



**RISK FACTORS AND DRIVERS OF FINANCIAL
SUSTAINABILITY IN LOCAL GOVERNMENT. AN EMPIRICAL
STUDY**

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Abstract

The current international crisis in public finances has made financial sustainability a key issue for governments. Although the EU and other international organisations have recommended governments to monitor demographic and accounting variables, few studies have considered the influence of these variables on financial sustainability. This paper seeks to identify and analyse the factors that influence the financial sustainability of local government. The findings identify both risk factors (population size, unemployment and population aged under 16 years) and drivers (education level and budgetary outcome) of financial sustainability, which may constitute a useful basis for decision making by managers and policy makers.

Keywords: Financial sustainability; Drivers and risk Factors; Local governments.

INTRODUCTION

In recent years, the financial and economic crisis has spurred a demand for greater financial sustainability in public administrations, which is a factor of particular significance in local government finances. The European Union (EU) recently issued recommendations linked to governmental solvency in terms of inter-temporal budget constraints (EU 2012a) and has called Member States to implement solid accounting systems in drawing up budget forecasts with the aim at producing high-quality, comparable statistics (EC 2011). In fact, governmental financial reports, particularly the income statement, play a fundamental role in the assessment of financial sustainability (IFAC 2012) and should provide all the information required to assess the capability of public administrations to maintain the level of public services over time (Navarro, Alcaraz, and Ortiz 2010).

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3 In the last years, leading international organisations have pointed out the need
4 for sustainability policies to be implemented (CICA 2009; IFAC 2012; EU 2012a) in
5 order to create the necessary conditions for achieving financial health and ensuring
6 intergenerational equity (Inceu et al. 2011; Cabaleiro, Buch, and Vaamonde 2013).
7 Under this milieu, the identification of explaining factors for financial sustainability can
8 help public managers and politicians to monitor and keep sustainability of public
9 services over time, through the adoption of measures such as reducing costs, increasing
10 income or consumption of reserves (IFAC 2013a; NAO 2013; EU 2012a, 2012b).
11 Moreover, it can help them to assess the impact of its funding decisions as well as to
12 manage financial risks and opportunities (IFAC 2013a; NAO 2013).
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25 Prior research has investigated factors that influence fiscal distress (Khola,
26 Weissert, and Kleine 2005a, 2005b; Zafra, López, and Hernández 2009a) and public
27 debt (Inceu et al. 2011; Pirtea, Nicolescu, and Mota 2013). Specifically, some authors
28 have studied political and socioeconomic factors' influence on the financial
29 transparency of local governments (Guillamón, Bastida and Benito 2011a), while other
30 authors investigated the motivations of governments to publish sustainability reports
31 (Greco, Sciulli and D'onza 2012). Nevertheless, none of these works identified specific
32 explanatory variables that influence financial sustainability in public administrations.
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43 Among these factors, the study of the influence of demographic variables, which
44 could influence public finances (EU 2012a, 2012b; IFAC 2013a) and the budgetary
45 result (EC 2011) on the achievement of financial sustainability could be of overriding
46 importance, even more so at the local level, which is closest to the general public and
47 shoulders the greatest burden of public services. The considerable magnitude of the
48 budgets managed and the great variety of services provided (Saiz 2011), coupled with
49 the present context of global economic crisis and of accumulated deficit and debt in
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3 large municipalities (Muñoz-Cañavate and Hípola 2011), makes it a matter of pressing
4 concern to analyse governments' capacity to continue providing services in the future.
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7 Therefore, this paper seeks to contribute to the analysis of the financial
8 sustainability of local governments by identifying significant explanatory variables in
9 this area, in particular socio-demographic variables and variables related to budget
10 deficit/surplus. To achieve its goals, the paper presents a critical analysis of financial
11 sustainability in public administrations and provides an overview of the main
12 demographic variables that, according to prior research, could influence this
13 sustainability. An empirical study of Spanish municipalities is then undertaken to
14 identify relevant drivers and risk factors, and a relevant time series is analysed to obtain
15 meaningful findings in this respect.
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27 **MEASURING FINANCIAL SUSTAINABILITY AND DETERMINANT** 28 **FACTORS IN LOCAL GOVERNMENT FINANCE** 29 30

31 Although IFAC has indicated that long-term fiscal sustainability information is
32 broader than information derived from the financial statements (IFAC 2013a), the
33 European Council (2011) and the IFAC (2013a) have also highlighted the importance of
34 financial statements for assessing financial sustainability, considering them vital to
35 achieving an understanding of the present situation of public finances.
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43 Specifically, based on the recent pronouncement of IFAC (2013a), the income
44 statement would reflect an approach to two of the three dimensions included into the
45 fiscal sustainability, in particular, the revenue dimension, whose value is included in
46 this financial statement, and the service dimension, whose economic measurement, as
47 stated in paragraph 32 of the pronouncement (IFAC 2013a), can be estimated by the
48 entity's service delivery commitments, which is also integrated via expenses on the
49 income statement. Moreover, to the extent that the level of debt is associated with the
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3 volume of services provided, the income statement also reflects a very influential factor
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5 in the third dimension, as is debt (IFAC 2013a: paragraph 38).
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8 Therefore, the question of using accounting methods to measure sustainability,
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10 defined as the ability of government to deliver services at present without
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12 compromising the ability to do so in the future, is of great current importance, so that
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14 politicians and managers can be provided with the necessary information for decision
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16 taking, from the standpoint of financial balance (Burritt and Schaltegger 2010).
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18 Accordingly, it would be interesting to provide policymakers with appropriate
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20 instruments enabling them to perceive, react to and/or prevent situations of imbalance in
21
22 the financial sustainability of public administrations.
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25 In this regards, as demographic variables, the main explanatory factors analysed
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27 in most empirical studies are population size, population density, dependency ratio,
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29 level of unemployment, immigration and, finally, the education level. The population
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31 size has a negative effect on public spending (Choi et al. 2010; Gonçalves and Veiga
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33 2007), on saving (Wang and Hou 2012), on fiscal capacity (Carr and Karuppusamy
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35 2010) and on public debt (Escudero and Prior 2002; Guillamón, Benito, and Bastida
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37 2011b).
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40 Regarding the population density, the results obtained have been contradictory.
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42 While some have observed a negative influence of this factor on public spending
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44 (Gonçalves and Veiga 2007; Choi et al. 2010; Wang and Hou 2012) and on public debt
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46 (Bahl and Duncombe 1993), others have failed to obtain significant results in this regard
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48 (Guillamón, Benito, and Bastida 2011b).
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51 The studies about the dependency ratio, defined as the ratio of the dependent
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53 population (those aged under 16 and over 65 years) have concluded that this ratio does
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55 affect the financial capacity of local authorities (Zafra, López, and Hernández 2009b;
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3 Carr and Karuppusamy 2010) and the per capita spending and taxation, and therefore
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5 the budget balance (Choi et al., 2010; Gonçalves and Veiga 2007). However, this
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7 variable is not statistically significant with respect to its influence on reductions in
8
9 public spending (Wang and Hou 2012).
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12 The level of unemployment is another very significant aspect in studies of public
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14 finances, especially in a context of international crisis, because it not only provokes
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16 increased social spending and changes in employment patterns (Zafra, López, and
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18 Hernández 2009a; Benito, Bastida, and García 2010), but also decreases the revenues
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20 available to the public treasury.
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23 In addition, the theoretical analyses performed by Scultz and Sjöström (2004)
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25 show that migration flows tend to raise the level of accumulated debt, a significant
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27 finding corroborated in the empirical study by Guillamón, Benito, and Bastida (2011b).
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29 For this reason, another variable incorporated into studies of public finance is that of the
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31 immigrant population. In this respect, while some authors have reported the immigrant
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33 population to be positively associated with the tax burden (Benito, Bastida, and Muñoz
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35 2010), by requiring increased social spending, others have reported this factor to have a
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37 negative influence on the financial performance of public administrations (Zafra, López,
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39 and Hernández 2009a). Finally, the education level of the population affects the demand
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41 for government information (Chaudhuri, Flamm, and Horrigan 2005; Caba, Rodríguez,
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43 and Hernández 2008; Serrano, Rueda, and Portillo 2009).
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48 On the other hand, budgetary variables have also been considered important
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50 factors with respect to public finance. In this regard, the Stability and Growth Pact of
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52 the EU Member States (EU 2012a), the Fiscal Sustainability Report (EU 2012b) and
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54 Directive 2011/85/EU of the European Council of 8 November 2011 (EC 2011) all
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3 consider that budgetary variables such as the budget surplus/deficit may determine long-
4
5 term sustainability.
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7 In conclusion, taking into consideration the various studies, reports and reviews
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9 produced in this field, we identify two main groups of variables that can influence
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11 public finances: demographic variables – population size and density, the dependency
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13 ratio, the rate unemployment, the immigrant population and the level of education– and
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15 budgetary variables. However, despite their importance for governmental sustainability,
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17 little research attention has been addressed to analysing the influence of these variables
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19 on the financial sustainability of public policies.
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22 **EMPIRICAL RESEARCH**

23 **Sample selection**

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26 Sustainability studies are particularly timely and relevant to the public sector in
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28 countries like Spain, where its prior expansion, coupled with duplication in the delivery
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30 of services by local and regional governments, preceded severe public spending cuts
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32 (Bank of Spain, 2012; Navarro, Alcaraz, and Ortiz 2010). In this regards, in Spain, as in
33
34 other European Union countries, public sector income and expenditure have increased
35
36 very significantly in recent years, as a result of the increasing functions undertaken and
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38 the expanding role of the public sector in economic activity (Bank of Spain 2012). This
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40 behaviour is not consistent with the real capacity of the economy (Bank of Spain 2012),
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42 and it has led to high levels of public debt and to a sustainability gap indicator above the
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44 European Union average, in the short, medium and long term -Fiscal Sustainability
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46 Report, (EU 2012b). Spanish governmental concern about the negative impact of these
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48 figures on the financial sustainability of public bodies has led to major legislative
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50 reforms such as the Budgetary Stability and Financial Sustainability Act (2012) and the
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3 Sustainable Economy Act (2011). For these reasons, the present empirical study is
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5 focused on the situation in Spain.
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8 This study focuses on the financial sustainability of local governments for the
9
10 following reasons. First, because our understanding of this question would be enriched
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12 by greater attention to institutional detail, with particular respect to the context of local
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14 government, which has been the target of many public sector reforms (Mussari 1999;
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16 Ter Bogt and Van Helden 2000; Pallot 2001; Smith 2004). Second, in view of the
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18 politics of legislative reforms of administrative structures carried out in the 1990s
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20 (Gallego and Barzelay 2010) and the managerial devolution process implemented in
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22 Spain (Bastida and Benito 2006), local government in this country is well placed to be
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24 aware of citizens' information needs (Watt 2004). Furthermore, local governments
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26 manage very large budgets and provide a wide variety of services (Saiz 2011). Finally,
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28 the accumulated deficit and debt in large municipalities in Spain have very significant
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30 effects on the sector (Muñoz-Cañavate and Hípola 2011).
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34 In accordance with numerous prior empirical studies of local public finance
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36 (Navarro 2005; Rodríguez and Navarro 2007; Navarro, Ortiz, and Henández 2008;
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38 Zafra, López, and Hernández 2009b; Benito and Bastida 2010; Guillamón, Benito, and
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40 Bastida 2011b; Guillamón, Bastida and Benito 2011a; Greco, Sciulli and D'onza 2012;
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42 Prado-Lorenzo, García-Sánchez and Cuadrado-Ballesteros 2013), we chose to examine
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44 exclusively municipalities with relatively large populations, because the municipalities
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46 with a population of over 50,000 account for more than 50% of the Spanish population
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48 (Fundación La Caixa 2011) and, in these municipalities, the demographic effects on
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50 local government finance are apparent, and a broader range of stakeholders are involved
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52 (EU 2012a, 2012b). In addition, in large municipalities the available resources are
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54 greater than in smaller ones, and so sustainability analyses have greater scope and
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3 impact. Also, the accounting model used by local governments with large populations is
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5 considerably more complete and detailed than the simplified version used by small
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7 municipalities. Therefore, the information content of the financial statements of large
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9 local authorities is expected to be more useful for measuring sustainability. And, finally,
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11 as observed by Navarro, Alcaraz, and Ortiz (2010) and Rodríguez and Navarro (2007),
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13 the professional training of managers in large municipalities is usually more complete
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15 than that available in municipalities with smaller populations, which could favour
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17 innovation regarding the value of financial statements for measuring sustainability.
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21 Under this rationale, the present empirical study is based on a sample of large
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23 Spanish municipalities, defined as those with a population of over 50,000 inhabitants,
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25 together with those which, although smaller in terms of numbers are classified as "large
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27 population" under Article 121 of Local Government Regulatory Act 7/1985, amended
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29 by the Local Government Modernization Act 57/2003, i.e. municipalities that are
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31 provincial capitals, regional capitals or in which the headquarters of regional institutions
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33 are located.
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37 In total, 148 Spanish municipalities meet these conditions, and account for
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39 24,225,379 of the 46,951,532 total population of Spain (51.60%) and disburse 11.18%
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41 of the total national budget. We analysed a sample of 110 Spanish municipalities with
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43 over 50,000 inhabitants, the only ones for which financial information and the complete
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45 budget from 2008 to 2011, inclusive, were available (in total, 440 observations, for four
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47 years). This sample corresponds to 74.73% of the valid municipalities for the study and
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49 represents over 44% of the total Spanish population and over 9% of the total national
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51 budget.
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54 **Dependent variable**

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56 In line with the aim of this paper, the dependent variable discussed is that of
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3 financial sustainability. Although, there is no consensus about the definitions of
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5 financial sustainability of local government, in our paper we understand that it is
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7 determined by local governments' ability to manage expected financial risks and shocks
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9 over the long-term financial planning period without needing to introduce substantial or
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11 disruptive revenue (and expenditure) adjustments. In brief, financial sustainability could
12
13 be defined as the ability to meet service delivery and financial commitments, applying
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15 current policies and maintaining them in the future without causing the debt to rise
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17 continuously (IFAC 2012, 2013a; U.S. Agency for International Development 2011; EU
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19 2012a, 2012b; EC 2011; Center for Strategic and International Studies 2010; CICA
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21 2009).

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25 One of the crucial issues pertaining to sustainability is that of intergenerational
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27 equity (World Commission on Environment and Development, 1987), or “inter-period
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29 equity” (IFAC 2011; Pezzey and Toman 2002). In public sector accounting, this
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31 concept is closely linked to the income statement (IFAC 2011, 2012; GASB 1990),
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33 which plays a fundamental role in assessing financial sustainability, by enabling users to
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35 assess, on the one hand, the capacity of the entity to continue providing at least the same
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37 volume of goods and services and, on the other, the level of resources that will be
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39 needed in the future to continue to fulfil its public services delivery obligation (IFAC
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41 2012). In fact, the information content of the income statement reflects a direct
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43 approach to two dimensions of fiscal sustainability (revenue and service) and,
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45 indirectly, to the debt dimension, due to its link with the volume of expenditure (IFAC
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47 2013a).

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52 Despite their acknowledged importance, the government financial statements
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54 currently produced do not seem to be sufficient to assess the financial sustainability or
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56 otherwise of public administrations (Williams, Wilmshurst, and Clift 2010), because
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3 they include extraordinary activities which are not expected to be repeated in the
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5 foreseeable future within the environment in which the organisation operates.
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7 Accordingly, what must be corrected in the income statement is the effect of revenues
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9 and expenses deriving from extraordinary activities, given that they lack any future
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11 scope. This modification would make the income statement a more reasonable measure
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13 of the size of intergenerational equity, and one more in accordance with the concept of
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15 financial sustainability. Therefore, we have adjusted the annual income statements
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17 sampled in accordance with the purposes of this paper, in order to maximise their utility
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19 for assessing financial sustainability. Thus, the dependent variable is represented by the
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21 total amount of the adjusted income statement, as shown in Table 1.
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25 In addition, it is also important to correct the effect arising from the accounting
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27 recognition of expenses and revenues which are not reasonably certain to be
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29 systematically repeated in the future because their accrual depends largely upon a
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31 highly uncertain future situation. Examples of such items include the behaviour of the
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33 demand for services subject to public prices, or changes in policy and/or the financial
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35 position of subsidising bodies.
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38 Finally, we should distinguish between the concepts of budget expenditure and
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40 revenue and financial expenditure and revenue. The former are part of the budget and
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42 provide the annual budget results, while the latter fall within the area of financial
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44 accounting and constitute the income statement as analysed above. The differences
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46 between these concepts arise, on the one hand, from their content, and on the other,
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48 from the criteria applied for their allocation. Thus, some items are defined as budget
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50 expenditures or revenues and are not considered financial expenditures or revenues.
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52 Therefore, there are some differences between financial and budget expenditures, and
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54 these differences are reflected too in the particular case of budget revenues with respect
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3 to financial revenue.

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5 Furthermore, in Spain, while expenses and income are allocated to the income
6 statement in accordance with the accrual basis of financial accounting, the allocation of
7 budget expenditure and revenue is primarily cash-based or follows a mixed cash-accrual
8 criterion in determining the budget results, and these criteria are clearly divergent.
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11 In summary, in measuring financial sustainability, this paper follows the
12 recommendations of the main international organisations (EU 2012a; USAID 2010) and
13 the pronouncements of international accounting bodies such as IFAC (2012), FASB
14 (2012) and GASB (1990). Accordingly, our dependent variable is the measure of
15 financial sustainability reflected in the income statement (adjusted for extraordinary
16 results), which is an accounting statement based on the accrual basis (IFAC 2013b).
17 Under this approach, financial sustainability can be measured from a much more
18 comprehensive standpoint than that of budget information, as it includes the
19 consumption of capital investments, estimates of future costs, and expenses incurred but
20 pending allocation to the budget, among other items. These concepts effectively
21 represent the organisation's capacity to maintain its financial wellbeing in the future.
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38 **Independent variables**

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40 Taking into account the foregoing sections, highlighting the significant influence
41 of budgetary and demographic variables on the public finances of local authorities, we
42 selected eight variables as factors that may influence the level of financial sustainability
43 in the local governments under study, namely: 1) population size (POP); 2) population
44 density (PD); 3) population aged over 65 years (DP65); 4) population aged under 16
45 years (DP16); 5) unemployment rate (UR); 6) immigrant population (IP); 7) education
46 level among the population (EDU); 8) budget results (BRpc).
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3 In the case of population size, the evidence from previous studies is
4 contradictory; on the one hand, Carr and Karuppusamy (2010) concluded that it has a
5 negative influence on the financial situation. But on the other hand, Escudero and Prior
6 (2002) and Choi et al. (2010) reported a positive relationship between population and
7 public borrowing and spending, respectively. Meanwhile, Guillamón, Bastida and
8 Benito (2011a) found evidence of the positive influence of population size on financial
9 transparency of local governments. However, these studies do not show empirical
10 evidence of the influence of this variable on financial sustainability.
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21 As regards population density, Guillamón, Benito, and Bastida (2011b), Bahl
22 and Duncombe (1993), Choi et al. (2010) and Wang and Hou (2012) concluded that
23 there is a positive relationship between this factor and public spending. Since the latter
24 forms an important part of government financial sustainability, it seems logical to
25 incorporate population density as a possible explanatory variable of financial
26 sustainability.
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34 With respect to the unemployment rate, the evidence is uneven. Khola, Weissert,
35 and Kleine (2005a, 2005b) argue there is a positive relationship with fiscal distress, but
36 Zafra, López, and Hernández (2009b) observed a negative relationship with financial
37 capacity. According to the Financial Sustainability Report (EU 2012b), a higher rate of
38 unemployment also has a negative influence on the country's productivity and on the
39 revenues of the social security system.
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47 In addition to the above, previous studies (Guillamón, Benito, and Bastida
48 2011b; Schultz and Sjöström 2004) have concluded that the level of the immigrant
49 population is positively associated with public debt. Zafra, López, and Hernández
50 (2009a) consider this to be a decisive factor in calculating the financial performance of
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3 local governments, while Benito, Bastida, and Muñoz (2010) argue that it is positively
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5 associated with the tax burden.
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7 According to Caba, Rodríguez, and Hernández (2008), the level of education is
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9 positively related to the online disclosure of financial information, because the higher
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11 the education level, the more likely that this information will be disclosed on the
12
13 internet (Chaudhuri, Flamm, and Horrigan 2005; Evans and Yen 2005). This evidence
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15 leads us to believe that the education level of the population might also influence
16
17 financial sustainability, as these previous studies show that when the education level is
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19 higher, citizens demand more information regarding sustainability, and this leads
20
21 government to pay particular attention to this question.
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25 With respect to the dependent population, Zafra, López, and Hernández (2009a)
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27 and Carr and Karuppusamy (2010) concluded that there is no significant relationship
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29 with financial sustainability. However, others, such as Gonçalves and Veiga (2007),
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31 believe that the size of the population aged over 65 years and under 15 years is
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33 inversely related to government income and expenditure and has a significant influence
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35 on increased deficit or fiscal distress (Kholá, Weissert, and Kleine 2005b). In addition,
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37 international reports, such as the Fiscal Sustainability Report (UE 2012b), Sustainability
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39 Framework 2.0, Sustainability Report 2009 (EC 9/2009) and Reporting on the Long-
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41 Term Sustainability of a Public Sector Entity's Finances (IFAC 2012), recognize that
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43 the existence of an aging population may influence financial sustainability. Therefore,
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45 these variables are expected to be inversely related to the financial sustainability of local
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47 government.
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52 Finally, the budget results factor was considered by Balaguer (2002) to be a
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54 variable that influences local authority debt. Both the Stability and Growth Pact and the
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56 Fiscal Sustainability Report (EU 2012b) consider the budget surplus/deficit to be a key
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3 variable for financial sustainability, and recommended that studies be made of its
4 impact on financial sustainability. Although Guillamón, Bastida and Benito (2011a)
5 found no evidence of the influence of the financial performance on financial
6 transparency of local governments, we judge interesting to follow the recommendation
7 of the EU.
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14 In sum, the variables analysed in previous research, together with their effects on
15 public finances, are summarised in Table 2. These variables are not controllable by local
16 entities, especially the size of the population, the dependent population or immigrants.
17 Furthermore, the evolution of some of these variables depends much more on the
18 policies of the central government than on the decisions of local governments, such as
19 the unemployment rate, the immigrant population and the level of education. The
20 analysis of these variables are justified by studies such as Greco, Sciulli and D'onza
21 (2012), who concluded that the uncertainly avoidance is a key aspect of sustainability
22 reporting for Local Governments. However, we have opted for analysing them in this
23 paper because the study of their influence on sustainability can be very useful for public
24 managers.
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38 Two main reasons support this assertion. First, from the point of view of the
39 local administration, the knowledge of these variables can help politicians and managers
40 to take preventive measures on the level of services in the future and to undertake
41 policies to encourage drivers of financial sustainability. In fact, various international
42 bodies (IFAC 2013b; EU 2012a, 2012b) have identified demographic variables as key
43 variables for control and maintain sustainability of public services across time and the
44 study of these variables is very relevant for management decision-making processes on
45 matters such as spending reductions, revenue growth or consumption of reserves (NAO
46 2013).
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3 Second, the study of demographic variables can also be very helpful for
4 managers and politicians at the central government level (EU 2012a, 2012b; NAO
5 2013). So, the objectives of this paper may also be relevant to central governments
6 because the NAO (2013) has recommended responsible persons of these governments to
7 study these influential factors on sustainability in order to assess the economic impact of
8 their financial decisions on local governments as well as to facilitate joint risk
9 management and service level opportunities and funding (IFAC 2013a).

18 **Statistical tool: Pooled OLS regression**

20 With respect to the aims of the present study, diverse statistical instruments have
21 been proposed (Pettersson-Lidbom 2012; Wang and Hou 2012; Choi et al. 2010;
22 Benito, Bastida, and García 2010), including the pooled OLS regression model, the
23 panel data-fixed effects model and the random effects model.

25 In the present case, Table 3 shows that most of the variables in question (PD, IP,
26 DP16, DP65 and POP) remain largely stable during the time period considered, a
27 typical pattern among what are termed "control variables" (Pettersson-Lidbom 2012;
28 Benito, Bastida, and García 2010). This behaviour leads us to believe that the most
29 appropriate methodology is pooled OLS regression (Plümper and Traeger 2007).

31 Nevertheless, we applied all three statistical models (pooled OLS regression,
32 fixed effects and random effects) to the study variables, applying statistical
33 methodology, in order to perform hypothesis tests and to decide which model best fits
34 the data in our sample (Hansen and Bruce 1999; Petterson-Lidbom 2012).

36 A restrictive F test was applied to determine whether pooled OLS regression,
37 rather than the fixed effects model, should be used (Wooldridge 2010) and the Breusch-
38 Pagan Lagrange multiplier test for random effects (Wooldridge 2010) was applied to
39 determine whether the random effects model is better than pooled OLS regression for
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our model. In this case, Table 4 indicates that the pooled OLS regression is more appropriate to analyse our sample data, which presents important advantages over pure time series or cross-sectional estimates (Plümper and Traeger 2007). Therefore, the model to be tested, following this statistical methodology, is expressed as:

$$Y_{it} = \alpha + \beta_1 X_{it} + e_{it}$$

where i is the i -th transversal unit (municipality) and t is the time (year). Thus, in our case, the full expression for the model would be:

$$FS_{it} = \alpha + \beta_1 BR_{pc_{it}} + \beta_2 PD_{it} + \beta_3 IP_{it} + \beta_4 DP16_{it} + \beta_5 DP65_{it} + \beta_6 LNPO_{it} + \beta_7 UR_{it} + \beta_8 EDU_{it} + e_{it}$$

ANALYSIS OF RESULTS

As shown by the standard deviations in Table 5, for a total of 440 observations (counting all the municipalities in the sample and the four financial years in each case), the variables with the most uniform values are those for education level, unemployment rate and dependent population aged under 16 years. In contrast, financial sustainability, budget result per capita and population density present the lowest levels of homogeneity.

The proper application of multiple regression analysis requires us first to confirm the absence of multicollinearity, as this could affect the goodness of fit of the results (Wooldridge 2010). Table 6 shows the values used to verify compliance with this requirement, and which allow us to conclude that there are no significant problems of multicollinearity; therefore, the results obtained are not limited in this respect and our conclusions are grounded on robust statistical results.

As regards the regression analysis, the data shown in Table 7 identify four variables with a strong influence on the dependent variable (financial sustainability),

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3 namely education level (0.000), unemployment rate (0.005), population size (0.004) and
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5 dependent population aged under 16 years (0.032). In addition, although with a
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7 considerably weaker influence, the budget result per capita could also affect the values
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9 for financial sustainability (0.070). Table 7 shows that the set of variables with a
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11 significant degree of influence account for 26.56% of the phenomenon observed.
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14 The signs of the coefficients in Table 7 show that education level is positively
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16 related to the financial sustainability of the local governments studied, whereas the other
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18 significant variables (unemployment rate, population size and dependent population
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20 aged under 16 years) present a negative relationship. The per capita budget result is also
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22 positively related to financial sustainability. These results corroborate that the
23
24 information content of a local government's financial statements is not sufficient to
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26 assess the financial sustainability of its actions (Williams, Wilmshurst, and Clift 2010;
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28 Navarro, Alcaraz, and Ortiz 2010) because, except for the budget result, the other
29
30 independent variables do not usually form part of these financial statements.
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34 In any case, starting with the population size variable, our empirical results
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36 extend the findings of Choi et al. (2010), Solé (2006) and Wang and Hou (2012), by
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38 showing that an increase in population may limit financial sustainability, in terms of a
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40 reduced balance in the income statement. Furthermore, our results show, specifically,
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42 that an increase in population size may adversely affect the financial sustainability of
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44 local government (risk factor); this conclusion is consistent with previous studies, as
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46 both rising debt and a worsening financial condition generate financial costs that reduce
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48 financial sustainability (Cabaleiro, Buch, and Vaamonde 2013).
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52 Furthermore, our results show that higher levels of education among the
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54 population could benefit a local government's financial sustainability (driver factor),
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56 whereas higher levels of unemployment and/or a dependent population aged under 16
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3 years could undermine it (risk factors), especially in more highly populated
4 municipalities. Therefore, the results of our empirical study corroborate the
5 recommendations of international organisations and the findings of previous studies that
6 highlight the influence of demographic variables on the financial sustainability of
7 governments (EU 2012a, 2012b; USAID 2011; Choi et al. 2010; Gonçalves and Veiga
8 2007), by analysing its effect on the particular case of local governments.
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12 The results of this empirical study regarding the negative impact of the variables
13 unemployment and dependent population aged under 16 years represent an advance on
14 previous research findings (Zafra, López, and Hernández 2009a), highlighting the
15 negative impact of rising unemployment on financial sustainability. Similarly, the
16 positive relationship between unemployment and fiscal stress (Benito, Bastida, and
17 García 2010), on the one hand, and the tax burden, on the other (Benito, Bastida, and
18 Muñoz 2010), is further developed by our results, which corroborate the negative effect
19 of the level of unemployment, specifically, on financial sustainability.
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24 With respect to the dependent population, our results further develop the
25 conclusions of previous studies on the impact of this variable on the finances of local
26 governments. While Carr and Karuppusamy (2012) and Zafra, López, and Hernández
27 (2009b) identify the negative effect of this population on the financial condition, Benito,
28 Bastida, and García (2010) argue that an increase in the dependent population may also
29 increase fiscal stress, in accordance with the views of Solé (2006), who identifies a
30 positive relationship between this variable and the volume of public spending. In our
31 statistical analysis, only those aged under 16 years exert a negative influence on
32 financial sustainability, while no such influence was recorded for the population aged
33 over 65 years.
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3 Thus, the values shown in Table 7 indicate that an increase in the number of
4 young people aged under 16 years and an increase in the unemployment rate can cause
5 local governments to lose financial sustainability with respect to the public services
6 provided and thus, in the long term, jeopardize their ability to meet the population's
7 demands. Furthermore, these negative influences on financial sustainability may be
8 aggravated in larger municipalities, because the sign of the coefficient for the variable
9 population size indicates that an increase in the number of inhabitants is also a risk
10 factor.
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21 These results enable us to identify a rapid growth in the number of inhabitants, a
22 strong presence of young people and a high rate of local unemployment as warning
23 signs for local governments wishing to maintain the sustainability of their finances.
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28 However, our results also show that when the education level of the population
29 is rising, this factor can support the financial sustainability of local government (driver
30 factor), which seems to mean that the higher education level, the higher population's
31 demands for information (Caba, Rodríguez, and Hernández 2008; Serrano, Rueda, and
32 Portillo 2009). It can encourage local governments to adopt a more sustainable
33 behaviour.
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41 In parallel, the sign of the coefficient for the budget result per capita is also
42 positive (driver factor), which means that governments which maintain positive levels
43 in this respect would be contributing to preserving their ability to provide services over
44 time. This result represents new knowledge about the negative relationship between the
45 budget result and the level of debt (Balaguer 2002) and financial performance (Zafra,
46 López, and Hernández 2009a, 2009b). Thus, when spending is properly balanced with
47 revenue, this can contribute to maintaining financial sustainability, as an expression of
48 the intergenerational equity reflected in the income statement.
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3 On the other hand, our empirical analysis observed no statistical evidence of any
4 influence on the financial sustainability of a municipality according to its population
5 density, level of immigrant population or dependent population aged over 65 years.
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9 With respect to population density, our results are in accordance with those of
10 Benito, Bastida, and Muñoz (2010) and Solé (2006), who found no influence of
11 population density on the tax burden of local governments. However, our results do not
12 reflect the positive relationship between population density and the volume of public
13 spending that was reported by Choi et al. (2010) and Wang and Hou (2012), or with the
14 level of debt (Guillamón, Benito, and Bastida 2011b). A possible explanation for this is
15 that an increase in population density could, at the same time, produce an increase in
16 municipal revenue, thus impacting positively on the income statement.
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19 Our results concerning the immigrant population do not show this factor to have
20 any effect on the financial sustainability of local governments. In contrast, other authors
21 have reported a positive relationship between the immigrant population and debt, fiscal
22 stress and volume of spending (Guillamón, Benito, and Bastida 2011b; Benito, Bastida,
23 and García 2010; Zafra, López, and Hernández 2009b; Choi et al. 2010) and with the
24 tax burden (Benito, Bastida, and Muñoz, 2010). The divergence between our findings
25 and those of other studies might be due to a positive impact on local government
26 revenues. In fact, authors such as Benito, Bastida, and Muñoz (2010) have concluded
27 that a growing immigrant population can increase the tax burden and, therefore, the
28 level of municipal revenue, which would impact positively on financial sustainability.
29 Accordingly, the immigrant population will not constitute a risk factor for sustainability
30 if this group is part of the occupationally active population.
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33 Finally, our results showed no evidence of any relationship between financial
34 sustainability and the dependent population aged over 65 years. However, authors such
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3 as Wang and Hou (2012), Choi et al. (2010) and Solé (2006) have reported that a rise in
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5 the dependent population can increase public spending, which would produce a negative
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7 effect on financial sustainability. Indeed, as was the case for the immigrant population,
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9 an increase in the population aged over 65 years would not necessarily damage financial
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11 sustainability if this population change at the same time produced increases in
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13 municipal revenue sufficient to offset the higher costs generated.
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16 Furthermore, although the Fiscal Sustainability Report (EU 2012b) identifies
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18 "cost of aging" as a component of governmental sustainability indicators, our results
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20 show that a change in the population aged over 65 years is not a factor that significantly
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22 influences the financial sustainability of local governments. Nevertheless, it should be
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24 recalled that the above report refers to central governments, for whom retirement
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26 pensions are charged as costs. However, pensions are not a cost to local governments
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28 and therefore are not involved in the measurement of their financial sustainability.
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31 **CONCLUSIONS**

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34 Given the current financial crisis affecting the public sector in many countries,
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36 the EU and other supranational organisations have acknowledged the timeliness and the
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38 value of further studying government financial sustainability, and the active role to be
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40 played by government accounting systems in the measurement and control of this
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42 factor.
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45 Based on an empirical study of large Spanish local governments, our results
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47 identify driver factors and risk factors that may influence the financial sustainability of
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49 these governments. In this regards, our empirical results show that increases in the
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51 number of inhabitants, the rate of unemployment and the population aged under 16
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53 years are all risk factors that may endanger the financial sustainability of local
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55 government, in the sense of its financial capability to maintain present services over
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3 time. In parallel, our results identify the budget result (as an indicator of good
4 management of the budget) and the education level of the population as factors that may
5 contribute to the financial sustainability of these governments.
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10 Knowledge of these factors can help policymakers and managers to assessing the
11 impact of their financial decisions, to improving the management of risks and
12 opportunities provided by their financial policies, and can alert them to warning signs
13 enabling them to prevent and/or resolve problems of sustainability in their policies and
14 to undertake actions to promote this sustainability.
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21 These empirical results highlight the existence of control variables of great
22 importance to local governments that wish to maintain the financial sustainability of
23 their policies. The main risk factors to the latter are especially significant in
24 municipalities experiencing rapid population growth, those with a numerous immigrant
25 population and those with a high proportion of young people, although the preventive
26 control of the budget deficit and special attention to promoting education may
27 counteract the negative effect of these factors. These conclusions represent an advance
28 on prior research and on international pronouncements, as they are based on empirical
29 evidence of the effect of sociodemographic and accounting variables on the financial
30 sustainability of governments, with particular regard to local government.
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43 Although previous studies had emphasised the negative influence of population
44 size and the rate of unemployment on public expenditure, financial condition and
45 financial health, our findings indicate that both a rising population and an increasing
46 rate of unemployment may threaten financial sustainability, possibly because of their
47 effect on the generation of current costs, especially financial expenses. Nonetheless, the
48 fact that the behaviour of these two variables may generate further costs does not
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3 necessarily mean that it undermines financial sustainability, since not all costs are
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5 charged to the income statement, but only accrued current costs.
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7 Thus, our findings represent progress regarding the findings of prior research.
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9 Our results support that increased population size can promote financial sustainability,
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11 which implies that this increase is not only a motivation for local governments to
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13 improve transparency (as concluded Guillamón, Bastida and Benito 2011a), but also it
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15 can be a motivation to promote the sustainability of public services. Also, while the
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17 previous literature found no relationship between budgetary and financial transparency,
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19 our findings show a positive relationship with their financial sustainability.
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23 Furthermore, when we deepen into the study of the influence of variables of
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25 uncertainty about the sustainability (raised by Greco, Sciulli and D'onza 2012), we
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27 obtained evidence of the relationship of uncontrollable factors on it, such as
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29 unemployment and dependent population.
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32 In relation to the dependent population, too, our empirical results have led to a
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34 new finding, providing evidence that an increase in the population aged under 16 years
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36 is a risk factor for the financial sustainability of local government. In contrast, no such
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38 evidence was obtained regarding any influence by the population aged over 65 years,
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40 which introduce new insights in the analysis of the dependent population variable.
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42 Therefore, age-related programs may be individually modelled (IFAC 2013a), which
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44 means the need of introducing tools for efficient management of these programs into the
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46 local governments.
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50 Local governments could take actions to reduce the negative effects of these risk
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52 factors on financial sustainability. Thus, our empirical results indicate that public
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54 policies aimed at raising the education level of the population, together with action to
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3 maintain the balance between income and expenditure, could enhance the financial
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5 sustainability of local governments.
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8 On the other hand, we found no empirical evidence of any influence of
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10 population density or the level of the immigrant population on financial sustainability.
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12 Whereas previous research concluded that population density may be associated with
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14 higher levels of government spending, our results suggest that the latter is more
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16 concentrated in the area of capital investments which are consumed over time. In
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18 addition, the size of the immigrant population is inversely related with debt, fiscal stress
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20 and the volume of spending, but our results seem to indicate that an increase in the
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22 number of immigrants is generally associated with higher levels of taxation and thus
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24 higher government revenues, which could benefit financial sustainability.
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28 Finally, our conclusions highlight the value of undertaking further research in
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30 areas such as the influence of other accounting and socioeconomic variables on
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32 financial sustainability, the question of factors that are specifically relevant to
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34 population size, and risk factors in other countries and/or levels of government. In fact,
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36 a lively debate on financial sustainability is taking place and encouraging relevant
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38 international bodies, like the IFAC (2013a, 2013b), to issue pronouncements with the
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40 aim at providing guidance on reporting on the long-term sustainability of a public sector
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42 entity's finances because it is thought to be relevant in public sector management
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44 nowadays.
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TABLES

Table 1. Adjusted Income Statement

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)

Source: Own elaboration.

Table 2. Main studies with dependent variables, independent variables and results achieved

Independent Variables	Authors	Dependent Variables	Results
Population	Choi et al. (2010)	Public expenditure	Positive influence
	Solé-Olle (2006)	Public expenditure	Positive influence
	Wang & Hou (2012)	Public expenditure savings	Negative influence
	Carr & Karuppusamy (2010); Zafra et al. (2006)	Financial condition	Negative influence
	Escudero & Prior (2002); Vallés & Zárata (2001)	Debt	Positive influence
Population Density	Choi et al. (2010)	Public expenditure	Positive influence
	Gonçalves & Veiga (2007)	Public expenditure	Positive influence
	Wang & Hou (2012)	Public expenditure savings	Negative influence
	Bahl & Duncombe (1993)	Debt	Positive influence
	Guillamón et al. (2011)	Debt	Positive influence
Dependent Population	Zafra et al. (2009b)	Financial condition	Negative influence
	Benito et al. (2010b)	Fiscal distress	Negative influence
	Carr & Karuppusamy (2010)	Financial condition	Negative influence
	Solé-Olle (2006), Choi et al. (2010), Gonçalves & Veiga (2007)	Public expenditure	Positive influence
	Wang & Hou (2012)	Public expenditure savings	Negative influence
	Kloha (2005)	Fiscal distress	Positive influence
Unemployment rate	Zafra et al. (2009a)	Financial performance	Negative influence
	Zafra et al. (2006)	Debt	Positive influence
	Guillamón et al. (2011)	Debt	Positive influence
	Benito et al (2010a)	Fiscal distress	Positive influence
	Kloha (2005)	Fiscal distress	Positive influence
Immigrant population	Scultz & Sjöström (2001)	Debt	Positive influence
	Guillamón et al. (2010)	Debt	Positive influence
	Benito et al. (2010a)	Fiscal distress	Positive influence
	Zafra at al. (2009a)	Financial performance	Negative influence
	Zafra et al. (2006)	Debt	Positive influence
Level of Education	Choi et al. (2010)	Public expenditure	Positive influence
	Chan & Rubin (1987)	Information demand	Positive influence
	Ríos et al. (2013)	Disclosure of public information online	Positive influence
	Chaudhuri et al. (2005)	Internet access	Positive influence
	Evans & Yen (2005)	Internet access	Positive influence
	Caba et al. (2008)	Disclosure of public information online	Positive influence
Serrano et al. (2009)	Disclosure of public information online	Negative influence	
Budget results	Balaguer (2002)	Indebtedness	Negative influence

Source: Own elaboration based on prior research.

Table 3. Summary statistics (descriptive statistics; obs = 440)

Variables (expected sign)	Acronym	Description	Source	Calculation	Mean	Std. Dev.	Min.	Max.
Financial Sustainability	FS	Adjusted results per capita 2008-2010 (euros)	Local government financial statement	Corrected income statement for the financial year per capita	131.44	207.48	-518.1	2,960.52
Budget results per capita (+)	BRpc	Budget results per capita 2008-2010 (euros)	Ministry of Finance and Public Administration (www.mihhap.gob.es)	Budget revenue less budget costs	17.13	240.76	-657.52	2,826.95
Population density (-)	PD	Population residing in the municipality per km ²	INE (Statistic Institute of Spain) (www.ine.es)	Population divided by km ²	2,409.76	3,179.64	52.67	18,871.88
Immigrant population (-)	IP	Immigrant population residing in the municipality	INE	% Immigrant population	13.07	10.94	0.02	64.48
Dependent population 16 years (-)	DP16	Population aged under 16 years residing in the municipality	INE	% Population aged under 16 years	23.17	2.71	16.06	27.65
Dependent population 65 years (-)	DP65	Population aged over 65 years residing in the municipality	INE	% Population aged over 65 years	25.31	5.90	15.94	45.83
Natural Logarithm population (-)	POP	Population residing in the municipality	INE	Neperian logarithm of the population	11.58	10.82	10.82	13.00
Unemployment rate (-)	UR	Unemployment rate in the municipality	Public Employment Service of Spain (www.sepe.es)	% Unemployed population	8.95	2.52	2.36	16.51
Level of Education (+)	EDU	University graduates	INE	% University graduates	0.44	1.48	0.01	26.00

Source: Own elaboration.

Table 4. Variations of the variables

Variables	2008-2009		2009-2010		2010-2011	
	Median	Total	Median	Total	Median	Total
BRpc	-58.32	-60.80%	-54.63	-57.77%	-52.21	-53.99%
PD	1.19%	1.23%	1.93%	2.03%	1.87%	1.95%
IP	3.32%	3.78%	-0.96%	-1.22%	0.22%	0.66%
DP16	0.86%	0.85%	1.57%	1.58%	1.29%	1.30%
DP65	0.88%	0.92%	1.84%	1.72%	1.97%	1.86%
POP	0.15%	0.15%	0.29%	0.31%	-0.22%	-0.23%
UR	21.15%	20.65%	2.81%	2.98%	6.03%	6.25%
EDU	33.31%	33.48%	29.98%	30.91%	30.43%	32.28%

Source: Own elaboration.

Table 5. Hypothesis Testing

MODEL	TEST	NULL HYPOTHESIS	STATISTIC	ρ	REJECTED VS. NOT REJECTED
Pooled OLS Regression vs. Fixed Effects Model	F Restrictive Test	$v_1=v_2=v_3=\dots v_i=0$	$F(109.322) = 1.34$	0.0273	Not rejected
Pooled OLS Regression vs. Random Effects Model	Breusch and Pagan Test	$\sum u_i^2=0$	$X^2(1)=0.10$	0.7484	Not rejected

Source: Own elaboration.

Table 6. Pearson correlation matrix (obs = 440)

	FS	BRpc	PD	IP	DP16	DP65	POP	UR	EDU
FS	1.000	-	-	-	-	-	-	-	-
BRpc	0.4808***	1.000	-	-	-	-	-	-	-
PD	-0.0288	-0.0057	1.000	-	-	-	-	-	-
IP	0.0745	0.0678	-0.1362***	1.000	-	-	-	-	-
DP16	-0.0606	0.0659	0.0881*	0.2611****	1.000	-	-	-	-
DP65	-0.006	-0.1210***	-0.0670	-0.3693***	-0.7617****	1.000	-	-	-
POP	-0.1288***	-0.0543	-0.2167***	-0.1406***	0.0115	-0.0977**	1.000	-	-
UR	-0.0942**	0.0502	-0.0616	-0.0659	0.2904***	-0.2879***	0.0369	1.000	-
EDU	0.0295	-0.0029	-0.0144	-0.0723	-0.0151	0.0561	0.1802****	0.0499	1.000

* $p < 0,1$; ** $p < 0,05$; *** $p < 0,01$

Source: Own elaboration.

Table 7. Pooled OLS Robust

Financial Sustainability (FS)	Coefficients	Robust Std. Err.	T
Budget results per capita (BRpc)	0.4110*	0.2260	1.82
Population density (PD)	-0.0003	0.0023	-0.15
Immigrant population (IP)	0.6466	1.2132	0.53
Dependent population 16 years (DP16)	-9.8212**	4.5579	-2.15
Dependent population 65 years (DP65)	-2.7947	2.0788	-1.34
Natural Logarithm population (POP)	-40.345***	13.7670	-2.93
Unemployment rate (UR)	-8.3123***	2.9461	-2.82
Level of Education (EDU)	8.4746***	2.5147	3.37
Cons	953.1481***	256.1637	3.72
Number of obs = 440 F (8, 431) = 5.26*** R-squared = 26.56% Root MSE = 179.45			

Source: Own elaboration.

NOTE 1: The estimates were made using Stata 12.0, where * p < 0.1, ** p < 0.05, *** p < 0.01

NOTE 2: The robust estimator of covariance matrices was used, to obtain a consistent estimate of the variance in the presence of overdispersion or heteroskedasticity (Huber, 1967, White, 1980).