

Fiscal Consolidation and Expenditure Arrears: Evidence from Local Governments' Investments*

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Abstract

In this paper we investigate how hardening fiscal constraints (e.g., inter-governmental transfer cuts or stricter local fiscal rules) can lead local governments to postpone the payments for public investments. We first provide a simple model showing how financially constrained local governments can use arrears as a form of *trade debt* to relax their short-run financial distress. 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. (122 words)

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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 at least part of needed fiscal adjustment measures to local governments (OECD, 2013; European Commission (2014)). OECD countries during the recent great recession are not an exception. Intergovernmental transfer cuts (i.e. from the central government to the local ones), unfunded decentralization of public expenditure and/or increase in national tax to fund local expenditure, stricter local fiscal rules imposed on, or negotiated with local governments, are all measures often adopted by central policy-makers to partly decentralize the fiscal consolidation process (see about Hagemann (2012); and Glaeser (2008)). A recent OECD Report (2013, p.27) highlights that the most powerful lever to address fiscal consolidation at local level is represented by the management of intergovernmental grants: they account for around 4 percent of the GDP, for about 8 percent of the general government spending and for around 50 percent of the total sub-central governments revenue.

In this paper we investigate how the cut of governmental grants to municipalities gives the rise to *trade debt* in the form of expenditure arrears, thus frustrating fiscal consolidation which represents the final objective pursued by the cut in itself.

There is a huge empirical literature and an extensive debate on the effects of intergovernmental grants and transfers on fiscal consolidation, and empirical results are often not conclusive and/or open to several interpretations. On the one hand, Hines and Thaler (2013), and more recently Inman (2008), sum up several empirical analysis and highlight that reducing transfer to local government can improve consolidation: this result is driven by the so called "flypaper effect"¹ according to which lower transfers improve the budget balance at central level more than worsen it at local level. Gennari and Messina (2014) assess the flypaper effect on Italian data, confirming it and finding a remarkable asymmetric response of municipal expenditures to central government transfers. On the other hand, De Mello (2007) empirically found a negative relationship between transfers and local government budget discipline: an increase in transfer was associated with a higher local government deficit. Brollo et al. (2013), on a Brazilian dataset about central transfers to municipalities, found that higher grants determine larger corruption and worsen the "quality" of political candidates challenging the incumbent. We contribute to this literature with a simple theoretical model and a novel empirical investigation which specifically addresses the effect of central government transfer on local governments' expenditure arrears. In particular, in our simple theory, lower transfers from the

¹This effect is based on the hypothesis that the local government's propensity to spend is greater if spending is financed through grants rather than through local government own revenues.

central government can lead the local government to increase expenditure arrears - e.g. postponed payment to business of contractual public investment - everything else held equal. Note that higher arrears result to be a form of *trade debt* of the local government. Diamond and Schiller (1993), and more recently Checherita-Westphal et al. (2015) stressed that expenditure arrears could: (i) make uncertain the true size of government debt; (ii) reduce the impact of fiscal policy and (iii), in general, undermine macroeconomics financial stability.²

This paper adds to the economic literature which focusses on how central government transfers affect the local fiscal policy a novel result on the effects of central government transfers' cut on municipalities' expenditure arrears. To the best of our knowledge, we are the first investigating this specific effect: recent papers focussing on fiscal decentralization in Italy have exploited discontinuities in the legal framework introduced - and at different times relaxed/modified - by the central government, i.e. the so called Domestic Stability Pact (DSP, henceforth; see, among others, Grembi et al. (2012), Gregori (2014), and Balduzzi and Grembi (2011)). However, considering the frequent changes of several specific regulations featuring the DSP and the effective enforcement of the DSP rules, there might arise some concerns about the relevance of these discontinuities and their exploitation for the empirical analysis.

In our paper we set a simple theoretical model where a local government - facing a ceiling on local debt - maximizes a standard inter-temporal objective function under a budget constraint. The local government can react to a cut in transfers from the central government - which hardens the local fiscal constraints - by increasing expenditure arrears, everything else held equal. We then take this prediction to a large dataset about accounting and financial report of Italian municipality for the period 2003-2010. Our dataset includes 6,700 municipalities: they are - on the one side - different in size and in many socio-economic-political features and - on the other - belonging to a common regulatory framework. This permits us to exploit the cross-sectional and over time changes in variables of interest. To control for endogeneity problems, we adopt an instrumental variable approach: we use the levels of *1979 transfers* from central to local governments as a new IV for the level of realized transfers. Our results highlight that lower transfers from the central government determine higher local governments' expenditure arrears. Moreover, arrears decrease with the interest expenditure - i.e. a *proxy* for the municipality's

²Expenditure 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 late payments (Connell (2014)) and in Flynn and Pessoa (2014). During economic and financial crisis, indeed, the government's 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.

cost of debt.

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, first describing our dataset (4.1), our empirical model and IV strategy (4.2), our estimation approaches and results (4.3), 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 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. 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 decrees³: 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 than 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.⁴

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 Maastricht 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 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.⁵ The revenue structure of municipalities was reformed in

³The 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.

⁴Several 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.

⁵The main functions of municipalities were revised in 1998 with the implementation of the two

1992 (Decree law n. 504/1992), with the assignment, from 1993, of a property tax (ICI)⁶ along with the rationalization of transfers from State, which became largely unconditional.⁷ 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).⁸

[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.⁹

The reduction in the amount granted to municipalities was not, however, accompanied by a significant change of allocation criteria. Indeed, the reform of the transfer system during the 1990s failed, letting substantially unchanged the design of intergovernmental grants.¹⁰

decentralization laws of 1997 (the so-called “Bassanini” laws, upon the name of the Public Function Minister).

⁶Municipalities 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.

⁷The 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.

⁸Central 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.

⁹In 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.

¹⁰Decree 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

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.¹¹ 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 inter-governmental 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).

3 Theoretical model

Note this version of the model will go in Appendix A.1. Here a version of the model with exogenous capital expenditure. Predictions on arrears do not change.

The economy is made by a large number of local governments. Each local govern-

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.

¹¹Several 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.

ment maximizes the following inter-temporal objective function

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

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

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

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

The local government faces the following budget constraint:

$$\tau_t + g_t + b_t - b_{t-1} = e_t + r b_{t-1} + i_t \quad (3)$$

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: $b_t \leq \bar{b}_t$.¹²

To keep the model as simple as possible we assume that the stock of capital in each year is determined as follows:

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

In particular, without loss of generality we assume that the capital is fully depreciated in a single period. 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 implementation 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 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

¹²We do not include any lower bound to gross public debt, considering that local government may issue negative debt (i.e., buy assets).

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.¹³ We assume that $\rho > r$, i.e., issuing (formal) debt is less costly than relying on trade debt (i.e., agreeing with private contractors a delay in payments and incurring in *voluntary* cost overruns).

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),

$$\tau_t : -h'_t + m'_t = 0 \quad (5)$$

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

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

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

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; and its effect on the optimal fiscal policy (τ_t, i_t, a_t) has the 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:

¹³In 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.

Proposition 2 *The optimal local fiscal policy is such that arrears, a_t , and tax revenues, τ_t , decrease (or do not increase), and capital expenditure, i_t , increases (or does not decrease) as the local budget constraints is relaxed (i.e., \bar{b}_t or g_t grows) or actual capital accumulation is below the expected level (i.e., θ_t is negative).*

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 $(\bar{b}_t, g_t, -\theta_t)$. Hence, the proposition follows. ■

4 Empirical analysis

The model presented in Section 3 highlights that larger restrictions to the municipality's financial constraints (i.e. lower grants from the central government) leads 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 exploiting 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 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 transportation, public utilities, and welfare. About half of the general 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. Bank of Italy collects and harmonizes (where needed) this information and provide a ready-to-use database containing information about the budget of the municipality. 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 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), State transfers have shaped the financial conditions (both on the revenue and expenditure sides) of Italian municipalities in the last three decades. 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. On average, in per capita terms, transfers represent about 245 euros, with a standard deviation of 220 euros. Figure 3 and Table 1 show large overall, between and within variations of the transfers in the period of our analysis (2003-2010).

[Figures 3, 4, and 5 about here]

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 theoretical model (Section 3). Descriptive statistics show that, on average and in per capita terms, the *Arrears* are about euros 380 euros (with a standard deviation of 772 euros; see Table 1, and Figure 4 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.

[Table 1 about here]

A simple correlation between the (log of per capita) *Transfers* and the (log of per capita) *Arrears* shows a strong and significant correlation of +0.35 (see Figure 5). However, this simple and descriptive evidence does not take into account other potential determinants of the arrears for which information can be recalled from municipalities’ accounting and financial reports.

Among these variables, there naturally is the amount of planned expenditure in investments (*Investment expenditure*), as a larger amount of investments is expected to be strongly associated with larger arrears for two main reasons. Firstly, because of a scale effect: a larger amount of payments 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” generate arrears for the part of payments due in the future years.

To control for the influence of ceilings to local debt (that is, as previously discussed, another aspect influenced by the fiscal consolidation process) on the formation of expenditure arrears, we also take into account the debt burden of the municipality. In particular, we control for the cost of the debt, proxied with the *Debt interest expenditure*. (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).

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.

$$y_{mt} = \alpha + \beta Transfers_{mt} + \gamma MT_{mt} + \epsilon_{mt}. \quad (9)$$

The dependent variable y denotes the *Arrears* from investments in year t by municipality m . *Transfers* are the grants 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 (i.e. *Investment expenditure* and *Debt interest expenditure*) of each municipality in each year. The error term ϵ captures all factors that influence the arrears but are not captured by the model specification and consists of the following: (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), for the location being in a mountainous area, for the extension of the existing road network in the municipality, for the socio-economic situation proxied by the unemployment rate and the share of tertiary educated population (data come from the Italian National Institute of Statistics - ISTAT). These characteristics aim at representing several dimensions of the demand for public spending in the municipality. 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 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 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.

Although the inclusion of additional control variables and fixed effects, the estimation of the relationship between municipality's *Transfers* and *Arrears* might be still affected by 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. Searching for exogenous discontinuities in the evolution of the Italian local public finance is not an easy task. The economic literature focusing on Italy offers some insights, such as the introduction (and, later, relaxation) of the DSP at the beginning of 2000s. However, on the one hand, these changes mainly influenced the regulation of the debt ceilings of the municipalities (e.g., Grembi et al. (2012)), 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). On the other hand, 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. In this paper, we employ the levels of *1979 transfers* from the central to the local governments as a new IV for the current level of transfers.

As presented in the narrative analysis on fiscal decentralization on Italy (Section 2), in the early 1970s, public finance reforms in Italy were in the direction of “more” (not less) fiscal decentralization and autonomy. In the following years, one of the consequences was the fast-growing debt of Italian local governments that led the central government to determine a sudden change in the policy stance. In 1977-1978, with the so-called “Stammati decrees”, very limited tax autonomy was given to local governments and larger transfers from the central government were granted. The basic determinant of the new granting system were to become the pre-1977 expenditure levels (i.e., transfers were based on “historical expenditure”, pre-1977). 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 0.45 (see Figure 6).¹⁴ 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.

[Figure 6 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

¹⁴Beyond 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 show the correlation among the two variables conditional on the other controls. 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, or socio-economic conditions and taxation levels; all factors that can have a direct effect on the arrears. Our set of control variables in (M), (MT), and the level of *Average Taxable income*, in each year 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.

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 the between and overall 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.

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. As previously discussed, in this framework, which 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 2, we report the results of the first stage and, in column 3, the second stage of the pooled two-stage least squares estimation (pooled-2SLS). Estimation results in column 4 are from the within-group estimator (i.e., municipality-fixed effects) that allows us to exploit the time dimension of our data.

In all specifications, we report standard errors clustered at municipal level, which are robust for serial correlation and heteroscedasticity. 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.

[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, and their magnitude is stable across different estimators and model specifications. In particular, we estimate that a reduction of 1% in the transfers per capita is associated with an increase of about 0.06% in arrears.¹⁵ 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.

Concerning the estimated coefficients of control variables of interest, it is hardly surprising that the coefficient of *Investment expenditure* is positive and statistically significant with a coefficient 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 and 3. This means that larger is the capacity of issuing new debt (or weaker the limits to local debt growth), higher is capacity of municipality to keep up with the payments for investment expenditure and to reduce the amount of arrears. In addition, this result suggests that a form of substitution between formal and trade debt could take place: lower the municipality’s use of formal credit, higher its recourse to the trade debt channel (i.e., arrears). Note that, on average, the debt burden (and its cost) of the municipalities does not often vary over-time and this can explain the non-statistical significance of the coefficients in column 4, when municipality-fixed effects are included.

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 panel fixed effects, while the full set of results are reported in the Online Appendix A.2.

[Table 3 about here]

¹⁵For example, in a municipality with average transfers per capita of 245 euros and average arrears per capita of 380 euros, a decrease of about 25 euros in the transfers per capita is associated with an increase in the arrears per capita of 2.30 euros.

The first concern is about the role of the stock of 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, municipality with larger stock of arrears could face additional payment difficulties and this could lead to the formation of larger new arrears in the year. 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, and magnitude of the effects of *Transfers*, *Investment expenditure*, and *Interest expenditure* on the *Arrears*.¹⁶

A second robustness check deals with the dimension and with the concerns related to political features of the municipalities. Both factors can influence the relationship between transfers and arrears. In fact, on the one hand, we might be interested 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). On the other hand, in Italy, municipalities below 15,000 inhabitants have a different electoral system respect 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)). Although the panel-fixed effects estimations already deal with this problem, we estimate our model specification (9) on the subsample of municipalities with a population below 15,000 inhabitants. Estimation results in Table 3, column 2, show that estimated coefficients of the variables of interest are in line with those obtained in our main estimation results.¹⁷

We also run an additional control for the influence of political economy factors. 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)

¹⁶See, in the Online Appendix A.2, Table A2 for the full set of estimations about this robustness check, and Table A1 for further summary statistics. Note that the coefficients for *Transfers*, *Investment expenditure*, and *Interest expenditure* remain stable when estimated with different approaches, while the coefficient of the *Stock of the arrears* is positive and significant in the pooled-OLS and pooled-2SLS estimations, and negative and significant in the panel fixed effect estimation. This suggests that municipalities 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.

¹⁷See, in the Online Appendix A.2, Table A3 for the full set of estimations about this robustness check.

and add to our model specification (9) political controls. We include two controls for the political and electoral cycles (i.e. 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), and two proxies for the population age structure to control for preferences for public spending of the constituency (i.e. variables indicating the shares of population below 15 years old and over 65 years old, respectively; data come from ISTAT). 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)).¹⁸ 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 and that our IV approach maintains its validity.¹⁹

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 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

¹⁸As 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).

¹⁹See, in the Online Appendix A.2, Table A4 and Table A5 for the full set of estimations about this robustness check. Note that, in further controls, we do not find any significant interaction effect between transfers and electoral and political cycle on the arrears.

on the arrears.²⁰ 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 more financially constrained municipalities decide to lower the level of investments, resulting in lower arrears. Although, we control for the level of investment expenditure, we have decided to instrument it 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 expenditure*). In a municipality-fixed effects framework, to allow our IVs to vary over-time, we use as instruments lagged values of the investment expenditures, and lagged values of the transfers as well as the *1979 transfers* interacted with year dummies.²¹ In Table 3, we report estimation results of our model specification obtained using the 2-steps GMM (Arellano and Bond, 1991; Arellano and Bover, 1995), augmented with the lagged value of arrears (*L. Arrears*) to control for the presence of a persistent process in the accumulation of arrears. In column 6, we instrumented only the *Investment expenditure*. In fact, in a municipality-fixed effects framework, it is possible to assign a lower degree of concern to the endogeneity problems of the current *Transfers*.²² In column 7, we instrument both *Transfers* and *Investments expenditure*. Estimated coefficients confirm the presence of a statistically significant and negative relationship between transfers and arrears.²³

Finally, the next two robustness show 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 had predictions from our theoretical model (Section 3) or we can make solid conjectures.

A further prediction of our model (Section 3) is that higher transfers leads to lower tax revenues (*Tax revenues*). Estimation results in Table 3, column 8, indicates that, in our data, higher transfers are actually significantly associated with

²⁰See, in the Online Appendix A.2, Table A6 for the full set of estimations about this robustness check.

²¹For a similar approach, see for instance Benfratello et al. (2008) and Moretti (2014). Hansen J test of overidentifying restrictions is reported.

²²Note that, contrary to *Transfers* that are decided by the central government, yearly changes in *Investments expenditure* might still suffer of endogeneity problems as they are actually decided by the municipality.

²³Note that in column 7, the estimated coefficient of the *Transfers* is larger than in other estimations. This could be related to the fact that lagged values can result in weak instruments (even if our instruments pass the Hansen J test).

lower tax revenues.²⁴ It can also be noted that the coefficient *Av. Taxable income* is positive and statistically significant with an elasticity on the arrears similar to that of the transfers: its unit increase is thus associated with an increase in the arrears by a smaller quantity than a decrease in the transfers. These findings are particularly interesting in the light of the literature flypaper effect: the empirical phenomenon that results when the increase of a euro of transfers leads to significantly greater public spending than an equivalent euro of citizen income and 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 those results 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 (or public spending) 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 3, column 9, confirm this conjecture.²⁵

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 cut in transfers translates in higher *trade debt* - in the form of expenditure arrears - at municipal level, 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 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 ap-

²⁴See, in the Online Appendix A.2, Table A7 for the full set of estimations about this robustness check.

²⁵See, in the Online Appendix A.2, Table A8 for the full set of estimations about this robustness check. Note that in the Online Appendix A.3, we also report other sets of robustness checks.

proach, 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 0.6 percent in local expenditure arrears.

Our theoretical and empirical analysis highlight a novel - and perverse - effect driven by the management of transfers from the central government to the local ones: the cut in transfer can determine an increase in the local *trade debt*, in the form of expenditure arrears, thus frustrating fiscal consolidation. In turn, this result provides new evidence about the costs of hardening constraints in the fiscal decentralization process and suggests as a new direction for future research the design of optimal exogenously imposed fiscal restraints, specifically taking into consideration the local government's response.

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Figures and Tables

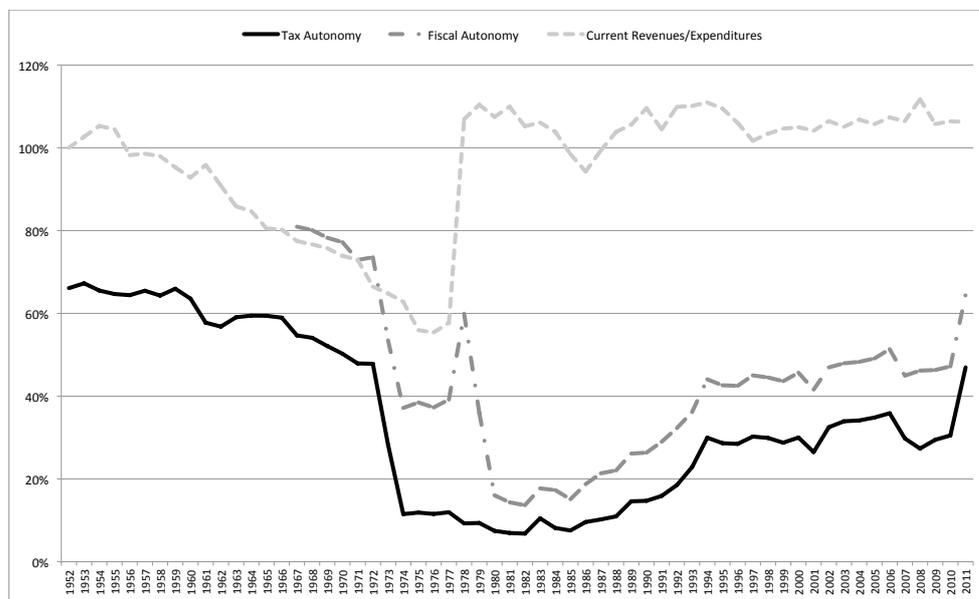


Figure 1: Municipal Public Finance in Italy: 1952-2011

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.

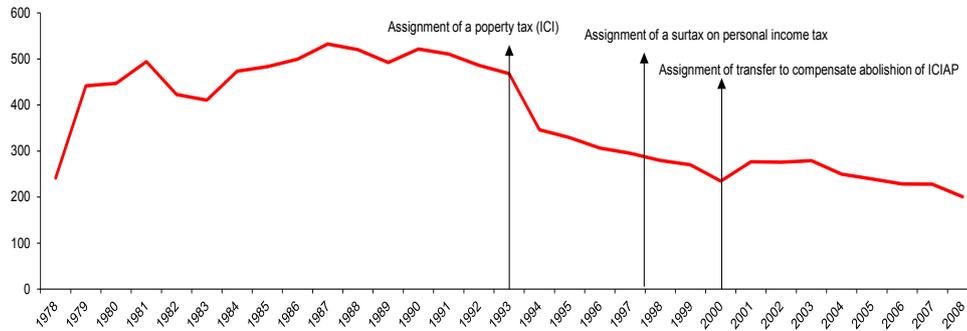


Figure 2: Real per-capita current account transfers from the state to municipalities

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

Table 1: Summary statistics (Real Euros per capita)

| VARIABLES | Mean | SD | | |
|--------------------------------|----------|----------|----------|---------|
| | | Overall | Between | Within |
| Arrears (Inv.) | 380.28 | 771.90 | 520.76 | 579.85 |
| Transfers from central gov. | 244.75 | 220.05 | 179.24 | 128.44 |
| Investment expenditure (comm.) | 436.02 | 821.83 | 570.72 | 600.47 |
| Debt interest expenditure | 33.65 | 28.49 | 26.96 | 9.15 |
| Av. Taxable income | 14660.32 | 2292.39 | 2242.52 | 531.85 |
| Population | 7497.50 | 43956.06 | 43180.71 | 1128.50 |
| 1979 Transfers | 40.49 | 21.30 | | |

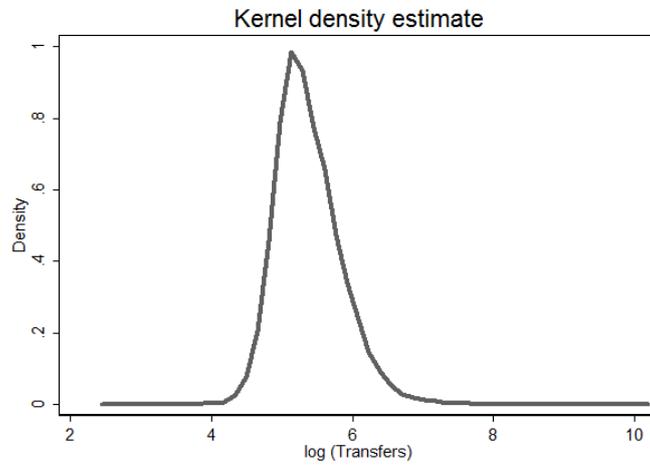


Figure 3: Distribution of the variable transfers pc

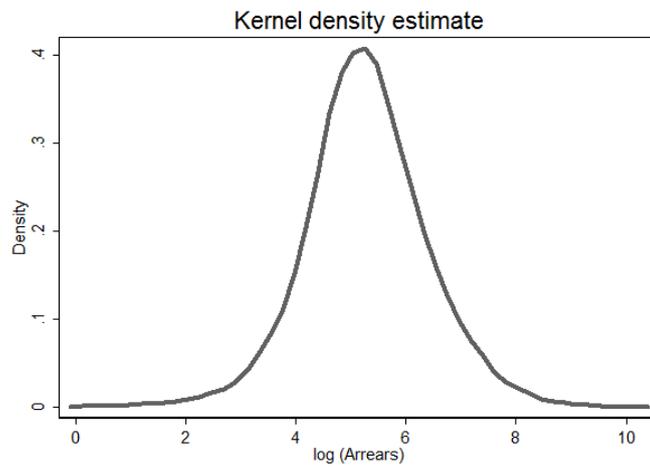


Figure 4: Kernel density estimation of the arrears pc

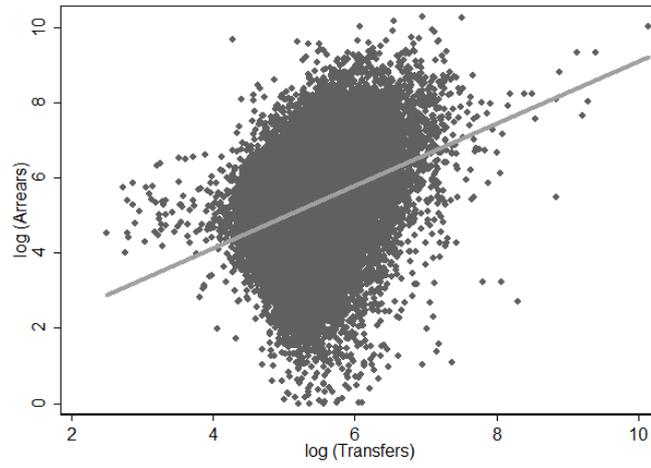


Figure 5: Correlation between arrears and transfers pc

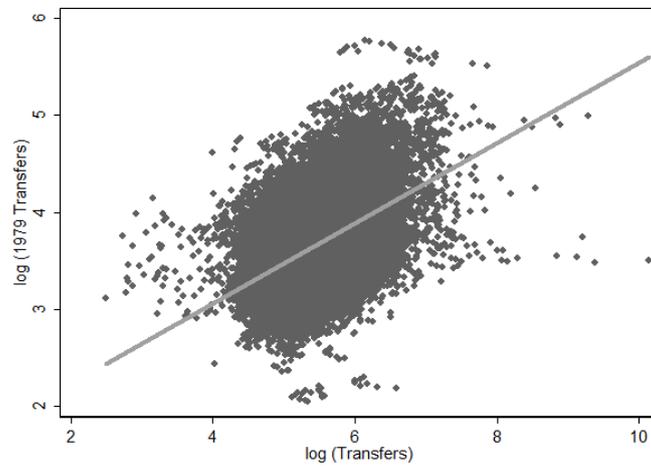


Figure 6: Correlation between transfers pc and 1979 transfers pc

Table 2: Main estimation

| Column | (1) | (2) | (3) | (4) |
|-----------------------------|----------------------|-----------------------|-----------------------|----------------------|
| Estimator | pooled OLS | 1' stage: pooled 2SLS | 2' stage: pooled 2SLS | FE |
| Dependent var. | log of | | | |
| | Arrears | Transfers | Arrears | Arrears |
| log of: | | | | |
| Transfers | -0.043*** (0.009) | | -0.065*** (0.021) | -0.064*** (0.016) |
| Investment expenditure | 1.054*** (0.004) | 0.061*** (0.003) | 1.056*** (0.004) | 1.070*** (0.004) |
| Interest expenditure | -0.018*** (0.004) | 0.095*** (0.006) | -0.015*** (0.005) | -0.011 (0.009) |
| Av. Taxable income | 0.039 (0.029) | -0.889*** (0.051) | 0.016 (0.032) | 0.047 (0.064) |
| 1979 transfers | | 0.371*** (0.016) | | |
| Municipality-level controls | YES | YES | YES | NO |
| Municipality-fixed effects | NO | NO | NO | YES |
| Province-fixed effects | YES | YES | YES | NO |
| Year-fixed effects | YES | YES | YES | YES |
| Observations | 50,344 | 50,344 | 50,344 | 50,344 |
| R-squared | 0.911 | 0.601 | 0.910 | 0.884 |
| Endogeneity(p-value) | | | 0.260 | |

Notes: Robust standard errors clustered at the municipality level are in parentheses. Inference: *** p<0.01, ** p<0.05, * p<0.1. In column 3 the excluded instrument is the 1979 transfers, and Transfers is the instrumented variable. Municipality-level controls include: number of bed places in tourist accommodations; index of tertiary educated people; km of roads within the municipality; unemployment rate; dummy variables for the municipality being located in a mountainous area. Monetary variables are per-capita in 2000 constant prices. 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.

Table 3: Extensions and robustness checks

| Column | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
|----------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|---------------------|
| Estimator | FE | FE | FE | FE | FE | 2-steps GMM | 2-steps GMM | FE | FE |
| Dependent var. | log of | | | | | | | | |
| Sample | Arrears Full | Arrears <15,000 inh. | Arrears Full | Arrears <15,000 inh. | Arrears Full | Arrears Full | Arrears Full | Tax revenues Full | Payments Full |
| log of: | | | | | | | | | |
| Transfers | -0.065*** (0.016) | -0.065*** (0.016) | -0.070*** (0.016) | -0.069*** (0.016) | -0.219*** (0.071) | -0.069*** (0.025) | -0.152** (0.066) | -0.135*** (0.012) | 0.186*** (0.035) |
| Investment expenditure | 1.072*** (0.004) | 1.073*** (0.004) | 1.072*** (0.004) | 1.074*** (0.005) | 1.070*** (0.004) | 1.183*** (0.081) | 1.102*** (0.045) | 0.010*** (0.001) | 0.462*** (0.007) |
| Interest expenditure | -0.010 (0.009) | -0.007 (0.009) | -0.008 (0.009) | -0.004 (0.010) | -0.263** (0.113) | 0.030 (0.025) | 0.011 (0.017) | 0.078*** (0.006) | -0.061** (0.024) |
| Av. Taxable income | 0.063 (0.063) | 0.054 (0.066) | 0.032 (0.067) | 0.038 (0.068) | 0.049 (0.064) | 0.126 (0.092) | 0.084 (0.089) | 0.167*** (0.035) | -0.019 (0.173) |
| Stock of arrears | -0.019*** (0.004) | | | | | | | | |
| Transfers*Intrest exp. | | | | | 0.046** (0.021) | | | | |
| L.Arrears | | | | | | -0.007 (0.009) | -0.016*** (0.006) | | |
| Political controls | NO | NO | YES | YES | NO | NO | NO | NO | NO |
| Municipality-fixed effects | YES | YES |
| Year-fixed effects | YES | YES |
| Observations | 50,261 | 45,831 | 47,191 | 43,191 | 50,344 | 35,020 | 35,020 | 50,344 | 48,670 |
| R-squared | 0.888 | 0.883 | 0.884 | 0.884 | 0.884 | 0.878 | 0.886 | 0.112 | 0.170 |
| Hansen J (p-value) | | | | | | 0.98 | 0.75 | | |

Notes: Robust standard errors clustered at the municipality level are in parentheses. Inference: *** p<0.01, ** p<0.05, * p<0.1. In columns 6 the excluded instruments are the lagged values of the investment expenditure; investment expenditures is the instrumented variable. In column 7 the excluded instruments are the 1979 transfers interacted with year dummies, the lagged values of investment expenditure and lagged values of Transfers; the investment expenditure and the Transfers are the instrumented variables. Municipality-level political controls include: dummies for the years from the past elections; dummy for mayor's first mandate period; dummies for mayor's level of education; share of young, and share of old population. Monetary variables are per-capita in 2000 constant prices. 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

This Online Appendix includes:

- Alternative theoretical model with endogenous investment expenditures A.1.
- Full set of empirical results A.2.
- Additional robustness checks A.3.

A.1 Alternative theoretical model with endogenous investment expenditures

NOTE: Here will go the model in Section 3.²⁶

²⁶Note that the estimation of a conditional correlation between Transfers and Investment expenditure confirms the positive relationship. See Table A12 in this Online Appendix A.

A.2 Full set of empirical results

Table A1: Further summary statistics (Real Euros per capita)

| VARIABLES | Mean | SD |
|-----------------------|---------|----------|
| Payments (Inv.) | 62.07 | 170.64 |
| Stock Arrears (Inv.) | 1123.62 | 1996.16 |
| Tax revenues | 246.96 | 164.51 |
| Population | 7497.50 | 43956.06 |
| Roads (km) | 81.35 | 140.42 |
| Tertiary education | 4.74 | 2.24 |
| Non-Mountainous | 0.50 | 0.52 |
| Partially-Mountainous | 0.08 | 0.27 |
| Mountainous | 0.40 | 0.49 |
| Unemployment | 8.87 | 7.72 |
| Dependence young pop. | 8.87 | 7.72 |
| Dependence old pop. | 0.36 | 0.14 |
| Years after elections | 1.93 | 1.48 |
| Mayor first mandate | 0.67 | 0.47 |
| Mayor education | 3.30 | 0.70 |

Table A2: Stock of arrears at the beginning of the year as an additional control

| Column | (1) | (2) | (3) | (4) |
|-----------------------------|----------------------|-----------------------|-----------------------|----------------------|
| Estimator | pooled OLS | 1' stage: pooled 2SLS | 2' stage: pooled 2SLS | FE |
| Dependent var. | Arrears | Transfers | log of Arrears | Arrears |
| log of: | | | | |
| Transfers | -0.059*** (0.009) | | -0.107*** (0.023) | -0.065*** (0.016) |
| Investment expenditure | 1.051*** (0.004) | 0.044*** (0.003) | 1.054*** (0.004) | 1.072*** (0.004) |
| Stock of arrears | 0.027*** (0.003) | 0.080*** (0.004) | 0.033*** (0.004) | -0.019*** (0.004) |
| Interest expenditure | -0.023*** (0.004) | 0.079*** (0.006) | -0.018*** (0.005) | -0.010 (0.009) |
| Av. Taxable income | 0.041 (0.027) | -0.854*** (0.050) | -0.003 (0.031) | 0.063 (0.063) |
| 1979 transfers | | 0.337*** (0.016) | | |
| Municipality-level controls | YES | YES | YES | NO |
| Municipality-fixed effects | NO | NO | NO | YES |
| Province-fixed effects | YES | YES | YES | NO |
| Year-fixed effects | YES | YES | YES | YES |
| Observations | 50,261 | 50,261 | 50,261 | 50,261 |
| R-squared | 0.913 | 0.614 | 0.913 | 0.888 |

Notes: Robust standard errors clustered at the municipality level are in parentheses. Inference: *** p<0.01, ** p<0.05, * p<0.1. In column 3 the excluded instrument is the 1979 transfers, and Transfers is the instrumented variable. Municipality-level controls include: number of bed places in tourist accommodations; index of tertiary educated people; km of roads within the municipality; unemployment rate; dummy variables for the municipality being located in a mountainous area. Monetary variables are per-capita in 2000 constant prices.

Table A3: Subsample: Municipalities below 15,000 inhabitants

| Column | (1) | (2) | (3) | (4) |
|-----------------------------|----------------------|-----------------------|-----------------------|----------------------|
| Estimator | pooled OLS | 1' stage: pooled 2SLS | 2' stage: pooled 2SLS | FE |
| Dependent var. | Arrears | Transfers | log of Arrears | Arrears |
| log of: | | | | |
| Transfers | -0.054*** (0.010) | | -0.127*** (0.027) | -0.065*** (0.016) |
| Investment expenditure | 1.057*** (0.004) | 0.062*** (0.003) | 1.063*** (0.005) | 1.073*** (0.004) |
| Interest expenditure | -0.019*** (0.005) | 0.100*** (0.007) | -0.009* (0.006) | -0.007 (0.009) |
| Av. Taxable income | 0.026 (0.030) | -0.923*** (0.054) | -0.048 (0.037) | 0.054 (0.066) |
| 1979 transfers | | 0.320*** (0.018) | | |
| Municipality-level controls | YES | YES | YES | NO |
| Municipality-fixed effects | NO | NO | NO | YES |
| Province-fixed effects | YES | YES | YES | NO |
| Year-fixed effects | YES | YES | YES | YES |
| Observations | 45,831 | 45,831 | 45,831 | 45,831 |
| R-squared | 0.910 | 0.620 | 0.910 | 0.883 |

Notes: Robust standard errors clustered at the municipality level are in parentheses. Inference: *** p<0.01, ** p<0.05, * p<0.1. In column 3 the excluded instrument is the 1979 transfers, and Transfers is the instrumented variable. Municipality-level controls include: number of bed places in tourist accommodations; index of tertiary educated people; km of roads within the municipality; unemployment rate; dummy variables for the municipality being located in a mountainous area. Monetary variables are per-capita in 2000 constant prices.

Table A4: Political factors as additional controls

| Column | (1) | (2) | (3) | (4) |
|-----------------------------|----------------------|-----------------------|-----------------------|----------------------|
| Estimator | pooled OLS | 1' stage: pooled 2SLS | 2' stage: pooled 2SLS | FE |
| Dependent var. | Arrears | Transfers | log of Arrears | Arrears |
| log of: | | | | |
| Transfers | -0.043*** (0.010) | | -0.072*** (0.026) | -0.070*** (0.016) |
| Investment expenditure | 1.056*** (0.004) | 0.046*** (0.003) | 1.058*** (0.004) | 1.072*** (0.004) |
| Interest expenditure | -0.017*** (0.004) | 0.065*** (0.006) | -0.014*** (0.005) | -0.008 (0.009) |
| Av. Taxable income | 0.033 (0.029) | -0.535*** (0.050) | 0.018 (0.030) | 0.032 (0.067) |
| 1979 transfers | | 0.300*** (0.015) | | |
| Political controls | YES | YES | YES | YES |
| Municipality-level controls | YES | YES | YES | NO |
| Municipality-fixed effects | NO | NO | NO | YES |
| Province-fixed effects | YES | YES | YES | NO |
| Year-fixed effects | YES | YES | YES | YES |
| Observations | 47,191 | 47,191 | 47,191 | 47,191 |
| R-squared | 0.912 | 0.648 | 0.911 | 0.884 |

Notes: Robust standard errors clustered at the municipality level are in parentheses. Inference: *** p<0.01, ** p<0.05, * p<0.1. In column 3 the excluded instrument is the 1979 transfers, and Transfers is the instrumented variable. Municipality-level political controls include: dummies for the years from the past elections; dummy for mayor's first mandate period; dummies for mayor's level of education; share of young, and share of old population. Municipality-level controls include: number of bed places in tourist accommodations; index of tertiary educated people; km of roads within the municipality; unemployment rate; dummy variables for the municipality being located in a mountainous area. Monetary variables are per-capita in 2000 constant prices.

Table A5: Subsample: Municipalities below 15,000 inhabitants and political factors as additional

| Column | (1) | (2) | (3) | (4) |
|-----------------------------|----------------------|-----------------------|-----------------------|----------------------|
| Estimator | pooled OLS | 1' stage: pooled 2SLS | 2' stage: pooled 2SLS | FE |
| Dependent var. | Arrears | Transfers | log of Arrears | Arrears |
| log of: | | | | |
| Transfers | -0.054*** (0.011) | | -0.145*** (0.035) | -0.069*** (0.016) |
| Investment expenditure | 1.059*** (0.004) | 0.048*** (0.003) | 1.064*** (0.005) | 1.074*** (0.005) |
| Interest expenditure | -0.018*** (0.005) | 0.068*** (0.006) | -0.010* (0.005) | -0.005 (0.010) |
| Av. Taxable income | 0.024 (0.030) | -0.574*** (0.051) | -0.031 (0.034) | 0.044 (0.068) |
| 1979 transfers | | 0.249*** (0.016) | | |
| Political controls | YES | YES | YES | YES |
| Municipality-level controls | YES | YES | YES | NO |
| Municipality-fixed effects | NO | NO | NO | YES |
| Province-fixed effects | YES | YES | YES | NO |
| Year-fixed effects | YES | YES | YES | YES |
| Observations | 43,191 | 43,191 | 43,191 | 43,191 |
| R-squared | 0.911 | 0.667 | 0.911 | 0.884 |

Notes: Robust standard errors clustered at the municipality level are in parentheses. Inference: *** p<0.01, ** p<0.05, * p<0.1. In column 3 the excluded instrument is the 1979 transfers, and Transfers is the instrumented variable. Municipality-level political controls include: dummies for the years from the past elections; dummy for mayor's first mandate period; dummies for mayor's level of education; share of young, and share of old population. Municipality-level controls include: number of bed places in tourist accommodations; index of tertiary educated people; km of roads within the municipality; unemployment rate; dummy variables for the municipality being located in a mountainous area. Monetary variables are per-capita in 2000 constant prices.

Table A6: Interaction effects

| Column | (1) | (2) | (3) | (4) | (5) |
|------------------------------|---------------------|-----------------------|--------------------------------|-----------------------|----------------------|
| Estimator | pooled OLS | 1' stage: pooled 2SLS | 1' stage: pooled 2SLS | 2' stage: pooled 2SLS | FE |
| Dependent var. | Arrears | Transfers | log of Transfers*Interest exp. | Arrears | Arrears |
| log of: | | | | | |
| Transfers | -0.060 (0.040) | | | -0.164*** (0.056) | -0.219*** (0.071) |
| Transfers*Interest exp. | 0.005 (0.010) | | | 0.027** (0.013) | 0.046** (0.021) |
| Interest expenditure | -0.044 (0.054) | 0.095*** (0.006) | 2.520*** (0.257) | -0.159** (0.071) | -0.263** (0.113) |
| Investment expenditure | 1.054*** (0.004) | 0.061*** (0.003) | 0.217*** (0.012) | 1.056*** (0.004) | 1.070*** (0.004) |
| Av. Taxable income | 0.038 (0.029) | -0.889*** (0.051) | -3.128*** (0.198) | 0.009 (0.033) | 0.049 (0.064) |
| 1979 transfers | | 0.371*** (0.016) | -1.701*** (0.233) | | |
| 1979 transfers*Interest exp. | | | 0.888*** (0.071) | | |
| Municipality-level controls | YES | YES | YES | YES | NO |
| Municipality-fixed effects | NO | NO | NO | NO | YES |
| Province-fixed effects | YES | YES | YES | YES | NO |
| Year-fixed effects | YES | YES | YES | YES | YES |
| Observations | 50,344 | 50,344 | 50,344 | 50,344 | 50,344 |
| R-squared | 0.911 | 0.601 | 0.940 | 0.910 | 0.884 |

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 instruments are the 1979 transfers and the 1979 transfers interacted with the interest expenditure; Transfers and Transfers*Interest expenditure are the instrumented variables. Municipality-level controls include: number of bed places in tourist accommodations; index of tertiary educated people; km of roads within the municipality; unemployment rate; dummy variables for the municipality being located in a mountainous area. Monetary variables are per-capita in 2000 constant prices.

Table A7: Testing the model's consistency: higher transfers leads to lower tax revenues

| Column | (1) | (2) | (3) | (4) |
|-----------------------------|----------------------|-----------------------|-----------------------|----------------------|
| Estimator | pooled OLS | 1' stage: pooled 2SLS | 2' stage: pooled 2SLS | FE |
| Dependent var. | Tax Rev. | Transfers | log of Tax Rev. | Tax Rev. |
| log of: | | | | |
| Transfers | -0.150*** (0.015) | | 0.509*** (0.046) | -0.135*** (0.012) |
| Investment expenditure | 0.057*** (0.003) | 0.061*** (0.003) | 0.002 (0.004) | 0.010*** (0.001) |
| Interest expenditure | 0.166*** (0.008) | 0.095*** (0.006) | 0.076*** (0.009) | 0.078*** (0.006) |
| Av. Taxable income | 0.589*** (0.061) | -0.889*** (0.051) | 1.237*** (0.079) | 0.167*** (0.035) |
| 1979 transfers | | 0.371*** (0.016) | | |
| Municipality-level controls | YES | YES | YES | NO |
| Municipality-fixed effects | NO | NO | NO | YES |
| Province-fixed effects | YES | YES | YES | NO |
| Year-fixed effects | YES | YES | YES | YES |
| Observations | 50,344 | 50,344 | 50,344 | 50,344 |
| R-squared | 0.530 | 0.601 | 0.329 | 0.112 |

Notes: Robust standard errors clustered at the municipality level are in parentheses. Inference: *** p<0.01, ** p<0.05, * p<0.1. In column 3 the excluded instrument is the 1979 transfers, and Transfers is the instrumented variable. Municipality-level controls include: number of bed places in tourist accommodations; index of tertiary educated people; km of roads within the municipality; unemployment rate; dummy variables for the municipality being located in a mountainous area. Monetary variables are per capita in 2000 constant prices.

Table A8: Payments for investment planned in the year as dependent variable

| Column | (1) | (2) | (3) | (4) |
|-----------------------------|---------------------|-----------------------|-----------------------|---------------------|
| Estimator | pooled OLS | 1' stage: pooled 2SLS | 2' stage: pooled 2SLS | FE |
| Dependent var. | Payments | Transfers | log of Payments | Payments |
| log of: | | | | |
| Transfers | 0.136*** (0.021) | | 0.335*** (0.066) | 0.186*** (0.035) |
| Investment expenditure | 0.567*** (0.007) | 0.065*** (0.003) | 0.550*** (0.009) | 0.462*** (0.007) |
| Interest expenditure | 0.081*** (0.013) | 0.094*** (0.006) | 0.054*** (0.016) | -0.061** (0.024) |
| Av. Taxable income | 0.030 (0.091) | -0.877*** (0.052) | 0.223** (0.108) | -0.019 (0.173) |
| 1979 transfers | | 0.365*** (0.017) | | |
| Municipality-level controls | YES | YES | YES | NO |
| Municipality-fixed effects | NO | NO | NO | YES |
| Province-fixed effects | YES | YES | YES | NO |
| Year-fixed effects | YES | YES | YES | YES |
| Observations | 48,670 | 48,670 | 48,670 | 48,670 |
| R-squared | 0.350 | 0.594 | 0.348 | 0.170 |

Notes: Robust standard errors clustered at the municipality level are in parentheses. Inference: *** p<0.01, ** p<0.05, * p<0.1. In column 3 the excluded instrument is the 1979 transfers, and Transfers is the instrumented variable. Municipality-level controls include: number of bed places in tourist accommodations; index of tertiary educated people; km of roads within the municipality; unemployment rate; dummy variables for the municipality being located in a mountainous area. Monetary variables are per-capita in 2000 constant prices.

A.3 Additional robustness checks

The next three tables offer additional robustness checks.

- Table A9. We test the conjecture that if higher transfers reduce the formation of *Arrears* in a given year, we would expect that higher transfers should reduce the *Annual change in the stock of arrears*. Estimation results in Table A9 confirm this hypothesis. Note that the sign of the estimated coefficient are in line with the our main estimation results, however, since about half of the values of the variable *Annual change in the stock of arrears* are negative, we do not take its log transformation. The estimation is thus in linear-log terms. This explains the very large coefficients and standard errors respect to the estimation results showed in the previous tables, where we estimated log-log model specifications.
- Table A10. We report an additional robustness check which deals with the overidentification restrictions. So far, we have proposed one instrumental variable (*1979 transfers*) for potentially the endogeneity of the current *Transfers*. This have allowed us to exactly identify the model. To offer additional evidence from overidentified 2SLS estimations, we need at least one additional instrument. Although, the variable we propose is related to historical evolution of the criteria governing the transfers from the central to the local government, like the *1979 transfers*, we believe that it can offer some insights on the robustness of our main estimation results. In particular, we use the *1993-1994 change in transfers* from the central government. As underlined in the narrative analysis (Section 2), after the 1993 introduction of a local propriety tax, the central government decided to reduce the transfers as form of compensation for this new tax. The reduction of the transfers was proportional to the increase in tax revenues for each municipality. In Table A10, we show estimation results using both *1979 transfers* and *1993-1994 change in transfers* to instrument the current *Transfers*. Hansen's J tests do not reject the null hypothesis 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. Estimation results are in line with our main results.
- Table A11. We deal with the possible influence of extreme values. We report our main estimation results when we exclude from the sample values belonging to the first and last percentiles of the distributions of the public finance variables (*Arrears*, *Transfers*, *Investment expenditure*, *Debt Interest Expenditure*). Estimation results are in line with those showed in Tables 2 and 3.

Table A9: Changes in the stock of arrears as dependent variable

| Column | (1) | (2) | (3) | (4) |
|-----------------------------|-------------------------|-----------------------|-------------------------|------------------------|
| Estimator | pooled OLS | 1' stage: pooled 2SLS | 2' stage: pooled 2SLS | FE |
| Dependent var. | Ch. arr. | Transfers | Ch. arr. | Ch. arr. |
| log of: | | | | |
| Transfers | -176.757*** (19.168) | | -405.516*** (32.749) | -18.200 (59.819) |
| Investment expenditure | 289.538*** (9.041) | 0.062*** (0.003) | 308.746*** (10.037) | 434.059*** (13.025) |
| Interest expenditure | -78.866*** (7.751) | 0.092*** (0.007) | -48.203*** (8.086) | 0.730 (21.921) |
| Av. Taxable income | -90.023* (49.534) | -0.900*** (0.055) | -317.025*** (59.618) | -200.691 (242.181) |
| 1979 transfers | | 0.376*** (0.017) | | |
| Municipality-level controls | YES | YES | YES | NO |
| Municipality-fixed effects | NO | NO | NO | YES |
| Province-fixed effects | YES | YES | YES | NO |
| Year-fixed effects | YES | YES | YES | YES |
| Observations | 43,661 | 43,661 | 43,661 | 43,661 |
| R-squared | 0.096 | 0.598 | 0.089 | 0.145 |

Notes: Robust standard errors clustered at the municipality level are in parentheses. Inference: *** p<0.01, ** p<0.05, * p<0.1. In column 3 the excluded instrument is the 1979 transfers, and Transfers is the instrumented variable. Municipality-level controls include: number of bed places in tourist accommodations; index of tertiary educated people; km of roads within the municipality; unemployment rate; dummy variables for the municipality being located in a mountainous area. Monetary variables are per-capita in 2000 constant prices.

Table A10: 1994-1993 change of transfers as additional instrument

| Column | (1) | (2) | (3) | (4) |
|--------------------------------|----------------------|-----------------------|-----------------------|----------------------|
| Estimator | pooled OLS | 1' stage: pooled 2SLS | 2' stage: pooled 2SLS | FE |
| Dependent var. | Arrears | Transfers | log of Arrears | Arrears |
| log of: | | | | |
| Transfers | -0.043*** (0.009) | | -0.042** (0.019) | -0.064*** (0.016) |
| Investment expenditure | 1.054*** (0.004) | 0.064*** (0.003) | 1.054*** (0.004) | 1.070*** (0.004) |
| Interest expenditure | -0.018*** (0.004) | 0.106*** (0.006) | -0.018*** (0.005) | -0.011 (0.009) |
| Av. Taxable income | 0.039 (0.029) | -0.689*** (0.052) | 0.038 (0.032) | 0.047 (0.064) |
| 1979 transfers | | 0.428*** (0.017) | | |
| 1994-1993 changes in transfers | | 0.705*** (0.062) | | |
| Municipality-level controls | YES | YES | YES | NO |
| Municipality-fixed effects | NO | NO | NO | YES |
| Province-fixed effects | YES | YES | YES | NO |
| Year-fixed effects | YES | YES | YES | YES |
| Observations | 50,344 | 50,298 | 50,298 | 50,344 |
| R-squared | 0.911 | 0.631 | 0.910 | 0.884 |
| Hansen J (p-value) | | | 0.17 | |

Notes: Robust standard errors clustered at the municipality level are in parentheses. Inference: *** p<0.01, ** p<0.05, * p<0.1. In column 3 the excluded instruments are the 1979 transfers and the 1994-1993 change of transfers; Transfers is the instrumented variable. Municipality-level controls include: number of bed places in tourist accommodations; index of tertiary educated people; km of roads within the municipality; unemployment rate; dummy variables for the municipality being located in a mountainous area. Monetary variables are per-capita in 2000 constant prices. 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 A11: Excluding extreme values of public finance variables from the sample

| Column | (1) | (2) | (3) | (4) |
|-----------------------------|----------------------|-----------------------|-----------------------|----------------------|
| Estimator | pooled OLS | 1' stage: pooled 2SLS | 2' stage: pooled 2SLS | FE |
| Dependent var. | Arrears | Transfers | log of Arrears | Arrears |
| log of: | | | | |
| Transfers | -0.033*** (0.006) | | -0.052*** (0.020) | -0.028*** (0.012) |
| Investment expenditure | 1.048*** (0.002) | 0.054*** (0.002) | 1.049*** (0.003) | 1.066*** (0.003) |
| Interest expenditure | -0.014*** (0.004) | 0.096*** (0.006) | -0.011** (0.005) | 0.001 (0.008) |
| Av. Taxable income | 0.047* (0.025) | -0.876*** (0.041) | 0.028 (0.031) | 0.051 (0.053) |
| 1979 transfers | | 0.341*** (0.013) | | |
| Municipality-level controls | YES | YES | YES | NO |
| Municipality-fixed effects | NO | NO | NO | YES |
| Province-fixed effects | YES | YES | YES | NO |
| Year-fixed effects | YES | YES | YES | YES |
| Observations | 47,395 | 47,395 | 47,395 | 47,395 |
| R-squared | 0.917 | 0.607 | 0.917 | 0.899 |
| Endogeneity(p-value) | | | 0.287 | |

Notes: Robust standard errors clustered at the municipality level are in parentheses. Inference: *** p<0.01, ** p<0.05, * p<0.1. In column 3 the excluded instrument is the 1979 transfers, and Transfers is the instrumented variable. Municipality-level controls include: number of bed places in tourist accommodations; index of tertiary educated people; km of roads within the municipality; unemployment rate; dummy variables for the municipality being located in a mountainous area. Monetary variables are per-capita in 2000 constant prices. 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.

Table A12: Transfers and investment expenditure

| Column | (1) | (2) | (3) | (4) |
|-----------------------------|---------------------|-----------------------|-----------------------|----------------------|
| Estimator | pooled OLS | 1' stage: pooled 2SLS | 2' stage: pooled 2SLS | FE |
| Dependent var. | Inv. Exp. | Transfers | log of Inv. Exp. | Inv. Exp. |
| log of: | | | | |
| Transfers | 0.626*** (0.021) | | 1.223*** (0.058) | 0.296*** (0.030) |
| Interest expenditure | 0.110*** (0.012) | 0.146*** (0.013) | 0.018 (0.014) | -0.267*** (0.021) |
| Av. Taxable income | -0.051 (0.087) | -0.558*** (0.094) | 0.570*** (0.112) | -0.050 (0.157) |
| 1979 transfers | | 0.490*** (0.024) | | |
| Municipality-level controls | YES | YES | YES | NO |
| Municipality-fixed effects | NO | NO | NO | YES |
| Province-fixed effects | YES | YES | YES | NO |
| Year-fixed effects | YES | YES | YES | YES |
| Observations | 50,344 | 50,344 | 50,344 | 50,344 |
| R-squared | 0.279 | 0.261 | 0.243 | 0.071 |

Notes: Robust standard errors clustered at the municipality level are in parentheses. Inference: *** p<0.01, ** p<0.05, * p<0.1. In column 3 the excluded instrument are the 1979 transfers, and Transfers is the instrumented variable. Municipality-level controls include: number of bed places in tourist accommodations; index of tertiary educated people; km of roads within the municipality; unemployment rate; dummy variables for the municipality being located in a mountainous area. Monetary variables are per-capita in 2000 constant prices.