in current Euros, including in the sample few observations reporting negative declared income (due to tax credits). We measure net surplus as the difference between fiscal and non-fiscal current revenues net of current transfers from other branches of government, plus capital and financial revenues net of capital transfers from other branches of government, minus current and capital expenditures. Transfers are netted out from revenues because these entries are not raised in the municipality, and thus do not constitute a direct loss of income or resources for taxpayers of the municipality. Before running regressions, we winsorize outliers in per-capita income and net surplus at the 1% level. All monetary values are also corrected for inflation and expressed in 2012 Euros.

2.3 Identification

To study the effect of budget restrictions on local economies, we use a difference-in-discontinuities approach identification strategy (Grembi et al., 2016). The DSP was in fact sharply applying to municipalities above 5,000 inhabitants between 2001 and 2012, and was then extended to municipalities with population between 1,000 and 5,000 inhabitants from 2013 onward. Our treatment group (resp. control group) is made of municipalities just below (resp. above) the 5,000 inhabitants cutoff. Treatment group municipalities are, before 2013, comparable in all fundamental characteristics to municipalities above the treshold but differ sharply in the DSP and its correlated aspects (Daniele and Giommoni, 2021). However, administrative rules on the composition and election of municipal councils vary around the 5,000 threshold (Gagliarducci and Nannicini, 2013), making the assumptions of a traditional RD design fail. Hence, we exploit the longitudinal shock provided by the extension of DSP to net-out these pre-differences and identify the effect of the DSP.

Formally, let individuals be indexed by i, being resident in municipality j, with net surplus $NET\_SUR_{j,t}$, population $POP_{j,t}$, and total number of declarations $n_{j,t}$. Our diff-in-disc first-stage and reduced-form

[6]The DSP applied to all 15 ordinary regions, plus Sicily and Sardinia (Daniele and Giommoni, 2021). Friuli and the autonomous province of Trento also enforced a version of the DSP extended to municipalities below 5,000 inhabitants in 2013.

regressions are as follows:

$$\begin{aligned}\frac{NET\_SUR_{j,t}}{POP_{j,2011}} =&\beta_{FS}\mathbb{1}(t>2012, POP_{j,2011}<5000)\\ &+\sum_{h\neq 0}[\pi^h POP_{j,t}\mathbb{1}(t=2012+h)+\delta^h POP_{j,t}\mathbb{1}(t=2012+h, POP_{j,2011}<t)]\\ &+\gamma_j+\tau_t+\varepsilon_{j,t} \qquad \text{(First stage)}\\ \frac{\sum_{i\in j}Y_{i,t}}{POP_{j,2011}} =&\beta_{RF}\mathbb{1}(t>2012, POP_{j,2011}<5000)\\ &+\sum_{h\neq 0}[\pi^h POP_{j,t}\mathbb{1}(t=2012+h)+\delta^h POP_{j,t}\mathbb{1}(t=2012+h, POP_{j,2011}<t)]\\ &+\gamma_j+\tau_t+\varepsilon_{j,t} \qquad \text{(Reduced form)}\end{aligned}$$

Where $Y_{i,t}$ is declared income for individual i at time t, γ_j and τ are municipality and year FEs respectively. We can also define a fully-dynamic specification in which $\beta_{...}\mathbb{1}(t\geq 2013, POP_{j,2011}<5000)$ is substituted by $\sum_{h\neq 0}[\beta^h_{...}\mathbb{1}(t=2012+h, POP_{j,2011}<5000)]$, which is the dynamic difference-in-discontinuity change in the outcome at an h years horizon with respect to the baseline year 2012.

Our difference-in-discontinuities approach is equivalent, in terms of point estimates, to a parametric RDD applied to long differences with respect to baseline, with polynomial fit of order one. Hence, we should be careful when choosing the relevant bandwidth on which we estimate our model around the threshold of 5,000 inhabitants Calonico et al. (2014). In Table 10 in the Appendix we report the optimal bandwidth values estimated following Calonico et al. (2020) on the RDD of long differences in per-capita surplus (equivalent to our static first stage) and income (equivalent to our static reduced form). The values for the reduced form vary between 1000 and 2500, according to different criteria for the estimator and bias-correction. To adapt this insight to our difference-in-discontinuities, we present our baseline local linear regression estimates for round values covering the whole range of optimal bandwidths, namely ±1000, ±1500, ±2000, and ±2500. We also cluster standard errors at the municipality level following Bertrand et al. (2004); Abadie et al. (2017), and account for this in choosing the optimal bandwidth.

The key assumption of our model is what we call the Common Trend in Discontinuities (CTD) assumption, i.e. that there is no pre-trend in the difference of outcomes of municipalities just above and below the 5,000 inhabitants discontinuity. Namely, $\forall t<2012$:

$$\begin{aligned}&\mathbb{E}\left(\frac{NET\_SUR_{j,t}(0)-NET\_SUR_{j,2012}(0)}{POP_{j,2011}}|POP_{j,2011}\in[5000-\epsilon,5000]\right)=\\ &=\mathbb{E}\left(\frac{NET\_SUR_{j,t}(0)-NET\_SUR_{j,2012}(0)}{POP_{j,2011}}|POP_{j,2011}[5000,5000+\epsilon]\right) \qquad \text{(CTD for first stage)}\\ &\mathbb{E}\left(\frac{\sum_{i\in j}Y_{i,t}(0)-\sum_{i\in j}Y_{i,2012}(0)}{POP_{j,2011}}|POP_{j,2011}\in[5000-\epsilon,5000]\right)=\\ &=\mathbb{E}\left(\frac{\sum_{i\in j}Y_{i,t}(0)-\sum_{i\in j}Y_{i,2012}(0)}{POP_{j,2011}}|POP_{j,2011}[5000,5000+\epsilon]\right) \qquad \text{(CTD for reduced form)}\end{aligned}$$

Where ϵ is arbitrarily small. Note that a threat to our CTD assumption requires not only a sharp change at the threshold of 5,000 inhabitants, for example mayor's salary (Gagliarducci and Nannicini, 2013), but also that these sharp discontinuities vary over time or have a significantly time-varying impact on our outcomes.

While no rules change regarding the 5,000 threshold occurs in the period of our analysis, we can test an implication of the CTD assumption, namely that $\hat{\beta^h_{FS}}$ and $\hat{\beta^h_{RF}}$ are not significantly different from zero for all years preceding the shock, when $d < 2012$.

Under CTD, the estimated coefficient $\hat{\beta^h_{FS}}$ is an estimator of the change in net surplus per-capita at an h-years horizon relative to the baseline year, 2012. In turn, the estimated coefficient $\hat{\beta^h_{RF}}$ is an estimator of the change in income per-capita with relative to 2012. By dividing the two estimators we obtain the multiplier at an h-years horizon of an extra euro of net fiscal deficit:

$$\frac{\hat{\beta^h_{RF}}}{\hat{\beta^h_{FS}}} = \frac{\mathbb{E}(NET\_SUR_{j,d} - \hat{} NET\_SUR_{j,2012})}{\mathbb{E}(Y_{j,d} - Y_{j,2012})} \tag{1}$$

3 Results

3.1 Budget Surplus and Local Income

Table 1 reports our difference-in-discontinuities estimates of the effect of DSP on per-capita surplus and local income. The upper panel reports the results considering the period up to 2015 included, i.e. excluding the period in which the new format of municipalities balance-sheets are introduced. The results point out a strong and significant effect of the extension of DSP on the net per-capita surplus run by municipalities below 5,000 inhabitants, which increases between €135 (1.1% of average income) and €65 (0.5% of average income) depending on the bandwidth used. In spite of this significant increase in municipalities' budget surplus, per-capita income declared do not react significantly. The estimated coefficients in columns 2, 4, 6, and 8 are either negative or slightly positive, but all not significantly different from zero. Consequently, the estimated multiplier is small and not significantly different from zero. Furthermore, standard errors indicate that we can exclude at 95% confidence that the multiplier is 1.5 or larger.

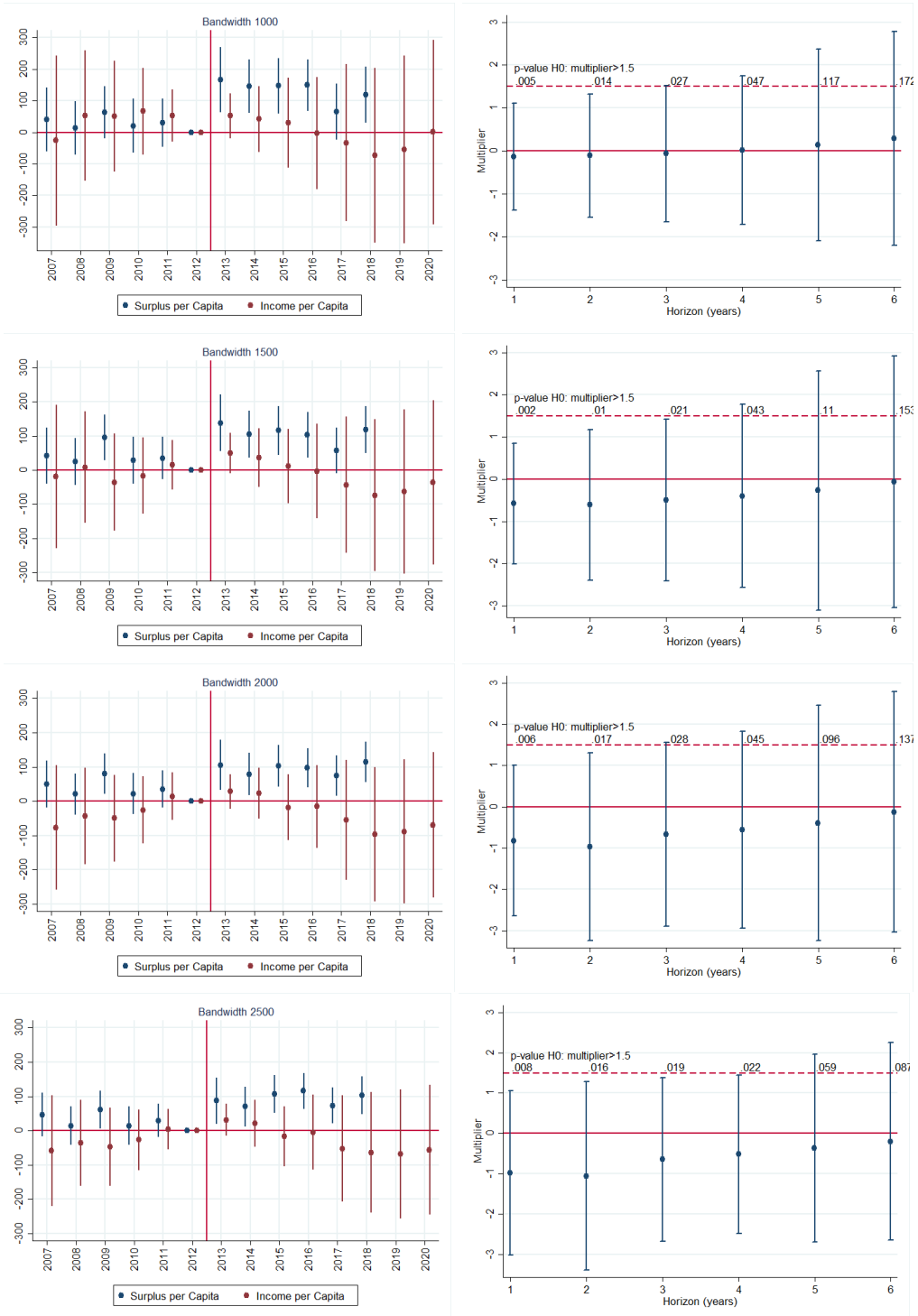
Table 1: Effect of DSP on Per-Capita Surplus and Local Income

VARIABLES	(1) Surplus pC	(2) Income pC	(3) Surplus pC	(4) Income pC	(5) Surplus pC	(6) Income pC	(7) Surplus pC	(8) Income pC
DSP	128.9***	-7.403	83.06***	11.50	62.02***	17.67	60.71***	19.26
	(29.42)	(97.23)	(23.83)	(79.35)	(20.68)	(68.46)	(19.87)	(61.46)
Observations	5,580	5,580	8,433	8,433	11,574	11,574	15,093	15,093
R-squared	0.513	0.983	0.500	0.983	0.506	0.982	0.500	0.982
Years	2007-2015	2007-2015	2007-2015	2007-2015	2007-2015	2007-2015	2007-2015	2007-2015
Bandwidth	1000	1000	1500	1500	2000	2000	2500	2500
Mean in 2012	-276.3	12664	-278.7	12650	-284.7	12640	-300	12584
Multiplier		.057		-.138		-.284		-.317
		[.757]		[.949]		[1.08]		[.998]
VARIABLES	(1) Surplus pC	(2) Income pC	(3) Surplus pC	(4) Income pC	(5) Surplus pC	(6) Income pC	(7) Surplus pC	(8) Income pC
DSP	104.0***	-30.58	68.99***	4.140	61.36***	7.737	65.07***	12.92
	(24.03)	(131.0)	(19.14)	(105.1)	(16.37)	(91.37)	(15.61)	(81.70)
Observations	7,440	7,440	11,244	11,244	15,432	15,432	20,124	20,124
R-squared	0.538	0.975	0.529	0.975	0.531	0.974	0.523	0.974
Years	2007-2018	2007-2018	2007-2018	2007-2018	2007-2018	2007-2018	2007-2018	2007-2018
Bandwidth	1000	1000	1500	1500	2000	2000	2500	2500
Mean in 2012	-275.4	12677	-278.3	12663	-284.3	12654	-299.5	12599
Multiplier		.294		-.06		-.126		-.198
		[1.27]		[1.52]		[1.48]		[1.25]

Notes. The Table reports difference-in-discontinuities estimates of the effect of the extension of the Domestic Stability Pact to Italian Municipalities between 1,000 and 5,000 inhabitants, from 2013 onward on their net per-capita surplus and income. All regressions include FEs for municipality and year, as well as controls for the interaction between the difference between population and the 5000 threshold and years FEs; and an interaction between the difference between population and the 5000 threshold, years FEs, and the dummy for treatment group. Standard errors are clustered at the municipality level. The multiplier estimate and its standard errors in the last row are calculated with an IV regression of per-capita income on net surplus, instrumented by the DSP dummy.

The lower panel of Table 1 reports estimates for the full sample, including the last three years, using our correspondance between balance-sheet items before and after 2015. The results are similar, although the reduced-form on income is noisier due to the auto-regressive nature of per-capita income, which makes long-difference estimators noisier at longer horizons. A more complete picture is provided by Figure 2, which reports the results of the fully dynamic specification. The left column reports the estimated coefficients for fully dynamic first stage and reduced form. The series on the effect on surplus per-capita provide striking evidence of how, after a five-year parallel trend, a sharp and permanent increase in surplus per-capita occurs. Conversely, income remains unaffected, except for a small insignificant dip 5-7 years after the fiscal contraction. In the right column, we compute the implied multipliers at different horizons after the shock, which are consistently around zero, although the estimate becomes noisier, as the estimated effect on income per-capita becomes noisier at longer horizons.

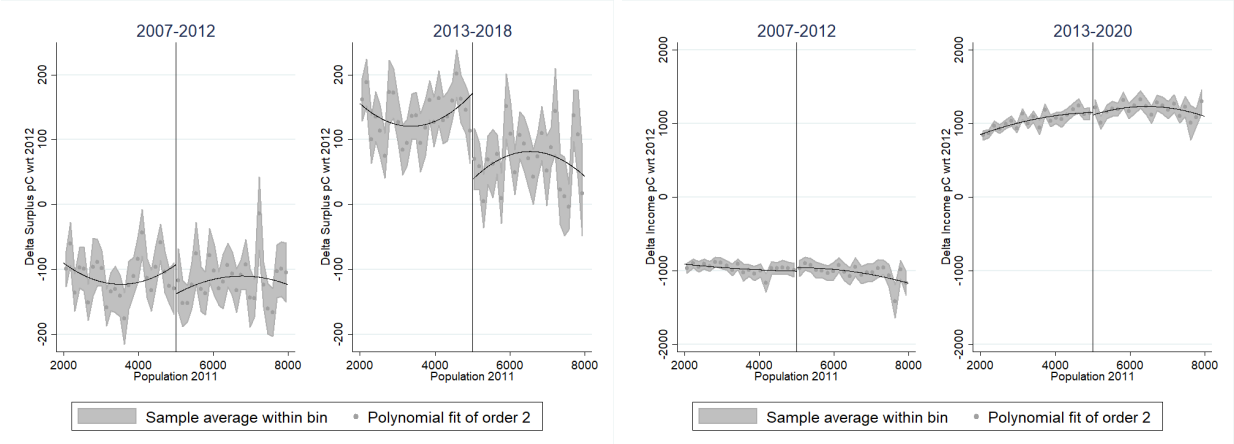
Figure 2: Dynamic Effect of DSP on Per-Capita Surplus and Local Income



Notes. The figures report difference-in-discontinuities estimates of the effect of the extension of the Domestic Stability Pact to Italian Municipalities below 5,000 inhabitants from 2013. All regressions include FEs for municipality and year, as well as controls for the interaction between the difference between population and the 5000 threshold and years FEs; and an interaction between the difference between population and the 5000 threshold, years FEs, and the dummy for treatment group. Standard errors are clustered at the municipality level. The multiplier estimate and its standard errors on the right are calculated with an IV regression of per-capita income on net surplus, instrumented by the DSP dummy, keeping observations only up to a specific horizon after the shock. The p-value in the right figures refer to a one-sided test for the multiplier being below 1.5.

An alternative empirical approach is to calculate, for each municipality, a set of long differences on the relevant outcomes with respect to 2012, for the years before the extension of DSP in 2013 and afterwards, and plot them against the municipality's population in 2011 census. In fact, our difference-in-discontinuities can be seen as regression discontinuity in the long differences with respect to the baseline year. This allows us to visualize potential non-linearities around the discontinuity. Figure 3 reports this result in binned scatter plots, with 95% confidence intervals for each population bin. While in 2007-2013 there is no significant difference in the change in per-capita net surplus for between municipalities just below/above the 5,000 threshold, municipalities below the threshold clearly increase their surplus more in the 2013-2018 period. The fit for budget surplus it's noisy but quite linear, if any with a mild quadratic shape, changing from convex below to concave above the threshold. This suggests out that the parametric specification in Table 1 is appropriate and conservative. Despite the clear differential in fiscal contraction, no significant difference around the threshold emerges in the evolution of per-capita income.

Figure 3: Regression Discontinuity in Long Differences



Notes. The Figure reports Robust Regression Discontinuity plots following Calonico et al. (2020) with as dependent variable the evolution of net per-capits surplus (resp. per-capita income) with respect to 2012 in each municipality. Quadratic trends and pre-determined 50 bins are imposed. Confidence intervals are at the 95% confidence level and clustered at municipality level.

3.2 Mechanisms

We then explore the mechanisms behind the insignificant effect of the fiscal contraction in municipalities below 5,000 inhabitants. First, we focus on the composition of the shock, i.e. the effect of DSP on different balance sheet changes underlying the increase in per-capita net surplus. Table 2 reports the results of our first stage regression using as outcome the different components of per-capita net surplus. Column 1-2 evaluate the change of per-capita net current and capital surplus. It appears that the fiscal consolidation is totally accounted for by an increse in the capital surplus. The result is confirmed by columns 3-6, which report the breakdown by total current per-capita revenues and expenditures, and total capital per-capita revenues and expenditures. The estimates on revenues are insignificant and close to zero, while the one on expenditures are all negative, and the one of capital expenditures is large and extremely significant. A final piece of corroborating evidence is reported in Column 7, where we use as outcome the total borrowing by the municipality. The coefficient is negative, significant, and of a magnitude corresponding to 5/6th of the

increase in per-capita surplus. Moreover, the dynamic specification in Figure 6 in the Appendix highlights that the reduction in per-capita borrowing is very stable, similarly to the increase in surplus. This suggests that the shock to surplus we observe after 2013 corresponds to an actual reduction of municipality borrowing.

Table 2: Composition of the shock of DSP extension

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
VARIABLES	Curr. Surpl. pC	Cap. Surpl. pC	Cur. Rev. pC	Cur. Exp. pC	Cap. Rev. pC	Cap. Exp. pC	Borrow. pC
DSP	3.231	55.69***	2.728	-4.503	-1.816	-59.08***	-48.15**
	(12.30)	(16.05)	(16.07)	(11.05)	(6.242)	(17.50)	(19.07)
Observations	11,574	11,574	11,574	11,574	11,574	11,574	11,574
R-squared	0.582	0.407	0.851	0.920	0.400	0.416	0.579
Years	2007-2015	2007-2015	2007-2015	2007-2015	2007-2015	2007-2015	2007-2015
Bandwidth	2000	2000	2000	2000	2000	2000	2000

Notes. The Table reports difference-in-discontinuities estimates of the effect of the extension of the Domestic Stability Pact to Italian Municipalities between 1,000 and 5,000 inhabitants, from 2013 onward on their net per-capita surplus and income. All regressions include FEs for municipality and year, as well as controls for the interaction between the difference between population and the 5000 threshold and years FEs; and an interaction between the difference between population and the 5000 threshold, years FEs, and the dummy for treatment group. Standard errors are clustered at the municipality level.

Thanks to the detailed information contained on our dataset, in Table 3 we can further breakdown by destination of municipalities' expenditures, using the thematic groups contained in the municipalities balance sheet. These groups are defined based on standardized criteria fixed by the central government for accountability purposes. The table reveals that the cut in expenditures is concentrated in the Administration and in the Roads and Transportation expenditure voices, each one being significantly cut by roughly 40%, i.e. 20 Euros per capita. Other items report a decrease in expeditures which is large but not statistically significant: School, Sport and Social Services are all cut by roughly 8-9 Euros per capita. In all these sectors, municipalities are in charge of the maintenance of buildings and accessory infrastructure (utilities, school bus), and in the case of schools this consists in a reduction of roughly one third of municipalities' investment in schools.

Table 3: Composition of the change in expenditures

	(1) Cur. Exp. pC	(2) Log Cur. Exp.	(3) Cap. Exp. pC	(4) Log Cap. Exp.
Administration	0.156	0.005	-19.162**	-0.369***
	(6.935)	(0.016)	(7.828)	(0.134)
Culture	-0.739	-0.035	-2.251	-0.120
	(0.728)	(0.061)	(2.859)	(0.300)
Justice	-0.132	-0.214	-0.164	-0.883
	(0.108)	(0.187)	(0.358)	(0.615)
School	0.348	-0.017	-7.400	-0.290
	(1.494)	(0.026)	(5.694)	(0.187)
Police	-1.844	-0.084	-0.228	-0.488*
	(1.160)	(0.051)	(0.309)	(0.293)
Utilities	-1.679	0.284	-2.783	1.111
	(2.201)	(0.237)	(4.316)	(0.726)
Social services	-7.417	-0.067*	-8.846	0.166
	(6.465)	(0.040)	(10.603)	(0.192)
Sport	-0.090	0.021	-9.809***	-0.284
	(0.706)	(0.051)	(3.256)	(0.213)
Economic Development	0.341	-0.015	1.568	0.011
	(0.448)	(0.116)	(2.254)	(0.563)
Environment	-0.766	-0.076	-3.795	-0.102
	(6.945)	(0.068)	(12.135)	(0.140)
Tourism	-1.620*	0.096	-1.510	-0.487
	(0.889)	(0.130)	(2.508)	(0.455)
Roads and Transp.	0.868	0.031	-20.219***	-0.360***
	(2.190)	(0.024)	(6.660)	(0.130)

Notes. The Table reports difference-in-discontinuities estimates of the effect of the extension of the Domestic Stability Pact to Italian Municipalities between 1,000 and 5,000 inhabitants, from 2013 onward on their net per-capita surplus and income. All regressions include FEs for municipality and year, as well as controls for the interaction between the difference between population and the 5000 threshold and years FEs; and an interaction between the difference between population and the 5000 threshold, years FEs, and the dummy for treatment group. Standard errors are clustered at the municipality level. The years considered are 2007-2013.

Turning to the composition of the reduced form effect of DSP extension, Table 4 suggests that the negative sign of the insignificant effect on total income is driven by a negative effect on labor income, still insignificant. No effect is also observed on distribution of income as captured by the number of income declarations per capita with total income in three brackets: "low" (≤€15,000), "middle" (€15,000-€26,000), and "high" (>€26,000). Finally, Figures 5 and 7 in the appendix report the estimated of first stage and reduced form composition from the fully dynamic specification. The graphs highlight that the CTD assumption is not violated even in every single breakdown of balance sheet and income item considered.

Table 4: Composition of the reduced form effect of DSP extension

VARIABLES	(1) Income per decl.	(2) Declar. pC	(3) Labor Inc. pC	(4) Pension Inc. pC	(5) Capital Inc. pC	(6) Freq. Low Inc.	(7) Freq. Mid Inc.	(8) Freq. High Inc.
DSP	12.04	-0.00238	-29.30	19.12	11.80	-0.00343	0.00159	-0.000749
	(89.21)	(0.00355)	(65.56)	(26.39)	(13.02)	(0.00256)	(0.00157)	(0.00180)
Observations	18,004	18,004	16,718	16,718	16,718	18,004	18,004	18,004
R-squared	0.982	0.884	0.969	0.978	0.962	0.958	0.973	0.970
Years	2007-2020	2007-2020	2008-2020	2008-2020	2008-2020	2007-2020	2007-2020	2007-2020
Bandwidth	2000	2000	2000	2000	2000	2000	2000	2000
Mean in 2012	18039	0.697	6840	3713	875.1	0.334	0.231	0.130

Notes. The Table reports difference-in-discontinuities estimates of the effect of the extension of the Domestic Stability Pact to Italian Municipalities between 1,000 and 5,000 inhabitants, from 2013 onward on their net per-capita surplus and income. All regressions include FEs for municipality and year, as well as controls for the interaction between the difference between population and the 5000 threshold and years FEs; and an interaction between the difference between population and the 5000 threshold, years FEs, and the dummy for treatment group. Standard errors are clustered at the municipality level.

3.3 Spillovers

A potential explanation of the insignificant effect on income we find, alternative to the one of a local economy multiplier close to zero, is that while the increase in budget surplus is associated to a specific municipality, its effect on income is simply spread over neighboring municipalities. Hence, in this section we investigate the presence of significant spillovers of the DSP extension to neighboring municipalities. To do so, our main strategy consists in focusing only on control group municipalities, having between 5,000 and 10,000 inhabitants, and evaluating the effect of having neighboring municipalities becoming subject to the DSP rule. Specifically, we first define rings around municipalities of all other municipalities reachable in 15 minutes by car, according to the 2011 census, which we call "neighboring" municipalities. Second, we calculate the share of population in neighboring municipalities which becomes subject to the DSP in 2012 (i.e. that belongs to our baseline treatment group). Then, our first stage consists in a regression of the average surplus per capita in neighboring municipalities on the share of population in neighboring municipalities which becomes subject to the DSP in 2012. Accordingly, our reduced form is a regression of the income per capita in municipalities at the center of the ring on the share of population in neighboring municipalities adopting DSP in 2012.

Yet, neighboring municipalities can be very far from our identifying discontinuity at 5,000 inhabitants, as they can be part of very big or small cities. We thus restrict our sample to those rings which are made only of municipalities close to our identifying threshold, i.e. in the ±2500 bandwidth around 5,000 inhabitants. These municipalities, reported in the left panel of Figure 8 in the Appendix, are forcefully few (only 38). As an alternative, we define as "tolerance" the share of population in the ring of neighboring municipalities belonging to municipalities out of the ±2500 bandwidth around 5,000 inhabitants. We then enlarge our sample by increasing the tolerance from 0 (only municipalities within the ±2500 bandwidth) to 50%, including those municipalities surrounded by rings in which at most half of the population resident in municipalities in the ±2500 bandwidth, as in the right panel of Figure 8 in the Appendix.

Table 5 reports the results. The estimates in Columns 1 and 2 consider only rings of neighboring municipalities fully made by municipalities in the bandwidth, and are extremely noisy suggest that although our strategy seems to work, with a positive and significant first stage, the reduced form is extremely noisy. By

increasing the tolerance of our selection and including rings that report at most 50% of population from municipalities outside the ±2500 bandwidth, the reduced form becomes more precise and not significantly different from zero. The implied multiplier is very similar to the one of our baseline estimates in Table 1, confirming that the fiscal contraction following DSP extension seems not to have a significant effect on income, even when considering municipalities neighboring treated ones. This evidence suggests that including spillovers would not push the multiplier significantly higher.

Table 5: Spillovers of DSP

	(1)	(2)	(3)	(4)
VARIABLES	Surplus pC in Neighb. Municip.	Income pC	Surplus pC in Neighb. Municip.	Income pC
%Pop. under DSP Neighb. M.	261.1***	448.4	259.6***	-0.971
	(88.00)	(294.6)	(42.87)	(159.0)
Observations	456	456	3,264	3,264
R-squared	0.576	0.983	0.558	0.981
Years	2007-2018	2007-2018	2007-2018	2007-2018
Bandwidth	2500	2500	2500	2500
Tolerance outside BW	Zero	Zero	50 %	50 %
Mean in 2012	-227.3	11002	-224.1	11828
Multiplier		-1.717		.003
		[1.16]		[.612]

Notes. The Table reports difference-in-difference estimates of the effect of the extension of the Domestic Stability Pact to neighboring municipalities. All regressions include FEs for municipality and year. Columns 1 and 2 include only municipalities in the ± 2500 bandwidth with respect to 5000, while Columns 3 and 4 allow a percentage of population to be from municipalities outside the bandwidth, namely up to 60% from municipalities above the bandwidth or 3% from municipalities from below (which are the mean % of population from municipalities above and below the bandwidth). Standard errors are clustered at the municipality level.

As an alternative, we can instead focus on the whole sample, and see if the effect of DSP is larger for those municipalities neighbouring treated ones. We run such heterogeneity of our baseline reduced form in Table 11 in the Appendix, but the estimates are extremely noisy.

4 Conclusions

In this paper, we study the impact of fiscal consolidation implemented by municipal governments on local income. To do so, we exploit the extension of tight fiscal rules to municipalities below 5,000 inhabitants enacted in Italy, in 2013. We implement a difference-in-discountinuity approach to isolate the effect of budget tightening on local income, thus controlling for confounders correlated to the running variable in our setting (i.e., population). We find that tighter budget rule result in presistently higher surplus per capita net of government transfers (i.e., 100 Euros per capita, 0.5% of local income), mostly driven by cuts in capital expenditures. Such cuts are concentrated in administrative functions and local infrastructures. We estimate a null effect of austerity policies on local income, with an estimated multiplier never significantly different from zero and lower than 1.5 with 95% confidence over a 4-year horizon. We also test for the presence of spatial spillovers in neighbor municipalities, finding similar results. Our findings indicated that the local fiscal multiplier estimated from local fiscal consolidation is lower than the estimates prevailing in

the literature on local fiscal multipliers. Such differences may be induced by a variety of factors.

First, local governments behave differently when they are forced to consolidate the budget relative to when they are allowed to relax it. Grembi et al. (2016) document that relaxing local budgets results in higher deficits and lower taxes, while we find that budget tightening results in lower deficits driven by cuts in capital expenditures. This asymmetry could be driven by economic motives (if lowering taxes is more expansionary than capital spending) or by strategic motives (if taxes are more electorally salient than capital expenditures). We find this question very relevant and potentially interesting for future reasearch.

Second, differently from most studies in the literature, our shock is not a windfall from the central government, but rather a budgetary shock, which may induce local Ricardian effects. If lower expenditures today result in lower taxes tomorrow, the negative impact of a permanent decrease in expenditures can at least partially be counterbalanced by higher private spending, thus compressing the multiplier. Our results do not exclude other types of adverse effects for the local population, such as lower amenities, although Daniele and Giommoni (2021) exclude a negative effect of budget tightening on publicly provided goods and services. Overall, our results indicate that government-imposed and effectively enforced fiscal consolidation of local governments may be a viable tool to reduce fiscal deficit at the national level and increase debt sustainability without harming the real economy in the short to medium run.

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A Additional Tables and Figures

Table 6: Evolution of the rules of Domestic Stability pact for Italian municipalities

Year	Target	Deficit rule	Accounting criteria	Others
1999	All municipalities	Zero growth	Cash	Initial sanctions: cut in transfers, ban on hires, cut on non-absenteeism bonuses
2000	All municipalities	Zero growth	Cash	
2001	>5,000	Max 3% growth	Cash	
2002	>5,000	Max 2.5% growth	Cash	Limit to current exp.
2003	>5,000	Zero growth	Cash+Accrual	
2004	>5,000	Zero growth	Cash+Accrual	
2005	>5,000		Cash+Accrual	Cur.+cap. exp. cannot grow more than pers. threshold (up to 10%)
2006	>5,000		Cash+Accrual	Current must be reduced, capital can grow within peronalized threshold
2007	>5,000	Zero growth	Cash+Accrual	
2008	>5,000	Zero growth	"Mixed"	
2009	>5,000	Personalized reduction goal (*)	"Mixed"	Additional sanctions: limits to borrowing, limits to current exp., larger cut to transfers and administrators' wages.
2010	>5,000	Pers. red. goal (*)	"Mixed"	
2011	>5,000	Zero-deficit	"Mixed"	
2012	>5,000	Zero-deficit	"Mixed"	Cut to transfers to municipalities >5,000
2013	>1,000	Zero-deficit	"Mixed"	
2014	>1,000	Zero-deficit	"Mixed"	
2015	>1,000	Zero-deficit	"Mixed"	
2016	All municipalities	Zero-deficit	Accrual	
2017	All municipalities	Zero-deficit	Accrual	
2018	All municipalities	Zero-deficit	Accrual	
2019	All municipalities	Zero-deficit	Accrual	

(*) Specifically, according to art.77 of L. 203/2008, municipalities are required to improve the 2007 balance, calculated on a "mixed" basis, a) If the municipality fulfilled the DSP and reported a deficit in 2007, 48% in 2009, 97% in 2010 and 165% for 2011; b) If the municipality fulfilled the DSP and reported a surplus in 2007, 10% in 2009, 10% in 2010 and 0% for 2011; c) If the municipality did not fulfill the DSP and reported a deficit in 2007, 70% in 2009, 110% in 2010 and 180% for 2011; and d) If the municipality did not fulfill the DSP and reported a surplus in 2007, 0% in 2009, 0% in 2010 and 0% for 2011. Requirments for 2011 were then modified by art.1 of L.220/2010.

Table 7: Balance sheet items from pre-2015 model (CCOU) and post-2015 model (CCOX)

Item	quadro CCOU	voce CCOU	colonna CCOU			quadro CCOX	voce CCOX	colonna CCOX		
			Accrual	Cash	Residual			Accrual	Cash	Residual
Fiscal revenues	2	80	1	2	3	3	40	8	7	2
Non-fiscal revenues	2	310	1	2	3	3	60	8	7	2
Capital revenues	2	395	1	2	3	3	70+80	8	7	2
Capital transfers from state	2	345	1	2	3			8	7	2
Capital transfers from regions	2	350	1	2	3	2	230+240	8	7	2
Capital transfers from other PA	2	355+360	1	2	3			8	7	2
Fiscal federalism revenues	2	67	1	2	3			8	7	2
Borrowing	2	420	1	2	3	3	90+100	8	7	2
Entries for third-party services	2	425	1	2	3	3	110	8	7	2
Total entries	2	430	1	2	3	3	130	8	7	2
Current expenditures	3	5	1	2	3	5	20	8	7	2
Capital expenditures	3	10	1	2	3	5	30	8	7	2
Loans repayment	3	15	1	2	3	5	50	8	7	2
Expenses for third-party services	3	45	1	2	3	5	70	8	7	2
Total expenses	3	50	1	2	3	5	90	8	7	2

Notes. The Table reports the correspondance between the voices from the *Rendiconti di Bilancio* used, from the pre-2015 format (CCOU) and post-2016 (CCOX).

Table 8: Descriptives, all dataset

	Mean	Sum	St.dev.	p10	p90	n
Period: 2007-2012						
Total budget	10,951	84,648,438	100,064	883	16,192	7,727
Fiscal revenues	3,322	25,594,384	25,768	169	5,490	7,727
Non-fiscal revenues	1,589	12,274,679	19,114	79	2,367	7,727
Revenues from capital transfers	2,032	15,743,330	31,624	84	2,999	7,727
Current expenditures	6,650	51,360,117	57,303	498	10,009	7,727
Capital expenditures	2,468	19,121,311	35,602	128	3,631	7,727
Total income declared	97,478,776	788,898,250,456	718,432,384	5,098,806	169,450,784	8,093
Labor income declared	51,525,562	416,918,271,815	375,114,298	2,455,260	93,827,240	8,092
Self-entrepreneurship income decl.	5,238,549	37,562,973,198	51,465,356	243,776	7,759,032	7,119
Capital income decl.	8,806,687	69,542,581,359	66,958,468	306,006	16,028,587	7,895
Freq. income 0-15,000	2,437	19,722,779	11,609	199	4,607	8,093
Freq. income 15,000-26,000	1,557	12,603,068	7,996	96	3,010	8,093
Freq. income > 26,000	1,057	8,550,627	8,871	37	1,770	8,093
Period: 2013-2015						
Total budget	11,822	90,906,228	104,032	841	17,369	7,690
Fiscal revenues	5,286	40,639,059	41,247	313	8,679	7,690
Non-fiscal revenues	1,665	12,800,792	21,936	79	2,441	7,690
Revenues from capital transfers	1,484	11,411,053	13,761	39	2,605	7,690
Current expenditures	7,056	54,257,627	68,998	500	10,842	7,690
Capital expenditures	1,726	13,273,888	16,147	55	2,955	7,690
Total income declared	102,013,032	817,859,931,229	748,240,320	5,164,882	179,283,536	8,018
Labor income declared	52,817,757	423,448,564,035	381,864,282	2,422,111	97,414,295	8,018
Self-entrepreneurship income decl.	8,868,396	65,073,767,021	68,182,576	514,083	14,906,539	7,338
Capital income decl.	7,860,670	61,767,158,815	59,140,644	275,023	14,428,147	7,858
Freq. income 0-15,000	2,248	18,021,255	11,117	172	4,266	8,018
Freq. income 15,000-26,000	1,529	12,261,596	7,591	97	3,008	8,018
Freq. income > 26,000	1,214	9,736,150	9,629	44	2,106	8,018
Period: 2016-2020						
Total budget	12,571	95,325,433	125,481	815	17,730	7,578
Fiscal revenues	4,990	37,804,407	41,966	293	7,996	7,578
Non-fiscal revenues	1,726	13,074,970	21,240	78	2,534	7,578
Revenues from capital transfers	1,225	5,563,300	10,314	36	2,121	4,547
Current expenditures	6,894	52,234,599	64,714	478	10,498	7,578
Capital expenditures	1,331	10,084,820	8,261	64	2,417	7,578
Total income declared	108,628,048	860,308,150,711	787,173,888	5,338,096	193,217,408	7,920
Labor income declared	57,564,814	455,891,261,262	411,181,109	2,564,747	107,659,706	7,920
Self-entrepreneurship income decl.	8,513,222	58,500,440,412	65,862,340	470,008	14,120,236	6,859
Capital income decl.	7,628,294	59,080,784,756	58,540,152	257,074	14,141,537	7,745
Freq. income 0-15,000	2,195	17,386,592	11,112	160	4,152	7,920
Freq. income 15,000-26,000	1,535	12,156,785	7,240	97	3,073	7,920
Freq. income > 26,000	1,354	10,722,296	10,257	50	2,393	7,920

Notes. The table reports descriptive statistics of the entire dataset after merging income data and municipalities' balance sheets. Monetary values are in current euros.

Table 9: Descriptives, selected sample

	Mean	Sum	St.dev.	p10	p90	n
Period: 2007-2012						
Total budget	4,765	10,183,637	2,873	2,274	7,908	2,137
Fiscal revenues	1,628	3,478,210	1,002	766	2,686	2,137
Non-fiscal revenues	706	1,508,865	822	213	1,309	2,137
Revenues from capital transfers	901	1,925,305	1,391	158	1,880	2,137
Current expenditures	2,843	6,075,332	1,521	1,443	4,536	2,137
Capital expenditures	1,169	2,498,643	1,505	248	2,368	2,137
Total income declared	51,747,128	110,583,609,837	25,455,420	24,874,174	90,343,120	2,137
Labor income declared	27,900,349	59,623,045,052	14,404,516	12,626,165	49,714,625	2,137
Self-entrepreneurship income decl.	1,986,124	4,243,496,096	1,522,346	717,191	3,619,964	2,136
Capital income decl.	4,524,118	9,668,040,229	3,118,746	1,306,004	8,647,261	2,137
Freq. income 0-15,000	1,470	3,140,468	619	789	2,357	2,137
Freq. income 15,000-26,000	960	2,051,361	472	444	1,683	2,137
Freq. income > 26,000	503	1,075,380	295	197	942	2,137
Period: 2013-2015						
Total budget	4,890	10,450,384	3,341	2,095	8,503	2,137
Fiscal revenues	2,480	5,299,123	1,646	1,158	4,165	2,137
Non-fiscal revenues	703	1,502,354	769	212	1,312	2,137
Revenues from capital transfers	778	1,663,322	1,510	82	1,684	2,137
Current expenditures	2,942	6,286,324	1,761	1,453	4,750	2,137
Capital expenditures	861	1,840,097	1,596	90	1,918	2,137
Total income declared	54,157,236	115,734,016,066	27,003,766	25,515,796	95,119,464	2,137
Labor income declared	28,741,920	61,421,483,366	15,286,813	12,603,803	51,601,486	2,137
Self-entrepreneurship income decl.	4,163,909	8,898,273,937	2,417,464	1,724,584	7,471,494	2,137
Capital income decl.	4,074,462	8,705,786,539	2,813,466	1,224,264	7,724,896	2,137
Freq. income 0-15,000	1,313	2,805,748	567	697	2,104	2,137
Freq. income 15,000-26,000	948	2,026,461	459	450	1,660	2,137
Freq. income > 26,000	603	1,288,433	351	233	1,141	2,137
Period: 2016-2020						
Total budget	5,010	10,705,840	3,526	2,140	8,708	2,137
Fiscal revenues	2,264	4,838,701	1,386	1,100	3,667	2,137
Non-fiscal revenues	709	1,515,651	827	201	1,341	2,137
Revenues from capital transfers	613	785,755	882	76	1,354	2,137
Current expenditures	2,911	6,220,958	1,856	1,393	4,725	2,137
Capital expenditures	762	1,627,741	918	141	1,606	2,137
Total income declared	57,145,408	122,119,736,290	29,140,016	26,266,862	100,766,208	2,137
Labor income declared	30,973,055	66,189,417,900	16,770,620	13,338,547	55,720,576	2,137
Self-entrepreneurship income decl.	3,674,313	7,832,826,087	2,323,032	1,374,153	6,754,143	2,131
Capital income decl.	3,916,998	8,370,624,850	2,830,692	1,145,194	7,467,320	2,137
Freq. income 0-15,000	1,240	2,649,512	537	657	1,992	2,137
Freq. income 15,000-26,000	950	2,030,258	458	450	1,666	2,137
Freq. income > 26,000	680	1,453,323	393	265	1,279	2,137

Notes. The table reports descriptive statistics of the our sample after dropping municipalities from Valle d'Aosta and Bozen autonomous province, municipalities that were merged, and restrict to municipalities with no missing information between 2007 and 2018, having a number of inhabitants between 2000 and 8000 in the 2011 census, which comprise all the municipalities in the different bandwidths around the threshold of 5,000 we are going to use. Monetary values are in 2012 euros.

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Table 10: Optimal bandwidth for first stage and reduced form estimation

Panel A: estimated optimal bandwidth for first stage

Method	Opt. BW for the estimator	Opt. BW for the bias-correct.
mserd	880	1605
msesum	1761	1761
cerrd	576	1605
cersum	717	1761

Panel B: estimated optimal bandwidth for reduced form

Method	Opt. BW for the estimator	Opt. BW for the bias-correct.
mserd	1516	2417
msesum	1540	2459
cerrd	992	2417
cersum	1008	2459

The table reports optimal bandwidth calculated using Calonico et al. (2020) with long differences in net per-capita surplus (Panel A) and per-capita income (Panel B) as outcome, restricting to post-2013. A polynomial of order 1 is imposed and standard errors are clustered at the municipality level.

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Table 11: Heterogeneity according to the percentage of neighboring municipalities which is treated

Bandwidth: 1000

	(1) Cutoff p50	(2) Cutoff p75	(3) Cutoff p90
High spillover	0.199	1.469	1.581
	(1.330)	(1.201)	(1.034)
Low spillover	1.223	0.744	-0.343
	(1.881)	(1.710)	(1.763)

Bandwidth: 1500

	(1) Cutoff p50	(2) Cutoff p75	(3) Cutoff p90
High spillover	-0.256	-0.037	1.244
	(1.554)	(1.212)	(1.191)
Low spillover	1.560	1.980	-0.530
	(3.656)	(3.601)	(3.002)

Bandwidth: 2000

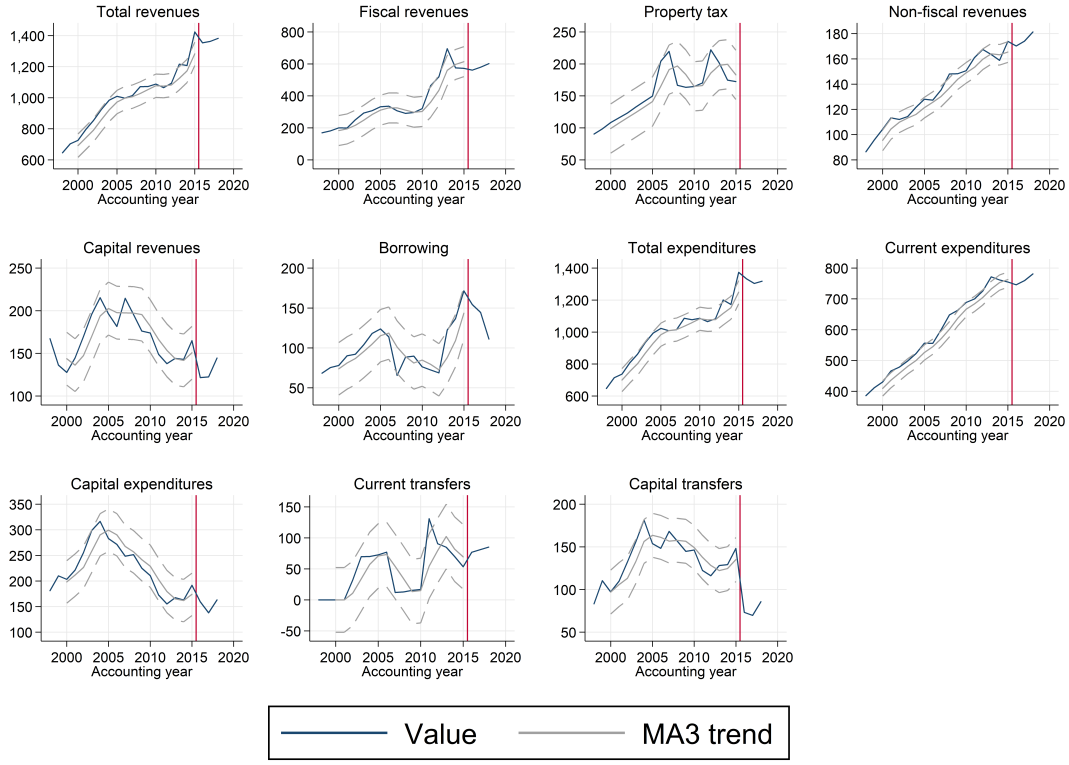
	(1) Cutoff p50	(2) Cutoff p75	(3) Cutoff p90
High spillover	-0.050	0.668	1.236
	(1.862)	(1.811)	(1.600)
Low spillover	-1.026	-0.595	-1.509
	(3.472)	(2.803)	(2.783)

Bandwidth: 2500

	(1) Cutoff p50	(2) Cutoff p75	(3) Cutoff p90
High spillover	-0.327	-0.472	-0.093
	(1.453)	(1.524)	(1.361)
Low spillover	-1.202	0.512	-0.274
	(3.700)	(2.471)	(2.126)

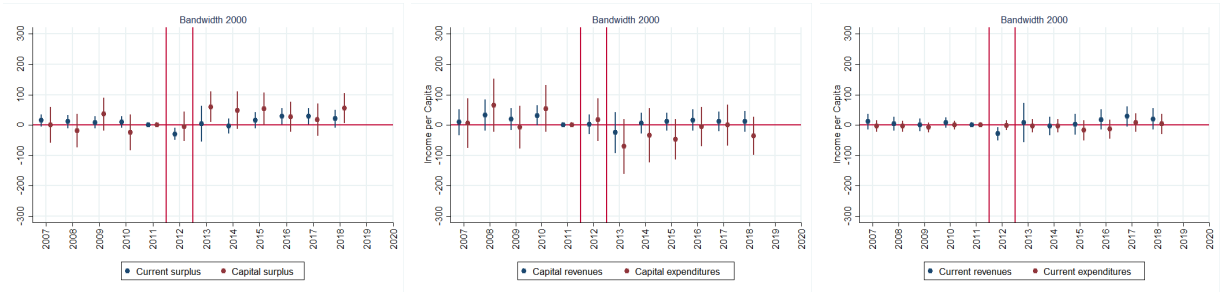
The Table replicates the baseline reduced form estimates for municipalities above/below a cutoff in the percentage of population in surrounding municipalities which is treated. All regressions include FEs for municipality and year, as well as controls for the interaction between the difference between population and the 5000 threshold and years FEs; and an interaction between the difference between population and the 5000 threshold, years FEs, and the dummy for treatment group. Standard errors are clustered at the municipality level.

Figure 4: Stability in match between balance-sheet variables in the pre-2015 model (CCOU) and post-2015 model (CCOX)



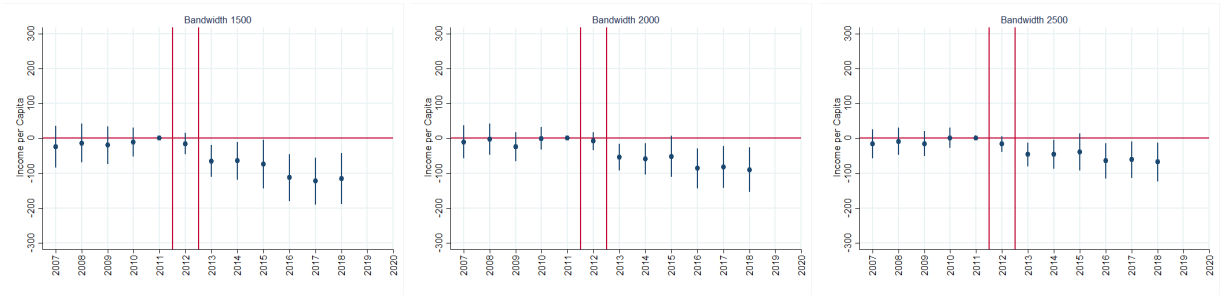
Notes. The Figure reports time series and MA3 trends of our main balace-sheet variables of interest, across the discontinuity of 15 in the balance sheets data.

Figure 5: Composition of the First Stage, Dynamic Specification



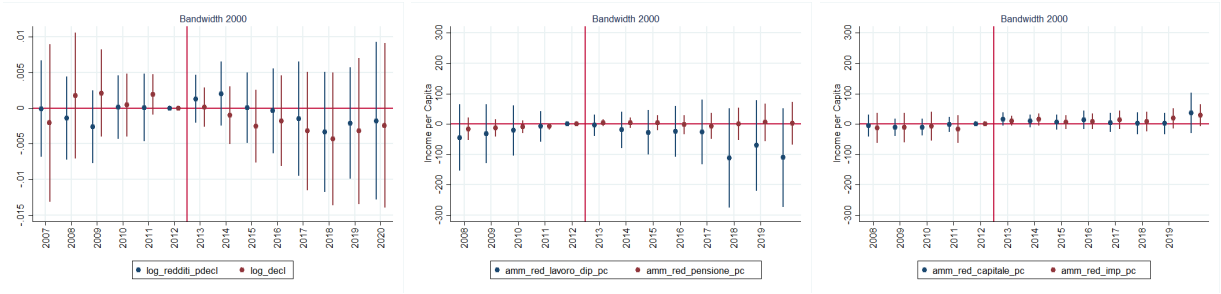
Notes. The Figures report difference-in-discontinuities estimates of the effect of the extension of the Domestic Stability Pact to Italian Municipalities below 5,000 inhabitants from 2013. All regressions include FEs for municipality and year, as well as controls for the interaction between the difference between population and the 5000 threshold and years FEs; and an interaction between the difference between population and the 5000 threshold, years FEs, and the dummy for treatment group. Standard errors are clustered at the municipality level.

Figure 6: Effect of DSP on Borrowing, Dynamic Specification



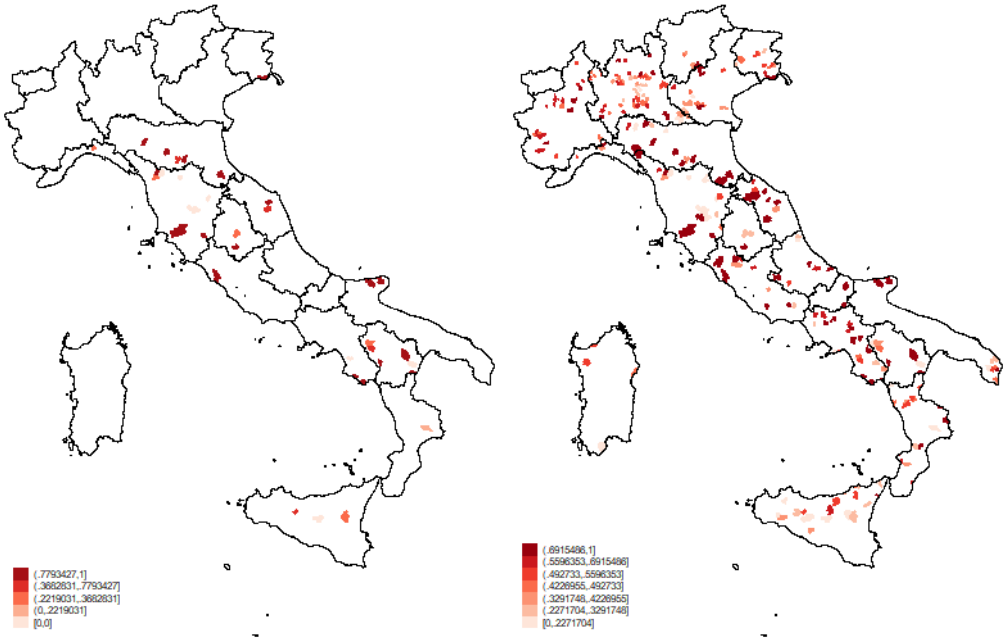
Notes. The Figures report difference-in-discontinuities estimates of the effect of the extension of the Domestic Stability Pact to Italian Municipalities below 5,000 inhabitants from 2013. All regressions include FEs for municipality and year, as well as controls for the interaction between the difference between population and the 5000 threshold and years FEs; and an interaction between the difference between population and the 5000 threshold, years FEs, and the dummy for treatment group. Standard errors are clustered at the municipality level.

Figure 7: Composition of the Reduced Form, Dynamic Specification



Notes. The Figures report difference-in-discontinuities estimates of the effect of the extension of the Domestic Stability Pact to Italian Municipalities below 5,000 inhabitants from 2013. All regressions include FEs for municipality and year, as well as controls for the interaction between the difference between population and the 5000 threshold and years FEs; and an interaction between the difference between population and the 5000 threshold, years FEs, and the dummy for treatment group. Standard errors are clustered at the municipality level.

Figure 8: Sample for Spillovers Analysis



Notes. The Figures reports municipalities that a) are between 5000 and 5000 inhabitants in 2011 b) in a 15 minutes by car range, they are surrounded only by municipalities in the 2500-7500 population bandwidth in 2011 (left panel) or population in neighboring municipalities is only up to 50% from municipalities above 7500 and below 2500. In shades of red, the share of of neighboring municipalities (15 minutes by car range) which is treated.