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Abstract

Local governments may increase expenditure arrears to relax the financial constraints induced by intergovernmental transfer cuts. We assess this hypothesis using information from accounting and financial reports from Italian municipalities for the period 2003-2010. By exploiting the long-lasting effect of the 1977-1978 structural reform of Italian local public finance, we employ an instrumental variable approach to address endogeneity concerns. We find robust empirical evidence that the lower the intergovernmental grants, the larger the use of arrears in public investment expenditures by municipalities. We argue that, when local governments are not subject to effective controls on the formation of arrears but fiscal rules impose binding budget constraints, a cut in intergovernmental transfers can partially diminish the effectiveness of fiscal consolidation at local level.

Contents

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1 Introduction[1]

The experience of fiscal consolidation implemented at different times in several developed, emerging, and transition countries has shown that central governments tend to delegate part of the necessary fiscal adjustments to local governments (OECD, 2013; European Commission, 2014). From this perspective, intergovernmental transfer cuts, unfunded decentralization of public expenditure, delegated changes of local taxes, and stricter local fiscal rules imposed on or negotiated with local governments have been commonly adopted by central policy makers to partly decentralize fiscal consolidation (e.g., Hagemann, 2012). From a theoretical viewpoint fiscal decentralization may affect the success of fiscal consolidation since local governments can support or undermine it by their fiscal policy choices (Blöchlinger, 2013).

As stressed by the OECD Report on Fiscal Federalism (OECD, 2013), the specific focus on intergovernmental grants as a powerful lever to address fiscal consolidation is explained by the fact that they account for around 4% of GDP, 8% of total government spending, and around 50% of the total sub-central government revenues in OECD countries. Some works have highlighted the contribution of intergovernmental transfer reductions on fiscal consolidation packages in different countries (De Mello, 2007; Blöchlinger, 2013; Vammalle and Hulbert, 2013).[2]

Different, widespread tools to implement decentralized fiscal consolidation are fiscal rules and intergovernmental cooperation (e.g., Molnar, 2012). Governments have implemented various rules, often combining several of them to jointly pursue different tasks (Kopits, 2001; Sutherland et al., 2005; Ter-Minassian, 2007).[3]

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[1] We would like to thank seminar participants at the Conference of the Italian Public Economics Society-SIEP (Pavia, September 2014), IAE-Université de Paris 1 Panthéon-Sorbonne (January 2015), BOMOPAV workshop (University of Modena, March 2015), Lemma-Université de Paris 2 Panthéon-Assas (March 2015), Annual Congress of the International Institute of Public Finance-IIPF (Dublin, August 2015), International Conference on Applied Research in Economics (Perm, September 2015), University of Bologna (November 2015), 6th Halle Colloquy on Local Public Economics (November 2015), and Universitat de les Illes Balears (December 2015). We also thank two anonymous referees for the Bank of Italy working paper series. The opinions expressed in this paper do not necessarily reflect those of the Bank of Italy. The usual disclaimer applies.

[2] Vammalle and Hulbert (2013) show that the more expenditures are in the hands of subnational levels of government, without corresponding revenue powers, the more fiscal consolidation burdens tend to be shifted to subnational levels. In the same vein, Blöchlinger (2013) finds that a transfer reduction increases the probability of success for fiscal consolidation. In a different empirical setting, De Mello (2007) finds that higher transfers had a negative impact on subnational governments budget discipline. One possible explanation of the positive relationship between transfer reductions and fiscal consolidation is the 'flypaper effect', i.e. the observation that local governments propensity to spend is higher if expenditures are financed through grants rather than own revenues. Under the flypaper assumption, lower transfers would improve budget balance at the central level more than they would deteriorate it at the sub-central level, hence the net effect would be positive (Hines and Thaler, 1995; Inman, 2008).

[3] Subnational fiscal rules take different forms, e.g.: yearly or medium-term budget balance, tax limits, expenditure caps, local revenue ceilings, limits on the stock of debt or on the issuance

A key aspect is the enforcement of fiscal consolidation measures. Policy makers typically have some scope to circumvent existing rules or to escape ex-post sanctions whenever enforcement is imperfect. The empirical literature that aims to assess the effectiveness of subnational fiscal rules usually overlooks their unintended consequences, or 'ugly outcomes' (Milesi-Ferretti, 2004), such as creative accounting and window dressing (see, for instance, Balduzzi and Grembi, 2011, on Italian municipalities). These practices may foster the transformation of outstanding local government debt into off-balance-sheet liabilities.

Our aim is to investigate a possible perverse effect of fiscal consolidation implemented by intergovernmental transfer cuts and binding constraints on (formal) borrowing capacities. In particular, we test the hypothesis that *a reduction of intergovernmental transfers, other things being equal, causes an increase in arrears for local public investment expenditure*. The intuition is that municipalities could react to transfer cuts by postponing the payments for the ongoing public work contracts to future years, so as to relax short-run financial restraints. This testable prediction is also determined by a simple theoretical model of local public finance (as shown in Appendix A.1), where a local government faces a ceiling on formal debt issuance and the usual budget constraints, maximizes a standard inter-temporal objective function, and reacts to a cut in intergovernmental transfers by increasing expenditure arrears – i.e., a form of trade debt.

Arrears in payments may be undesirable for three main reasons (see, for example, Diamond and Schiller, 1993, and Checherita-Westphal et al., 2016): (i) they lead to a 'camouflaging' of local governments' debt position; (ii) they may dampen the effectiveness of local fiscal consolidation; and, (iii) they directly affect the supplier firms' financial conditions, particularly in the case of small and medium enterprises facing bad credit ratings, and in this way may undermine macroeconomic and financial stability. This paper adds novel results as regards effects (i) and (ii).

Our empirical analysis focuses on Italian municipalities, during the period 2003-2010. This represents an ideal field in which to test our hypothesis empirically for at least four reasons. First, according to the IMF definition (Devries et al., 2011), this is a period of fiscal consolidation, which has been characterized by a significant reduction in transfers to the municipalities. Second, funding of Italian municipalities depends heavily on intergovernmental transfers (on average current transfers are about 40% of the total current revenues) and the degree of actual fiscal auton-

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of new debt, golden rule (i.e., restriction of debt financing to investments), limits on the debt service, transparency requirements, and so on. The main rationale for such rules is the perceived reluctance of local governments to commit to fiscal sustainability, driven by 'soft budget constraints' (Goodspeed, 2002; Kornai et al., 2003; Wildasin, 2004; Rodden et al., 2003). Empirical studies tend to show a correlation between the presence of fiscal restraints and lower deficits. However, systematic empirical evaluations remain scarce. This is partly due to the insufficient quality of data. Another challenge is the proper identification of causal effects, given the serious endogeneity problems that affect the introduction and enforcement of the fiscal restraints considered. Recently, Christofzik and Kessing (2014), for Germany, and Grembi et al. (2015), for Italy, have made progress towards the identification of a causal link between fiscal rules and fiscal policy outcomes.

omy has remained low. In turn, the scope for spending and revenue adjustments to cope with a cut in transfers is limited. In fact, on the one hand, municipalities have little control over their tax revenues (because of limited autonomy over tax bases or rates), while, on the other hand, much of the expenditure is delegated by higher levels of government through fiscal federalism mechanisms. Third, Italian municipalities have traditionally been subject to a set of fiscal rules put in place by the central government in order to control public deficit and local government debt. In particular, the Domestic Stability Pact (or DSP – a complex set of rules in terms of deficit and/or expenditure introduced in 1999 as a consequence of the European Union Stability and Growth Pact) has been a binding constraint on borrowing capacity through different formal channels (see, among others, Chiades and Mengotto, 2015). It is noteworthy that these rules did not significantly change during the period of our analysis, thus limiting the problems associated with confounding events in the identification of the effects of changes in transfers. Fourth, liabilities stemming from the delay in payments related to supplies of goods, services and public works were not included in the formal definition of the debt. Consequently, municipalities could use arrears without constraints as they were not subject to controls by supervision authorities.

Our dataset consists of annual information for the 8 years of our analysis from the accounting and financial reports of the 6,700 municipalities belonging to the 15 Italian ordinary regions. From these reports we can observe the different types of intergovernmental transfers the municipalities receive, a measure of outstanding payments for investment expenditures (i.e., the amount of accrual investment expenditures for each year that have not been paid and are postponed to the future), which serves as our proxy of arrears,[4] and further budgetary information that – together with the municipalities' structural and geographical characteristics – help us to control for other determinants of arrears.

Our estimation of the relationship between changes in intergovernmental transfers and arrears is robust to several checks and is not trivial: everything else equal (in particular, the level of formal debt), a 10% decrease in transfers is associated with at least a 1% increase in arrears for local public investments.

To the best of our knowledge, we are the first to investigate the relationship that goes from transfers to the arrears for investment expenditure. In thinking about arrears as a form of non-conventional, short-term public debt, this paper contributes to the empirical literature on the relationship between changes in intergovernmental transfers and local public debt that has not achieved consensus on the direction of causality (see, for example, De Mello, 2007).[5]

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[4]See, Checcherita-Westphal et al. (2016) for a discussion on the difficulties of using clean measures of arrears in European countries and, consequently, the need to use proxy variables: "While it may not be possible to cleanly identify arrears in a legal sense, from an economic point of view, it may be more important to identify payment delays that go beyond what is expected by suppliers" (p. 4).

[5]Using a panel of OECD countries for the period 1980-2005, De Mello (2007) finds a stable long-

To deal with endogeneity concerns we follow a twofold empirical strategy. On the one hand, we aim at reducing omitted variable problems by focusing on a single country. Italy has a large number of municipalities of different sizes, located in different socio-economic environments. This allows us to analyse constituencies governed by a common regulatory framework and responding to similar macro shocks, without losing the cross-sectional and over-time variability of the variables of interest. On the other hand, we adopt a novel instrumental variable approach, which consists of the use of historical breaks in Italian local public finance, to obtain an exogenous determinant of the intergovernmental transfers. In particular, our narrative analysis (see Appendix A.2 for details) and our empirical evidence show that the criteria for the allocation of transfers from central to local governments adopted in 1979 have shaped central government transfers to municipalities since their introduction and over the entire period under investigation.

The rest of the paper is organized as follows: in Section 2, we introduce our empirical analysis, in Section 3, we provide our main results (3.1), along with robustness checks (3.2), and Section 4 offers concluding remarks.

2   Data and empirical framework

In this Section, we first present the dataset consisting of information from 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 (2.1). Then, we discuss the reduced form empirical model that we estimate using different approaches (2.2), including an IV estimation based on the 1979 reform of the allocation of transfers from the central government to the municipalities (2.3).

2.1   Municipalities' accounting and financial reports

In Italy, municipalities are the smallest administrative units and they provide public goods and services for several policy areas, such as local transport, local police, culture and recreation, land management and environment (waste disposal, water and sewage), nursery schools and complementary education services, and registry services. About half of total government investment expenditure is managed by mu-

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term relationship between transfer receipts and local government net worth for the case of current transfers but underlines that the direction of causality is sensitive to estimation techniques. In fact, other studies have highlighted a possible reverse causality: whenever cuts in central government transfers are not credible, expectations of future bailouts may induce local governments' fiscal profligacy in the form of greater borrowing to finance public expenditure (Goodspeed, 2002). The credibility of the institutional framework of federal systems and, in particular, of intergovernmental fiscal relations plays a central role in determining which one of these two alternative theories is relevant (Wildasin, 2004).

nicipalities. For instance, municipalities manage the outsourcing to private suppliers of about 50% of public works (such as road works and building constructions).[6]

Annually, each municipality is obliged to transmit its accounting and financial report to the Ministry of the Interior ('Certificati di Conto Consuntivo). This source of information provides us with a clear picture of the financial situation of the municipalities for each year, for both the revenue and the expenditure sides of the budget.

In this analysis, we focus on the 6,700 municipalities belonging to the 15 ordinary regions; we do not consider the 1,400 or so municipalities of the remaining 5 regions since the latter enjoy a larger degree of legislative and financial autonomy and respond to different regulations in many fields.[7]

We study the financial restraints on the municipalities by focusing on one of the main sources of revenue: current transfers from the central and regional governments and other public administrations to a municipality (i.e., intergovernmental transfers). Over the last three decades, intergovernmental transfers have shaped the financial conditions of Italian municipalities, and in the period 2003-2010, on average, they accounted for about 40% of the municipalities' total current revenues.[8] Together with the constraints put on local public debt, which we control for in our analysis,[9] intergovernmental transfers are a key variable in the fiscal consolidation process. In turn, intergovernmental transfers drive the 'marginal' adjustments required to fulfill the budget balance rule, which municipalities are forced by law to pursue each year.

In the period of our analysis (2003-2010), average per capita intergovernmental transfers were about 243 euros (in 1995 constant prices) and this value varied across municipalities. Table 1 shows large overall and between variations (220 and 178 euros, respectively) and a within municipality variation of 130 euros.[10]

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[6]See, for the years of our analysis, the Annual Reports ('Relazione annuale') of the Italian Authority for the Supervision of Public Contracts (AVCP).

[7]Note that in our analysis we cannot use about 4% of the municipality-year observations because some data are missing for some of the control variables.

[8]Note that our results are robust to the use of central government current transfers (which are more exogenous than transfers from the other levels of government, and account on average for about 85% of current transfers) and total transfers (i.e., capital account plus current account transfers); see Section 3.2.

[9]In particular, two rules were imposed on Italian municipalities during the period of analysis: (i) the DSP, a complex set of rules in terms of deficit rules and/or expenditure cap for municipalities with more than 5,000 inhabitants; this rule did not appreciably change during the period of analysis, and we include dummy variables for municipality population categories to control for the differences above and below the threshold of 5,000 inhabitants; and (ii) because of the combining effects of the DSP and a cap imposed on the expenditure for debt service, municipalities were subject to borrowing limits (see, Chiades and Mengotto, 2015); we control for the debt interest expenditure.

[10]We started our analysis in 2003 for two reasons: first, to avoid the confounding effect of the change to the fiscal rules (DSP) that occurred in 2001 for municipalities with fewer than 5,000 inhabitants (Grembi et al., 2015) and, second, to conduct the analysis during a fiscal consolidation period (Devries et al., 2011). In the same vein, we stopped our analysis with 2010 because of the

From the accounting and financial reports, we are able to obtain a measure of the outstanding payments for investment expenditures. This variable gives us information for each municipality and each year on the amount of accrual investment expenditures that have not been paid by the end of the year and are postponed to the future. Our focus is on investment expenditures since we are interested in the effects of a transfer cut in the presence of (direct and indirect) constraints on public debt which, according to the legal rules of the Italian local public finance, can only be issued to finance capital expenditures.[11]

Descriptive statistics show that, on average and in per capita terms, the outstanding payments for investment expenditures were about 380 euros (with a standard deviation of 772 euros). To give a better idea of the weight of the outstanding payments on the municipalities' budgets, the new yearly outstanding payments were on average about 34% of their stock at the beginning of the year, and they represented about 87% of the planned investment expenditures. Table 1 shows the summary statistics in per capita terms and constant prices.

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
Current transfers	243.35	219.85	178.34	129.56
Investment expenditure	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		

The amount of planned expenditure on investments is naturally the variable that explains much of the variability in the outstanding payments. In fact, according to the legal framework of Italian local public finance, during the period of analysis, multi-year investments 'automatically' generated outstanding payments for the payments due in future years. The accounting of the total accrual expenditure and the total accrual revenue is recorded in the first year of the investment project for the total amount of the work. Once we control for the accrual investment spending, *the*

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substantial changes to Italian local public finance during the period 2011-2014. In particular, different measures have affected the structure of local tax revenues and introduced a new, provisional tax-sharing and intergovernmental transfer scheme. This has caused a discontinuity in the time series of transfers to the municipalities, which makes comparison with previous years particularly difficult.

[11]On the contrary, outstanding payments for current expenditures are generally tied to a temporary shortage of liquidity. Moreover, to analyse the behavior of the latter outstanding payments we would need additional information, lacking in our budgetary sources, about the purchases of intermediate goods or services that generate them.

outstanding payments can be considered as arrears, because they represent payment delays tied to trade debts or to rescheduling agreements.[12]

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 (-0.04). 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 a municipality's debt and the influence of the ceilings on local debt on the formation of expenditure arrears. The latter is, as we have previously said, another aspect influenced by the fiscal consolidation process.

2.2 Empirical model

The reduced form empirical model that we estimate by different approaches to analyse the relationship between intergovernmental transfers and investment expenditure arrears is as follows:

$$a_{mt} = \alpha + \beta g_{mt} + \gamma MT_{mt} + \epsilon_{mt}. \tag{1}$$

All monetary variables are expressed in logs of the per-capita values at constant prices. The dependent variable a denotes the arrears in investment expenditure in year t for municipality m. The main explanatory variable of interest is g, which represents the current transfers received from the central and regional governments and other public administrations by the municipality in any year. MT is the set of controls from the accounting and financial report of each municipality for each year (i.e., planned 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: (i) municipality-specific time-invariant effects, (ii) municipality-specific time-varying effects, and (iii) time-varying macro effects that influence all municipalities.

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[12]According to the IMF Government Finance Statistics Manual (2001) arrears only occur if a bill is not paid by the due date, regardless of whether this is based on a contractual agreement, commercial law or custom. Admittedly, ours is not a perfectly clean measure of arrears. Unfortunately, the difficulty in measuring public expenditure arrears, in Italy as well as in other countries across the world, is a common and well-known problem. For instance, in 2013 the Italian government decided to pay a large amount of arrears owed by the public administration to the private sector, but "the total amount owed is disputed" (*The Financial Times*, April 8, 2013). See also D'Aurizio et al. (2015) for the Italian case. In a study focusing on European Union countries, Checherita-Westphal et al. (2016) needed to construct proxies for the amount of arrears, as these figures are not directly available, nor they can be easily elicited from national accounts (149-150): "Public accounts typically do not track true arrears, except following ad hoc audits to identify them (as sometimes required under IMF programs). Alternative sources from international datasets do not report fiscal arrears either [...] Instead, depending on the public accounting system in place, there could be data on spending commitments, payment orders and actual payments (check or transfer). Differences between these stages can provide indications of the development of payment lags".

To reduce omitted variables problems and deal with (i), we follow two alternative approaches. The first approach consists of augmenting the model specification (1) 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 accommodation), the location being in a mountainous area, the population density, the categories of population size,[13] 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 for all these variables come from the Italian National Institute of Statistics - ISTAT; summary statistics in Table A1 in Appendix A.3). All these characteristics aim at representing several dimensions of the demand for and composition of public spending in the municipality.[14] Furthermore, we augment equation (1) with province-fixed effects to control for factors that influence municipalities operating in contexts with similar socio-institutional qualities (such as social capital, crime and effectiveness of the judicial system) and levels of economic and financial development. The second alternative approach to reducing municipality-level time-invariant omitted variables involves the inclusion of municipality-fixed effects in the model specification (1). This approach fully captures the cross-sectional variability and allows us to exploit the within-municipality variability.

Considering (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 the average taxable income in each municipality m in year t into the model specification, which controls for the socio-economic development of the municipality.

Finally, we include year-fixed effects (T) in the model specification to deal with time-varying macro effects (iii) and capture country-level shocks both on macro/financial conditions as well as regulation changes during the years covered by the analysis. Both types of shocks could have affected municipalities' public finance choices, and thus the arrears, in any given year.[15]

2.3   Instrumental variable approach

The inclusion of additional control variables in the estimated model (1) reduces the omitted variable and reverse causality problems of the relationship between a municipality's current transfers and arrears, but it does not fully control for endogeneity. For instance, each year the municipality might receive larger intergovernmental transfers to deal with the payment difficulties (i.e. to reduce the formation of new ar-

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[13]We include dummy variables for populations 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.

[14]In Section 3.2, we also show robustness checks including an additional set of municipality-level variables.

[15]In Section 3.2, we also show robustness checks including province-year fixed effects.

rears). To further reduce endogeneity concerns, we propose an instrumental variable (IV) approach that exploits a source of exogeneity shaping the current budgetary situation of Italian municipalities. Specifically, we employ the 1979 levels of current transfers from the central government (i.e. the State) to the municipalities as a new IV for the level of total current transfers in the period 2003-2010. In what follows, we present the rationale for using this exogenous instrument (Section 2.3.1), show its empirical relationship with the current transfers (2.3.2), and discuss its validity (2.3.3).

2.3.1 Instrumenting intergovernmental grants

A historical analysis of Italian local public finance clearly shows that the 1977-1978 reforms of the allocation of State transfers were an exogenous event that had an important role in the allocation criteria of intergovernmental grants until 2010.[16]

During the 1950s and 1960s, the tax and fiscal autonomy of Italian municipalities was quite inelastic to the rapid growth of GDP and social needs. In 1972-1973, a reform drastically reduced the autonomy of the revenue-side of the municipalities, which was replaced by a larger amount of State transfers. However, between 1972 and 1976, the outburst of inflation (and the consequent growth of nominal interest rates) widened the gap between nominally set revenues and the current expenditures of local governments, which was covered by loans granted by commercial banks and State financial institutions. The result was that in 1977, the total stock of outstanding debt of municipalities was more than three times as much as at the beginning of the decade.

In 1977-1978, emergency measures were implemented by two central-government decrees ('Stammati decrees'). The State assumed direct liability for municipal debt (including interest) issued before 1977. The future growth of current expenditures was capped by law, and restrictions were put on local public employment. A budget-balance rule and restrictions on local government borrowing were introduced (in particular, debt financing of current expenditures was prohibited). Finally, State grants were increased to balance the budget of each municipality approximately, and they were established as an ordinary financing mechanism with a centrally determined growth rate. Thus, the basic determinant of the new granting system was the pre-1978 expenditure levels (i.e., the so-called 'historical expenditure' criterion: higher transfers were allocated in 1979 to those municipalities that had higher pre-1978 expenditure levels).

The timing and features of this change were largely unexpected by municipal policy makers. In turn, the latter could not anticipate the impact of the new mechanism by increasing pre-1978 expenditures to ensure larger future transfers. This anticipation would have meant that municipalities increased their expenditures because they expected a bail-out by the central government, followed by the introduction of the

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[16]For a detailed narrative analysis of the main changes in the allocation of intergovernmental grants in Italy in the last four decades, refer to Appendix A.2.

'historical expenditure' criterion for the allocation of future transfers. However, we have not found any evidence of the presence of such an expectation in the political debate or among the stakeholders of that period.

To better understand how the 1977-1978 reform of the allocation of transfers has influenced future transfers, consider that each year, the amount of State transfers to each municipality decided by the central government is composed, for the sake of simplicity, by (i) the amount of transfers the municipality has received in the previous year, and (ii) an adjustment factor that depends on (a) an annual growth rate common to all municipalities, and (b) a compensation component specific for each municipality.

When determining the amount of transfers granted, the weight of each component can change from one year to the another. However, a larger weight has been attached to the first component, which is influenced by the 1979 transfers. In fact, after 1979, each year the transfers to the municipality have largely reflected the amount of transfers received in the previous year. For example, the distribution of transfers across municipalities in 1980 replicated, with marginal changes, the 1979 distribution of transfers (that, as discussed, were suddenly set in 1978 to cover each municipality's pre-1978 expenditure); in a similar way, the 1981 transfers reflected the 1980 transfers, the 1982 transfers reflected the 1981 transfers, and so on.

This recursive process has led to a gradual reduction of the direct effect of the 1979 transfers over time because of the annual marginal adjustments of distribution criteria and, in particular, of some specific events that have reduced the weight of the 'historical expenditure' criterion in the allocation of transfers to municipalities (such as the 1992 introduction of a local property tax that was compensated for by a corresponding drop in that municipality's transfers). But the small weight assigned to alternative apportionment criteria and, more generally, the failure of several attempts to reform intergovernmental transfers during the 1990s and 2000s have maintained a distribution of State transfers that is still based on the 'historical expenditure' criterion. Thus, municipalities that enjoyed larger State transfers in 1979 have continued to receive a larger amount of State current transfers.

At the beginning of the 1990s, more than 50% of the transfers paid to local governments still depended on the debt accumulated (to cover the expenditures) before the 1977-1978 reform (Emiliani, 1997). In May 2009, the first article of the new law on fiscal federalism (Law 42/09) pointed out among its main objectives: "[..] ensuring revenue and expenditure autonomy of municipalities [..], so as to gradually replace, for all levels of government, the criterion of historical expenditure." In other words, more than three decades after the 1977-1978 reform the Italian municipal finance framework is still largely affected by that criterion. This is also supported by the +0.37 value of the simple correlation between the (log of per capita of) 1979 transfers and the (log of per capita) current intergovernmental transfers in the period 2003-2010 (see Figure 1).
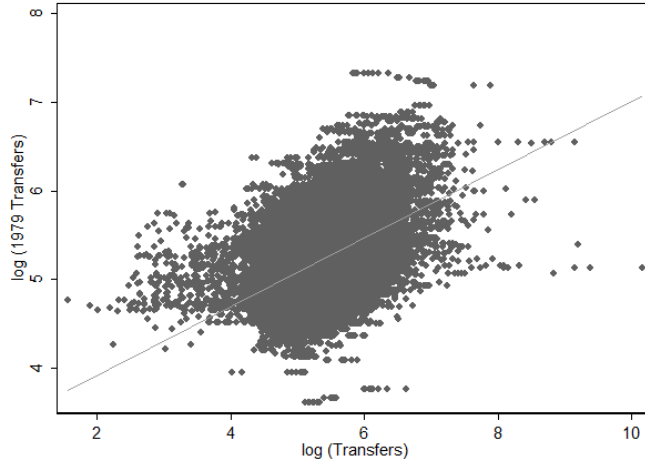
Figure 1 – Correlation between transfers pc and 1979 transfers pc

2.3.2 First-stage results

In this context, beyond the simple correlation shown above, we study the relationship between the two variables conditional on other controls. These estimations are the first-stage of a 2SLS estimation approach of the empirical model in equation (1), where the 1979 transfers are employed as an excluded instrument for the 2003-2010 levels of the current transfers.

If the adjustment component specific for each municipality in any year is particularly small (let's say infinitesimal), the influence of the 1979 transfers on the current transfers would be linear across the years, once we control for the year-fixed effects; in fact, the latter aim at capturing the annual growth rate of the amount of transfers common to all municipalities and set by the central government.

The estimation results of this specification are presented in column 1 of Table 2 and confirm a positive and statistically significant relationship between the 1979 transfers and the current transfers, after controlling for other covariates with municipality-fixed and time-varying dimensions (as discussed in Section 2.2). In particular, the estimated elasticity indicates that municipalities that received a 10% larger amount of transfers in 1979 still received on average 2.1% larger transfers in the period 2003-2010.

To take into account the different weights that the central government assigns to the marginal adjustment component each year for determining the new amount of transfers to each municipality (and, inversely, the importance of the transfers allocated in the previous year, which are influenced by the 1979 transfers), we augmented the first stage equation with the interaction terms between the 1979 transfers and the year dummies. It is worth emphasizing that this exercise allows us to capture the exogenous component linked to the 1979 transfers that influences the allocation

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of transfers across municipalities every year and it is not intended to artificially augment the number of instruments or artificially give a time dimension to a cross-section instrument. The interaction terms indicate the differential effect in each given year with respect to the effect in 2003, where the latter is captured by the coefficient of the (non-interacted) variable of the 1979 transfers.

In column 2 of Table 2, the estimated coefficient of the single term of the 1979 transfers indicates that municipalities that received a 10% larger amount of transfers in 1979 received, on average, transfers that were 1.8% larger in 2003. This effect is similar to that shown in column 1, indicating that the non-linear effects of the 1979 transfers over the years (introduced in column 2) have a minor role. Accordingly, the coefficients of the interaction terms (i) are small in magnitude, confirming the limited differential effects over the years, (ii) are positive and statistically significant until 2007, indicating that municipalities receiving a larger amount of transfers in 1979 not only received a larger amount of transfers in 2003, but also received even higher transfers than other municipalities every year until 2007 (such behaviour is consistent with the fact that the 2003-2007 period was characterized by annual cuts of State transfers to municipalities) and, (iii) are not statistically significant in the years 2008-2010, reflecting the impact of the 2008 central government's decision to cut the local property tax and to partially compensate lost revenues in the municipalities by making higher State transfers (such behaviour has reduced the differential effects across municipalities but has not altered the important role of the 1979 transfers, given the small and statistically non-significant magnitude of the interaction coefficients).[17]

2.3.3 Discussion

A concern regarding the validity of the instrument is that the 1979 transfers have influenced the current rise of investment expenditure arrears through channels we do not control for. For instance, one might argue that the 1979 transfers have shaped the municipality's subsequent spending and revenue capacity, and socio-economic conditions, which are all factors that can have a direct effect on the arrears. Our set of control variables in (M), (MT), and particularly the current level of average taxable income, observed 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 municipalities lacking 'budget responsibility'. In fact, because higher transfers were allocated in 1979 to those municipalities that had higher pre-1978 expenditure levels, one might suspect that those municipalities had a tendency not to use public money correctly. If for some reason this behaviour is still at work in those municipalities, there might be a positive correlation between the 1979 transfers and the lack of 'budget responsibility' in municipalities. Although we

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[17]The F-statistics of excluded instruments indicate that the instrument is both relevant and strong.

Table 2 – First stage results

Column	(1)	(2)
Estimator	OLS	OLS
Dependent var.	log of	
	Current transfers	Current transfers
log of:		
1979 transfers	0.209***	0.184***
	(0.012)	(0.013)
1979 transfers*y2004		0.038***
		(0.008)
1979 transfers*y2005		0.060***
		(0.009)
1979 transfers*y2006		0.049***
		(0.009)
1979 transfers*y2007		0.052***
		(0.009)
1979 transfers*y2008		0.005
		(0.010)
1979 transfers*y2009		-0.005
		(0.009)
1979 transfers*y2010		0.000
		(0.010)
Investment expenditure	0.035***	0.036***
	(0.003)	(0.003)
Interest expenditure	0.056***	0.056***
	(0.006)	(0.006)
Av. taxable income	-0.410***	-0.409***
	(0.036)	(0.036)
Municipality controls	YES	YES
Province FE	YES	YES
Year FE	YES	YES
Observations	51,225	51,225
R-squared	0.638	0.639
F-test of excluded instruments	284.21	46.34

Notes: Robust standard errors clustered at the municipality level are in parentheses. Inference: *** $p<0.01$, ** $p<0.05$, * $p<0.1$. 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. First stage F-statistics of the excluded instruments are reported.

cannot fully exclude this channel, two facts have to be pointed out. First, 'financially irresponsible' municipalities typically tend to increase their current expenditures (e.g., for employees, for consultancy services and so on), while our focus is on the arrears for investment expenditures. Second, in cases of a perpetuation over decades of non-correct use of public money within a municipality, we would observe that

today's higher transfers (because of higher 1979 transfers, and thus higher pre-1978 expenditure) are associated with higher arrears (i.e., a higher level of missing expenditure payments). Thus, if this were the case, the coefficient of transfers on arrears would be upward biased.

To the best of our knowledge, we are the first to exploit the 1977-1978 important and largely exogenous break in the institutional setting of Italian local public finance and to take into account the effect of the 'historical expenditure' criterion for instrumenting the current transfers.

Other papers have analysed the political determinants of the heterogeneity of the total 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 for an instrumental variable approach. For instance, Bracco et al. (2015) suggest the use of a 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 by 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 our paper, we do not use the alignment of the mayor with respect to the political party/orientation of the central government as an instrument for transfers for two main reasons. First, we are interested in an analysis of all the Italian municipalities, but in most of the municipalities (about 64% of our sample), we were not able to identify the mayor's political affiliation since it is recorded as 'lista civica' (i.e. independent civic coalitions). Indeed, Bracco et al. (2015) also point out that for the period 1998-2008, in 66% of the smallest Italian municipalities, the mayor's party affiliation 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 mayor's political affiliation). Second, we aim to study the overall variation (not only over-time) in the current transfers and, to this end, we exploit the impact of the 1977-1978 historical institutional reform of the Italian public finance to capture an exogenous component of this variation. However, we will show that our main results and the validity of the instrument hold even when we include political economy features of the municipalities in the model specification.

3 Estimation results

3.1 Main results

To estimate the augmented equation (1), we employ different estimators that will allow us to capture different dimensions of the variability of our data and to deal with various concerns about endogeneity.

In Table 3, we report our main estimation results. In column 1, we employ a pooled-ordinary least squares estimator (pooled-OLS) that includes the controls at municipality level (M), the municipality-year level (MT), and province-fixed and year-fixed effects. The estimation results in column 2 are from the within-group estimator (i.e., municipality-fixed effects), which 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 second stage of the pooled two-stage least squares estimation (pooled-2SLS) using the 1979 transfers as instruments for the current transfers (which is an exactly identified model). In column 4, we show evidence from an overidentified 2SLS, where the 1979 transfers that interacted with year dummies are the excluded instruments for the current transfers.[18] In all specifications, we report standard errors clustered at the municipality level, which are robust for serial correlation and heteroscedasticity.[19]

Our primary interest is in the estimated coefficient of current transfers, which indicates whether a municipality's change in transfers is reflected in the formation of arrears for investment expenditure. The estimated coefficients for transfers are negative and statistically significant at the 1% level. 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 between 0.28% and 0.49% in arrears. In the 2SLS estimations, we estimate that a reduction of 10% in the transfers per capita is associated with an increase of between 1.03% and 1.11% in arrears.[20] Thus, lower intergovernmental transfers harden the municipality's financial constraints, and force the municipal government to increase payment arrears for (new) investment expenditure.

Concerning the estimated coefficients of other control variables, it is hardly surprising that the coefficient of investment expenditure is positive and statistically significant (indicating an elasticity of about 1). As for the interest expenditure vari-

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[18]The Hansen J test of overidentifying restrictions is reported. The first-stages of both 2SLS estimations are reported in Table 2.

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

[20]For example, in a municipality with average current transfers per capita of about 243 euros and average arrears per capita of about 380 euros, a decrease of 24 euros in the transfers per capita is associated with an increase in the arrears per capita of about 4.20 euros.

Table 3 – Main estimation

Column	(1)	(2)	(3)	(4)
Estimator	OLS	Within	2SLS	2SLS
Dependent var.		log of		
	Arrears	Arrears	Arrears	Arrears
log of:				
Current transfers	-0.028***	-0.049***	-0.111***	-0.103***
	(0.009)	(0.013)	(0.041)	(0.039)
Investment expenditure	1.055***	1.069***	1.058***	1.058***
	(0.004)	(0.005)	(0.004)	(0.004)
Interest expenditure	-0.016***	-0.009	-0.010*	-0.011**
	(0.005)	(0.013)	(0.006)	(0.005)
Av. taxable income	0.009	0.013	-0.021	-0.018
	(0.024)	(0.066)	(0.027)	(0.027)
Municipality controls	YES	NO	YES	YES
Municipality FE	NO	YES	NO	NO
Province FE	YES	NO	YES	YES
Year FE	YES	YES	YES	YES
Observations	51,225	51,225	51,225	51,225
R-squared	0.889	0.856	0.889	0.889
F-test of excluded instruments			284.21	46.34
Endogeneity(p-value)			0.039	
Hansen J (p-value)				0.206

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 Current transfers is the instrumented variable. In column 4 the excluded instruments are the 1979 transfers interacted with year dummies; Current 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. First stage F-statistics of the excluded instruments are reported. 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.

able, the estimated coefficients are negative and statistically significant in columns 1, 3, and 4. This variable is a proxy of the cost of the municipality's debt and, thus, of the municipality's capacity to issue new debt and access to credit, given all the formal borrowing limits induced by the Italian law during the period of analysis (both because of the effects of the DSP and a cap imposed on the expenditure for debt service). The negative estimated coefficient, thus, reflects the fact that the larger the capacity for issuing new debt (or the weaker the limits on local debt growth), the less the municipality's need to resort on issuing arrears (or, the higher the capacity of keeping up with the payments for investment expenditure). [21]

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[21]Note that our main estimation results do not change when we use the ratio between debt interest expenditure and total revenues as an alternative control.

Table 4 – Extensions and robustness checks: 2SLS

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Column							
Dependent var.				log of Arrears			
Sample	Full	Full	Full	<15,000 inhab.	Full	Full	Full
log of:							
Current transfers	-0.159***	-0.098**	-0.087**	-0.134***			-0.145**
	(0.041)	(0.039)	(0.042)	(0.051)			(0.064)
Investment expenditure	1.055***	1.056***	1.061***	1.065***	1.056***	1.102***	1.099***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.020)	(0.048)
Stock of arrears	0.034***						
	(0.005)						
Interest expenditure	-0.014**	-0.012**	-0.009	-0.007	-0.013**	-0.012**	-0.015***
	(0.005)	(0.006)	(0.006)	(0.006)	(0.005)	(0.005)	(0.005)
Av. taxable income	-0.046*	-0.015	-0.013	-0.031	-0.039	-0.015	-0.041
	(0.027)	(0.027)	(0.034)	(0.036)	(0.032)	(0.027)	(0.037)
State current transfers					-0.118***		
					(0.045)		
Total transfers						-0.119**	
						(0.046)	
L.Arrears							0.002
							(0.008)
Municipality controls	YES	YES	YES	YES	YES	YES	YES
Political controls	NO	NO	YES	YES	NO	NO	NO
Province FE	YES	YES	YES	YES	YES	YES	YES
Province-year FE	NO	YES	NO	NO	NO	NO	NO
Year FE	YES	YES	YES	YES	YES	YES	YES
Observations	51,145	51,225	47,358	43,208	51,225	51,225	43,294
R-squared	0.891	0.891	0.893	0.894	0.888	0.887	0.905
F-test of excluded instruments	42.05	46.17	38.82	32.41	34.21	41.01	52.28
Hansen J (p-value)	0.319	0.224	0.408	0.143	0.214	0.224	0.741

Notes: Robust standard errors clustered at the municipality level are in parentheses. Inference: *** p<0.01, ** p<0.05, * p<0.1. In columns 1-6, the excluded instruments are the 1979 transfers interacted with year dummies; Current transfers is the instrumented variable in columns 1-4 (State current transfers and Total transfers, in columns 5 and 6). In column 7, the excluded instruments are the 1979 transfers interacted with year dummies; Investment expenditure and the Current 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: dummies for the years since the past elections; dummy for mayor's first mandate period; dummies for mayor's level of education; index of tertiary-level educated people; number of non profit organizations per capita. First stage F-statistics of the excluded instruments 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.

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3.2 Further results and robustness checks

In this section, we propose a set of robustness checks to further control for the validity of our estimation results and the consistency of their interpretation with our main prediction. Each change introduced to the estimated empirical model or analysed sample is estimated using different approaches. However, for reasons of space, in Table 4, we only report the estimation results obtained with the 2SLS estimator, while the full set of results are reported in Appendix A.3.

The first concern is about the role of the stock of the expenditure arrears at the beginning of the year. One might argue that the formation of new arrears each year is influenced by the stocks of arrears accumulated in previous years. In fact, on the one hand, municipalities with a larger stock of arrears could tend to systematically have higher new arrears, with respect to the other municipalities. On the other hand, a municipality with a larger stock of past arrears could tend to reduce the formation of new arrears over the year to avoid greater difficulties with future payments. To control for this factor, we include in the model specification (1) the stock of the arrears for investments, recorded at the beginning of the year. Estimation results in Table 4, column 1, confirm the previously estimated sign, the statistical significance of the effects of transfers, investment expenditure, and debt interest expenditure on the arrears.[22]

In column 2 of Table 4, we report estimation results after including province-year fixed effects in the model specification. 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. The results confirm our main estimation.

An additional robustness check deals with the concerns related to political features. The economic literature shows that the electoral cycle and the alignment of local politicians with 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 thorough analysis of these political economy factors is beyond the scope of the present paper, we add political controls to our model specification (1). Specifically, we include a dummy variable indicating whether a municipality's mayor is in his/her first mandate and a set of dummy variables indicating the years passed since the last municipal election (data come from the Ministry of the Interior) to control for the mayor's term limit and political cycles. In Italy, in each municipality, the mayor and city council are elected for a five-year term and each mayor has a limit of two consecutive terms. Mayors

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[22]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 when we compare the effects across municipalities and over time, those 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.

might have different expenditure incentives/choices in their first mandate compared with their second mandate, as well as in the years just before the election compared to the years just after the elections (see, for instance, Besley and Case, 2003, and Cioffi et al., 2012).[23] Note that elections in the Italian municipalities do not take place at the same time and this allows us to better identify the effects of the political cycle empirically. In addition we add a proxy of social capital (i.e., the number of non-profit organizations per capita to our model specification; data are from Nannicini et al., 2013), and a variable representing the share of tertiary-level educated people (data come from ISTAT) in the municipality to control for the accountability of local politicians (see Nannicini et al., 2013).

We also run an additional robustness check to verify whether our estimated relationship also holds in small municipalities and is not driven by larger municipalities (in Italy, and in our sample, about 91% of municipalities have a population below 15,000 inhabitants). Although we already control for population size in our model specifications, we estimate our model (1) on the sub-sample of municipalities with a population below 15,000 inhabitants. In fact, in Italy, municipalities with below 15,000 inhabitants have a different electoral system than larger municipalities, and we might be interested in controlling whether different political contexts influence our results (a single ballot system is in place for municipalities with fewer than 15,000 inhabitants, while a dual ballot system is in place above that threshold; see, among others, Barone and de Blasio, 2013). The estimation results reported in Table 4, columns 3 and 4, show that our main estimation results are not influenced by the inclusion of these political controls in the model specifications and the limitation of the sample to small municipalities, respectively.[24]

In column 5, we use the state current transfers (i.e., the amount of grants received by the municipality from the central government) as an alternative to total current transfers. As underlined in Section 2.3.1, this is the most exogenous component of the current transfers. Our estimation results remain stable with this change.

In column 6, we use the total amount of transfers per capita, as an alternative to the current transfers. Total transfers include, as well as current transfers, capital account transfers from the central government, the regional government, and other public administrations. In our main analysis, we preferred to use current transfers as these are less discretionary than capital account transfers. In fact, capital account transfers can suffer more from endogeneity problems since the municipal government could bargain for transfers for financing planned investments, while current transfers mainly follow the 'historical expenditure' criterion. Estimations show that our results are also robust to the use of total transfers, once they are instrumented with the 1979 level of transfers.[25]

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[23]Note that we also control for a proxy for mayors' level of education (data come from the Ministry of the Interior).

[24]Note that our IV approach maintains its validity when we include municipality-level political controls in the model specification.

[25]In this robustness check, our instrumental variable mainly captures the exogenous part of

Finally, we show a robustness check that aims at taking into account the fact that our results might be affected by endogeneity problems related to the level of investment expenditure decided by the municipalities each year. In fact, it might be the case that municipalities that tend to accumulate arrears decide to lower their 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. In Table 4, column 7, we report the estimation results of our model specification, which is augmented with the lagged value of arrears (*L. Arrears*, to control for the presence of a persistent process in the accumulation of arrears) and estimated with the two-step feasible GMM estimation. Estimates confirm the presence of a statistically significant and negative relationship between transfers and arrears.[26]

4   Conclusion

The reduction of transfers from the central government to local ones is widely adopted in an attempt to decentralize the fiscal consolidation process. However, if a cut in transfers translates into higher outstanding payments (or expenditure arrears) at the municipal level, the pursued consolidation objectives will be partly frustrated.

This paper has addressed the effect of central government changes in transfers on municipalities' arrears for local public investments. Our hypothesis is that, when there is no effective control over the use of expenditure arrears and budget-balance rules are imposed, hardening fiscal constraints by cutting intergovernmental transfers can lead local governments to relax the constraints by increasing their expenditure arrears (i.e., a non-conventional form of short-term trade debt).

We test this prediction using a large dataset of Italian municipalities for the period 2003-2010. Our empirical strategy is based on an instrumental variable approach, relying on the structural break that significantly changed the Italian local public finance in 1977-1978 and on the central role played by intergovernmental transfers in driving local fiscal policy. Our main results indicate that a reduction

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the total transfers related to the current transfers; however in the first stage the instrument is significantly and positively associated with the total transfers and the Hansen J test does not reject the null hypothesis that the instruments are valid.

[26]In Appendix A.4 we report further sets of robustness checks: i) we show 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 based on intuitions (i.e., percentage change of the stock of arrears in the year, and payments for investment expenditure planned in the year), or based on our theoretical model (i.e., tax revenues, see Appendix A.1); ii) we control for the influence of extreme values; iii) we offer evidence that municipalities receiving higher levels of transfers do not systematically select public investment projects of shorter duration (even after controlling for political budget cycle), so that we can exclude that the lower arrears are simply driven by the shorter life of the projects.

of 10% in the per capita intergovernmental transfers to a municipality is associated with an increase of 1.1% in local expenditure arrears.

These empirical results, confirmed by several robustness checks, highlight a novel and perverse effect driven by the (mis)management of intergovernmental transfers. In particular, on the one hand, our findings provide new evidence about the costs of hardening financial constraints on the fiscal decentralization process; on the other hand, our findings suggest that further research on the design of optimal, exogenously imposed fiscal restraints should carefully take into account local governments response. Last, but not least, as is widely recognized, central public administrations should devote far more effort and resources to the collection of precise and systematic data on public expenditure arrears, as this is key for future assessments of the undesired side-effects of fiscal policies.

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A APPENDIX

A.1 Theoretical model

We can draw our main testable prediction (see Sections 1 and 2) by a simple theoretical model of local public finance, featuring a large number of local governments. Each of them maximizes an intuitive, inter-temporal objective function

$$u_t = m(e_t - \lambda(\tau_t)) + h(k_t) + \delta E_t(u_{t+1}) \tag{2}$$

where: $\delta < 1$ is the inter-temporal discount factor; $m(.)$ measures the benefits that the local government (i.e., politicians and/or citizens) draws, at time t, from current expenditure, e_t, net of the political and economic costs (measured by the increasing and convex function $\lambda(.)$) of local taxation, τ_t; $h(.)$ measures the benefits deriving in each period from the stock of local public capital (e.g., infrastructure for social services), k_t. As usual, $m(.)$ and $h(.)$ are well-behaved (twice differentiable, increasing, concave); for the sake of simplicity, we also assume that both have constant absolute risk aversion, $\alpha^m = -\frac{m''}{m'}$ and $\alpha^h = -\frac{h''}{h'}$.

To keep the model as simple as possible, we assume that the stock of capital is fully depreciated each year and its amount available at time t,

$$k_t = i_{t-1} + p_t, \tag{3}$$

depends on the investment that is decided and implemented by the local government in the previous period, i_{t-1}, and on additional investment payments,

$$p_t = \theta_{t-1} + a_{t-1} \cdot (1 + \rho) - a_t. \tag{4}$$

These payments are the reaction of the local government to the formation of capital expenditure arrears during the period $t - 1$. Such arrears are partly determined by a random shock, $\theta_{t-1} \sim F(\theta)$ (with $E(\theta_{t-1}) = 0$), that affects the actual investment during the execution of public works contracts in $t - 1$ (after capital expenditure i_{t-1} has been decided).

We introduce θ_{t-1} for two reasons. First, we want to take into account non-deterministic discrepancies between the investment decided at time $t - 1$ and the stock of capital available at time t. Second, in this simple way, we model 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 the structural features of the local government and local constituency (e.g., demography, human and social capital).

A second component of arrears is endogenous. The local government can adjust the original investment plan, as exogenously modified by the random shock, by postponing investment payments (and works) to the future, i.e., issuing voluntary arrears a_t. Quite naturally, these cannot be negative, i.e., $a_t \geq 0$, and involve transaction costs. We model transaction costs associated to the decision to increase arrears by the implicit rate of return, ρ, that the local government has to concede

to public works contractors.[27]

The local government faces the following budget constraint:

$$\tau_t + g_t + b_t - b_{t-1} = e_t + rb_{t-1} + i_t + p_t \tag{5}$$

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 decided at time t (that will be implemented as investment in the period $t+1$). 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: $b_t \leq \bar{b}_t$.[28]

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 hidden debt).

Each local government maximizes its intertemporal objective function under the budget constraint. To simplify the analysis, we substitute e_t by (5), k_t by (3) in the objective function, and we maximize with respect to the sequence of τ_t, i_t, a_t, and b_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 order conditions[29] (corresponding to controls at time t),

$$\tau_t: \quad m_t'(1 - \lambda_t') = 0 \tag{6}$$

$$i_t: \quad -m_t' + \delta E(h_{t+1}') = 0 \tag{7}$$

$$a_t: \quad m_t' - h_t' - \delta(E(m_{t+1}') - E(h_{t+1}'))(1 + \rho) + \mu_t = 0 \tag{8}$$

$$b_t: \quad m_t' - \delta E(m_{t+1}')(1 + r) - \nu_t = 0, \tag{9}$$

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 that $b_t < \bar{b}_t$ (hence, $\nu_t = 0$) for all t. Substituting (7) and (9) in (8), $h_t' = m_t'(1 + r\frac{1+\rho}{1+r}) + \mu_t$. Substituting the expectation of the latter formula, at time $t+1$, in (7) and contrasting the result with (9), we have a contradiction (by

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[27]This is a distinctive feature of endogenous arrears, a_t, with respect to exogenous arrears determined by the random shock, θ_{t-1}. 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.

[28]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 DSP provisions). We do not include any lower bound to gross public debt, considering that the local government may issue negative debt (i.e., buy assets). The latter case is particularly relevant when we consider the provisions of the DSP.

[29]It is worth noticing that m_t' and h_t' are the marginal utilities of current and capital expenditure, respectively, and λ_t' is the marginal cost of public funds.

$\rho > r$): $m'_t = \delta E(h'_{t+1})(1 + r\frac{1+\rho}{1+r}) + \delta E(\mu_{t+1}) > \delta E(h'_{t+1})(1 + r) = m'_t.$ ■

By Lemma 1, the local public debt level becomes a parameter of the local government optimization problem. The optimal fiscal policy is determined by the first order conditions (6), (7), and (8).

To characterize the main comparative statics result of our analysis, it is sufficient to assume that the following condition is satisfied:[30]

$$\alpha^m < \alpha^h(1 + \rho). \tag{10}$$

Thus, we have[31]

Proposition 2 *The optimal local fiscal policy is such that arrears, a_t, decrease (or do not increase) as the local government budget constraint is relaxed (i.e., g_t or $\bar{b}_t$ grow), whenever (10) is satisfied.*

Proof. By inspection of the second-order cross derivatives of the objective function with respect to optimization variables and parameters, we can see that, if the sufficient condition (10) is satisfied, the objective function of the local government is supermodular in $(-\tau_t, i_t, -a_t, \bar{b}_t, g_t)$. Hence, the proposition follows. ■

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[30]It is worth noticing that, in particular, the condition (10) is satisfied if the risk aversion parameter is similar for both measures $m(.)$ and $h(.)$.

[31]The argument of Proposition 2 relies on monotone comparative statics techniques (Milgrom and Shannon, 1994).

A.2 Narrative analysis of the allocation of intergovernmental transfers in Italy

This section presents the evolution of the regulatory framework of Italian local public finance over the last four decades.

Up to the early 1970s. The vigorous economic growth of the 1950s and 1960s significantly expanded the financial needs of local authorities for the provision of public services and infrastructure facilities. However Italian municipalities' revenues, which relied heavily on their own taxes (i.e., the family tax, the consumption tax, and the tax on capital gains on building areas), had proven to be quite inelastic to the growth of GDP and to the new societal challenges. 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 Italian public finance.

First half of the 1970s. In 1972-73, a massive tax reform was introduced. The main municipal taxes were suppressed and their revenues provisionally substituted by State grants. Other taxes, such as IGE (General Tax on Revenues), where municipalities shared revenues, were substituted by IVA (the new VAT required by the European Economic Community) which did not allow for any revenue sharing at local level. The reform also introduced some new local taxes (Invim, a tax on capital gains on housing assets, Tarsu on waste collection, Tosap on the use of urban territory, and Ilor on all incomes other than dependent labour income) that proved to be highly inelastic to income and with their real revenue easily eroded by inflation. Indeed, 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 outstanding 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 Italian local public finance.

Second half of the 1970s. In 1977, emergency measures were implemented by two central-government decrees, the 'Stammati decrees' (after the name of the Treasury Minister): Decree 2/77, converted into Law 62/77, and the Decree 946/77, converted into Law 43/78. The State assumed direct liability for municipal debt (including interest) issued before 1977; the future growth of current expenditures was capped by law (restrictions were also 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 mechanisms with a centrally determined growth rate. In 1978,

the amount of transfers was set to provide each municipality with the expenditure incurred in the previous year (i.e., 'historical expenditure' criterion). The effects of both the financial crisis in Italian local public finance and the 1977 emergency measures on 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 1980s. The 'historical expenditure' criterion for deciding and allocating Sate transfers among municipalities remained substantially in force for over a decade, despite several legislative measures attempting to change the transfer apportionment scheme. In 1981, with Law 154/81, the government established an equalization fund for the first time that only represented a marginal share of total transfers. In the mid-1980s, transfers from the higher tiers of government still accounted for almost 70% of municipalities' total revenues. Funds were mostly earmarked and allocated in such a way as to compensate for individual differences between past expenditures and autonomous revenues. In 1989, in order to strengthen fiscal autonomy, a new local tax was introduced (Iciap, the municipal business tax).

First half of the 1990s. At the beginning of the 1990s, when more than 50% of the transfers paid to local governments still depended on the debt accumulated in the 1970s, the severe financial and political crisis (which culminated in Italy's falling out of the European Monetary System and the devaluation of the Lira in 1992) as well as the fiscal discipline imposed by the Maastricht Treaty, leading to the European monetary unification, made it imperative for Italy to engage in budget consolidation. Decentralization gained momentum as an important driver of fiscal discipline by the mid-1990s. Several reforms were implemented with the aim of hardening the local budget constraints and improving the accountability and responsibility of local governments. A turning point in the Italian history of public finance occurred in 1992 when important reforms of local government financing were approved in order to increase their tax and fiscal autonomy. The central government's attitude regarding local public finances changed dramatically: rather than attempting to control local expenditures from the center, responsibility at local level was increased by reducing the role of transfers and by increasing the revenue and expenditure autonomy of the local governments (Law 142/90). The revenue structure of municipalities was reformed (Decree Law 504/92), with the assignment, from 1993, of a property tax (ICI), in which municipalities were allowed to choose the tax rate in a given interval, along with the rationalization of the State grant framework, which comprised five different kinds of transfers: three mandatory, non-earmarked and general purpose for the current account, and two mandatory and earmarked for the capital account. Transfers to municipalities were reduced in 1993 by the same amount of the ICI base revenue. In the same year, Invim was abolished. Moreover, Decree Law 504/92 explicitly provided for the progressive reduction, over a period

of 16 years, of the role of the '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 strengthen the equalization component of intergovernmental grants. However, the new model was applied only in 1994. In 1995, Law 539/95 introduced a new model of intergovernmental transfers, which was never applied.

Second half of the 1990s. At the end of the 1990s, new administrative (and expenditure) functions were devolved from central to local governments. The main functions of municipalities were revised in 1998 with the implementation of the two decentralization laws of 1997 ('Bassanini laws', after the name of the Minister of Public Service): Law 59/97 ('Bassanini I') and Law 127/97 ('Bassanini II') and the subsequent Legislative Decrees (in particular Legislative Decree n. 112/98). In 1997, in exchange for the abolished municipal business tax (Iciap), municipalities received a sharing quota in the regional business tax (Irap) that, starting from 2001, was turned into grant. To finance new local expenditures devolved by the central government, starting in 1999, municipalities were allowed to levy a surcharge on their residents' personal income tax (PIT), with a corresponding reduction in State transfers. The central government maintained its full powers over PIT, including the definition of the tax base and tax brackets, while municipal governments could only raise a flat surcharge on their PIT base. The reduction in the amount granted to municipalities was not, however, accompanied by a significant change in the allocation criteria. Despite further changes in the late 1990s and early 2000s, when some minor revisions of the allocation criteria were implemented (for example in 2002 the annual amount of transfers to be distributed among municipalities was set as a proportion of the receipts from national PIT), the design of intergovernmental grants remained substantially unchanged.

The 2000s. Since the early 2000s, Italy has been involved in a complex, confused, and still ongoing process of fiscal decentralization. This formally began in 2001 when Parliament approved a constitutional reform that 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, and several attempts to implement the reforms have failed. In May 2009, an enabling law on fiscal federalism was approved (Law 42/09). This law authorized the Government to issue decrees to regulate the financial autonomy of local authorities and laid down some rules of a general nature concerning local tax resources, tax equalization, and coordination between the various levels of government. One of the key principles underpinning the law, as stated by Article 1, is "[..] ensuring revenue and expenditure autonomy of municipalities [..], so as to gradually replace, for all levels of government, the criterion of historical expenditure," reflecting the fact that, more than 30 years after the 'Stammati decrees' the Italian municipal finance framework is still largely affected by such a

criterion. The transition to the new regime for the assessment of the equalization resources (supposed to take place over five years) is still under way and the time-frame for full implementation of the decrees is lengthy and uncertain. In particular, Legislative Decree 23/2011 (one of several legislative decrees enacted by the implementation of Law 42/2009 on fiscal federalism) has significantly changed the way in which local governments are financed and, in particular, the design of intergovernmental grants. Since 2011, for the municipalities of ordinary statute regions, central government transfers have been replaced with a portion of the proceeds of property taxes and VAT. These resources were allocated to an "experimental rebalancing fund", distributed according to criteria that essentially duplicated the distribution of the abrogated transfer payments. In 2013, this fund was replaced by a 'solidarity fund', powered by a share of the new property tax ("IMU - Imposta Municipale sugli Immobili"). In the same year, the national budget law established the suspension of the VAT revenue sharing for 2013 and 2014.

Concluding remarks. A number of reasons can explain the difficulties in the transition to the new regime of the assessment for equalization resources. 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 regarding the proper implementation of (any) fiscal federalism model aimed 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.

A.3 Full set of empirical results

The results presented in Figure A1 and Tables A1 to A7 complement the results presented in Tables 3 and 4.
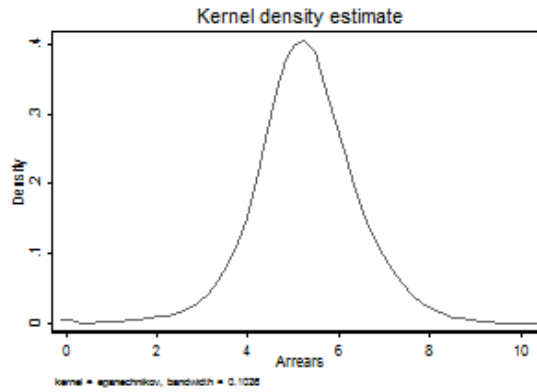
Figure A1 – Density of log of Arrears

Table A1 – Further summary statistics (Real euros per capita)

VARIABLES	Mean	SD
Payments (Inv.)	61.73	169.62
Stock Arrears (Inv.)	1128.74	1993.88
Total transfers	558.66	823.66
State current transfers	201.50	127.75
Tax revenues	247.06	166.83
Touristic 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 rate	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	1.92	1.47
Mayor's first mandate	0.66	0.48
Mayor's education	3.30	0.70

Table A2 – Controlling for the stock of arrears

Column	(1)	(2)	(3)	(4)	(5)
Estimator	OLS	Within	1' stage: 2SLS	2' stage: 2SLS	2' stage: 2SLS
Dependent var.	Arrears	Arrears	log of Transfers	Arrears	Arrears
log of:					
Current transfers	-0.037***	-0.049***		-0.169***	-0.159***
	(0.009)	(0.013)		(0.044)	(0.041)
Investment expenditure	1.052***	1.070***	0.026***	1.056***	1.055***
	(0.004)	(0.004)	(0.002)	(0.004)	(0.004)
Stock of arrears	0.027***	-0.021***	0.047***	0.035***	0.034***
	(0.004)	(0.005)	(0.004)	(0.005)	(0.005)
Interest expenditure	-0.021***	-0.007	0.048***	-0.013**	-0.014**
	(0.005)	(0.013)	(0.006)	(0.005)	(0.005)
Av. Taxable income	-0.001	0.032	-0.419***	-0.050*	-0.046*
	(0.023)	(0.066)	(0.036)	(0.027)	(0.027)
1979 transfers			0.195***		
			(0.012)		
Municipality controls	YES	NO	YES	YES	YES
Municipality FE	NO	YES	NO	NO	NO
Province FE	YES	NO	YES	YES	YES
Year FE	YES	YES	YES	YES	YES
Observations	51,145	51,145	51,145	51,145	51,145
R-squared	0.892	0.860	0.643	0.891	0.891
F-test of excluded instruments				255.70	42.05
Hansen J (p-value)					0.319

Table A3 – Province-year dummy variable as additional controls

Column	(1)	(2)	(3)	(4)	(5)
Estimator	OLS	Within	1' stage: 2SLS	2' stage: 2SLS	2' stage: 2SLS
Dependent var.			log of		
	Arrears	Arrears	Current transfers	Arrears	Arrears
log of:					
Current transfers	-0.027***	-0.047***		-0.108***	-0.098**
	(0.009)	(0.013)		(0.041)	(0.039)
Investment expenditure	1.053***	1.068***	0.035***	1.057***	1.056***
	(0.004)	(0.005)	(0.003)	(0.005)	(0.004)
Interest expenditure	-0.017***	-0.014	0.058***	-0.011**	-0.012**
	(0.005)	(0.013)	(0.006)	(0.006)	(0.006)
Av. Taxable income	0.010	0.035	-0.406***	-0.018	-0.015
	(0.025)	(0.077)	(0.037)	(0.028)	(0.027)
1979 transfers			0.208***		
			(0.012)		
Municipality controls	YES	NO	YES	YES	YES
Municipality FE	NO	YES	NO	NO	NO
Province FE	YES	NO	YES	YES	YES
Province-year FE	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES
Observations	51,225	51,225	51,225	51,225	51,225
R-squared	0.891	0.859	0.646	0.891	0.891
F-test of excluded instruments				278.54	46.17

Notes: Robust standard errors clustered at the municipality level are in parentheses. Inference: *** $p<0.01$, ** $p<0.05$, * $p<0.1$. In column 4 the excluded instrument is the 1979 transfers, and Current transfers is the instrumented variable. In column 5 the excluded instruments are the 1979 transfers interacted with year dummies; Current 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. First stage F-statistics of the excluded instruments are reported.

Table A4 – Political factors as additional controls

Column	(1)	(2)	(3)	(4)	(5)
Estimator	OLS	Within	1' stage: 2SLS	2' stage: 2SLS	2' stage: 2SLS
Dependent var.			log of		
	Arrears	Arrears	Current transfers	Arrears	Arrears
log of:					
Current transfers	-0.023**	-0.045***		-0.094**	-0.087**
	(0.010)	(0.011)		(0.045)	(0.042)
Investment expenditure	1.059***	1.073***	0.033***	1.061***	1.061***
	(0.004)	(0.004)	(0.003)	(0.004)	(0.004)
Interest expenditure	-0.012**	-0.003	0.048***	-0.008	-0.009
	(0.005)	(0.013)	(0.006)	(0.006)	(0.006)
Av. Taxable income	0.011	-0.035	-0.398***	-0.016	-0.013
	(0.031)	(0.066)	(0.047)	(0.035)	(0.034)
1979 transfers			0.190***		
			(0.012)		
Municipality controls	YES	NO	YES	YES	YES
Municipality FE	NO	YES	NO	NO	NO
Political controls	YES	YES	YES	YES	YES
Province FE	YES	NO	YES	YES	YES
Year FE	YES	YES	YES	YES	YES
Observations	47,358	47,358	47,358	47,358	47,358
R-squared	0.893	0.861	0.634	0.893	0.893
F-test of excluded instruments				238.57	38.82
Hansen J (p-value)					0.408

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 Current transfers is the instrumented variable. In column 5 the excluded instruments are the 1979 transfers interacted with year dummies; Current 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-level 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. First stage F-statistics of the excluded instruments 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 A5 – Subsample: Municipalities with below 15,000 inhabitants and political factors as additional controls

Column	(1)	(2)	(3)	(4)	(5)
Estimator	OLS	Within	1' stage: 2SLS	2' stage: 2SLS	2' stage: 2SLS
Dependent var.			log of		
	Arrears	Arrears	Current transfers	Arrears	Arrears
log of:					
Current transfers	-0.025**	-0.044***		-0.156***	-0.134***
	(0.010)	(0.011)		(0.057)	(0.051)
Investment expenditure	1.061***	1.076***	0.033***	1.066***	1.065***
	(0.004)	(0.004)	(0.003)	(0.005)	(0.004)
Interest expenditure	-0.014***	-0.002	0.054***	-0.006	-0.007
	(0.005)	(0.014)	(0.006)	(0.007)	(0.006)
Av. Taxable income	0.011	-0.029	-0.400***	-0.040	-0.031
	(0.032)	(0.067)	(0.049)	(0.038)	(0.036)
1979 transfers			0.164***		
			(0.013)		
Municipality controls	YES	NO	YES	YES	YES
Municipality FE	NO	YES	NO	NO	NO
Political controls	YES	YES	YES	YES	YES
Province FE	YES	NO	YES	YES	YES
Year FE	YES	YES	YES	YES	YES
Observations	43,208	43,208	43,208	43,208	43,208
R-squared	0.895	0.863	0.647	0.894	0.894
F-test of excluded instruments				154.73	32.41
Hansen J (p-value)					0.143

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 Current transfers is the instrumented variable. In column 5 the excluded instruments are the 1979 transfers interacted with year dummies; Current 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-level 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. First stage F-statistics of the excluded instruments 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 A6 – State current transfers as an alternative control

Column	(1)	(2)	(3)	(4)	(5)
Estimator	OLS	Within	1' stage: 2SLS	2' stage: 2SLS	2' stage: 2SLS
Dependent var.			log of		
	Arrears	Arrears	State current transfers	Arrears	Arrears
log of:					
State current transfers	-0.023**	-0.031**		-0.131***	-0.118***
	(0.009)	(0.012)		(0.049)	(0.045)
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	0.032***	-0.012**	-0.013**
	(0.005)	(0.013)	(0.006)	(0.005)	(0.005)
Av. Taxable income	0.008	0.012	-0.536***	-0.045	-0.039
	(0.024)	(0.066)	(0.039)	(0.033)	(0.032)
1979 transfers			0.177***		
			(0.012)		
Municipality controls	YES	NO	YES	YES	YES
Municipality FE	NO	YES	NO	NO	NO
Province FE	YES	NO	YES	YES	YES
Year FE	YES	YES	YES	YES	YES
Observations	51,225	51,225	51,225	51,225	51,225
R-squared	0.889	0.856	0.562	0.888	0.888
F-test of excluded instruments				216.32	34.21
Hansen J (p-value)					0.214

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 State current transfers is the instrumented variable. In column 5 the excluded instruments are the 1979 transfers interacted with year dummies; State current 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. First stage F-statistics of the excluded instruments 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.

42

Table A7 – Total transfers as an alternative control

Column	(1)	(2)	(3)	(4)	(5)
Estimator	OLS	Within	1' stage: 2SLS	2' stage: 2SLS	2' stage: 2SLS
Dependent var.	Arrears	Arrears	Total transfers	Arrears	Arrears
			log of		
log of:					
Total transfers	0.032***	0.051***		-0.136***	-0.119**
	(0.011)	(0.012)		(0.051)	(0.046)
Investment expenditure	1.040***	1.049***	0.400***	1.108***	1.102***
	(0.007)	(0.008)	(0.004)	(0.021)	(0.020)
Interest expenditure	-0.020***	-0.014	0.040***	-0.011**	-0.012**
	(0.005)	(0.013)	(0.005)	(0.005)	(0.005)
Av. Taxable income	0.028	0.037	-0.327***	-0.019	-0.015
	(0.024)	(0.067)	(0.028)	(0.028)	(0.027)
1979 transfers			0.171***		
			(0.010)		
Municipality controls	YES	NO	YES	YES	YES
Municipality FE	NO	YES	NO	NO	NO
Province FE	YES	NO	YES	YES	YES
Year FE	YES	YES	YES	YES	YES
Observations	51,225	51,225	51,225	51,225	51,225
R-squared	0.889	0.856	0.771	0.887	0.887
F-test of excluded instruments				295.54	41.01
Hansen J (p-value)					0.224

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 Total transfers is the instrumented variable. In column 5 the excluded instruments are the 1979 transfers interacted with year dummies; Total 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. First stage F-statistics of the excluded instruments 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.

43

A.4 Further results

A further prediction that can be drawn from our theoretical model (Section A.1) is that higher transfers lead to lower tax revenues (*Tax revenues*). The 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 marginal increase in taxable income is thus associated with an increase in tax revenues by a smaller quantity than a decrease in transfers. These findings are particularly interesting in the light of the literature on the flypaper effect, i.e. 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 into a one-euro reduction of tax revenues or an 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).[32] Although in this paper we are not directly interested in the effect of transfers on taxation choices, these findings, together with the results reported in Table 3 (on the negative effect of the transfers and a non-significant effect of the taxable income on arrears), suggest that one of the reasons why transfers do not fully translate into a similar reduction in tax revenues could be related to the presence of a third channel: part of the transfers are allocated to reduce trade debt (i.e., the expenditure for arrears). Further research in this direction is needed.

We also test the conjectures that if higher transfers reduce the formation of arrears, we would expect that higher transfers increase payments for investment expenditure planned for the year's (*Payment*) and reduce the stock of arrears during the year (*%Ch. Stock arr.*). The estimation results in Table A8 columns 3-6, confirm these conjectures.

Furthermore, we test whether municipalities receiving higher levels of transfers systematically select public investment projects of shorter duration. We use the variable (*Duration*) that represents the days of expected duration of the procured projects for public works by a sample of 2,432 municipalities between 2003 and 2006 (the sample is obtained by merging our dataset with that of Coviello et al. 2013, who use AVCP data containing information on the characteristics of public works with a value greater than 150,000 euros for the period 2000-2006).[33] If this were

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[32]Bracco, E., Lockwood, B., Porcelli, F., and Redoano, M. (2015). Intergovernmental grants as signals and the alignment effect: Theory and evidence. *Journal of Public Economics*, forthcoming. Gennari, E. and Messina, G. (2014). How sticky are local expenditures in Italy? Assessing the relevance of the flypaper effect through municipal data. *International Tax and Public Finance*, 21: 324-344.
Inman, R. (2008). The flypaper effect. NBER Working Papers 14579. National Bureau of Economic Research, Inc.

[33]Coviello D., L. Moretti, G. Spagnolo, and P. Valbonesi (2013). Courts' Efficiency and Procurement Performance. Marco Fanno Working Paper No. 164, Department of economics, University

the case, the estimated negative relationship between transfers and arrears could be explained by the shorter life of the projects. Our estimation results in Table A8 columns 7-8 are reassuring, as they actually show that, if any, higher levels of transfers are instead associated with project of longer duration. This result does not change after controlling for political budget cycle (columns 9-10).

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

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of Padova.

Table A8 – Further results

Column	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Estimator	OLS	Within	OLS	Within	OLS	Within	OLS	Within	OLS	Within
			log of						log of	
Dependent var.	Tax revenues	Tax revenues	Payments	Payments	%Ch. Stock arr.	%Ch. Stock arr.	Duration	Duration	Duration	Duration
Current transfers	-0.194***	-0.059***	0.074***	0.136***	-0.072***	-0.025*	0.066***	-0.023	0.063***	-0.039
	(0.035)	(0.013)	(0.021)	(0.025)	(0.008)	(0.013)	(0.021)	(0.043)	(0.021)	(0.042)
Interest expenditure	1.949***	0.417***	0.076***	-0.083***	-0.078***	-0.143***	-0.009	-0.048	-0.008	-0.039
	(0.275)	(0.064)	(0.013)	(0.024)	(0.004)	(0.011)	(0.014)	(0.039)	(0.014)	(0.042)
Av. Taxable income	0.016***	0.002**	0.181**	0.021	-0.112***	-0.132**	-0.025	-0.239	0.023	-0.251
	(0.002)	(0.001)	(0.073)	(0.158)	(0.022)	(0.066)	(0.084)	(0.409)	(0.121)	(0.411)
Investment expenditure			0.561***	0.468***	0.286***	0.379***	0.021**	0.007	0.018*	-0.002
			(0.007)	(0.007)	(0.003)	(0.004)	(0.010)	(0.015)	(0.010)	(0.015)
1-Year after elections									0.003	0.047
									(0.026)	(0.031)
2-Year after elections									0.002	0.027
									(0.023)	(0.028)
3-Year after elections									0.035	0.072**
									(0.028)	(0.034)
4-Year after elections									-0.038	-0.018
									(0.026)	(0.033)
2nd term									-0.016	-0.042
									(0.030)	(0.042)
1-Year after elec. X 2nd term									0.022	0.031
									(0.043)	(0.052)
2-Year after elec. X 2nd term									-0.004	-0.017
									(0.038)	(0.048)
3-Year after elec. X 2nd term									-0.001	0.010
									(0.065)	(0.075)
4-Year after elect. X 2nd term									0.026	0.058
									(0.043)	(0.065)
Municipality controls	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO
Municipality FE	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES
Political controls	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Province FE	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	51,246	51,246	49,704	49,704	43,204	43,204	12,135	12,135	11,846	11,870
R-squared	0.465	0.043	0.350	0.180	0.333	0.424	0.082	0.006	0.083	0.008

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 3-10 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. Municipality-level political controls include: index of tertiary-level educated people; number of non profit organizations per capita; dummy for mayor's first mandate period; dummies for mayor's level of education.

Table A9 – Excluding extreme values

Column	(1)	(2)	(3)	(4)	(5)
Estimator	OLS	Within	1' stage: 2SLS	2' stage: 2SLS	2' stage: 2SLS
Dependent var.			log of		
	Arrears	Arrears	Current transfers	Arrears	Arrears
log of:					
Current transfers	-0.020***	-0.029***		-0.080**	-0.081**
	(0.007)	(0.010)		(0.040)	(0.038)
Investment expenditure	1.053***	1.069***	0.029***	1.055***	1.055***
	(0.002)	(0.003)	(0.002)	(0.003)	(0.003)
Interest expenditure	-0.015***	0.001	0.055***	-0.011**	-0.011**
	(0.004)	(0.008)	(0.005)	(0.005)	(0.005)
Av. Taxable income	0.001	0.020	-0.369***	-0.018	-0.018
	(0.020)	(0.050)	(0.029)	(0.023)	(0.023)
1979 transfers			0.182***		
			(0.010)		
Municipality controls	YES	NO	YES	YES	YES
Municipality FE	NO	YES	NO	NO	NO
Province FE	YES	NO	YES	YES	YES
Year FE	YES	YES	YES	YES	YES
Observations	47,446	47,446	47,446	47,446	47,446
R-squared	0.918	0.900	0.679	0.918	0.918

Notes:: Values belonging to the first and last percentiles of the distributions of the Arrears, Current 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 Current transfers is the instrumented variable. In column 5 the excluded instruments are the 1979 transfers interacted with year dummies; Current 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.

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