Determinants of Fiscal Distress in Italian Municipalities*

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Abstract

How important are specific categories of local spending in affecting municipalities' defaults? This study considers Italian municipalities from 2000 to 2012 and checks which of the main indicators (debt repayments, current budget equilibrium, amount of residuals and personnel costs) affects the default probability. Results suggest that a ten per cent rise in the share of loan repayment over total spending leads to an increase in default probability by 2.6%-2.9% on average. No significant role is found for other budget indicators. These findings are robust to alternative model specifications and the inclusion of fixed effects, time dummies and macroeconomic control variables

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Keywords: local government default, local public debt, fiscal distress, panel regressions.

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1 Introduction

Fiscal coordination rules between government layers are crucial in order to guarantee sound public finances and fiscal stability of national economies. Since 1999, the Italian government has been imposing a set of constraints - the main one being the Internal Stability Pact[1] - in order to preserve financial and fiscal discipline not only at the national leve, but also at the local one. These limits include upper thresholds to sub-categories of either current spending (such as personnel costs, advertising, etc.) or budget balances (such as ex-post equilibrium between current revenue and current spending). The main question that this study will attempt to answer is whether there is any particular budget category more effective than another in signalling future fiscal distress. Particularly, the focus is on two local public spending items - personnel expenditure and loan repayments - which have been emphasized by the Italian Governments policy actions, because charged of injecting too much rigidity into current spending. The former has been tightened for 2016 (turn over has been diminished to 25%, and other constraints are in place[2]) and the latter has been relaxed in 2015 (limit on interest payments has been raised from 8% to 10% of total current spending). Possibly, an inquiry into the main determinants of default probability can provide support to policy-makers in their attempt to design rules able to effectively address the ultimate causes of local defaults. In this respect, Italy represents an interesting case study: on one hand, it is characterized by a huge variety of local governments, and on the other hand, there is detailed data available for each municipal budget. Moreover, recent policy actions signalled the government's intention to redefine these limits on given spending categories. For instance, budget law for 2015 increased the ratio between interest spending and total current revenue that municipalities are allowed to maintain, from eight to ten per cent.

A further and more general motivation of this study relies on the fact that fiscal distress of local governments and municipalities played an important role in the deterioration of public finance that occurred following the 2008 Financial Crisis. The 2013 default of Detroit - the largest city in US history to file for bankruptcy - is probably the most famous case, but by no means the only one: famous episodes of fiscal distress in US municipalities or local governments over the years include New York, Cleveland, Miami, Pittsburgh, Philadelphia, Orange County. Budget default of sub-national authorities can also be observed in Europe: the most visible episode has been Catalonia in 2012, but there have been some other significant cases in Portugal and Italy.[3] Local governments defaults can be either the cause or consequence of national public finances tensions. Particularly in the former case, it is important to understand their determinants in order to prevent negative spillovers from lower to higher levels of governments, which are lately called in to bail-out the local government. Nicolini et al. (2002) discuss several vertical bail-out episodes that occurred in Argentina in the 1990s, while Von Hagen et al. (2000) focus on four subnational bail-outs in the OECD area. On the other hand, sound theoretical

[1] See Giuriato and Gastaldi (2009) and Gregori (2014) among others.

[2] Each year personnel costs must diminish in nominal terms with respect to the last three years average (as described in the Law 296/2006, art. 1).

[3] See Dexia (2006).

modelling of externalities arising from local fiscal indiscipline is provided by Wildasin (1997), which explicitly links the needs of central government bail-out intervention to the presence of optimal specification of fiscal decentralization and policy rules. Therefore, it seems that investigating the actual determinants of local defaults is also crucial for the policy design of fiscal constraints that national authorities usually impose on local governments.

While there is significant literature on sovereign debt crisis and default (see, among others, Schaltegger and Weder, 2015; Jorra, 2012; Manasse and Roubini, 2009), less attention on the same topic has been paid at the local level. There are studies on how local fiscal performances are affected by specific budget choices (see, for example, Epple and Spatt, 1986; Capeci, 1994; Buettner and Wildasin, 2006; Skidmore and Scorsone, 2011) or by the degree of decentralization (Von Hagen and Eichengreen, 1996; Hausmann, 1998; Richard and Musgrave, 1989). There are also many analysis on local public spending efficiency (Worthington and Dollery, 2000, Grossman et al., 1999, Afonso and Fernandes, 2006) and local taxation (Skidmore, 1999). However, to the best of our knowledge, there are no specific studies on what budget variable is a leading indicator of fiscal distress, at least for European countries. The aim of this paper is to provide a contribution to the empirical literature on local public finance, by empirically investigating the determinants of Italian local municipalities default using a panel annual dataset from 2000 to 2012. This work applies binary regression models in the attempt to identify the most important variables leading to major fiscal distress episodes. Results show that the most significant budget component increasing the probability of future default is the share of annual loan repayment over total spending. In all specifications, this debt indicator is significant in affecting the default probability: ceteris paribus, a 10 percentage points increase in the principal index at the sample means increases the default probability of about 3%. This result is in line with the recent literature that identifies fiscal limits as debt levels beyond which the burden of interest payments greatly compresses the current spending manoeuvrability. There is also evidence that an increase in fiscal revenue diminishes the probability of local municipalities' fiscal distress, whilst other components that are often pointed out as dangerous indicators are not significant, such as residuals of the level of current spending or personnel costs, which nevertheless continue to be a policy target in the relationship between central government and municipalities. As the focus is merely on economic explanatory variables, this study is not related to the vast amount of political economy research on local public finance.

The remainder of this paper is organized as follows. Section 2 presents the dataset, the specification of the empirical model and the main results. Section 3 offers some concluding remarks.

2 Empirical analysis

In this section is carry out the empirical analysis. First the data sources, descriptive statistics and binary dependent variable are illustrated (2.1); then it is presented the model specification (2.2). After showing the main results (2.3), a set of robustness tests

are implemented to check the validity of the findings (2.4).

2.1 Data and the default indicator

The analysis merges different sources of information. The first one relies on an Italian database for public administration from the Ministry of the Interior,[4] which includes Municipality budget data, and six indicators are implemented,[5] as detailed in table 1, in order to take into account different features of local budgets, specifically: (i) principal index (i.e. loan repayment over total spending) (ii) current revenues index (i.e. the logarithm of current revenue per-capita), (iii) current spending index (i.e. the ratio between current spending and total spending), (iv) autonomy index (i.e. tax revenue over current spending), (v) residual index (i.e. positive residuals over total revenues), (vi) personnel index (i.e. the ratio between personnel spending and current spending). In order to control for time-varying effects, the dataset also includes a set of regional macroeconomic variables obtained from the National Institute of Statistics (Istat): unemployment rate, per-capita GDP and inflation rate.

Table 1: Budget indexes, summary statistics

	Mean	SD	Min.	Max.
Principal index	0.10	0.13	0	0.58
Current revenues index	6.69	0.38	6.06	8.43
Current spending index	0.51	0.20	0.05	0.88
Autonomy index	0.39	0.21	0.02	1.00
Residual index	1.52	1.74	0.13	21.88
Personnel index	0.22	0.06	0.06	0.44
Number of observations	416	416	416	416
Municipalities	32	32	32	32
Years	13	13	13	13

Notes: The indexes refer to the period 2000-2012.

The dependent variable is a binary variable D, a local default indicator, calculated using data from data from the Ministry of the Interior. It assumes the following values:

$$D_{i,t} = \begin{cases} 1 & \text{when a Municipality } i \text{ has financial distress in year } t \\ 0 & \text{otherwise} \end{cases} \tag{1}$$

The literature does not employ a unique definition of local fiscal distress, which is often country-specific: a local government is considered to default whenever it enters the conditions disciplined by national laws, due to its inability to fulfil its existing financial

[4]For further details, see http://finanzalocale.interno.it/.

[5]These indicators are the one used by the Ministry of the Interior to analyse local public budgets.

obligations (Lobo et al., 2011). Following the Italian Court of Auditors, in this work it is established that a municipality is in financial distress when its council votes a default resolution, an event which is specifically disciplined by Italian Law. Legislation on local defaults was introduced for the first time in 1989[6] but was only permanently systematized eleven years later with the Consolidated Text of Local Governments (Decree Law 267/2000), where default is defined as a contingency in which municipalities have definite and liquid liabilities that they cannot cope with. The procedure is the following: first, the City Council votes the default resolution, which includes the report by the Audit Committee. Within five days these documents are officially transmitted to the Ministry of the Interior and to the local section of Accounting Judiciary and then officially published into the Italian Official Journal (which includes new law and administrative acts).

The analysis focuses on Municipalities that have experienced the default event and the final database riles on 32 cases of local default. As shown in table 2, the default are quite well distributed in the period analysed and they mainly occur in municipalities in the south (22 events).[7] In addition, the number of defaults increased during the Great Recession: on average, in the period 2010-2012 there has been 3.7 local defaults per year, while between 2000 and 2009 just 1.1.

Based on the dataset detailed above, next subsection shows the model specification.

2.2 Model specification

The goal is to investigate the probability of a local default and for this purpose it is required a model able to deal with a binary dependent variable, where the interest lies primarily in the response probability of the covariates included in the specification.[8] It is therefore implemented a logit model[9] specified as follows:

$$D_{i,t} = \alpha + \boldsymbol{\beta B_{i,t-1}} + \boldsymbol{\gamma C_{r,t}} + \tau T_t + \epsilon_{i,t} \tag{2}$$

where $D_{i,t}$ is the default indicator for municipality i at time t; α is a constant; B is a vector of five budget indicators and C is a vector of macroeconomic variables at the regional level r to control for time-varying effects, as specified in the previous subsection. T are time dummies and ϵ is the error term. In order to avoid simultaneity issues, budget indicators are lagged at t_{-1}.

[6]Decree Law n. 66, converted into Law n.144/1989

[7]There are not cases of serial default, because there are 32 cases of default and 32 municipalities. In addition, for each year every default occurs among municipalities that do not share any border, excluding the idea that municipal defaults are correlated.

[8]For a detailed explanation of binary models, see Wooldridge (2010), while a qualitative response model survey is proposed by Amemiya (1981).

[9]In the default probability literature, both logit and probit models have been used to serve this purpose, as shown by Van Rijckeghem and Weder (2009). Following King and Zeng (2001), who study rare events using the logistic regression, and in order to include fixed effects as robustness checks, in this study it is implemented the logistic specification.

Table 2: Municipal defaults, by year and geographical area

	North	Centre	South	Total
2000	0	2	1	3
2001	0	0	0	0
2002	0	1	2	3
2003	0	0	1	1
2004	0	1	0	1
2005	0	0	2	2
2006	0	1	2	3
2007	0	0	0	0
2008	0	1	3	4
2009	0	1	0	1
2010	0	1	4	5
2011	2	0	4	6
2012	0	0	3	3
Total	2	8	22	32

Notes: The Italian regions are classified as follows: (North) Pedmont, Aosta Valley, Lombardy, Trentino-South- Tyrol, Veneto, Friuli-Venezia Giulia, Liguria, Emilia-Romagna; (Centre) Tuscany, Marche, Lazio; (South) Abruzzo, Campania, Apuglia, Calabria, Sicily, Sardinia.

2.3 Results

Table 3 shows the result of the logit model as described in subsection 2.2. Firstly, there is a bivariate regression (column 1) and then each independent variable is added one by one amongst the regressors. In all specifications, the debt indicator (the annual loan repayment over total spending[10]) is significant in affecting the default probability: ceteris paribus, a 10 percentage points increase in the principal index at the sample means increases the default probability by a percentage ranging from 2.6% to 2.9%, when both macroeconomic control variables and year dummies are included (column 8).[11] Our results confirm on a local level what economic literature (Davig et al., 2011, Bi, 2012 and Bi et al., 2014) has recently been pointing out on a national or international level: an economy hits its fiscal limit when the debt level rises to the point where current spending is too constrained and the government loses the ability to finance it by increasing taxes. In the analysis this issue is even more relevant, as - unlike what happens at national level - current revenue must cover not only the interest payments but also the principal component (ie. roll over of debt is not allowed). Other than the debt indicator, there is weak evidence (column 6), still considering a 10 percentage point increase, of statistical significance for the current spending index (with a positive average marginal effect of 1.2%) and for the current revenue index (-0.7%). This last effect is confirmed also in the most complete specification (column 8), with both a higher coefficient and a stronger statistical significance. It is relevant to note that the personnel index is never statistically significant; thus there is not any evidence that this indicator has increased default probability in the sample.

2.4 Robustness checks

In this subsection are implemented some alternative specifications of the model so as to test the robustness of the key results.

Table 4 shows a panel logit model with fixed effects. The inclusion of fixed effects permits to control for time-invariant parameters, but do not allow to calculate the marginal effects and therefore it is lost the economic interpretability of the coefficients. Nevertheless, it is still possible to interpret their sign and statistical significance. More specifically, it is confirmed that an increase in the Principal index fosters the probability of default (see specifications 1, 2 and 3). The Current revenue index becomes significant and lowers the probability of default in specifications 2 and 3, therefore when macro-variables and year dummies are included.

Adding a further lag[12] in budget indexes (see table 5) confirms that the Principal and the Current revenue indexes affect the default event respectively positively and negatively. In addition to this, the debt indicator is also significant two year before the default

[10]Since there are multiple budget indicators that can signal the presence of debt sustainability, we ran the model alternatively using the following three indicators of debt burden: annual loan repayment, interest paid on debt and new principal. Results do not change significantly.

[11]For a detailed explanation on how to interpret the results, see Williams (2012).

[12]Results are confirmed also adding budge indexes with three lags.

Table 3: Probability of default, marginal effects, panel logit model

	Default (1)	Default (2)	Default (3)	Default (4)	Default (5)	Default (6)	Default (7)	Default (8)
Principal index (t_{-1})	0.26***	0.26***	0.29***	0.29***	0.29***	0.29***	0.27***	0.27***
	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.08)
Current Revenues index (t_{-1})		-0.02	-0.03	-0.04	-0.04	-0.04	-0.07*	-0.11**
		(0.04)	(0.03)	(0.04)	(0.04)	(0.04)	(0.04)	(0.05)
Current spending index (t_{-1})			0.10	0.11	0.11	0.12*	0.12*	0.13
			(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.08)
Autonomy index (t_{-1})				-0.04	-0.04	-0.03	-0.05	-0.11
				(0.06)	(0.06)	(0.07)	(0.07)	(0.09)
Residual index (t_{-1})					-0.00	-0.01	-0.01	-0.01
					(0.01)	(0.01)	(0.01)	(0.01)
Personnel index (t_{-1})						0.13	0.05	0.11
						(0.21)	(0.23)	(0.27)
Macro-variables	No	No	No	No	No	No	Yes	Yes
Year dummies	No	No	No	No	No	No	No	Yes
Number of observations	384	384	384	384	384	384	384	320
Number of groups	32	32	32	32	32	32	32	32
Pseudo R-squared	0.14	0.15	0.16	0.16	0.16	0.19	0.19	0.20
Log-likelihood value	-96.41	-96.20	-95.07	-94.90	-94.88	-94.71	-91.86	-83.98
Prob > Chi-square	0.00	0.00	0.00	0.00	0.01	0.01	0.03	0.28

Notes: The explanatory variables are lagged (t_{-1}) to avoid simultaneity issues. *** (**, *) indicates statistical significance at the 1 (5, 10) percent level. Marginal effects are calculated at the sample means of the explanatory variables. Pseudo R-squared is calculated as suggested by McFadden and Zarembka (1974).

occurrence. There is also evidence that current revenues are positively correlated with the default (see specifications 1). However, adding further controls this feature disappears (see specifications 3). Robustness checks do not alter the non-significance of personnel index.

Table 4: Probability of default, panel logit model with fixed effects

	Default (1)	Default (2)	Default (3)
Principal index (t_{-1})	10.71***	10.49***	9.95***
	(2.48)	(2.58)	(2.88)
Current Revenues index (t_{-1})	-2.33	-4.24**	-8.25***
	(1.52)	(1.94)	(2.74)
Current spending index (t_{-1})	2.09	1.59	1.71
	(1.52)	(1.50)	(1.65)
Autonomy index (t_{-1})	0.02	-0.88	0.40
	(1.58)	(1.87)	(2.45)
Residual index (t_{-1})	-0.20	-0.17	-0.23
	(0.18)	(0.23)	(0.19)
Personnel index (t_{-1})	0.84	0.09	-4.21
	(6.76)	(7.35)	(7.86)
Fixed effects	Yes	Yes	Yes
Macro-variables	No	Yes	Yes
Year dummies	No	No	Yes
Number of observations	348	348	348
Number of groups	29	29	29
Pseudo R-squared	0.12	0.24	0.381
Log-likelihood value	-58.25	-55.10	-45.05
Prob > Chi-square	0.00	0.00	0.00

Notes: The explanatory variables are lagged (t_{-1}) to avoid simultaneity issues. *** (**, *) indicates statistical significance at the 1 (5, 10) percent level. Pseudo R-squared is calculated as suggested by McFadden and Zarembka (1974).

3 Conclusions

This paper empirically studies the main determinants of Italian municipalities' default using a panel dataset over the period 2000-2012. Creating a binary local default indicator, this study implements binary regression models to evaluate which budget components have a major impact on local default. The main indicators that have been used are the following ones: loan repayment, current budget equilibrium (investigated through

Table 5: Probability of default, panel logit model with fixed effects and lags

	Default (1)	Default (2)	Default (3)
Principal index (t_{-1})	9.43***	9.40***	8.87***
	(2.76)	(2.92)	(3.16)
Principal index (t_{-2})	5.13**	4.97*	5.88*
	2.54	2.71	2.71
Current revenues index (t_{-1})	-4.26**	-5.44**	-8.75***
	(2.08)	(2.38)	(2.38)
Current revenues index (t_{-2})	0.24	-1.67	-4.15
	(1.77)	(2.04)	(2.57)
Current spending index (t_{-1})	2.98**	2.57	2.42
	(1.50)	(1.63)	(1.77)
Current spending index (t_{-2})	-2.00	-2.26	-2.22
	(1.58)	(1.68)	(1.80)
Autonomy index (t_{-1})	0.52	-1.08	-0.34
	(1.91)	(2.16)	(2.89)
Autonomy index (t_{-2})	-3.37	-2.72	-2.08
	(3.47)	(3.75)	(4.02)
Residual index (t_{-1})	-0.22	-0.25	-0.25
	(0.18)	(0.18)	(0.19)
Residual index (t_{-2})	0.01	0.02	-0.01
	(0.16)	(0.16)	(0.15)
Personnel index (t_{-1})	-4.15	-3.50	-3.24
	(8.50)	(9.30)	(9.94)
Personnel index (t_{-2})	7.79	5.40	-1.99
	(8.16)	(8.42)	(9.36)
Fixed effects	Yes	Yes	Yes
Macro-variables	No	Yes	Yes
Year dummies	No	No	Yes
Number of observations	319	319	319
Number of groups	29	29	29
Pseudo R-squared	0.25	0.30	0.41
Log-likelihood value	-51.63	-48.69	-41.05
Prob > Chi-square	0.00	0.00	0.00

Notes: The explanatory variables are lagged (t_{-1}) to avoid simultaneity issues. Further lags are added as a robustness check. *** (**, *) indicates statistical significance at the 1 (5, 10) percent level. Pseudo R-squared is calculated as suggested by McFadden and Zarembka (1974).

three indexes: current revenue, current spending and their ratio), amount of residuals, and personnel costs. Results show that the main variable positively affecting the default probability is the share of loan repayment over total spending: a ten per cent increase in this index increases the probability of fiscal distress by a percentage ranging from 2.6% to 2.9% on average. Weaker evidence on the current revenue index is also found. In other words, the results do not point towards the loss of control of current spending/revenue to be the main default's determinant, nor the share of personnel cost over total spending.. Rather, municipalities seem to be on the default path when they are incapable to fully internalize the effects of issuing new debt today on the current equilibrium of tomorrow. This evidence supports the view that to maintaining local debt under control should be a central goal for both local and national policy makers, in order to avoid local default episodes that generate economic and social instability. At the same time, the effectiveness of budget constraints other than the usual balanced-budget, such as the limitations in particular subcategories of spending, in providing insurance against future default may be questioned.

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