IMPACT OF SIZE AND GEOGRAPHIC LOCATION ON THE FINANCIAL CONDITION OF SPANISH MUNICIPALITIES

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Abstract

In this study, the financial condition of Spanish municipalities is analyzed, due to its complex nature, through an integrated approach. In order to achieve that, the frameworks developed by the International City/County Management Association and the Canadian Institute of Chartered Accountants were taken as reference. Moreover, the authors used several indicators and a large sample of Spanish municipalities; the methodology used in the study objectifies the process of use of indicators. The study highlights the influence of population size and geographic location of local government on some dimensions of the financial condition of Spanish municipalities.

Keywords: financial condition, municipality, Spain, impact analysis, geographic location.

1. Introduction

In times of crisis, adequate knowledge of the diagnostic tools of financial condition – a contemporary topic for public institutions – is essential. The goal is to instrumentalize policies to avoid, as far as possible, the negative consequences of poor financial condition for a society. In local governments, problems of financial crisis occur frequently (Honadle, 2003). This means that the issue is studied by the doctrine.

The multiple objectives of this study were established after the literature on the approaches of institutions and doctrinal studies was reviewed. Firstly, it was attempted to merge the two of the most important institutional approaches currently available in a single system of analysis. These are the approaches proposed by the International City/County Management Association (ICMA, 2003) and the Canadian Institute of Chartered Accountants (CICA, 1997, 2009). Secondly, the new system was taken as reference and applied on a sample of more than 60% of municipalities in Spain to determine whether such factors as population size and geographic location have significant influence on the financial condition of these municipalities. The study of the differences between different socio-geographical spaces is considered useful in the investigation of the possible factors that could have shaped them and directly impacted the financial condition of the municipalities.

2. Financial condition of local governments: literature review

At the local government level, the importance of sound financial condition (Honadle *et al.*, 2004) constitutes a vital requirement for the financing of services. This influences some important decisions which have socio-economic significance related to the supply of services, and their quality and reliability. Moreover, this can influence the reelection of politicians and the business locations. If the voters have full mobility, the patterns of income and expenditure of local governments would be approved by them. Although this assertion is not entirely accurate because of the institutional rigidities, it does not disprove the importance of the voters (Tiebout, 1956). It is therefore of great interest to know the potential financial imbalances in a community in order to determine the appropriate patterns between financial capacity and the provision of services to citizens by local governments.

In her study (2004) on how to measure the fiscal health of public institutions, Hendrick shows that the possible indicators to use are based on various concepts such as fiscal strain, fiscal distress, fiscal crisis and financial condition, which reveal the existence of alternative names that correspond to different methodological approaches to a common reality.

Following the systems approach developed by Berne and Schramn (1986) and applying it to a financial context, Hendrick (2004) identifies three major dimensions that affect the local fiscal health: the environmental characteristics, the balance between social context and tax structure, and characteristics of the tax structure of institutions.

In literature this problem is generally referred to as financial condition, although with different meanings. Groves *et al.* (1981) note that the analysis of financial condition

of a local institution, a term closely linked to the concept of fiscal health (Honadle *et al.*, 2004), can be articulated using four aspects: cash solvency, budgetary solvency, long-run solvency, and service-level solvency.

The publication GASB no. 34 – *Basic Financial Statements – and Management's Discussion and Analysis – for State and Local Governments* – includes a framework that provides even more financial data about local governments, of a type previously inaccessible to anybody except for the most sophisticated governments and analysts. In this sense, the ICMA's publication *Evaluating Financial Condition: A Handbook for Local Government*, following the work of Groves *et al.* (1981), has made a significant contribution in filling this void (ICMA, 2003).

The Canadian Institute of Chartered Accountants (CICA, 1997, 2009) defines the financial condition of a government as its financial health measured by *Sustainability, Flexibility and Vulnerability*, looked at in the context of the overall economic and financial environment.

Since financial condition as a concept is not directly observable, the problem that arises is "what are the most appropriate instruments to measure it?" There are several proposals to assess financial condition. These proposals are influenced both by the conceptual approach and the information available in each particular environment.

The evaluation of this concept requires setting clear objectives. If the objective is to analyze different aspects characterizing the financial health, it would be sufficient to analyze the specific aspects that are considered pertinent without needing to obtain a single quantitative or qualitative indicator (Alter *et al.*, 1984; ICMA, 2003; Hendrick, 2004). But, if the objective is to determine the overall positioning of the institution within a particular universe, obtaining an indicator would be necessary (Brown, 1993, 1996; Kloha *et al.*, 2005a, 2005b; Wang *et al.*, 2007).

The literature suggests a variety of dimensions to consider, and some indicators to use. However, there has been no consensus on which are the dimensions or which are the specific indicators that represent their status or value (Wang *et al.*, 2007), although certain aspects (income, expenses, debt etc.) dominate the studies from diverse perspectives (Petersen, 1977; Morgan and England, 1983; Hugues and Laverdiere, 1986; Zehms, 1991; Clark, 1994; Mercer and Gilbert, 1996; Honadle and Lloyd-Jones, 1998; Petro, 1998; Wolff and Hughes, 1998; Carmeli, 2002; Kleine *et al.*, 2003; Honadle *et al.*, 2004; Cárcaba, 2004; Kloha *et al.*, 2005a and 2005b; Zafra *et al.*, 2006, 2009a and 2009b).

The alternatives to the measurement of the financial situation include the use of both limited number (Wolkoff, 1987) and large (Ammar *et al.*, 2001) number of indicators. Moreover, these alternatives are focused sometimes only on financial aspects and sometimes also include socio-economic aspects, depending on the conceptual approach adopted. When considered from a purely financial approach, socio-economic factors are excluded from the core of the approach, but these factors have the character of conditions (Wang *et al.*, 2007). On the contrary, when a broader approach is adopted, the socio-economic factors are a part of the concept, and their exclusion would lead to a significant lack of measurement (Kloha *et al.*, 2005a).

In any case, when analyzing the financial condition, either by a broad or narrow approach, there appears to be an agreement on assessing the financial field. In this sense, following the approach promoted by the ICMA (2003), four dimensions must be considered: cash solvency, budgetary solvency, long-run solvency and service-level solvency (Wang *et al.*, 2007). Cash solvency is government's ability to generate enough cash over thirty to sixty days to pay its bills. Budgetary solvency is government's ability to generate enough resources during its normal budgetary period to meet its expenditure without incurring any deficit. Long-run solvency is the ability to pay in the long run all the costs of transacting business, including expenditure that normally appears in each annual budget, and the one that appears only in the years in which they must be paid. Service-level solvency is the ability to provide services at the level and quality required for the health, the safety, and the welfare of the community and as desired by its citizens.

The Canadian proposal for assessing the financial condition, based on the term financial health, focuses on three financial dimensions (CICA, 1997, 2009): Sustainability, Flexibility and Vulnerability. "Sustainability is the degree to which a government can maintain existing programs and meet existing creditor requirements without increasing the debt burden on the economy; Flexibility is the degree to which a government can increase its financial resources to respond to rising commitments, by either expanding its revenues or increasing its debt burden; Vulnerability is the degree to which a government becomes dependent on, and therefore vulnerable to, sources of funding outside its control or influence."

In any case, the analysis is done by using a series of indicators covering various aspects and often, by using benchmarking techniques. The choice is largely influenced by the administrative structures and available information of the universe under study (CICA, 1997, 2009).

The factors affecting the financial health of municipal entities are diverse: economic sectors that predominate in the geographical area, climatic aspects, nature of the territory, population structure and population movements, economic policies developed by state public institutions, municipalities and other regional units etc. (Honadle, 2003). All the above-mentioned factors, which have a special connection with physical space, define and determine this reality.

According to Berne (1992) many social, political and economic features appear to be related to the size of the entity, usually measured in terms of population. There are numerous works, therefore, in this field of study in which population as a variable was addressed from various perspectives (Ladd, 1994; Petro, 1998; Hendrick, 2004; Chase and Phillips, 2004; Benito and Bastida, 2004; Carmeli, 2007; Jones and Walker, 2007).

The concept of geographic location includes the whole array of socio-economic elements that can influence the local government's financial condition, each in its own way. Identifying the Autonomous Communities is considered an important step for understanding the importance of the socio-economic aspects that characterize the aforementioned space – i.e. geographic location (Hill, 1974; Felbinger and Robey,

2001; O'Connor *et al.*, 2001; McDougall and O'Connor, 2005; Jones and Walker, 2007). This facilitates the subsequent identification of the factors that possibly impact the financial condition of the local authority.

3. Assessing the financial condition of the Spanish municipalities and impact analysis of size and location

The literature in economics has several contributions on evaluation of the financial condition of public institutions. Some follow the scheme developed by Groves and Valente (1981), which has been reported by the International City/County Management Association (ICMA, 2003) based on GASB no. 34. Others follow the formal framework developed by the CICA (1997, 2009).

This paper considered both lines of study by first trying to identify and quantify the dimensions that define the concept of financial condition. The second objective was to determine to what extent the size and/or location of a municipality might influence the financial condition of municipalities in Spain.

3.1. Methodology

Prior to the collection of data required for this analysis, it was ensured that the data was homogeneous i.e., common to all entities. The data required for this analysis was obtained from various institutional sources. The settlements of the budgets of local administrations and the amount of borrowing for the year 2009 were extracted from two databases of the Ministry of Economy and Finance (MEH). Data with respect to geographic location and population of local authorities for 2009 were obtained from the National Statistics Institute (INE).

According to the existing literature and taking into account the available data, we attempted to develop a battery of 34 indicators that cover a range of issues of different approaches (Table 1).

Table 1: Indicators of Financial Condition

	Indicator	Explanation
R1	$\dfrac{CCE+AR-DAR-EF}{OO}$	Refined short-term solvency: Cash and Cash Equivalents (CCE) plus accounts receivable (AR), less doubtful accounts receivable (DAR) and excess funds to finance expenditures earmarked funding (EF), divided by the outstanding obligations (OO) at year end.
R2	$\dfrac{CCE+AR-DAR}{OO}$	Gross short-term solvency: Cash and Cash Equivalents (CCE) plus accounts receivable (AR) and less doubtful accounts receivable (DAR), divided by the outstanding obligations (OO) at year end.
R3	$\dfrac{CCE}{OO}$	Quick Ratio: Cash and Cash Equivalents (CCE) divided by outstanding obligations (OO) at year end.
R4	$\dfrac{\text{Long-term debt}}{TNBR}$	Long-term debt in relation to the total net budgetary revenues (TNBR)
R5	$\dfrac{\text{Long-term debt}}{NBR\ Ch.^*\ 1\ to\ 8}$	Long-term debt divided by net budgetary revenues (NBR) from non-financial operations.
R6	$\dfrac{\text{Long-term debt}}{NBR\ Ch.\ 1\ to\ 5}$	Ratio between the long-term debt and net budgetary revenues from current operations.
R7	$\dfrac{\text{Long-term debt}}{Pop.}$	Long-term debt per inhabitant (Pop)

	Indicator	Explanation
R8	NBR Ch. 1 to 5 / NBO Ch.1 to 4	Net current budgetary revenues divided by net budget obligations (NBO) from current expenditures.
R9	NBR Ch. 1 a 5 / NBO Ch.1 to 4 and 9	Net current budgetary revenues divided by budget obligations from non-financial current expenditures, minus debt service.
R10	Net savings / Pop.	Difference between the receivables from current budget resources and the budget obligations from non-financial current expenditures, minus debt service per inhabitant.
R11	NBO Ch. 3 and 9 / NBR Ch.1 to 5	Debt service (interest and principal) divided by net current budgetary revenues.
R12	NBO Ch. 3 and 9 / Pop.	Debt service per inhabitant.
R13	NBO Ch. 3 / Pop.	Debt interest per inhabitant.
R14	Result of the budget settlement / Pop.	Result of the budget settlement per inhabitant.
R15	Total NBR / Pop.	Total net budgetary revenues per inhabitant.
R16	NBR Ch. 1 to 5 / NBR Ch. 4	Ratio between net current budgetary revenues and current grants received.
R17	NBR Ch. 1 to 3 / NBO Ch. 1 to 3	Direct and indirect taxes and fees divided by obligations from net expenditure of personnel, services and debt interest.
R18	NBR Ch. 1 to 3 / NBO Ch. 1 to 4	Direct and indirect taxes and fees divided by net budget obligations from current expenditure.
R19	NBR Ch. 1 to 3 / Pop.	Direct and indirect taxes and fees per inhabitant.
R20	NBR Ch. 1 and 3 to 5 / NBO Ch. 1 to 4	Net current budgetary revenues less current grants received, divided by net budget obligations (NBO) from current expenditures.
R21	Total NBR – NBR Ch. 4 to 7 / Total NBO	Difference between total net budgetary revenues and budgetary current and capital transfers received divided by total net budget obligations.
R22	NBR Ch. 7 / Pop.	Capital transfers received per inhabitant.
R23	NBR Ch. 4 and 7 / Pop.	Current and capital transfers received per inhabitant.
R24	Expenditures CP and PS / Pop.	Expenditures on civil protection and public safety (CP and PS) per inhabitant.
R25	Expenditures SS, SP and SPR / Pop.	Expenditures on social security, social protection and social promotion (SS, SP an SPR) per inhabitant.
R26	Expenditures E / Pop.	Expenditure on education (E) per inhabitant.
R27	Expenditures H and UD / Pop.	Expenditures on housing and urban development (H and UD) per inhabitant.
R28	Expenditures CW / Pop.	Community welfare spending (CW) per inhabitant.
R29	Expenditures C / Pop.	Expenditure on culture (C) per inhabitant.
R30	Expenditures OCS and OSS / Pop.	Expenditure on other community and social services (OCS and OSS) per inhabitant.
R31	Expenditures BI and T / Pop.	Expenditure on basic infrastructure and transport (BI and T) per inhabitant.
R32	Total NBO / Pop.	Total net budget obligations per inhabitant.
R33	NBO Ch. 6 and 7 / Pop.	Investments per inhabitant: Net budget obligations from capital expenditures, capital transfers and capital grants per inhabitant.
R34	NBO Ch. 6 and 7 / Total NBO	Investments effort: Net budget obligations from capital expenditures, capital transfers and capital grants divided by total net budget obligations.

*Ch.: Budgetary chapter of the economic classification in Spain.

Afterwards, values of these ratios were calculated for the sample of municipalities and once they were typified, cluster analysis of these variables was taken up. Among the various cluster analysis alternatives available, hierarchical method was chosen, because, starting from the reading of each individual indicator, it allows for increasingly broad and heterogeneous vertical groups. The aim was to find a number of relatively homogeneous set of indicators which configure some theoretical dimensions.

After identifying the theoretical dimensions in the analyzed setting, main components analysis will have to be carried out to test the existence or nonexistence of differentiated aspects or uncorrelated factors within each of the dimensions identified. Thus, one can get a score for each dimension. We ponder each of the uncorrelated factors to obtain a single score per dimension. The weighting may be based on the percentage of variance explained.

The study can be approached from a longitudinal or transverse perspective. In the same way that other scientific papers are reflected in the literature review, we have opted for a transverse approach in which the universe of municipalities in each time period provides the financial dimensions rating of each one of them. Obviously, indicators can be constructed in subsequent periods. This would allow us to know the evolution of financial dimensions of municipalities according to their position in the universe.

After calculating the values, which represent the dimensions of each municipality in the sample, statistical analysis was carried out to assess the dependence or association between the financial dimensions of the municipality and its size and/or of the Autonomous Community it belongs to. The normality of distributions was checked, as also the homogeneity of the variances in relation to population size and geographical space. These requirements are essential for implementing parametric methods of analysis of variance. In the event of failure to meet these requirements, it will be decided to use non-parametric analysis of variance.

3.2. Data

After cross-checking the debt database with the settlement of the last municipal budgets, prepared by the MEH for the year 2009, it was found that information was available for 5,823 municipalities. After the selection process, which involved the elimination of municipalities with incomplete or erroneous information, 5,158 municipalities were left as sample for analysis. Thus, the data rejected accounts for less than 11.43% of what was available. The universe of local governments in Spain is composed of 8,112 municipalities (excluding the autonomous cities of Ceuta and Melilla). This means that the sample used represents 63.58% of the local governments in Spain. For all these municipalities, information relating to their location and population was extracted from the INE database. The universe and sample of municipalities, which are disaggregated by population size and as autonomous communities, are presented in Table 2.

Table 2: Distribution of municipalities
by population size and Autonomous Communities

		Pop. < 5,000			5,000 < Pop. < 20,000			20,000 < Pop. < 50,000			50,000 < Pop. < 200,000			200,000 < Pop.			Total		
		U	S	%	U	S	%	U	S	%	U	S	%	U	S	%	U	S	%
CCAA	Andalucía	508	273	53.74%	181	126	69.61%	52	43	82.69%	24	21	87.50%	5	4	80.00%	770	467	60,65%
	Aragón	707	278	39.32%	20	12	60.00%	2	2	100%	1	1	100.00%	1	0	0.00%	731	293	40,08%
	Canarias	21	14	66.67%	40	30	75.00%	19	14	73.68%	6	6	100.00%	2	2	100.00%	88	66	75,00%
	Cantabria	82	60	73.17%	15	9	60.00%	3	3	100%	2	1	50.00%	0	0		102	73	71,57%
	Castilla y León	2189	1192	54.45%	44	29	65.91%	6	4	66.67%	8	7	87.50%	1	1	100.00%	2248	1233	54,85%
	Castilla-La Mancha	844	398	47.16%	60	42	70.00%	8	7	87.50%	7	6	85.71%	0	0		919	453	49,29%
	Cataluña	738	573	77.64%	144	129	89.58%	41	39	95.12%	18	14	77.78%	5	5	100.00%	946	760	80,34%
	Cdad. Foral de Navarra	251	192	76.49%	18	14	77.78%	2	1	50.00%	1	1	100.00%	0	0		272	208	76,47%
	Comunidad de Madrid	101	58	57.43%	46	39	84.78%	12	10	83.33%	17	16	94.12%	3	3	100.00%	179	126	70,39%
	Comunitat Valenciana	384	328	85.42%	94	87	92.55%	49	48	97.96%	12	12	100.00%	3	2	66.67%	542	477	88,01%
	Extremadura	345	244	70.72%	33	32	96.97%	4	3	75.00%	3	3	100.00%	0	0		385	282	73,25%
	Galicia	199	164	82.41%	94	80	85.11%	15	11	73.33%	5	5	100.00%	2	2	100.00%	315	262	83,17%
	Illes Balears	27	18	66.67%	28	27	96.43%	10	10	100%	1	1	100.00%	1	1	100.00%	67	57	85,07%
	La Rioja	165	128	77.58%	7	7	100%	1	1	100%	1	1	100.00%	0	0		174	137	78,74%
	País Vasco	182	124	68.13%	51	42	82.35%	12	8	66.67%	4	3	75.00%	2	2	100.00%	251	179	71,31%
	Principado de Asturias	47	32	68.09%	24	16	66.67%	3	2	66.67%	2	1	50.00%	2	1	50.00%	78	52	66,67%
	Región de Murcia	9	2	22.22%	19	17	89.47%	13	10	76.92%	2	2	100.00%	2	2	100.00%	45	33	73,33%
Total		6799	4078	59,98%	918	738	80.39%	252	216	85.71%	114	101	88.60%	29	25	86.21%	8112	5158	63.58%

U: Universe   S: Sample   %: S/U percent

3.3. Identification and assessment of financial condition dimensions

Following the procedure described in the methodology section, the indicators shown in Table 1 were calculated. The descriptive analysis of the sample is summarized in Table 3.

The search of the financial dimensions under consideration led to the identification of the indicators that reflected similar variability. Thus, it was possible to obtain a common reading of groups of indicators that were based on theoretical concepts collected from literature.

It was considered appropriate to use cluster analysis technique. Among the various methods available, the Ward Method was considered suitable to the present objective. This is a sequential, agglomerative, hierarchical and non-overlapping method based on the minimization of the variance of the dissimilarity measure of the squared Euclidean distance. Therefore, the authors proceeded to typing all the variables and applying the technique of clustering process, which was stopped at step 29. At this stage, the clustering coefficient moved from 43,311.156 to 61,179.509.

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
R1	5,158	-47.6119	279.2265	3.0322	10.4794
R2	5,158	-47.6119	279.2265	3.4404	10.6035
R3	5,158	-215.3450	270.9052	2.0982	9.8859
R4	5,158	0.0000	2.7624	0.1831	0.2315
R5	5,158	0.0000	3.5033	0.1991	0.2573
R6	5,158	0.0000	8.0124	0.2980	0.3996
R7	5,158	0.0000	9,250.0000	279.8486	422.9547
R8	5,158	0.4106	38.6805	1.2034	0.7410
R9	5,158	0.1299	38.6805	1.1623	0.7383
R10	5,158	-3,531.6322	17,348.2217	130.0467	588.8943
R11	5,158	0.0000	5.5975	0.0476	0.1157
R12	5,158	0.0000	2,618.0817	44.9031	99.9258
R13	5,158	0.0000	433.2755	10.7749	18.2515
R14	5,158	-2,279.0228	17,215.1485	54.4503	488.3428
R15	5,158	66.3647	20,267.8768	1,646.7433	1,214.9197
R16	5,158	1.0275	80.9780	2.8414	2.5492
R17	5,158	0.0162	44.9581	0.6757	0.7316
R18	5,158	0.0161	38.0132	0.6086	0.6189
R19	5,158	0.9350	17,501.4033	511.3774	611.0050
R20	5,158	0.0305	38.0230	0.6962	0.6468
R21	5,158	0.0200	18.1341	0.4309	0.3249
R22	5,158	0.0000	12,940.3914	569.1930	705.6636
R23	5,158	12.9603	14,790.8385	978.6584	863.7673
R24	5,158	0.0000	787,562.9783	1,674.5382	15,693.2326
R25	5,158	0.0000	604,975.7177	3,043.7052	19,550.7891
R26	5,158	0.0000	311,503.1133	1,040.5805	7,551.5409
R27	5,158	0.0000	1468,021.0385	4,173.3603	30,266.8607
R28	5,158	0.0000	1075,930.1892	3,241.3566	22,981.1056
R29	5,158	0.0000	652,659.9770	3,004.2931	19,158.6866
R30	5,158	0.0000	122,752.9533	462.8842	3,703.5887
R31	5,158	0.0000	841,136.5449	2,959.8383	20,759.1642
R32	5,158	59.9894	19,463.8451	1,592.2929	1,079.4047
R33	5,158	1.8732	16,325.9618	720.8649	817.8102
R34	5,158	0.0099	0.9313	0.4093	0.1518
Valid N (listwise)	5,158				

The distance between coefficients revealed an efficient cut line that showed the existence of various dimensions identified in economics literature. Figure 1 shows the dendrogram of clustering where one can clearly identify five conceptual clusters.

The results reflect the existence of five large blocks of variables. The first block (R8, R9, R10, R14, R16, R17, R18, R19, R20 and R21) comprise a set of indicators related to budgetary matters. The meaning of this block is close to what is known in literature as flexibility. The second (R4, R5, R6, R7, R11, R12 and R13) block represents a set of
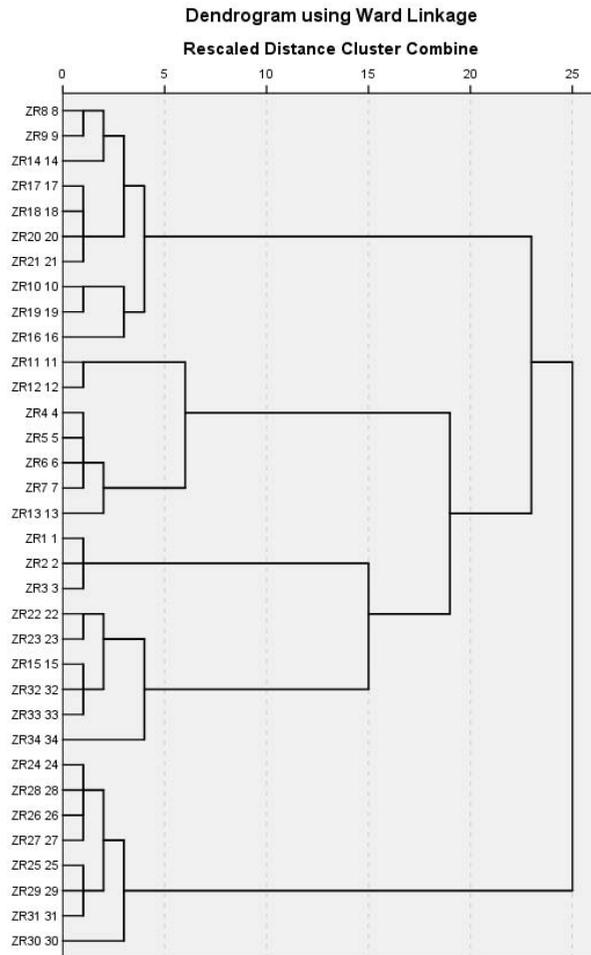
Figure 1: Identification of financial condition dimensions

issues related to the debt of the entity and its cost. These aspects are clearly linked to sustainability. The third block (R1, R2 and R3) is composed of clear indicators of short-term solvency or cash solvency. The fourth block (R15, R22, R23, R32, R33 and R34), which includes indicators related to various activities of the entity and the nature of its financing, either through their own funding sources or through transfers from other institutions, led the authors to identify it with the notion, conceptualized in literature as vulnerability. The last block of indicators (R24, R25, R26, R27, R28, R29, R30 and R31), which represents the per capita distribution of expenditure by functional concepts, is called Service-level Solvency.

Thereafter, the authors had to build one or several functions that would allow them to get those components, both primary and second-order, which are not correlated within each of these dimensions. For this, the statistical technique of principal component analysis was used. This allowed the authors to visualize different subconcepts within each dimension and obtain a numerical assessment of each of them.

It was feasible to apply the technique of principal component analysis to each of the dimensions that were drawn together both by cluster analysis and economics literature.

Within each of the dimensions considered, the indicators were reasonably correlated. The values that were taken by determinants of correlation matrices (0.000 – 3.37E-005) were low, and the Kaiser-Meyer-Olkin Measure of Sampling Adequacy statistics (0.729 – 0.917) were high and satisfactory. Bartlett's tests of sphericity showed appropriate significances (p_values < 0.001).

To extract the components, the rule of Kaiser was followed. A high degree of commonality of all indicators was observed in the components extracted, except for the dimension of vulnerability. In the latter case, it was decided to increase the percentage of variance explained. Thus, with two components, a high level of commonality of all indicators, included in the concept, was achieved.

Then, Varimax orthogonal rotation method was chosen to clearly identify the components. This rotation method minimizes the number of variables with high saturations and simplifies the interpretation of the components. Kaiser normalization was used. The aim was to prevent distortion of the final solution due to the excessive weight of the indicators with major commonality. Once this process was completed, the extraction of components could explain a high percentage of data variance (71.628% – 94.724%) in all the dimensions extracted with the initial cluster analysis. The functions that determine the values of the components extracted are shown in Table 4.

As the objective of this phase was to obtain a value for each municipality, in each aspect of the financial condition, the authors extracted the scores previously obtained by each municipality in different components. In the case of Flexibility (Flex), Cash Solvency (Cash_solv) and Service-level Solvency (Solv_serv), the values were determined from the functions of the single component of the dimension.

However, the sustainability and vulnerability are explained by two distinct components. In the case of sustainability, the rotated component matrix shows that indicators R4, R5, R6, R7, and R13, basically related to the volume of debt of the entity, are linked more to the first component, and hence this component was identified as Sustainability of the volume of debt (Sust_debt). In the second component of this dimension, it was observed that a significant weight of indicators was linked to the price of debt (R11 and R12), interests, and hence this component was identified as Sustainability interest (Sust_int).

In the analysis of vulnerability, the rotated component matrix showed that, in the first component extracted, more weight was in indicators (R15, R22, R23, R32 and R33) which focused basically on general aspects of vulnerability. For this reason, this component was described as General Vulnerability (Vuln_gen). The second component of this dimension showed a significant weight of the R34 indicator, which assesses the investment efforts of the institution. Therefore, this component was referred to as Vulnerability associated with investments (Vuln_inv).

Table 4: Process of principal component analysis

BLOCK		Flexibility	Sustainability	Cash Solvency	Vulnerability	Serv.-level Solvency.
Indicators		R8, R9, R10, R14, R16, R17, R18, R19, R20 and R21	R4, R5, R6, R7, R11, R12 and R13	R1, R2 and R3	R15, R22, R23, R32, R33 and R34	R24, R25, R26, R27, R28, R29, R30 and R31
Components	Num.	1	2	1	2	1
	Determinant. CorrelationMatrix	1.43E-008	3.37E-005	0.04	0.00	2.12E-005
	KMO: Sampl. Adequacy	0.845	0.748	0.729	0.773	0.917
	Bartlett Sig.	0.000	0.000	0.000	0.000	0.000
	Variance Explained (VE)	F1: 71.628%	S1: 68.822% S2: 19.598%	CS1: 94.724%	V1: 78.108% V2: 12.668%	SS1: 79.912%
	Communalities:	High	High	High	High	High
Rotation Method: Varimax with Kaiser Normalization.						
Component Scores Functions:						
Flexibility		$Flex_i = 0.125 \times R_{8i} + 0.125 \times R_{9i} + 0.115 \times R_{10i} + 0.103 \times R_{14i} + 0.088 \times R_{16i} + 0.129 \times R_{17i} + 0.130 \times R_{18i} + 0.105 \times R_{19i} + 0.134 \times R_{20i} + 0.119 \times R_{21i}$				
Sustainability		$Sust_i = (VE\_Sust\text{-}debt \times Sust\text{-}debt_i + VE\_Sust\text{-}int \times Sust\text{-}int_i)/(VE\_Sust\text{-}debt + VE\_Sust\text{-}int)$				
	Sustainability-Debt	$Sust\text{-}debt_i = 0.279 \times R_{4i} + 0.275 \times R_{5i} + 0.228 \times R_{6i} + 0.228 \times R_{7i} - 0.141 \times R_{11i} - 0.122 \times R_{12i} + 0.147 \times R_{13i}$				
	Sustainability-Interests	$Sust\text{-}int_i = -0.131 \times R_{4i} - 0.123 \times R_{5i} - 0.017 \times R_{6i} - 0.026 \times R_{7i} + 0.547 \times R_{11i} + 0.533 \times R_{12i} + 0.083 \times R_{13i}$				
Cash Solvency		$Cash\text{-}Solv_i = 0.347 \times R_{1i} + 0.347 \times R_{2i} + 0.334 \times R_{3i}$				
Vulnerability		$Vuln_i = (VE\_Vuln\text{-}gen \times Vuln\text{-}gen_i + VE\_Vuln\text{-}inv \times Vuln\text{-}inv_i)/(VE\_Vuln\text{-}gen + VE\_Vuln\text{-}inv)$				
	General Vulnerability	$Vuln\text{-}gen_i = 0.356 \times R_{15i} + 0.149 \times R_{22i} + 0.238 \times R_{23i} - 0.312 \times R_{32i} + 0.140 \times R_{33i} - 0.329 \times R_{34i}$				
	Vulnerability-Investments	$Vuln\text{-}inv_i = -0.288 \times R_{15i} + 0.142 \times R_{22i} - 0.034 \times R_{23i} - 0.183 \times R_{32i} + 0.180 \times R_{33i} + 0.963 \times R_{34i}$				
Service-level Solvency		$Solv\text{-}serv_i = 0.149 \times R_{24i} + 0.143 \times R_{25i} + 0.143 \times R_{26i} + 0.143 \times R_{27i} + 0.149 \times R_{28i} + 0.144 \times R_{29i} + 0.111 \times R_{30i} + 0.132 \times R_{31i}$				

A single value was calculated for the dimensions in which more than one uncorrelated component was extracted. Each component was weighted according to the explained variance (Table 4). The reason for this procedure was that the objective was to obtain a single value for each dimension.

To complete this phase of work, correlation analysis was performed to confirm the differentiated nature of the five dimensions used. As can be seen in Table 5, the correlations are either insignificant or significant with substantially low levels of correlation.

3.4. Impact of size and geographic location on the dimensions of financial condition of Spanish municipalities

After preliminary calculation of the values that have the dimensions for all municipalities in the sample, the next step was to analyze the dependence or association between the levels of the financial dimensions of the municipality and its size and the Autonomous Community to which it belongs.

The analysis revealed no compliance with the hypothesis of normality of residuals and homogeneity of variances. Therefore, the authors could not apply statistical techniques of analysis of variance under parametric assumptions. Consequently non-parametric contrasts were performed. The authors opted for execution of the Median Test to verify whether the median values of the dimensions were similar in different sections of the sample.

Table 5: Correlations

		Flex.	Sust.	Cash Solv	Vuln.	Serv. Solv.
Flex.	Pearson Correlation	1				
	Sig. (1-tailed)					
	N	5,158				
Sust.	Pearson Correlation	-0.024*	1			
	Sig. (1-tailed)	0.045				
	N	5,158	5,158			
Cash Solv.	Pearson Correlation	-0.002	-0.021	1		
	Sig. (1-tailed)	0.445	0.067			
	N	5,158	5,158	5,158		
Vuln.	Pearson Correlation	0.218**	0.038**	-0.016	1	
	Sig. (1-tailed)	0.000	0.004	0.123		
	N	5,158	5,158	5,158	5,158	
Serv. Solv.	Pearson Correlation	0.019	-0.053**	-0.016	0.094**	1
	Sig. (1-tailed)	0.082	0.000	0.126	0.000	
	N	5,158	5,158	5,158	5,158	5,158
*. Correlation is significant at the 0.05 level (1-tailed).						
**. Correlation is significant at the 0.01 level (1-tailed).						

Therefore, the size of the municipality was first taken as a category variable and then a contrast for the total sample performed. This contrast showed that the size of the municipality was associated with all the dimensions of financial condition ($p\_value < 0.001$), except for the Cash Solvency (Table 6).

Table 6: Hypothesis Test Summary:
Association between municipality size and financial condition

	Null Hypothesis	Total N	Median	Test Statistic	Sig. (2-sided test)	Decision
Median Test						
1	The medians of Flexibility are the same across categories of municipal size	5,158	-0.115	110.077	0.000	Reject the null hypothesis
2	The medians of Sustainability are the same across categories of municipal size	5,158	-0.264	700.916	0.000	Reject the null hypothesis
3	The medians of Cash Solvency are the same across categories of municipal size	5,158	-0.169	1.206	0.877	Retain the null hypothesis
4	The medians of Vulnerability are the same across categories of municipal size	5,158	-0.234	174.801	0.000	Reject the null hypothesis
5	The medians of Service-level Solvency are the same across categories of municipal size	5,158	-0.146	795.609	0.000	Reject the null hypothesis
Asymptotic significances are displayed. The significance level is 0.01						
Degrees of Freedom: 4						
Municipal Size: Pop. < 5,000; 5,000 < Pop. < 20,000; 20,000 < Pop. < 50,000; 50,000 < Pop. < 200,000; 200,000 < Pop.						

Next, it was tested if there was any association between municipality's membership in any particular autonomous community and its financial condition. Moreover, given that the size exerts unequal influence on certain aspects of financial condition (Table 6), this test was carried out taking into account different sizes of municipalities.

The result indicated that, in general, statistical influence exists between a municipality belonging to an autonomous community and all aspects of financial condition. However, considering the sample segmented by population size, it was found that this influence was active in all aspects of the financial condition of municipalities whose population was less than 20,000. For a municipality, with a population between 20,000 and 50,000, its membership in a CCAA affects only the Flexibility, Sustainability and Vulnerability. No statistical impact was observed on Cash solvency and Services-level solvency. For those municipalities whose population exceeded the threshold of 50,000, no statistical evidence was found to show that membership in a CCAA affects any of the various aspects of financial condition (Table 7).

Table 7: Hypothesis Test Summary:
Association between CCAA and financial condition

		Median Test				
		1	2	3	4	5
		Flex.*	Sust.*	Cash Solv*	Vuln.*	Serv.-level Solv*
Tot. Sample	N	5,158	5,158	5,158	5,158	5,158
	Median	-0.115	-0.264	-0.169	-0.234	-0.146
	Test Statistic	585.794	734.618	125.879	638.674	480.107
	Sig. (2-sided test)	0.000	0.000	0.000	0.000	0.000
	Decision	Reject H_0	Reject H_0	Reject H_0	Reject H_0	Reject H_0
Pop. < 5,000	N	4,078	4,078	4,078	4,078	4,078
	Median	-0.138	-0.412	-0.168	-0.191	-0.141
	Test Statistic	448.240	462.942	108.071	541.488	183.770
	Sig. (2-sided test)	0.000	0.000	0.000	0.000	0.000
	Decision	Reject H_0	Reject H_0	Reject H_0	Reject H_0	Reject H_0
5,000 < Pop. < 20,000	N	738	738	738	738	738
	Median	-0.072	0.286	-0.172	-0.318	-0.153
	Test Statistic	203.228	87.956	43.363	176.429	84.373
	Sig. (2-sided test)	0.000	0.000	0.000	0.000	0.000
	Decision	Reject H_0	Reject H_0	Reject H_0	Reject H_0	Reject H_0
20,000 < Pop. < 50,000	N	216	216	216	216	216
	Median	0.019	0.562	-0.173	-0.297	-0.154
	Test Statistic	42.425	40.240	23.066	43.590	19.433
	Sig. (2-sided test)	0.000	0.001	0.112	0.000	0.247
	Decision	Reject H_0	Reject H_0	Retain H_0	Reject H_0	Retain H_0
50,000 < Pop. < 200,000	N	101	101	101	101	101
	Median	0.047	0.672	-0.167	-0.299	-0.154
	Test Statistic	18.680	20.554	12.918	24.709	24.871
	Sig. (2-sided test)	0.286	0.196	0.679	0.075	0.072
	Decision	Retain H_0	Retain H_0	Retain H_0	Retain H_0	Retain H_0

* H_0: The medians of Dimension are the same across categories CCAA.
Asymptotic significances are displayed. The significance level is 0.01
Degrees of Freedom: 16
We did not conduct the test for the size of municipalities over 200,000 inhabitants because the number of municipalities is small.

4. Conclusions

As financial condition is an open concept with several alternatives for measurement, it was attempted in this study to develop an integrated approach of the two most representative contributions (ICMA, CICA), which is capable of application to reality.

The concept, by virtue of it being not directly observable and complex, has implications for the usually proposed indicators. The indicators are not univocal and they often pick up aspects from more than one dimension. Furthermore, the choices in different researches usually have a subjective character.

This problem was sought to be overcome in this study by applying statistical methods. The objective was to determine what are the most representative indicators and if their grouping is consistent. To cover all the dimensions, a sample of 5,158 municipalities of Spain was studied in terms of a selected set of 34 indicators, with the constraints imposed by the available information.

The application of statistical techniques revealed the existence of five distinct dimensions. In three of these dimensions (Flexibility, Cash solvency and Services-level solvency), a certain uniqueness was found in the variability of the indicators. The analysis of the indicator values in the dimensions of sustainability and vulnerability revealed the existence of more than one sub-dimension in both cases. As regards sustainability, two components were identified, one associated with the volume of debt incurred by the municipality and the other related to its cost. In the case of vulnerability, a general component was found besides the one associated with the investments.

With the instruments developed, it was found that, for all municipalities in the sample, the size of the municipality had a clear statistical influence on all the components of the concept of financial condition, with the exception of Cash Solvency.

It was also found that the territorial factor had significant influence, though of a different nature, on the generality of the dimensions constituting the financial condition. Specifically, the geographic factor had greater influence on the segment of smaller municipalities (less than 20,000 inhabitants) than on the segment of municipalities with greater population.

References:

1. Alter, T.R., McLaughlin, D.K. and Melniker, N.E., *Analyzing Local Government Fiscal Capacity*, 2nd edition, University Park, PA: Pennsylvania State University, Cooperative Extension Service, 1984.
2. Ammar, S., Duncombe, W., Hou, Y. and Wright, R., 'Evaluating City Financial Management Using Fuzzy Rule-Based Systems', 2001, *Public Budgeting & Finance*, vol. 21, no. 4, pp. 70-90.
3. Benito, B. and Bastida, F., 'The Determinants of the Municipal Debt Policy in Spain', 2004, *Journal of Public Budgeting, Accounting and Financial Management*, vol. 16, no. 4, pp. 525-558.
4. Berne, R. and Schramm, R., *The Fiscal Analysis for Governments*, Englewood Cliffs, NJ: Prentice-Hall, 1986.

5. Berne, R., *The Relationships between Financial Reporting and the Measurement of Financial Condition*, GASB Research Report no. 18, Norwalk, Conn.: Governmental Accounting Standards Board, GASB, 1992.

6. Brown, K.W., 'The 10-Point Test of Financial Condition: Toward an Easy-to-Use Assessment Tool for Smaller Cities', 1993, *Government Finance Review*, vol. 9, no. 6, pp. 21-26.

7. Brown, K.W., 'Trends in Key Ratios Using the GFOA Financial Indicators Databases 1989-1993', 1996, *Government Finance Review*, vol. 12, no. 6, pp. 30-34.

8. Canadian Institute of Chartered Accountants (CICA), *Indicators of Government Financial Condition*, *Research Report*, Toronto, Canada: CICA, 1997.

9. Canadian Institute of Chartered Accountants (CICA), *Indicators of Financial Condition*, *Public Sector Statements of Recommended Practice (SORP) 4*, Toronto, Canada: CICA, 2009.

10. Cárcaba García, A., 'El análisis de la condición financiera en la Administración Pública', 2004, *Técnica Contable*, no. 669, pp. 26-42.

11. Carmeli, A., 'Conceptual and Practical Framework of Measuring Performance of Local Authorities in Financial Terms: Analysing the Case of Israel', 2002, *Local Government Studies*, vol. 28, no. 1, pp. 21-36.

12. Carmeli, A., 'The Effect of Fiscal Conditions of Local Government Authorities on Their Economic Development', 2007, *Economic Development Quarterly*, vol. 21, no. 1, pp. 91-98.

13. Chase, B.W. and Phillips, R.H., 'GASB 34 and Government Financial Condition: An Analytical Toolbox', 2004, *Government Finance Review*, vol. 20, no. 2, pp. 26-31.

14. Clark, T.N., 'Municipal Fiscal Strain: Indicators and Causes', 1994, *Government Finance Review*, vol. 10, no. 3, pp. 27-29.

15. Felbinger, C.L. and Robey, J.E., 'Globalization's Impact on Local Policy: The Rise of Regional Cluster-Based Economic Development Strategies', 2001, *Policy Studies Review*, vol. 18, no. 3, pp. 63-79.

16. Governmental Accounting Standards Board (GASB), *Basic Financial Statements – and Management's Discussion and Analysis – for State and Local Governments*, Statement no. 34, Norwalk, CT: GASB, 1999.

17. Governmental Accounting Standards Board (GASB), *Economic Condition Reporting: The Statistical Section an amendment of NCGA Statement 1*, Statement no. 44, Norwalk. CT: GASB, 2004.

18. Governmental Accounting Standards Board (GASB), *Objectives of Financial Reporting*, Concepts Statement No. 1, Norwalk, CT: GASB, 1987.

19. Groves, S.M., Godsey, W.M. and Shulman, M.A., 'Financial Indicators for Local Government', 1981, *Public Budgeting and* Finance, vol. 1, no. 2, pp. 5-19.

20. Hendrick, R., 'Assessing and Measuring the Fiscal Heath of Local Governments', 2004, *Urban Affaires Review*, vol. 40, no. 1, pp. 78-114.

21. Hill, R.C., 'Separate and Unequal: Governmental Inequality in the Metropolis', 1974, *The American Political Science Review*, vol. 68, no. 4, pp. 1557-1568.

22. Honadle, B.W., 'The States' Role in U.S. Local Government Fiscal Crises: A Theoretical Model and Results of a National Survey', 2003, *International Journal of Public Administration*, vol. 26, no. 13, pp. 1431-1472.

23. Honadle, B.W. and Lloyd-Jones, M., 'Analyzing Rural Local Governments Financial Condition: An Exploratory Application of Three Tools', 1998, *Public Budgeting and Finance*, vol. 18, no. 2, pp. 69-86.

24. Honadle, B.W., Costa, J.M. and Cigler, B.A., *Fiscal Heath for Local Governments*, San Diego, California: Elsevier Academic Press, 2004.

25. Hughes, J.W. and Laverdiere, R., 'Comparative Local Government Financial Analyses', 1986, *Public Budgeting and Finance*, vol. 6, no. 4, pp. 23-33.

26. International City/County Management Association (ICMA), *Evaluating Financial Condition, A Handbook for Local Government*, 4th edition, Washington, D.C.: ICMA, 2003.

27. Jones, S. and Walker, G., 'Explanators of Local Government Distress', 2007, *Abacus*, vol. 63, no. 3, pp. 396-418.

28. Kleine, R., Kloha, P. and Weissert, C.S., 'Monitoring Local Government Fiscal Health: Michigan's New 10 Points Scale of Fiscal Distress', 2003, *Government Finance Review*, vol. 19, no. 3, pp. 18-23.

29. Kloha, P., Weissert, C.S. and Kleine, R., 'Developing and Testing a Composite Model to Predict Local Fiscal Distress', 2005a, *Public Administration Review*, vol. 65, no. 3, pp. 313-323.

30. Kloha, P., Weissert, C.S. and Kleine, R., 'Someone to Watch Over Me: State Monitoring of Local Fiscal Conditions', 2005b, *The American Review of Public Administration*, vol. 35, no. 3, pp. 236-255.

31. Ladd, H.F., 'Fiscal Impacts of Local Population Growth: A Conceptual and Empirical Analysis', 1994, *Regional Science and Urban Economics*, vol. 24, no. 6, pp. 661-686.

32. McDougall, A. and O'Connor, K., 'The Importance of Proximity in Economic Competitiveness: Rethinking the Role of Clusters in Local Economic Development Policy', 2005, *Australasian Journal of Regional Studies*, vol. 11, no. 1, pp. 3-24.

33. Mead, D.M., *An Analyst's Guide to Government Financial Statements,* Norwalk, CT: GASB, 2001.

34. Mercer, T. and Gilbert, M., 'A Financial Condition Index for Nova Scotia Municipalities', 1996, *Government Finance Review*, vol. 12, no. 5, pp. 36-38.

35. Morgan, D.R. and England, R.E., 'Explaining Fiscal Stress among Large U.S. Cities: Toward an Integrative Model', 1983, *Public Studies Review*, vol. 3, no. 1, pp. 73-78.

36. O'Connor, K., Stimson, R.J. and Daly, M., *Australia's Changing Economic Geography: A Society Dividing*, South Melbourne: Oxford University Press, 2001.

37. Petersen, J.E., 'Simplification and Standardization of State and Local Government Fiscal Indicators', 1977, *National Tax Journal*, vol. XXX, no. 3, pp. 299-311.

38. Petro, J., 'Fiscal Indicators Reports and Ratio Analysis: Benchmarking Ohio Municipalities and School Districts', 1998, *Government Finance Review*, vol. 14, no. 5, pp. 17-21.

39. Tiebout, C.M., 'A Pure Theory of Local Expenditures', 1956, *The Journal of Political Economy*', vol. 64, no. 5, pp. 416-424.

40. Wang, X., Dennis, L. and Tu., Y.S., 'Measuring Financial Condition: A Study of U.S. States', 2007, *Public Budgeting and Finance*, vol. 27, no. 2, pp. 1-21.

41. Wolff, L.W. and Hughes, J., 'Net Available Assets as a Proxy for Financial Condition: A Model for Measuring and Reporting Resources Available to a Local Government', 1998, *Government Finance Review*, vol. 14, no. 3, pp. 29-33.

42. Wolkoff, M., 'An Evaluating of Municipal Rainy Day Fund', 1987, *Public Budgeting and Finance*, vol. 7, no. 2, pp. 52-63.

43. Zafra Gómez, J.L., López Hernández, A.M. and Hernández Bastida, A., 'Developing a Model to Measure Financial Condition in Local Government', 2009a, *The American Review of Public Administration*, vol. 39, no. 4, pp. 425-449.

44. Zafra Gómez, J.L., López Hernández, A.M. and Hernández Bastida, A., 'Developing An Alert System for Local Governments in Financial Crisis', 2009b, *Public Money & Management*, vol. 29, no. 3, pp. 175-181.

45. Zafra Gómez, J.L., López Hernández, A.M. and Hernández Bastida, A., 'Evaluación de la condición financiera en las administraciones locales a través del análisis de componentes principales', 2006, *Presupuesto y Gasto Público*, vol. 2, no. 43, pp. 113-126.

46. Zehms, K.M., 'Proposed Financial Ratios for Use in Analysis of Municipal Annual Financial Reports', 1991, *Government Accountants Journal*, Fall, pp. 79-85.