



### Measuring the financial sustainability and its influential factors in local governments

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## Measuring the financial sustainability and its influential factors in local governments

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### Abstract

The economic crisis has led international organizations and previous research to point out the need for measuring and controlling financial sustainability in governments. Based on the main international pronouncements, this paper seeks to contribute to the measurement and management of the financial sustainability, analysing the income statement evolution and identifying its influential factors. An empirical study of Spanish municipalities is then undertaken to test the relationship between the measure of the financial sustainability and three dimensions proposed by IFAC (revenues, debt and services). Our findings indicate that the income statement is a good approach for the financial sustainability assessment, because it reveals relevant information about its three dimensions, allowing to identify the specific factors which could provoke sustainability problems on public services.

**Key words:** Financial Sustainability; Local Government; Income Statement

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## I. Introduction

The economic crisis, especially the debt and deficit in government finances, has led international organizations to point out the need for sustainability policies to be implemented (CICA, 2009; EC, 2011; EU, 2012a; IFAC, 2014), in order to create the necessary conditions for achieving financial health and ensuring intergenerational equity (Groves and Valente, 2003; Cabaleiro *et al.*, 2013), particularly in local governments which have been involved in a context of a decrease of public revenues followed by public expenditure cuts.

In fact, recent papers and international pronouncements have identified high volume of debt and deficit as two essential problems for local governments, encouraging the opportunity and the interest of studying its repercussion on financial sustainability of these organizations (Bailey *et al.*, 2014; Checherita-Westphal *et al.*, 2014; International Monetary Fund –IMF-, 2014; Pérez-López *et al.*, 2013).

In this context, following World Commission on Environment and Development (WCED, 1987) and IFAC (2014), financial sustainability can be defined as the ability to meet service delivery and financial commitments both now and in the future, applying current policies and maintaining them in the future without causing debt to rise continuously. According to IFAC (2013), long-term sustainability of a public sector entity's finances is composed of three inter-related dimensions: service, revenue and debt.

However, to measure the financial sustainability of governmental policies, international bodies such as EC (2011), EU (2012a, b), IFAC (2012, 2013), NAO (2013) and previous studies (Navarro *et al.*, 2010; Williams *et al.*, 2012; Rodríguez *et al.*, 2014), are recognising the usefulness of government financial statements to report on the sustainability of public policies.

Specifically, the income statement is strongly linked to the intergenerational equity concept (GASB, 1990; IFAC, 2012, 2014), which has a crucial importance in assessing financial sustainability (Pezzey and Toman, 2002; Stavins *et al.*, 2003; IFAC, 2014), by enabling users to assess, on the one hand, the capacity of the entity to continue providing at least the same volume of goods and services and, on the other hand, the level of resources that will be needed in the future to continue to fulfil its public services delivery obligation (GASB, 1987, 1990; IFAC, 2014). This has led to pronouncements of international organizations (GASB, 1990; EU, 2012a, b; IFAC, 2014) and previous research (Krueger and Agyeman, 2005; Rodríguez *et al.*, 2014), to recognize that the income statement should play a fundamental role in the assessment of financial sustainability in public administration.

In this line, the financial sustainability measurement and the influence of the three dimensions of IFAC (2013), are especially interesting for local governments, since its behaviour has not been consistent with the real economy evolution (EU, 2012b) causing a high debt levels. This fact significantly contributed to the economic and financial crisis of the governments of Eurozone countries, generating substantial risk in maintaining the ability to deliver services in the future (Bailey *et al.*, 2014).

However, up until now, very few works have been dedicated to study how the financial sustainability of local governments and its determining factor can be measured and controlled, so more studies on the subject are necessary (Guthrie and Farneti, 2008; Rodríguez *et al.*, 2014).

This article aims to provide new knowledge on the measurement and improvement of the financial sustainability of governmental policies. Therefore, the aim of this paper is twofold. First, the paper analyses whether the informative content of

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3 financial statements, specially the income statement, provide useful information to  
4 measure the financial sustainability in local governments. Secondly, the paper also  
5 examines influential factors on the evolution of the financial sustainability in these  
6 governments. We have carried out a statistical model of panel data based on the analysis  
7 of the association between the behaviour of the income statement and the evolution of  
8 the three dimensions of sustainability proposed by IFAC (2013).

9  
10 The remainder of this paper is as follows. The second section deals with the  
11 need for measuring financial sustainability and how it can be measured. The third  
12 section shows the research questions. The fourth section, empirical research is  
13 performed on local governments in Spain with large population. The fifth section  
14 reports the results of the empirical analysis. In the final section, conclusions are  
15 analysed.

## 16 17 18 **II. Measuring Financial Sustainability in Governmental Organizations**

19  
20 Based on CICA (1997), Bath (2001) and Stavins *et al.* (2003) financial  
21 sustainability can be defined as the ability of government to finance the provision of  
22 public services at present without compromising the ability to do so in the future. So,  
23 one of the crucial issues pertaining to sustainability is intergenerational equity (WCED,  
24 1987), or ‘inter-period equity’ (Pezzey and Toman, 2002; IFAC, 2014).

25  
26 In this regard, the Stability and Growth Pact of the Member States of the  
27 European Union (EU, 2012a) focuses on accounting tools to prevent excessive deficits.  
28 In addition, Directive 2011/85/EU of the European Council of 8<sup>th</sup> November 2011 (EC,  
29 2011) stresses that improvements in public accounting practices, making them more  
30 comprehensive and reliable, are crucial to financial sustainability.

31  
32 In addition, IFAC (2014) has also highlighted the importance of financial  
33 statements for assessing financial sustainability, considering them vital to achieve an  
34 understanding of the present situation of public finances. Specifically, IFAC (2012)  
35 indicates that the income statement provides useful information for assessing future  
36 ability of governments to continue providing the same services while maintaining their  
37 quality, which is a main feature of long-term fiscal sustainability. IPSAS n° 1 (IFAC,  
38 2014), indicates that the statement of financial performance, also named as income  
39 statement, reflects all items of revenue and expense recognized in the fiscal period. So,  
40 the income statement is comprised of positive components (revenues), which are added,  
41 and of negative components (expenses), which are subtracted. The balance of this  
42 financial statement is obtained as a difference of these components, which are registered  
43 under accrual basis of accounting (called surplus/deficit of the period).

44  
45 Accordingly, the IFAC has released a Recommended Practice Guide that  
46 provides a guidance report on the financial sustainability of governmental entities,  
47 identifying that it consists of three interrelated dimensions: revenues, debt and services.  
48 Therefore, based on the concept of inter-period equity, the income statement is a  
49 representative indicator of financial sustainability of government policy (GASB 1990;  
50 IFAC, 2014) and it could include the three financial sustainability dimensions (IFAC,  
51 2013).

52  
53 According to IFAC (2013), the revenue dimension considers taxation levels and  
54 other revenue sources over the period of the projections, given current policy  
55 assumptions on the provision of services to recipients and entitlements for beneficiaries,  
56 while remaining within debt constraints. Secondly, the debt dimension considers debt  
57 levels over the period of the projections, given current policy assumptions on the  
58 provision of services to recipients, and entitlements for beneficiaries and revenue from  
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3 taxation and other sources. Thirdly, the service dimension considers the volume and  
4 quality of services to recipients and entitlements to beneficiaries over the period of the  
5 projections, given current policy assumptions on revenue from taxation and other  
6 sources, while remaining within debt constraints.

7  
8 In this context, although international bodies and previous research conclude that  
9 the income statement is a useful measure of financial sustainability statement, our  
10 motivation is based on the fact that previous studies neither have analysed its ability to  
11 reflect the combined effect of the three dimensions nor have identified influential  
12 factors on the evolution of the financial sustainability.

13 We undertake this empirical research on the conviction that our findings will  
14 advance the knowledge of useful tools to manage and to improve the financial  
15 sustainability of public services, allowing us to identify influential factors. Therefore,  
16 the aim of the paper is of scientific interest because it could be useful for public  
17 managers and policymakers, since it provides them relevant information to: a) evaluate  
18 the ability to modify the volume and the quality of services provided; b) identify and  
19 measure risks for maintenance across the time of this capacity; c) provide vulnerability  
20 issues linked to reduced revenues and increased expenses.  
21  
22

### 23 **III. Objectives and Research Questions of the Empirical Research**

24  
25 According to the previous sections of this paper, our empirical research analyses  
26 the usefulness of the informative content of the income statement to assess the financial  
27 sustainability and, furthermore, we try to find influential factors on its evolution in local  
28 governments.

29 To achieve these goals, four investigation questions are analysed in this paper:

- 30  
31 1) Does the income statement provide relevant information to measure the financial  
32 sustainability?  
33 2) Can the behaviour of revenues affect the evolution of financial sustainability?  
34 3) Can the evolution of the debt have influence on the behaviour of the financial  
35 sustainability?  
36 4) Can the changes in the volume and quality of services explain the behaviour of  
37 the financial sustainability?  
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39

40 The opportunity and interest of the objectives and questions of our empirical  
41 research are motivated by international organizations' pronouncements and prior  
42 research. Following IFAC (2014), we seek to answer the first research question  
43 analyzing the informative content of the income statement to assess the financial  
44 sustainability and studying its association with possible explanatory variables.

45 The financial sustainability is determined by the ability of the local government  
46 to manage expected financial risks and shocks over the long-term financial planning  
47 period, without necessity to introduce substantial or disruptive revenue (and  
48 expenditure) adjustments (CICA, 2009; CSIS, 2010; USAID, 2011; EC, 2011; EU,  
49 2012a, b; IFAC, 2012, 2014). So, one of the crucial issues pertaining to sustainability is  
50 intergenerational equity (WCED, 1987), or 'inter-period equity' (Pezzey and Toman,  
51 2002; IFAC 2014).  
52

53 In public sector accounting, the intergenerational equity is a concept more  
54 closely linked to the income statement (GASB, 1990; IFAC, 2012), since it use the  
55 accrual criteria. Under this approach, financial sustainability through the information  
56 content in the income statement can be measured from a much more comprehensive  
57 standpoint than that of budget information, as it includes the consumption of capital  
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3 investments, estimates of future costs, and expenses incurred but pending allocation to  
4 the budget, among other items. These concepts effectively represent the organization's  
5 capacity to maintain its financial well-being in the future.

6 So, the income statement must play a fundamental role in assessing financial  
7 sustainability, by enabling users to assess, on the one hand, the capacity of the entity to  
8 continue providing at least the same volume of goods and services and, on the other  
9 hand, the level of resources that will be needed in the future to continue to fulfil its  
10 public services delivery obligation (IFAC, 2012).

11 On the other hand, the second research question analyses the behaviour of  
12 revenues because the IFAC (2013) considers it as one of the dimensions of the financial  
13 sustainability. This dimension should include the ability to vary government revenues  
14 from taxes and create new ones, including income received from entities at other levels  
15 of government or from international organizations (IFAC 2013). So, in our empirical  
16 study, this dimension must include the total income of the period, taking into account  
17 current policies on the provision of services to citizens and revenue from taxation and  
18 other sources. Thus, it could be interesting to select some variables to measure the  
19 revenue dimension and its elements, since the destiny and source of this dimension  
20 could have influence on its probability of future occurrence (Guillamón *et al.*, 2011;  
21 Rodríguez *et al.*, 2014).

22 According to the third research question, IFAC (2013) proposes the debt as an  
23 another dimension of the financial sustainability and establishes that an increase of debt  
24 shows that a higher proportion of income is required to repay it, causing the diversion of  
25 resources necessary for the provision of services. Therefore, our empirical research will  
26 try to identify the influence of the debt dimension on the financial sustainability, since  
27 the debt control is crucial to maintain it (Checherita-Westphal *et al.*, 2014). In this  
28 regard, it could be necessary to determine the variable that can represent the debt  
29 dimension and its factors, since its maturity and origin could have influence on financial  
30 sustainability (Rivernbark *et al.*, 2010; Cabaleiro *et al.*, 2013).

31 Finally, the IFAC (2013) determines that the quality and volume of services  
32 provided by the government given current policies is the service dimension of the  
33 financial sustainability. So, the study of the public services is relevant in order to  
34 achieve the financial sustainability. Therefore, it is essential to choose adequate  
35 variables in order to measure the service dimensions, since this dimension must express  
36 the ability of the entity to maintain or change the volume and quality of provided  
37 services. Moreover, it could be interesting to analyse its factors, since the nature and  
38 purpose of the expenditures could determine the fixedness or variability of services  
39 (Groves and Valente, 2003; Štastná and Gregor, 2015).

#### 46 **IV. Research Methodology**

##### 47 *Sample selection*

48  
49 We will check the proposed research questions using a sample of municipalities  
50 from a country which has one of the highest sustainability gap indicators in Europe, in  
51 the short, medium and long term (EU, 2012b). In Spain, as in other European Union  
52 countries, public sector revenues and expenditures have increased significantly in the  
53 recent years as a result of the increased functions undertaken and the expanding role of  
54 the public sector in economic activity (Bank of Spain, 2014; Pérez-López *et al.*, 2013).  
55 According to Guillamón *et al.* (2011), Ruiz-Huerta and García (2012), Solé-Ollé and  
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3 Sorias-Navarro (2012) and the Bank of Spain (2014), this behaviour is not consistent  
4 with the real capacity of the economy, and it has led to high levels of public debt, which  
5 will have a very negative effect on future service provision by all levels of government.

6  
7 In the case of Spanish municipalities, a great part of this deficit has been  
8 generated by the difference between the increase in expenditure and the decrease of  
9 revenue that has been a consequence of the 'property bubble'. In Spain, in the years  
10 2002–2006, construction was a very important source of municipal revenue due to tax  
11 collection. However, in 2007, the property market correction caused new construction to  
12 fall (-14%), this decrease becoming huge in 2008 (-58%) (Bastida *et al.*, 2014). This  
13 caused a large decrease in municipal revenues that depend on construction activity,  
14 while the expenditures continued to rise, causing a great deficit in the Spanish  
15 municipalities.

16  
17 Therefore, sustainability studies are particularly timely and relevant to the public  
18 sector in countries such as Spain, where its prior expansion, coupled with duplication in  
19 the delivery of services by local and regional governments, preceded severe public  
20 spending cuts (Navarro *et al.*, 2010; Ruiz-Huerta and García, 2012; Bank of Spain,  
21 2014). This study focuses on the financial sustainability of local governments for the  
22 following reasons. First, local governments represent the level of administration that  
23 builds the highest level of debt in the Spanish public sector (Brusca *et al.*, 2015).  
24 Second, because our understanding of this question is enriched by greater attention to  
25 institutional detail, with particular respect to the context of local government, which has  
26 been the target of many public sector reforms (Pallot, 2001; Smith, 2004). Third, in  
27 view of the politics of legislative reforms of administrative structures carried out in the  
28 1990s (Gallego and Barzelay, 2010) and the managerial devolution process  
29 implemented in Spain (Bastida and Benito, 2006), local government in this country is  
30 well placed to be aware of citizens' information needs (Watt, 2004). Finally, local  
31 governments manage very large budgets and provide a wide variety of services (Sáiz,  
32 2011).

33  
34 In designing this study, according to numerous prior empirical studies of local  
35 public finance (Pina *et al.*, 2010; Guillamón *et al.*, 2011; Brusca *et al.*, 2015), we chose  
36 to examine exclusively municipalities with relatively large populations. In Spain, they  
37 are municipalities with a population over 50,000 inhabitants, together with those which,  
38 although smaller in terms of numbers, are classified as 'large population' under Article  
39 121 of Local Government Regulatory Act 7/1985, amended by the Local Government  
40 Modernisation Act 57/2003. This was done for the following reasons.

41  
42 First, the municipalities with a population over 50,000 account for more than  
43 50% of the Spanish population (INE, 2013; Brusca *et al.*, 2015). Second, in large  
44 municipalities the available resources are greater than in smaller ones, and so  
45 sustainability analysis has greater scope and impact. Third, according to the current  
46 legislation, all municipalities with over 50,000 inhabitants are obliged to provide the  
47 same type of services. Fourth, the accounting model used by local governments with  
48 large population (regulated by Order EHA/4041/2004) is considerably more complete  
49 and detailed than the simplified version used by small municipalities. Moreover, this  
50 accounting model based on the accrual criteria proposed by the standards of IFAC  
51 (2014) involves a great homogeneity in the preparation of financial statements, which  
52 contributes to its proper statistical analysis.

53  
54 Under this rationale, we analysed a sample of 130 of the total of large Spanish  
55 municipalities (148), the only ones whose financial and budget complete information  
56 were available from 2006 to 2011. This sample corresponds to 87.84% of the valid  
57 municipalities for the study and represents over 45% of the total Spanish population and  
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3 over 9.82% of the total national budget. Furthermore, the period studied includes three  
4 years where economic growth is not influenced by the crisis (2006, 2007 and 2008), and  
5 three years with effect of the crisis (2009, 2010 and 2011).  
6

7  
8 *Variables (explained and explanatory variables)*

9  
10 **Explained Variable.** In this paper, the explained variable is financial  
11 sustainability in local governments, which is determined by these entities' ability to  
12 manage expected financial risks and shocks over the long-term financial planning  
13 period, without compromising the future generations (CICA, 2009; CSIS, 2010;  
14 USAID, 2011; EC, 2011; EU, 2012a, b; IFAC, 2012, 2014). Due to the relationship  
15 between the intergenerational equity and the financial statements explained in the  
16 Section III, we use the informative content of the income statement to assess the  
17 financial sustainability.  
18

19 However, the government income statements currently produced does not seem  
20 to be sufficient to assess the financial sustainability or otherwise of public  
21 administrations (Williams *et al.*, 2012; Rodríguez *et al.*, 2014), because they include  
22 extraordinary activities which are not expected to be repeated in the foreseeable future  
23 within the environment in which the organization operates. Accordingly, the effect of  
24 revenues and expenses deriving from extraordinary activities must be corrected in the  
25 income statement, since they lack of any future scope. This modification would make  
26 the income statement a more reasonable measure of the intergenerational equity, and  
27 more accordant with the concept of financial sustainability.  
28

29 Therefore, we have adjusted the balance of the annual income statements in  
30 accordance with the purposes of this paper, in order to maximise their utility for  
31 assessing financial sustainability. Thus, in this paper the explained variable is  
32 represented by the total amount of the adjusted income statement, as shown in Fig. 1.  
33

34 Likewise, we should distinguish between the concepts of budgetary expenditure  
35 and revenue, and financial expenditure and revenue. The former are part of the budget  
36 and provide the annual budget results, while the latter fall within the area of financial  
37 accounting and constitute the income statement as analysed above. The differences  
38 between these concepts arise, on the one hand, from their content, and on the other,  
39 from the criteria applied for their allocation. Thus, some items are defined as budgetary  
40 expenditures or revenues and are not considered financial expenditures or revenues.  
41 Therefore, there are some differences between financial and budget expenditures, and  
42 these differences are reflected too in the particular case of budgetary revenues with  
43 respect to financial revenue.  
44

45 Furthermore, in Spain, while expenditure and revenue are allocated to the  
46 income statement in accordance with the accrual basis of financial accounting, the  
47 allocation of budgetary expenditure and revenue is primarily cash-based or follows a  
48 mixed cash accrual criterion in determining the budget results, and these criteria are  
49 clearly divergent. In any case, during the period analyzed, the Spanish local  
50 governments used a model consistent with IFAC's international accounting standards  
51 (2014).  
52

53 In summary, in measuring financial sustainability, this paper follows the  
54 recommendations of the main international organizations (USAID, 2011; EU, 2012a)  
55 and the pronouncements of international accounting bodies such as GASB (1990),  
56 FASB (2012) and IFAC (2012). Accordingly with this Section and the Section III, our  
57 dependent variable is the measure of financial sustainability reflected in the income  
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3 statement (adjusted for extraordinary results), which is an accounting statement based  
4 on the accrual basis (IFAC, 2014).  
5

6 **Explanatory Variables.** As already mentioned, IFAC (2013) indicates that long-term  
7 sustainability of public sector entities' finances is composed of three dimensions: debt,  
8 revenues and services. Therefore, considering the objective of this paper, we will take  
9 these dimensions as potential explanatory variables in our statistical analysis, which  
10 allow us to identify influential factors on the financial sustainability.  
11

12 To begin with the revenue dimension, as we have explained in Section III, IFAC  
13 (2013) considers that this dimension includes the ability to vary total government  
14 revenues. So, we measure the revenue dimension by the total income of each local  
15 government, reduced by the amount of the extraordinary income, since it is unlikely to  
16 recur in the future and they are not controllable by the local policy makers.  
17

18 In addition, it is interesting determine which factors of revenues could affect  
19 financial sustainability, since prior research shows that the source of revenues and its  
20 destiny could influence their probability of future occurrence (Guillamón *et al.*, 2011;  
21 Rodríguez *et al.*, 2014). So, to analyse the revenue dimension, we identify four possible  
22 factors which could affect financial sustainability: external revenues, internal revenues,  
23 capital revenues and operating revenues.  
24

25 Regarding the debt dimension, IFAC (2013), in accordance with the IMF (2007)  
26 and CICA (2009), states that it must be measured by debt net per capita, since it is a  
27 variable that provides information about public administration's indebtedness in a year,  
28 taking into account current policies in the provision of goods and services. Following  
29 these statements, in this paper the variable net debt will be calculated by total debt (total  
30 liabilities) less financial assets, defined as the receivables of the entity and the liquid  
31 assets.  
32

33 Furthermore, to analyse the debt dimension (net debt per capita), we have  
34 identified four possible factors which could affect financial sustainability (long-term  
35 debt, short-term debt, commercial debt and financial debt), since Rivernbark *et al.*  
36 (2010) and Cabaleiro *et al.* (2013) suggested that the maturity and origin of the debt  
37 could influence on financial sustainability.  
38

39 Finally, IFAC (2013) considers the services dimension as the quality and volume  
40 of services provided by the government given current policies. We utilise the  
41 government expenditures to measure this dimension following Schaltegger and Torgler  
42 (2006) who used the expenditures as an approach of the government size. In fact,  
43 Cameron (1978) and Choi *et al.* (2008) take government expenditures as approach of  
44 demand for public services and goods, due to the causal relationship between volume of  
45 provided services and expenditures. It means, a greater volume of provided services by  
46 local government requires a greater amount of expenditures (staff, infrastructures...),  
47 since the resources employed by local government to meet the citizens' demands  
48 increase when the number of users of public services rise.  
49

50 Moreover, in the analysis of the services dimension, it is interesting to identify  
51 which factors related to services, like wages, financial expenditures, capital  
52 expenditures and operating expenditures, could influence on financial sustainability,  
53 since factors such as wages and capital expenditure influence on the financial stress of  
54 Spanish municipalities (Brusca *et al.*, 2015). Following prior research (Groves and  
55 Valente, 2003; Štastná and Gregor, 2015), the nature and purpose of the expenditures  
56 could determine the fixedness or variability of services, which could affect the  
57 sustainability of public services.  
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Fig. 2 shows all the dependent and independent variables that we try to analyse in this paper, together with their measurement and the main descriptive data.

### *Statistical model and methodology*

To achieve the aim of this study, we will check if the measurement of financial sustainability may or may not be explained by the behaviour of the three dimensions proposed by IFAC (2013), basing on the following model.

$$FS_{it} = \beta_1 REV_{it} + \beta_2 SERV_{it} + \beta_3 DEBT_{it} + u_{it}$$

(FS: financial sustainability; REV: revenues; SERV: services; DEBT: debt)

We selected the panel data technique because it is the technique used by the latest research in government, since the technique can increase the number of observations by pooling different time-series together (Zhu, 2013). In other words, we have a vector of variables for N (148 local governments) over T periods of time (six years, from 2006 to 2011):  $x_{it}$  for  $i = 1 \dots N$  and  $t = 1 \dots T$ . The error ( $u_{it}$ ) is composed for  $\alpha_i$  (unobservable heterogeneity) designed to measure unobservable characteristics of the local governments that have a significant impact on financial sustainability of local governments, and  $\epsilon_{it}$  (the error term).

To conduct panel data estimation, it is necessary to determine the use of fixed effects or random effect. However, the exogeneity of the variables should also be considered, since both estimators are biased when endogenous variables are included in the model (Wooldridge, 2002; Baltagi, 2008). In our research, although there are no previous studies on the possible endogeneity of the explanatory variables with financial sustainability, there are studies that interpret the possible existence of bi-directional causality between transfers, municipal debt, and income endogenous in a model of municipal spending (Cárdenas and Sharma, 2011). Given the variables in this study are closely related with the variables in our model, we thought endogeneity might exist between financial sustainability and income, services and debt. Therefore, we estimate our model by Generalised Method of Moment (GMM) (Dynamic Panel Data), which is very appropriate to control for explanatory variables' potential endogeneity (Wooldridge, 2002; Baltagi, 2008).

We use, specifically, the robust System-GMM (Arellano and Bover, 1995; Windmeijer, 2005), which combines the moment conditions for the equations in first-differences with additional moment conditions implied for equations in level. In this sense, this statistical technique is a more powerful tool to control the possible endogeneity that could occur in this type of database.

To check the robustness and suitability of the model used, we perform the Arellano–Bond test ( $m$ ) to check the existence of serial correlation (Arellano and Bond, 1991), and the Sargan test of over-identifying restrictions to verify that the instruments used to control the endogeneity are adequate (Arellano and Bond, 1991). In our investigation, following Fig 4, the Arellano-Bond test ( $p=0.17$ ) and Sargan test ( $p=0.067$ ) confirm the consistency of our model and, therefore, the robustness of the results we have obtained, controlling any type of endogeneity that may exist between the variables.

In summary, we use the statistical methodology which avoids the distorting effect of possible endogeneity and multicollinearity, allowing us to obtain robust results to properly support the findings related to the purpose of the paper.

## V. Analysis of Results

### *Descriptive Statistics*

As shown in Fig. 2, the variable with the highest average is the total revenue (977.83), followed by operating revenues with a value of 870.93; while the lowest averages correspond to financial expenditures (21.17) and capital expenditures (6.72).

Regarding the homogeneity of the behaviour of the variables, considering all observations (overall), variables with less dispersion (standard deviation) are financial expenditures (16.07) and capital expenditures (51.34) and the variables with greater dispersion are total debt (476.94), short-term debt (303.83) and financial debt (277.36).

On the other hand, the comparison of the dependent variable with the explanatory variables of the three dimensions proposed by IFAC (2013) shows that the financial sustainability has a lower standard deviation (160.60) than the three mentioned dimensions (revenues, services and debt). Similarly, if we observe the standard deviation of the mean between analysed governments, the uniformity of financial sustainability is higher than in the three dimensions, because it shows the lowest value (90.55).

However, when we analyse the intra-group values, financial sustainability has greater homogeneity than revenues or debt dimensions, but less homogeneity than services dimension (98.75).

On the other hand, it is important to highlight that the behaviour of all independent variables is more heterogeneous among municipalities (between groups) than between the years within the same local government (intra-groups). However, in the case of the dependent variable (financial sustainability), the uniformity of evolution is higher among governments than between years observed for each government.

Similarly, the analysis of pairs of variables reveals interesting information. Our empirical results suggest that capital revenues, financial expenditures and capital expenditures appear to be the variables with lower oscillations and greater predictability as to future developments. Therefore, these three variables could be controlled and managed more easily than the rest and could represent less risk to the financial sustainability.

Regarding the use of the expenditures, even though the staff expenditures have a fixed character in time, their level of dispersion is greater than the capital expenditures which generally represent an investment effort which often varies significantly between years and/or between governments. This difference could be due to local governments analysed during the period under review devoting more resources to human capital rather than investing.

Taking into account the nature of the debt, although the meaning of commercial debt is significantly lower than the average of financial debt, the uniformity of their behaviour is very similar (see standard deviations overall, between and within). However, its values (overall, between and within) identify it as the variable with the most volatility, and therefore more difficult to control. This suggests that the debt could be one of the risk factors more harmful to the financial sustainability of local governments.

Finally, in the case of financial sustainability, the lowest dispersion of values between local governments implies that the management style of the policymakers possibly causes less volatility (and therefore less risks to financial sustainability) than the specific economic situation of each year, which usually comes imbued with factors

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3 uncontrollable by the local government, such as unemployment, income per capita,  
4 population age or volume of received grants.

5 Therefore, based on these results, the analysis of the vulnerability of variables  
6 advocated by IFAC (2014) must be more intense in those variables with higher level of  
7 volatility, because they seem to have higher risk of oscillating and being uncontrolled  
8 over time, particularly total debt and more especially, commercial debt and financial  
9 debt.

10 In addition, it seems interesting to compare behaviour of the variables between  
11 pre-crisis years (2006-2008) and post-crisis period (2009-2011). In post-crisis period,  
12 the mean of the revenues (1008.35) suffered a sharp drop compared with its mean in  
13 pre-crisis period (4447.36). Due to the drop of the revenues in post-crisis period, local  
14 government had to reduce their expenditures (from 2511.95 to 719.29) and increase  
15 their debt (from 302.87 to 467.98). Nevertheless, the mean of the revenues decreased in  
16 greater proportion than that of expenditures (77.32% and 71.36% respectively).

17 This fact provoked that the mean of the financial sustainability fell and changed  
18 from 1045.11 in pre-crisis period to 135.78 in post-crisis period. However, the standard  
19 deviations of the financial sustainability between these two periods are not significantly  
20 different (-532.72 and -518.09). As it was above mentioned, this result could  
21 corroborate that the behaviours of this variable in these two periods are similarly  
22 between local governments.

### 23 *Analysis of relationship between the income statement and three dimensions of the* 24 *financial sustainability*

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27 The results generated by the utilised statistical tools are robust enough to support  
28 these findings, since it allows control of the possible effects of endogeneity and  
29 multicollinearity.

30 Our results in Fig. 3 show that the financial sustainability in a particular year is  
31 not influenced by the behaviour of the previous year's financial sustainability, which is  
32 in concordance with the results mentioned about the descriptive statistics. In addition, to  
33 test the robustness of our model we pose the model without the lagged dependent  
34 variable. The results showed in the Fig. 4 do not change substantially when we drop the  
35 lagged dependent variable from the previous model (Drukker, 2008; Benito *et al.*,  
36 2012), except in the case of the long-term debt or financial debt which were not strongly  
37 significant. This confirms the robustness of our estimations and, therefore, we will  
38 analyse the results showed in the Fig. 4.

39 Therefore, the findings shown in Fig. 4 have empirically contrasted that the  
40 income statement is an important statement for the measurement of financial  
41 sustainability of local governments, as its temporal evolution is associated with the  
42 behaviour of the three main dimensions of financial sustainability proposed by IFAC  
43 (2013): revenues, debt and services. Our first results show that these three dimensions  
44 are significant for the analysis of financial sustainability, since the signs of the  
45 coefficients expected are accordant with the conceptual studies based on the IFAC  
46 (2013) pronouncements that we had realised in section 2.

47 Individually, we have tested that the variable debt and variable services have an  
48 adverse effect on the financial sustainability (coefficients -1.1305 and -0.0319,  
49 respectively), whereas the variable revenues have a favourable influence (+0.8593).

50 Therefore, our empirical analysis shows the ability of the income statement to  
51 reflect the negative and positive impact of the evolution of the three dimensions  
52 proposed by IFAC (2013), since it follows the same relationship that the IFAC (2013)

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3 proposes between these three dimensions and financial sustainability. However,  
4 comparative analysis between the coefficients shows that the financial sustainability  
5 (income statement) is more influenced by the variable services and revenues than the  
6 variable debt.

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8 Regarding the revenues dimension, its positive influence on financial  
9 sustainability has been tested empirically in our statistical analysis (coefficient +0.8593)  
10 with high explanatory power of external revenues (+0.8942), internal revenues  
11 (+0.7964), operating revenues (+0.7805) and capital revenues (+0.9566). Therefore,  
12 these results suggest that origin and nature of revenues could influence on the evolution  
13 of financial sustainability.

14 These positive coefficients suggest that the income statement could be a good  
15 indicator in two key issues of the revenues dimension, according to IFAC (2014):  
16 capacity and vulnerability. With respect to capacity, an increase of revenues could be  
17 reflected in the income statement, and it could mean a higher chance to increase the  
18 volume and the quality of services provided by local government. Otherwise, a  
19 decreased volume of revenues would involve a reduction of these possibilities.

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21 In fact, the coexistence of negative coefficient for expenditures and positive  
22 coefficient for revenues, empirically tests the utility of income statements for measuring  
23 sustainability, as suggested by IFAC (2014). The information obtained by the income  
24 statement could be useful in the management of financial sustainability and it could help  
25 governments to provide citizens with sufficient information about the financial  
26 sustainability through the relationship between expenditures and revenues.  
27 Governments are under growing pressure not only to manage their funds effectively, but  
28 also to show their management has been effective. To achieve this, governments need  
29 complete information about their expenditures in order to assess their revenue  
30 requirements, the sustainability of their programmes and their flexibility (IFAC, 2014).

31  
32 Moreover, the information content of the income statement could also help to  
33 predict vulnerability issues, since the source of revenues (coefficients +0.8593 and  
34 +0.8942) as their destination (+0.7805 and +0.9566) are indicators of the probability of  
35 occurrence in future years, as suggested by IFAC (2014). For example, a grant to fund  
36 expenditure programmes whose reception depends on a state government is more  
37 vulnerable than the taxes on ownership of houses in the town.

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39 Continuing with the debt dimension, its relationship with the income statement  
40 is weaker than in the case of the other two dimensions (coefficient of total debt: -  
41 0.0319). So, the volume of debt should be taken into account in the management of  
42 financial sustainability. However, our results show that the income statement could  
43 provide useful information in order to study this dimension's capacity and vulnerability,  
44 although the maturity (short-term or long-term) and the debt origin (financial or  
45 commercial) are not associated with the evolution of the financial sustainability.

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47 Finally, the services dimension (-1.1305) reflected in the income statement is a  
48 good approximation of its capacity and vulnerability (IFAC, 2014). We have been able  
49 to detect some explanatory factors, regarding to its destination and nature, such as  
50 wages (-2.4466), financial expenditures (-1.7438) and operating expenditures (-0.1109),  
51 which could be a useful tool to the management of the financial sustainability. A  
52 positive sign of the income statement implies the coverage of the services provided  
53 expenditures and, therefore, it shows the ability of the entity to maintain or even expand  
54 the volume and/or quality of services provided without jeopardizing financial  
55 sustainability. On the contrary, a negative balance involves the necessity to reduce its  
56 volume and/or quality in order not to endanger financial sustainability, or the necessity  
57 to obtain new funds to finance the expenditures.  
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3 Furthermore, our results reveal that the income statement could contribute to  
4 predict vulnerability problems, since it could help to make decisions about services  
5 taking into account uncontrollable factors by the local governments, such as the demand  
6 of citizens or regulatory impositions by other levels of government regarding services to  
7 be provided. This predictive ability of the income statement is reinforced by the fixed  
8 nature of staff expenditures, since the capacity of government decision on its evolution  
9 is more limited than in the case of variable expenditures, whose behaviour over time is  
10 more dependent on the volume of services provided, and operating expenditures.

11 In addition, a comparative analysis of the evolution of the financial expenditures  
12 and operating revenues could allow the income statement to predict vulnerability  
13 problems from uncontrollable factors such as changes in the interest rate of financial  
14 markets. As IFAC (2014) suggests, the income statement could contribute to make  
15 decisions about the percentage of revenues that should be destined to reimbursement  
16 debt and, therefore, the amount of revenues used to the provision of services.

17 Finally, the explanatory power of the income statement which supports our  
18 statistical analysis, reveals that this statement is useful for measuring the interrelation  
19 between the three dimensions suggested by IFAC (2013), since our results show the  
20 simultaneous influence of several factors of these dimensions on financial sustainability.  
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22 These results imply that the balance of the income statement is an approximate  
23 indicator of the financial sustainability of local governments. Our findings reveal that a  
24 negative value of the balance of the income statement reflects a warning sign, and  
25 policy makers and public managers should identify the causes making an analysis of the  
26 revenues and their application (current expenditures and capital expenditures) over time,  
27 the volume of the debt, the wages and the financial expenditures. Likewise, if the sign  
28 of the balance of the income statement is positive, our findings are useful for public  
29 managers and politicians interested in political preventive actuations in order to  
30 maintain the financial sustainability through the analysis of the explanatory variables.  
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## 33 34 **VI. Conclusion**

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36 In the current international context of economic crisis, the analysis of the  
37 financial sustainability of governmental policies is a key issue for public sector leaders  
38 (politicians and managers) and citizens, since it is interesting to learn and improve the  
39 intergenerational equity of public services. The main international organizations and  
40 academic research have concluded that the accounting systems of public entities are  
41 called in to play an essential role in measuring and improving the governmental  
42 sustainability. According to prior literature and different international organizations, the  
43 income statement is the government's financial statement most tied to the financial  
44 sustainability, since it is a good indicator to measure the intergenerational equity. In  
45 parallel, IFAC (2013) has identified three dimensions of financial sustainability  
46 (services, revenues and debt).  
47

48 Our results in Spanish local governments provide empirical evidence to support  
49 the idea that the income statement reveals important information about the effect of the  
50 evolution of the three dimensions on the financial sustainability of governments,  
51 including the individual effects in each dimension and the impact of the interrelation  
52 between them. So, the results of our empirical research support that the income  
53 statement is a useful instrument to provide relevant information about influential factors  
54 on financial sustainability, helping managers and politicians in the decision-making  
55 process about public policy.  
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3 In summary, the findings of this paper have revealed, on the one hand, that the  
4 income statement represents a useful measure of the impact of these dimensions on the  
5 financial sustainability, both positive and negative and, on the other hand, that it is an  
6 effective tool to identify and to assess influential factors on financial sustainability.

7 In addition, we have found empirically that the income statement supply  
8 information about the capacity of the entities to continue providing goods and services  
9 in the same volume and quality and the level of resources that will be needed to provide  
10 them in the future, so this income statement is relevant to analyse the evolution of the  
11 intergenerational equity. Therefore, the income statement shows useful information to  
12 assess the ability of vulnerability of the three dimensions identified by IFAC (2013). In  
13 this respect, in order to manage the intergenerational equity, local governments could  
14 adopt different decisions in any of these three dimensions to detect and manage the  
15 financial sustainability risk, taking into account the information that supply the income  
16 statement.

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18 In parallel, relevant information about revenues dimension can be extracted from  
19 the income statement as our findings support, since this report can be a good indicator  
20 of the capacity and vulnerability of this governmental sustainability dimension. Our  
21 results about revenues dimensions imply that the revenues origin (external and internal)  
22 and its destination (operating and capital) can be specific factors which affect financial  
23 sustainability of local governments.

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25 An increase in the volume of revenues would increase the chances of local  
26 government to increase the volume and/or quality of services provided. Also, according  
27 to IFAC (2014), our empirical results show that the income statement can reveal useful  
28 information for citizens in order to assess the financial sustainability through the  
29 relationship between expenditures and revenues, helping to predict vulnerability  
30 problems associated with reduction in revenue to cover expenditures that are maintained  
31 in the future, especially since, as noted by our statistical analysis, revenues are one of  
32 the variables with greater dispersion between years.

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34 On the other hand, the effect of the evolution of debt dimension is also reflected  
35 in the income statement. However, we have found no significant evidence of the debt  
36 origin and its maturity and, therefore ours results do not support the influence of these  
37 two factors on financial sustainability. Nevertheless, the negative influence of financial  
38 expenditures on financial sustainability can be useful to assess the capacity to provide  
39 services and to predict vulnerability problems caused by uncontrollable factors such as  
40 rising interest rates. This conclusion is reinforced when our descriptive results highlight  
41 that debt is the most volatile variable, between municipalities and between years.

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43 Regarding services dimension, income statement reveals useful information to  
44 assess the government's ability to maintain or adjust the volume and/or quality of  
45 services provided, and to predict vulnerability problems caused by uncontrollable  
46 factors such as demographic trends or standards issued by other levels of government.  
47 Furthermore, the association of income statement with the evolution of expenditures  
48 suggests that this report is useful to identify risk factors such as the staff expenditures  
49 and financial expenditures, which are two variables with a strong dependence on  
50 governmental style management, as shown by our descriptive analysis. So, our results  
51 show that the nature of expenditures could influence on the financial sustainability  
52 evolution, although it is unclear the final influence of the expenditure purpose, since we  
53 have found no empirical evidence of the association between capital expenditure and  
54 financial sustainability.

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56 Finally, regarding the possible extrapolation of our model for analysis of other  
57 governmental levels, we understand that the measurement of financial sustainability  
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could be accepted, although it would require an adequate accounting system. However, our findings allow deducing that the explanatory factors in the central and regional governments should be elected according to its peculiarity of functions such as: budget structure of revenues and expenditures, debt capacity, grants to the other governments or the final users of their activities.

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| Concept   | Amount      |
|---|-------------|
| Income statement for the financial year obtained by applying the current IPSAS                            | (1)         |
| + Negative entries for extraordinary activities   | (2)         |
| - Positive entries for extraordinary activities   | (3)         |
| Corrected income statement for the financial year (intergenerational equity for financial sustainability) | (1)+(2)-(3) |

**Fig. 1. Dependent variable. Financial sustainability: Adjusted Income Statement**

Source: own elaboration  
260x58mm (125 x 150 DPI)

For Peer Review

| Variable                                    | Calculation   | Mean     |         | Std. Dev. | Min       | Max     |
|---|---|----------|---------|-----------|-----------|---------|
| <b>Financial Sustainability<sup>1</sup></b> | Income Statement Adjusted = income statement – extraordinary revenues + extraordinary expenses                  | 121.1277 | overall | 160.6058  | -532.7156 | 997.755 |
|   |   |          | between | 90.55434  | -103.271  | 375.031 |
|   |   |          | within  | 99.163    | 427.8481  | 2072.04 |
| <b>Revenues<sup>1</sup></b>                 | Total of revenues - extraordinary revenues  | 977.8347 | overall | 256.9811  | 89.63999  | 2889.68 |
|   |   |          | between | 233.3268  | -353.8658 | 1188.95 |
|   |   |          | within  | 122.346   | -727.9144 | 1156.77 |
| <b>External Revenues<sup>1</sup></b>        | Current and capital transfers and grants + ceded taxes  | 378.5737 | overall | 130.7489  | 35.79921  | 1127.13 |
|   |   |          | between | 83.1675   | 168.775   | 580.739 |
|   |   |          | within  | 76.4692   | 269.3641  | 1281.52 |
| <b>Internal Revenues<sup>1</sup></b>        | Total revenues - external revenues - extraordinary revenues   | 600.6627 | overall | 214.1218  | 47.99468  | 2248.4  |
|   |   |          | between | 195.3929  | 321.6445  | 1644.94 |
|   |   |          | within  | 104.0553  | 154.7598  | 1737.35 |
| <b>Operating Revenues<sup>1</sup></b>       | Current revenues (current transfers, grants, services revenues, tax revenues...)                                | 870.9289 | overall | 228.7696  | 83.41305  | 2686.7  |
|   |   |          | between | 216.8804  | 645.8931  | 2131.74 |
|   |   |          | within  | 110.3737  | -730.0548 | 1085.2  |
| <b>Capital Revenues<sup>1</sup></b>         | Revenues for capital transfers and grants   | 102.3041 | overall | 89.5883   | -11.7603  | 661.893 |
|   |   |          | between | 81.1621   | 241.9506  | 702.237 |
|   |   |          | within  | 76.3646   | -147.8213 | 453.148 |
| <b>Debt<sup>2</sup></b>                     | Total liabilities - financial assets <sup>2</sup>   | 393.2627 | overall | 476.9442  | -1561.673 | 2770.29 |
|   |   |          | between | 438.8859  | -1074.426 | 1809.09 |
|   |   |          | within  | 208.4378  | -790.3945 | 1608.02 |
| <b>Long Term Debt<sup>2</sup></b>           | Total long-term debt - the percentage of financial assets <sup>2</sup>  | 211.363  | overall | 250.782   | -459.8469 | 2062.78 |
|   |   |          | between | 218.898   | 83.41305  | 1995.6  |
|   |   |          | within  | 111.9509  | -451.8071 | 947.95  |
| <b>Short Term Debt<sup>2</sup></b>          | Total short-term debt - the percentage of financial assets <sup>2</sup>   | 185.3308 | overall | 303.8322  | -1343.755 | 1919.31 |
|   |   |          | between | 274.2705  | -818.3453 | 1458.2  |
|   |   |          | within  | 144.8233  | -85.23563 | 2271.66 |
| <b>Commercial Debt<sup>2</sup></b>          | Total commercial debt (example creditors) - the percentage of financial assets <sup>2</sup>                     | 150.7308 | overall | 265.2456  | -1297.31  | 1550.43 |
|   |   |          | between | 240.3188  | -763.654  | 1297.34 |
|   |   |          | within  | 130.4939  | -458.6253 | 1465.37 |
| <b>Financial Debt<sup>2</sup></b>           | Total financial debt (example debenture and other securities) - the percentage of financial assets <sup>2</sup> | 245.5002 | overall | 277.3562  | -497.69   | 2118.76 |
|   |   |          | between | 257.5461  | -420.2527 | 1207.49 |
|   |   |          | within  | 133.0098  | -407.1345 | 924.3   |
| <b>Services<sup>1</sup></b>                 | Total operating expenses of services and social benefits such as social benefits, staff costs                   | 702.6666 | overall | 178.529   | 74.0514   | 1535.63 |
|   |   |          | between | 162.6186  | 377.3664  | 1333.04 |
|   |   |          | within  | 98.753    | -21.8399  | 1561.01 |
| <b>Wages<sup>1</sup></b>                    | Total staff cost  | 325.0117 | overall | 89.1598   | 32.4109   | 707.36  |
|   |   |          | between | 47.5714   | 6.2269    | 350.661 |
|   |   |          | within  | 43.93427  | -292.729  | 905.052 |
| <b>Financial Expenditures<sup>1</sup></b>   | Financial expenses  | 21.16739 | overall | 16.0708   | 0         | 127.954 |
|   |   |          | between | 13.7924   | 2.6829    | 86.7072 |
|   |   |          | within  | 8.4353    | -15.14391 | 88.7498 |
| <b>Operating Expenditures<sup>1</sup></b>   | Total expenses - capital expenses and extraordinary expenses  | 823.3808 | overall | 203.2929  | 95.48324  | 2289.42 |
|   |   |          | between | 177.956   | 573.2655  | 1671.34 |
|   |   |          | within  | 102.0778  | -118.1686 | 803.462 |
| <b>Capital Expenditures<sup>1</sup></b>     | Expenditures for capital transfers and grants   | 6.716299 | overall | 51.34419  | -0.823683 | 1197.78 |
|   |   |          | between | 29.96835  | 0         | 299.445 |
|   |   |          | within  | 31.21849  | 49.36899  | 622.334 |

Fig. 2. Descriptive analysis

Source: Own elaboration based on results obtained from STATA12 and the information obtained from INE and Income Statement.

Notes: N=880 observations (148 local governments, 6 years)

1Numbers in per capita values

2Financial assets=receivables+liquid assets.

Overall statistics=based on all the observations.

Between statistics=based on local governments regardless of time period.

Within statistics=based on all time periods regardless of local governments

303x394mm (150 x 150 DPI)

| Variables              | Model 1    | Model 2    | Model 3    | Model 4    | Model 5    | Model 6    | Model 7   |
|------------------------|------------|------------|------------|------------|------------|------------|-----------|
| FS-Retarded_1          | -3.21E-05  | -2.10E-05  | 3.93E-05   | 1.22E-05   | 3.51E-05   | 6.17E-05   | -4.11E-05 |
| Revenues               | .8790***   |            | .8798***   | .8819***   |            | 0.7735***  | .9273***  |
| Services               | -1.0208*** | -1.0092*** | -1.0054*** | -1.0170*** | -1.0224*** |            |           |
| Debt                   | -.0461***  | -.0432***  | -.0362**   |            |            | -0.1194**  | -0.173*   |
| External Revenues      |            | .9108***   |            |            |            |            |           |
| Internal Revenues      |            | .8356***   |            |            |            |            |           |
| Operating Revenues     |            |            | .8335***   |            |            |            |           |
| Capital Revenues       |            |            | .9877***   |            |            |            |           |
| Long-Term Debt         |            |            |            | -.0761*    |            |            |           |
| Short-Term Debt        |            |            |            | -0.0219    |            |            |           |
| Commercial Debt        |            |            |            |            | 0.0017     |            |           |
| Financial Debt         |            |            |            |            | -.0822**   |            |           |
| Wages                  |            |            |            |            |            | -1.0649**  |           |
| Financial Expenditures |            |            |            |            |            | -1.9517*** |           |
| Operating Expenditures |            |            |            |            |            |            | -.7664*** |
| Capital Expenditures   |            |            |            |            |            |            | 0.0515    |

**Fig. 3. Lagged dependent variable in the right hand side**

Source: Own elaboration based on the test performed in STATA12  
 Note: Significant at 1%\*\*\*; Significant at 5%\*\*; Significant at 10% level\*.  
 273x135mm (119 x 150 DPI)

| Variables                  | Model 1    | Model 2     | Model 3     | Model 4    | Model 5    | Model 6    | Model 7   |
|----------------------------|------------|-------------|-------------|------------|------------|------------|-----------|
| Revenues                   | .8592***   |             |             | .8488***   | .8516***   | .7779***   | 0.2691**  |
| Services                   | -1.1304*** | -1.1309***  | -1.1181***  | -1.1103*** | -1.1157*** |            |           |
| Debt                       | -.0319*    | -0.0320     | -.0373*     |            |            | -.05323*   | -0.0813** |
| External Revenues          |            | .8941***    |             |            |            |            |           |
| Internal Revenues          |            | .7963***    |             |            |            |            |           |
| Operating Revenues         |            |             | .7804***    |            |            |            |           |
| Capital Revenues           |            |             | .9566***    |            |            |            |           |
| Long-Term Debt             |            |             |             | -0.0551    |            |            |           |
| Short-Term Debt            |            |             |             | 0.0005     |            |            |           |
| Commercial Debt            |            |             |             |            | 0.0097     |            |           |
| Financial Debt             |            |             |             |            | -0.0502    |            |           |
| Wages                      |            |             |             |            |            | -2.4466*** |           |
| Financial Expenditures     |            |             |             |            |            | -1.7438*** |           |
| Operating Expenditures     |            |             |             |            |            |            | -0.1109*  |
| Capital Expenditures       |            |             |             |            |            |            | 0.0435    |
| cons                       | 85.0639*** | 111.9355*** | 143.8634*** | 80.9408*** | 81.8231*** | -1.6393    | -19.1942  |
| <i>m_Z</i>                 | -1.3549    | -0.4906     | -0.59554    | -1.3792    | -1.2881    | -1.3258    | -1.8973   |
| <i>m_Prob&gt;z</i>         | 0.1755     | 0.6237      | 0.5515      | 0.1678     | 0.1977     | 0.1849     | 0.0578    |
| <i>Sargan_chi²</i>         | 74.0614    | 88.0408     | 84.7541     | 89.4261    | 88.2504    | 96.397     | 118.7004  |
| <i>Sargan_Prob&gt;chi²</i> | 0.067      | 0.1629      | 0.2302      | 0.1392     | 0.1591     | 0.0591     | 0.1704    |

**Fig. 4. Estimation result of the model**

Source: Own elaboration based on the test performed in STATA12

Note: All models have been estimated by System-GMM. All the independent variables are treated as endogenous. The first-differenced equation has instruments in form of the endogenous variables in levels lagged by 2 periods.

Significant at 1%\*\*\*; Significant at 5%\*\*; Significant at 10% level\*.

We have carried on the test *m* that reports the Arellano–Bond test for serial correlation in the first-differenced errors and the Sargan test for overidentifying restrictions which tests the validity of the instruments.

318x188mm (102 x 138 DPI)