FISCALLY RESPONSIBLE MAFIA-CLANS

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Abstract

To work as an accountability mechanism, fiscal decentralization requires the democratic mechanism to function well. This is generally not the case where the quality of the institutional environment is weak, and local governments might be captured by local oligarchs. We explore this issue by studying how Italian municipalities reacted to an unexpected tax reform reducing tax autonomy at the local level. Focusing on three Southern provinces, where some municipal governments are captured by Camorra clans, our estimates suggest that captured municipalities are less responsive to incentives stemming from re-centralization. We also observe a different recomposition of spending between the two groups, which we interpret – according to our theoretical model – considering the different degrees with which clans can extract rents from public expenditure.

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1. Introduction

In line with the suggestions coming from a large literature, and for reasons contingent on current historical circumstances, fiscal decentralization has become in recent decades a seemingly non-controversial formula to improve resource allocation at the local level, a prescription inspiring many reforms affecting the architecture of political power in both developing and developed countries (e.g., World Bank, 2000). According to modern fiscal federalism literature, the main argument sustaining decentralization has to be find in the right incentives to control potential opportunistic behaviour of local politicians, when voters cannot observe their effort in managing public resources (e.g., Qian and Weingast, 1997; Oates, 2005; Weingast, 2009; Albornoz and Cabrales, 2013). The alignment of spending and funding responsibilities increases electoral accountability of local politicians, providing effective incentives to discipline their behaviour.

Despite both the rigorous theoretical foundations and the support received from recent empirical analyses – which emphasise the importance of the degree of fiscal decentralization in explaining an effective impact on accountability (e.g., Jin and Zou, 2002; Borge and Rattsø, 2008; Eyraud and Lusinyan, 2013; Boetti et al., 2012, Liberati and Sacchi, 2013, and Francese et al., 2014, for the Italian case) – the above argument is unsatisfactory in explaining the real outcomes of many decentralization initiatives, especially when these take place in developing countries (e.g., Bardhan, 2002), or in the poorer areas of developed nations. The crucial issue – advanced by a recent strand of literature (e.g., Bardhan and Mookherjee, 2006a,b) – is the quality of institutions at the local level, which has been implicitly assumed to be similar across local contexts, while we generally observe large differences. In broad terms, institutions are defined by the social norms allowing the working of democracy, and the connected mechanisms of political accountability: in the presence of "weak" institutions, corruption of local officials might become the norm, and the greater accountability deriving from fiscal decentralization might be actually offset by the capture of policy-makers by local interest groups. In this case, the potential advantages of having local governments more accountable towards citizens may be displaced by the former being more prone to the desiderata of local oligarchs.

Despite the capture of local governments is a crucial element in order to understand the actual effects of fiscal decentralization, there has been little work on the subject. Traditionally, scholars have focused their attention on whether decentralization might curb corruption, without however providing definitive answers, especially in terms of causality (e.g., Treisman, 2000; Fisman and Gatti, 2002; Cooter, 2003; Fan et al., 2009). Whether the incentives stemming from fiscal decentralization are always effective in influencing the behaviour of local governments, or they are indeed contingent on the quality of local institutions – which then determines *de facto* also the degree of corruption – is a question largely neglected so far in the literature.

In this paper we contribute at improving our understanding of this issue by looking at contexts characterized by the presence of a particular type of strong local oligarchs, which have been proved able to capture local officials and to interfere with the working of the democratic mechanisms using violence (e.g., Alesina et al., 2016; Daniele and Dipoppa, 2017). In particular, we consider the municipalities belonging to three provinces in Southern Italy – Naples, Caserta and Salerno – where the Camorra clans (the local mafia-type organizations) are remarkably active as vividly told in Saviano's world-known Gomorrah (Saviano, 2008). We study whether the incentives provided by fiscal decentralization are really effective also in the presence of such elites at the municipal level, by exploiting a quasi-natural experiment involving municipalities: the unforeseen exemption of the main residence from the local property tax (the so-called *Imposta Comunale sugli Immobili*) implemented by the Central government in 2008 as a way to sustain household consumption depressed by the severe economic crisis hitting also the Italian economy. According to modern fiscal federalism theories, by reducing the degree of fiscal decentralization,

such a policy should have implied lower incentives to control opportunistic behaviour. In order to test whether this conclusion holds true conditional on the quality of local institutions, we need to identify municipalities characterized by "weak" institutional environments. To do so, we take advantage of the Law 221/1991, which established that the municipal council can be dismissed whenever there are reasons to believe that Mafia-type organizations have captured local officials, as they are able to influence (or control) a relevant part of council members, with sensible effects either on the functioning of the council itself or on the decisions it takes. This allows us to separate municipal governments not captured by mafia-type organizations, which are potentially accountable toward the citizens (the "strong" institutional environments), from those captured by mafia-type organizations, which are expected to be unaffected by the policy change (the "weak" institutional environments).

Using a Difference-in-Differences (DiD) model, we provide evidence supporting the view that the quality of local institutions does matter in determining the outcome of fiscal decentralization, since the incentives stemming from decentralization are ineffective where institutions are weak. In particular, according to theory, we show that in strong institutional environments the reduction in tax autonomy causes a large increase in municipal spending with respect to municipalities run by Camorra clans. As the latter are less sensitive to the change in the incentives provided by tax autonomy, they appear to be more "fiscally responsible". However, we also show that the increase in spending is the result of a recomposition across spending categories. With respect to municipalities infiltrated by mafia-clans, municipalities characterized by "strong" institutions react by increasing social spending as well as a residual spending category, and contemporaneously reducing spending for waste management. Our interpretation – stemming from a simple theoretical model which we present in Section 2 – is that municipalities are involved in the provision of many different local services, some of which might be more prone than others to produce rents for local oligarchs. These results are robust to a less sharp definition of Mafia-controlled municipalities, based on the idea that Camorra infiltrations can affect also municipalities close to those whose council has been dismissed, as well as to alternative specifications of the empirical model in an event study framework.

The remainder of the paper is structured as follows. Section 2 is devoted to a simple theoretical model framing our research question. Institutional details on some key features of the Italian local governments as well as of the tax reform are illustrated in Section 3. The empirical model, the data and the results are presented in Section 4, while Section 5 concludes.

2. Theoretical framework

In this Section we provide a theoretical framework to guide our empirical analysis below. Hence, we consider a municipality made up by identical individuals with (consistent, convex and continuous) preferences represented by the quasi concave utility function $u(.): (c, q, g) \rightarrow \Re_+$, defined over private consumption c and two different types of (local) public services, q and g. Individuals' private consumption, c, depends on exogenous income y as well as on the (local) tax rate, t. We assume that, due to the lack of first best tax instruments, the local tax imposes a dead-weight loss on consumers that is increasing and convex in the tax rate. Therefore, for the representative individual $c = (1 - t - \frac{\pi t^2}{2})y$, where $\pi \geq 0$ is a parameter measuring the efficiency loss from taxation. The local government faces the following budget constraint:

$$T + ty = q + g$$

where T denotes transfers from the central government to finance local spending. Notice that T, q and g are all expressed in per-capita terms. Clearly, fiscal autonomy increases (decreases)

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when T decreases (increases) for a given level of spending.

To consider the quality of institutions, we assume local governments are of two possible kinds: those whose decisions are driven by a mafia-type organization (what we term mafia-type local governments); those whose decisions are not hetero-directed by organized crime (what we term *accountable* governments). Both types of government wish to maximize rents. But, as local politicians aim, for instance, at being re-elected, they need to keep consensus above a given level; hence, rents maximization is constrained by the need to provide a minimum level of welfare to the representative citizen. Mafia-type local governments have however the advantage of being able to enforce citizens' consensus by different means than by just providing services in exchange of taxes: they can indeed use intimidation and violence. The reservation utility that this type of government needs to grant to citizens is thus lower. This is captured here by a lower weight being imposed on the utility of a representative citizen in communities where the government is controlled by a mafia-type organization. Let $\lambda = (\lambda_m, \lambda_n)$ be the weights imposed on citizens' welfare by the mafia-type and the accountable government respectively, with $1 \geq \lambda_n > \lambda_m > 0$. (Notice that the subscript m (*resp.* n) indicates the policy choices of the Mafia-type (*resp.* accountable) government).

Rents are collected as a percentage of the local public spending, but, in line with the evidence provided in many official reports[1], we make the assumption that different types of expenditure allow for a different collection of rents. For simplicity, we assume that rents can be collected at a fixed rate $1 > s > 0$ from public expenditure on good g (say, waste management), while no rents can be collected from public expenditure on service q (say, kindergartens)[2].

The objective function of a typical local government can therefore be written as

$$max_{g,q,t} \ (1 - \lambda)sg + \lambda u(c, q, (1 - s)g) \tag{1}$$

where the first part captures the rents accruing from providing g, while the second accounts for the welfare to be granted to citizens.

2.1. Optimal choices

By substituting for the consumer and government's budget constraints into the objective function of the government, Eq. (1) can be rewritten as:

$$max_{g,t} \quad L = (1 - \lambda)sg + \lambda u((1 - t - \frac{\pi t^2}{2})y; T + ty - g; (1 - s)g) \tag{2}$$

The first order conditions (FOC) with respect to t and g for interior solutions give:

$$L_g = (1 - \lambda)s - \lambda u_q + \lambda u_g(1 - s) = 0 \tag{3}$$

$$L_t = -\lambda u_c(1 + \pi t)y + \lambda u_q y = 0 \tag{4}$$

Provided that the marginal utility of a good is only slightly affected by a marginal increase in the consumption of any other good (i.e., cross derivatives are not too large), the second order conditions (SOC) for a local maximum are also satisfied (see Appendix A). Manipulating, the FOC conditions can be rewritten as

$$u_q = u_c(1 + \pi t); \tag{5}$$

$$(1 - \lambda)s/\lambda = u_c(1 + \pi t) - u_g(1 - s). \tag{6}$$

As criminal organizations use violence, hence $\lambda_n > \lambda_m$, notice that a lower value of λ implies a higher value of the difference between $u_c(1 + \pi t)$ (equal to u_q at the optimum) and $u_g(1 - s)$. By quasi-concavity and continuous differentiability of $u(.)$ this immediately implies:

Proposition 1 *With respect to an accountable government, a mafia-type local government will fix an higher tax rate. It will also deliver a greater (lower) amount of the good on which rent extraction is feasible (unfeasible).*

Proof. See Appendix A. ∎

Intuitively, a mafia-controlled government, less constrained in its choices by the need to gain citizens' support, will choose a higher level of the tax rate. More important, it will also choose to increase the provision of the good that allows it to collect rents, reducing instead expenditure on the other type of good.

Comparative statics exercises (reported in Appendix A) also show that g, q, and t are all increasing function of y. Hence, if mafia-controlled governments prevail in lower income communities, we expect lower taxation in these communities and a greater proportion of total expenditure financing the provision of the goods and services from which it is easier to extract rents.

Less obvious is the effect of an increase in s, the rent extraction rate. To evaluate its impact it is advantageous to get rid of the ambiguity that cross effects – likely to be negligible – carry with them. That is why, in doing comparative static exercises, we resort to the hypothesis of a utility function separable in c, g, q.

Proposition 2 *Assume $u(.)$ to be separable. Then, if the following condition holds $\frac{1-\lambda}{\lambda} \geq u_g(1 - (1-s)\varepsilon_g)$, where $\varepsilon_g = -\frac{u_{gg}}{u_g} g$ is the elasticity of the marginal utility of good g with respect to its provision, then a marginal increase in s induces: i) an increase in the equilibrium level of the tax rate; ii) an increase in the provision of the good on which rent extraction is feasible; iii) a decrease in the provision of the good on which rent extraction is unfeasible. The opposite is true if the inequality is reversed.*

Proof. See Appendix A. ∎

To understand the previous proposition, notice that, as an increase in s allows more rent extraction, it might induce an higher tax rate as well as greater expenditure on g; on the other hand, however, an increase in s also reduces the (marginal) utility that the consumer obtains from the consumption of g. To evaluate the effect of an increase in s on taxation and the provision of services, it is therefore necessary to compare the importance given by the government to citizens' welfare, inversely related to $\frac{1-\lambda}{\lambda}$, with the utility gains individuals obtain from marginally increasing the provision of the good on which rent extraction is possible, $u_g(1 - (1-s)\varepsilon_g)$. A mafia-type government is more likely to react to an increase in the rate of exploitation s by increasing g and reducing q, as $\frac{1-\lambda}{\lambda}$ is larger and u_g is smaller for this type of government (as it is ε_g). Hence, an increase in s might reduce distortions in expenditure where the government is accountable, while it might increase for mafia-types.

Finally, notice also that, from the previous proposition, a larger value of π, that is, greater efficiency loss associated to taxation, implies a lower tax rate and lower level of expenditure in both goods.

2.2.   A reform reducing tax autonomy

The empirical analysis in the next section focuses on a reform reducing municipal fiscal autonomy, substituting (at supposedly unchanged total revenues) a local tax with transfers from the Central government. Municipalities can in principle react to this change by modifying the composition of public expenditure and the amount of revenues accruing from other local taxes. However, as it will become clear below, because of the abolition of local tax, local governments lost their main source of fiscal autonomy, and the room for discretion was indeed very limited.

To gain some insights on the likely effect of the reform, we will first consider two polar cases, and then match them together. In the first case, we model the reform as just an *exogenous increase* in transfers: governments are free in setting the local tax rate and public expenditure. In the second case, we assume transfers to substitute (a share of) an autonomous source of revenue: governments are not allowed to make compensate changes in the residual (if any) tax revenues. Finally, we assume transfers to substitute (a share of) an autonomous source of revenue, but we also allow local government to make compensate changes in the residual tax base. Let us begin with the former case:

Proposition 3 *Assuming $u(.)$ to be separable, a marginal change in the amount of resources available from the central government, ΔT, induces, at the local level, a reduction in the equilibrium tax rate t, as well as an increase in the provision of any good publicly provided, irrespective of whether rent extraction is associated with public provision or not.*

Proof. See Appendix A. ∎

Thus, the extra revenues accruing from the Central government, would be *shared* between an higher rent and higher citizens' welfare, allowing for both a lower level of taxation at the local level t, and a higher level of expenditure in both goods. This effect is common to both types of government, although mafia-type governments might presumably increase the ratio between g and q.

To discuss the second case, let us rewrite the budget constraint as follows:

$$T + \theta ty + (1 - \theta)ty = q + g$$

where $1 \geq \theta > 0$. The assumption here is that the increased transfer ΔT would now cover exactly θty (where t is the tax optimally chosen by the government in the original equilibrium), letting the local government with only $(1 - \theta)ty$ of autonomous tax revenue.

Assuming first that t is fixed at the original level, the only relevant behavioural equation is (3). Deriving this equation and assuming that ΔT is not too large with respect to total revenues, the effect can be approximated as

$$\Delta g \cong -\frac{1}{u_{qq} + u_{gg}(1 - s)^2}(u_{qc} - u_{gc}(1 - s))y(1 + \pi t)\Delta T; \qquad \Delta g = -\Delta q;$$

where all derivatives are evaluated at the original equilibrium. Intuitively, if the increased transfer just substitutes existing tax revenues and the local government cannot adjust the residual tax rates, *total* revenues will remain unchanged after the reform, and the government's only possible choice margin is to change the composition of public expenditure. In turn, the government will do it, only if an increase in private consumption differently affects the marginal utility of any good publicly provided. Thus, for instance if $u_{qc} > 0$ (meaning that the marginal utility that the consumer obtains from consuming q when c increases also increases), while $u_{gc} < 0$ (meaning that the marginal utility from consuming g when c increases instead decreases), the government

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will react compensating consumers by increasing the provision of g; if $u_{qc} = u_{gc} = 0$, there will be no change in the composition of public expenditure. Notice that the effect on g increases with θ, as more taxes are substituted by transfers ($\Delta T = \theta t y$), and also increases with the welfare loss induced by taxation, π. Intuitively, a higher π imposes a higher costs on citizens for unit of tax revenues; therefore the effect of the reform will be more beneficial for the consumer, increasing private consumption even further.

Finally, let us put these two pieces of analysis together, assuming that when the Central government substitutes $\theta t y$ with extra transfers, the local government still retains the possibility of changing t on the residual tax base, $(1-\theta)y$. The following proposition summarizes the result:

Proposition 4 *Consider a marginal change in T, $\Delta T = \theta t y$, and suppose that the government adjusts public expenditure and the tax rate t on the residual tax base. If i) $u(.)$ is separable or ii) $(u_{qc} - u_{gc}(1-s)) < 0$, the local government reduces the tax rate and the provision of the good on which rent extraction is possible. Furthermore, with a separable utility function it is increased the provision of the good on which rent extraction is unfeasible.*

Proof. See Appendix A. ∎

Unsurprisingly, the results in this case is a mixture of the two polar cases. Cross derivatives effects tend to introduce a lot of ambiguities, but if we eliminate them by assuming separability in the utility function (or if we assume the cross effects to be small, as is likely to be the case) the picture is clear. As in the case of an exogenous increase in transfers, municipalities will react to the reform by reducing the tax rate on the residual tax base, because of the beneficial effects of the reduction of tax distortions on consumer's utility (an income effect). With separability, or if there is larger complementarity between good q and private consumption (as in the second polar case), government will also reduce expenditure on g and increases instead expenditure on q. If instead there is a large complementarity between good g and private consumption, the effect will in general be ambiguous, as the wish of government to increase expenditure on g might lead the former effects on t and q to be reversed in sign. Even assuming separability, with generic utility functions, it is impossible to sign unambiguously the difference of behaviour between the two types of government, although it is plausible that – ceteris paribus – the mafia-controlled governments would again spend a larger part of the increased net revenue on g, as rents matter more for this government.

Summing up, our simple model produces the following predictions. First, as mafia-type municipalities can afford to care less for the welfare of citizens, we should expect these governments to tax citizens more, employing the additional resources to increase the provision of the goods producing rents. In all cases, taking into account potential differences in the tax base across municipalities, the share of expenditure on these types of goods for mafia-type local governments should be higher than for accountable governments. Second, in its decision about public goods provision a mafia-type municipality should also be more sensible to increases in the rent extraction rate, being more likely as a result to increase expenditure on the rent producing public good. However, the effect of a reform affecting the degree of tax autonomy – on which we concentrate our empirical analysis below – is generally ambiguous; an ambiguity that also depends on the (real) margins of autonomy enjoyed by municipalities. In general, we expect a downward pressure on local revenues and an increase in public expenditure, particularly for the good less prone to rent seeking. A mafia-type local government might counteract these forces, however, keeping unchanged or even increasing expenditure on goods producing rents, as rents matter more for this type of government.

3. Institutional background

3.1. Mafia controlled municipalities

Municipalities are the level of government closest to citizens in the Italian architecture of governments. Any municipality is governed by a mayor, directly voted by citizens and supported by an elected council holding office for five years. Elections can take place before the natural end of the mandate either when the majority of the council members distrust the mayor, or when the President of the Italian Republic, following the suggestion of the Ministry of Domestic Affairs, dismiss the municipal council by decree. The dismissal of the council can happen only in very specific circumstances (Law n. 142/1990): the council must be either responsible of acts contrary to the Italian laws, or must be unable to approve the budget and to fulfil its duties. One reason for this to happen has been specified by the Law 221/1991 (modified with the Legislative Decree 267/2000): the municipal council can be dismissed when there are reasons to believe that *mafia-type organizations are able to influence (or control) a relevant part of council members with sensible effects either on the functioning of the council itself or on the nature of the decisions it takes.* Until 2016, the official statistics provided by the Italian Ministry of Domestic Affairs report 204 cases of dismissed municipal councils, with the highest number in the Region Campania (70, mostly in the Provinces of Naples and Caserta), followed by the Region Calabria (61, mostly in the Province of Reggio Calabria), and the Region Sicilia (53, mostly in the Province of Palermo). These three regions are all in the South of Italy, where GDP per capita is historically below national average income, also for the presence of strong criminal organizations (e.g., Pinotti, 2015).

When the municipal council is dismissed for the influence of Mafia-type organizations, a commission composed by three external members is appointed to rule the municipality for up to 18 months, until new elections are held. The aim pursued by the legislator is to "clean out" the environment before fair elections can take place. This would require getting rid of the circumstances which made it possible for Mafia-type organizations to influence the activity of the city council. However, as it has been emphasized in many official reports (e.g., Parliament Anti-Mafia Commission, 2005), the available evidence shows that the dismissal of the municipal council never represents, by itself, a way to really stop the influence of Mafia-type organizations. The reason must be found in the fact that these kind of organizations profoundly influences the institutional environment. They acquire extensive power in a local context because, within a community, shared values and informal social norms allow a broad social support to (closed) elites, whose primary objective is that of conditioning the allocation of resources – hence also the activity of the policy-maker – through the use (or the menace) of violence, which is what really distinguishes a Mafia-type organization from any other ruling elite[3]. As such norms and values persist in the long run, the decision to dismiss the council in order to stop the influence of Mafia-type elites on the policy-makers cannot be decisive. In fact, it is not infrequent that the council of a given municipality is dismissed more than once[4].

Since the control of Mafia-type organizations can be viewed as a *structural* characteristic of a given municipality, the dismissal of the city council at least once, up to 2016, is considered in the empirical exercise below as a first rough indicator of a "weak" institutional environment. In

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[3] According to the pluralist view of the ruling elite model (e.g., Dahl, 1958), in order to establish the existence of a ruling elite, it is sufficient that the following conditions are satisfied: the hypothetical ruling elite constitutes a well-defined group; there is a sample of cases involving key political decisions in which the preferences of the ruling elite run counter to those of any other likely group that might be suggested; the preferences of the elite regularly prevail.

[4] In this sense, our work differs from Di Cataldo and Mastrorocco (2016), who implicitly support the idea that the collusion between elected officials and the mafia comes to an end when the council is dismissed.

these municipalities we expect that prevailing social norms allowing broad support to Mafia clans will not generate social outcomes driven by both generalized voluntary exchanges and (legal) codified procedures for policy making (on this see also Gambetta, 1996). The implications of such institutional weaknesses, and the capture of local governments, will distort the fiscal exchange between local politicians and voters, so undermining the potential increase of electoral accountability that could be obtained via tax decentralization.

3.2. The tax reform

As in other countries, Italian municipalities are in charge of a wide array of local services, such as administrative services (including, for instance, the registry office), waste management, and some social services (like childcare and elderly care). According to aggregate national data, until 2008 about two thirds of municipal expenditures were funded with autonomous revenues. These own revenues accrued for the most part from a local property tax, the so-called *Imposta Comunale sugli Immobili* (ICI from now on). This tax was applied to both household and business properties, according to a set of general rules defined at the national level. However, municipalities were allowed to freely modify some parameters of the tax, such as the rates within a given range, as well as the tax credits for the main residence. Before being partially suppressed in 2008, ICI brought about almost one fourth of total municipal revenues.[5]

The 2008 tax reform (Law Decree n. 93/2008, converted in the Law n. 126/2008) was an urgent measure proposed by the Central government to sustain households' consumption in the wake of the financial crisis. The government suppressed for the ongoing year 2008, the payment of ICI on the property used as the main residence by households. The foregone revenues (estimated in about 1.7 billion euro by the government, and in 3 billion euro by ANCI-IFEL, the Association of Italian Municipalities) had to be reimbursed to municipalities via an increase in transfers. In particular, the transfers have been computed for each municipality to compensate exactly the lost revenues from the main residence, minus some minor adjustments to account for the efficiency in cashing the tax, the respect of the Internal Stability Pact (a set of fiscal rules aimed at controlling deficits in larger municipalities), and the financial difficulties of very small municipalities.

The unambiguous effect of the reform is a reduction in local tax autonomy; and – according to the theoretical model above – we would expect an increase in public expenditure, particularly for goods less prone to rent seeking for municipalities accountable towards citizens, but not for Mafia-type local governments, which – being more interested to rents – might even increase spending on goods producing rents. The empirical test below aims at uncovering these different behaviours.

4. The empirical analysis

4.1. Data and descriptive evidence

We collected data on expenditures, revenues, institutional quality and various socio-demographic and political characteristics for a panel of 348 municipalities belonging to the provinces of Naples, Caserta and Salerno, over the time period 2003-2011.[6] We focus our analysis on these three

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[5]Other two important local taxes are represented by a surcharge on the Personal Income Tax (Addizionale Comunale IRPEF) and by a specific tax for waste collection and management (TARSU). As for the first, municipalities can only slightly modify the tax rate. As for the second, it is computed relying on a vague proxy of waste production. Further institutional details on Italian municipalities can be found in, e.g., Boetti et al. (2012).

[6]Since 2012, ICI have been suppressed and substituted with a different tax, partially shared between the State and the municipalities.

provinces in Campania because – according to official statistics – these are those with the highest number of municipalities controlled by Mafia-type organizations, and these organizations are all Camorra clans (which are different in their organization and their behavior by other Italian mafias, 'Ndrangheta and Cosa Nostra; e.g., Catino, 2014; Scaglione, 2016). Our primary data sources are the budgets of Italian municipalities published by the Ministry of Domestic Affairs (the so-called *Certificati di Conto Consuntivo*) and the statistics on the dismissed municipal councils because of Mafia influences published by the Anti-Mafia Commission of the Italian Parliament. Other complementary pieces of information about different characteristics of the municipalities have been obtained by both the regional datasets elaborated by the Italian National Institute for Statistics (ISTAT) and the Historical Archive of Elections published by the Ministry of Domestic Affairs.

Considering a rough classification of institutional environments based on municipal council dismissal, our sample includes 282 municipalities with a "strong" institutional environment, free from the control of Mafia (for a total of 2,335 observations) and 66 municipalities characterized by "weak" institutions, under the control of Mafia-type organizations (for a total of 555 observations).[7] According to the theoretical model above, we define the dummy variable NM to identify the first type of municipalities, those *not captured* by a Mafia-type organization. To identify the impact of the tax reform, we also define the dummy $TAXREF$, which takes value one for the last four years in the sample (2008-2011), when the main residence was exempted from the local property tax base, implying a lower degree of tax decentralization and lower incentives to control opportunistic behaviour. Table 1 shows the average share of own revenues from ICI on total current revenues and the average ICI value per capita, distinguishing between the two periods before (2003-2007) and after (2008-2011) the tax reform, and the two types of municipalities according to the quality of local institutions. We observe a clear reduction of fiscal autonomy of local governments following the reform, as reflected by the decrease of 3-4 percentage points in the ICI share and about 10-12 euro in the ICI per capita revenues, for both groups of municipalities. Given this observed symmetry in the dynamics of local tax revenues, we are interested in checking whether the reaction of the municipalities in terms of spending following the reform differs across the two types of municipalities. Preliminary insights on this issue are provided by Figure 1 and Table 2.

Table 1: Own revenues from local property tax (ICI) by tax decentralization and institutional quality: average share (%) on total current revenues and average value per capita (€)

| | $TAXREF$ | | | |
| | 0 | | 1 | |
NM	Share (%)	Per capita (€)	Share (%)	Per capita (€)
0	0.18	106	0.15	94
1	0.16	108	0.12	98
All groups	0.17	108	0.13	97

Note: $NM = 0$ indicates municipalities *captured* by the Mafia, while $NM = 1$ those *not captured* by the Mafia. $TAXREF = 0$ refers to the years from 2003 to 2007, when the property tax applied also on the main residence; $TAXREF = 1$ refers to the years from 2008 to 2011, when tax decentralization has been reduced.

Figure 1 shows the average yearly municipal current expenditure per capita ($TOTAL\_EXP$) for the two groups of municipalities in the two periods: a parallel trend across groups emerges

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[7]The panel is clearly unbalanced. We discuss this issue in the robustness checks below.

Figure 1: Average municipal expenditure per capita ($TOTAL\_EXP$) by year and institutional quality
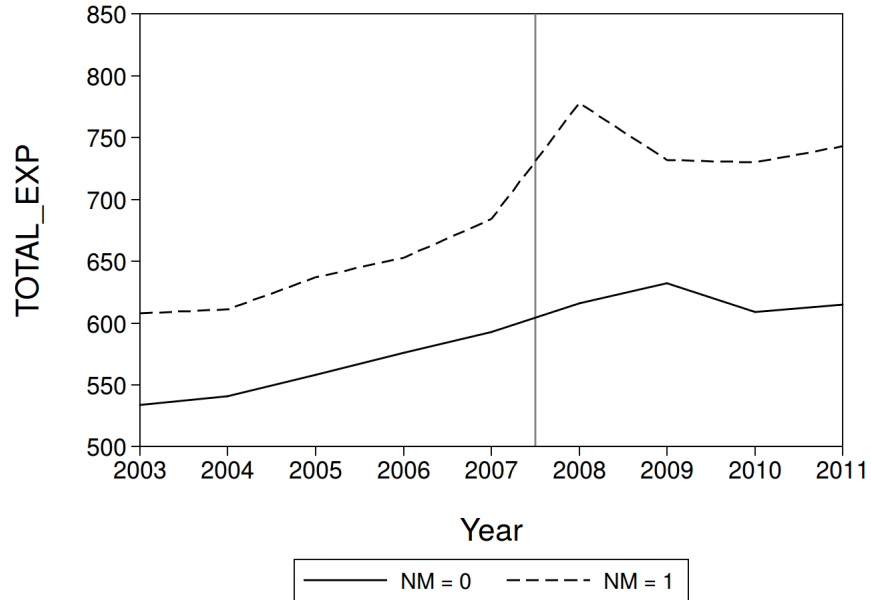
Table 2: Average municipal expenditure per capita ($TOTAL\_EXP$) by degree of tax decentralization and institutional quality

		$TAXREF$		
		0	1	Diff.
	0	560 (147)	617 (151)	57
NM	1	638 (193)	745 (294)	107
	Diff.	77	127	50

Note: Standard deviations in round brackets. $NM = 0$ indicates municipalities *captured* by the Mafia, while $NM = 1$ those *not captured* by the Mafia. $TAXREF = 0$ refers to the years from 2003 to 2007, when the property tax applied also on the main residence; $TAXREF = 1$ refers to the years from 2008 to 2011, when tax decentralization has been reduced.

until 2007, while a marked jump is observed only for treated municipalities in 2008, when the reform kicks in. This evidence of "fiscally responsible" Camorra clans is confirmed in Table 2: the tax reform reducing autonomy brings about an average expenditure increase of 57 euro in mafia captured municipalities, while $TOTAL\_EXP$ grows up to 107 euro for those not captured, with a difference of 50 euro across the two groups.

Before moving to a rigorous test of the statistical significance of this difference using regression analysis, it is worth noticing that the higher average expenditure levels reported in Figure 1 and Table 2 for municipalities characterized by a "strong" institutional environment might be reasonably justified by the provision of public services of higher quality, as suggested by some studies comparing municipalities with different levels of corruption (e.g., Dal Bó and Rossi, 2007; Estache et al., 2009). Unfortunately, information on either the quantity or the quality of the complete set of services supplied by municipalities is unavailable; thus we cannot directly check the relationship between the influence of Mafia clans and the general performance of municipalities in public service provision. However, at least for waste management, we can provide some evidence showing that expenditure is higher but services are of lower quality in mafia-controlled municipalities with respect to non-controlled ones. Waste management is an important example for two reasons: first, it represents, on average, a share of about 20% of municipal current spending in our sample; second, and most importantly, it is the typical context strongly plagued by widespread corruption and entrenched presence of organized crime (e.g., D'Amato et al., 2015). Available data for the 2007-2009 period confirm the worst performance in garbage collection for the group of municipalities *captured* by Mafia clans: from Table 3, the average tons of collected waste per capita when $NM = 1$ are about 6 times higher than those collected when $NM = 0$, with a variability in the ratio across provinces that ranges from about 5 times in the case of Caserta to almost 20 times in the case of Salerno. Similar differences are likely to characterize also the provision of other local services and help understand the higher expenditure registered for municipalities not captured by Camorra clans.

Table 3: Tons of collected waste per capita by Province and institutional quality (average values over the period 2007–2009)

| | *PROVINCE* | | | |
NM	Naples	Caserta	Salerno	All
0	0.69	0.89	0.19	0.72
1	4.14	4.97	3.82	4.25

Note: $NM = 0$ indicates municipalities *captured* by the Mafia, while $NM = 1$ those *not captured* by the Mafia.

4.2. Identification and estimation

The general specification of the model used to estimate the impact of the tax reform on our main outcome variable $TOTAL\_EXP$ is represented by the following equation:

$$TOTAL\_EXP_{it} = \beta TAXREF_t \times NM_i + \gamma \mathbf{X}_{it} + \delta_t + \theta_i + \varepsilon_{it} \qquad (7)$$

where the coefficient of interest is β, which picks up the differential impact of the tax reform on municipalities *not captured* by the Mafia clans with respect to those captured. As the tax reform is exogenously imposed by the Central government to all Italian municipalities, β is identifying the causal impact of a decrease in tax autonomy on municipal spending. $\mathbf{X}$ is a vector of control

variables that can vary both across municipalities and time, which includes: socio-demographic variables like the size and the age composition of the population[8], the municipal income per capita, the population density; political economy variables like the end of the mandate, whether the mayor is term limited or not, whether ruling parties belong to a civic list, mayor's gender, the political alignment of municipal government with higher government tiers. All these variables have been shown to play an important role in government budget choices around the world (e.g., Besley and Case, 2003; Chattopadhyay and Duflo, 2004; Arulampalam et al., 2009; Bordignon et al., 2016). We also include in vector $\mathbf{X}$ a control for whether an external commission imposed by the Central government after the dismissal of the municipal council is in charge. Finally, we include in the model a whole set of municipality i and year t fixed effects to account for unobserved residual heterogeneity across local governments (e.g., in terms of the voting system or the presence of fiscal rules), and the influence of other possible time-varying factors common both to treatment and control groups. In all the estimates, we cluster standard errors at the municipal level to consider possible heteroschedasticity and within-group correlation. The definition and the summary statistics for all the variables are reported in Table 4.

One main issue in identification is the definition of municipalities *not captured* by Camorra clans. We start our analysis with a very simple and conservative approach, by taking $NM = 1$ for all municipalities whose council has never been dismissed. These are municipalities with a strong institutional environment. However, one can think to several problems for this sharp classification. For instance, clans might be so strong to corrupt prosecutors and judges, so to avoid the dismissal of municipal council. Or they might have ties with politicians and judges at higher levels of government, again favouring the status quo. For all these reasons, in order to check the robustness of our findings, we also define a continuous indicator of institutional quality, NMD. The basic idea is that clans can more easily expand their criminal activity in places closer to the ones they have already infected. Hence, NMD is equal to zero when the council has been dismissed at least once ($NM = 0$), but takes values in the range $(0, 1]$ for municipalities *not captured* by Mafia clans, according to the average distance (in kilometers) of each municipality from those *captured* by clans. More precisely, NMD is equal to 1 only for the "best" municipality among those whose council has never been dismissed, i.e. the one with the largest average distance (143 km) from the municipalities *captured* by Mafia clans. The latter acts as a benchmark for the institutional quality, since the value of NMD for the other municipalities that *officially* have not yet been captured by Mafia clans is computed by dividing their average distance from the *captured* municipalities for the largest average distance.

Additionally, in order to check whether – as predicted by our theoretical model – the impact of the tax reform is different across spending categories, we run previous Eq. (7) on different sub-categories of municipal expenditure. As we do not have a simple way to classify expenditures according to the ability of clans to collect rents (g and q in our theoretical model above), we follow anecdotal evidence and define the following four categories: administrative expenditure ($ADMIN\_EXP$), waste management expenditure ($WASTE\_EXP$), social expenditure ($SOCIAL\_EXP$), and a residual category ($RESIDUAL\_EXP$) picking up a range of other services (such as local police, road maintenance and traffic regulation, parks and recreation areas, support to productive activities), each of which individually accounts for a very small fraction of the total spending. According to available evidence (e.g., D'Amato et al., 2015), we expect Mafia clans to collect more easily rents from waste management spending than from other categories.

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[8]Notice, in particular, that population size is included in the model also with a quadratic term, in order to control for a U-shaped expenditure function. An analysis of returns to scale in the production of municipal services in Italy is in, e.g., Boetti et al. (2012).

Table 4: Summary statistics of the variables used in the spending equation (7)

Variable description	Name	Mean	Std. Dev.	Min	Max
Outcome variable					
Total municipal current expenditure (€per capita)	$TOTAL\_EXP$	666	237	263	5,679
– Administrative expenditure	$ADMIN\_EXP$	270	111	79	1,481
– Waste expenditure	$WASTE\_EXP$	123	61	0	595
– Social expenditure	$SOCIAL\_EXP$	68	37	7	365
– Residual expenditure	$RESIDUAL\_EXP$	205	141	0	5,107
Treatment variables					
Local property tax (ICI) does not apply on the main residence (years 2008–2011)	$TAXREF$	0.44	0.50	0	1
The municipality belongs to the group of local government *not captured* by the Mafia	NM	0.81	0.39	0	1
ICI does not apply on the main residence and the municipality belongs to the group *not captured* by the Mafia	$TAXREF \times NM$	0.36	0.48	0	1
Indicator of institutional quality for municipalities *not captured* by the Mafia, based on the average kilometric distance of each municipality from the *captured* ones	NMD	0.36	0.29	0	1
ICI does not apply on the main residence and the municipality belongs to the group *not captured* by the Mafia, taking also into account the average kilometric distance from the *captured* ones	$TAXREF \times NMD$	0.16	0.26	0	1
Control variables					
Population size	POP	11,322	15,678	277	117,963
Number of old people (age > 75)	OLD	677	840	44	7,881
Number of young people (age < 15)	BOY	2,160	3,205	17	26,575
Municipal income per capita	$INCOME$	16,909	2,927	7,668	25,906
Inhabitants per squared km of municipal area	$DENS$	1,150	1,932	7	12,941
Deadline of the mandate (years before new elections)	$YGOV$	2.14	1.43	0	4
Mayor at the second mandate (term limit)	$GOV2$	0.06	0.24	0	1
Governing coalition parties belonging to a civic list	$CIVIC$	0.73	0.45	0	1
Government controlled by an external commission	$COMM$	0.02	0.14	0	1
Alignment with provincial government	$ALIG\_PROV$	0.16	0.37	0	1
Alignment with regional government	$ALIG\_REG$	0.14	0.35	0	1
Alignment with national government	$ALIG\_ITA$	0.13	0.34	0	1
Mayor is a female	$MAYORSEX$	0.03	0.17	0	1

Note: The values refer to an unbalanced panel of 348 municipalities observed from 2003 to 2011, for a total of 2,890 observations.

4.3. Results

4.3.1. Baseline estimates

Estimates of Eq. (7) are in Table 5. Considering total spending, coefficient on the interaction term $TAXREF \times NM$ is positive and statistically significant. The magnitude of the effect is roughly a 5.6% increase in the average spending (computed on the whole sample) when the tax reform kicks in for municipalities *not captured* by Mafia clans with respect to those where clans rule. When considering sub-definitions of spending, it becomes clear that the impact is due to the residual spending, which increases of about 35 euro more in NM municipalities, implying a 17% average increase for this category. Also social spending shows a similar pattern, even if the coefficient estimate suggests only a 6.7% increase. On the contrary, expenditure for waste management is characterized by a negative (although not statistically significant) coefficient: after the reform, municipalities with a strong institutional environment reduced this spending by 4.50 euro with respect to those captured, roughly a 4% differential decrease as a consequence of the reform. This evidence is consistent with the predictions of our theoretical model: municipalities free from clans' influence increase public spending for local public goods less prone to rent seeking, while mafia-controlled governments – caring less about the welfare of their citizens – spend more resources on local public goods which are more able to produce rents.

As for controls, most are insignificant after controlling for time and municipality fixed effects. Coefficients for population (POP and $POP2$) suggests the presence of a non-linear relationship, with the notable exception of waste management spending. The share of young out of the total population (BOY) shows mostly a positive relationship with municipal expenditure, while the share of old people (OLD) is positively and significantly correlated only with spending for waste management. Coefficient for income ($INCOME$) is negative and significant only for administrative spending, likely picking up the efficiency in the production of municipal services. Looking at political economy variables we observe a scattered pattern of significant coefficients: social expenditure grows as next elections approach ($YGOV$); when the municipal council is governed by a civic (non-party) list ($CIVIC$) we observe an increase in waste expenditure and a decrease in residual spending; a similar pattern arises for the presence of an external commission imposed by the Central government after the dismissal of the municipal council ($COMM$); as for the alignment of the municipal council with higher levels of governments, a negative coefficient is estimated for the alignment with national government ($ALIG\_ITA$) in the case of total expenditure and the two sub-categories of social spending and residual spending, while a positive relationship arises between the alignment with provincial government and residual expenditure; finally, mayor's gender ($MAYORSEX$) seems to be important only in the case of administrative expenditure, which reduces when the mayor is a female.

4.3.2. Robustness checks

We test the robustness of our main results in different directions. First, we simply substitute the sharp definition of Mafia-controlled municipalities with one that takes into account the possibility for Camorra clans to extend their power in close territories, although for the latter the infiltrations of clans have not yet been "officially" detected. In particular, using the continuous indicator of institutional quality NMD, based on the average distance between each municipality and the captured ones, the coefficient for the interaction $TAXREF \times NMD$ is even more significant and stronger in magnitude for all spending categories (Table 6): we observe now an increase in $TOTAL\_EXP$ which ranges from about 2% for the municipalities with the smallest distance from the captured ones (19 km) to almost 18% for the municipality with the largest distance; a similar variability in spending growth is found for $ADMIN\_EXP$ (1-9%), $SOCIAL\_EXP$

Table 5: Impact of tax reform on municipal current expenditure per capita

VARIABLES	TOTAL	ADMIN	WASTE	SOCIAL	RESIDUAL
TAXREF × NM	37.453***	2.618	-4.498	4.580**	35.426***
	(11.827)	(5.556)	(3.955)	(1.909)	(9.225)
POP	-42.742***	-15.524***	0.848	-7.239***	-21.043***
	(8.200)	(4.212)	(4.487)	(1.837)	(5.832)
POP2	0.225***	0.058***	0.003	0.043***	0.122***
	(0.044)	(0.021)	(0.021)	(0.009)	(0.030)
OLD	-0.009	-0.008	0.008***	-0.003	-0.007
	(0.009)	(0.006)	(0.003)	(0.002)	(0.004)
BOY	0.018***	0.012**	0.003	0.002*	0.001
	(0.007)	(0.005)	(0.003)	(0.001)	(0.003)
INCOME	-0.004	-0.007***	-0.000	0.000	0.001
	(0.005)	(0.002)	(0.002)	(0.001)	(0.003)
DENS	0.002	0.003	-0.038*	0.015	0.022
	(0.035)	(0.019)	(0.021)	(0.010)	(0.020)
YGOV	-2.112	-0.664	0.207	-0.565***	-0.886
	(1.776)	(0.609)	(0.377)	(0.212)	(1.627)
GOV2	-7.623	-1.240	-0.820	1.248	-7.145
	(11.420)	(5.326)	(3.777)	(3.807)	(6.249)
CIVIC	-12.633	-3.938	9.217*	0.705	-18.838**
	(11.408)	(5.307)	(5.032)	(2.568)	(7.673)
COMM	-12.523	-8.235	11.529**	-1.486	-15.062**
	(11.267)	(6.301)	(4.481)	(2.078)	(7.256)
ALIG_PROV	7.775	-3.584	-3.703	3.383	11.969**
	(8.066)	(4.071)	(4.351)	(3.060)	(5.849)
ALIG_REG	2.698	1.338	2.327	0.656	-1.705
	(8.035)	(4.427)	(4.835)	(2.823)	(6.087)
ALIG_ITA	-12.620**	-0.959	0.363	-2.566**	-9.594*
	(6.195)	(2.429)	(1.890)	(1.215)	(4.887)
MAYORSEX	-9.205	-15.845*	-1.442	0.519	7.213
	(15.443)	(9.207)	(4.080)	(3.377)	(12.791)
F	25.460	6.807	29.340	6.325	8.332
Prob. > F	0.000	0.000	0.000	0.000	0.000
Nr. observ.	2,890	2,890	2,890	2,890	2,890
Nr. municip.	348	348	348	348	348

*** p<0.01, ** p<0.05, * p<0.1
Note: All estimates include municipality fixed effects and year fixed effects.
Robust standard errors are reported in round brackets.

(2-18%) and $RESIDUAL\_EXP$ (6-46%, again the category with the highest increase), while – as expected – $WASTE\_EXP$ shows an opposite reaction, with a reduction from 1% for the smallest distance to 9% for the largest distance.

Table 6: Sensitivity analysis: continuous indicator of institutional quality

VARIABLES	TOTAL	ADMIN	WASTE	SOCIAL	RESIDUAL
TAXREF × NMD	117.479***	23.016**	-11.214*	12.018***	95.289***
	(27.650)	(9.649)	(6.717)	(3.818)	(25.010)
F	29.000	7.192	29.130	6.500	7.936
Prob. > F	0.000	0.000	0.000	0.000	0.000
Nr. observ.	2,890	2,890	2,890	2,890	2,890
Nr. municip.	348	348	348	348	348

*** p<0.01, ** p<0.05, * p<0.1
Note: All estimates include municipality fixed effects, year fixed effects and the vector X of control variables. Robust standard errors clustered at the municipality level are reported in round brackets. NMD is a continuous indicator of institutional quality that is equal to 0 for municipalities *captured* by the Mafia and assumes a value in the range (0, 1] for municipalities *not captured*, according to the average kilometric distance of each municipality from the *captured* ones.

Second, we redefine our empirical model in an *event-study* framework (Table 7), by interacting our original dummy for the municipalities free from the influence of Camorra clans NM with a full set of year dummies (using 2003 as the reference year). This allows us to both check formally for the common trend assumption, including anticipatory effects ($Year04 \times NM$, $Year05 \times NM$, $Year06 \times NM$ and $Year07 \times NM$), and to better characterize the impact of the tax reform after its introduction, including post-treatments effects ($Year09 \times NM$, $Year10 \times NM$ and $Year11 \times NM$). As for the common trend, results are reassuring: coefficients for the years 2004-2007 are mostly insignificant for all spending categories (exceptions are only waste spending in 2006 and 2007 and residual spending in 2005), hence we do not detect any different trend prior to the reform between the two groups of municipalities. As for the impact of the reform, it seems that its differential effect is mainly concentrated in the year 2008 when the tax reform kicks in (e.g., +12% for $TOTAL\_EXP$), and then it reduces remarkably in the following years (e.g., only +5% in 2011 for $TOTAL\_EXP$). This evidence confirms what has been already highlighted by comparing the spending trends of the two groups of municipalities before and after the tax reform in Figure 1. Finally, we check also the stability of our results with respect to the use of a balanced panel data set, limiting the analysis only to municipalities for which relevant information are available for all the years analyzed. One reason to do so is the suspect that – for some municipalities – data are missing because of accounting irregularities, which might be connected with the influence of Mafia-controlling organizations. In this case, there would be a problem of sample selection bias, and fixed effects estimates would be inconsistent (Cameron and Trivedi, 2010). After removing from the sample municipalities with budget information missing for at least one year, we remain with 203 municipalities, for a total of 1,827 observations. More precisely, 42 are municipalities under the control of Mafia-clans while 161 are *not captured* municipalities (a reduction of equal proportions for the two groups of municipalities, about 40%, compared to the original sample size). The complete set of estimates (including descriptive evidence and the full set of regression models) are shown in Tables 1B-6B and Figure 1B in Appendix B and substantially confirms the findings obtained with the unbalanced data set.

Hence, the potential sample selection bias does not appear to be a relevant issues in our study.

Table 7: Sensitivity analysis: event study framework

VARIABLES	TOTAL	ADMIN	WASTE	SOCIAL	RESIDUAL
Year04 × NM	-2.223	0.121	-6.073	-0.336	4.563
	(10.697)	(6.061)	(4.270)	(1.892)	(6.112)
Year05 × NM	0.724	-6.742	-6.173	0.115	14.690*
	(13.003)	(7.627)	(4.133)	(2.374)	(8.414)
Year06 × NM	-3.845	-3.328	-12.151**	3.454	9.203
	(14.316)	(6.794)	(5.627)	(2.880)	(10.573)
Year07 × NM	12.250	2.478	-10.527*	4.176	16.379
	(15.007)	(7.022)	(5.580)	(2.806)	(10.602)
Year08 × NM	82.420***	10.336	-26.507***	9.786***	92.176***
	(29.536)	(7.419)	(6.281)	(3.654)	(27.235)
Year09 × NM	7.650	-9.244	-12.572*	4.218	25.720**
	(18.905)	(12.225)	(6.684)	(3.320)	(11.512)
Year10 × NM	27.463*	-0.581	-2.569	3.509	27.627**
	(15.901)	(7.158)	(6.879)	(3.300)	(11.975)
Year11 × NM	33.080**	3.145	-3.654	6.666*	27.371**
	(16.268)	(7.922)	(6.797)	(3.577)	(11.913)
F	20.230	6.129	25.020	5.849	6.862
Prob. > F	0.000	0.000	0.000	0.000	0.000
Nr. observ.	2,890	2,890	2,890	2,890	2,890
Nr. municip.	348	348	348	348	348

*** p<0.01, ** p<0.05, * p<0.1
Note: All estimates include municipality fixed effects, year fixed effects and the vector X of control variables. Robust standard errors clustered at the municipality level are reported in round brackets. Year04 × NM, Year05 × NM, Year06 × NM, and Year07 × NM are anticipatory effects (*leads*), while Year09 × NM, Year10 × NM and Year11 × NM are post–treatment effects (*lags*); Year08 × NM refers to the effect of tax reform in the year of its adoption (2008).

5. Concluding remarks

To work as an accountability mechanism, fiscal decentralization requires the democratic mechanism to function well. This might not be the case where the quality of the institutional environment is weak, and local governments are captured by local oligarchs. In this paper, we explore this issue by studying the reaction of municipalities to an unexpected tax reform reducing tax autonomy at the local level, which was implemented by the Central government with the aim of sustaining private consumption in the wake of the 2008 economic crisis. We focus our analysis on municipalities belonging to three provinces in Southern Italy, which share a common type of mafia organization – the Camorra clans, vividly discussed in Saviano's Gomorrah – and identify the presence of a weak institutional environment exploiting a law that allow the Central government to dismiss the municipal councils when there are reasons to believe that they are captured by clans.

Our estimates suggest that only municipalities not controlled by Camorra clans increased spending as a reaction to the reduction in tax autonomy. In particular, this holds true for social spending as well as a residual category of spending picking up a variety of local services. On the contrary, we find evidence of a reduction in spending for waste management, a peculiar category of municipal expenditure which might be more prone than others to the ability of clans to extract rents.

Overall, our findings have strong implications for the ongoing discussion on the benefits which can be gained from decentralization. In particular, while the literature has shown that the degree of tax autonomy is crucial for the incentives coming from decentralization to work properly, our work provides support also to the quality of local institutions: to be effective, decentralization also requires a strong institutional environment, which allows the democratic mechanism to work well. In contexts where local institutions are potentially subject to the capture by powerful interest groups, and the institutional environment is weak, some caution is then needed before deciding to devolve more fiscal power to lower tiers of government.

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Appendix A

Second order conditions

Differentiating the FOC further, we get the following derivatives:

$L_{gg} = \lambda(u_{qq} + u_{gg}(1-s)^2 - 2u_{qg}(1-s))$;

$L_{tt} = \lambda y^2(u_{cc}(1+\pi t)^2 - 2u_{cq}(1+\pi t) + u_{qq} - u_c\frac{\pi}{y})$;

$L_{tg} = \lambda y(-u_{qq} + u_{qc}(1+\pi t) - u_{gc}(1-s)(1+\pi t) + u_{qg}(1-s))$;

Inspection shows that by quasi-concavity of $u(.)$, $L_{gg} < 0$ and $L_{tt} < 0$. Assuming $L_{tg} > 0$ and $L_{gg}L_{tt} > (L_{tg})^2$, the Hessian of the second derivatives is negative definite, implying that the FOC identifies a (local) maximum. Notice that by assuming separability of the utility function, $u_{cg} = u_{qg} = u_{qc} = 0$. Substituting in the equations above,

$L_{gg} = \lambda(u_{qq} + u_{gg}(1-s)^2) < 0$

$L_{tt} = \lambda y^2(u_{cc}(1+\pi t)^2 + u_{qq} - u_c\frac{\pi}{y}) < 0$

$L_{tg} = \lambda y(-u_{qq}) > 0$,

The SOC are then satisfied.

Comparative statics.

Fully differentiating the FOC above and assuming that one parameter r changes each time, where $r = s, y, T, \pi$, we can get the effects of a change in the parameter on the two choices variables:

$$\begin{bmatrix} L_{gg} & L_{gt} \\ L_{tg} & L_{tt} \end{bmatrix} \begin{bmatrix} dg \\ dt \end{bmatrix} = -dr \begin{bmatrix} L_{gr} \\ L_{tr} \end{bmatrix}$$

Implying:

$$\begin{bmatrix} \frac{dg}{dr} \\ \frac{dt}{dr} \end{bmatrix} = - \begin{bmatrix} L_{gg} & L_{gt} \\ L_{tg} & L_{tt} \end{bmatrix}^{-1} \begin{bmatrix} L_{gr} \\ L_{tr} \end{bmatrix}$$

Remembering that $A^{-1} = \frac{1}{det(A)} * Adj(A)$, where $Adj(A)$ is the adjiugate of A, we can write

$$\begin{bmatrix} \frac{dg}{dr} \\ \frac{dt}{dr} \end{bmatrix} = -\frac{1}{\Delta} \begin{bmatrix} L_{tt} & -L_{gt} \\ -L_{tg} & L_{gg} \end{bmatrix} \begin{bmatrix} L_{gr} \\ L_{tr} \end{bmatrix}$$

where $\Delta = L_{gg}L_{tt} - (L_{tg})^2 > 0$. Finally, fully differentiating the budget constraint, we get the effect of a small change in r on q: $\frac{dq}{dr} = dT + \frac{dt}{dr}y + tdy - \frac{dg}{dr}$. ∎

Proof. (Proposition 2).

Changes in s.

Assuming separability of the utility function, $L_{gs} = (1-\lambda) - \lambda u_g - \lambda u_{gg}g(1-s)$; and $L_{ts} = 0$. It follows:

$dg/ds = -\frac{1}{\Delta}(L_{tt}L_{gs})$; $dt/ds = \frac{1}{\Delta}(L_{gt}L_{gs})$; $dq/ds = \frac{1}{\Delta}L_{gs}(yL_{gt} + L_{tt})$

Notice that $(yL_{gt} + L_{tt}) = (\lambda y^2(-u_{qq}) + \lambda y^2(u_{cc}(1+\pi t)^2 + u_{qq} - u_c\frac{\pi}{y}) = (\lambda y^2(u_{cc}(1+\pi t)^2 - u_c\frac{\pi}{y}L_{gs}) < 0$

It follows that if $L_{gs} > 0, dg/ds > 0, dt/ds > 0, dq/ds < 0$, while all signs are reversed if $L_{gs} \leq 0$. Now,

$L_{gs} > 0$ if $\frac{(1-\lambda)}{\lambda} > u_g(1 + (1-s)\frac{u_{gg}}{u_g}g) = u_g(1 - (1-s)\varepsilon_g)$, where $\varepsilon_g = -\frac{u_{gg}}{u_g}g > 0$.

Changes in π.

Assuming separability of the utility function, $L_{g\pi} = 0$; and $L_{t\pi} = -\lambda u_c ty + \lambda u_{cc}(1+\pi t)y^2\frac{t^2}{2} < 0$. It follows:

$dg/d\pi = \frac{1}{\Delta}L_{tg}L_{t\pi} < 0; dt/d\pi = -\frac{1}{\Delta}L_{gg}L_{t\pi} < 0;$

$dq/d\pi = \frac{dt}{d\pi}y - \frac{dg}{d\pi} = -\frac{1}{\Delta}L_{t\pi}(yL_{gg} + L_{tg}) = -\frac{1}{\Delta}L_{t\pi}(\lambda y(u_{qq} + u_{gg}(1-s)^2) + \lambda y(-u_{qq})) =$
$= -\frac{1}{\Delta}L_{t\pi}(\lambda y u_{gg}(1-s)^2) < 0.$

Changes in y.

Assuming separability of the utility function,

$L_{gy} = -\lambda u_{qq}t > 0; L_{ty} = -\lambda u_{cc}(1+\pi t)y(1 - t - \frac{\pi t^2}{2}) > 0$. It follows:

$dg/dy = -\frac{1}{\Delta}(L_{tt}L_{gy} - L_{tg}L_{ty}) = -\frac{1}{\Delta}L_{tg}(tL_{tt} - L_{ty}) > 0;$

$dt/dy = \frac{1}{\Delta}(L_{tg}L_{gy} - L_{gg}L_{ty}) > 0$

$\frac{dq}{dy} = \frac{dt}{dy}y + t - \frac{dg}{dy} = t + \frac{1}{\Delta}(-yL_{gg}L_{ty} + L_{tg}(yL_{gy} + tL_{tt} - L_{ty})) > 0.$ ∎

Proof. (Proposition 3).

Assuming separability of the utility function, $L_{gT} = -\lambda u_{qq} > 0; L_{tT} = \lambda u_{qq}y < 0$. It follows:

$dg/dT = \frac{1}{\Delta}(-L_{tt}L_{gT} + L_{tg}L_{tT}) = \frac{1}{\Delta}\lambda u_{qq}(L_{tt} + yL_{tg}) =$
$= \frac{1}{\Delta}\lambda u_{qq}(\lambda y^2(u_{cc}(1+\pi t)^2 + u_{qq} - u_c\frac{\pi}{y}) + \lambda y^2(-u_{qq})) =$
$= \frac{1}{\Delta}\lambda^2 y^2 u_{qq}((u_{cc}(1+\pi t)^2 - u_c\frac{\pi}{y}) > 0$

$dt/dT = -\frac{1}{\Delta}(-L_{tg}L_{gT} + L_{gg}L_{tT}) = -\frac{1}{\Delta}\lambda u_{qq}(-L_{tg} + yL_{gg}) = -\frac{1}{\Delta}y\lambda^2 u_{qq}u_{gg}(1-s)^2 < 0$

$dq/dT = 1 + \frac{dt}{dT}y - \frac{dg}{dT} =$
$= 1 + \frac{1}{\Delta}\lambda^2 u_{qq}y(-u_{cc}(1+\pi t)^2y + u_c\pi - yu_{gg}(1-s)^2) = 1 - \frac{1}{\Delta}\lambda^2 yK$ where
$K = -u_{qq}(-u_{cc}(1+\pi t)^2y + u_c\pi - yu_{gg}(1-s)^2) > 0$
Now notice: $\Delta = L_{tt}L_{gg} - (L_{tg})^2 = L_{tt}L_{gg} - \lambda^2 y^2(u_{qq})^2 =$
$= \lambda^2 y^2(u_{qq}(u_{cc}(1+\pi t)^2 + u_{qq} - u_c\frac{\pi}{y}) + u_{gg}(1-s)^2(u_{cc}(1+\pi t)^2 + u_{qq} - u_c\frac{\pi}{y}) - (u_{qq})^2)$
$= \lambda^2 y^2(u_{qq}(u_{cc}(1+\pi t)^2 - u_c\frac{\pi}{y}) + u_{gg}(1-s)^2(u_{cc}(1+\pi t)^2 + u_{qq} - u_c\frac{\pi}{y}))$
$= \lambda^2 y(u_{qq}(u_{cc}(1+\pi t)^2y - u_c\pi) + u_{gg}(1-s)^2y(u_{cc}(1+\pi t)^2 + u_{qq} - u_c\frac{\pi}{y}))$
$= \lambda^2 y(u_{qq}(u_{cc}(1+\pi t)^2y - u_c\pi + u_{gg}(1-s)^2y) + u_{gg}(1-s)^2(u_{cc}(1+\pi t)^2y - u_c\pi))$
$= \lambda^2 y(K + u_{gg}(1-s)^2(u_{cc}(1+\pi t)^2y - u_c\pi)) = \lambda^2 y(K + R)$
It follows: $dq/dT = 1 - \frac{K}{K+R} > 0$, as $\frac{K}{K+R} < 1$. ∎

Proof. (Proposition 4).

Changes in T, to substitute θty, letting local government adjusts t on the residual tax base, $(1-\theta)y$.

Differentiating the FOC and considering that now the government can only tax a portion of the tax base, we get:

$L_{gg} = +\lambda u_{qg} + \lambda u_{gg}(1-s) < 0$

$L_{tt} = (-\lambda u_{cc}(1+\pi t)^2y^2 + \lambda u_{qq}y^2)(1-\theta) < 0$

$L_{tg} = +\lambda u_{cq}(1+\pi t)y - \lambda u_{cg}(1+\pi t)y(1-s) + \lambda u_{qc}(1+\pi t)y^2(1-\theta) - \lambda u_{qq}y + \lambda u_{qg}y(1-s)$

$L_{gT} = +(\lambda u_{qc} + \lambda u_{gc}(1-s))(1+\pi t)y$

$L_{tT} = (-\lambda u_c(1+\pi t)y + \lambda u_{qc}y)(1+\pi t)y$

Notice that now several expressions have changed, in particular L_{tt}, because of the reduced tax autonomy of government and because of the effect of the transfer on private consumption. Applying the formulas above, we get:

Fact 1: $dg/dT = \frac{1}{\Delta}(-L_{tt}L_{gT} + L_{tg}L_{tT})$; if there are no cross derivative effects, $L_{gT} = 0$. In this case, $L_{tg} > 0$ and $L_{tT} < 0$; hence, $dg/dT < 0$. The same is true if $L_{gT} < 0$.

Fact 2: $dt/dT = -\frac{1}{\Delta}(-L_{tg}L_{gT} + L_{gg}L_{tT})$; if there are no cross derivative effects, $L_{gT} = 0$. In this case, as $L_{tT} < 0$, $dt/dT < 0$. The same is true if $L_{gT} < 0$.

Combining Fact 1 and 2, we prove point *i)* in Proposition (4).

Finally, totally differentiating the budget constraint with limited tax base we get: $dq/dT = (1-\theta)ydt/dT - dg/dT$. Substituting, in the case of separability of the utility function, we get:

$dq/dT = (1-\theta)y\frac{1}{\Delta}(-L_{gg}L_{tT}) - \frac{1}{\Delta}(L_{tg}L_{tT}) = -\frac{1}{\Delta}L_{tT}((1-\theta)yL_{gg}+L_{tg}) = -\frac{1}{\Delta}L_{tT}\lambda y(u_{gg}(1-s)(1-\theta) - u_{qq}) = -\frac{1}{\Delta}L_{tT}\lambda yu_{gg}((1-s)(1-\theta) - 1) > 0$. This proves point *ii)* of the proposition.
∎

Appendix B

Table 1B: Own revenues from local property tax (ICI) by tax decentralization and institutional quality: average share (%) on total current revenues and average value per capita (€) – balanced panel

	$TAXREF$			
	0		1	
NM	Share (%)	Per capita (€)	Share (%)	Per capita (€)
0	0.19	110	0.15	99
1	0.16	110	0.13	104
All groups	0.16	110	0.13	103

Note: $NM = 0$ indicates municipalities *captured* by the Mafia, while $NM = 1$ those *not captured* by the Mafia. $TAXREF = 0$ refers to the years from 2003 to 2007, when the property tax applied also on the main residence; $TAXREF = 1$ refers to the years from 2008 to 2011, when tax decentralization has been reduced.

Table 2B: Average municipal expenditure per capita ($TOTAL\_EXP$) by degree of tax decentralization and institutional quality – balanced panel

		$TAXREF$		
		0	1	Diff.
	0	568 (158)	621 (155)	54
NM	1	652 (207)	771 (341)	119
	Diff.	84	150	66

Note: Standard deviations in round brackets. $NM = 0$ indicates municipalities *captured* by the Mafia, while $NM = 1$ those *not captured* by the Mafia. $TAXREF = 0$ refers to the years from 2003 to 2007, when the property tax applied also on the main residence; $TAXREF = 1$ refers to the years from 2008 to 2011, when tax decentralization has been reduced.

Table 3B: Summary statistics of the variables used in the spending equation (7) – balanced panel

Variable description	Name	Mean	Std. Dev.	Min	Max
Outcome variable					
Total municipal current expenditure (€per capita)	*TOTAL_EXP*	682	265	282	5,679
– Administrative expenditure	*ADMIN_EXP*	276	115	101	1,225
– Waste expenditure	*WASTE_EXP*	124	64	0	595
– Social expenditure	*SOCIAL_EXP*	70	38	12	365
– Residual expenditure	*RESIDUAL_EXP*	212	164	0	5,107
Treatment variables					
Local property tax (ICI) does not apply on the main residence (years 2008–2011)	*TAX_REF*	0.44	0.50	0	1
The municipality belongs to the group of local government *not captured* by the Mafia	*NM*	0.79	0.41	0	1
ICI does not apply on the main residence and the municipality belongs to the group *not captured* by the Mafia	*TAX_REF × NM*	0.35	0.48	0	1
Indicator of institutional quality for municipalities *not captured* by the Mafia, based on the average kilometric distance of each municipality from the *captured* ones	*NMD*	0.37	0.29	0	1
ICI does not apply on the main residence and the municipality belongs to the group *not captured* by the Mafia, taking also into account the average kilometric distance from the *captured* ones	*TAX_REF × NMD*	0.16	0.27	0	1
Control variables					
Population size	*POP*	12,170	16,826	348	117,963
Number of old people (age > 75)	*OLD*	720	866	44	6,011
Number of young people (age < 15)	*BOY*	2,327	3,471	33	26,575
Municipal income per capita	*INCOME*	16,960	2,948	7,668	25,906
Inhabitants per squared km of municipal area	*DENS*	1,189	1,999	11	12,941
Deadline of the mandate (years before new elections)	*YGOV*	2.14	1.43	0	4
Mayor at the second mandate (term limit)	*GOV2*	0.07	0.25	0	1
Governing coalition parties belonging to a civic list	*CIVIC*	0.70	0.46	0	1
Government controlled by an external commission	*COMM*	0.02	0.14	0	1
Alignment with provincial government	*ALIG_PROV*	0.19	0.39	0	1
Alignment with regional government	*ALIG_REG*	0.16	0.37	0	1
Alignment with national government	*ALIG_ITA*	0.14	0.34	0	1
Mayor is a female	*MAYORSEX*	0.03	0.16	0	1

Note: The values refer to a balanced panel of 203 municipalities observed from 2003 to 2011, for a total of 1,827 observations.

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Table 4B: Impact of tax reform on municipal current expenditure per capita – balanced panel

VARIABLES	TOTAL	ADMIN	WASTE	SOCIAL	RESIDUAL
TAXREF × NM	53.688***	4.975	-6.894	5.789**	50.551***
	(15.055)	(4.952)	(4.825)	(2.345)	(12.967)
POP_1000	-65.984***	-20.477***	-4.620	-8.382**	-32.815***
	(13.087)	(7.589)	(4.975)	(3.309)	(6.659)
POP2_1000	0.352***	0.089**	0.028	0.047***	0.191***
	(0.069)	(0.035)	(0.025)	(0.015)	(0.033)
OLD	-0.038**	-0.030***	0.013*	-0.005	-0.019
	(0.016)	(0.008)	(0.008)	(0.003)	(0.014)
BOY	0.017**	0.012***	0.004	0.001	-0.000
	(0.007)	(0.003)	(0.003)	(0.001)	(0.005)
INCOME	-0.003	-0.007***	-0.000	0.001	0.002
	(0.006)	(0.003)	(0.002)	(0.001)	(0.005)
DENS	0.044	0.016	-0.034	0.019	0.043
	(0.055)	(0.028)	(0.023)	(0.015)	(0.028)
YGOV	-0.650	0.613	0.403	-0.623**	-0.722
	(2.588)	(0.592)	(0.460)	(0.288)	(2.480)
GOV2	-9.091	-4.266	2.533	2.420	-10.357
	(15.991)	(7.077)	(4.452)	(5.458)	(9.245)
CIVIC	-35.174**	-10.805*	11.917*	-2.056	-34.562***
	(14.338)	(6.062)	(6.228)	(2.409)	(10.388)
COMM	-12.423	-4.453	13.383***	-2.829	-19.753*
	(14.065)	(6.366)	(4.463)	(2.313)	(11.224)
ALIG_PROV	3.488	-2.804	-6.754	5.206	8.229
	(8.446)	(4.851)	(5.360)	(3.197)	(6.333)
ALIG_REG	14.353	2.859	5.882	-2.160	7.476
	(8.926)	(5.378)	(5.951)	(3.042)	(5.691)
ALIG_ITA	-22.468***	-3.542	-0.065	-2.483*	-16.476**
	(8.159)	(2.885)	(2.244)	(1.410)	(6.410)
MAYORSEX	-6.208	-20.715*	-1.047	-0.007	14.531
	(21.014)	(11.982)	(5.500)	(2.912)	(18.927)
F	18.370	5.516	22.730	4.879	8.395
Prob. > F	0.000	0.000	0.000	0.000	0.000
Nr. observ.	1,827	1,827	1,827	1,827	1,827
Nr. municip.	203	203	203	203	203

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Note: All estimates include municipality fixed effects and year fixed effects.

Robust standard errors are reported in round brackets.

Figure 1B: Average municipal expenditure per capita ($TOTAL\_EXP$) by year and institutional quality – balanced panel
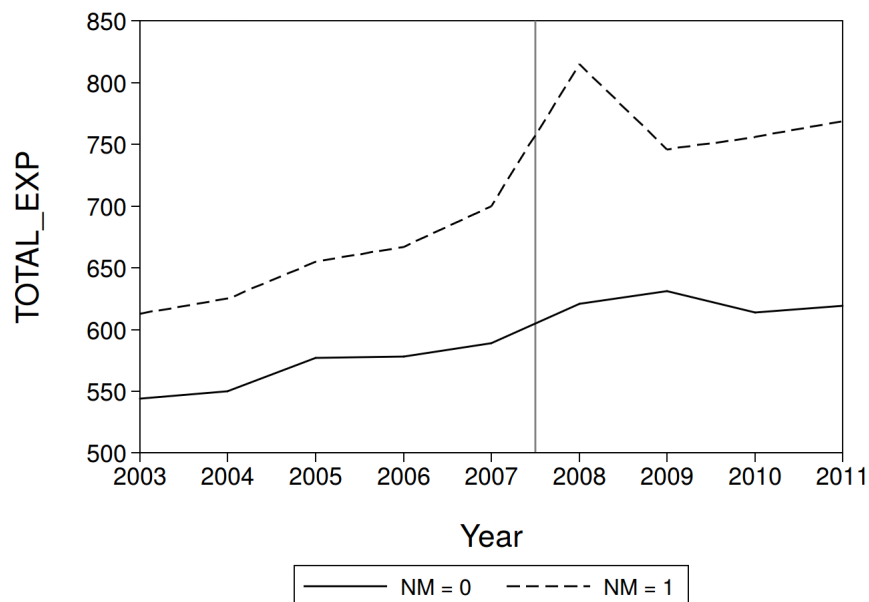

Table 5B: Sensitivity analysis: continuous indicator of institutional quality – balanced panel

VARIABLES	TOTAL	ADMIN	WASTE	SOCIAL	RESIDUAL
TAXREF × NMD	132.810***	30.161***	-21.293***	8.422*	117.581***
	(38.377)	(9.896)	(7.807)	(4.823)	(36.155)
F	19.500	5.653	23.080	4.935	8.358
Prob. > F	0.000	0.000	0.000	0.000	0.000
Nr. observ.	1,827	1,827	1,827	1,827	1,827
Nr. municip.	203	203	203	203	203

*** p<0.01, ** p<0.05, * p<0.1

Note: All estimates include municipality fixed effects, year fixed effects and the vector X of control variables. Robust standard errors clustered at the municipality level are reported in round brackets. NMD is a continuous indicator of institutional quality that is equal to 0 for municipalities *captured* by the Mafia and assumes a value in the range (0, 1] for municipalities *not captured*, according to the average kilometric distance of each municipality from the *captured* ones.

Table 6B: Sensitivity analysis: event study framework – balanced panel

VARIABLES	TOTAL	ADMIN	WASTE	SOCIAL	RESIDUAL
Year04 × NM	-0.652	0.386	-1.239	-1.735	2.482
	(12.880)	(6.032)	(3.101)	(2.397)	(7.654)
Year05 × NM	0.823	-9.560	-1.931	1.126	12.760
	(16.646)	(8.396)	(4.321)	(3.088)	(10.797)
Year06 × NM	6.708	-3.200	-3.626	2.553	12.389
	(18.932)	(7.776)	(5.433)	(3.698)	(14.388)
Year07 × NM	30.202	4.245	-3.753	4.208	25.645*
	(18.577)	(7.144)	(6.138)	(3.350)	(13.930)
Year08 × NM	110.060***	8.083	-23.181***	11.399**	118.211***
	(39.285)	(8.412)	(7.113)	(4.604)	(36.253)
Year09 × NM	28.987	-2.418	-7.189	4.440	34.329**
	(20.691)	(8.740)	(7.590)	(4.185)	(15.840)
Year10 × NM	50.522**	3.308	-0.643	4.157	44.008**
	(21.206)	(7.618)	(7.926)	(4.305)	(17.176)
Year11 × NM	48.859**	4.553	-1.289	8.017*	37.778**
	(22.183)	(9.226)	(8.368)	(4.549)	(16.556)
F	15.520	4.901	21.590	5.088	6.954
Prob. > F	0.000	0.000	0.000	0.000	0.000
Nr. observ.	1,827	1,827	1,827	1,827	1,827
Nr. municip.	203	203	203	203	203

*** p<0.01, ** p<0.05, * p<0.1
Note: All estimates include municipality fixed effects, year fixed effects and
the vector X of control variables. Robust standard errors clustered at the
municipality level are reported in round brackets. Year04 × NM, Year05 × NM,
Year06 × NM, and Year07 × NM are anticipatory effects (*leads*), while
Year09 × NM, Year10 × NM and Year11 × NM are post-treatment effects (*lags*);
Year08 × NM refers to the effect of tax reform in the year of its adoption 2008.