Balanced Budget Requirements and Local Austerity Multipliers

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August 2023

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Abstract

Fiscal consolidation often entails balanced budget requirements (BBRs) for local governments. However, little is known about the effects of BBRs on economic activity, as most quasi-experimental estimates of local fiscal multipliers stem from windfall expansionary shocks. This paper studies the 2013 extension of a BBR to Italian municipalities below 5,000 residents. Tighter rules pushed local governments to increase their net budget surplus by 0.6%-1% of local income. Treated municipalities cut capital expenditures, rather than decreasing current expenditures or raising taxes. The estimated multiplier is not statistically different from zero and significantly lower than 1.5, the prevailing estimate in the literature.

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

JEL Codes: E62, H71, H72, E12

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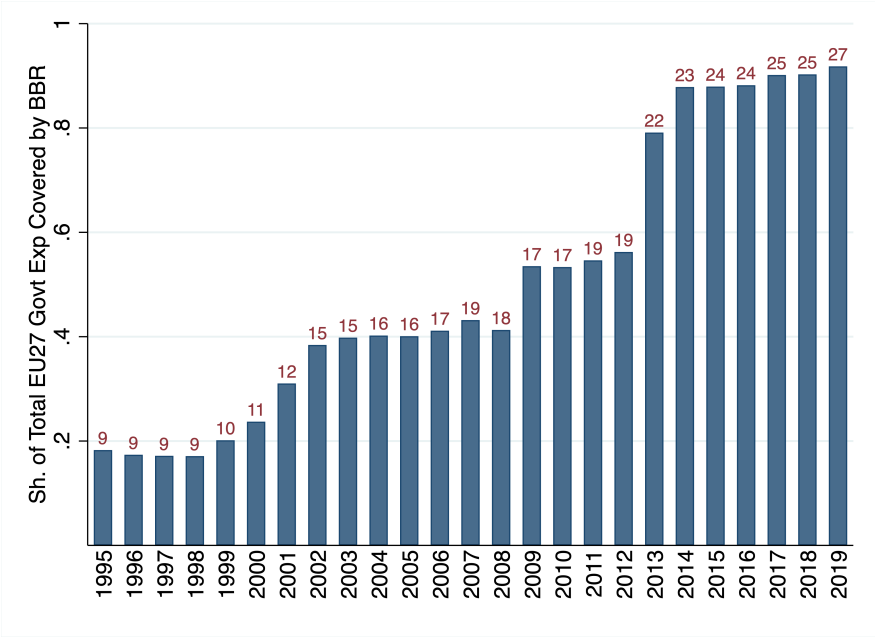
We thank Matilde Bombardini, Marc Gurgand, Enrico Moretti, Emi Nakamura, Philipp Ketz, Paolo Pinotti, and Chris Walters for helpful suggestions. We are also indebted to the researchers of the localopportunitieslab.it project for data collection and cleaning. Finally, we are grateful to the participants at *Chaire Travail* seminar at the Paris School of Economics. Andrea Cerrato acknowledges the financial support of the UC Berkeley Oppourtunity Lab, *Place-Based Policy Initiative*. Francesco Filippucci acknowledges the financial support of the EUR grant ANR-17-EURE-0001.

1 Introduction

Fiscal consolidation programs often entail balanced budget requirements (BBRs) for sub-national governments. Such requirements typically consist in zero-deficit rules imposed by central governments to discipline the public finance of sub-national governments and ensure their participation in the consolidation efforts. As shown in Figure 1, all EU-27 countries had a BBR in place in 2019 and the share of aggregate government expenditures of EU-27 countries subject to these rules has been constantly increasing over time, reaching around 90% in 2019. Constitutional or statutory limitations restricting the ability of state and local governments to run deficits are also present in the US (Bohn and Inman, 1996).

Figure 1: Share of Total EU27 Government Expenditures Covered by BBRs



Notes: The figure shows the share of the aggregate EU-27 government expenditures covered by BBRs over time. Each country's share of expenditures covered by BBRs is weighted by the ratio between the country's government expenditures and EU-27 total general government expenditures. On top of each bar, the figure reports the total number of EU-27 countries with at least one BBR in place in that year. Source: Fiscal governance database of the European Commission.

The literature on BBRs has focused on two crucial questions. First, whether these rules are effective in enforcing fiscal discipline. Second, in case they are effective, what costs they impose in terms of increased output variability (Alesina and Bayoumi, 1996). Answering these questions requires estimating the response of budget surplus and income to a plausibly random assignment of BBRs. Unfortunately, BBRs are not randomly assigned to local governments and detailed longitudinal information about local public finances are hardly available to the public. These challenges have made it difficult for researchers to credibly identify, characterize, and estimate the effects of BBRs on local economic activity. Most quasi-experimental estimates of local fiscal multipliers in the literature range between 1.5 and 1.8 (Chodorow-Reich, 2019), implying a high

short-term output cost of fiscal consolidation efforts. However, these estimates are obtained from temporary windfall expansionary shocks rather than permanent fiscal adjustments apt to maintain intertemporal budget balance (Clemens and Miran, 2012). It is reasonable to hypothesize that those multipliers are not symmetric, as governments endogenously seek to minimize the impact of fiscal consolidations on their constituency.

This paper exploits the 2013 extension of tight budget rules to Italian municipalities below 5,000 residents as a quasi-experimental setting to study the impact of BBRs on local public finance and economic activity. We estimate local fiscal multipliers induced by BBRs adopting a novel two-stage least squares (2SLS) difference-in-discontinuities approach. We provide two main results. First, treated municipalities comply with the newly introduced fiscal rules by increasing net municipal budget surplus by 0.6%-1% of local income. As a result, municipal borrowings also decrease by 1% of local income, indicating that BBRs are effective in disciplining local public finance. To reach this objective, treated municipalities decrease municipal capital expenditures, rather than cutting current outlays or raising taxes. Second, municipal fiscal consolidation has a limited impact on the income level of residents over a six-year horizon. Our estimates of the local fiscal multiplier range between 0.23 and 0.58, are always not significantly different from zero, and we can exclude they are higher than 1.5 with 95% confidence within six years from the shock.

These estimates are significantly lower than the ones prevailing in the literature. Such difference can be rationalized in several ways. First, through crowding-out effects on firms (Pinardon-Touati, 2021) or "Ricardian" effects on consumers (Clemens and Miran, 2012), which differentiate persistent local budget shocks from transitory windfalls induced by central government spending shocks. Second, in the case of a fiscal contraction, local governments might resort to *beggar-thy-neighbor* policies and concentrate cuts on budget items disproportionately affecting other municipalities. We test this second mechanism by estimating spatial spillovers of local fiscal consolidation efforts. Specifically, we examine the extent to which income of residents in untreated municipalities is affected by local fiscal consolidation efforts induced by the proximity of treated municipalities. We estimate a negative but not statistically significant impact, implying a local fiscal multiplier lower than 1.5 even after accounting for potential spatial spillovers. Overall, our results point to relatively low short-term output costs of fiscal consolidation implemented through BBRs imposed to local governments.

This paper relates to two strands of the literature. First, we contribute to the literature on the effect of budgetary shocks on local public finance. The relaxation of budget constraints induces an increase in municipal expenditures (Dahlberg et al., 2008; Adelino et al., 2017), although in some contexts mayors opt for reducing taxes (Grembi et al., 2016). Few papers have studied stricter budget rules, finding that these primarily cause a cut in outlays (Bohn and Inman, 1996; Clemens and Miran, 2012; Daniele and Giommoni, 2021; Coviello et al., 2022).[1] Our findings are in line with the latter stream of the literature, highlighting

[1] In addition, Alpino et al. (2022) found changes in the composition of tax revenues, with lower progressivity in tax rates following tighter budget rules.

that cuts are concentrated in capital expenditures (Venturini, 2020; Mühlenweg and Gerling, 2023). Second, we contribute to the literature on local fiscal multipliers by estimating the impact of BBRs on local economic activity in the European context and employing a novel and robust identification strategy. The literature on local fiscal multipliers has reached a wide consensus on estimates ranging between 1.5 and 1.8 (Chodorow-Reich, 2019). Such consensus is based on numerous 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 US locations. A comprehensive list of these studies include Chodorow-Reich et al. (2012), Feyrer and Sacerdote (2012), Wilson (2012), Conley and Dupor (2013), Dupor and Mehkari (2016), Dube et al. (2018), and Dupor and McCrory (2018). Other studies exploiting non-ARRA induced geographical variation in Federal spending find similar estimates overall. For instance, Nakamura and Steinsson (2014) exploit state-level variation in US military spending, estimating a local fiscal multiplier of 1.5.[2] We estimate low and non-significant multipliers, in contrast with the recent literature on local fiscal multipliers, and more in line with earlier evidence on the impact of fiscal rules in the US provided by Alesina and Bayoumi (1996) and Clemens and Miran (2012).

The reminder of the the paper is structured as follows. In Section 2, we describe the institutional setting in which our quasi-experimental study takes place. In Section 3, we discuss the data sources and the identification strategy. Section 4 presents our findings on the impact of BBRs. Section 5 concludes.

2 Institutional Setting

Municipalities constitute the lowest level of sub-national government in Italy. The country counts 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 mayor, and an elected council. The total amount of municipalities' budgets was around 75 billion Euros in 2004 (5.2% of GDP) and progressively decreased to 57 billion Euros in 2018 (3.2% of GDP). Municipalities provide services within their competence, which include local administration, utilities and waste management, maintenance of public spaces, municipal roads and transportation, schools building, social housing and services, sports facilities, and small services for tourism and economic development. Revenues come in large part from own fiscal revenues (32%), namely 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 – the regions and the central government – 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 public development

[2]Other relevant 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).

bank *Cassa Depositi e Prestiti*, but increasingly also from private banks) or issuing bonds.[3]

Since 1999, Italian municipalities have been subject to the so-called Domestic Stability Pact (DSP), which aims at controlling municipal budget deficits. The need for these rules arose as Italy faced challenges in adhering to the limitations imposed by the European Monetary Union (EMU) on member states' general government deficit, defined as the sum of central and local government deficits. 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; Vannutelli, 2020). Bail-out or default of lower administrations is in fact not uncommon in Italy[4], and the risk is worsened by the low salience of municipal finances (Murtinu et al., 2022) and by criminal infiltration (Acconcia et al., 2014; Fenizia and Saggio, 2020).

The rules imposed by the DSP have changed over time, as summarized in Table A.1 in the Appendix. Between 1999 and 2004, the DSP targeted deficit growth, imposing either zero or minimal growth with respect to two years before. In the 2005-2006 period, a stricter joint cap on current and capital expenditure was enforced. From 2007 onward, our period of interest, the DSP turned into a proper BBR, initially imposing zero-growth in deficit.[5] From 2011 onward, the DSP became increasingly restrictive, requiring a structural zero-deficit goal. Municipalities which did not comply with the DSP were subject to penalties, including a cap on the growth of current expenditures, bans 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 strategy, while municipalities below 5,000 residents were exempted from the DSP since 2001, in 2013 the DSP was extended to all municipalities above 1,000 residents.[6] Finally, starting in 2016 the DSP was formally abolished, although a zero-deficit requirement on an accrual basis is still in place.

3 Data and Identification

3.1 Administrative Sources

We collect data from two administrative sources. First, we use balance sheets from Italian municipalities made available by the Italian Ministry of Interior, which contain detailed information about all revenues and expenditures of Italian municipalities from 1998 to 2018. From this dataset, we extract revenues and expenditures on an accrual basis, the breakdown of revenues into fiscal vs. non-fiscal revenues, borrowing

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

[4]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 remarkable liabilities for credits of defaulted municipalities to Italy (De Luca vs. Italy, 2013).

[5]Note that, from 2008 to 2015, the deficit considered to assess the compliance to the 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.

[6]Municipalities between 3,000 and 5,000 residents were initially foreseen to be subject to the DSP in 2005 and 2006, but their inclusion was suspended and never reconsidered.

and transfers, and the breakdown of expenditures by functional destination.[7]

Second, we use 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 by individuals every year. 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 (i.e., labor, self-entrepreneur, rents, pensions) and from declarations belonging to different tax brackets.

We build a dataset covering the period 2007-2018 including all municipalities for which it is possible to recover a fiscal code.[8] We then operate three restrictions to obtain our sample of analysis. First, we keep only municipalities from the 15 ordinary regions.[9] Second, we drop municipalities that were merged, and restrict the dataset to municipalities with no missing information in either balance sheet or income data between 2007 and 2018 to obtain a balanced panel. Finally, we keep municipalities having a number of residents between 3,500 and 6,500 in the 2011 census, which comprise all the municipalities in the different bandwidths around the threshold of 5,000 we use.[10]

Our main outcomes of interest are the municipal budget surplus net of transfers from other government bodies and total income declared by municipal residents. We measure the net municipal budget 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 within the municipality, thus they do not constitute a direct loss of income or resources for taxpayers of the municipality. We winsorize outliers in per-capita income and net budget surplus at the 1% level. We express all monetary values in 2012 Euros.

[7]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 A.2 in the Appendix, and in Figure B.1 in the Appendix we plot the average value for all our variables of interest across the 2015 discontinuity. No clear discontinuity appears in the relevant variables.

[8]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 loss of municipalities in earlier periods. Table A.3 in the Appendix reports descriptive statistics of the dataset obtained by merging our sources. We split descriptive statistics 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.

[9]Even though the DSP applied also to special statute regions of Sardinia and Sicily (Daniele and Giommoni, 2021), regions with special statute are not subject to standardized costs for services, which are taken into consideration for defining penalties in case a municipality does not respect the DSP (Art. 20 D.L. 98/2011). Moreover, weaker budget rules apply to Sardinia and Sicily regional governments (Rapporto 2013, *Corte dei Conti*), so that more fiscal autonomy could be used to transfer larger funds to municipalities that become subject to DSP in 2013. In the Appendix, we show that all our results are robust to the inclusion of Sardinia and Sicily.

[10]Table A.4 in the Appendix reports descriptive statistics for the sample obtained. Throughout the paper, we use 2011 population as that is the one legally binding at the time of the DSP exension. 2011 is also the latest census before DSP extension, hence population is more precisely measured and not dependent on municipalities' birth registries as an intra-census source.

3.2 Identification

To estimate the local fiscal multiplier of the DSP extension, we adopt a novel two-stage least squares (2SLS) difference-in-discontinuities approach (Grembi et al., 2016). The DSP was sharply applying to municipalities above 5,000 residents between 2001 and 2012, and was then extended to municipalities with population between 1,000 and 5,000 residents from 2013 onward. Our treatment and control groups are made of municipalities just below and just above the 5,000 residents cutoff, respectively. Treatment group municipalities are, before 2013, comparable in all fundamental characteristics to municipalities above the threshold but differ sharply in BBR assignment 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 regression discontinuity design fail. Hence, we exploit the longitudinal variation provided by the extension of DSP to difference out these confounders.

Let i denote municipalities and t denote years. We restrict our sample to municipalities with 2011 population in the interval $P_i \in [P_c - b, P_c + b]$, where P_c denotes the 5,000 residents threshold and b denotes the chosen bandwidth. Our specification takes the following form:

$$Y_{it} = \eta_i + \sum_{t \neq 2012} \left(\alpha_t + \beta_t P_i^{\star} + \delta_t D_i P_i^{\star} \right) + \gamma D_i T_t + \varepsilon_{it} \tag{1}$$

where η_i denotes municipality fixed effects, α_t denotes time fixed effects, D_i is a dummy variable capturing treatment status (i.e., 2011 population below 5,000 residents), T_t denotes a dummy taking value 1 for all time periods between 2013 and 2018, and $P_i^{\star} = P_i - P_c$ denotes normalized municipal population. The coefficients β_t and δ_t partial-out any confounding difference proportional to the normalized municipal population. We allow such impact to vary by group-year and we assume it affects the outcome linearly. The remaining coefficient γ is the difference-in-discontinuity estimator capturing the impact of budget balance requirements from DSP on the outcome variable Y_{it}. We also use a fully dynamic specification, where we include a set of year-specific treatment dummies $\sum_{t \neq 2012} \gamma_t D_i$ instead of $\gamma D_i T_t$. In the first-stage regression, Y_{it} is budget surplus as a share of baseline municipal residents' income, s_{it}. In the reduced-form regression, Y_{it} is the log of income normalized by population in 2011 ("per-capita income", thereafter), denoted y_{it}. We present our estimates for different bandwidth selections, i.e., ±750, ±1,000, ±1,250, and ±1,500. Figure B.2 in the Appendix shows a map of treatment and control groups in our benchmark specification with 1,000 residents population bandwidth. We cluster standard errors at the municipality level, following Bertrand et al. (2004) and Abadie et al. (2017).

The identifying assumption of our model requires parallel trends in the difference of outcomes of municipalities just above and below the 5,000 residents discontinuity, i.e., Common Trend in Discontinuities (CTD).

A threat to our CTD assumption requires not only a sharp difference at the threshold of 5,000 residents, such as mayor's salary (Gagliarducci and Nannicini, 2013), but also that these sharp discontinuities vary significantly over time or have a time-varying impact on our outcomes. No further change in fiscal rules at the 5,000 threshold occurs in the period of our analysis. Moreover, we can test an implication of the CTD assumption, namely that the coefficients $\hat{\gamma}_t$ from our fully dynamic version of specification (1) are not significantly different from zero for all years preceding the shock, when $t < 2013$.

Under CTD, the estimated coefficient $\hat{\gamma}$ in the first-stage regression captures the causal effect of the DSP extension on budget surplus as a share of baseline local income. The same coefficient in the reduced-form regression captures the percentage change in per-capita income caused by the DSP extension. Following Angrist et al. (1996), the ratio between the reduced-form and the first-stage coefficients is an estimator of the percentage change in local income caused by a unitary increase in budget surplus as a share of baseline local income. As in Nakamura and Steinsson (2014), this ratio identifies the local fiscal multiplier induced by the BBR.

4 Results

4.1 Budget Surplus and Local Income

Table 1 reports our difference-in-discontinuities estimates of the effect of the DSP extension on surplus-to-income ratio and local per-capita income from specification (1). Each pair of columns i.e., (1) and (2), (3) and (4), (5) and (6), (7) and (8), reports the first-stage and reduced-form estimated coefficients for different selected bandwidths. For each specification, the table reports the selected bandwidth and the estimated fiscal multiplier, i.e., the coefficient of an IV regression with log per-capita income as the dependent variable and net budget surplus-to-income ratio as the independent variable, instrumented by the DSP extension. The results point to a strong and significant effect of the DSP extension on the net municipal budget surplus run by municipalities below 5,000 residents, which increases between 0.6% and 1% of local income, depending on the selected bandwidth. This result indicates that BBRs were effective in disciplining local public finance and make municipalities participate in the national fiscal consolidation effort. In spite of this large increase in municipalities' budget surplus, per-capita income does not react significantly. The estimated coefficients in columns (2), (4), (6), and (8) are negative, but are all not statistically different from zero and their magnitude is small, ranging between -0.36% and -0.14%. Depending on the selected bandwidth, we estimate a local austerity multiplier between 0.23 and 0.58, never significantly different from zero. Standard errors imply that we can exclude at 95% confidence that the multiplier is 1.5 or larger.[11]

[11] Table A.5 in the Appendix shows that the results are robust to limiting the time frame of the analysis to 2015, the year when municipalities balance sheets format changes. Results are also robust to the inclusion of Sardinia and Sicily in the sample, as shown in Appendix Table A.6.

Table 1: Effect of DSP on Surplus and Local Income

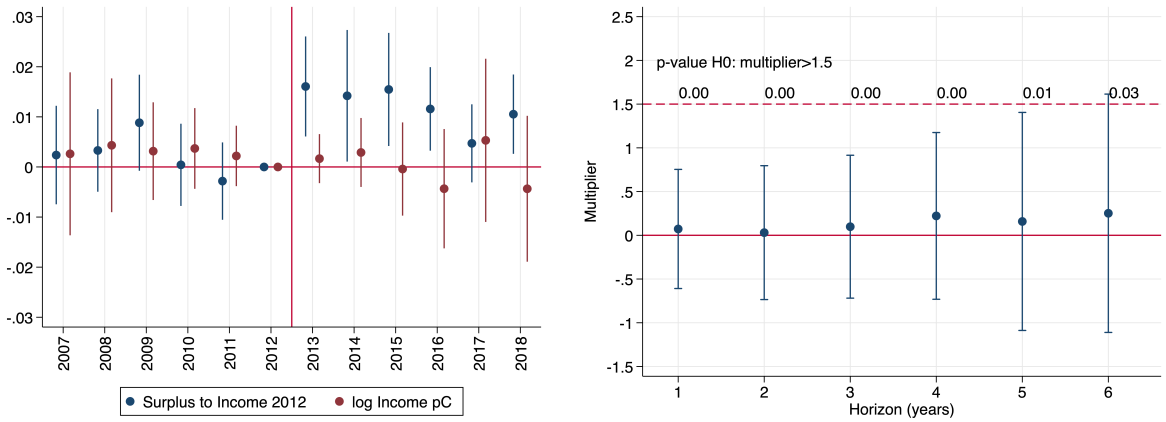
VARIABLES	(1) Surplus to Income 2012	(2) Log Income pC	(3) Surplus to Income 2012	(4) Log Income pC	(5) Surplus to Income 2012	(6) Log Income pC	(7) Surplus to Income 2012	(8) Log Income pC
DSP	0.00622**	-0.00361	0.01007***	-0.00254	0.00699***	-0.00247	0.00608***	-0.00138
	(0.00274)	(0.00798)	(0.00260)	(0.00699)	(0.00222)	(0.00612)	(0.00203)	(0.00557)
Observations	6,021	6,021	8,048	8,048	10,076	10,076	12,185	12,185
R-squared	0.55954	0.98879	0.54856	0.98850	0.55662	0.98859	0.55877	0.98820
Years	2007-2018	2007-2018	2007-2018	2007-2018	2007-2018	2007-2018	2007-2018	2007-2018
Bandwidth	750	750	1000	1000	1250	1250	1500	1500
Mean in 2012	-0.0251	9.389	-0.0255	9.393	-0.0253	9.397	-0.0256	9.393
Specification		Diff-in-disc		Diff-in-disc		Diff-in-disc		Diff-in-disc
F-stat		5.128		14.948		9.870		8.926
Multiplier		.58		.251		.352		.226
		[1.29]		[.695]		[.881]		[.920]
H0: Multiplier > 1.5		.239		.037		.097		.083

Notes. The table reports difference-in-discontinuities estimates of the effect of the 2013 extension of the Domestic Stability Pact (DSP) to Italian Municipalities between 1,000 and 5,000 residents on their net budget surplus and the log of municipal per-capita income. We report the estimated coefficient $\hat{\gamma}$ from specification (1). The table presents results from our benchmark specification with several population bandwidth (i.e., 750, 1,000, 1,250, and 1,500 residents around the threshold of 5,000 residents). Standard errors are clustered at the municipality level. The reported F-statistic on the excluded instrument corresponds to the Kleibergen-Paap F-statistic for weak identification. The multiplier estimate and its standard errors are obtained from an IV regression with log income per-capita as the dependent variable and net budget surplus as the main independent variable, instrumented by the DSP dummy. The last row reports the p-values obtained from one-sided tests for the multiplier being below 1.5.

Figure 2 reports the results from the fully dynamic version of specification (1), with a selected bandwidth of 1,000 residents.[12] The left panel displays the estimated coefficients $\hat{\gamma}_t$ for the fully dynamic first-stage and reduced-form specifications. The vertical red line is set between 2012 and 2013, right before the introduction of the BBR, and all the coefficients are expressed relative to 2012. The blue dots provide striking evidence of the response of municipal net budget surpluses to the DSP extension. After five years of parallel trends, treated municipalities immediately react to the introduction of the BBR by increasing their surplus. Conversely, income remains mostly unaffected. In the right panel, we compute the implied multipliers at different horizons after the shock. The estimated coefficients are consistently around zero, although they become noisier at longer horizons, as the estimated effect on per-capita income becomes less precise. The red dashed line is set at 1.5, the lower bound of local fiscal multipliers estimates prevailing in the literature (Chodorow-Reich, 2019). As the figure shows, we can exclude that the multiplier we estimate is greater than or equal to 1.5 with 95% confidence up to a six-period horizon after the introduction of the BBR.

[12] Figure B.3 in the Appendix shows the same results including Sardinia and Sicily in the sample.

Figure 2: Dynamic Effect of DSP Extension on Net Budget Surplus and Per-Capita Income



Notes: The left-hand panel of the figure displays difference-in-discontinuities estimates of the effect of the extension of the Domestic Stability Pact (DSP) to Italian Municipalities below 5,000 residents from 2013 on their net budget surplus and the log of municipal per-capita income. The net budget surplus is scaled by 2012 total income of municipal residents. We report the estimated coefficients $\hat{\gamma}_t$ from specification (1) in its fully dynamic form. Standard errors are clustered at the municipality level. The multiplier estimate and its standard errors are displayed on the right-hand panel of the figure. They are the coefficients of an IV regression with log income per-capita as the dependent variable and net budget surplus as the main independent variable, instrumented by the DSP dummy, keeping observations only up to a specific horizon after the shock. The p-values displayed in the right-hand panel of the figure are obtained from one-sided tests for the multiplier being below 1.5.

4.2 Composition of Municipal Budget Shock

In this section, we focus on the composition of the municipal fiscal adjustment, examining the differential impact of the DSP extension on different balance sheet items. Table 2 reports the results of our first-stage regression using different components of the net budget surplus as outcome variables and a population bandwidth of 1,000 residents. Columns (1) and (2) report the impact of the DSP extension on current and capital budget surpluses, respectively. The fiscal consolidation induced by the DSP extension is totally accounted for by an increase in the capital surplus. This result is confirmed by columns (3) to (6), which report the breakdown by total current revenues and expenditures, and total capital revenues and expenditures, as a share of residents' income in 2012. On the one hand, the estimated impact on revenues is positive, but not significant and close to zero, indicating that higher taxes (i.e., current revenues) and higher capital revenues do not explain the increase in net budget surplus. On the other hand, the estimated impact on capital expenditures is negative, large, and extremely significant. In particular, the estimated coefficient in column (6) indicates that capital expenditures decreased by 0.89% of local income, thus explaining most of the increase in capital surplus reported in column (2) (i.e., 0.91% of local income) and of the increase in net budget surplus reported in Table 2, column (3) (i.e., 1% of local income). An additional piece of corroborating evidence is reported in column (7), where we estimate the effect on new municipal borrowing. The coefficient is negative, significant, and its magnitude matches exactly the increase in net budget surplus reported in Table 2, column (3). Moreover, the coefficients estimated from a dynamic specification displayed in Figure

B.4 in the Appendix show that the reduction in borrowing is very stable, following the same dynamic of the net budget surplus. This suggests that the shock to surplus induced by the DSP corresponds to a persistent decrease in capital expenditures and a reduction of municipality borrowings. From these results, we conclude that BBRs are effective in disciplining local public finance.[13]

Table 2: Composition of the Municipal Budget Shock Induced by DSP Extension

VARIABLES	(1) Curr. Surpl. to Income 2012	(2) Cap. Surpl. to Income 2012	(3) Cur. Rev. to Income 2012	(4) Cur. Exp. to Income 2012	(5) Cap. Rev. to Income 2012	(6) Cap. Exp. to Income 2012	(7) Borrow. to Income 2012
DSP	0.00006	0.00914***	-0.00144	-0.00173	-0.00018	-0.00885***	-0.01042***
	(0.00119)	(0.00193)	(0.00179)	(0.00140)	(0.00061)	(0.00204)	(0.00288)
Observations	8,048	8,048	8,048	8,048	8,048	8,048	8,048
R-squared	0.66712	0.43042	0.83404	0.91119	0.31510	0.43206	0.56151
Years	2007-2018	2007-2018	2007-2018	2007-2018	2007-2018	2007-2018	2007-2018
Bandwidth	1000	1000	1000	1000	1000	1000	1000
Mean in 2012	-0.0108	-0.0150	0.0484	0.0593	0.00539	0.0166	0.00728

Notes: The table reports difference-in-discontinuities estimates of the effect of the 2013 extension of the Domestic Stability Pact (DSP) to Italian Municipalities between 1,000 and 5,000 residents on the different components of their net budget surplus. We report the estimated coefficient $\hat{\gamma}$ from specification (1) for several different outcome variables. Specifically, columns (1) and (2) report the impact on current and capital surplus, respectively. Columns (3) to (6) report the impact on current revenues, current expenditures, capital revenues, and capital expenditures, respectively. Finally, column (7) reports the impact on municipal borrowings. All outcome variables are scaled by 2012 total income of municipal residents. The table presents results from our benchmark specification with a population bandwidth of 1,000 residents around the threshold of 5,000 residents. Standard errors are clustered at the municipality level.

Thanks to the detailed information contained in our dataset, we can further break down the effect of DSP on capital expenditures by budget items, exploiting the thematic categorization of expenditures present in the municipal balance sheets. Expenditure categories are defined based on standardized criteria established by the central government for accountability purposes. Column (4) of Table A.8 in the Appendix reveals that the cut in expenditures is significantly concentrated in Sports Facilities and Urban Planning. These two expenditure items account for about half of the cuts in capital expenditures induced by the DSP extension.

4.3 Spillovers

We further investigate whether the increase in net budget surplus in treated municipalities spilled over to neighbouring municipalities, and estimate a local fiscal multiplier that accounts for these potential spatial externalities. If local economies are sufficiently interconnected, the DSP extension could have a significantly attenuated impact on the municipality itself, as the effect of the budget cut is spread over a larger area including other municipalities not subject to the treatment. This occurrence is even more likely in the case of a fiscal contraction, as local governments could try to concentrate cuts on budget items disproportionately affecting other municipalities, rather than their constituencies (i.e., *beggar-thy-neighbor* policies). The

[13]Table A.7 in the Appendix re-runs the analysis focusing only on 2007-2015, when municipalities balance sheets format changes, finding similar results.

fact that municipalities mostly cut capital expenditures, affecting workers not necessarily resident in the municipality, rather than raising taxes on residents, points in this direction.

To formally test for the presence of spillover effects, we restrict our attention to untreated municipalities above 5,000 residents, focusing only on the ones counting up to 15,000 residents to maintain comparability with treated municipalities.[14] For such untreated municipalities, we define a neighborhood $\mathscr{O}_i$ including all municipalities in a radius of 20 minutes driving by car, and calculate the share of total income in the neighborhood accounted by municipalities between 1,000 and 5,000 residents, which become subject to the DSP after 2013, denoted $D_{\mathscr{O}_i}$.[15] Figure B.5 in the Appendix shows an example, with the untreated municipality of Crescentino (Piedmont) in red surrounded by several treated municipalities in blue. We can then write down our specification as follows:

$$Y_{it} = \eta_i + \sum_{t \neq 2012} \left(\alpha_t + \beta_t p_{\mathscr{O}_i} + \delta_t p^2_{\mathscr{O}_i} + \theta_t p^3_{\mathscr{O}_i} \right) + \gamma D_{\mathscr{O}_i} T_t + \varepsilon_{it} \tag{2}$$

Equation (2) corresponds to a difference-in-differences specification with continuous treatment, where treatment dosage is $D_{\mathscr{O}_i}$ representing the share of 2012 economic activity around municipality i that gets affected by DSP extension in 2013, and T_t is a dummy taking value 1 for all years after 2012. Consistently with our difference-in-discontinuities approach in the estimation of main effects, the specification includes municipality fixed effects η_i and time fixed effects α_t. Yet, an important difference is that in the difference-in-discontinuities approach the identifying variation in net budget surplus was coming only from municipalities close to the 5,000 residents threshold, focusing on a narrow bandwidth and linearly controlling for time-varying and group-varying population trends. Conversely, our neighborhoods $\mathscr{O}_i$ also include very large municipalities, that could be on different time trends in terms of budget surplus or income and weigh a lot in the neighborhood-level ratio of total surplus to total income. To account for this potential bias, we allow for flexible (i.e., 3rd-degree polynomial) and time-varying controls of baseline average neighborhood population, $p_{\mathscr{O}_i}$.[16]

In the first-stage regression, Y_{it} is the total surplus of municipalities within a 20-minute drive distance, normalized by their 2012 total income, denoted by $s_{\mathscr{O}_i t}$. In this case, our coefficient of interest γ identifies the causal effect of the 2013 DSP extension on neighborhood-level surplus. In the reduced-form regression, Y_{it} is the log of per-capita income, y_{it}, in the municipality i (i.e., the municipality around which the neighborhood is defined), and γ identifies the change in the income of the municipality at the center of the neighborhood

[14] In Table A.9 in the Appendix, we provide robustness checks for different upper limits to the set of municipalities considered.

[15] The 20-minute radius is in line with evidence that job search declines sharply with geographical distance, making labor markets very local (Manning and Petrongolo, 2017; Marinescu and Rathelot, 2018). We provide robustness checks for neighborhoods defined using 15, 25, and 30-minute radius in Appendix Table A.10.

[16] An alternative approach would be to focus on neighborhoods including *only* municipalities in a narrow bandwidth around 5,000 residents. This is not feasible in our case, as the number of neighborhoods would be extremely small (e.g., only 38 neighborhoods with *only* municipalities with $5,000 \pm 2,500$ residents), making it impossible to achieve sufficient statistical power.

following the DSP extension in the neighborhood, scaled as-if all municipalities in the neighborhood became subject to the DSP. Standard errors are clustered at the municipality level.

Table 3 presents our results.[17] Columns (1) and (2) display the estimates without additional controls. The coefficient in column (1) is highly significant and very close in magnitude to the one in Table 1 column (3), indicating that switching to DSP leads to an approximately 1.2% increase in net budget surplus in neighboring municipalities. Yet, column (2) suggests that such an increase in budget surplus in neighboring municipalities does not result in a significant change in income. However, one concern with columns (1) and (2) is the low F-statistic, indicating potential weakness of our instrument. This might be attributed to confounding time-varying factors, such as large regional differences in income growth that are often observed in the Italian context. To address this, in columns (3) and (4), we include region-specific time trends. The F-statistic becomes larger, indicating improved instrument strength, while the results remain consistent. The estimated multiplier is positive, ranges between 0.04 and 0.45, and is not significantly different from zero. In our benchmark specification (i.e., columns 3 and 4), we can exclude a multiplier of 1.5 or above with more than 95% confidence, while in columns (1) and (2) we can exclude a multiplier of 1.5 or above with about 90% confidence.[18]

Table 3: Effect of the DSP Extension on Neighborhood Surplus and Spillovers on Local Income

	(1)	(2)	(3)	(4)
VARIABLES	Net Surplus to Income 2012	Log Income pC	Net Surplus to Income 2012	Log Income pC
% of Neighborhood-level Income under DSP	0.01237***	-0.00560	0.01439***	-0.00051
× Post-2013	(0.00412)	(0.00995)	(0.00408)	(0.00930)
Observations	16,176	16,176	16,176	16,176
R-squared	0.82850	0.99110	0.87065	0.99275
Time trend	-	-	Region	Region
Mean in 2012	-0.0217	9.420	-0.0217	9.420
F-stat		9.000		12.429
Multiplier		.453		.035
		[.827]		[.646]
H0: Multiplier > 1.5		.103		.012

Notes: The table reports the impact of neighborhood-level exposure to the 2013 extensions of the Domestic Stability Pact (DSP) on neighborhood-level net budget surplus and municipal log per-capita income. Columns (1) and (3) report the coefficient $\hat{\gamma}$ from specification (2) with neighborhood-level net budget surplus scaled by neighborhood level income in 2012 as the dependent variable (i.e., first-stage regression). Columns (2) and (4) report the coefficient $\hat{\gamma}$ from specification (2) with municipal log per-capita income as the dependent variable (i.e., reduced-form regression). Columns (3) and (4) include region-specific time fixed effect. Standard errors are clustered at the municipality level. The reported F-statistic on the excluded instrument corresponds to the Kleibergen-Paap F-statistic for weak identification. The multiplier estimate and its standard errors are obtained from an IV regression with municipal log income per-capita as the dependent variable and the neighborhood-level net budget surplus as the main independent variable, instrumented by the neighborhood-level exposure to the 2013 DSP extension interacted with a dummy taking value 1 for all years after 2013. The last row reports the p-values obtained from one-sided tests for the multiplier being below 1.5.

[17] Results are robust to the inclusion of municipalities from Sardinia and Sicily, as shown in Appendix Table A.11.

[18] We can also define a fully dynamic specification including $\sum_{t \neq 2012} \gamma_t D_{\tilde{\mathcal{O}}_i}$ instead of $\gamma D_{\tilde{\mathcal{O}}_i} T_t$, as in Appendix Figure B.6, which confirms our results.

5 Conclusions

This paper estimates local austerity multipliers when fiscal consolidation is implemented through balanced budget requirements (BBRs) imposed to local governments. To do so, we exploit the 2013 extension of tight fiscal rules to municipalities below 5,000 residents enacted in Italy. We use a dynamic difference-in-discontinuity approach to isolate the effect of budget tightening on local income, thus obtaining a quasi-experimental estimate of the local fiscal multiplier. Our approach only assumes that no confounding variation sharply affecting municipalities just above and below the threshold is present in the period of interest. Under such mild assumption, municipalities above and below the threshold are fully comparable except for BBR assignment.

We find that tighter budget rules result in persistently higher budget surplus net of transfers (i.e., 0.6-1% of local income), mostly driven by cuts in capital expenditures. Such cuts cause a persistent decrease in municipal borrowings and are concentrated in local infrastructures, such as sports facilities and urban planning expenditure categories. We estimate a low and not statistically significant causal effect of BBR-induced austerity policies on local income, with a local fiscal multiplier never significantly different from zero and lower than 1.5 with 95% confidence over a six-year horizon. We also test for the presence of spatial spillovers to neighboring municipalities, finding similar results. Our findings indicate that the local fiscal multiplier induced by BBRs is lower than the estimates prevailing in the literature on local fiscal multipliers. Such differences may be due to 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 research.

Second, differently from most studies in the literature about local fiscal multipliers, our shock is not a windfall from the central government, but rather a budgetary shock, which may induce local Ricardian effects (Clemens and Miran, 2012). 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. Recent studies have also shown that when municipalities increase their borrowings, local banks decrease their loans to local firms (Pinardon-Touati, 2021). This crowding-out effect in the capital market may constitute another reason why we estimate a lower multiplier.

Our results suggest that the short-term output cost of BBRs is relatively low. However, they do not exclude other types of adverse effects for the local population, such as a long-run deterioration in local amenities or

human capital. In this respect, the literature focusing on the effect of the DSP extension has provided mixed results. Daniele and Giommoni (2021) exclude negative effects of budget tightening on publicly provided goods and services, while Pavese and Rubolino (2021) point to negative effects of lower municipal capital expenditures in schools on students' performance. Overall, our results indicate that effectively enforced BBRs imposed to local governments may be a viable tool to reduce fiscal deficits and increase debt sustainability with relatively low short-term costs for local economic activity.

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A Additional Tables

Table A.1: Evolution of DSP Rules for Italian Municipalities

Year	Target Municipalities	Deficit rule	Accounting criteria	Others
1999	All	Zero growth	Cash	Initial sanctions: cut in transfers, ban on hires, cut on non-absenteeism bonuses
2000	All	Zero growth	Cash	
2001	>5,000 resid.	Max 3% growth	Cash	
2002	>5,000 resid.	Max 2.5% growth	Cash	Limit to current expenditure
2003	>5,000 resid.	Zero growth	Cash+Accrual	
2004	>5,000 resid.	Zero growth	Cash+Accrual	
2005	>5,000 resid.		Cash+Accrual	Current+capital expenditure cannot grow more than personalized threshold (up to 10%)
2006	>5,000 resid.		Cash+Accrual	Current must be reduced, capital can grow within personalized threshold
2007	>5,000 resid.	Zero growth	Cash+Accrual	
2008	>5,000 resid.	Zero growth	"Mixed"	
2009	>5,000 resid.	Pers. red. goal (*)	"Mixed"	Additional sanctions: limits to borrowing, limits to current expenditure, larger cut to transfers and administrators' wages
2010	>5,000 resid.	Pers. red. goal (*)	"Mixed"	
2011	>5,000 resid.	Zero-deficit	"Mixed"	
2012	>5,000 resid.	Zero-deficit	"Mixed"	Cut to transfers to municipalities >5,000 residents
2013	>1,000 resid.	Zero-deficit	"Mixed"	
2014	>1,000 resid.	Zero-deficit	"Mixed"	
2015	>1,000 resid.	Zero-deficit	"Mixed"	
2016	All	Zero-deficit	Accrual	
2017	All	Zero-deficit	Accrual	
2018	All	Zero-deficit	Accrual	
2019	All	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. Requirements for 2011 were then modified by art.1 of L.220/2010.

Table A.2: Balance Sheet Items from Pre-2015 Model (CCOU) and Post-2015 Model (CCOX)

Model	CCOU					CCOX				
Item	*Quadro*	*Voce*	*Colonna*			*Quadro*	*Voce*	*Colonna*		
			Accrual	Cash	Residual			Accrual	Cash	Residual
Revenues										
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					
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					
Fiscal federalism revenues	2	67	1	2	3					
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 revenues	2	430	1	2	3	3	130	8	7	2
Expenditures										
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 expenditures	3	50	1	2	3	5	90	8	7	2

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

Table A.3: Descriptive Statistics (Full Sample)

	Count	Mean	St. Dev.	P10	P90	Total
Period: 2007-2012						
Total budget	33,610	11,630	96,198	1,148	17,127	390,899,548
Fiscal revenues	33,610	3,697	30,679	245	5,995	124,240,142
Non-fiscal revenues	33,610	1,735	21,792	111	2,606	58,301,638
Revenues from capital transfers	33,610	1,932	24,300	87	3,010	64,942,761
Curr. expenditures	33,610	7,241	60,659	688	10,887	243,374,757
Capital expenditures	33,610	2,385	28,238	138	3,692	80,154,161
Total income declared	33,610	108,979,715	751,632,018	8,388,570	187,807,880	3,662,808,221,310
Labor income declared	33,610	57,323,343	390,931,134	4,173,840	101,863,825	1,926,637,549,403
Self-entrepreneurship income decl.	33,610	5,267,338	51,751,893	188,625	8,077,614	177,035,221,810
Capital income decl.	33,610	9,543,522	68,938,787	442,013	17,033,919	320,757,765,551
Freq. income 0-15,000	33,610	2,791	12,482	320	5,198	93,806,411
Freq. income 15,000-26,000	33,610	1,815	8,689	162	3,457	61,007,551
Freq. income > 26,000	33,610	1,259	9,823	69	2,092	42,320,490
Period: 2013-2015						
Total budget	20,807	13,181	112,800	1,087	19,104	274,248,891
Fiscal revenues	20,807	5,914	44,239	445	9,740	123,046,764
Non-fiscal revenues	20,807	1,848	23,517	108	2,702	38,459,827
Revenues from capital transfers	20,807	1,628	14,757	50	2,860	33,865,694
Curr. expenditures	20,807	7,870	73,755	673	12,075	163,752,076
Capital expenditures	20,807	1,893	17,268	65	3,238	39,381,256
Total income declared	20,807	116,662,353	814,699,602	8,026,806	204,846,224	2,427,393,580,244
Labor income declared	20,807	60,414,856	415,776,245	3,844,104	110,905,303	1,257,051,910,210
Self-entrepreneurship income decl.	20,807	9,327,854	71,085,682	551,107	15,580,202	194,084,664,348
Capital income decl.	20,807	8,816,965	63,791,444	389,385	15,982,554	183,454,597,923
Freq. income 0-15,000	20,807	2,512	11,904	253	4,758	52,257,752
Freq. income 15,000-26,000	20,807	1,715	8,126	144	3,324	35,694,259
Freq. income > 26,000	20,807	1,372	10,332	71	2,362	28,546,566
Period: 2016-2018						
Total budget	20,350	14,626	137,578	1,165	20,765	297,644,450
Fiscal revenues	20,350	5,797	45,662	448	9,361	117,971,380
Non-fiscal revenues	20,350	1,986	23,112	111	2,954	40,416,460
Revenues from capital transfers	20,350	1,389	11,209	48	2,379	28,256,850
Curr. expenditures	20,350	7,987	70,376	697	12,330	162,526,020
Capital expenditures	20,350	1,504	9,001	86	2,716	30,614,588
Total income declared	20,350	126,424,075	870,454,630	9,073,736	222,636,320	2,572,729,934,498
Labor income declared	20,350	66,687,281	449,912,872	4,475,370	122,782,228	1,357,086,162,725
Self-entrepreneurship income decl.	20,350	9,413,462	73,484,128	535,052	15,562,734	191,563,960,339
Capital income decl.	20,350	9,054,309	65,986,535	414,293	16,264,128	184,255,189,129
Freq. income 0-15,000	20,350	2,502	11,976	254	4,680	50,925,405
Freq. income 15,000-26,000	20,350	1,755	7,970	157	3,430	35,707,585
Freq. income > 26,000	20,350	1,521	10,984	86	2,636	30,947,511

Notes: The table reports descriptive statistics of the sample after dropping municipalities that were merged, and restricting to municipalities with no missing information between 2007 and 2018. Monetary values are in 2012 Euros.

Table A.4: Descriptive Statistics (Selected Sample)

	Count	Mean	St. Dev.	P10	P90	Total
Period: 2007-2012						
Total budget	5,074	5,205	2,853	3,071	8,030	26,411,463
Fiscal revenues	5,074	1,860	1,099	924	2,912	9,439,201
Non-fiscal revenues	5,074	756	798	279	1,301	3,837,040
Revenues from capital transfers	5,074	926	1,709	161	1,892	4,698,411
Curr. expenditures	5,074	3,132	1,271	2,047	4,420	15,892,447
Capital expenditures	5,074	1,209	1,839	227	2,489	6,131,931
Total income declared	5,074	55,988,832	17,736,808	33,068,016	80,695,240	284,087,333,640
Labor income declared	5,074	30,073,178	10,230,294	17,415,668	44,310,776	152,591,306,996
Self-entrepreneurship income decl.	5,074	2,159,301	1,843,604	692,005	4,822,989	10,956,292,219
Capital income decl.	5,074	4,816,191	2,794,988	1,547,302	8,160,609	24,437,352,668
Freq. income 0-15,000	5,074	1,674	453	1,133	2,281	8,494,818
Freq. income 15,000-26,000	5,074	1,087	362	575	1,574	5,513,387
Freq. income $>$ 26,000	5,074	580	252	274	927	2,941,435
Period: 2013-2015						
Total budget	3,047	5,816	3,678	3,054	9,639	17,722,571
Fiscal revenues	3,047	2,919	1,846	1,732	4,449	8,893,951
Non-fiscal revenues	3,047	798	692	293	1,412	2,431,133
Revenues from capital transfers	3,047	915	1,810	107	1,988	2,787,579
Curr. expenditures	3,047	3,429	1,601	2,157	4,862	10,448,394
Capital expenditures	3,047	1,021	1,948	115	2,325	3,109,579
Total income declared	3,047	62,221,824	19,948,740	36,335,092	90,227,440	189,589,898,978
Labor income declared	3,047	33,062,563	11,753,872	18,332,301	49,504,198	100,741,630,194
Self-entrepreneurship income decl.	3,047	4,773,777	1,979,808	2,626,048	7,305,872	14,545,697,309
Capital income decl.	3,047	4,640,220	2,665,786	1,627,681	7,649,623	14,138,749,820
Freq. income 0-15,000	3,047	1,524	424	1,030	2,112	4,644,223
Freq. income 15,000-26,000	3,047	1,068	343	594	1,529	3,254,595
Freq. income $>$ 26,000	3,047	682	295	313	1,095	2,077,633
Period: 2016-2018						
Total budget	3,046	5,963	3,474	3,164	9,975	18,164,654
Fiscal revenues	3,046	2,693	1,311	1,727	3,742	8,204,096
Non-fiscal revenues	3,046	814	817	290	1,474	2,477,991
Revenues from capital transfers	3,046	706	1,003	106	1,566	2,151,743
Curr. expenditures	3,046	3,425	1,649	2,143	4,876	10,432,212
Capital expenditures	3,046	847	940	172	1,751	2,578,665
Total income declared	3,046	65,831,931	21,902,948	37,730,180	96,559,328	200,524,062,294
Labor income declared	3,046	35,645,755	12,828,313	19,726,300	53,820,543	108,576,970,776
Self-entrepreneurship income decl.	3,046	4,568,505	2,081,158	2,286,246	7,185,275	13,915,665,973
Capital income decl.	3,046	4,693,262	2,902,008	1,598,401	7,863,386	14,295,675,769
Freq. income 0-15,000	3,046	1,458	402	989	2,013	4,441,749
Freq. income 15,000-26,000	3,046	1,071	336	612	1,527	3,262,925
Freq. income $>$ 26,000	3,046	752	321	351	1,196	2,289,237

Notes: The table reports descriptive statistics of the sample after dropping municipalities from autonomous regions with special statute, municipalities that were merged, and restrict to municipalities with no missing information between 2007 and 2018, having a number of inhabitants between 3,500 and 6,500 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 A.5: Effect of DSP on Surplus and Local Income (Restricted Panel)

VARIABLES	(1) Surplus to Income 2012	(2) Log Income pC	(3) Surplus to Income 2012	(4) Log Income pC	(5) Surplus to Income 2012	(6) Log Income pC	(7) Surplus to Income 2012	(8) Log Income pC
DSP	0.00839**	-0.00124	0.01323***	-0.00130	0.00982***	-0.00141	0.00886***	0.00001
	(0.00390)	(0.00629)	(0.00367)	(0.00553)	(0.00314)	(0.00479)	(0.00283)	(0.00439)
Observations	4,516	4,516	6,036	6,036	7,557	7,557	9,139	9,139
R-squared	0.57089	0.99199	0.55980	0.99170	0.56525	0.99191	0.56635	0.99148
Years	2007-2015	2007-2015	2007-2015	2007-2015	2007-2015	2007-2015	2007-2015	2007-2015
Bandwidth	750	750	1000	1000	1250	1250	1500	1500
Mean in 2012	-0.0251	9.389	-0.0255	9.393	-0.0253	9.397	-0.0256	9.393
Specification		Diff-in-disc		Diff-in-disc		Diff-in-disc		Diff-in-disc
F-stat		4.618		12.975		9.733		9.816
Multiplier		.148		.098		.143		0
		[.745]		[.416]		[.487]		[.496]
H0: Multiplier > 1.5		.035		0		.003		.001

Notes: The table reports difference-in-discontinuities estimates of the effect of the 2013 extension of the Domestic Stability Pact (DSP) to Italian Municipalities between 1,000 and 5,000 residents on their net budget surplus and the log of municipal per-capita income. We report the estimated coefficient $\hat{\gamma}$ from specification (1), limiting the time frame to the 2007-2015 period, before the municipal balance sheet format changes. The table presents results from our benchmark specification with several population bandwidth (i.e., 750, 1,000, 1,250, and 1,500 residents around the threshold of 5,000 residents). Standard errors are clustered at the municipality level. The reported F-statistic on the excluded instrument corresponds to the Kleibergen-Paap F-statistic for weak identification. The multiplier estimate and its standard errors are obtained from an IV regression with log income per-capita as the dependent variable and net budget surplus as the main independent variable, instrumented by the DSP dummy. The last row reports the p-values obtained from one-sided tests for the multiplier being below 1.5.

Table A.6: Effect of DSP on Surplus and Local Income (Including Sardinia and Sicily)

VARIABLES	(1) Surplus to Income 2012	(2) Log Income pC	(3) Surplus to Income 2012	(4) Log Income pC	(5) Surplus to Income 2012	(6) Log Income pC	(7) Surplus to Income 2012	(8) Log Income pC
DSP	0.00368	-0.00311	0.00778***	0.00026	0.00508**	0.00045	0.00468**	-0.00019
	(0.00292)	(0.00850)	(0.00270)	(0.00731)	(0.00236)	(0.00644)	(0.00214)	(0.00580)
Observations	6,441	6,441	8,708	8,708	10,892	10,892	13,229	13,229
R-squared	0.61019	0.98905	0.60930	0.98875	0.62033	0.98879	0.62497	0.98853
Years	2007-2018	2007-2018	2007-2018	2007-2018	2007-2018	2007-2018	2007-2018	2007-2018
Bandwidth	750	750	1000	1000	1250	1250	1500	1500
Mean in 2012	-0.0289	9.362	-0.0299	9.363	-0.0302	9.367	-0.0308	9.361
Specification		Diff-in-disc		Diff-in-disc		Diff-in-disc		Diff-in-disc
F-stat		1.590		8.300		4.633		4.785
Multiplier		.843		-.034		-.088		.041
		[2.30]		[.941]		[1.27]		[1.23]
H0: Multiplier > 1.5		.388		.052		.107		.12

Notes: The table reports difference-in-discontinuities estimates of the effect of the 2013 extension of the Domestic Stability Pact (DSP) to Italian Municipalities between 1,000 and 5,000 residents on their net budget surplus and the log of municipal per-capita income. We report the estimated coefficient $\hat{\gamma}$ from specification (1), expanding the sample of our benchmark specification to include municipalities in the autonomous regions of Sardinia and Sicily. The table presents results from our benchmark specification with several population bandwidth (i.e., 750, 1,000, 1,250, and 1,500 residents around the threshold of 5,000 residents). Standard errors are clustered at the municipality level. The reported F-statistic on the excluded instrument corresponds to the Kleibergen-Paap F-statistic for weak identification. The multiplier estimate and its standard errors are obtained from an IV regression with log income per-capita as the dependent variable and net budget surplus as the main independent variable, instrumented by the DSP dummy. The last row reports the p-values obtained from one-sided tests for the multiplier being below 1.5.

Table A.7: Composition of the Municipal Budget Shock Induced by DSP Extension (Restricted Panel)

VARIABLES	(1) Curr. Surpl. to Income 2012	(2) Cap. Surpl. to Income 2012	(3) Cur. Rev. to Income 2012	(4) Cur. Exp. to Income 2012	(5) Cap. Rev. to Income 2012	(6) Cap. Exp. to Income 2012	(7) Borrow. to Income 2012
DSP	0.00069	0.01110***	-0.00022	-0.00123	0.00014	-0.01099***	-0.00845***
	(0.00147)	(0.00264)	(0.00192)	(0.00125)	(0.00067)	(0.00276)	(0.00271)
Observations	6,036	6,036	6,036	6,036	6,036	6,036	6,036
R-squared	0.67611	0.45314	0.82673	0.93009	0.34415	0.45780	0.60749
Years	2007-2015	2007-2015	2007-2015	2007-2015	2007-2015	2007-2015	2007-2015
Bandwidth	1000	1000	1000	1000	1000	1000	1000
Mean in 2012	-0.0108	-0.0151	0.0483	0.0593	0.00542	0.0167	0.00727

Notes: The table reports difference-in-discontinuities estimates of the effect of the 2013 extension of the Domestic Stability Pact (DSP) to Italian Municipalities between 1,000 and 5,000 residents on the different components of their net budget surplus. We report the estimated coefficient $\hat{\gamma}$ from specification (1) for several different outcome variables, limiting the time frame to the 2007-2015 period, before the municipal balance sheet format changes. Specifically, columns (1) and (2) report the impact on current and capital surplus, respectively. Columns (3) to (6) report the impact on current revenues, current expenditures, capital revenues, and capital expenditures, respectively. Finally, column (7) reports the impact on municipal borrowings. All outcome variables are scaled by 2012 total income of municipal residents. The table presents results from our benchmark specification with a population bandwidth of 1,000 residents around the threshold of 5,000 residents. Standard errors are clustered at the municipality level.

Table A.8: Composition of the Change in Expenditures Induced by DSP Extension

	(1) Cur. Exp. to Income 2012	(2) Mean DV	(3) Cap. Exp. to Income 2012	(4) Mean DV
Administration	-0.00147	0.01996	-0.00095	0.00319
	(0.00126)		(0.00199)	
Culture	-0.00013	0.00116	-0.00066	0.00073
	(0.00011)		(0.00057)	
Justice	-0.00001	0.00005	-0.00002	0.00002
	(0.00001)		(0.00002)	
School	0.00011	0.00579	-0.00087	0.00252
	(0.00016)		(0.00076)	
Police	-0.00004	0.00274	0.00000	0.00009
	(0.00016)		(0.00003)	
Utilities	-0.00004	0.00050	-0.00039	0.00042
	(0.00010)		(0.00037)	
Social services	-0.00129	0.00682	0.00048	0.00164
	(0.00097)		(0.00065)	
Sport Facilities	0.00014*	0.00094	-0.00123***	0.00101
	(0.00008)		(0.00039)	
Economic Development	0.00008	0.00025	0.00024	0.00043
	(0.00006)		(0.00078)	
Urban Planning	-0.00023	0.01300	-0.00380*	0.00696
	(0.00091)		(0.00220)	
Tourism	0.00001	0.00043	0.00013	0.00049
	(0.00012)		(0.00034)	
Roads and Transp.	-0.00000	0.00529	-0.00095	0.00488
	(0.00025)		(0.00086)	

Notes: The table reports difference-in-discontinuities estimates of the effect of the 2013 extension of the Domestic Stability Pact (DSP) to Italian Municipalities between 1,000 and 5,000 residents on the different components of their net budget surplus. We report the estimated coefficient $\hat{\gamma}$ from specification (1) for current and capital expenditures normalized by the 2012 total income of municipal residents. The table presents results from our benchmark specification with a population bandwidth of 1,000 residents around the threshold of 5,000 residents. Standard errors are clustered at the municipality level.

Table A.9: Effect of DSP on Neighborhood Surplus and Spillover on Local Income (Upper Panel: Municipalities 5,000-20,000 residents; Lower Panel: 5,000-10,000 residents)

VARIABLES	(1) Net Surplus to Income 2012	(2) Log Income pC	(3) Net Surplus to Income 2012	(4) Log Income pC
% of Neighborhood-level Income under DSP	0.01489***	-0.00438	0.01563***	0.00368
× Post-2013	(0.00500)	(0.01124)	(0.00496)	(0.01047)
Observations	11,532	11,532	11,532	11,532
R-squared	0.82962	0.99044	0.87044	0.99227
Time trend	-	-	Region	Region
Mean in 2012	-0.0226	9.420	-0.0226	9.420
F-stat		8.857		9.955
Multiplier		.294		-.235
		[.769]		[.667]
H0: Multiplier > 1.5		.059		.005

VARIABLES	(1) Net Surplus to Income 2012	(2) Log Income pC	(3) Net Surplus to Income 2012	(4) Log Income pC
% of Neighborhood-level Income under DSP	0.01184***	-0.00855	0.01359***	-0.00489
× Post-2013	(0.00384)	(0.00951)	(0.00381)	(0.00893)
Observations	18,336	18,336	18,336	18,336
R-squared	0.82581	0.99119	0.86740	0.99278
Time trend	-	-	Region	Region
Mean in 2012	-0.0214	9.422	-0.0214	9.422
F-stat		9.494		12.729
Multiplier		.721		.36
		[.849]		[.673]
H0: Multiplier > 1.5		.18		.045

Notes: The table reports the impact of neighborhood-level exposure to the 2013 extensions of the Domestic Stability Pact (DSP) on neighborhood-level net budget surplus and municipal log per-capita income. The upper panel reports the results for municipalities with 2011 population ranging between 5,000 and 10,000 residents. The lower panel reports the results for municipalities with 2011 population ranging between 5,000 and 20,000 residents. Columns (1) and (3) report the coefficient $\hat{\gamma}$ from specification (2) with neighborhood-level net budget surplus scaled by neighborhood level income in 2012 as the dependent variable (i.e., first-stage regression). Columns (2) and (4) report the coefficient $\hat{\gamma}$ from specification (2) with municipal log per-capita income as the dependent variable (i.e., reduced-form regression). Columns (3) and (4) include region-specific time fixed effect. Standard errors are clustered at the municipality level. The reported F-statistic on the excluded instrument corresponds to the Kleibergen-Paap F-statistic for weak identification. The multiplier estimate and its standard errors are obtained from an IV regression with municipal log income per-capita as the dependent variable and the neighborhood-level net budget surplus as the main independent variable, instrumented by the neighborhood-level exposure to the 2013 DSP extension interacted with a dummy taking value 1 for all years after 2012. The last row reports the p-values obtained from one-sided tests for the multiplier being below 1.5.

Table A.10: Effect of DSP on Neighborhood Surplus and Spillover on Local Income (Municipalities 5,000-15,000 residents)

VARIABLES	(1) Net Surplus to Income 2012	(2) Log Income pC	(3) Net Surplus to Income 2012	(4) Log Income pC	(5) Net Surplus to Income 2012	(6) Log Income pC	(7) Net Surplus to Income 2012	(8) Log Income pC
% of Neighborhood-level Income under DSP	0.00817**	-0.00863	0.01237***	-0.00560	0.01123***	-0.00908	0.00950**	0.01313
× Post-2013	(0.00355)	(0.00835)	(0.00412)	(0.00995)	(0.00354)	(0.01296)	(0.00446)	(0.02283)
Observations	15,936	15,936	16,176	16,176	16,224	16,224	16,236	16,236
R-squared	0.78296	0.99102	0.82850	0.99110	0.85279	0.99102	0.87234	0.99091
Radius	15 min.	15 min.	20 min.	20 min.	25 min.	25 min.	30 min.	30 min.
Time trend	-	-	-	-	-	-	-	-
Mean in 2012	-0.0226	9.422	-0.0217	9.420	-0.0213	9.420	-0.0214	9.420
F-stat		5.293		9.000		10.083		4.539
Multiplier		1.056		.453		.808		-1.381
		[1.11]		[.827]		[1.16]		[2.73]
H0: Multiplier > 1.5		.346		.103		.277		.146

VARIABLES	(1) Net Surplus to Income 2012	(2) Log Income pC	(3) Net Surplus to Income 2012	(4) Log Income pC	(5) Net Surplus to Income 2012	(6) Log Income pC	(7) Net Surplus to Income 2012	(8) Log Income pC
% of Neighborhood-level Income under DSP	0.00912***	-0.00222	0.01439***	-0.00051	0.01374***	-0.01528	0.01222***	0.01257
× Post-2013	(0.00339)	(0.00773)	(0.00408)	(0.00930)	(0.00321)	(0.01255)	(0.00421)	(0.02253)
Observations	15,936	15,936	16,176	16,176	16,224	16,224	16,236	16,236
R-squared	0.82369	0.99264	0.87065	0.99275	0.89803	0.99267	0.91718	0.99254
Radius	15 min.	15 min.	20 min.	20 min.	25 min.	25 min.	30 min.	30 min.
Time trend	Region	Region	Region	Region	Region	Region	Region	Region
Mean in 2012	-0.0226	9.422	-0.0217	9.420	-0.0213	9.420	-0.0214	9.420
F-stat		7.228		12.429		18.322		8.427
Multiplier		.243		.035		1.111		-1.028
		[.853]		[.646]		[.978]		[2.00]
H0: Multiplier > 1.5		.071		.012		.346		.104

Notes: The table reports the impact of neighborhood-level exposure to the 2013 extensions of the Domestic Stability Pact (DSP) on neighborhood-level net budget surplus and municipal log per-capita income. We vary the radius defining a neighborhood across pairs of columns. Specifically, columns (1) and (2) report results with 15-minute radius, columns (3) and (4) with 20-minute radius, columns (5) and (6) with 25-minute radius, and columns (7) and (8) with 30-minute radius. Columns (1), (3), (5), and (7) report the coefficient $\hat{\gamma}$ from specification (2) with neighborhood-level net budget surplus scaled by neighborhood level income in 2012 as the dependent variable (i.e., first-stage regression). Columns (2), (4), (6), and (8) report the coefficient $\hat{\gamma}$ from specification (2) with municipal log per-capita income as the dependent variable (i.e., reduced-form regression). In the lower panel, all columns include region-specific time fixed effect. Standard errors are clustered at the municipality level. The reported F-statistic on the excluded instrument corresponds to the Kleibergen-Paap F-statistic for weak identification. The multiplier estimate and its standard errors are obtained from an IV regression with municipal log income per-capita as the dependent variable and the neighborhood-level net budget surplus as the main independent variable, instrumented by the neighborhood-level exposure to the 2013 DSP extension interacted with a dummy taking value 1 for all years after 2012. The last row reports the p-values obtained from one-sided tests for the multiplier being below 1.5.

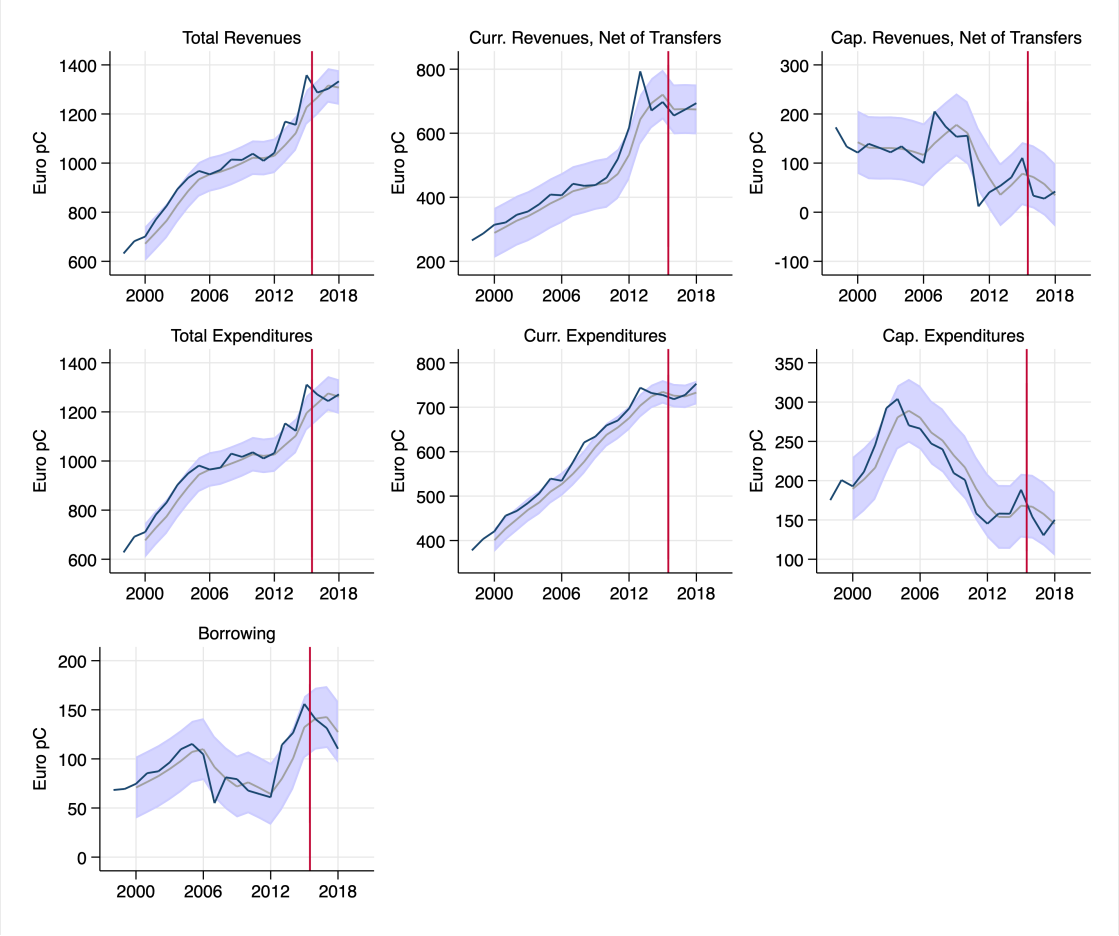
Table A.11: Effect of the DSP Extension on Neighborhood Surplus and Spillovers on Local Income (Including Sardinia and Sicily)

VARIABLES	(1) Net Surplus to Income 2012	(2) Log Income pC	(3) Net Surplus to Income 2012	(4) Log Income pC
% of Neighborhood-level Income under DSP	0.01081***	-0.00238	0.01431***	-0.00505
× Post-2013	(0.00417)	(0.00958)	(0.00417)	(0.00888)
Observations	17,868	17,868	17,868	17,868
R-squared	0.85074	0.99121	0.88561	0.99339
Time trend	-	-	Region	Region
Mean in 2012	-0.0256	9.381	-0.0256	9.381
F-stat		6.702		11.775
Multiplier		.219		.352
		[.893]		[.638]
H0: Multiplier > 1.5		.076		.036

Notes: The table reports the impact of neighborhood-level exposure to the 2013 extensions of the Domestic Stability Pact (DSP) on neighborhood-level net budget surplus and municipal log per-capita income. We expand the sample of our benchmark specification to include municipalities located in the autonomous regions of Sardinia and Sicily. Columns (1) and (3) report the coefficient $\hat{\gamma}$ from specification (2) with neighborhood-level net budget surplus scaled by neighborhood level income in 2012 as the dependent variable (i.e., first-stage regression). Columns (2) and (4) report the coefficient $\hat{\gamma}$ from specification (2) with municipal log per-capita income as the dependent variable (i.e., reduced-form regression). Columns (3) and (4) include region-specific time fixed effect. Standard errors are clustered at the municipality level. The reported F-statistic on the excluded instrument corresponds to the Kleibergen-Paap F-statistic for weak identification. The multiplier estimate and its standard errors are obtained from an IV regression with municipal log income per-capita as the dependent variable and the neighborhood-level net budget surplus as the main independent variable, instrumented by the neighborhood-level exposure to the 2013 DSP extension interacted with a dummy taking value 1 for all years after 2012. The last row reports the p-values obtained from one-sided tests for the multiplier being below 1.5.

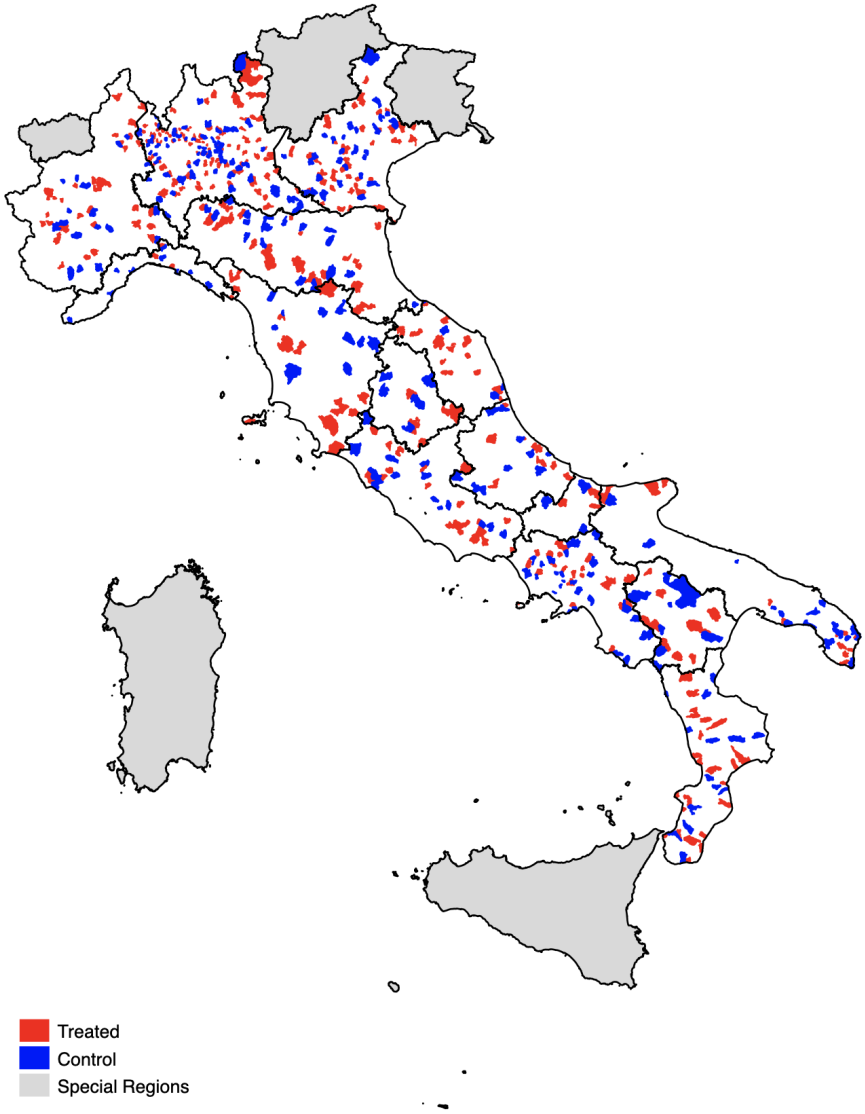
B Additional Figures

Figure B.1: Stability in Match Between Balance-Sheet Variables in the Pre-2015 Model (CCOU) and Post-2015 Model (CCOX)



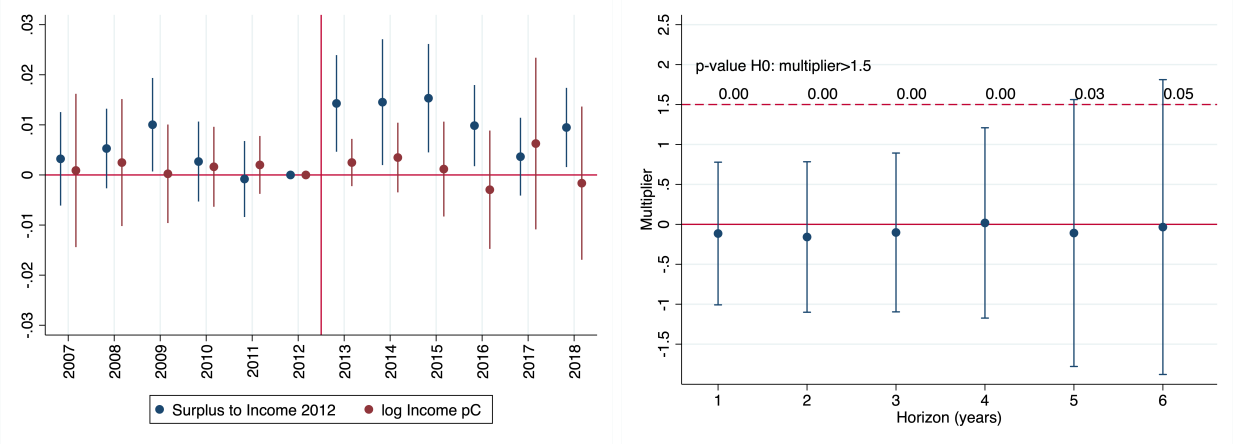
Notes: The figure reports time series (blue lines) and MA3 trends (gray lines) with 95% confidence intervals of the per-capita mean of our main balance-sheet variables of interest. Values are in 2012 Euros. The vertical red line between 2015 and 2016 highlights the year in which the format of municipal balance sheets changed. No clear discontinuity is visible between 2015 and 2016 in any of the variables considered.

Figure B.2: Treated and Control Municipalities



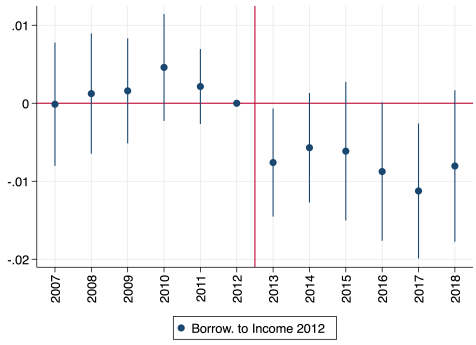
Notes: The figure shows treated and control municipalities used in the main analysis. Treated municipalities are the ones with a population between 4,000 and 5,000 in 2011. Control municipalities are the ones with a population between 5,001 and 6,000 in 2011. Municipalities in the 5 autonomous regions with a special statute, as well as municipalities that merged at some point in the period of the analysis, are excluded.

Figure B.3: Dynamic Effects of DSP on Net Budget Surplus and Local Income (Including Sardinia and Sicily)

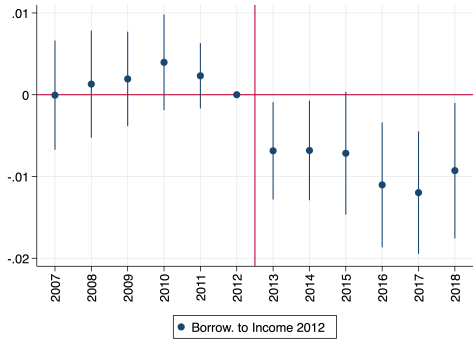


Notes: The left-hand panel of the figure displays difference-in-discontinuities estimates of the effect of the extension of the Domestic Stability Pact (DSP) to Italian Municipalities below 5,000 residents from 2013 on their net budget surplus and the log of municipal per-capita income. We expand the sample of our benchmark specification to include municipalities located in the autonomous regions of Sardinia and Sicily. The net budget surplus is scaled by 2012 total income of municipal residents. We report the estimated coefficients $\hat{\gamma}_t$ from specification (1) in its fully dynamic form. Standard errors are clustered at the municipality level. The multiplier estimate and its standard errors are displayed on the right-hand panel of the figure. They are the coefficients of an IV regression with log income per-capita as the dependent variable and net budget surplus as the main independent variable, instrumented by the DSP dummy, keeping observations only up to a specific horizon after the shock. The p-values displayed in the right-hand panel of the figure are obtained from one-sided tests for the multiplier being below 1.5.

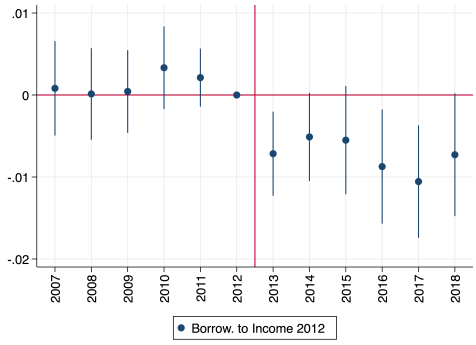
Figure B.4: Dynamic Effects of DSP on Municipal Borrowing



(a) Bandwidth: 750



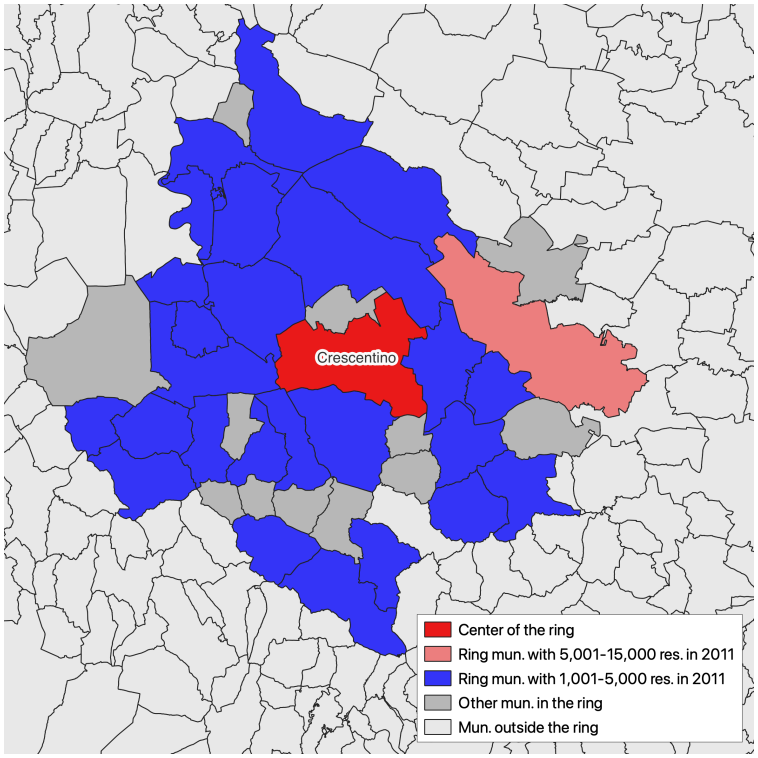
(b) Bandwidth: 1,000



(c) Bandwidth: 1,250

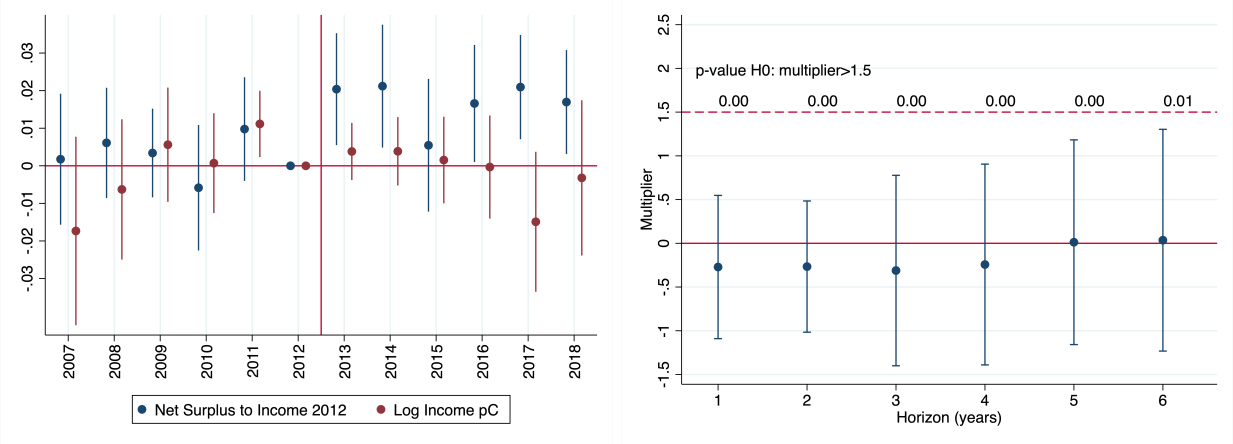
Notes: The figure reports difference-in-discontinuities estimates of the effect of the extension of the Domestic Stability Pact (DSP) to Italian Municipalities below 5,000 residents from 2013 on municipal borrowings. Panels (a), (b), and (c) display the coefficients $\hat{\gamma}_t$ from the fully dynamic version of specification (1) with municipal borrowing scaled by 2012 total income of municipal residents as the outcome variable. Panel (a), (b), and (c) differ in the bandwidth around the 5,000 resident population threshold (i.e., 750, 1,000, and 1,250, respectively). Standard errors are clustered at the municipality level.

Figure B.5: Ring around the municipality of Crescentino



Notes: The figure shows an example of a neighborhood used to estimate spillover effects in our analysis. The units of observations for our benchmark analysis are municipalities with 2011 population between 5,001 and 15,000 residents, not subject to the 2013 DSP extension. Around these units of observations we define neighborhoods of 20-minute drive. The dark red municipality at the center of the neighborhood is one of our unit of observations (i.e., Crescentino). The blue municipalities around are the ones subject to the 2013 DSP extension within the neighborhood we defined. The light red municipality is another unit of observation of our analysis, whose neighborhood is not shown in this figure. Dark gray municipalities lie within the neighborhood defined, but are not subject to the 2013 DSP extension nor one of our units of observation. Light gray municipalities are outside the neighborhood defined. The logic of our analysis is the following. The share of income of the defined neighborhood accruing to the blue municipalities interacted with a dummy that takes value 1 for all years after 2012 is our instrument for the neighborhood-level fiscal consolidation shock that affects income in Crescentino. In our robustness checks, we vary the size of the neighborhood (i.e., 15, 25, 30-minute drive, as well as the 2011 population ranges to define our units of observations (i.e., 5,000-10,000 and 5,000-20,000).

Figure B.6: Dynamic Effects of DSP on Neighborhood Surplus and Spillover on Local Income



Notes: The figure reports the impact of neighborhood-level exposure to the 2013 extensions of the Domestic Stability Pact (DSP) on neighborhood-level net budget surplus and municipal log per-capita income. The blue dots display the coefficients $\hat{\gamma}_t$ from specification (2) with neighborhood-level net budget surplus scaled by neighborhood level income in 2012 as the dependent variable (i.e., first-stage regression). The red dots display the coefficients $\hat{\gamma}_t$ from specification (2) with municipal log per-capita income as the dependent variable (i.e., reduced-form regression). The specifications include controls for region-specific time trends. Standard errors are clustered at the municipality level. The multiplier estimate and its standard errors are displayed on the right-hand panel of the figure. They are the coefficients of an IV regression with log income per-capita as the dependent variable and neighborhood-level net budget surplus as the main independent variable, instrumented by the share of 2012 income subject to the DSP from 2013 interacted with a dummy taking value 1 for all years after 2012, keeping observations only up to a specific horizon after the shock. The p-values displayed in the right-hand panel of the figure are obtained from one-sided tests for the multiplier being below 1.5.