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FISCAL CONSOLIDATION AND EXPENDITURE ARREARS:
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Fiscal Consolidation and Expenditure Arrears:
Evidence from Local Governments' Investments[*]

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Abstract

In this paper we investigate how tightening fiscal constraints (e.g., through intergovernmental transfer cuts) can lead local governments to postpone investments' payments. We first provide a simple model showing how local governments can use arrears to relax their short-run financial constraints. We then empirically assess our theoretical prediction, using information from accounting and financial reports of all Italian municipalities for the period 2003-2010. Exploiting the long-lasting effect of 1979 structural reform of Italian local public finance, we employ an instrumental variable approach to face endogeneity concerns. We find robust evidence that tighter fiscal and financial conditions of the local governments determine larger arrears for public investment expenditures.

Keywords: Intergovernmental Grants, Payment in Government to Business (G2B) Transactions, Instrumental Variables, Panel Data.
JEL classification: H30, H72, H77, C33, C36.

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1 Introduction

The experience of fiscal consolidation implemented at different times in several developed, emerging, and transition countries has shown that central governments tend to mandate part of the needed fiscal adjustments to local governments (OECD (2013); European Commission (2014)). OECD countries during the recent Great recession are not an exception. Intergovernmental transfer cuts from central to local governments, unfunded decentralization of public expenditure and/or tax increases, stricter local fiscal rules imposed on, or negotiated with local governments are common measures adopted by central policy-makers to partly decentralize fiscal consolidation (see Hagemann (2012)). A recent OECD Report (OECD (2013), p.31) stresses that intergovernmental grants represent a powerful lever to address fiscal consolidation: they account for around 4% of the GDP, 8% of the total government spending and around 50% of the total sub-central governments revenue in OECD countries.

In this paper we investigate a possible perverse effect of tighter municipalities' financial constraints: facing central-government grants cuts, municipalities could react rising expenditure arrears, a form of *trade debt* that eventually frustrates fiscal consolidation in itself. We set a simple theoretical model where a local government - with a ceiling on local debt and the usual budget constraint - maximizes a standard inter-temporal objective function. Under reasonable assumptions, the local government can optimally react to a cut in transfers from the central government by increasing arrears in its investment expenditure, i.e. postponing payments for public works contracts, everything else held equal. We then take this prediction to a large dataset of accounting and financial reports of Italian municipalities for the period 2003-2010. Our dataset includes 6,700 municipalities: they are - on the one side - different in size and in many social, economic, and political features and - on the other - belonging to a common regulatory framework. This permits us to exploit the cross-sectional and over time variability in the variables of interest as well as limiting omitted variable problems. To control for endogeneity problems and to obtain an exogenous determinant of the current transfers, we adopt a novel instrumental variable approach, which consists in the use of historical breaks in the Italian local public finance. In particular, our narrative analysis and our empirical evidence show that the criteria for the allocation of transfers from the central to the local governments introduced in 1979 have shaped the municipalities' availability of intergovernmental grants until the period under investigation. Our main empirical finding, corroborated by several robustness tests, highlights that lower transfers from the central government determine higher local governments' expenditure arrears. This effect is not trivial as we find that a decrease of 10% in the transfers is associated with an increase of about 1.2% in the arrears for public investment expenditure.

This paper adds novel results to at least two strands of the economic literature. Our first contribution is to the vast literature that investigates the link between intergovernmental grants and local government debt. Empirical results on this issue are not conclusive and open to several interpretations (see De Mello (2007) for a review of the literature). On the one hand, the relationship can go from transfers to debt decisions as transfers can determine fiscal profligacy in the form of larger public expenditure (so called "flypaper effect").[1] On the other hand, the relationship may be reversed as it can go from indebtedness to transfers. In particular, whenever transfer cuts are not credible, expectations of future bailouts from the central government may also induce fiscal profligacy in the form of larger borrowing of local governments (Goodspeed, 2002).[2] In our analysis we use an instrumental variable approach to avoid reverse causality and, everything else held equal (including the level of formal indebtedness), we look at the relationship that goes from transfers to a form of trade debt (i.e., the arrears for investment expenditure). To the best of our knowledge, we are the first to look at how local governments react in terms of trade debt to a change in intergovernmental transfers. This form of debt is particularly relevant, especially in those contests where hard budget constraints, such as cap to formal debt, are posed on the municipalities. Our results tend to corroborate the view that, facing intergovernmental transfer cuts, the local government increases expenditure arrears (i.e., trade debt) as far as the opportunity cost of this form of trade debt is lower compared to other sources of borrowing.

Our second contribution is to the literature on government expenditure arrears. Diamond and Schiller (1993) and more recently Checherita-Westphal et al. (2015) highlighted that expenditure arrears may be undesirable because of three main reasons: (i) they make uncertain the true size of government debt; (ii) they dampen the effectiveness of fiscal policy; and (iii) they undermine macroeconomic and financial stability.[3] Our empirical results provide evidence for the (i) and (ii) as regards the

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[1]Hines and Thaler (2013) and Inman (2008) review the existing empirical studies highlighting how reducing transfers to local governments may improve fiscal consolidation by cutting local public expenditure. In the words of Courant et al. (1979, p. 6) "the obvious reason for this phenomenon, which we term the flypaper effect (money sticks where it hits), is that bureaucrats and politicians find it easier to avoid cutting taxes when the government receives revenue-sharing monies than they do to raise taxes when some exogenous event raises the income of the community". Gennari and Messina (2014) assesses the flypaper effect on Italian data, confirming it and finding a remarkable asymmetric response of municipal expenditures to central government transfers.

[2]Using a panel of OECD countries for the period 1980-2005, De Mello (2007) finds a stable long-term relationship between transfer receipts and local government net worth for the case of current transfers. In particular, "an increase in intergovernmental transfer receipts is found to be associated with a modest reduction in the recipient jurisdiction's net worth over the long term, but a fall in net worth is associated with an almost one-to-one subsequent increase in transfer receipts" (De Mello, 2007, p. 2).

[3] Expenditure arrears - in the form of payment delays by government to business (G2B) - could also determine distortions at firm level, as empirically documented in a recent EU study on

case of the Italian municipalities.

The paper is organized as follows. In Section 2 we briefly present a narrative analysis of fiscal decentralization in Italy since the 1970s. In Section 3 we provide a simple model showing how local government can react to a reduction in transfers from central government. In Section 4 we present our empirical analysis: we describe our dataset (4.1), our empirical model and IV strategy (4.2), our estimation approaches and results (4.3), and the robustness checks (4.4). Section 5 draws concluding remarks and policy implications.

2 Fiscal Decentralization in Italy: a narrative analysis

The regulatory framework of the local public finance in Italy has deeply changed in the last four decades. Two main institutional changes occurred during this period. In the middle years of the 1970s, a sequence of reforms centralized taxation and introduced a system of intergovernmental grants, which still plays a significant role in the financing of local governments (i.e., municipalities and provinces). Then, in the first half of 1990s, a new round of reforms of the local public finance partially restored fiscal autonomy.

A growing structural unbalance between revenues and current expenditures had affected the Italian local public finance since mid-1950s. Before the tax reform of 1973-1974, municipal revenues had heavily relied on taxes (i.e., the family tax, the consumption tax, and the tax upon the capital gains on building areas) that had proved to be quite inelastic to the growth of GDP and to the new societal challenges. These stylized facts explain the slow decline of tax and fiscal autonomy indicators during the 1960s and the sharp reduction in the ratio between current revenues and expenditure since 1972 (see Figure 1). The gap between current expenditures and revenues had been covered by loans granted by commercial banks and State financial institutions. The financial crisis of the fiscal decentralization model, namely the soft-budget constraint problem driving local-governments' policies seriously threatened the overall stability of the Italian public finance.

[Figure 1 about here]

The initial design of the early-1970s tax reform aimed at solving the crisis of the local public finance by introducing new local taxes and tax-sharing mechanisms.

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late payments (EU (2014)) and in Flynn and Pessoa (2014). The latter investigation highlights that - during economic and financial crisis - the government delayed payments could affect the survival of firms, as access to credit is more restricted; moreover, they could increase cost of the investment/service provision, as suppliers will adjust their prices upward to mitigate the risk/cost of delayed payments, thus contributing to economy-wide inflation.

In 1972, the main municipal taxes were suppressed and their revenues provisionally substituted by State grants. However, the initial design was never completed. Between 1972 and 1976, the outburst of inflation, and the consequent growth of nominal interest rates, widened the gap between nominally-set revenues and current expenditures of local governments. In 1977, the total stock of external debt of municipalities was more than three times as much as at the beginning of the decade. In turn, the central government was forced to bail-out the local public finance.

Sudden, somewhat unexpected emergency measures were implemented in 1977 by two central-government decrees[4]: the State assumed direct liability for the municipal debt (including interests) issued before 1977; the future growth of current expenditures was capped by law (also, restrictions were put on local public employment); a budget-balance rule and restrictions on borrowing were introduced (in particular, debt-financing of current expenditures was prohibited); finally, State grants were increased to approximately balance the budget of each municipality, and established as ordinary financing mechanism with centrally-determined growth rate. In 1978, the amount of transfers was set to afford each municipality the expenditure incurred in the previous year (i.e., so-called "historical expenditure" criterion).

The effects of the financial crisis of Italian local public finance and of 1977 emergency measures on the municipalities' fiscal autonomy have been dramatic and long-lasting. Local tax autonomy dropped from about 50% in 1972 to less then 10% by 1978. Correspondingly, grants from the central government rose from less than 30% of total current revenues in 1972 to about 80% in 1978. The "historical expenditure" criterion for the determination of State transfers to each municipality remained in force for over a decade. Until early 1990s transfers were negotiated between local and central governments each year. Funds were mostly earmarked and allocated in such a way to compensate for individual differences between past expenditures and autonomous revenues.[5]

At the beginning of the 1990s, the severe financial and political crisis (culminated in Italy's falling out of the European Monetary System and the devaluation of Lira in 1992) as well as the fiscal discipline imposed by the Maastrict Treaty leading to the monetary unification called Italy to imperatively engage in budget consolidation. Decentralization gained momentum as an important driver of fiscal discipline by mid-1990s. Several reforms were implemented with the aim to harden the local budget

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[4]The so-called "Stammati" decrees (upon the name of the Treasury Minister), namely: the 'Stammati I', Decree n. 2 of January 17, 1977, 'Consolidation of short-term overdrafts of municipalities and provinces' converted with amendments into Law n. 62 of March 17, 1977; the 'Stammati II', Decree n. 946 of December 29, 1977, 'Urgent provisions for local finance' converted into Law n. 43 of February 27, 1978.

[5]Several reforms were tried to change the transfer apportionment scheme. According to Emiliani (1997), at the beginning of the 1990s, more than 50% of the transfers paid to local governments still depended on the debt accumulated in the 1970s.

constraints and to improve accountability and responsibility of local governments.

Early-1990s reforms increased tax and fiscal autonomy. In the second half of 1990s, new administrative (and expenditure) functions were devolved from central to local governments.[6] The revenue structure of municipalities was reformed in 1992 (Decree law n. 504/1992), with the assignment, from 1993, of a property tax (ICI)[7] along with the rationalization of transfers from State, which became largely unconditional.[8] State transfers to each municipality were reduced by the same amount of its ICI base revenue (i.e., revenues calculated at the minimum rate of 0.4%). To finance new local expenditures devolved by the central government, since 1999, municipalities were allowed to levy a surcharge on their residents personal income tax (PIT).[9]

[Figure 2 about here]

Figure 2 shows the evolution of real per-capita transfers from central to local governments. We can observe a sharp fall of transfers in 1993-1994: which is a composition effect due to the introduction of the municipal property tax (see also tax autonomy in Figure 1). The trend for transfers kept on downwards, with a temporarily interruption in 2001, when municipalities were granted a financial compensation for the abolition of some minor local taxes.[10]

The reduction in the amount granted to municipalities was not, however, accompanied by a significant change of allocation criteria. Indeed, the reform of the

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[6]The main functions of municipalities were revised in 1998 with the implementation of the two decentralization laws of 1997 (the so-called "Bassanini" laws, upon the name of the Public Function Minister).

[7]Municipalities were allowed to choose the ICI tax rate in a given interval (from 0.4% to 0.7%). Progressively they have been given more autonomy in determining tax deductions and in monitoring the tax base.

[8]The framework set by the decree law was made-up by five different kind of transfers: three in current account, that are mandatory, non-earmarked and general purpose and two in capital account, that are mandatory but earmarked.

[9]Central government maintained its full powers on PIT, including the definition of tax base and tax brackets while municipal governments could only raise a flat surcharge on their PIT base. Originally municipalities were empowered to set the rate up to a maximum level of 0.5%, being enabled to reach the maximum level only in a three years period, with annual tax rate increases not larger than 0.2%; no power were instead given over tax relief. However the rates were frozen in 2003 and liberalized in 2007, when the maximum rate was also increased to 0.8%. The freeze allowed those municipalities that had never used the PIT surcharge tax before 2003 to introduce it after, while for the others, they could maintain the PIT surcharge at the level that they had already chosen, but could not increase it further. More precisely, in the period from 2004 to 2006, municipalities that had not made use of the PIT surcharge before, could introduce it at a constrained rate of 0,1% per fiscal year.

[10]In 1997, in exchange for the abolished municipal business tax (ICIAP), they received a sharing quota in the regional business tax (IRAP) that, starting from 2001 was turned into grant.

transfer system during the 1990s failed, letting substantially unchanged the design of intergovernmental grants.[11]

Since early 2000s Italy has been involved in a complex, confuse and still ongoing process of fiscal decentralization. This formally begun in 2001 when the Parliament approved a constitutional reform which modified a number of articles concerning the powers of sub-national governments and their financial relationships with the central government. The 2001 constitutional reform has proved to be too revolutionary to be implemented.[12] In spite of the reform, local governments kept on to be financed as they were already in the 1990s. In particular, the amount to be granted to municipalities is set annually by the "Financial Law" passed by the national Parliament, on the basis of a bargaining process between representatives of the municipalities and the central government. Similarly, the framework of the intergovernmental transfers and its allocation criteria largely reflected the system settled by Decree law n. 504/1992 which modified only slightly the post-1978 local public finance mechanisms characterized by the recursive link between local revenues (i.e., essentially State transfers) and past expenditures, while the equalization component (based on structural parameters) continued to play only a marginal role.

An important conclusion of our narrative overview of municipal public finance in Italy is that the way fiscal decentralization was re-introduced in 1990s only slightly affected the strong cross-sectional correlation between State transfers/local revenues and past expenditures (in particular, pre-1977 expenditures, that - as explained above - can be represented by 1979 State transfers).

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[11]Decree law n. 504/92 explicitly provided the progressive reduction, over a period of 16 years, of the role of "historical expenditure" criterion in the determination of transfers. The objective was to base the new regime of intergovernmental transfers on structural parameters in order to strengthening the equalization component of intergovernmental grants. However, the new model was applied only in 1994. In 1995, the law n. 539/1995 introduced a new model of intergovernmental transfers, which was never applied. Further changes occurred in 1997, when some minor revisions of the allocation criteria were put in place, and in 2002 (in application of Financial law n. 448/2001), when the annual amount of transfers to be distributed among municipalities was set as a proportion of the receipts from national personal income tax.

[12]Several attempts to implement the 2001 constitutional reforms have failed. Also, constitutional reforms to complete the federalization process, proposed in the last decade, have failed. A number of reasons explain such difficulties. First, the large economic and fiscal divide between rich (i.e., northern and central) and poor (southern) regions of Italy poses major distributional and political challenges on the way of the proper implementation of (any) fiscal federalism model aiming at warranting at least some common standards in terms of citizens' social rights. Second, the slowdown of Italian productivity in the last fifteen years has exacerbated the distributional conflict among rich and poor regions. Third, the need for fiscal consolidation has justified new rules (often sustained by judgments of the Constitutional Court) in the direction of fiscal centralization.

3 Theoretical model

The economy is made by a large number of local governments. Each local government maximizes the following inter-temporal objective function

$$u_t = x_t + \delta E_t(u_{t+1}) \tag{1}$$

where $\delta < 1$ is the inter-temporal discount factor, and

$$x_t = y_t - h(\tau_t) + m(e_t) + v(k_t) \tag{2}$$

with y_t the income of local constituency after national and regional taxes and transfers, τ_t the local tax revenues, e_t the local primary current expenditure, and k_t the stock of local public infrastructures (all variables refer to the year t). We assume that: the monetary cost of local taxes in each year, $h(.)$, is strictly increasing, convex, and goes to infinity when τ_t approaches y_t; the monetary benefit of current expenditure, $m(.)$, and public infrastructure, $v(.)$, in each year are strictly increasing and concave. For the sake of simplicity, we also assume that the monetary benefit of current expenditure is linear (i.e., $m''(.) = 0$).

The local government faces the following budget constraint:

$$\tau_t + g_t + b_t - b_{t-1} = e_t + rb_{t-1} + i_t \tag{3}$$

where g_t are transfers by national or regional governments, b_t is local (gross) public debt issued at time t, r is the interest rate on local public debt, and i_t is the local capital expenditure. In our analysis, we assume that the local government faces a fiscal rule imposing a ceiling to the total debt that can be issued each year: $b_t \leq \bar{b}_t$.[13]

To keep the model as simple as possible, we assume that the stock of capital is fully depreciated each year and it is determined as follows:

$$k_t = i_{t-1} + \theta_t - a_t + a_{t-1} \cdot (1 + \rho). \tag{4}$$

The stock of capital depends on the total investment that is decided in the previous period, i_{t-1}, but also on a random shock, $\theta_t \sim F(\theta)$ (with $E(\theta_t) = 0$), that affects the actual capital cost during the execution of public works contracts.

We rely on θ_t to represent a number of selection problems (i.e., cost overruns due to firms' behavior or pre-contractual features, as well as to the capacity of the local government to monitor contractors' behaviors), that depend on structural

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[13]This ceiling is determined by the combination of all fiscal rules imposed on debt issuing (e.g., the golden rule linking local public debt to investments, the absolute maximum level of debt service expenditure, the Domestic Stability Pact provisions). We do not include any lower bound to gross public debt, considering that local government may issue negative debt (i.e., buy assets). The latter case is particularly relevant when we consider the provisions of the Domestic Stability Pact.

features of local government and local constituency (e.g., demography, human and social capital). The overall capital expenditure is also determined by the dynamics of arrears (i.e., trade debt of the local government with respect to public-works contractors in the year t). In other words, the local government may roll-over part of investments to the future by "issuing" new arrears, a_t. Quite naturally we assume that the local government cannot issue negative arrears, i.e., $a_t \geq 0$. However, the local government has also to take into account that past arrears have to be paid, including an implicit rate of return ρ that the local government has to concede to the private firm.[14] To avoid the unrealistic case in which local governments issue debt only in the form of arrears, we assume that $\rho > r$ (i.e., issuing "formal" debt is less costly than relying on trade debt).

3.1   Local fiscal policy

Each local government maximizes its intertemporal objective function under the budget constraint. To simplify the analysis, we substitute e_t by (3), k_t by (4) in the objective function, and we maximize with respect to the sequence of τ_t, i_t, b_t, and a_t for all t, taking into account the non-negativity constraint on arrears, $a_t \geq 0$ (with $\mu_t \geq 0$ the corresponding Lagrangian multiplier), and the upper bound on gross local public debt, $b_t \leq \bar{b}_t$ (with $\nu_t \geq 0$ the corresponding Lagrangian multiplier).

By the first conditions (corresponding to controls at time t),

$$\tau_t: \quad -h'_t + m'_t = 0 \tag{5}$$

$$i_t: \quad -m'_t + \delta E(v'_{t+1}) = 0 \tag{6}$$

$$b_t: \quad m'_t - \delta E(h'_{t+1})(1+r) - \nu_t = 0 \tag{7}$$

$$a_t: \quad -v'_t + \delta E(v'_{t+1})(1+\rho) + \mu_t = 0, \tag{8}$$

we obtain the following

Lemma 1 *The optimal local fiscal policy is such that $b_t = \bar{b}_t$ (and $\nu_t > 0$) for all t.*

Proof. Assume, by contradiction, that $b_t < \bar{b}_t$ (hence $\nu_t = 0$). Substituting (6) in (7), $m'_t = \delta^2 E(v'_{t+2})(1+r)$. Substituting (8) in (6), $m'_t = \delta^2 E(v'_{t+2})(1+\rho) + \delta E(\mu_{t+1}) > \delta^2 E(v'_{t+2})(1+r)$. That brings to a contradiction. ■

By Lemma 1 and by inspection of the local public budget constraint (3), we see that: the local public debt level becomes a parameter of the local government optimization problem; and its effect on the optimal fiscal policy (τ_t, i_t, a_t) has the

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[14]In our analysis, ρ is given; we implicitly assume that the local government has all the bargaining power when determining the delay in payment (and works), a_t. A thorough analysis of the bargaining process is beyond the scope of this work.

same sign as intergovernmental transfers, g_t. Thus, a marginal growth of $\bar{b}_t$ or g_t involves the same relaxation effect on the local public budget constraint.

The optimal fiscal policy is determined by the first order conditions (5), (6), and (8), and we have:

Proposition 2 *The optimal local fiscal policy is such that arrears, a_t decrease (or do not increase) as the local local budget constraints is relaxed (i.e., $\bar{b}_t$ or g_t grows).*

Proof. By Lemma 1, the local public debt is a parameter of the optimization problem of the local government. By inspection of the second-order cross derivatives of the objective function with respect to controls and parameters, we can see that the objective function of the local government is supermodular in $(-\tau_t, i_t, -a_t)$ and it has increasing differences in $(\bar{b}_t, g_t)$. Hence, the proposition follows. ∎

4   Empirical analysis

The model presented in Section 3 highlights that larger restrictions to the municipality's financial constraints, via lower grants from the central government, lead to higher municipality's arrears in investment payments. In what follows, we offer empirical evidence of this relationship. In particular, in Section 4.1, we present the dataset consisting of the accounting and financial reports for a panel of Italian municipalities in the period 2003-2010, and the available measures that better capture the financial constraints and the expenditure arrears. In Section 4.2, we discuss the identification strategy and the rationale for using the impact of the main historical break of Italian local public finance (i.e., the late 1970s reform in the allocation of transfers) as exogenous instrument for the intergovernmental grants to overcome possible endogeneity problems. Then, we present our main estimation results in Section 4.3, and extensions and robustness checks in Section 4.4.

4.1   Municipalities accounting and financial reports

In Italy, municipalities are the smallest administrative units and they provide public goods and services in several policy areas, such as local transport, local police, culture and recreation, land management and environment (waste disposal, water, sewage), nursery school and complementary education services, registry services. About half of the total government investment expenditure is managed by municipalities. For instance, municipalities manage the outsourcing (through competitive auctions, to private suppliers) of about 50% of the public works (such as road works and building constructions).

Each municipality is obliged to transmit, annually, its accounting and financial report to the Ministry of Interior (the so called *Certificati di Conto Consuntivo*). This source of information allows us to have a clear picture of the financial situation of the municipality in each year, both on the revenue and the expenditure sides of the budget.

In Italy, there are 8,100 municipalities. We focus on the 6,700 municipalities belonging to the 15 ordinary regions, while we do not consider the municipalities of the remaining 5 regions, as the latter enjoy a larger degree of legislative and financial autonomy and respond to different regulations in several fields. Focusing on a single country, Italy, with a large number of municipalities of different sizes, located in different socio-economic environments, allows us to analyze constituencies governed by a common regulatory framework, without losing the cross-sectional and over-time variability of the variables of interest.

Searching for proxies of the financial situation of municipal budgets is not an easy task. The financial restraints can be related to various dimensions of the budget. In our empirical analysis, we follow the theoretical model of Section 3, and we focus on one of the sources of revenues: the *Transfers* from the central to the local governments (i.e., intergovernmental grants). As illustrated in the narrative analysis (Section 2), in the last three decades, State transfers have shaped the financial conditions of Italian municipalities (both on the revenue and expenditure sides). Together with (constraints put on) the local public debt (which we control for in our analysis), State transfers are a key variable influenced by the fiscal consolidation process. They account, on average, for about the 40% of the municipalities' total revenues. In turn, State transfers drive the "marginal" adjustments required to fulfill the budget balance rule, which municipalities are forced to pursue by law each year.

Our dataset of accounting and financial reports contains the annual amount of transfers from the central government to each municipality. About the transfers in the period of our analysis (2003-2010), on average, in per capita terms, State transfers represent about 200 euros (in 1995 constant prices). Table 1 shows large overall and between variations (128 and 117 euros, respectively) and a within municipality variation of 55 euros.[15]

About the (dependent) variable we want to explain, the *Arrears*, from our dataset we are able to obtain a measure that gives us the information, for each municipality, of the amount of investments for the year that have not been paid. Such a variable represents the endogenous variable for which we have obtained predictions in our

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[15]Note that we stop our analysis in 2010 because starting from 2011 the intergovernmental grant system has changed. This has caused a discontinuity in the time series of transfers to the municipalities which makes it particularly difficult the comparison with previous years. Note also that in our analysis about 4% of the municipality-year observations are missing because of some missing data in some of the control variables.

theoretical model (Section 3). Descriptive statistics show that, on average and in per capita terms, the arrears are about 380 euros (with a standard deviation of 772 euros; see Figure 3 for the log-distribution of the variable). Each year, on average, the new arrears are about the 34% of the stock of arrears at the beginning of the year. To give a better idea of the importance of the arrears in the municipalities' budget, on average, they represent about the 87% of the investment expenditures. (Table 1 reports summary statistics for the variables with municipality-year variation, in per capita terms and constant prices, coming from the accounting and financial reports).

[Table 1 and Figure 3 about here]

The amount of planned expenditure in investments (*Investment expenditure*) is naturally the variable that explains much of the arrears variability because of two main reasons. Firstly, because of a scale effect: a larger amount of payments for investments is more difficult to be financially sustained, everything else being equal. Secondly, because according to the Italian legislation, during the period of analysis, multi-year investments "automatically" generated arrears for the part of payments due in the future years.

A simple correlation between the (log of per capita) *Transfers* and the (log of per capita) *Arrears*, conditional on the (log of per capita) *Investment expenditure*, is statistically significant and negative (-0.05). However, this simple and descriptive evidence does not take into account other potential determinants of the arrears. Among the variables included in the municipalities' accounting and financial reports, we consider the *Debt interest expenditure*. This variable controls for the cost of the stock of debt of the municipality and the influence of the ceilings to local debt (that is, as previously discussed, another aspect influenced by the fiscal consolidation process) on the formation of expenditure arrears.

4.2 Empirical model and IV strategy

In this section we present the reduced form empirical model (9), where all monetary variables are expressed in logs of the per-capita values at constant prices.

$$a_{mt} = \alpha + \beta g_{mt} + \gamma MT_{mt} + \epsilon_{mt}. \tag{9}$$

The dependent variable a denotes the *Arrears* from investments in year t by municipality m. The main explanatory variable of interest is g, which represents the *Transfers* received from the central government by the municipality in any year (i.e., intergovernmental grants). MT is the set of controls from the annual accounting and financial report of each municipality in each year (i.e. *Investment expenditure* and *Debt interest expenditure*). The error term ϵ captures all factors that influence the arrears but are not captured by the model specification and consists of the following:

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(i) municipality-specific time-invariant effects, (ii) municipality-specific time-varying effects, and (iii) time-varying macro effects that influence all municipalities.

To reduce omitted variables problems and deal with (i), we follow two alternative strategies. A first approach consists in augmenting the model specification (9) with a set of municipality-level control variables (M) that aim to control for the constituency's structural characteristics. In particular, we control for the municipality being a touristic location (proxied by the number of per-capita bed places in tourist accommodations), the location being in a mountainous area, the population density, the categories of population size,[16] the extension of the existing road network in the municipality, the socio-economic situation proxied by the unemployment rate and the share of young and old population (data come from the Italian National Institute of Statistics - ISTAT). These characteristics aim at representing several dimensions of the demand for and composition of public spending in the municipality.[17] Furthermore, we augment equation (9) with province-fixed effects to control for factors that influence municipalities operating in contexts with similar socio-institutional quality (such as social capital, crime, effectiveness of judicial system) and levels of economic and financial development. A second alternative approach to reduce municipality-level time-invariant omitted variables consists in the inclusion in the model specification (9) of municipality-fixed effects. The former approach does not ensure to fully control for municipality's structural characteristics (i.e. the model can still suffer of omitted variables), but it allows us to assess the effect of our explanatory variables of interest on the overall (both cross-sectional and over-time) variability of our dependent variable. The latter approach fully captures the cross-sectional variability and allows us to exploit the within-municipality variability.

To deal with (ii), that is, to better take into account time-varying municipality-specific effects, in addition to (MT) controls from the accounting and financial reports, we introduce in any model specification the *Average taxable income* in each municipality m in year t, to control for the socio-economic development of the municipality.

To deal with time-varying macro effects (iii), in any model specification, we include year-fixed effects (T), which aim to capture country-level shocks both on macro/financial conditions as well as regulation changes during the years of analysis. Both types of shocks could have affected municipalities' public finance choices, and thus the arrears, in any given year.[18]

Although the inclusion of additional control variables, the estimation of the relationship between municipality's *Transfers* and *Arrears* might be still affected by

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[16]We include dummy variables for population below 1,000 inhabitants, between 1,000 and 5,000, between 5,000 and 15,000, between 15,000 and 200,000, and above 200,000.

[17]We also show robustness checks including additional set of municipality-level variables.

[18]We also show robustness checks including province-year-fixed effects.

endogeneity problems. To control for this, we propose an instrumental variable (IV) approach exploiting a source of exogeneity that has shaped the current budgetary situation of the municipality and, in particular, the level of current transfers. Specifically, we employ the levels of *1979 transfers* from the central to the municipalities as a new IV for the current level of transfers.

As presented in the narrative analysis on fiscal decentralization on Italy (Section 2), in 1977-1978, with the so-called "Stammati decrees", very limited tax autonomy was given to the local governments and larger transfers from the central government were granted. The basic determinant of the new granting system were to become the pre-1978 expenditure levels (i.e., transfers were based on "historical expenditure", pre-1978). The timing and features of this change were largely unexpected by the municipal policy-makers (that, in turn, could not anticipate the mechanism by increasing their levels of expenditure to ensure larger future transfers). The criterion of the "historical expenditure" for granting the transfers to local governments is still at work, and the municipalities that enjoyed larger State transfers in 1979 have continued to receive larger amount of transfers. The simple correlation between the (log of per capita) *1979 transfers* and the (log of per capita) current *Transfers* from the central government is about 0.37 (see Figure 4).[19] To the best of our knowledge we are the first to exploit the 1977-78 important and largely exogenous break in the institutional setting of Italian local public finance.

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[19]Beyond this simple correlation, to assess the validity of the *1979 transfers* as instrumental variable for the current *Transfers*, we will report the first stage estimation results, which shows the correlation among the two variables conditional on the other controls. Furthermore, we will also show evidence (and related Hansen test) from an overidentified 2SLS model, where the *1979 transfers* interacted with year dummies are used as instruments for the current transfers. A concern for the validity of the instrument is that *1979 transfers* have influenced the formation of current arrears through channels for which we do not control for. For instance, one might argue that 1979 transfers have shaped the municipality's subsequent spending and revenue capacity, and socio-economic conditions; all factors that can have a direct effect on the arrears. Our set of control variables in (M), (MT), and in particular the current level of *Average Taxable income*, in each year and in each municipality, can account for a very large set of (possible) other channels through which the 1979 transfers might have an effect on the dependent variable. A specific concern is related to the "budget irresponsibility" of the municipalities. In fact, because higher 1979 transfers were allocated to those municipalities that had higher pre-1978 expenditure levels, one might suspect that those municipalities had a tendency to make a non-accurate use of public money. If, for some reasons, this behavior is still at work in those municipalities, there might be a positive correlation between 1979 transfers and the "budget irresponsibility" of the municipalities. Although we can not exclude this channel, two facts have to be underlined. Firstly, "financially irresponsible" municipalities typically tend to increase their current expenditures (e.g. personal costs, expenditures for consultancies, etc.), while our focus is on the arrears for investment expenditures. Secondly, in case of a perpetuation over the decades of the non-accurate use of public money within the municipality, we would observe that today's higher transfers (because of higher 1979 transfers, thus higher pre-1978 expenditure) are associated with higher arrears. Thus, if this were the case, the coefficient of transfers on arrears would be upward biased.

[Figure 4 about here]

Other papers have analyzed the political determinants of the heterogeneity in the transfers (see, among others, Solé-Ollé and Sorribas-Navarro (2008), Bracco and Brugnoli (2012), Brollo and Nannicini (2012), and Bracco et al. (2015)) and underlined the need of an instrumental variable approach. For instance, Bracco et al. (2015) suggest the use of the municipality's political alignment with the central government as a variable for instrumenting annual changes in transfers. They show the validity of this instrument in a fixed effect framework exploiting a regression-discontinuity design for a subsample of large Italian municipalities for which the mayor's political affiliation can be classified. In particular, they "compare municipalities where the elected mayor is just aligned with central governments with ones where the mayor is just unaligned, where "just aligned" means that the mayor won the election with a small margin and that the mayor and the central government belong to the same party" (Bracco et al. (2015): 2). In this paper, for two main reasons, we do not use the alignment of the mayor respect to the political party/orientation of the central government as an instrument for transfers. Firstly, because we are interested in the analysis of all of the Italian municipalities but, in most of the municipalities (about 64% of our sample), we could not identify the political affiliation of the mayor as it is labeled with "lista civica" (i.e., independent civic coalitions). Also Bracco et al. (2015) point out that during the period 1998-2008 in the 66% of Italian small municipalities the party affiliation of the mayor cannot be classified because of "liste civiche" and they look at a subsample of 526 large Italian municipalities (i.e. those municipalities with a population above 15,000, for which they could identify the political affiliation of the mayor). Secondly, because in this paper we aim at exploiting the impact of the 1979 historical institutional reform in the Italian public finance to capture the exogenous component of overall (not only over-time) variations in the current transfers (we employ this instrument in a pooled-2SLS framework). However, we will show that our main results and validity of the instrument hold even when we include in the model specification political economy features of the municipalities.[20]

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[20]A related strand of the economic literature focusing on Italy offers other insights to exploit exogenous changes in the local public finance: for instance, the relaxation of the DSP in 2001 for the municipalities below 5,000 inhabitants (see, Grembi et al. (2012)). We do not use this approach for three main reasons. Firstly, these changes mainly influenced the regulation of the debt ceilings of the municipalities, while in the present study we aim to focus on the other mechanism through which fiscal consolidation can take place (namely, the adjustments of State transfers). Secondly, looking at the regulation, we can notice that the terms of DSP changed yearly on several dimensions, which can create problems of confounding effects and limited time span for the analysis. Thirdly, because the 2001 change falls outside the period of our analysis.

4.3 Estimation approaches and results

To estimate the augmented equation (9), we employ different estimators that will allow us to capture different dimensions of the variability of our data and to deal with different concerns about endogeneity.

In Table 2, we report our main estimation results. In column 1, we employ a pooled-ordinary least square estimator (pooled-OLS) that includes the controls at the municipality level (M), the municipality-year level (MT), province-fixed and year-fixed effects. Estimation results in column 2 are from the within-group estimator (i.e., municipality-fixed effects) that allows us to exploit the time dimension of our data. As previously discussed, in a framework that aims to capture both the cross-sectional and over-time variability of the *Arrears*, we also employ an IV approach that is based on the *1979 transfers* as an instrument for the current *Transfers*. In column 3, we report the results of the first stage and, in column 4, the second stage of the pooled two-stage least squares estimation (pooled-2SLS) using *1979 transfers* as instruments for the current transfers (that is an exactly identified model). In column 5, we show evidence from an overidentified 2SLS, where the 1979 transfers interacted with year dummies are the excluded instruments for the current transfers.[21] In all specifications, we report standard errors clustered at municipality level, which are robust for serial correlation and heteroscedasticity.[22]

[Table 2 about here]

Our primary interest is in the estimated coefficient of *Transfers*, which indicates whether a municipality's change in transfers is reflected on the formation of *Arrears* for investment expenditure. Estimated coefficients for *Transfers* are negative, statistically significant at the 1% level (or 5% level in column 2). In the OLS and panel fixed effects estimations, we estimate that a reduction of 10% in the transfers per capita is associated with an increase of about 0.3% in arrears. In the 2SLS estimations, we estimate that a reduction of 10% in the transfers per capita is associated with an increase of about 1.2% in arrears.[23] As predicted by our model (3), lower transfers from the central government harden the municipality's financial constraints, and force the municipal government to increase payment arrears for (new) investment expenditure.

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[21]See, in the Online Appendix A.1, Table A1 for the first stage results of this overidentified model. Hansen J test of overidentifying restrictions is reported.

[22]Due to space constraints, the coefficients on the time-invariant socio-economic controls at the municipality-level are not reported; we only report coefficients related to time-varying public finance variables.

[23]For example, in a municipality with average transfers per capita of 200 euros and average arrears per capita of 380 euros, a decrease of about 20 euros in the transfers per capita is associated with an increase in the arrears per capita of 4.60 euros.

Concerning the estimated coefficients of other control variables of interest, it is hardly surprising that the coefficient of *Investment expenditure* is positive and statistically significant (indicating an elasticity of about 1). As for the variable *Interest expenditure*, which is a proxy of the cost of the debt of the municipality and, thus, of the municipality's capacity to issue new debt and access to credit, the estimated coefficients are negative and statistically significant in columns 1, 4, and 5. This means that larger is the capacity of issuing new debt (or weaker the limits to local debt growth), higher is capacity of the municipality to keep up with the payments for investment expenditure and to reduce the amount of arrears. Note that, on average, the debt interest expenditure of the municipalities does not often vary over-time and this can explain the non-statistical significance of the coefficients in column 2, when municipality-fixed effects are included.[24]

4.4 Extensions and robustness checks

In this section, we propose a set of robustness checks to further control for the validity of our estimation results and consistency of our interpretation of the results with the model's predictions. Each change in the estimated empirical model, or analyzed sample, that we introduce is again estimated using different approaches. However, for reasons of space, in Table 3, we report only the estimation results obtained with the 2SLS estimator, while the full set of results are reported in the Online Appendix A.1.

[Table 3 about here]

The first concern is about the role of the *Stock of the arrears* at the beginning of the year. One might argue that the formation of arrears in each year is influenced by the previous stocks of arrears. In fact, on the one hand, municipalities with larger stock of arrears could tend to systematically have higher new arrears respect to the other municipalities. On the other hand, a municipality with larger stock of past arrears could tend to reduce the formation of new arrears in the year to avoid greater difficulties in future payments. To control for this factor, we include in the model specification (9) the stock of the arrears for investments, taken at the beginning of the year. Estimation results in Table 3, column 1, confirm the previously estimated sign, statistical significance of the effects of *Transfers*, *Investment expenditure*, and *Debt interest expenditure* on the *Arrears*.[25]

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[24]Note that our main estimation results do not change when we alternatively use the ratio between debt interest expenditure and total revenues.

[25]See, in the Online Appendix A.1, Table A3 for the full set of estimations about this robustness check, and Table A2 for further summary statistics. Note that the coefficient of the *Stock of the arrears* is positive an significant in the pooled-OLS and pooled-2SLS estimations, and negative

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In column 2 of Table 3, we report estimation results after including in the model specification province-year fixed effects. This is to control for additional time-varying characteristics and exploit variation, in any given year, among the municipalities within each of the 86 provinces in our sample. Results confirm our main estimation.[26]

An additional robustness check deals with the concerns related to political features. Economic literature shows that the electoral cycle as well as the alignment of local politicians to national governments are among the determinants of the differences in intergovernmental grants among the municipalities (see, among others, Solé-Ollé and Sorribas-Navarro (2008), Bracco and Brugnoli (2012), Brollo and Nannicini (2012), and Bracco et al. (2015)). Although a deep analysis of these political economy factors is beyond the scope of the present paper, we follow Bracco et al. (2015) and add to our model specification (9) political controls. Specifically, we include the following controls: a dummy variable indicating whether the municipality's mayor is in his first mandate, and a set of dummy variables indicating the year passed from the last election (data come from the Ministry of Interior), to control for the political and electoral cycles; a proxy of social capital (i.e., number of non profit organizations per capita, data are from Nannicini et al. (2013))), and a variable representing the share of tertiary educated people (data come from ISTAT) in the municipality, to control for the accountability on local politicians (see, Nannicini et al. (2013)). In Italy, in each municipality the mayor and city's council are elected for a five-year term and each mayor has a limit of two consecutive terms (note that elections in the municipalities do not take place at the same time). Mayors might tend to have different expenditure incentives/choices in their first mandate respect to their second mandate as well as in the years just before the election respect to the years just after the elections (see, for instance, Besley and Case (2003) and Cioffi et al. (2012)).[27] We also run an additional robustness check to verify whether our estimated relationship holds also in municipalities of small dimension and it is not driven by larger municipalities (in Italy, and in our sample, about 91% of the municipalities have a population below 15,000 inhabitants). Although we already control for population size in our model specifications, we estimate our model (9 on the sub-sample of municipalities with a population below 15,000 inhabitants. In fact, in Italy, municipalities below 15,000 inhabitants have a different electoral system re-

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and significant in the panel fixed effect estimation. This suggests that when we compare across municipalities, those with higher stocks of arrears tend to maintain higher levels of new arrears, while an increase in the stock of arrears within a municipality translates into a smaller amount of new arrears.

[26]See, in the Online Appendix A.1, Table A4 for the full set of estimations about this robustness check.

[27]As previously noted, we do not control for the alignment of the mayor respect to the political party/orientation of the central government because in most municipalities we cannot identify the political affiliation of the mayor. Note that we also control for a proxy for mayor's level of education (data come from the Ministry of Interior).

spect to larger municipalities and we might be interested to assess whether different political contexts influence our results (a single ballot system applies to municipalities with less than 15,000 inhabitants, while a dual ballot system is in place above that threshold; see, among others, Barone and de Blasio (2013)). Estimation results reported in Table 3, columns 3 and 4, show that our main estimation results are not influenced by the inclusion of these controls in the model specifications.[28]

Further insight about the consistency of the interpretation of the estimated relationship between transfers and arrears can be gained by interacting the transfers with the (cost of) debt of the municipality (*Transfers*Interest expenditure*). As illustrated above, estimation results of our main model specification show that higher expenditure for interests on the debt reduces the arrears (Table 2). This relationship indicates a possible substitution effect between bank and trade debt. To bring further evidence on the interpretation of the arrears as a form of trade debt, the intuition suggests to verify whether an increase in transfers reduces the arrears by a smaller percentage in municipalities with higher level of debt than in municipalities with lower level of debt. When a municipality is highly-constrained in the formation of additional debt, it will tend to use the trade debt channel (i.e., the arrears) to relax its constraints more than in a less-constrained municipality. Thus, the net marginal effect of higher transfers on the reduction of the arrears is expected to be smaller in the former than in the latter municipality. Estimation results in Table 3, column 5, show that the estimated coefficient of the interaction term between transfers and expenditure for debt interests is positive and statistical significant, while the estimated coefficients for the single terms of transfers and debt remain negative on the arrears.[29] This finding brings additional evidence on the interpretation of the arrears as a form of trade debt as well as on the presence of a form substitution between formal and trade debt that can take place in the municipalities.

Then, we show a robustness check that aims at taking into account the fact that our results might be affected by the endogeneity problems that are related to the level of investment expenditure that is decided by the municipality each year. In fact, it might be the case that municipalities that tend to accumulate arrears decide to lower the level of investments, to limit the formation of new arrears. We have instrumented the level of investment expenditure to check whether its potential endogeneity influences our results. This test has the implication that we need to deal with two variables to be instrumented (both *Transfers* and level of *Investment*

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[28]See, in the Online Appendix A.1, Table A5 and Table A6 for the full set of estimations about these robustness checks. Note that our IV approach maintains its validity when we include in the model specification municipality-level political controls. Note also that, in further controls, we do not find any significant interaction effect between transfers and electoral and political cycle on the arrears.

[29]See, in the Online Appendix A.1, Table A7 for the full set of estimations about this robustness check.

expenditure). In Table 3, column 6, we report estimation results of our model specification obtained using the 2-steps GMM. The model is augmented with the lagged value of arrears (*L. Arrears*) to control for the presence of a persistent process in the accumulation of arrears. Estimated coefficients confirm the presence of a statistically significant and negative relationship between transfers and arrears.[30]

5   Conclusion

The reduction of transfers from the central government to the local ones is widely adopted in the aim to decentralize the fiscal consolidation process; however, if the the cut in transfers translates at the municipal level in higher *trade debt* - in the form of expenditure arrears - the pursued objective can result frustrated.

This paper has addressed the effect of the central government cuts in transfers/grants on the municipalities' payment for local public investments. Our simple model predicts that hardening fiscal constraints at municipal level can lead local governments to increase their expenditure arrears; moreover, expenditure arrears will result positively affected by the municipality's expenditure in investment and negatively affected by the municipality's cost of debt.

We test these predictions using a large dataset on Italian municipalities in the period 2003-2010. Our empirical strategy is based on an instrumental variable approach, relying on the structural break that deeply changed the Italian local public finance in 1979, and on the central role played by intergovernmental transfers in driving local fiscal policy. Our empirical results - implemented with several robustness checks - are largely consistent with our theoretical predictions. In particular, we find that a reduction of 10 percent in the transfer per capita from the central government to municipality is associated with an increase of 1.2 percent in local expenditure arrears.

On the one hand, our theoretical and empirical analysis highlight a novel and perverse effect driven by the (mis)management of intergovernmental transfers. We provide new evidence about the costs of hardening constraints in the fiscal decentralization process. On the other hand, this suggests that further research on the design of optimal exogenously imposed fiscal restraints should consider the local government's response.

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[30]Note that in the Online Appendix A.2 we report two further robustness checks showing estimation results for different dependent variables. The idea is to offer evidence of the goodness of our dataset and model specification in predicting the effects of the transfers on alternative outcomes for which we have predictions from our theoretical model (Section 3) or we can make solid conjectures.

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Figures and Tables
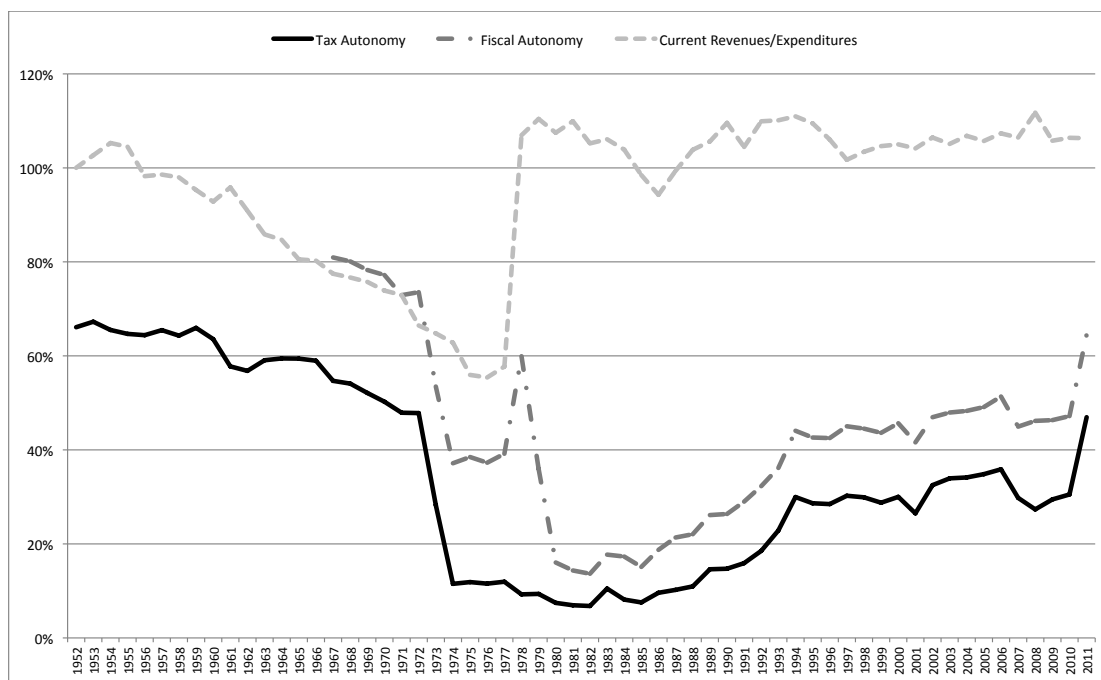
Figure 1: Municipal Public Finance in Italy: 1952-2011

Source: our elaboration on ISTAT data. Legend: Tax Autonomy: ratio between tax revenues and total revenues; Fiscal Autonomy: ratio between autonomous revenues (i.e., all revenues excluding intergovernmental grants) and total revenues; Current Revenues/Expenditure: ratio between current revenues and current expenditures.
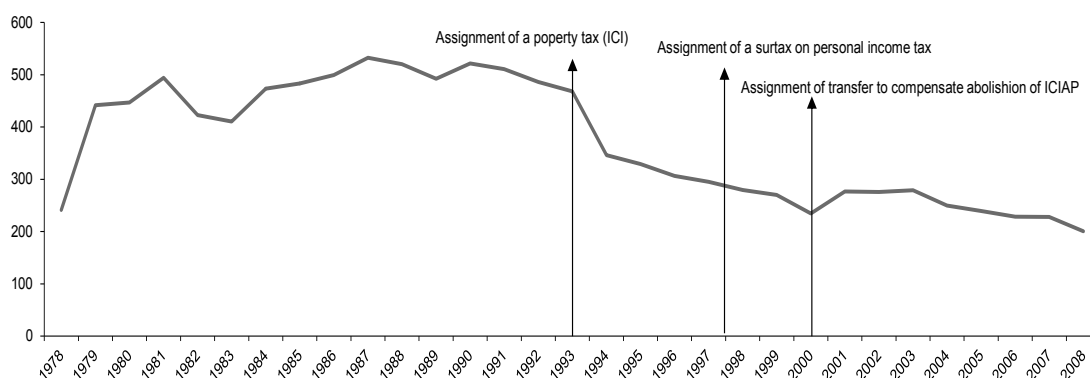
Figure 2: Real per-capita current account transfers from the state to municipalities

Source: Italian Home Office. Legend: euro, base year 2008

Table 1: Summary statistics (Real euros per capita). Period 2003-2010.

VARIABLES	Mean	SD		
		Overall	Between	Within
Arrears (Inv.)	380.79	771.83	512.27	583.67
Transfers from central gov.	200.56	127.65	117.32	54.75
Investment expenditure (comm.)	436.84	822.21	564.09	603.62
Debt Interest expenditure	33.68	28.45	26.87	9.23
Av. Taxable income	14691.02	2299.82	2236.85	568.37
Population	7500.07	44072.47	43252.87	1217.41
1979 Transfers	203.46	106.74	108.45	0
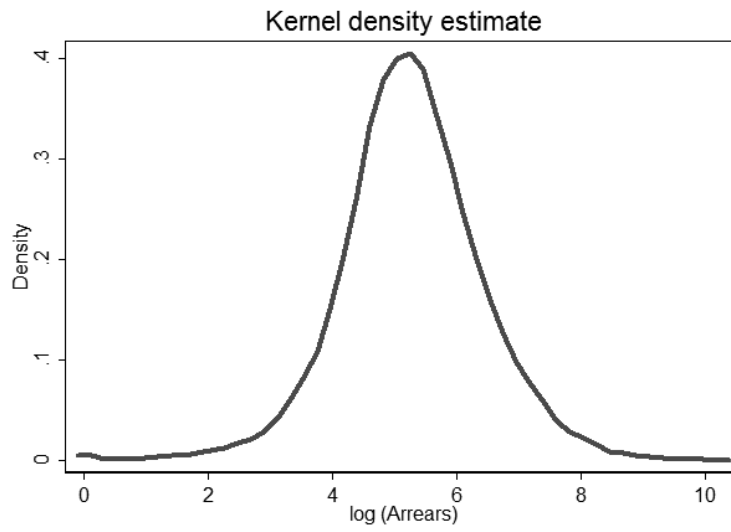
Figure 3: Kernel density estimation of the arrears pc
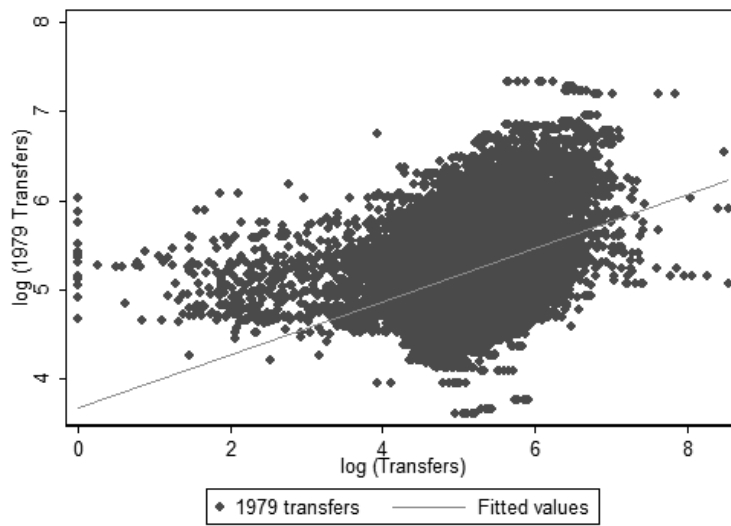
Figure 4: Correlation between transfers pc and 1979 transfers pc

Table 2: Main estimation

Column	(1)	(2)	(3)	(4)	(5)
Estimator	pooled OLS	FE	1' stage: pooled 2SLS	2' stage: pooled 2SLS	2' stage: pooled 2SLS
Dependent var.			log of		
	Arrears	Arrears	Transfers	Arrears	Arrears
log of:					
Transfers	-0.022**	-0.031***		-0.132***	-0.116***
	(0.009)	(0.012)		(0.049)	(0.044)
Investment expenditure	1.054***	1.068***	0.020***	1.057***	1.056***
	(0.004)	(0.005)	(0.003)	(0.004)	(0.004)
Interest expenditure	-0.017***	-0.010	0.034***	-0.012**	-0.013**
	(0.005)	(0.013)	(0.006)	(0.005)	(0.005)
Av. Taxable income	0.007	0.012	-0.545***	-0.047	-0.040
	(0.024)	(0.066)	(0.040)	(0.034)	(0.032)
1979 transfers			0.177***		
			(0.012)		
Municipality-level controls	YES	NO	YES	YES	YES
Municipality-fixed effects	NO	YES	NO	NO	NO
Province-fixed effects	YES	NO	YES	YES	YES
Year-fixed effects	YES	YES	YES	YES	YES
Observations	51,246	51,246	51,246	51,246	51,246
R-squared	0.889	0.856	0.563	0.888	0.889
Endogeneity(p-value)				0.024	
Hansen J (p-value)					0.216

Notes: Robust standard errors clustered at the municipality level are in parentheses. Inference: *** p<0.01, ** p<0.05, * p<0.1. In column 4 the excluded instrument is the 1979 transfers, and Transfers is the instrumented variable. In column 5 the excluded instruments are the 1979 transfers interacted with year dummies; Transfers is the instrumented variable. Municipality-level controls include: population size categories; density of population; number of bed places in tourist accommodations; km of roads within the municipality; share of young, and share of old population; unemployment rate; dummy variables for the municipality being located in a mountainous area. Endogeneity is the regression-based form of the Durbin-Wu-Hausman test. If the null hypothesis is not rejected, OLS estimations are preferred: p-values are reported. The Sargan-Hansen test is a test of overidentifying restrictions. The joint null hypothesis is that the instruments are valid instruments, i.e., uncorrelated with the error term, and that the excluded instruments are correctly excluded from the estimated equation.

Table 3: Extensions and robustness checks

	(1) 2SLS	(2) 2SLS	(3) 2SLS	(4) 2SLS	(5) 2SLS	(6) 2-steps GMM
Column	(1)	(2)	(3)	(4)	(5)	(6)
Estimator	2SLS	2SLS	2SLS	2SLS	2SLS	2-steps GMM
Dependent var.	Arrears	Arrears	Arrears	log of Arrears	Arrears	Arrears
Sample	Full	Full	Full	<15,000 inh.	Full	Full
log of:						
Transfers	-0.179***	-0.099**	-0.099**	-0.147**	-0.293***	-0.144**
	(0.047)	(0.043)	(0.048)	(0.058)	(0.094)	(0.066)
Investment expenditure	1.054***	1.055***	1.060***	1.063***	1.056***	1.080***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.042)
Stock of arrears	0.033***					
	(0.005)					
Interest expenditure	-0.016***	-0.014***	-0.010**	-0.010*	-0.248**	-0.017***
	(0.005)	(0.005)	(0.005)	(0.006)	(0.097)	(0.005)
Av. Taxable income	-0.078**	-0.030	-0.029	-0.053	-0.054	-0.059
	(0.032)	(0.031)	(0.038)	(0.043)	(0.033)	(0.044)
Transfers* Interest expenditure					0.045**	
					(0.019)	
L.Arrears						0.004
						(0.008)
Municipality-level controls	YES	YES	YES	YES	YES	YES
Political controls	NO	NO	YES	YES	NO	NO
Province-fixed effects	YES	YES	YES	YES	YES	YES
Province-year-fixed effects	NO	YES	NO	NO	NO	NO
Year-fixed effects	YES	YES	YES	YES	YES	YES
Observations	51,166	51,246	47,275	43,165	51,246	43,312
R-squared	0.890	0.891	0.893	0.893	0.888	0.906
Hansen J (p-value)	0.318	0.450	0.450	0.143	0.102	0.699

Notes: Robust standard errors clustered at the municipality level are in parentheses. Inference: *** $p<0.01$, ** $p<0.05$, * $p<0.1$. In columns 1 to 4 the excluded instruments are the 1979 transfers interacted with year dummies; Transfers is the instrumented variable. In column 5 the excluded instruments are the 1979 transfers interacted with year dummies as well as the 1979 transfers interacted with debt interest expenditures and with year dummies; Transfers and Transfers*Interest expenditure are the instrumented variables. In column 6 the excluded instruments are the 1979 transfers interacted with year dummies; Investment expenditure and the Transfers are the instrumented variables. Municipality-level controls include: population size categories; density of population; number of bed places in tourist accommodations; km of roads within the municipality; share of young, and share of old population; unemployment rate; dummy variables for the municipality being located in a mountainous area. Municipality-level political controls include: index of tertiary educated people; number of non profit organizations per capita; dummies for mayor's level of education. The Sargan-Hansen test is a test of overidentifying restrictions. The joint null hypothesis is that the instruments are valid instruments, i.e., uncorrelated with the error term, and that the excluded instruments are correctly excluded from the estimated equation.

A ONLINE APPENDIX

A.1 Full set of empirical results

The following estimation results presented in Tables A1 to A7 complement the results presented in Tables 2 and 3.

Table A1: Overidentified 2SLS model

Column	(1)	(2)
Estimator	1' stage: pooled 2SLS	2' stage: pooled 2SLS
Dependent var.	log of	
	Transfers	Arrears
log of:		
1979 transfers	0.159***	
	(0.014)	
1979 transfers*y2004	0.037***	
	(0.009)	
1979 transfers*y2005	0.062***	
	(0.010)	
1979 transfers*y2006	0.050***	
	(0.010)	
1979 transfers*y2007	0.035***	
	(0.011)	
1979 transfers*y2008	-0.004	
	(0.010)	
1979 transfers*y2009	-0.023*	
	(0.012)	
1979 transfers*y2010	-0.016	
	(0.011)	
Investment expenditure	0.020***	1.056***
	(0.003)	(0.004)
Interest expenditure	0.034***	-0.013**
	(0.006)	(0.005)
Av. Taxable income	-0.544***	-0.040
	(0.040)	(0.032)
Transfers		-0.116***
		(0.044)
Municipality-level controls	YES	YES
Province-fixed effects	YES	YES
Year-fixed effects	YES	YES
Observations	51,246	51,246
R-squared	0.563	0.889
Hansen J (p-value)		0.216

Notes: Robust standard errors clustered at the municipality level are in parentheses. Inference: *** p<0.01, ** p<0.05, * p<0.1. In column 2 the excluded instruments are the 1979 transfers interacted with year dummies; Transfers is the instrumented variable. Municipality-level controls include: population size categories; density of population; number of bed places in tourist accommodations; km of roads within the municipality; share of young, and share of old population; unemployment rate; dummy variables for the municipality being located in a mountainous area. The Sargan-Hansen test is a test of overidentifying restrictions. The joint null hypothesis is that the instruments are valid instruments, i.e., uncorrelated with the error term, and that the excluded instruments are correctly excluded from the estimated equation.

Table A2: Further summary statistics (Real euros per capita).

VARIABLES	Mean	SD
Payments (Inv.)	61.73	169.62
Stock Arrears (Inv.)	1128.74	1993.88
Tax revenues	247.06	166.83
Touristics bed places per cap.(x100)	11.17	39.61
Roads (km)	81.44	140.20
Non-Mountainous	0.52	0.50
Partially-Mountainous	0.08	0.27
Mountainous	0.41	0.49
Unemployment	8.93	7.76
Dependence young pop.	0.20	0.04
Dependence old pop.	0.36	0.14
Population density	313.33	654.65
Tertiary education	4.74	2.25
Non profit organizations per cap. (x1000)	0.52	0.39
Years after elections	1.93	1.48
Mayor first mandate	0.67	0.47
Mayor education	3.30	0.70

Table A3: Stock of arrears at the beginning of the year as an additional control

Column	(1)	(2)	(3)	(4)	(5)
Estimator	pooled OLS	FE	1' stage: pooled 2SLS	2' stage: pooled 2SLS	2' stage: pooled 2SLS
Dependent var.	Arrears	Arrears	Transfers	Arrears	Arrears
			log of		
log of:					
Transfers	-0.027***	-0.033***		-0.199***	-0.179***
	(0.009)	(0.012)		(0.052)	(0.047)
Investment expenditure	1.051***	1.070***	0.013***	1.054***	1.054***
	(0.004)	(0.004)	(0.002)	(0.004)	(0.004)
Interest expenditure	-0.022***	-0.009	0.028***	-0.015***	-0.016***
	(0.005)	(0.013)	(0.006)	(0.005)	(0.005)
Av. Taxable income	-0.001	0.031	-0.551***	-0.089*	-0.078**
	(0.023)	(0.066)	(0.039)	(0.035)	(0.032)
Stock of arrears	0.026***	-0.021***	0.037***	0.034***	0.033***
	(0.004)	(0.005)	(0.004)	(0.005)	(0.005)
1979 transfers			0.165***		
			(0.012)		
Municipality-level controls	YES	NO	YES	YES	YES
Municipality-fixed effects	NO	YES	NO	NO	NO
Province-fixed effects	YES	NO	YES	YES	YES
Year-fixed effects	YES	YES	YES	YES	YES
Observations	51,166	51,166	51,166	51,166	51,166
R-squared	0.892	0.860	0.565	0.889	0.890
Hansen J (p-value)					0.318

Notes: Robust standard errors clustered at the municipality level are in parentheses. Inference: *** $p<0.01$, ** $p<0.05$, * $p<0.1$. In column 4 the excluded instrument is the 1979 transfers, and Transfers is the instrumented variable. In column 5 the excluded instruments are the 1979 transfers interacted with year dummies; Transfers is the instrumented variable. Municipality-level controls include: population size categories; density of population; number of bed places in tourist accommodations; km of roads within the municipality; share of young, and share of old population; unemployment rate; dummy variables for the municipality being located in a mountainous area. The Sargan-Hansen test is a test of overidentifying restrictions. The joint null hypothesis is that the instruments are valid instruments, i.e., uncorrelated with the error term, and that the excluded instruments are correctly excluded from the estimated equation.

Table A4: Province-year dummy variable as additional controls

Column	(1)	(2)	(3)	(4)	(5)
Estimator	pooled OLS	FE	1' stage: pooled 2SLS	2' stage: pooled 2SLS	2' stage: pooled 2SLS
Dependent var.	Arrears	Arrears	Transfers	Arrears	Arrears
			log of		
log of:					
Transfers	-0.021**	-0.031**		-0.128***	-0.099**
	(0.009)	(0.012)		(0.049)	(0.043)
Investment expenditure	1.053***	1.068***	0.021***	1.056***	1.055***
	(0.004)	(0.005)	(0.003)	(0.004)	(0.004)
Interest expenditure	-0.018***	-0.015	0.038***	-0.013**	-0.014***
	(0.005)	(0.013)	(0.006)	(0.005)	(0.005)
Av. Taxable income	0.009	0.034	-0.536***	-0.044	-0.030
	(0.025)	(0.077)	(0.040)	(0.034)	(0.031)
1979 transfers			0.175***		
			(0.012)		
Municipality-level controls	YES	NO	YES	YES	YES
Municipality-fixed effects	NO	YES	NO	NO	NO
Province-fixed effects	YES	NO	YES	YES	YES
Province-year-fixed effects	YES	YES	YES	YES	YES
Year-fixed effects	YES	YES	YES	YES	YES
Observations	51,246	51,246	51,246	51,246	51,246
R-squared	0.891	0.859	0.574	0.890	0.891

Notes: Robust standard errors clustered at the municipality level are in parentheses. Inference: *** p<0.01, ** p<0.05, * p<0.1. In column 4 the excluded instrument is the 1979 transfers, and Transfers is the instrumented variable. In column 5 the excluded instruments are the 1979 transfers interacted with year dummies; Transfers is the instrumented variable. Municipality-level controls include: population size categories; density of population; number of bed places in tourist accommodations; km of roads within the municipality; share of young, and share of old population; unemployment rate; dummy variables for the municipality being located in a mountainous area.

Table A5: Political factors as additional controls

Column	(1)	(2)	(3)	(4)	(5)
Estimator	pooled OLS	FE	1' stage: pooled 2SLS	2' stage: pooled 2SLS	2' stage: pooled 2SLS
Dependent var.	Arrears	Arrears	Transfers	Arrears	Arrears
			log of		
log of:					
Transfers	-0.014*	-0.023***		-0.110**	-0.099**
	(0.007)	(0.007)		(0.053)	(0.048)
Investment expenditure	1.058***	1.073***	0.016***	1.060***	1.060***
	(0.004)	(0.004)	(0.003)	(0.004)	(0.004)
Interest expenditure	-0.013***	-0.005	0.025***	-0.010*	-0.010**
	(0.005)	(0.013)	(0.006)	(0.005)	(0.005)
Av. Taxable income	0.013	-0.035	-0.508***	-0.035	-0.029
	(0.031)	(0.066)	(0.043)	(0.040)	(0.038)
1979 transfers			0.163***		
			(0.012)		
Municipality-level controls	YES	NO	YES	YES	YES
Municipality-level political controls	YES	YES	YES	YES	YES
Municipality-fixed effects	NO	YES	NO	NO	NO
Province-fixed effects	YES	NO	YES	YES	YES
Year-fixed effects	YES	YES	YES	YES	YES
Observations	47,275	47,275	47,275	47,275	47,275
R-squared	0.893	0.861	0.559	0.892	0.893
Hansen J (p-value)					0.450

Notes: Robust standard errors clustered at the municipality level are in parentheses. Inference: *** p<0.01, ** p<0.05, * p<0.1. In column 4 the excluded instrument is the 1979 transfers, and Transfers is the instrumented variable. In column 5 the excluded instruments are the 1979 transfers interacted with year dummies; Transfers is the instrumented variable. Municipality-level controls include: population size categories; density of population; number of bed places in tourist accommodations; km of roads within the municipality; share of young, and share of old population; unemployment rate; dummy variables for the municipality being located in a mountainous area. Municipality-level political controls include: index of tertiary educated people; number of non profit organizations per capita; dummies for the years from the past elections; dummy for mayor's first mandate period; dummies for mayor's level of education. The Sargan-Hansen test is a test of overidentifying restrictions. The joint null hypothesis is that the instruments are valid instruments, i.e., uncorrelated with the error term, and that the excluded instruments are correctly excluded from the estimated equation.

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Table A6: Subsample: Municipalities below 15,000 inhabitants and political factors as additional controls

Column	(1)	(2)	(3)	(4)	(5)
Estimator	pooled OLS	FE	1' stage: pooled 2SLS	2' stage: pooled 2SLS	2' stage: pooled 2SLS
Dependent var.	Arrears	Arrears	Transfers	Arrears	Arrears
log of:					
Transfers	-0.014*	-0.021***		-0.189***	-0.147**
	(0.008)	(0.007)		(0.069)	(0.058)
Investment expenditure	1.060***	1.076***	0.016***	1.064***	1.063***
	(0.004)	(0.004)	(0.003)	(0.004)	(0.004)
Interest expenditure	-0.015***	-0.003	0.030***	-0.008	-0.010*
	(0.005)	(0.014)	(0.006)	(0.006)	(0.006)
Av. Taxable income	0.014	-0.029	-0.513***	-0.074	-0.053
	(0.032)	(0.067)	(0.046)	(0.047)	(0.043)
1979 transfers			0.136***		
			(0.013)		
Municipality-level controls	YES	NO	YES	YES	YES
Municipality-fixed effects	NO	YES	NO	NO	NO
Municipality-level political controls	YES	YES	YES	YES	YES
Province-fixed effects	YES	NO	YES	YES	YES
Year-fixed effects	YES	YES	YES	YES	YES
Observations	43,165	43,165	43,165	43,165	43,165
R-squared	0.895	0.863	0.571	0.892	0.893
Hansen J (p-value)					0.144

Notes: Robust standard errors clustered at the municipality level are in parentheses. Inference: *** p<0.01, ** p<0.05, * p<0.1. In column 4 the excluded instrument is the 1979 transfers, and Transfers is the instrumented variable. In column 5 the excluded instruments are the 1979 transfers interacted with year dummies; Transfers is the instrumented variable. Municipality-level controls include: population size categories; density of population; number of bed places in tourist accommodations; km of roads within the municipality; dummy variables for the municipality being located in a mountainous area. Municipality-level political controls include: unemployment rate; share of young, and share of old population; number of non profit organizations per capita; dummies for the years from the past elections; dummy for mayor's first mandate period; dummies for mayor's level of education. The Sargan-Hansen test is a test of overidentifying restrictions. The joint null hypothesis is that the instruments are valid instruments, i.e., uncorrelated with the error term, and that the excluded instruments are correctly excluded from the estimated equation.

Table A7: Interaction effects

Column	(1)	(2)	(3)	(4)	(5)	(6)
Estimator	pooled OLS	FE	1' stage: pooled 2SLS	1' stage: pooled 2SLS	2' stage: pooled 2SLS	2' stage: pooled 2SLS
Dependent var.	Arrears	Arrears	Transfers	Transfers* log of Inter. exp.	Arrears	Arrears
log of:						
Transfers	-0.055	-0.215***			-0.303***	-0.293***
	(0.038)	(0.063)			(0.103)	(0.094)
Transfers*						
Interest expenditure	0.010	0.055***			0.045**	0.045**
	(0.010)	(0.017)			(0.020)	(0.019)
Investment expenditure	1.054***	1.069***	0.019***	0.071***	1.056***	1.056***
	(0.004)	(0.004)	(0.003)	(0.011)	(0.004)	(0.004)
Interest expenditure	-0.068	-0.303***	-0.365***	1.197***	-0.249**	-0.248**
	(0.048)	(0.090)	(0.068)	(0.317)	(0.102)	(0.097)
Av. Taxable income	0.007	0.017	-0.550***	-1.859***	-0.059*	-0.054
	(0.025)	(0.066)	(0.040)	(0.156)	(0.036)	(0.033)
1979 transfers			-0.087*	-2.080***		
			(0.045)	(0.193)		
1979 transfers*						
Interest expenditure			0.076***	0.792***		
			(0.013)	(0.060)		
Municipality-level controls	YES	NO	YES	YES	YES	YES
Municipality-fixed effects	NO	YES	NO	NO	NO	NO
Province-fixed effects	YES	NO	YES	YES	YES	YES
Year-fixed effects	YES	YES	YES	YES	YES	YES
Observations	51,246	51,246	51,246	51,246	51,246	51,246
R-squared	0.889	0.856	0.565	0.919	0.888	0.888
Hansen J (p-value)						0.102

Notes: Robust standard errors clustered at the municipality level are in parentheses. Inference: *** p<0.01, ** p<0.05, * p<0.1. In column 5 the excluded instruments are the 1979 transfers and the 1979 transfers interacted with debt interest expenditures; Transfers and Transfers*Interest expenditure are the instrumented variables. In column 6 the excluded instruments are the 1979 transfers interacted with year dummies as well as the 1979 transfers interacted with debt interest expenditures and with year dummies; Transfers and Transfers*Interest expenditure are the instrumented variables. Municipality-level controls include: population size categories; density of population; number of bed places in tourist accommodations; km of roads within the municipality; unemployment rate; dummy variables for the municipality being located in a mountainous area. The Sargan-Hansen test is a test of overidentifying restrictions. The joint null hypothesis is that the instruments are valid instruments, i.e., uncorrelated with the error term, and that the excluded instruments are correctly excluded from the estimated equation.

A.2 Further results

A further prediction of our theoretical model (Section 3) is that higher transfers leads to lower tax revenues (*Tax revenues*). Estimation results in Table A8, columns 1 and 2, indicate that, in our data, higher transfers are actually significantly associated with lower tax revenues. It can also be noted that the coefficient *Av. Taxable income* is positive and statistically significant and smaller than the coefficient of transfers: a unit increase in the taxable income is thus associated with an increase in the tax revenues by a smaller quantity than a decrease in the transfers. These findings are particularly interesting in the light of the literature on the flypaper effect: the empirical phenomenon that results when an increase of one euro of transfers leads to (i) significantly greater public spending than an equivalent euro of citizen income and (ii) it does not translate in an one-euro reduction of tax revenues or increase in public spending (see Inman (2008) for a survey, and Gennari and Messina (2014) and Bracco et al. (2015) for recent empirical analyses on Italy). Even if in this paper we are not directly interested on the effect of transfers on taxation choices, these findings, together with the results reported in Table 2 (about a negative effect of the transfers and a non-significant effect of the taxable income on the arrears), suggest that one of the reasons because transfers do not fully translate into a similar amount of reduction in tax revenues could be related to the presence of a third channel: part of the transfers are allocated to reduce the trade debt (i.e., the expenditure for arrears). Further research in this direction is needed.

We also test the conjecture that if higher transfers reduce formation of arrears, we would expect that higher transfers should increase payments for investment expenditure planned in the year *Payments*. Estimation results in Table A8, columns 3 and 4, confirm this conjecture.

Finally, Table A9 present results our main results after excluding extreme values from the sample. Our findings are confirmed.

Table A8: Further results

Column	(1)	(2)	(3)	(4)
Estimator	pooled OLS	FE	pooled OLS	FE
Dependent var.			log of	
	Tax revenues	Tax revenues	Payments	Payments
			log of	log of
Transfers	-0.194***	-0.059***	0.033*	0.069***
	(0.035)	(0.013)	(0.017)	(0.018)
Investment expenditure			0.564***	0.469***
			(0.007)	(0.007)
Interest expenditure	1.949***	0.417***	0.079***	-0.080***
	(0.275)	(0.064)	(0.013)	(0.024)
Av. Taxable income	0.016***	0.002**	0.173**	0.019
	(0.002)	(0.001)	(0.074)	(0.158)
Municipality-level controls	YES	NO	YES	NO
Municipality-fixed effects	NO	YES	NO	YES
Province-fixed effects	YES	NO	YES	NO
Year-fixed effects	YES	YES	YES	YES
Observations	51,246	51,246	49,725	49,725
R-squared	0.465	0.044	0.350	0.180

Notes: Robust standard errors clustered at the municipality level are in parentheses. Inference: *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Note that only in columns 3 and 4 we use logs of dependent and explanatory variables. Municipality-level controls include: population size categories; density of population; number of bed places in tourist accommodations; km of roads within the municipality; share of young, and share of old population; unemployment rate; dummy variables for the municipality being located in a mountainous area.

Table A9: Excluding extreme values

Column	(1)	(2)	(3)	(4)	(5)
Estimator	pooled OLS	FE	1' stage: pooled 2SLS	2' stage: pooled 2SLS	2' stage: pooled 2SLS
Dependent var.			log of		
	Arrears	Arrears	Transfers	Arrears	Arrears
log of:					
Transfers	-0.025***	-0.020**		-0.098**	-0.099**
	(0.007)	(0.010)		(0.049)	(0.046)
Investment expenditure	1.053***	1.069***	0.017***	1.055***	1.055***
	(0.002)	(0.003)	(0.002)	(0.003)	(0.003)
Interest expenditure	-0.015***	-0.001	0.031***	-0.012***	-0.011***
	(0.004)	(0.008)	(0.005)	(0.004)	(0.004)
Av. Taxable income	-0.002	0.018	-0.449***	-0.032	-0.032
	(0.020)	(0.050)	(0.029)	(0.028)	(0.027)
1979 transfers			0.151***		
			(0.010)		
Municipality-level controls	YES	NO	YES	YES	YES
Municipality-fixed effects	NO	YES	NO	NO	NO
Province-fixed effects	YES	NO	YES	YES	YES
Year-fixed effects	YES	YES	YES	YES	YES
Observations	47,462	47,462	47,462	47,462	47,462
R-squared	0.918	0.900	0.685	0.918	0.918
Hansen J (p-value)					0.170

Notes: Values belonging to the first and last deciles of the distributions of the Arrears, Transfers, Investment expenditure, Debt interest expenditure, and Tax revenues are excluded from the sample. Robust standard errors clustered at the municipality level are in parentheses. Inference: *** p<0.01, ** p<0.05, * p<0.1. In column 4 the excluded instrument is the 1979 transfers, and Transfers is the instrumented variable. In column 5 the excluded instruments are the 1979 transfers interacted with year dummies; Transfers is the instrumented variable. Municipality-level controls include: population size categories; density of population; number of bed places in tourist accommodations; km of roads within the municipality; share of young, and share of old population; unemployment rate; dummy variables for the municipality being located in a mountainous area. The Sargan-Hansen test is a test of overidentifying restrictions. The joint null hypothesis is that the instruments are valid instruments, i.e., uncorrelated with the error term, and that the excluded instruments are correctly excluded from the estimated equation.