

Budgetary solvency of Italian local governments: an assessment

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Abstract

Purpose – The purpose of this paper is to investigate budgetary solvency (BS) as a part of the financial condition of local governments (LGs), considering that the growing demand for public services is primarily affecting this variable.

Design/methodology/approach – The study investigates a sample of 132 Italian LGs with more than 50,000 inhabitants for the period 2005–2014. The authors obtain a set of indicators as proxies of BS, which serve as the dependent variable of a regression model aimed at testing several independent variables which the authors are interested in, namely, financial autonomy, current equilibrium, level of indebtedness and investments.

Findings – BS, as well as its three indicators—sustainability, flexibility and vulnerability—are positively related to financial autonomy and current equilibrium and negatively related to the level of indebtedness and investments.

Practical implications – To cover citizens' demands for public services guaranteeing sound financial management, policymakers are advised to control both the balance between current revenue and expenses and the level of indebtedness while preserving financial autonomy from external sources.

Originality/value – This study adds fresh insight to the literature on financial health, emphasising the relevance of public financial management.

Keywords Financial condition, Indebtedness, Budgetary solvency, Current equilibrium, Financial autonomy
Paper type Research paper

1. Introduction

In the last decade, on the basis of the new public management (NPM) paradigm (Dafflon, 2015), decentralisation of competencies from the central government to other levels of government has increased, raising the need for resources to comply with new (and additional) competencies (Grossi and Mussari, 2009; Pérez-López *et al.*, 2015). Taxes and fees paid by citizens to local governments (LGs) for public services have become insufficient to cover their demands with regard to quantity and quality, although LGs receive transfers from other public administrations.

Furthermore, this situation has been aggravated by the international financial crisis suffered by many LGs. This has called attention to the importance of identifying harmful financial conditions (Kloha *et al.*, 2005a) to avoid financial distress, considering that national indicators do not capture different performances at local levels (Turley *et al.*, 2015). Monitoring financial conditions provides public managers with relevant information (García-Sánchez *et al.*, 2012, 2014), supporting their decision making on public services delivery. Better decision-making processes will improve the efficiency and effectiveness of



resource allocation (Grossi *et al.*, 2017), ameliorating citizens' welfare and quality of life (Cuadrado-Ballesteros *et al.*, 2014).

Accordingly, many countries have introduced relevant innovations aimed at improving the quality of public services, at the same time trying to prevent LGs from suffering bad financial conditions.

In this study, we focus on the Italian context for several reasons. First, public entities have increased their efforts in the last years to improve the efficiency and effectiveness of public service delivery. Second, the responsibility of managing financial resources has been shifted from the central government to local authorities because of the decentralisation of public finances, coupled with a reduction in central government transfers (Cohen *et al.*, 2017). Third, several reforms have been introduced to control financial health and to define financial distress, establishing the so-called long-term financial re-equilibrium procedure (Bisogno *et al.*, 2014). Moreover, the reforms implemented in Italy (as well as in many other countries) have progressively emphasised the efficient and effective use of the local taxes paid by citizens (Caperchione and Mussari, 2000).

Several studies have investigated financial health, at the same time emphasising that it relates to the tax base (Bradbury, 1982; Cohen *et al.*, 2017; Wilson, 1984). Although there is no consensus on the best way to represent the financial health of LGs, several studies have approached it by discussing different kinds of solvency (Greenberg and Hiller, 1995; Wang *et al.*, 2007; Zafra-Gómez *et al.*, 2009a). One of them is budgetary solvency (BS), namely, the ability of a public sector organisation to raise sufficient revenues to cover its legally required expenditures without falling into deficit.

Considering that BS is most affected by increases in demands for public services, this study aims to investigate whether BS of Italian LGs is affected by financial autonomy (expressed by the incidence of own revenue to total revenue), the current equilibrium (based on the relationship between current revenue and current expenses), the level of indebtedness and the level of investments (namely, capital expenditures).

From a methodological perspective, we investigate a sample of 132 Italian LGs composed of municipalities with more than 50,000 inhabitants. For the period 2005–2014, we have calculated a set of indicators as proxies of BS. Through an aggregation process, we have obtained a global index, which will serve as the dependent variable of a regression model aimed at testing several independent variables which we are interested in: financial autonomy, current equilibrium, level of indebtedness and investments.

Results suggest that BS is positively related to financial autonomy and current equilibrium and negatively related to the levels of both indebtedness and investments. Considering that variations in financial results are obtained mainly from management policies, the main implication of this study for policymakers is that controlling the balance between current revenue and expenses is essential for preventing future solvency problems. In the same vein, policymakers are advised to control the level of indebtedness while preserving financial autonomy from external sources and to guarantee sound financial management to cover citizens' demands for public services with available resources. Therefore, this study contributes to the literature on financial health, emphasising the relevance of public financial management.

The paper is structured as follows. Section 2 will describe the Italian context, while the Section 3 will deal with the different elements of the financial condition, focussing on BS, as well as delineating the research hypotheses. Section 4 will define the methodology, while Section 5 will discuss the results. The last section will offer some concluding thoughts and look ahead to future prospects for research.

2. Describing the context: Italian LGs

Italian public administration is based on a three-level structure: national government, regional governments (20) and LGs (110 provinces and 8,092 municipalities). The vast

majority of municipalities (about 85 per cent) have a population of fewer than 10,000 inhabitants while only 52 LGs have more than 100,000 inhabitants.

In the 1990s, under the umbrella of the NPM paradigm, several public management reforms were implemented, coupled with important accounting innovations (Anessi-Pessina *et al.*, 2010). Although the process of change is still in action (Ongaro *et al.*, 2013) and a remarkable implementation gap has been observed (Ongaro and Valotti, 2008), the reforms have introduced important innovations, especially at the LG level, from different perspectives (Manes Rossi *et al.*, 2016):

- A separation has been made between the competencies of politicians and those of managers, and a performance measurement system has been introduced. Therefore, managers are responsible for the use of resources and the results achieved.
- The Italian LGs have to provide several local public services of the highest importance for citizens. Accordingly, on the one hand they benefit from transfers and grants from central and regional governments; on the other hand, they can collect local taxes and manage their own assets. However, Italian LGs have increased their autonomy from other levels of government due to the decentralisation of competencies, which has caused, among other things, a growing incidence of their own revenue, compared to grants, on total revenue.
- Since 1995, strict control over financial conditions has been introduced with the goal of avoiding financial disequilibrium. Legislative Decree No. 267/2000 introduced the so-called long-term financial re-equilibrium procedure, according to which the representative body has to prepare a plan to restore financial equilibrium to prevent financial distress from ensuing. This decree further defines financial distress as occurring when an LG cannot deliver public services and perform its essential functions, or when it is no longer able to repay its debts through ordinary means. In this case, the LG has to declare financial distress, whereupon the central government appoints an Extraordinary Board, which is in charge of preparing a reorganisation plan and removing the causes of the distress.

3. BS and financial situation of LGs

3.1 Definition and literature review

“Financial condition” (also called financial health, financial situation) is an abstract concept that cannot be directly observed and precisely measured. Therefore, several factors should be taken into account, such as financial, socioeconomic, organisational or structural factors (Bisogno *et al.*, 2014; Carmeli, 2008). The International Public Sector Accounting Standards Board (IPSASB) (2012) has emphasised the impact of governmental decisions on future long-term financial sustainability, while Rodríguez-Bolívar *et al.* (2016) have highlighted the relevance of both drivers and risk factors.

Different definitions of “financial condition” have been proposed (Bisogno, Cuadrado-Ballesteros and García-Sánchez, 2017), ranging from wider ones, such as the capability of a government to provide services adequately to satisfy present and future obligations (GASB, 1987) to other, more specific definitions, such as financial performance as measured by changes in net assets, fund equity or net funds (Wang *et al.*, 2007). In any case, a broadly accepted definition of good financial health is based on the ability of a public sector entity to cover its financial obligations while providing adequate public services to the citizens.

Several studies have proposed indicators to define “financial condition”. At the local level, the seminal paper of Groves *et al.* (1981) defined financial health as solvency, including cash solvency, BS, long-run solvency and service-level solvency. Wang *et al.* (2007) set up an

empirical measure of financial condition using government-wide information, as required by Statement No. 34 of the Governmental Accounting Standards Board. This measure consists of the same four solvency magnitudes developed by Groves *et al.* (1981), which are expressed through 11 financial indicators.

Following Greenberg and Hiller (1995), at the core of financial health is BS, which refers to the ability of a public sector organisation to raise sufficient revenues to cover its legally required expenditures without falling into deficit. More specifically, Greenberg and Hiller (1995) suggest representing BS as the level of:

- sustainability: the ability of an entity to maintain the existing public services while covering obligations to creditors without increasing indebtedness and taxation levels;
- flexibility: the capacity of an entity to adapt to external (economic and financial) changes within the limits of its fiscal abilities via modifications to tax rates, public debt or transfers; and
- vulnerability: the level of independence of an entity from external financing received via transfers and grants.

As can be observed, several studies have dealt with the measurement of financial condition, attempting to develop indicators to represent it. Moreover, scholars have proposed models to assess (Cohen *et al.*, 2012) and prevent financial distress (e.g. Brown, 1993; Carmeli and Cohen, 2001; Kloha *et al.*, 2005a; Zafra-Gómez *et al.*, 2009a; Cohen *et al.*, 2017). Nevertheless, financial condition has also been studied from other perspectives.

Cahill and James (1992) suggest distinguishing between external and internal factors, bearing in mind the greater difficulty for an LG to control the former than the latter. Examples of external factors are the demographic and socioeconomic conditions of the community, the inflation rate and the unemployment rate, which can negatively affect the finances of LGs. Examples of internal factors can be inefficient and ineffective management of budgeting and accounting procedures, wasteful and excessive bureaucracy, low transparency and/or corruption (Bisogno, Nota and Ianulardo, 2017) and so forth.

Previous studies have operationalised these factors, hypothesising their influence on the fiscal condition of an LG (Kloha *et al.*, 2005b; Zafra-Gómez *et al.*, 2009c). However, the results are not conclusive; while Guillamón, Bastida and Benito (2011) did not show a statistically significant relationship between financial transparency and budget results, Brusca *et al.* (2015) highlighted the role of variables such as capital and personal (current) expenditures, as well as the financial independence of LGs.

Nollenberger *et al.* (2003) suggested that imbalance between public services demands and public resources will affect BS, also considering environmental and organisational factors. Honadle *et al.* (2004) argue that choices regarding what to finance and how to finance projects and programmes affect the financial health of LGs, along with other factors such as natural disasters, population changes, labour costs, voting pressures, etc. Following the work of Rodríguez-Bolívar *et al.* (2014), the annual budget result is a key determinant of financial sustainability; therefore, the balance of budget expenditures in preventing future problems of viability should be strictly controlled.

Previous literature has also pointed out the potential influence of demographic, political and social factors. Rodríguez-Bolívar *et al.* (2016) found a negative effect of population size on financial sustainability; scholars have investigated the role of population density, testing the incidence of population aged under or over defined thresholds (i.e. under 16 and over 65 years) on financial condition, but the results are quite conflicting (Kloha *et al.*, 2005b; Rodríguez-Bolívar *et al.*, 2016; Zafra-Gómez *et al.*, 2009c). The pioneer study of Fried (1971) underlines the weight and direction of political influence on municipal budgeting.

More recently, García-Sánchez *et al.* (2014) provided evidence that LGs dominated by left-wing parties are usually in worse financial health than others, while Cuadrado-Ballesteros *et al.* (2014) demonstrated a positive link between quality of life and financial health.

3.2 Research hypotheses

As stated previously, BS can be expressed as the ability of a public sector entity to raise sufficient revenues to cover its legally required expenditures without falling into deficit. Accordingly, it is based on three main concepts: service, revenues and debt (IPSASB, 2012).

Knutsson *et al.* (2008) observe that the key for financial sustainability derives from a broad resource perspective, together with a daily attention to financial issues. Focussing on the Italian context (at the same time considering that many other countries are experiencing similar situations: Botica-Redmayne *et al.*, 2017), it is worth recalling that LGs have to comply with new (and additional) competencies due to the diffuse decentralisation, even if they have experienced a progressive reduction of grants from central governments due to the recent global financial crisis. In other words, Italian LGs have the autonomy to manage expenditures and revenues, which affects their financial situation, but that increase in competencies was not accompanied by an increase in resources, which affects their financial health. Consequently, taxes (namely, current revenue) collected to cover (current) expenditures for providing public services have become insufficient to guarantee adequate (in terms of quantity and quality) services to citizens, with one of the main effects being an increase in public debt. Moreover, financial health can also be affected by new long-term investments that, according to the above-mentioned Decree No. 267/2000, have to be financed primarily by new loans.

Therefore, we would argue that BS is affected by the financial autonomy of LGs, coupled with their ability to provide services to citizens by preserving a proper equilibrium between current revenue and current expenditures while avoiding increasing indebtedness and checking for the effects of long-term investments.

Financial autonomy can be expressed as the freedom to impose local taxes, collect revenue and allocate financial resources without external interference (Turley *et al.*, 2015). Obviously, this concept should not be interpreted in absolute terms since each LG has to comply with the general rules defined by the central government. In any event, we expect that high levels of freedom to impose taxes will facilitate obtaining revenues to cover citizens' demands without damaging the solvency of an LG (Honadle *et al.*, 2004). Therefore, the first research hypothesis is:

H1. BS is positively affected by financial autonomy.

Current equilibrium is based on current revenue and current spending. Current spending comes from expenditures on general public services (e.g. lighting, waste and water services, road maintenance, etc.), and these are generally financed from current revenues (e.g. the LG's own taxes, grants from other government levels, etc.). Scholars have underlined the relevance of this indicator, since current expenditures exceeding current revenues have been interpreted as a warning signal of financial stress (Bisogno *et al.*, 2013; Manes Rossi *et al.*, 2012). Therefore, the second research hypothesis is:

H2. BS is positively affected by current equilibrium.

Prior studies (Zafra-Gómez *et al.*, 2009b; Rodríguez-Bolívar *et al.*, 2016) have also largely investigated indebtedness as a key element of the financial condition of public sector entities. Additionally, the level of indebtedness has also been related to fiscal sustainability (European Commission (EC), 2012, 2016), expressed as the ability of an entity to maintain current public policies and public services delivery without changing the taxation and

indebtedness levels. Therefore, a public sector entity has to maintain a low level of indebtedness to guarantee a good health condition. Accordingly, the third hypothesis is:

H3. BS is negatively affected by the level of indebtedness.

Finally, it is worth recalling, following Knutsson *et al.* (2008), that key drivers to improve financial sustainability include not only a daily attention to financial issues but also the adoption of a broad perspective, considering the effect of long-term projects. Investments in new infrastructures could imply a reduction in operating costs (i.e. current expenses), improving the LGs' efficiency (Doumpos and Cohen, 2014), which in turn is expected to have a positive effect on financial sustainability. Therefore, the fourth research hypothesis is:

H4. BS is positively affected by the level of investment.

4. Methodology

4.1 Sample

To obtain empirical evidence on determinants of BS, we use a sample of 132 Italian LGs, consisting of municipalities with more than 50,000 inhabitants. We focussed on these municipalities because they are required to provide a great number of basic public services (e.g. urban waste collection and treatment, cleaning, paving and maintenance of public roads, drinking water supply, civil protection and security, social services, etc.), which directly affect their financial situation.

Italy is an interesting context for the analysis due to the financial problems that LGs suffered in the last decade. Accordingly, we selected the period 2005–2014 because from 2003, Italian LGs were obliged by law to repay on their own and in full all costs related to financial distress (Cohen *et al.*, 2017). Furthermore, that period covers the global recession, which affected all levels of Italian Governments, especially at the local level (Bolgherini, 2014). This results in a balanced panel data set with 1,320 observations on Italian LGs.

4.2 Variables

To test the hypotheses, we need measures of BS and of the four determinants we are interested in (financial autonomy, current equilibrium, indebtedness and investments).

BS is a specific kind of solvency and, accordingly, we need specific indicators to represent this feature which refers to the level of financial sustainability, the extent of flexibility to adapt to external changes, and the degree of independence from external financing (Greenberg and Hiller, 1995). Therefore, traditional solvency indicators (e.g. Turley *et al.*, 2015) are not appropriate here.

One of the indicators used most often to represent BS, especially for LGs, is the approach proposed by Zafra-Gómez *et al.* (2009a) and later updated by Cuadrado-Ballesteros *et al.* (2014). Hence, each feature of BS (namely, sustainability, flexibility and vulnerability: Greenberg and Hiller, 1995) is represented by one or more ratios obtained from LGs' budgetary information, as Table I illustrates.

Having calculated these ratios for each LG in each year, we followed the aggregation process proposed by Cuadrado-Ballesteros *et al.* (2014). More concretely, for ratios that are positively related to BS (i.e. NSI and FRI), 1 point is assigned to sample observations that show values of ratios higher than the 75th percentile, 0.5 points if the value is between the 50th and 75th percentile, 0.25 points if the value is between the 25th and the 50th percentile and 0 points if the value of these ratios is lower than the 25th percentile. For ratios that are negatively related to financial condition (i.e. NFBRI, FCII, NDI, CFII and FII), the assignment of values is inverse. Therefore, each sample observation has seven scores, one from each ratio.

Table I.
Budgetary solvency
indicators

| Feature | Ratio | Definition | Link with BS |
|----------------|--|---|--------------|
| Sustainability | Non-financial budgetary results index (NFBR) | Non-financial budgetary payables divided by non-financial budgetary receivables | - |
| Flexibility | Net saving index (NSI) | Net saving divided by net current liquidated rights | + |
| | Financial charge index (FCI) | Annual amortisation payment minus interest and principal per inhabitant | - |
| | Net debt index (NDI) | Annual accumulation variation long-term credit operations per inhabitant | - |
| Vulnerability | Current financial independence index (CFII) | Current budgetary payables divided by current budgetary receivables (except grants) | - |
| | Total financial independence index (FII) | Total budgetary payables divided by total budgetary receivables (except grants) | - |
| | Fiscal revenue index (FRI) | Fiscal receivables divided by net current budgetary receivables | + |

Finally, the seven scores are added up and a global index is created to represent BS, which takes values between 0 and 7. Moreover, as BS is represented by three features, we accordingly added up the different ratios to create three other indicators—sustainability (taking values between 0 and 1), flexibility (taking values between 0 and 3) and vulnerability (taking values between 0 and 3), with the purpose of testing the robustness of the results.

Regarding the four determinants we are interested in: financial autonomy is represented by ratio of revenues obtained from taxes and other extra tax incomes to total current revenues; current equilibrium expresses the ability of current revenue to cover current expenses, and it is represented by the ratio of current revenues to current expenses; the level of indebtedness is measured as the ratio of total debts to total current cashed revenue (Copley, 1991; Bisogno *et al.*, 2014); and the level of investment is represented by the part of the expenses that the municipality decides to devote to long-term projects (i.e. capital expenditure), and it is calculated as a percentage of capital expenditure on total current expenditure on the average for the last three years, understanding that the higher the percentage, the higher the ability to invest in the future.

The empirical results are also controlled by different socioeconomic factors whose effect on BS (financial health in general) has been previously shown (da Costa Carvalho *et al.*, 2007; Zafra-Gómez *et al.*, 2009a, b; Bastida *et al.*, 2009; García-Sánchez *et al.*, 2012, 2014; Cuadrado-Ballesteros *et al.*, 2014). Concretely, we have included in the model the following variables: logarithm of population density (density), unemployment rate (unemployment), GDP per capita and percentage of population over 65 years (old population).

4.3 Model

To test the hypotheses, we propose the following basic model:

$$\begin{aligned}
 BS_{it} = & \beta_0 + \alpha_1 \text{Financial autonomy}_{it} + \alpha_2 \text{Current equilibrium}_{it} \\
 & + \alpha_3 \text{Indebtedness}_{it} + \alpha_4 \text{Investment}_{it} + \beta_1 \text{Density}_{it} + \beta_2 \text{Unemployment}_{it} \\
 & + \beta_3 \text{GDP}_{it} + \beta_4 \text{Old population}_{it} + \eta_i + v_{it},
 \end{aligned} \tag{1}$$

where sub-indexes i and t refer to each LG and year, respectively, and variables are those previously defined, as summarised in Table AI. Moreover, the error term has been broken down into two elements: η_i refers to unobservable heterogeneity and μ_{it} is the classical disturbance term. The former refers to the particular characteristics of each LG, which differ among municipalities but are invariant over time. These characteristics are difficult to

measure because they are unobservable to researchers; however, failing to consider them could bias the results.

To select the most appropriate estimator, we first test the presence of heteroscedasticity and autocorrelation problems by using the Breusch–Pagan test and the Wooldridge test, respectively. The results lead us to reject the null hypothesis of the presence of homoscedastic errors and the absence of serially correlated errors, respectively, both at the 95% confidence level. Therefore, neither fixed- nor random-effects estimators are appropriate in this case.

In addition, the endogeneity problem also arises in Model 1 due to the presence of reverse causality between dependent and independent/control variables; that is, we are interested in the impact of financial autonomy, current equilibrium, indebtedness and investments on the BS level, but it is probable that the budgetary level tends to impact those features. Instrumental variables (IV) may resolve endogeneity, but in the presence of heteroscedasticity, as in this case, the conventional IV estimator is inefficient, although consistent (Baum *et al.*, 2003). In this situation, the dynamic panel estimator (Arellano and Bond, 1991) overcomes such limitations.

Hence, we use the two-step system estimator of Arellano and Bover (1995), which augments the traditional estimator, namely, the difference estimator (Arellano and Bond, 1991), since the difference estimator is known to be consistent as the sample size is large, but it has poor finite sample properties (Blundell and Bond, 1998). To remove endogeneity, the system estimator uses the lagged values of endogenous and predetermined variables as instruments. The lagged values are natural candidates for a valid instrument instead of the outside instruments that other estimators (2SLS, 3SLS, OLS, etc.) use (Pindado and Requejo, 2015). It is demonstrated that lagged values are uncorrelated with the error term when Arellano and Bond (1991) derived the estimator; and they contain information on the current value of their corresponding variable.

Nevertheless, using the system estimator may prevent a proliferation of instruments and results could be biased. Instrument validity is tested by two tests: the Arellano–Bond test for AR(2) in first differences, under the null hypothesis of no serial correlation between the error terms; and the Hansen test of over-identification restrictions, under the null hypothesis that the over-identifying restrictions are valid.

5. Results and implications

5.1 Descriptive analysis

As Table II shows, the mean value of BS is 3.05 in a range from 0 to 7, suggesting that Italian LGs suffer some problems on average, and BS may be improved. The situation is also worrisome regarding the three sub-indicators: sustainability has a mean value of 0.43 (in a range from 0 to 1), but most of the observations are at the extremes; flexibility has a mean value of 1.32 (in a range from 0 to 3); and vulnerability has a mean value of 1.3 (in a range from 0 to 3).

Figure 1 shows the evolution of these indicators during the period of analysis. BS seems to be more or less constant from 2005 to 2007 and also from 2012 to 2014, but it shows a “U” evolution during the crisis period. This evolution is especially determined by the vulnerability indicator because the other two indicators show very slight variations.

Table I also shows the statistics for the remaining (independent and control) variables. Regarding the independent variables, the mean value of financial autonomy suggests that 71.63 per cent of current revenues come from taxes and other revenues collected directly by LGs. The indicator of current equilibrium is 105.99, which indicates that current revenues are 6 per cent higher than current expenses, on average. The mean value of the indebtedness indicator suggests that total debts are 71.06 per cent of total current cashed revenues, on average. The variable Investment shows a mean value around 30.20, which indicates that

Table II.
Descriptive statistics

| | Obs | Mean | SD | Min. | Max. |
|---------------------|-------|--------|-------|-------|--------|
| Budgetary solvency | 1,320 | 3.05 | 1.46 | 0 | 7 |
| Sustainability | 1,320 | 0.43 | 0.37 | 0 | 1 |
| Flexibility | 1,320 | 1.32 | 0.65 | 0 | 3 |
| Vulnerability | 1,320 | 1.30 | 0.94 | 0 | 3 |
| Financial autonomy | 1,311 | 71.63 | 16.42 | 31.24 | 97.87 |
| Current equilibrium | 1,311 | 105.99 | 13.09 | 49.64 | 198.65 |
| Indebtedness | 1,310 | 71.06 | 60.09 | 0 | 340.42 |
| Investment | 1,311 | 30.20 | 30.98 | 3.10 | 509.56 |
| Density | 1,320 | 6.75 | 1.05 | 4.56 | 9.47 |
| Unemployment | 1,282 | 10.32 | 5.62 | 1.87 | 27.81 |
| GDP | 1,188 | 22.18 | 5.13 | 13.2 | 34.95 |
| Old | 1,300 | 21.68 | 8.61 | 7.39 | 73.46 |

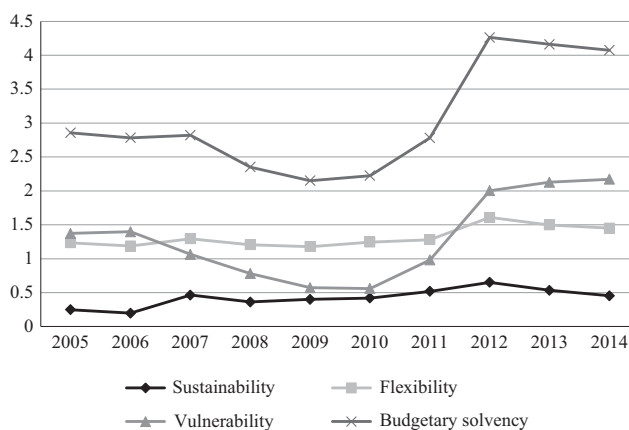


Figure 1.
Evolution of
budgetary solvency
indicators

capital expenditure is about 30.20 per cent of total current expenditures. However, there are relevant differences among LGs in the sample.

Figure 2 represents the reduction of investment, along with the evolution of the other independent variables (Financial autonomy, Current equilibrium and Indebtedness). On average, Italian LGs experienced a current equilibrium because the indicator takes values higher than 100 during the period of analysis. The level of indebtedness shows a decreasing tendency while the financial autonomy indicators decreased from 2006 to 2010, but after that it increased, although it did not reach 100 per cent in any year.

Finally, focussing on the control variables, the mean value of the Density variable is 6.74, but it is the natural logarithm of the population density, being 1,482.58 inhabitants per km² on average; the unemployment rate is about 10.32 on average; the mean value of GDP per capita is 22.18, suggesting incomes about 22,000 euros per year; finally, about 21.66 per cent of the population are 65 or more years old, but with great differences in the sample.

Table III shows bivariate correlations among all variables entered into the model. The highest values are shown between BS indicators, but this does not generate multicollinearity problems because they are different dependent variables. The rest of the coefficients are not so high; the independent variables are not highly correlated, so they will also be entered

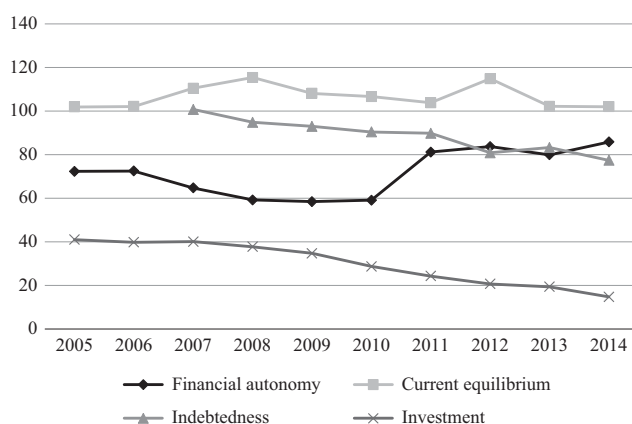


Figure 2.
Evolution of
independent variables

jointly into the same model. Moreover, variance inflation factors (VIF values) have been calculated for each estimated model, and results[1] suggest that predictor variables are not highly correlated.

5.2 Empirical analysis

Table IV shows the estimated parameters (β and α) of each variable in Model 1. These coefficients refer to the change (increase if positive or decrease if negative) in the dependent variable (BS) when each independent/control variable increases one unit.

Financial autonomy has a positive coefficient, which suggests that it impacts positively on BS, and it is statistically relevant at 99.9 per cent. This result means that LGs more financially autonomous and less dependent on other external resources tend to show a greater BS, which is consistent with the first hypothesis of this study.

Current equilibrium also has a positive coefficient, and it is statistically relevant at 99.9 per cent; therefore, BS is improved, thanks to current surplus, i.e., when current expenditures are covered by current revenues. This result allows us to accept the second hypothesis of this study.

Regarding the level of indebtedness, results show a negative coefficient, being statistically relevant at 90 per cent, which means that the higher the level of indebtedness, the worse the BS; therefore, this result is consistent with our third hypothesis.

Finally, the variable Investment also has a negative coefficient, and it is statistically relevant at 99.9 per cent. Therefore, the level of investment impacts negatively on BS, suggesting that Italian LGs investing more resources in long-term projects tend to show worse BS than other LGs. We expected that a growing level of capital expenditures should have determined a renewal of stock assets, improving efficiency (Doumpos and Cohen, 2014), which in turn is supposed to have a positive effect on financial health. However, the empirical results do not support this hypothesis. A possible explanation for the negative incidence could be based on the work of Drew *et al.* (2016), according to whom improving efficiency does not necessarily mean that an LG achieves a better financial condition. Moreover, it should be considered that, to be coherent with the budgetary nature of the other variables entered into the model, we did not use the stock of assets evaluated in accordance with an accrual-based approach (as in the case of Doumpos and Cohen, 2014). Nevertheless, in the following section, we will investigate this unexpected result in more depth by providing additional analysis.

Table III.
Bivariate correlations

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|-------------------------|-------------|-------------|-------------|-------------|---------|---------|-----------|------------|-------------|---------|----------|----|
| (1) Budgetary solvency | 1 | | | | | | | | | | | |
| (2) Sustainability | 0.6228**** | 1 | | | | | | | | | | |
| (3) Flexibility | 0.7255**** | 0.5089**** | 1 | | | | | | | | | |
| (4) Vulnerability | 0.8055**** | 0.2214**** | 0.2351**** | 1 | | | | | | | | |
| (5) Financial autonomy | 0.6296**** | 0.1775**** | 0.2176**** | 0.7578**** | 1 | | | | | | | |
| (6) Current equilibrium | 0.0655** | 0.0651** | 0.1508**** | -0.0238 | -0.0204 | 1 | | | | | | |
| (7) Indebtedness | -0.0079 | 0.155**** | -0.0752**** | -0.0214 | 0.0291 | -0.0117 | 1 | | | | | |
| (8) Investment | -0.0762**** | -0.0392 | 0.0244 | -0.1198**** | -0.0093 | 0.036 | 0.0568** | 1 | | | | |
| (9) Density | -0.1177**** | -0.1047**** | -0.1865**** | -0.0128 | 0.033 | -0.0296 | 0.0116 | 0.0707** | 1 | | | |
| (10) Unemployment | 0.0681** | 0.0062 | 0.093**** | 0.0394 | 0.0371 | 0.0455 | -0.0481* | 0.0423 | -0.0529* | 1 | | |
| (11) GDP | -0.0004 | -0.0321 | 0.0468 | -0.0212 | -0.0018 | 0.0287 | 0.0519** | -0.048* | -0.1062**** | 0.0057 | 1 | |
| (12) Old | -0.0943**** | -0.043 | -0.1216**** | -0.0455 | 0.018 | 0.0037 | 0.1146*** | 0.2496**** | 0.2845**** | -0.0177 | 0.0624** | 1 |

Notes: ****, ***, **, * Represent statistical relevance at 10, 5, 1, and 0.1 per cent levels, respectively

Table IV.
Determinants of
budgetary solvency
index

| | Coef. | SE |
|---|-------------------------|----------|
| Financial autonomy | 5.7400**** | 0.0100 |
| Current equilibrium | 0.2550**** | 0.0048 |
| Indebtedness | -0.0111* | 0.0062 |
| Investment | -0.2603**** | 0.0128 |
| Density | -0.0068**** | 0.0004 |
| Unemployment | 0.0004**** | 0.0001 |
| GDP | -0.4591**** | 0.1096 |
| Old | -0.0002**** | 3.12E-06 |
| _cons | -1.0140**** | 0.0226 |
| Arellano-Bond test for AR(2) in first differences | Prob > z = 0.290 | |
| Hansen test of overid. restrictions | Prob > $\chi^2 = 0.997$ | |

Notes: Regression includes year fixed effects. *, **, ***, **** Represent statistical relevance at 10, 5, 1, and 0.1 per cent levels, respectively

Regarding the control variables, Density and Old population have negative coefficients, and they are both statistically relevant at a 99.9% confidence level, suggesting that BS is worse in municipalities with a larger population density and a larger proportion of people over 65. This may be explained from the public services viewpoint, considering that these variables affect the level and types of needs of citizens as far as public services are concerned (Allers *et al.*, 2001). For instance, the most densely populated municipalities will demand more protection services (e.g. police, firefighting), utilities (e.g. paving, lighting, drinking water and cleaning), social and health services (culture, sports, health), etc. Similarly, the demand for social and health services increases with populations above 65 years old. Therefore, it is expected that public service demands increase public spending, affecting negatively financial health in general, and more concretely the BS. This becomes even truer when one considers that the population over 65 tends to contribute to public finance to a lesser extent.

The coefficient estimated for variable GDP is also statistically relevant at 99.9 per cent, which indicates that the economic level is one of the factors that determine financial health. Such a coefficient is negative, but the effect of the economic level on financial health has not been clearly determined by previous studies (Borge, 2005; Allers *et al.*, 2001; Ashworth *et al.*, 2005; Lago-Peña and Lago-Peña, 2009). Finally, the results obtained for Unemployment are not according to expectations. A higher unemployment rate is usually considered negative in terms of social spending (Benito *et al.*, 2010), total revenues (Zafra-Gómez *et al.*, 2009c) and the level of indebtedness (Guillamón, Benito and Bastida, 2011). However, the estimated coefficient is positive (although small) and statistically relevant at 99.9 per cent, suggesting a slight positive effect, probably because unemployment subsidies are paid by the national government. Therefore, unemployment spending probably does not affect the level of solvency of Italian LGs.

5.3 Robustness analyses

We have developed several analyses with the aim of checking the robustness of the previous results.

The first analysis shows the effect of each independent variable on BS individually. Although they are not highly correlated (so they will also be entered jointly into one equation), the economic sense of some of them could be closely related. For example, financial autonomy is represented by the ratio of revenues obtained from taxes and other extra tax incomes to total current revenues, and current equilibrium is represented by the ratio of current revenues to current expenses. Therefore, in general terms, these indicators refer to how LGs may cover current expenditure by total current revenues or taxes in particular. Investment is calculated as a percentage of capital expenditure on total current

expenses, so it is also related to current expenditure. Furthermore, indebtedness represents another way of financing, so it is also related to previous indicators.

Table V illustrates the results. The estimated coefficients of Financial autonomy and Current equilibrium are positive, while Indebtedness and Investment have negative coefficients. All of them are statistically relevant at a 99.9% confidence level and are according to those shown previously in Table IV. The results for the control variables are also similar to those obtained previously: Density, Old population and GDP impact negatively on BS, and Unemployment shows slight negative effects on BS.

The second analysis considers as dependent variables the three features of BS—sustainability (represented by NFBRI), flexibility (represented by NSI, FCII and NDI) and vulnerability (represented by CFII, FII and FRI), as illustrated in Table I. The aim is to test whether previous results are robust to these three features. Findings are shown in Table VI. Equation 1 illustrates the results for sustainability, which refers to the capacity of the LGs to preserve the citizens' welfare by public policies and public services delivery: as estimated coefficients of variables Financial autonomy and Current equilibrium are positive, we may conclude that LGs with better financial autonomy and current equilibrium show better sustainability levels than others. Indebtedness also impacts positively on sustainability, suggesting that LGs use public debt with the aim of improving and preserving social welfare. However, investment is negatively related to the dependent variable, indicating that expenditure on long-term projects reduces the level of the sustainability indicator. Therefore, in conclusion, the capacity of the LGs to preserve citizens' welfare improves when current expenditures are controlled and it is possible to support them with taxes and current revenues in general; the use of debt also seems to affect positively the capacity to preserve welfare. However, the ability to invest in the future does not guarantee a better capacity to maintain social welfare; in fact, the higher the percentage of capital expenditures, the worse the sustainability of LGs.

Equation (2) illustrates the results for flexibility (see Table VI), which refers to the capacity of LGs to respond to changes in the economy. Findings are generally according to those obtained previously for BS; that is, financial autonomy and current equilibrium impact positively on flexibility, while the level of indebtedness is negatively related to that.

| | Equation (1) | | Equation (2) | | Equation (3) | | Equation (4) | |
|---|-------------------------|----------|-------------------------|----------|-------------------------|----------|-------------------------|----------|
| | Coef. | SE | Coef. | SE | Coef. | SE | Coef. | SE |
| Financial autonomy | 5.7951**** | 0.0002 | | | | | | |
| Current equilibrium | | | 0.2244**** | 0.0001 | | | | |
| Indebtedness | | | | | -0.0312**** | 0.0001 | | |
| Investment | | | | | | | -0.1503**** | 0.0008 |
| Density | -0.0057**** | 0.0003 | -0.0101**** | 0.0003 | -0.0104**** | 0.0004 | -0.0105**** | 0.0003 |
| Unemployment | 0.0046**** | 4.71E-06 | 0.0068**** | 7.38E-06 | 0.0070**** | 9.64E-06 | 0.0073**** | 5.09E-06 |
| GDP | -0.4495**** | 0.0016 | -2.1683**** | 0.0036 | -2.7758**** | 0.0038 | -2.1712**** | 0.0053 |
| Old | -0.0021**** | 2.41E-05 | -0.0018**** | 2.52E-05 | -0.0016**** | 3.14E-05 | -0.0013**** | 3.58E-05 |
| _cons | -0.8826**** | 0.0011 | 3.3836**** | 0.0015 | 3.7817**** | 0.0019 | 3.6578**** | 0.0009 |
| Arellano-Bond test for AR(2) in first differences | Pr > z = 0.402 | | Pr > z = 0.124 | | Pr > z = 0.098 | | Pr > z = 0.098 | |
| Hansen test of overid. restrictions | Prob > χ^2 = 0.319 | | Prob > χ^2 = 0.342 | | Prob > χ^2 = 0.265 | | Prob > χ^2 = 0.295 | |

Table V.
Robustness checking 1

Notes: All regressions include year fixed effects. *, **, ***, **** Represent statistical relevance at 10, 5, 1, and 0.1 per cent levels, respectively

Table VI.
Robustness
checking 2

| | Equation (1): Sustainability | | Equation (2): Flexibility | | Equation (3): Vulnerability | |
|---|---------------------------------|-----------|------------------------------|-----------|--------------------------------|----------|
| | Coef. | SE | Coef. | SE | Coef. | SE |
| Financial autonomy | 0.5712**** | 0.0142 | 1.0202**** | 0.0064 | 4.1644**** | 0.0018 |
| Current equilibrium | 0.0673**** | 0.0013 | 0.1932**** | 0.0022 | -0.0019*** | 0.0007 |
| Indebtedness | 0.1117**** | 0.0020 | -0.0396**** | 0.0014 | -0.0815**** | 0.0032 |
| Investment | -0.0896**** | 0.0050 | 0.0838**** | 0.0073 | -0.2640**** | 0.0037 |
| Density | -0.0010**** | 0.0001 | -0.0044**** | 0.0004 | -0.0012**** | 0.0001 |
| Unemployment | 0.0007** | 0.0003 | 0.0034**** | 0.0001 | 0.0007**** | 0.0001 |
| GDP | -0.2157 | 0.1331 | 0.5432**** | 0.0888 | -0.5640**** | 0.0132 |
| Old | -0.0003**** | 0.0000278 | -0.0012**** | 0.0000211 | -0.0004**** | 9.47E-06 |
| _cons | -0.2534 | 0.3271 | 0.3621**** | 0.0331 | -1.4155 | 0.0055 |
| Arellano–Bond test for AR(2) in first differences | Pr > z = 0.429 | | Pr > z = 0.234 | | Pr > z = 0.086 | |
| Hansen test of overid. restrictions | Prob > χ^2 = 0.998 | | Prob > χ^2 = 0.999 | | Prob > χ^2 = 0.090 | |

Notes: All regressions include year fixed effects. *, **, ***, ***** Represent statistical relevance at 10, 5, 1, and 0.1 per cent levels, respectively

However, it is worth nothing that, in this case, Investment impacts positively on the dependent variable, suggesting that the ability to invest in the future increases the capacity of LGs to respond to economic and financial changes in the future.

Finally, Equation (3) (see Table VI) shows the results for vulnerability, which refers to the level of independence of LGs from external financing (the higher the level of this variable, the larger the independence from external resources and, therefore, the lower the vulnerability and the better the BS). We can see that financial autonomy and current equilibrium impact positively again, suggesting that LGs are less vulnerable (more financially independent) when financial autonomy and the balance between current revenues and expenditures increase. Moreover, large levels of indebtedness increase the vulnerability of LGs (i.e. reduce the level of independence from external financing). Investment also impacts negatively on vulnerability, suggesting that the independence of LGs from external financing is lower when they are involved in more long-term projects.

Regarding the control variables, population density and the proportion of inhabitants aged over 65 years impact negatively on sustainability, flexibility and vulnerability. Similar to previous findings, Unemployment shows positive coefficients, and the effect of GDP is not totally clear.

5.4 Sensitive analysis

We expect that results may be affected by the bad international financial situation from 2008, so we propose a refinement of the previous basic model:

$$\begin{aligned}
 BS_{it} = & \beta_0 + \alpha_1 \text{Financial autonomy}_{it} + \alpha_2 \text{Current equilibrium}_{it} + \alpha_3 \text{Indebtedness}_{it} \\
 & + \alpha_4 \text{Investment}_{it} + \alpha_5 \text{Financial autonomy} \times \text{Crisis}_{it} + \alpha_6 \text{Current equilibrium} \\
 & \times \text{Crisis}_{it} + \alpha_7 \text{Indebtedness} \times \text{Crisis}_{it} + \alpha_8 \text{Investment} \times \text{Crisis}_{it} \\
 & + \beta_1 \text{Density}_{it} + \beta_2 \text{Unemployment}_{it} + \beta_3 \text{GDP}_{it} + \beta_4 \text{Old population}_{it} \\
 & + \beta_5 \text{Crisis} + \eta_i + v_{it},
 \end{aligned} \tag{2}$$

Variables are the same as previous ones, but there is a new one—Crisis, which is a dummy variable that takes the value 1 for 2009–2014 (crisis period) and 0 for 2005–2008

(pre-crisis period). Furthermore, interaction terms between this new variable and previous independent variables are entered into the model.

Table VII shows the results. The effect of Financial autonomy, Current equilibrium and Investment are similar to those obtained previously in Model 1: the first two impact positively, while Investment impacts negatively on BS. In addition, these effects are higher in the crisis period, since the three interaction terms show similar results. However, the empirical results change in the case of Indebtedness. In Model 1, we obtained a negative effect of Indebtedness on BS; but here, in Table VII, Indebtedness positively impacts on BS, and Indebtedness \times Crisis negatively impacts. This means that the level of indebtedness positively affects the ability of LGs to raise sufficient revenues to cover their legally required expenditures without falling into deficit, but it turned negative in the crisis period when the level of indebtedness had to be controlled by governments after cutting reforms to fight the crisis in Italy.

5.5 Implications

Findings from this study contribute to the academic debate on the consequences of implementing public management reforms in the wake of NPM principles. Indeed, these reforms have caused an increasing decentralisation of competencies, with one of the main effects being an increasing autonomy of LGs from central governments. Moreover, reforms have stimulated LGs to provide more adequate public services to citizens (Pérez-López *et al.*, 2015), at the same time emphasising their financial conditions and providing several remedies in cases of financial distress (Cohen *et al.*, 2017).

Consistently, findings from this study underline the effects of both LGs' broad autonomy to manage expenditures and revenues originated by public service delivery and the reduction of transfers and grants from other levels of government.

Bearing in mind that financial results and their variations relate principally with management policies, several implications for policymakers to take note of emerge. First, controlling the relationship between current revenue and expenses is essential for preventing future solvency problems. Second, preserving financial autonomy from external sources and controlling the level of indebtedness are key elements for guaranteeing sound financial management and covering citizens' demands for public services with available resources.

| | Coef. | SE |
|---|-------------------------|--------|
| Financial autonomy | 5.4974**** | 0.1410 |
| Current equilibrium | 0.1777**** | 0.0043 |
| Indebtedness | 0.1324**** | 0.0065 |
| Investment | -0.1512**** | 0.0279 |
| Crisis | -0.9261**** | 0.0763 |
| Financial autonomy \times Crisis | 0.3498*** | 0.1129 |
| Current equilibrium \times Crisis | 1.0798**** | 0.0310 |
| Indebtedness \times Crisis | -0.3559**** | 0.0174 |
| Investment \times Crisis | -0.3310**** | 0.0412 |
| Density | -0.0073**** | 0.0005 |
| Unemployment | 0.0004 | 0.0003 |
| GDP | -0.4304 | 0.3722 |
| Old | -0.0002**** | 0.0000 |
| _cons | -0.9539**** | 0.1580 |
| Arellano-Bond test for AR(2) in first differences | Pr > z = 0.202 | |
| Hansen test of overid. restrictions | Prob > χ^2 = 0.996 | |

Table VII.
Sensitivity analysis

Notes: All regressions include year fixed effects. *, **, ***, **** represent statistical relevance at 10, 5, 1, and 0.1 per cent levels, respectively

Third, the effects of long-term investments should not be taken for granted while investigating the solvency of LGs.

To recapitulate, monitoring and having a picture of financial conditions in general, and BS in particular, are essential in making governments sustainable. Therefore, the knowledge of appropriate diagnostic tools of the financial situation becomes not only an issue but a necessity (Cabaleiro *et al.*, 2013) to evaluate and support public services management. Indeed, a public sector entity will be considered “sustainable” if it can cover the demand for public services without increasing taxes or using debt; otherwise, it will be considered an unsustainable entity. Therefore, public managers would be interested in assessing the quality of public services (i.e. not only in terms of efficiency but mainly focussing on their effectiveness; Osborne *et al.*, 2014), their costs and the ways of obtaining funds to provide them, at the same time evaluating their future financial sustainability (Walker, 2009).

6. Conclusion

This study has investigated BS as a part of the financial condition of LGs. Focussing on the Italian context, we have analysed whether this variable is affected by the growing demand for public services in the last decade, coupled with a decentralisation of competencies from central governments to LGs and a parallel reduction in transfers.

Our empirical findings suggest that BS of Italian LGs may improve with less dependency on external resources, when current expenditures may be covered by current revenues, by reducing the level of indebtedness, and by controlling the investment in long-term projects.

The study is not free of limitations. First, it focusses on a single country; therefore, it would be interesting to expand the analysis by considering other contexts. Second, the study is essentially based on BS; therefore, enlarging the view by considering other aspects of financial condition would improve the results. Third, the three BS sub-indicators (i.e. sustainability, flexibility and vulnerability) take on value within a narrow range, so it could be interesting to check the robustness of our findings with alternative measures of BS.

Note

1. Results are not included, but they are available to readers upon request.

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Appendix

| Variable | Definition | Measurement |
|-------------------------|---|---|
| Budgetary solvency (BS) | The ability of a public sector organisation to raise sufficient revenues to cover its legally required expenditures without entering into deficit | Global index that takes values between 0 and 7 |
| Sustainability | The capacity of an entity to promote and preserve citizens' welfare through public policies and public services delivery | Taking values between 0 and 1 |
| Flexibility | The capacity of an entity to adapt to external (economic and financial) changes, within the limits of its fiscal abilities via modifications to tax rates, public debt or transfers | Taking values between 0 and 3 |
| Vulnerability | The level of independence of an entity in relation to external financing received via transfers and grants | Taking values between 0 and 3 |
| Financial autonomy | The freedom to impose local taxes, collect revenue and allocate financial resources without external interference | Ratio of revenues obtained from taxes and other extra-tax incomes to total current revenues |
| Current equilibrium | The ability of current revenue to cope with current expenses | Ratio of current revenues to current expenses |
| Indebtedness | The incidence of the debts on cashed current revenue | Ratio of total debts to total current cashed revenues |
| Investment | Part of the expenses that the municipality decides to devote to long-term projects | Ratio of capital expenditure to total current expenditure |
| Density | Population density | Natural logarithm of the number of inhabitants per km ² |
| Unemployment | Unemployment rate | Number of unemployed people as a percentage of the labour force |
| GDP | Per capita GDP | Gross domestic product (GDP) divided by population |
| Old | Population over 65 years | Percentage of population over 65 years |

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