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A New Approach to Determinant Factors of Local Government Debt

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Abstract

The purpose of this research is to define a structural/conjunctural model to explain the debt of municipalities. More specifically, the intention is to understand whether there is a relationship between the institutional, tax, budgetary and economic circumstances and municipalities' debt. The paper fits the theories of debt, namely the theories of public choice, tax illusion and institutional theory, allow identification of a range of factors that can influence municipalities' debt, using a structural equation methodology. The results allow concluding that the institutional, tax and budgetary situations present a negative and statistically significant relationship with municipal debt. This means that, in the local government setting, when the institutional, tax and budgetary contexts are favourable, debt levels tend to be lower. Therefore, municipalities should take advantage of their institutional context and of periods of higher tax revenue, increased central government grants and investment expenditure, to reduce their debt levels, so they can face other circumstances pushing for debt increases.

Keywords: Local debt, Determinants, Structural equation analysis, Latent variables.

Introduction

In the recent context of economic crisis, a number of countries attempted to solve their problems by pursuing expansionist spending policies which, by not being accompanied by increased public revenue, led to an increased public deficit and, consequently, debt. In this setting, those economies have been facing a problem of excessive public debt, which have to be solved in a sustainable way.

Portugal has been facing this problem, with it being fundamental for there to be reciprocal solidarity between all sectors within the Portuguese Public Administrations[1]. Accordingly, the Local Government (LG) should also make an effort to control its debt. In such a scenario, it is therefore fundamental to analyse the main determinant factors of municipal debt, as it does not seem to exist sufficient research allowing deeper understanding of this phenomenon.

Therefore, taking the Portuguese case as a reference, the main issue underlying this study concerns the lack of knowledge about the possible factors affecting municipalities' debt. It offers a contribution, given that perceiving what affects local debt, might be helpful to support its management.

The general aim is to define a structural/conjunctural model explaining the debt of the 308 Portuguese municipalities. More specifically, it seeks to determine whether there is a relationship between the institutional, tax, budgetary and economic situations and municipalities' debt, using data from years 2004 to 2016.

A structural equation methodology is used, which is believe to be a major contribution, as its use is innovative in the local public finance research. As far as it is known by the authors, until the present date, there have been no national or international studies using this methodology to study the subject. Therefore, introducing this new methodology of analysis will contribute to deepening scientific study of the phenomenon of municipal debt. Fundamentally, based on a structural model, the results allow to explore and conclude about the influence of some non-observable variables (latent or constructs)[2], such as the institutional, tax, budgetary and economic conjunctures, on Portuguese municipalities' debt. Following this Introduction, the Section 2 includes a brief literature review, presenting some studies dealing with the determinants of LG debt.

The methodology is explained in Section 3, recapitulating the objectives, and defining the research hypotheses and variables. The methodological framework is also presented together with the statistical treatment of the data and specification and validation of the measurement model of analysis. In Section 4 the structural model is specified, validated and presented and the research hypotheses are finally discussed.

The last section summarises the main conclusions of the study, presenting some limitations that can be opportunities for future lines of research.

Literature Review

The explanatory theories of debt, namely the theories of public choice, tax illusion and institutional theory, allow identification of a range of factors that can influence debt. Based on those theories, various studied have emerged attempting to understand the determinants of debt and their influence.

As one will see, the Spanish situation has been greatly studied, both at the municipal level and regarding the Autonomous Communities. However, this section also presents studies carried out in other countries such as USA, Norway, Chile, Switzerland and Czech Republic. As for studies applied to Portuguese local authorities, which are very few in number, those by Fernandes (2010) and Ferreira (2011) are highlighted.

Concerning the Spanish context, Escudero Fernández and Prior Jiménez (2002) obtained results allowing to conclude that income *per capita*, the tourism index and the number of inhabitants present a positive relationship with the different local authorities' levels of debt. In relation to budgetary variables, the negative relationship between the current balance and levels of debt stands out, with the authors presenting no explanation for the situation.

The study by Fernández Llera et al (2003) only allowed validation of the hypotheses that the level of tourism and gross savings has a significant effect on debt. They also concluded that the proximity to election periods originates an increase in debt. In another study, the same authors (Fernández Llera et al, 2004) found that population, gross savings, investment and tax capacity influence debt.

Bastida Albadalejo and Benito López (2005) observed that financial variables are those best explaining the level of municipal debt, highlighting the non-financial budgetary result and the capital revenue, which present a negative relationship, and capital expenditure with a positive relationship.

Goeminne and Smolders (2008) also obtained results allowing to identify the determinants of local debt, concluding that socio-economic variables such as population, immigrants, income *per capita*, transfers and tax revenue have a positive influence on municipalities' debt level. The results also support the idea that, at political level, it is not the ideology that influences debt, but rather the political strength. Therefore, less political fragmentation gives rise to greater debt.

Vallés Giménez et al (2003) and Cabasés et al (2007) find that investment, net savings and tax revenue are the variables most related with debt.

Agundez Alvarez and Baza Román (2008) deal fundamentally with institutional and budgetary variables, concluding that debt is influenced essentially by current and capital expenditure and revenue and by tax capacity. They also show the possibility of a budgetary cycle to exist.

The results of another study (Zafra Gómez et al, 2009) also applied to the Spanish situation, concluded that the variables best explaining debt depend on the size of the local authority. However, the authors highlight that, in most cases, internal variables, namely the non-financial budgetary result and tax revenue, are those better explaining municipalities' debt. External variables have a greater influence in small local authorities, losing significance as size increases.

In a later study, Zafra Gómez et al (2011) considered fundamentally financial and political variables, finding that in terms of the former, tax revenue, transfers, non-financial budgetary balance and capital expenditure are those that more influence debt. Concerning political variables, they confirm the hypotheses related to ideology and political strength. They also validate the hypothesis that the creation of dependent entities originates a reduction in the municipality's debt.

As for the study of debt in Spanish Autonomous Communities, Vallés Giménez (2002) obtained shows that debt is destined fundamentally to investment expenditure, despite covering certain current or financial expenditure. He also confirmed the positive relationship between debt and income *per capita*. Regarding institutional variables, no type of influence on the evolution of debt was perceptible.

The results obtained by Salinas Jiménez and Álvarez García (2002, 2003) supported the basic idea that there is a relationship between debt and total expenditure and revenue allocated to investment. Regarding political and ideological variables, the authors found no significant relevance allowing conclusions to be drawn.

Also for Spanish Autonomous Communities, Benito López et al (2004) concluded, in relation to institutional variables, that the entities with more competences showed greater debt. When these corresponded to a single province, the authors found they presented less debt than those corresponding to several provinces. Regarding the results obtained for economic-financial variables, it stands out that current expenditure showed a positive relationship with debt. The authors also confirmed that tax revenue presented a negative relationship with debt, just as the financial capacity to create gross and net savings.

Out of the EU, the situation in the USA has also been subject to study. Farnham (1985), addressing mainly the effectiveness of limitations to debt, also presented results in relation to the determinants. Places with higher income *per capita* were also found to have the greatest debt.

Kieweit and Szakaly (1996) also studied the determinants of debt, in the specific case of fifty US states, despite this not being the main aim of their study. The results confirmed a positive relationship between debt and income *per capita*, crime index and school age.

Large Swiss local authorities were also subject to research by Feld and Kirchgässner (2001). The results validated the hypotheses that the number of inhabitants, unemployment rate and fiscal responsibility influenced debt.

Tovmo (2007) studied debt in Norwegian local authorities, analysing more specifically deficit rather than debt. Statistical significance was found for political strength and for transfers obtained. In relation to the ideology of the governing party, it was not possible to validate the hypotheses that the socialist (left wing) party presents higher deficits. Hagen and Vabo (2005) also studied the Norwegian situation, obtaining significant results only for political strength. In the same context, Borge (2005), studying the main economic and political factors, concluded that transfers received and taxes influence debt negatively, whereas revenue presents a positive relationship. Political fragmentation of the government was also found to lead to higher debt.

Hájek and Hájková (2009) studied debt in Czech local authorities, obtaining statistically significant results pointing that population, tax capacity and the introduction of limits to debt, influence debt.

Chilean local authorities were studied by Letelier (2011) who, besides finding the existence of strategic cycles of debt, concluded that population and political fragmentation have also a significant influence on debt.

Regarding the Portuguese situation, Fernandes (2010) studied the debt of local authorities in mainland Portugal, and concluded that personnel expenditure, current and capital transfers to civil parishes and investment, increased the degree of municipal debt. Contrary to expectations, the greater the revenue, the greater the debt. Ferreira (2011) investigated the same phenomenon, finding that the degree of dependence, measured by the weight of revenue in total transfers, affected debt negatively. The weight of investment expenditure in total expenditure had a positive impact on debt.

Galiński (2015) analysed the determinants and applied approaches of debt limits in Poland local governments between 1995 and 2013. Concluded that "…*growth of share of the debt in the revenues was significantly affected by the financial situation in the public finance sector and in the local government sector as well as by the cost of capital there*."

Ehalaiye, Botica-Redmayne and Laswad (2017) investigate the financial determinants of local government debt in New Zealand. The results validated the hypotheses that council income is the major financial determinant of local government borrowing.

Based on the various studies quoted, one gather that a great variety of factors are likely to influence LG debt. Analysis of these studies confirms they investigate primarily institutional, political-ideological, tax and economic-financial/budgetary determinants. However, is was noted that authors managed to obtain greater significant empirical evidence in relation to economic-financial/budgetary and tax factors. On the contrary, hypotheses related to political-ideological factors have been relatively less validated.

Methodology

Objectives, Research Hypotheses and Variables

This study aims to contribute to enhancing the international literature, fundamentally through the use of a statistical methodology of analysis that has not been used in studies on the determinants of municipal debt. As mentioned above, that methodology is structural equation analysis. Therefore, the general objective, as stated, is to define a structural/conjunctural model to explain municipal debt, taking as reference data from Portuguese local authorities.

Given this general objective, the following specific objectives are considered:

- to understand whether there is a relationship between the institutional scenario and debt in Portuguese local authorities, and if so, the sign it presents;
- to understand whether there is a relationship between the tax scenario and debt in Portuguese local authorities, and if so, the sign it presents;

- to understand whether there is a relationship between the budgetary scenario and debt in Portuguese local authorities, and if so, the sign it presents;
- to understand whether there is a relationship between the economic scenario and debt in Portuguese local authorities, and if so, the sign it presents.

Taking into account the overall objective, the methodological framework and the literature review, research hypotheses were defined that could lead to answer to the research question "*What latent factors influence municipal debt?*".

As this study is of an innovative nature, one did not find support in the literature for establishing a relationship for the research hypotheses as they were put. Therefore, the various hypotheses will be formulated, seeking to find the possible relationship between the institutional, tax, budgetary and economic conjunctures and municipal debt, based on the structural equation methodology of analysis. For each hypothesis, the latent variable or construct will be presented, which not being directly observable or measurable, will be "felt", through the observable or manifest ones, which will also be presented.

Considering the somewhat inexpressive results obtained by various authors regarding political-ideological factors (e.g. political ideology, form of governance, …), as well as the results of some studies carry out previously by the authors themselves, it was chosen not to insert in this model a latent variable for the "political-ideological scenario", as could be expected.

Institutional Scenario

Some of the authors presented in the literature review obtained significant statistical evidence that various institutional factors influence municipal debt. However, none of them obtained empirical evidence allowing the conclusion there is a positive or negative relationship between the set of factors used and debt. Therefore, the following hypothesis was established:

H_1: *There is a relationship between the institutional scenario of municipalities and their debt.* The latent variable or construct of "institutional scenario" is operationalized by three observable variables, as presented in Figure 1.
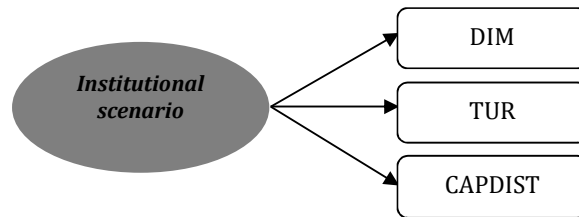
Fig. 1: Construct of the institutional scenario

- DIM (*Dimension*): Measured by the total population of the municipality.
- TUR (*Tourist capacity*): Measured by the number of hotels and similar (total hotels, guest houses, apartment hotels, tourist apartments, tourist complexes, motels, hostels and inns).
- CAPDIST (*District capital*): With the value of 1 when the municipality is a district capital and 0 otherwise.

Ii) Tax Scenario

The tax variables most studied in the diverse research presented in Section 2 are related to direct and indirect taxes, charges and other forms of own revenue. Some of the terms used by the various authors to frame these variables are those of tax responsibility or own tax capacity. There are different opinions

regarding the sign of the relationship these could have with municipal debt. Some authors consider municipalities with high tax revenue will have less need to resort to debt; contrarily, others highlight that by being able to present a better financial structure, they could access debt more easily.

The opinions of various authors, concerning the sign of the relationship between the different tax variables and municipal debt, are also valid for the tax situation – they are not unanimous regarding the sign of the relationship, despite acknowledging that this exists. Accordingly, the following hypothesis was set:

> **H_2:** *There is a relationship between the tax scenario of municipalities and their debt.*

The observable variables operationalizing the "tax scenario" are as in Figure 2.
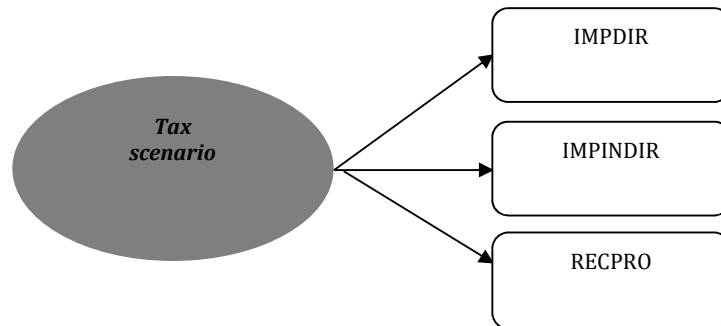
Fig. 2: Construct of tax scenario

- IMPDIR (*Direct taxes*): Measured by municipalities' total direct taxes divided by total number of inhabitants.
- IMPINDIR (*Indirect taxes*): Measured by municipalities' total indirect taxes divided by number of inhabitants.
- RECPRO (*Own revenue*): Measured by municipalities' total own revenue (total revenue deducted from transfers and financial liabilities) divided by number of inhabitants.

Iii) Budgetary Scenario

A variety of budgetary factors are addressed in the literature on the determinants of municipal debt. Depending on the study focusing more on revenue or expenditure, or the combination of both, different overall results can arise. Therefore, as it is difficult to understand, at the outset, the relationship between the budgetary situation and the municipal debt, the following hypothesis was formulated:

> **H_3:** *There is a relationship between the budgetary scenario of municipalities and their debt.*

Operationalization of the latent variable of "budgetary scenario" is done through the budgetary variables in Figure 3.
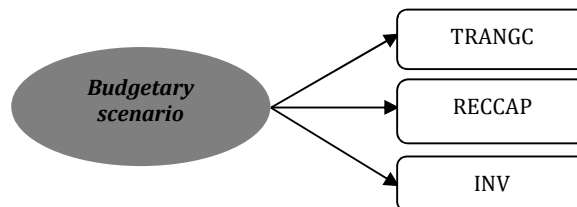
Fig. 3: Construct of budgetary scenario

- TRANGC (*Transfers from Central Government*): Measured by total transfers from the State (current and capital).
- RECCAP (*Capital revenue*): As short, medium and long-term loans are considered financial liabilities and are included in capital revenue, this variable is calculating by deducting financial liabilities from total capital revenue.
- INV (*Investment*): Measured by total investment expenditure.

iv) Economic scenario

Any study of the economic scenario considers various indicators, the most commonly used being related with gross domestic product, economic activity, inflation, unemployment rate and others of the kind. The literature related to the analysis of municipal debt has considered, among others, economic factors such as unemployment rate, residents' income *per capita* and economic activity. The conclusions of the different studies relate the factors individually with municipal debt, and then draw a conclusion about each factor.

There may be a general idea that the better the economic environment, the less local authorities need to resort to debt. Nevertheless, as far as it is known, no study related the economic situation overall with municipal debt. Therefore, with no empirical evidence of the possible relationship, and considering the results of studies that analysed economic factors individually, the following hypothesis was put:

   H$_4$: *There is a relationship between the economic scenario of municipalities and their debt.*
In this case, the municipality's "economic scenario" is operationalized by the observable variables in Figure 4.
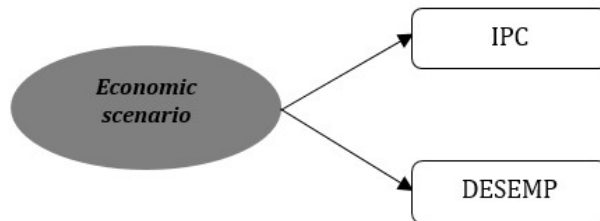
Fig. 4: Construct of the economic scenario

- IPC (*Purchasing power index*): Measured by the purchasing power index of residents in the area of the municipality, when unable to obtain information about municipalities' income *per capita*.
- DESEMP (*Unemployment*): Measured by the number of unemployed in the area of the municipality, due to the unavailability of a municipal unemployment rate.

Methodological Framework and Statistical Data Treatment

This study uses a positivist approach, based on quantitative research. Instruments of statistical analysis are used, so as to confirm the hypotheses formulated, in this particular case, structural equation analysis.

The statistical treatment[3] is described next, highlighting that the data (2004-2016) could be classified as secondary (Costa, 2012), since they derive fundamentally from databases. This classification is also justified by the fact that those data are held by others and not originally researched by the authors (Ferreira and Sarmento, 2009). Budgetary and tax data are particularly obtained from the Local Authorities' Portal[4] database, while the source for the rest of the data is the database of the National Statistics Institute (INE)[5].

The first aspect to be highlighted relates to the main variable intended to be studied. In this case, being a question of structural equation analysis, a construct of net debt *per capita* is used, which takes into consideration the calculation formula appearing in the former Local Finance Law (LFL)[6], in force for most of the time frame of the study. Figure 5 shows the variables used to operationalize that latent variable.
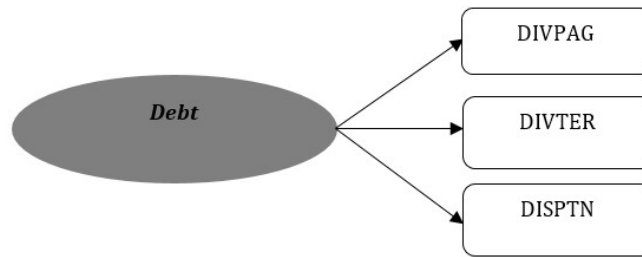
Fig. 5: Construct of net debt *per capita*

- DIVPAG (*Debts to be paid*): Measured by the value of total debts to be paid (liabilities), as in the municipality's balance sheet.
- DIVTER (*Debts of others*): Measured by the value of the debts of others (receivables), as in the municipality's balance sheet.
- DISPTN (*Cash on hand, bank deposits and short term negotiable financial applications*): Measured by the amounts of these items in the municipality's balance sheet.

As there is a pre-defined form of calculation, there is no need to assess the reliability and validity of this construct.

The analysis process begins with the specification of the model to explain (Portuguese) municipalities' debt. This stage is based on theoretical reference. So, after various analyses performed in order to find the best manifest variables to operationalize the constructs, their reliability and validity is assessed, using the Cronbach Alpha and composite reliability. Then the measurement model is validated, using for this purpose the *Goodness of Fit Index* (GFI), *Comparative Fit Index* (CFI), *Tucker-Lewis Index* (TLI), *Parsimony Comparative Fit Index* (PCFI), *Parsimony Goodness of Fit Index* (PGFI) and *Root Mean Square Error of Approximation* (RMSEA) (Marôco, 2010).

After validation of the measurement model, the structural model is specified, containing the relationships between the variables. To validate this, the indices used for the measurement model are calculated. Alterations are introduced to the model, considering, for example, the Modification Indices (MI) presented by the statistical analysis program or setting parameters. The estimations are made using the Maximum Likelihood (ML) method (Hair et al, 1998; Marôco, 2010).

Following the validation of the model, the results of the estimation are analysed, seeking to understand the relationships between the constructs of the institutional, tax, budgetary and economic scenarios, and the municipal net debt *per capita*.

Specification and validation of the measurement model

To define the observable variables that operationalize each construct, associated with the various factors, a previous exploratory factor analysis was performed.

Factor analysis, with the *Kaiser-Meyer-Olkin* (KMO) test giving 0,719 and considering the values recommended by Pestana and Gageiro (2008), confirmed there is an average correlation between the variables. The *Bartlett* test also presented a level of significance of 0,000, which allows rejection of the hypothesis of the correlation matrix in the population being identical, for any *p*, showing there is correlation between some variables. Therefore, the results of the two tests allowed to proceed with the factor analysis.

Three factors were extracted, and the observable variables that operationalize the economic scenario were removed from the analysis, since they greatly impoverished the results. Thus, contrary to that adopted by Ribeiro and Jorge (2014), only three constructs are used in the structural equations analysis, since it was considered that the inclusion of the economic scenario could significantly worsen the quality of the model adjustment. When performing confirmatory factor analysis, the internal consistency of each construct is also assessed.

Based on the theory presented in Section 2, the results of the exploratory factor analysis and the different hypotheses established in Section 3.1., the analysis proceeds to specify the model. The process begins by identifying the sub-model of measurement through confirmatory factor analysis. According to Marôco (2010), this methodology allows assessment of the quality of the adjustment of a theoretical measurement model to the correlational structure observed between the manifest variables. For this author, in the confirmatory factor analysis, it is also usual to assess the reliability and validity of the measuring instruments.

Therefore, considering the constructs presented (institutional scenario, tax scenario and budgetary scenario – the economic scenario was excluded from the analysis), the study goes ahead to confirmatory factor analysis of the measurement sub-model. It is worthy of note that not all the assumptions underlying this type of analysis were able to be followed (e.g. normality and existence of outliers), which might create some bias in the results.

The results of the adjustment quality from confirmatory factor analysis were obtained after introducing various alterations to the initial model, based on the methodology presented by Marôco (2010).

Table 1 presents the quality adjustment indices of the measurement sub-model indices, observing that overall the adjustment can be considered good. That is, the theoretical model seems able to reproduce the correlational structure of the manifest variables observed (Marôco, 2010).

Table 1: Adjustment quality indices from confirmatory factor analysis

Indices	*Estimation*	*Adjustment*
Goodness of Fit Index (GFI)	0,9	Good
Comparative Fit Index (CFI)	0,9	Good
Tucker-Lewis Index (TLI)	0,9	Good
Parsimony Comparative Fit Index (PCFI)	0,6	Good
Parsimony Goodness of Fit Index (PGFI)	0,5	Bad
Root Mean Square Error of Approximation (RMSEA)	0,09	Good

Besides the global quality of adjustment, as mentioned, Marôco (2010) considers it normal to assess the reliability and validity of the measuring instruments (constructs). Table 2 presents the Cronbach Alpha results for the three constructs that could explain municipal debt.

The Cronbach Alpha coefficients obtained for the constructs of "tax scenario" and "budgetary scenario" are considered good (0,799 and 0,857, respectively), and so they present reliability and internal validity (Pestana and Gageiro, 2008). For "institutional scenario" the coefficient (0,647) is mediocre.

Table 2: Cronbach Alpha of the constructs

Observable constructs and variables	Factor weight	% Explained variance	Cronbach alpha *	Communalities
Institutional scenario		**37,36%**	**0,647**	
DIM	0,720			0.649
TUR	0,673			0.678
CAPDIST	0,781			0,618
Tax scenario		**21,54%**	**0,799**	
IMPDIRpc	0,878			0,859
IMPINDIRpc	0,666			0,478
RECPROpc	0,924			0,876
Budgetary scenario		**13,25%**	**0,857**	
TRNGCpc	0,849			0,793
RECCAPpc	0,887			0,797
INVpc	0,859			0,745
*Standardized Cronbach Alpha				

Findings

Specification, estimation and validation of the structural model

After confirming the quality of adjustment of the measurement sub-model in the previous section, through validity of the confirmatory factor analysis, the analysis continues to specify the structural model followed by its validation. This specification is grounded on theory, as in the literature review.
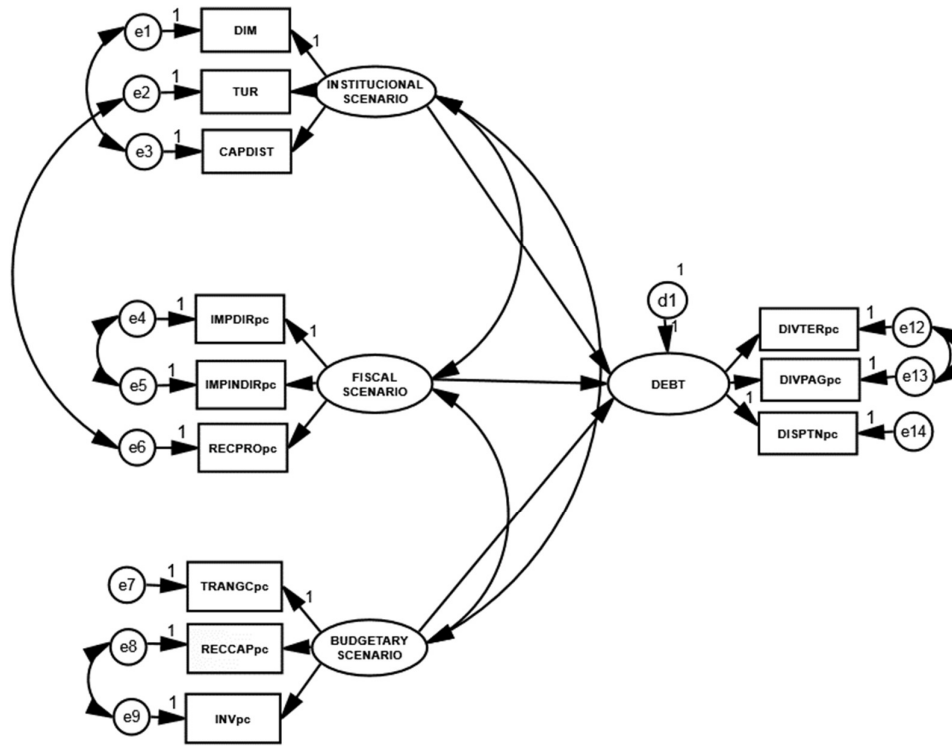
Fig. 6: Structural model explaining municipal debt

The process begins by eliminating the correlations between the "Debt" construct and the other constructs of "Institutional scenario", "Tax scenario" and "Budgetary scenario", to establish the causal paths between the latter and the former.

The diagram representing the structural model that allows explaining municipal debt in the period considered, is presented in Figure 6. Based on this model, the analysis proceeds to its estimation, allowing to obtain estimates of the model's various parameters (e.g. factor weights, regression coefficients, co-variances and means) to maximize the probability of observing the correlational structure of the manifest variables observed (Marôco, 2010). If the model is correct, the estimation data will be sufficiently close to the observed data, with the model's error being minimal.
Internal validation of the constructs explaining municipal debt was carried out.
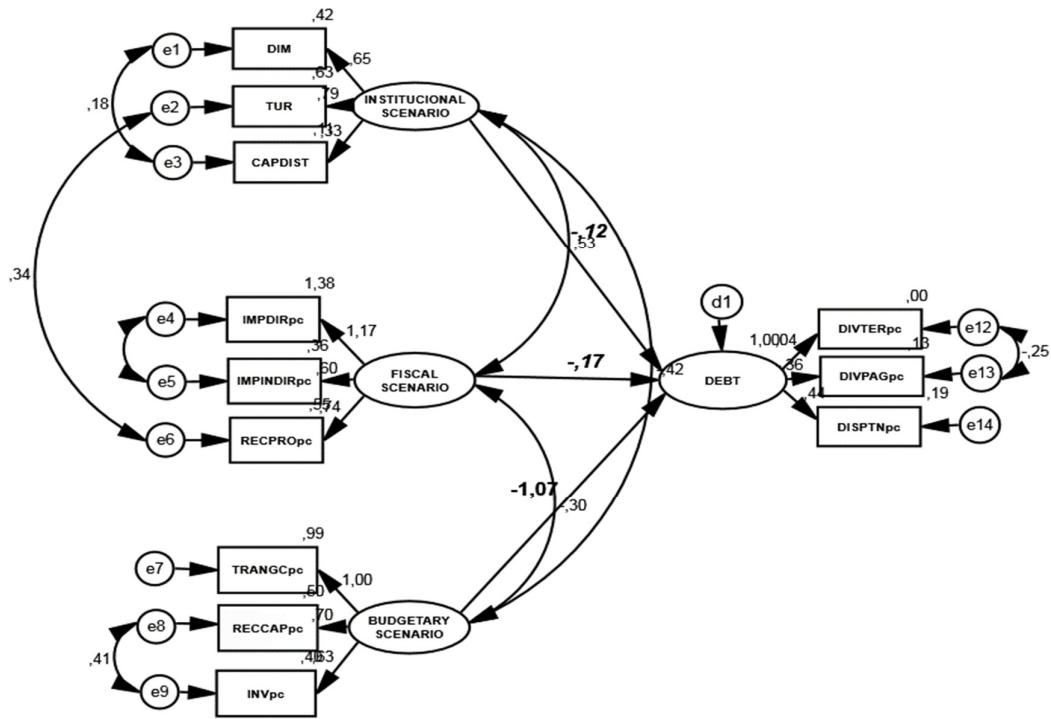
Fig. 7: Results of estimating the structural model explaining municipal debt

Following, the paths associated with each of the hypotheses established in Section 3.1 are analysed. Tables 4 and 5 presents, respectively, the non-standardized estimates and the significance of the paths, and standardized coefficients.

Table 3: Non-standardized estimates and significance of paths

	Path		Estimation	S.E.	C.R.	P
Debt	←	Institutional scenario	0,000	0,000	-3,022	0,003
Debt	←	Tax scenario	-0,090	0,013	-6,727	0,000
Debt	←	Budgetary scenario	-0,170	0,007	-25,546	0,000

Table 4: Standardized coefficients of the estimation

	Path		Estimation
Debt	←	Institutional scenario	-0,122
Debt	←	Tax scenario	-0,173
Debt	←	Budgetary scenario	-1,074

Analysis of the paths lead to conclude that all present statistical significance, with "Budgetary scenario" to "Debt" presenting the greatest weight (B = -0,170; SE = 0,007; β = -1,074; p = 0,000). Next, "Tax scenario" to "Debt" (B = -0,090; SE = 0,013; β = -0,173; p = 0,000). Finally, presenting least weight is "Institutional scenario" to "Debt" (B = 0,000; SE = 0,000; β = -0,122; p = 0,003).

Finally, the model's quality of adjustment is assessed, aiming to determine whether the theoretical model is able to reproduce the correlational structure of the manifest variables observed in the sample studied (Marôco, 2010). The way this assessment should be performed is not consensual, with the emergence of various statistics that could be used. Table 5 presents some indices of adjustment quality.

Table 5: Indices of the model's adjustment quality

Indices	*Estimation*	*Adjustment*
Goodness of Fit Index (GFI)	0,9	Good
Comparative Fit Index (CFI)	0,9	Good
Tucker-Lewis Index (TLI)	0,9	Good
Parsimony Comparative Fit Index (PCFI)	0,6	Good
Parsimony Goodness of Fit Index (PGFI)	0,5	Bad
Root Mean Square Error of Approximation (RMSEA)	0,1	Good

The values of the indices presented show that the model explaining the debt of Portuguese municipalities presents good adjustment, and although it can be improved, it allows to discuss the research hypotheses.

Discussion of the hypotheses

Considering the results obtained in estimating the models, presented in the previous sections, the hypotheses are now discussed. It must be underlined that the results will not be validated with research by other authors, as one did not find any study with the characteristics presented in this one. As noted before, the conclusions of the various authors that studied LG debt, are generally associated with the relations between this and observable variables.

To begin with, the results allow validation of hypothesis H_1. Therefore, one can confirm the existence of a negative relationship between the institutional scenario (represented by the number of inhabitants, tourist capacity and being a district capital) of municipalities and their debt. These findings might relate to the fact that municipalities with larger number of inhabitants, greater tourist capacity, and which are usually district capitals, have usually a higher capacity to raise their own revenues. In these circumstances they will not have to resort to debt to finance their activities, in order to meet citizens' needs.

The results obtained for the relationship between the tax scenario and net debt *per capita* lead also to conclude on a negative relationship, which implies validation of hypothesis H_2. Therefore, there is significant statistical evidence, which allows to state, based on the assumptions of the theory of tax illusion, that a greater tax burden leads to lower values of net debt *per capita*. This evidence may be explained by municipalities with a favourable tax situation not needing to turn to debt to finance the goods and services they provide. It could also be justified by entities being able to increase the tax burden to amortize their debt.

Concerning hypothesis H_3, the results allow its validation, and one can state there is a negative relationship between the budgetary scenario and net debt *per capita* in all Portuguese municipalities. This evidence may be based on having operationalized the budgetary scenario fundamentally with observable variables which are expected to have a negative relationship with debt, namely transfers from central government and capital revenue.

Finally, no significant statistical results were obtained allowing the validation of H_4. The result of combining the values of the purchasing power index and that of unemployment do not operationalize the economic scenario, so it was not finally included in the model.

Summarizing, one can conclude that the model specified, presenting acceptable adjustment, allowed validation of three of the four hypotheses formulated (Table 6).

Table 6: Results obtained in relation to the hypotheses formulated: structural equation analysis

	Hypotheses	Results	
		Relation	*Validation*
H_1	There is a relationship between municipalities' institutional scenario and their debt	-	Validated
H_2	There is a relationship between municipalities' tax scenario and their debt	-	Validated
H_3	There is a relationship between municipalities' budgetary scenario and their debt	-	Validated
H_4	There is a relationship between municipalities' economic scenario and their debt		Not validated

These results could be an excellent basis for future research carried out by the authors or other researchers. Based on these findings, more consistent and validated constructs could be found, presenting better internal consistency, in order to be used in various studies, irrespective of the jurisdictions and target population.

Conclusion

Taking the Portuguese municipalities as reference and data of that last thirteen years, this study aimed to define a structural/conjunctural model to explain LG debt, and to analyse how this is influenced. As far as it is the authors' knowledge, this study is original, both in Portugal and at international level, contributing to advancing this type of research, by studying the determinants of debt using structural equation analysis – a novelty with great development potential through the exploration of latent variables or constructs.

The specific objectives, as well as the research question aimed to be answered, were established based on the theories explaining public debt and the international literature on the factors that can affect it.

The structural/conjunctural model suggested and specified incorporated as latent factors (constructs), institutional, tax and budgetary scenarios. The estimation produced statistical significance for all of them.

Therefore, three of the four initially established hypotheses were validated.

H_1 "*There is a relationship between the institutional scenario of municipalities and their debt*" – Considering that a negative relation was observed, one can say that larger municipalities and with more tourist supply, generate more revenue, which allows them to fulfil their competences without resorting to debt.

H_2 "*There is a relationship between the tax scenario of municipalities and their debt*" – The results associated with the tax scenario construct lead to prove a negative, statistically significant relationship with municipal debt. Overall, considering the manifest variables (direct taxes, indirect taxes and own revenue) associated with this construct, lead to conclude that a less favourable tax situation for residents (greater tax burden) reduces municipalities' need to resort to debt. Entities might also be using tax revenue to amortize debt.

H_3 "*There is a relationship between the budgetary scenario of municipalities and their debt*" – Also for budgetary scenario a similar negative statistically significant relationship with municipal debt was observed. Considering that the manifest variables operationalizing this scenario are transfers from

central government, capital revenue and investment expenditure, one could expect a negative relationship.

A major limitation of this study is the fact that it does not include in the (structural equation) analysis, the political scenario, considering the rather insignificant results obtained by various authors. As political variables are subject to considerable study in the international literature, this is a limitation that should be overcome in future research. It should be pointed out, however, that the international literature has had great difficulty in validating hypotheses associated with political variables, fundamentally the political ideology.

Another limitation is associated with the structural equation analysis itself, and it lies in not fulfilling all the statistical assumptions (e.g. normality and existence of outliers). Nevertheless, as data from all municipalities were used, it is believed this did not influence the results significantly.

Notwithstanding, it can be stated that this research has achieved the aims initially proposed.

Acknowledgements

Notes

[1] No. 2 of Art. 12 of the Budget Framework Law (Law no. 151/2015, of September 11), states that "*The principle of reciprocal solidarity forces all* [Public Administrations] *sub-sectors, through their services and entities, to contribute proportionally to achieving budgetary stability […] and to accomplishing with European legislation in the domain of fiscal policy and public finances*".
[2] These variables will be introduced to the model and their existence will be indicated by their appearance in manifest or observable variables (Marôco, 2010).
[3] The SPSS (Statistical Package for Social Sciences) statistical software was used, and more specifically, its application named AMOS (Analysis of Moment Structures).
[4] www.portalautarquico.pt
[5] www.ine.pt
[6] Law nº 2/2007, January 15. This law was meanwhile revoked with the introduction of the financial regime of local authorities and inter-municipal entities, under Law nº 73/2013, September 3.

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