Balanced Budget Requirements and Local Austerity Multipliers

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Abstract

Fiscal consolidation often entails balanced budget requirements (BBRs) imposed to 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. Using a two-stage least squares difference-in-discontinuities design, we document that tighter rules pushed local governments to increase their budget surplus and correspondingly reduce their borrowings by about 1% of local income. Treated municipalities cut capital expenditures, rather than decreasing current expenditures or raising taxes. The estimated local fiscal multiplier is not statistically different from zero and significantly lower than 1.5, the prevailing estimate in the literature. The result holds even after accounting for spatial and public procurement network spillovers. Overall, our findings point to a relatively low short-term local output cost of BBRs.

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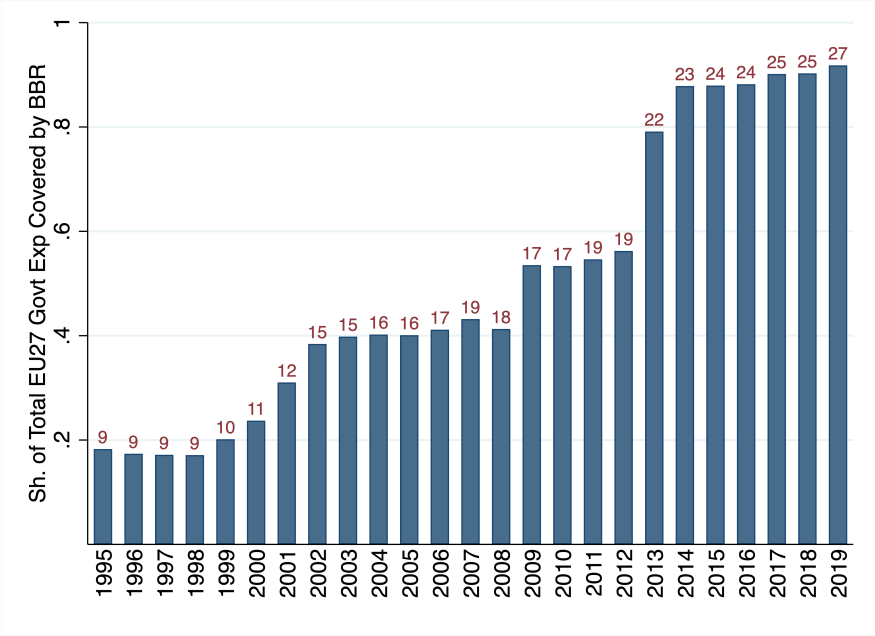
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1 Introduction

Fiscal consolidation programs often entail balanced budget requirements (BBRs) for local governments. These requirements typically involve zero-deficit rules imposed by central governments to discipline public finances of sub-national governments and ensure their participation in consolidation efforts. As shown by Figure 1, all EU-27 countries had BBRs in place in 2019 and the share of their aggregate government expenditures subject to these rules has increased over time, reaching around 90% in 2019. Similar constitutional or statutory limits on state and local government deficits exist 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, if 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 to local governments. Unfortunately, BBRs are not randomly assigned and detailed longitudinal information about local public finances is rarely 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 stem from temporary

windfall expansionary shocks rather than permanent fiscal adjustments apt to maintain the intertemporal budget balance (Clemens and Miran, 2012). It is reasonable to hypothesize that these multipliers differ, as local governments endogenously seek to minimize the impact of fiscal consolidations on their constituencies.

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 their budget surplus by about 1% of municipal 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 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 baseline estimate of the local fiscal multiplier is 0.25, not significantly different from zero, and we can exclude it is higher than 1.5 with 95% confidence within six years from the shock.

This estimate is lower than the prevailing estimates in the literature around or above 1.5 (Serrato and Wingender, 2016; Corbi et al., 2019; Shoag, 2013; Pennings, 2021). Such differences can be rationalized in several ways. First, crowding-out effects on firms (Pinardon-Touati, 2021) or "Ricardian" effects on consumers (Clemens and Miran, 2012) can differentiate permanent local budget changes from transitory windfalls stemming from central government spending. Second, the size of the fiscal multiplier depends on numerous characteristics of the policies and the recipient local economies (Ramey, 2016, 2019). For example, Clemens et al. (2022)'s estimates of the windfall multiplier associated with the pandemic federal aid to state and local governments in the US are centered around zero.

Another hypothesis is that fiscal contractions enacted by small municipalities mostly affect neighboring municipalities, suggesting that higher openness entails lower municipal multipliers (Farhi and Werning, 2016). Especially in the case of a fiscal contraction, local governments might deliberately resort to *beggar-thy-neighbor* policies and concentrate cuts on budget items disproportionately affecting other municipalities. We test this spillover mechanism by estimating spatial and network spillovers of municipal fiscal consolidation efforts. Specifically, we analyze how the income of residents in untreated municipalities is impacted by fiscal consolidation efforts from a) neighboring treated municipalities and b) treated municipalities awarding public procurement contracts to firms located in that untreated municipality. The estimated effect is small and not statistically significant in both cases, implying a local fiscal multiplier lower than 1.5 even after accounting for spatial and network spillovers. Overall, our results point to relatively low short-term output costs of fiscal consolidation implemented through the extension of BBRs to small municipalities.

This paper relates to two strands of the literature. First, we contribute to the literature on local fiscal

multipliers that reached a wide consensus on estimates ranging between 1.5 and 1.8 (Chodorow-Reich, 2019). This consensus is mostly based on studies that estimate 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).[1] Our study extends the literature to the European context and employs a novel and robust identification strategy. We estimate low and non-significant multipliers in contrast with the recent literature 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).

Second, we contribute to the literature on the effect of budgetary shocks on local public finance. Relaxing 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).[2] Our findings are in line with the latter stream of the literature, highlighting that cuts are concentrated in capital expenditures (Venturini, 2020; Mühlenweg and Gerling, 2023) and lead to persistent reductions in municipal borrowings.

The remainder of the paper is structured as follows. Section 2 details the institutional context, Section 3 outlines data and methods, Section 4 presents the results, and Section 5 concludes.

2 Institutional Setting

Municipalities are the lowest level of sub-national government in Italy, totaling around 8,000, with a median and mean 2011 population of about 2,500 and 7,400, respectively. 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 declined to 57 billion Euros in 2018 (3.2% of GDP).[3] Municipalities provide services including local administration, utilities and waste management, maintenance of public spaces, municipal roads and transportation, school buildings, social housing and services, sports facilities, and services for tourism and economic development. Revenues stem largely from own fiscal revenues (32%), namely property tax and a surcharge on the income tax, and from non-fiscal revenues (21%), like building permits, traffic fines, parking and utilities fees. Upper levels

[1] Other studies studying 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.Other relevant contributions in this literature include Shoag (2013), Leduc and Wilson (2013), Acconcia et al. (2014), Serrato and Wingender (2016), Adelino et al. (2017), and Corbi et al. (2019).

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

[3] 2004 and 2018 are respectively the first and last year present in our dataset.

of administration, the regional and central governments, 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, with 10% of the budget on average raised through loans or bonds.[4]

Since 1999, Italian municipalities have been subject to the so-called Domestic Stability Pact (DSP), designed to control municipal budget deficits. These rules were necessary as Italy struggled to meet the limitations imposed by the European Monetary Union on member states' general government deficit, including both central and local government deficits. Besides debt reduction and compliance with European rules, the central government sought to prevent moral hazard from lower levels of government (Alesina and Tabellini, 1990; Vannutelli, 2020). Bailouts or defaults among lower administrations are not uncommon in Italy,[5] a risk exacerbated by the low salience of municipal finances (Murtinu et al., 2022) and criminal infiltration (Acconcia et al., 2014; Fenizia and Saggio, 2020).

The rules of the DSP have evolved over time, as summarized in Appendix Table A.1. Between 1999 and 2004, the DSP targeted deficit growth, imposing either zero or minimal growth relative to two years before. In 2005-2006, a stricter joint cap on current and capital expenditures was enforced. From 2007, our period of interest, the DSP became a proper BBR, initially imposing zero-growth in deficit.[6] From 2011 onward, the DSP became increasingly restrictive, requiring a zero-deficit goal. Non-compliant municipalities were subject to penalties, including a cap on current expenditure growth, hiring freezes, borrowing bans, cuts to administrators' bonuses and wages, and reductions in 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.[7] 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 provided by the Italian Ministry of Interior and containing detailed information on revenues and expenditures of Italian municipalities from 1998 to 2018. We extract accrual-based revenues and expenditures, the break-

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

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

[6]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 expenditures were accounted on a cash basis.

[7]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.

down of revenues into fiscal vs. non-fiscal, borrowing and transfers, and the classification of expenditures into current and capital, along with their functional destinations.[8]

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 excludes 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 Italy's GDP. The dataset includes the total number of declarations, total income declared, income tax due, income from various sources (i.e., labor, self-employment, rents, pensions), and from declarations belonging to different tax brackets.

We build a dataset covering 2007-2018, including all municipalities with a recoverable fiscal code.[9] We then operate two restrictions to obtain our final sample. First, we keep only municipalities from the 15 ordinary regions.[10] Second, we drop municipalities that were merged, and restrict the dataset to municipalities with no missing balance sheet or income data between 2007 and 2018, thus obtaining a balanced panel.[11]

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 excluded from revenues as they are not generated within the municipality and do not represent 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 and express all monetary values in 2012 Euros.

Finally, we add driving times between municipalities estimated by the Italian Statistical Institute (ISTAT) and data on public procurement contracts collected by the Italian Authority for Public Contracts (ANAC). ANAC data include all public procurement contracts above €150,000 for 2000-2007 and above €40,000 for

[8] 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.

[9] 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, our pre-shock period; for 2013-2015, three years after the shock; and for 2016-2018, after the format change in balance sheet data.

[10] 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.

[11] Table A.4 in the Appendix reports descriptive statistics for the sample of our main analysis of municipalities between 3,500 and 6,500 residents in the 2011 census. 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.

2008-2016. We merge procurement companies' data to municipalities based on the company's headquarter's location web-scraped from the Italian Chamber of Commerce website.

4 Main Effects

4.1 Identification

To estimate the local fiscal multiplier of the DSP extension, we adopt a two-stage least squares (2SLS) difference-in-discontinuities approach (Grembi et al., 2016). Between 2001 and 2012, the DSP applied to municipalities with over 5,000 residents, and was extended to those with populations between 1,000 and 5,000 starting in 2013. Our treatment and control groups consist of municipalities just below and just above the 5,000-residents cutoff, respectively. Before 2013, treatment group municipalities are comparable in all fundamental characteristics to municipalities above the threshold, but differ sharply in BBR assignment and its related 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 traditional regression discontinuity assumptions invalid. Therefore, 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:

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

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 periods after 2012, 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 this impact to vary by group-year and assume it affects the outcome linearly. The remaining coefficient γ is the difference-in-discontinuities estimator capturing the impact of the BBR on the outcome variable Y_{it}. We also employ a fully dynamic specification, where we include a set of year-specific treatment dummies $\sum_{k \neq 2012} \gamma_k D_i \tau_k$ instead of $\gamma D_i T_t$, where τ_k is a dummy for a specific year. In the first-stage regression, Y_{it} is budget surplus as a share of baseline municipal residents' income. In the reduced-form regression, Y_{it} is the log of income normalized by population in 2011 ("per-capita income", thereafter). 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 failure of 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. In principle, 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 $\hat{\gamma}_k$ 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 in the first-stage regression captures the causal effect of the DSP extension on budget surplus as a share of baseline local income, $\gamma_k^{Surplus}$. The same coefficient in the reduced-form regression captures the percentage change in per-capita income caused by the DSP extension, γ_k^{Income}. 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 one percentage-point increase in budget surplus as a share of baseline local income. This ratio identifies the local fiscal multiplier induced by the BBR (Nakamura and Steinsson, 2014). Formally:

$$\frac{\gamma_k^{Income}}{\gamma_k^{Surplus}} = \mathbb{E}_{i,t=k}\left[\frac{\ln(Income_{i,t=k}/Pop_{i,2012}) - \ln(Income_{i,2012}/Pop_{i,2012})}{Surplus_{i,t=k}/Income_{i,2012} - Surplus_{i,2012}/Income_{i,2012}}\right] \tag{2}$$

$$= \mathbb{E}_{i,t=k}\left[\frac{\ln(Income_{i,t=k}) - \ln(Income_{i,2012})}{(Surplus_{i,t=k} - Surplus_{i,2012})/Income_{i,2012}}\right] \tag{3}$$

$$= \mathbb{E}_{i,t=k}\left[\frac{(Income_{i,t=k} - Income_{i,2012})/Income_{i,2012}}{(Surplus_{i,t=k} - Surplus_{i,2012})/Income_{i,2012}}\right] \tag{4}$$

$$= \mathbb{E}_{i,t=k}\left[\frac{Income_{i,t=k} - Income_{i,2012}}{Surplus_{i,t=k} - Surplus_{i,2012}}\right]. \tag{5}$$

4.2 Effects on 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 municipal 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. The first-stage 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. Despite 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 not

statistically different from zero and their magnitude is small, ranging between -0.36% and -0.14%.

Table 1: Effect of DSP on Surplus and Local Income

	(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
$D_i T_t$	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	6021	6021	8048	8048	10076	10076	12185	12185
R-squared	0.516	0.988	0.505	0.987	0.515	0.988	0.517	0.987
Bandwidth	750	750	1000	1000	1250	1250	1500	1500
Years	2007-2018	2007-2018	2007-2018	2007-2018	2007-2018	2007-2018	2007-2018	2007-2018
Mean in 2012	-0.02513	9.38875	-0.02552	9.39266	-0.02535	9.39733	-0.02564	9.39345
Effective F-stat	5.140		14.974		9.884		8.936	
Multiplier	.58		.251		.352		.226	
	[1.29]		[.694]		[.880]		[.919]	
H0: Multiplier > 1.5	.239		.036		.096		.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 Montiel-Olea Pflueger 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.

The implied fiscal multiplier is the ratio of reduced form to first-stage coefficients and can be estimated from a just-identified 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. Yet, this requires the DSP to be a sufficiently strong instrument. The first-stage cluster-robust Effective F-stats (Olea and Pflueger, 2013) suggest that the DSP is a stronger instrument when using a bandwidth of 1,000, which we adopt as our preferred specification. However, when using larger or smaller bandwidths the first-stage and reduced-form estimates are extremely close to the ones obtained using a 1,000-resident bandwidth, with a very significant first stage, and with F-stats sufficiently large to minimize weak-IV concerns. Recent results show that in our case of just-identified IVs over-rejection due to a weak instrument emerges only for exceptionally high levels of endogeneity of OLS estimates. Moreover, if assuming a positive first-stage sign – a very plausible hypothesis in our context – the median bias toward OLS of a weak IV estimate is virtually zero for expected F-stats larger than 5 (Angrist and Kolesár, 2024).[12] Therefore, we can safely test how the estimate of the local austerity multiplier varies using different bandwidths, finding a range between 0.23 and 0.58, never significantly different from zero.[13] In all these cases, standard errors imply that we can exclude with 95%

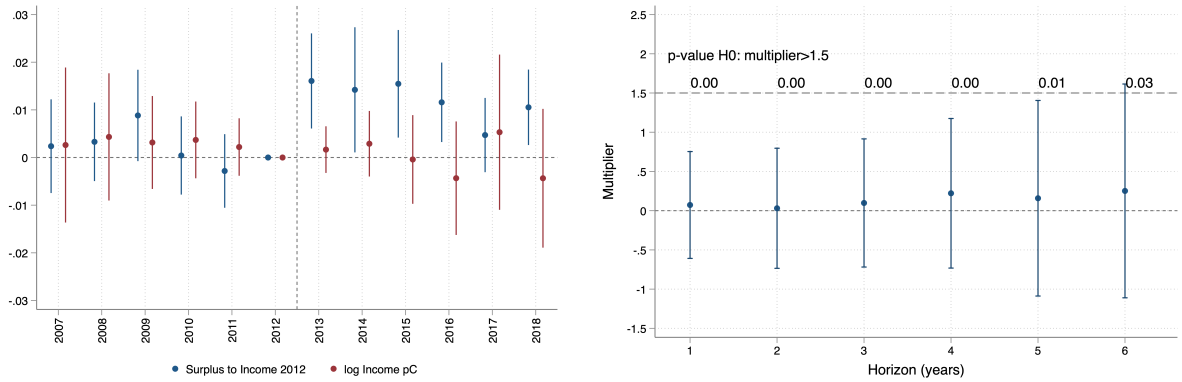
[12] Angrist and Kolesár (2024) leverage the fact that over-rejection due to weak instruments depends both from F-stats and from the extent of endogeneity of OLS estimates. They show that for expected F-stats above 7 one can exclude rejecting a true null more than 10% of the times for any level of endogeneity. For the same values of F-stats, one can exclude over-rejection with 5% confidence for extremely high levels of endogeneity in OLS estimates. The gain in having larger F-stats becomes smaller as F-stats grow. The bias toward OLS is also only about 5% for expected F-stats of 3.5.

[13] 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 a 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 residents (Calonico et al., 2014). In Table A.5 in the Appendix we report the optimal bandwidth values estimated following Calonico et al. (2018) on the RDD of long differences

confidence that the multiplier is 1.5 or larger.[14]

Figure 2 reports the results from the fully dynamic version of specification (1), with a selected bandwidth of 1,000 residents.[15] The left panel displays the estimated coefficients $\hat{\gamma}_k$ for the fully dynamic first-stage and reduced-form specifications. The dashed vertical gray 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 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.

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 $\hat{\gamma}_k$ 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.

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 1,000 and 2,500, according to different criteria for the estimator and bias-correction, cosistently with our choice of bandwiths in Table 1.

[14]Table A.6 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.7.

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

4.3 Effects on the Composition of Municipal Budget

In this section, we focus on the composition of the municipal fiscal adjustment. 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. The fiscal consolidation induced by the DSP extension is totally accounted for by an increase in the capital surplus. Columns (3)-(6) confirm this, breaking down the changes by total current and 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, column (6) indicates that capital expenditures decreased by 0.89% of local income, 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).[16] Column (7) provides further evidence by estimating the effect on new municipal borrowings. The coefficient is negative, significant, and its magnitude matches exactly the increase in net budget surplus reported in Table 2, column (3). Moreover, dynamic estimates in Appendix Figure B.4 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.[17]

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

	(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
$D_i T_t$	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	8048	8048	8048	8048	8048	8048	8048
R-squared	0.635	0.376	0.818	0.903	0.249	0.378	0.519
Bandwidth	1000	1000	1000	1000	1000	1000	1000
Years	2007-2018	2007-2018	2007-2018	2007-2018	2007-2018	2007-2018	2007-2018
Mean in 2012	-0.01077	-0.01504	0.04841	0.05933	0.00539	0.01661	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.

[16] Figure B.5 in the Appendix shows the coefficients estimated from the dynamic specification.

[17] Table A.8 in the Appendix re-runs the analysis focusing only on 2007-2015, when municipalities balance sheets format changes, finding similar results.

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.9 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.

5 Spillover Effects

We further investigate whether the increase in net budget surplus in treated municipalities had negative effects other, untreated, municipalities. If local economies are sufficiently interconnected, the BBRs could have a significantly attenuated impact on the treated municipality itself, as its effect is spread over a larger area including other municipalities not subject to the treatment. Indeed, the theoretical literature acknowledges that high openness in small local economies can reduce the size of the local fiscal multiplier (Farhi and Werning, 2016). This occurrence is even more likely in the case of a fiscal contraction, as local governments could deliberately try to concentrate cuts on budget items disproportionately affecting other municipalities rather than their own constituencies (i.e., *beggar-thy-neighbor* policies). In line with this intuition, we found in the previous section that municipalities becoming subject to DSP avoid raising taxes, a policy whose incidence falls entirely on residents, and rather cut capital expenditures often contracted out to firms located outside the municipality (Appendix Figure B.7).

To estimate spillover effects, we focus on untreated municipalities above 5,000 residents, limiting the sample to the ones up to 15,000 residents to maintain comparability with treated municipalities.[18] We test the possible propagation of budget cuts over two dimensions. First, spatial spillovers affecting neighboring municipalities. Second, network spillovers affecting municipalities where contractors to treated municipalities were located before the DSP extension. For spatial spillovers, we define a geographical neighborhood $\mathscr{O}_i$ around untreated municipality i including all municipalities in a radius of 20 minutes driving by car.[19] For network spillovers, $\mathscr{O}_i$ is instead the set of municipalities that assigned public procurement contracts to firms located in untreated municipality i before 2013.[20] In both cases, our instrument is the share of total income in the neighborhood accounted for by municipalities between 1,000 and 5,000 residents, denoted by $D_{\mathscr{O}_i}$, interacted with the post-2012 dummy, T_t.

[18] In Table A.10 in the Appendix, we provide robustness checks for different upper limits to the set of municipalities considered.

[19] 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 all results using neighborhoods defined with 15, 25, and 30-minute radius in Appendix Table A.11.

[20] We use ANAC data on public procurement contracts and information on firms' location to construct these networks.

We estimate

$$Y_{it} = \eta_i + \alpha_t + \gamma D_{\mathscr{O}_i} T_t + \sum_{t \neq 2012} \left[\beta_t p_{\mathscr{O}_i} + \delta_t p^2_{\mathscr{O}_i} + \theta_t p^3_{\mathscr{O}_i} \right] + \varepsilon_{it}, \tag{6}$$

where T_t denotes a dummy taking value 1 for all periods after 2012, η_i are municipality fixed effects, and α_t are time fixed effects. In the reduced-form regression, Y_{it} is the log of per-capita income in municipality i and γ identifies the change in the income of municipality i following the DSP extension, scaled as-if all municipalities in $\mathscr{O}_i$ became subject to the DSP. In the first-stage regression, Y_{it} is the neighborhood-level surplus divided by neighborhood-level 2012 income. This can also be seen as proxying the share of neighborhood-level surplus affecting municipality i by the ratio of municipality i income to neighborhood-level income. Specifically,

$$\frac{\sum_{j \in \mathscr{O}_i} Surplus_{j,t}}{\sum_{j \in \mathscr{O}_i} Income_{j,2012}} = \frac{\left(\sum_{j \in \mathscr{O}_i} Surplus_{j,t} \right) \left(\frac{Income_{i,2012}}{\sum_{j \in \mathscr{O}_i} Income_{j,2012}} \right)}{Income_{i,2012}}, \tag{7}$$

where j denotes a municipality in neighborhood $\mathscr{O}_i$ and i is an untreated municipality around which the neighborhood is drawn. Therefore, the ratio of the reduced-form to first-stage coefficients identifies the local fiscal multiplier induced by the introduction of BBRs in the municipalities belonging to $\mathscr{O}_i$:

$$\frac{\gamma_k^{Income}}{\gamma_k^{Surplus}} = \mathbb{E}_{i,t=k} \left[\frac{Income_{i,t=k} - Income_{i,2012}}{\left(\sum_{j \in \mathscr{O}_i} Surplus_{j,t=k} - \sum_{j \in \mathscr{O}_i} Surplus_{j,2012} \right) \left(\frac{Income_{i,2012}}{\sum_{j \in \mathscr{O}_i} Income_{j,2012}} \right)} \right] \tag{8}$$

which we can estimate using two-stage least squares IV regression.

Intuitively, equation (6) corresponds to a difference-in-differences specification with continuous treatment, where treatment dosage is $D_{\mathscr{O}_i}$. We compare income in untreated municipalities at the center of $\mathscr{O}_i$ in which more or less municipalities increased their surplus following the 2013 DSP extension. While in our difference-in-discontinuities approach to estimate direct effects we leveraged a sharp, as-good-as-random, discontinuity, the identifying variation in this case stems from being more or less connected to municipalities of different populations, which is more exposed to unobserved time-varying confounders. To neutralize this threat to identification, we allow for flexible (i.e., 3rd-degree polynomial) time-varying controls for baseline average population in $\mathscr{O}_i$, $p_{\mathscr{O}_i}$,[21] and include regional time trends to account for the large regional differences in income growth observed in the Italian context. We cluster standard errors at the municipality level.

Table 3 presents our results. Columns (1) and (3) display the estimates for the first-stage regressions. The coefficients are highly significant and close in magnitude to the one in Table 1, column (3), indicating that switching to DSP leads to a 1.2-1.6 percentage-point increase in neighborhood-level budget surplus as a share

[21] For the same reason, we exclude neighborhood municipalities above 100,000 residents from $\mathscr{O}_i$ in the case of network spillovers, as this makes the results extremely noisy. 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.

of income. Yet, columns (2) and (4) document a small impact on municipality i's income. In both cases, the estimated multiplier is only slightly positive, non-significant, and we can exclude a multiplier of 1.5 or above with more than 95% confidence.[22]

Table 3: Spillover Effect of DSP Extension on Geographic Neighborhoods and Procurement Networks

	Geographic networks		Public procurement networks	
	(1)	(2)	(3)	(4)
	Net Surplus to Income 2012	Log Income pC	Net Surplus to Income 2012	Log Income pC
% GDP of Neigh. under DSP	0.01555***	-0.00143	0.01173***	-0.00009
	(0.00402)	(0.00941)	(0.00335)	(0.00610)
Observations	16176	16176	9816	9816
R-squared	0.857	0.992	0.699	0.991
Mean in 2012	-0.02172	9.42025	-0.01983	9.42011
Effective F-stat	14.972		12.294	
Multiplier	.091		.007	
	[.608]		[.520]	
H0: Multiplier > 1.5	.01		.002	
Neigh./Networks characteristics				
Avg. N. mun.	29.45		4.54	
% treated mun.	0.18		0.14	
Avg. pop. (2012) per mun.	11,678		26,296	
Avg. income (2012) per capita	14,742		15,915	

Notes: The table reports the impact of neighborhood or network-level exposure to the 2013 extensions of the Domestic Stability Pact (DSP) on net budget surplus of the neighborhood or network, and on municipal log per-capita income of the center of the network. Columns (1) and (2) use neighborhoods based on geography; columns (3) and (4) use municipalities' networks obtained from public procurement data. Columns (1) and (3) report the coefficient $\hat{\gamma}$ from specification (6) with neighborhood/network net budget surplus scaled by neighborhood/network income in 2012 as the dependent variable (i.e., first-stage regression). Columns (2) and (4) report the coefficient $\hat{\gamma}$ from specification (6) with municipal log per-capita income as the dependent variable (i.e., reduced-form regression). Standard errors are clustered at the municipality level. The reported F-statistic on the excluded instrument corresponds to the Montiel-Olea and Pflueger effective F-statistic for weak instruments. The multiplier estimate and its standard errors are obtained from an IV regression. The last row reports the p-values obtained from one-sided tests for the multiplier being below 1.5.

The sum of the multipliers estimated in Table 1 and Table 3 captures a comprehensive estimate of the local economy multiplier including spatial and network spillovers. In other words, we estimate that if all municipalities in a neighborhood increased budget surplus by 1 percentage point of their income, income in each municipality would decrease by 0.25% due to the direct effect estimated in Table 1, and by at most 0.1% due to the effect of spillovers estimated in Table 3, column (2). Therefore, the implied local austerity multiplier comprising spillover effects is 0.35, still far below the prevailing estimate of 1.5 in the literature.

[22] We can also define a fully dynamic specification including $\sum_{k \neq 2012} \gamma_k D_{\mathscr{C}_i} \tau_k$ instead of $\gamma D_{\mathscr{C}_i} T_t$, as in Appendix Figure B.6, which confirms our results.

6 Conclusions

This paper estimates local austerity multipliers when fiscal consolidation is implemented through balanced budget requirements (BBRs) for local governments. Using the 2013 extension of strict fiscal rules to municipalities below 5,000 residents in Italy, we apply a difference-in-discontinuities approach to isolate the effect of budget tightening on local income. We find that tighter budget rules lead to higher budget surpluses (0.6-1% of local income), primarily from cuts in capital expenditures, which decrease municipal borrowings. We estimate a low and statistically insignificant local fiscal multiplier, never significantly different from zero and below 1.5 over a six-year horizon. We also test for the presence of spatial and network spillovers, finding similar results.

Our findings indicate that the local fiscal multiplier induced by BBRs is lower than the estimates prevailing in the literature. Such differences may arise from several factors. First, local governments react differently when they are forced to consolidate budgets versus relaxing them. Grembi et al. (2016) show that relaxing local budgets leads to higher deficits and lower taxes, while we find that budget tightening reduces deficits through cuts in capital expenditures. This asymmetry could stem from economic motives — if tax cuts are more expansionary than public capital spending — or strategic motives, such as the political salience of taxes over capital expenditures. We find this an interesting topic for future research.

Second, unlike most studies on local fiscal multipliers, our shock is a budgetary one, not a windfall from the central government, which may induce 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, compressing the multiplier. Moreover, recent studies show 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 extension to small municipalities is relatively low. However, there may be long-term adverse effects, such as a deterioration in local public goods or human capital. While some studies find no negative impact of budget tightening on public services (Daniele and Giommoni, 2021), others report declines in the quality of services like education (Pavese and Rubolino, 2021). Overall, our results suggest that BBRs, when effectively enforced, can help reduce fiscal deficits and increase debt sustainability with relatively low short-run costs for local economies.

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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"	
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: 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. (2018) 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.

Table A.6: Effect of DSP on Surplus and Local Income (Restricted Panel)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Surplus to Income 2012	Log Income pC	Surplus to Income 2012	Log Income pC	Surplus to Income 2012	Log Income pC	Surplus to Income 2012	Log Income pC
$D_i T_t$	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	4516	4516	6036	6036	7557	7557	9139	9139
R-squared	0.514	0.991	0.502	0.991	0.509	0.991	0.511	0.990
Bandwidth	750	750	1000	1000	1250	1250	1500	1500
Years	2007-2015	2007-2015	2007-2015	2007-2015	2007-2015	2007-2015	2007-2015	2007-2015
Mean in 2012	-0.02513	9.38875	-0.02552	9.39266	-0.02535	9.39733	-0.02564	9.39345
Effective F-stat	4.629		12.999		9.748		9.828	
Multiplier	.148		.098		.143		0	
	[.744]		[.416]		[.487]		[.495]	
H0: Multiplier $\geq$ 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 Montiel-Olea Pflueger 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: Effect of DSP on Surplus and Local Income (Including Sardinia and Sicily)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Surplus to Income 2012	Log Income pC	Surplus to Income 2012	Log Income pC	Surplus to Income 2012	Log Income pC	Surplus to Income 2012	Log Income pC
$D_i T_t$	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	6441	6441	8708	8708	10892	10892	13229	13229
R-squared	0.572	0.988	0.572	0.988	0.584	0.988	0.590	0.987
Bandwidth	750	750	1000	1000	1250	1250	1500	1500
Years	2007-2018	2007-2018	2007-2018	2007-2018	2007-2018	2007-2018	2007-2018	2007-2018
Mean in 2012	-0.02890	9.36215	-0.02992	9.36326	-0.03024	9.36659	-0.03083	9.36057
Effective F-stat	1.594		8.314		4.639		4.790	
Multiplier	.843		-.034		-.088		.041	
	[2.30]		[.940]		[1.27]		[1.23]	
H0: Multiplier ≥ 1.5	.388		.052		.106		.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 Montiel-Olea Pflueger 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.8: Composition of the Municipal Budget Shock Induced by DSP Extension (Restricted Panel)

	(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
$D_i T_t$	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	6036	6036	6036	6036	6036	6036	6036
R-squared	0.634	0.382	0.804	0.921	0.259	0.387	0.556
Bandwidth	1000	1000	1000	1000	1000	1000	1000
Years	2007-2015	2007-2015	2007-2015	2007-2015	2007-2015	2007-2015	2007-2015
Mean in 2012	-0.01076	-0.01513	0.04832	0.05928	0.00542	0.01673	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.9: 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.10: 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)

	Geographic networks		Public procurement networks	
	(1)	(2)	(3)	(4)
	Net Surplus to Income 2012	Log Income pC	Net Surplus to Income 2012	Log Income pC
% GDP of Neigh. under DSP	0.01469***	-0.00596	0.00990**	0.00159
	(0.00375)	(0.00903)	(0.00305)	(0.00569)
Observations	18336	18336	11652	11652
R-squared	0.854	0.992	0.702	0.991
Mean in 2012	-0.02139	9.42168	-0.01923	9.42371
Effective F-stat	15.364		10.561	
Multiplier	.406		-.161	
	[.633]		[.573]	
H0: Multiplier > 1.5	.042		.002	
Neigh./Networks characteristics				
Avg. N. mun.	29.10		4.68	
% treated mun.	0.17		0.13	
Avg. pop. (2012) per mun.	12,537		28,391	
Avg. income (2012) per capita	14,884		15,880	

	Geographic networks		Public procurement networks	
	(1)	(2)	(3)	(4)
	Net Surplus to Income 2012	Log Income pC	Net Surplus to Income 2012	Log Income pC
% GDP of Neigh. under DSP	0.01563**	0.00368	0.01364**	0.00309
	(0.00496)	(0.01047)	(0.00434)	(0.00734)
Observations	11532	11532	6612	6612
R-squared	0.856	0.991	0.697	0.990
Mean in 2012	-0.02265	9.41965	-0.02006	9.42491
Effective F-stat	9.955		9.885	
Multiplier	-.235		-.226	
	[.667]		[.537]	
H0: Multiplier > 1.5	.005		.001	
Neigh./Networks characteristics				
Avg. N. mun.	30.19		4.33	
% treated mun.	0.20		0.16	
Avg. pop. (2012) per mun.	10,569		25,534	
Avg. income (2012) per capita	14,887		16,100	

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 (6) 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 (6) 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 Montiel-Olea Pflueger 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.

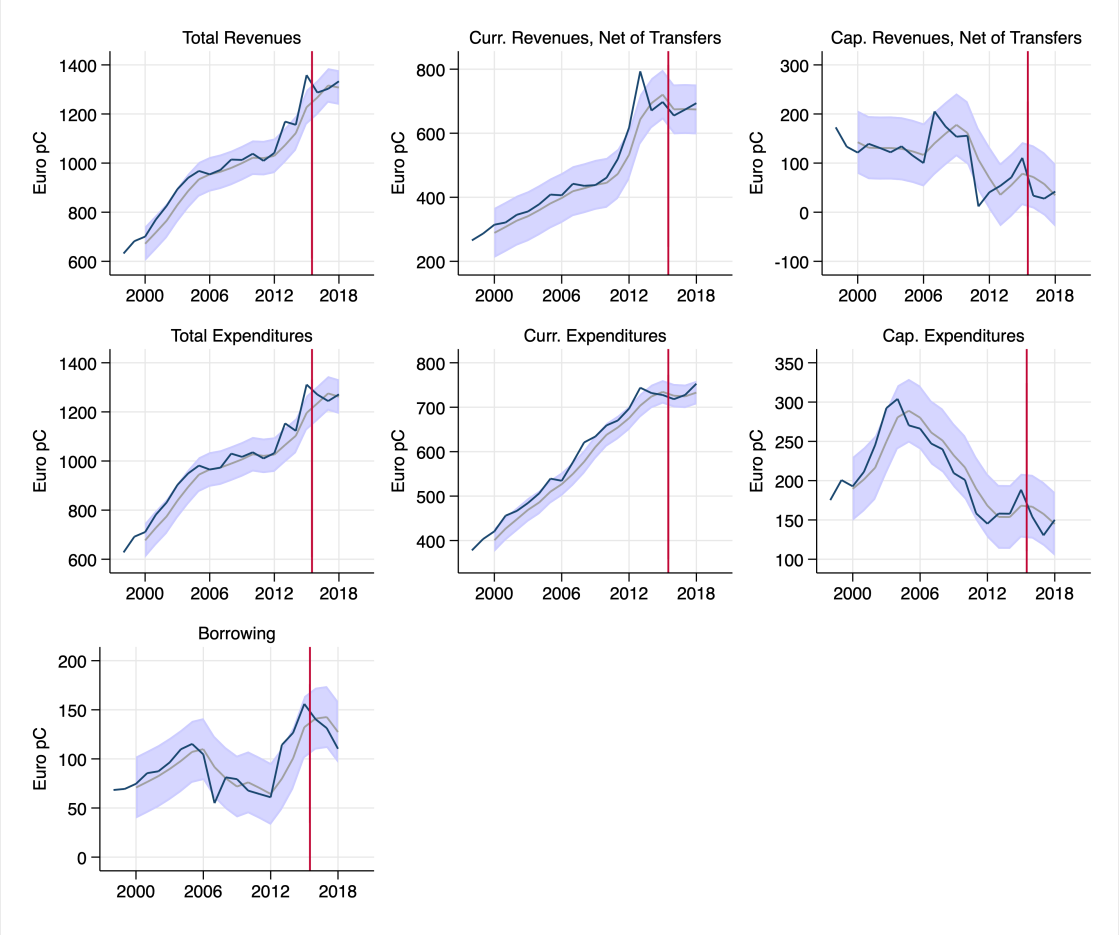
Table A.11: Effect of DSP on Neighborhood Surplus and Spillover on Local Income (Municipalities 5,000-15,000 residents), by different radius of neighborhood

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Surplus to Income 2012	Log Income pC	Surplus to Income 2012	Log Income pC	Surplus to Income 2012	Log Income pC	Surplus to Income 2012	Log Income pC
% GDP of Neighb. under DSP	0.00912**	-0.00222	0.01439***	-0.00051	0.01374***	-0.01528	0.01222**	0.01257
	(0.00339)	(0.00773)	(0.00408)	(0.00930)	(0.00321)	(0.01255)	(0.00421)	(0.02253)
Observations	15936	15936	16176	16176	16224	16224	16236	16236
R-squared	0.805	0.992	0.857	0.992	0.887	0.992	0.908	0.992
Radius	15	15	20	20	25	25	30	30
Mean in 2012	-0.02265	9.42243	-0.02172	9.42025	-0.02128	9.41997	-0.02137	9.42013
Effective F-stat	7.228		12.429		18.322		8.427	
Multiplier	.243		.035		1.111		-1.028	
	[.853]		[.646]		[.978]		[2.00]	
H0: Multiplier $\geq$ 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 (6) 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 (6) with municipal log per-capita income as the dependent variable (i.e., reduced-form regression). 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 Montiel-Olea Pflueger 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.

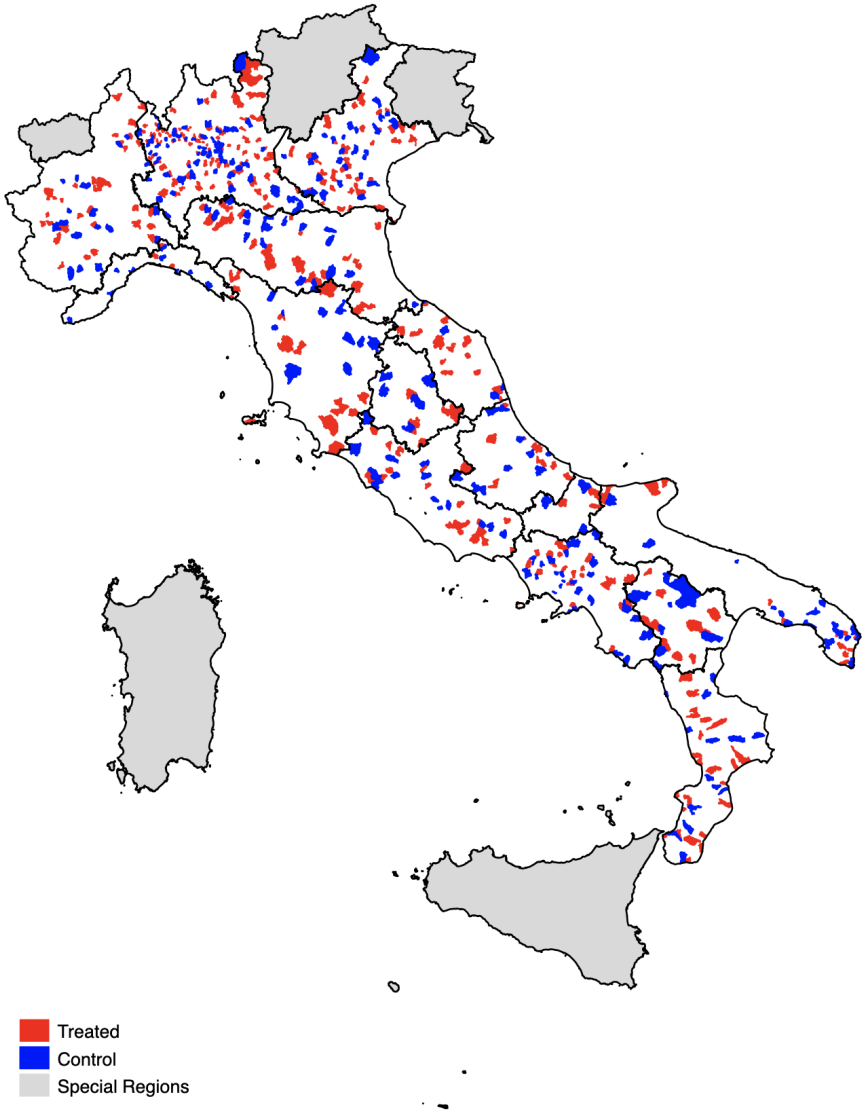
B Additional Figures

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



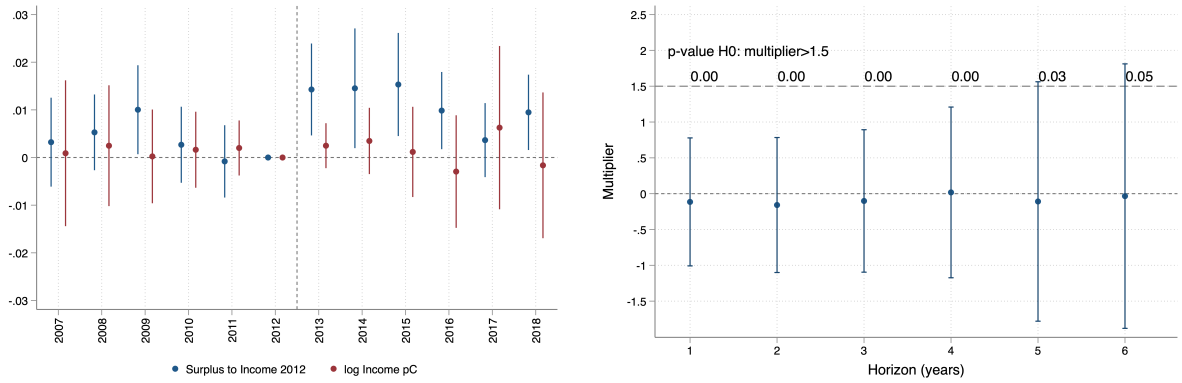
Notes: The figure reports time series (blue lines) and MA3 trends (gray lines) with 95% confidence intervals of the per-capita mean of our main balance-sheet variables of interest. Values are in 2012 Euros. The vertical red line between 2015 and 2016 highlights the year in which the format of municipal 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



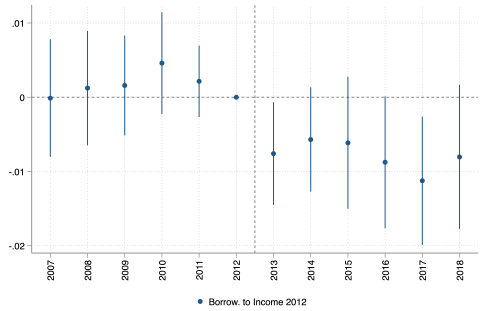
Notes: The figure shows treated and control municipalities used in the main analysis. Treated municipalities are the ones with a population between 4,000 and 5,000 in 2011. Control municipalities are the ones with a population between 5,001 and 6,000 in 2011. Municipalities in the 5 autonomous regions 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)

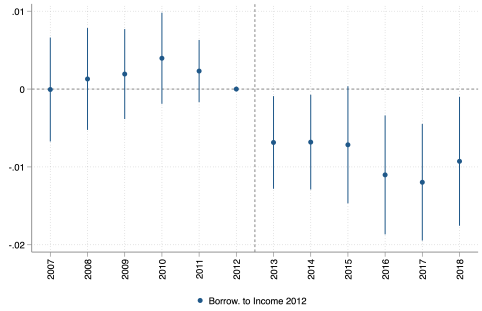


Notes: The left-hand panel of the figure displays difference-in-discontinuities estimates of the effect of the extension of the Domestic Stability Pact (DSP) to Italian Municipalities below 5,000 residents from 2013 on their net budget surplus and the log of municipal per-capita income. We expand the 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 $\hat{\gamma}_k$ 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.

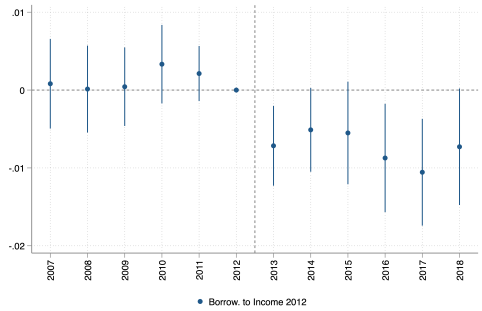
Figure B.4: Dynamic Effects of DSP on Municipal Borrowing



(a) Bandwidth: 750



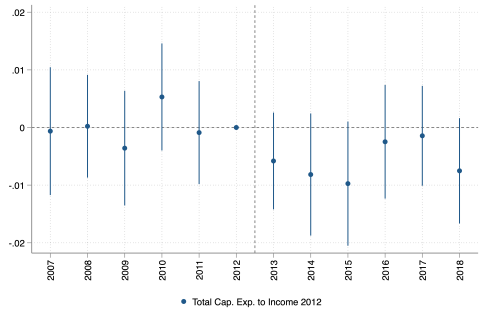
(b) Bandwidth: 1,000



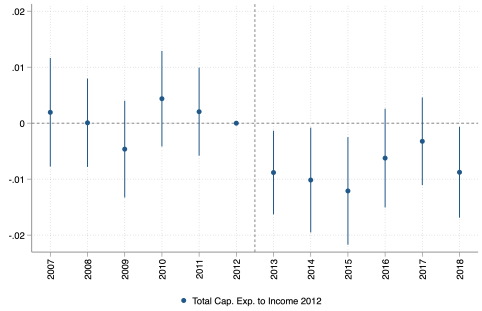
(c) Bandwidth: 1,250

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 $\hat{\gamma_k}$ 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.

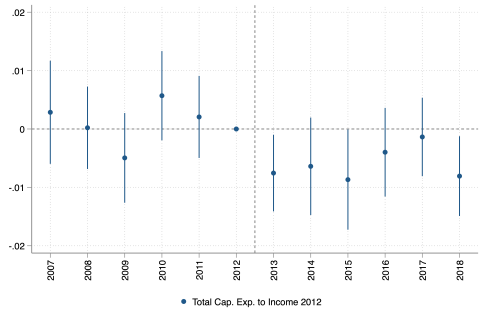
Figure B.5: Dynamic Effects of DSP on Capital Expenditures



(a) Bandwidth: 750



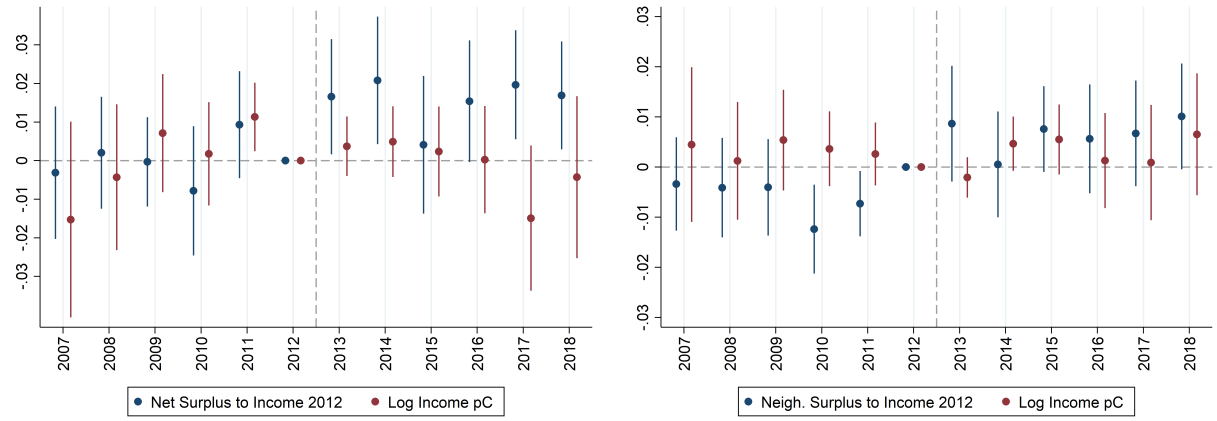
(b) Bandwidth: 1,000



(c) Bandwidth: 1,250

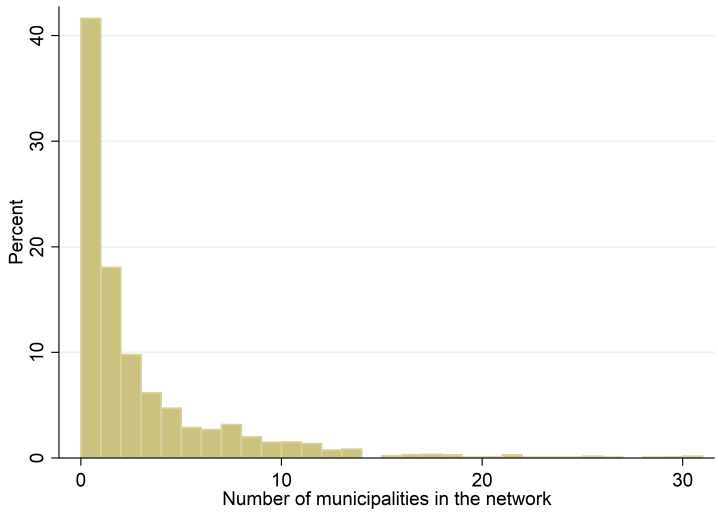
Notes: The figure reports difference-in-discontinuities estimates of the effect of the extension of the Domestic Stability Pact (DSP) to Italian Municipalities below 5,000 residents from 2013 on capital expenditures. Panels (a), (b), and (c) display the coefficients $\hat{\gamma_k}$ from the fully dynamic version of specification (1) with capital expenditures 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.6: Dynamic Effects of DSP on Neighborhood or Network Surplus and Spillovers on Local Income



Notes: The figure reports the impact of neighborhood-level (network-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 $\hat{\gamma}_k$ from specification (6) with neighborhood-level net budget surplus scaled by neighborhood-level (network-level) income in 2012 as the dependent variable (i.e., first-stage regression). The red dots display the coefficients $\hat{\gamma}_k$ from specification (6) 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.

Figure B.7: Distribution of the number of municipalities within procurement networks



Notes: The figure reports the distribution of the number of municipalities which assign at least one procurement contract to a given municipallity, for municipalities between 5,000 and 15,000 residents, considering all years before 2013, based on ANAC data.