Public Budgeting & Finance

PUBLIC BUDGETING & FINANCE

ORIGINAL ARTICLE OPEN ACCESS

Understanding the Relationship Between Municipal Structure and Size, Depopulation and Default Risk

Dionisio Buendía-Carrillo | Andrés Navarro-Galera | Juan Lara-Rubio | María Elena Gómez-Miranda

Department of Financial Economics and Accounting, University of Granada, Granada, Andalusia, Spain

Correspondence: Juan Lara-Rubio (juanlara@ugr.es)

Received: 8 May 2025 | **Revised:** 8 May 2025 | **Accepted:** 12 May 2025

ABSTRACT

Several international organizations and research scholars have concluded that two of the main problems in the management of public services are high public debt and increasing depopulation. It is hypothesized that increasing the financial viability of governments is likely a means of fighting depopulation in small municipalities. This paper identifies factors that influence the financial risks of small-sized local governments by analyzing the impact of demographic, socioeconomic, financial and political variables on default risk. Our findings provide new insights into the contribution of the financial viability of public services to the fight against depopulation.

1 | Introduction

Recently, various international organizations and research studies have concluded that high public debt and increasing depopulation are two of the main problems for governments in Europe (International Monetary Fund, IMF 2021; World Bank 2021; UN 2021; Pina et al. 2022; Gómez-Miranda et al. 2022; Alamá-Sabater et al. 2021). Worldwide, economic crises and the COVID-19 pandemic have caused enormous growth in government debt in recent years, which implies an increase in the risk of default. This is a very worrying problem for tax authorities, Supreme Auditing Institutions, politicians, managers, financial entities, public services users, taxpayers and citizens in general (Eurostat 2022; OECD 2021a; European Commission 2021; Navarro-Galera et al. 2021; Buendía-Carrillo et al. 2020).

Given this situation, research in recent years has examined the factors influencing the volume of debt in public entities, focusing mainly on large local governments (Olmo and Brusca 2021; Alamá-Sabater et al. 2021; Buendía-Carrillo et al. 2020; Dzialo et al. 2019; Rodríguez-Bolívar et al. 2018; Vera 2018; Lara-Rubio et al. 2017; MacKay 2017; Greer 2016); their findings highlight the need to advance the analysis of determinant variables of insolvency risk in small and medium-sized municipalities. More specifically, some authors (Pina et al. 2022; Merino and Prats 2020; Ribeiro et al. 2019; Santis 2020; Shon and Kim 2019) have recognized the importance of studying the joint effect of various types of factors (demographic, socioeconomic, financial and political) on the debt of local governments of different population sizes, which is useful for designing public policies against depopulation in smaller municipalities.

In fact, depopulation in small and medium-sized municipalities is a highly relevant research topic (Miyauchi et al. 2021; Pinilla and Sáez 2017; García and Muñiz 2020). The EU has more than 100,000 municipalities, of which 95% have less than 20,000 inhabitants (10.2% of the municipalities are at risk of depopulation), and rural areas represent 33% of the European population (Eurostat 2023). However, the contribution of governments' financial management to the fight against depopulation has not received the necessary attention in existing research, even though the problem has been aggravated by agricultural restructuring and the concentration of employment and population in large cities (OECD 2021b; European Observation Network for Territorial Development and Cohesion ESPON 2020; UN 2019).

Summary

- We analyse the default risk of 6456 Spanish local governments using a panel logistic regression with random effects with 43 demographic, socioeconomic, financial and political variables influencing insolvency risk.
- Results reveal that financial risk determinants differ significantly across population size segments.
- Findings suggest that financial factors have greater predictive power than demographic or political variables.
- The influencing factors on the default risk are interesting to finance government investments through loans that allow the repopulation of small municipalities.

In parallel, the World Bank (2021), the International Monetary Fund, IMF (2021), the OECD (2021c), the UN (2021) and some research scholars (Lara-Rubio et al. 2022; Alamá-Sabater et al. 2021; Olmo and Brusca 2021; Buendía-Carrillo et al. 2020) have stated that the financial viability of public services is essential for the sustainability of small and medium-sized municipalities. Considering that debt is one of the three key dimensions of government financial sustainability (International Federation of Accountants IFAC 2013), the analysis of factors that influence the quality of debt management in small and médium-sized municipalities can provide insights for creating public pólices that can work against depopulation.

Based on this motivation, this paper identifies significant factors in the default risk of small and medium local governments by analyzing the impact of demographic, socioeconomic, financial and political variables on the probability of debt default. We analyse the financial behaviour of 6456 Spanish local governments during the 2009–2018 period, studying the possible influence of 43 variables on the default risk of different segments according to municipal population size.

We have selected these local governments because Spain is one of the European countries with the highest level of total public sector indebtedness and a high number of municipalities at risk of depopulation (Eurostat 2022; Pina et al. 2022). In addition, Spain has a diversity of sizes in municipalities very similar to that of other European countries (Bank of Spain 2021; Eurostat 2023), which may favour the usefulness of our empirical findings to fight depopulation in countries such as Germany, France or Italy.

2 | Theoretical Framework and Literature Review

Previous studies have observed that Institutional Theory and Stakeholder Theory can be useful to assess the impact of certain population factors (measured with demographic and socioeconomic variables) on local government (LG) indebtedness and their default risk (Sinervo 2014; Ribeiro and Scapens 2006; Gómez-Miranda et al. 2022). In addition, Agency Theory and Intergenerational Equity Theory can be useful to analyze the incidence of financial variables (Rodríguez-Bolívar et al. 2018; Pérez-López et al. 2014). In parallel, Institutional Theory and Agency Theory can contribute to the study of the impact of political variables on debt volume and default risk (Rodríguez-Bolívar et al. 2018; Gómez-Miranda et al. 2022).

According to the Institutional Theory, organizations fulfil social obligations to achieve the acceptance and support necessary for their own success and survival (Dowling and Pfeffer 1975). Stakeholders are the groups or individuals who can affect or be affected by the efforts of an organization to achieve its objectives (Freeman 1984). Stakeholder Theory postulates that the objective of management is to achieve the long-term maximization of public welfare, which is why governments must define their policies based on the needs of the population (Rusconi 2007). Taking these theories as a reference, we can argue that, in the field of LG, the demographic and socioeconomic characteristics of the population can condition the needs of the inhabitants and, therefore, affect the levels of spending and indebtedness of the municipalities. In parallel, these same population characteristics can affect municipal revenue levels, which can condition the ability of LGs to generate sufficient resources for meet payment commitments on bank loans and debts with suppliers of goods and services

The impact of financial variables can be studied following the Agency Theory and the Intergenerational Equity Theory. Based on Agency Theory, one or more individuals (principal) give mandates to another (agent) to perform activities in accordance with the interests of the principal (Jensen and Meckling 1976). For its part, the Intergenerational Equity Theory postulates that future generations have the right to an adequate standard of living, which means that the current generation should not pass on excessive indebtedness (Letelier 2011). Based on these theories, LGs should manage finances responsibly, considering the population's interests and seeking a long-term financial balance that does not compromise future generations. However, sometimes governments may make inadequate decisions from a financial point of view, affecting the financial risks assumed.

With reference to Institutional Theory and Agency Theory, we can think that voters will elect responsible politicians, who will try to fulfil social obligations and make decisions in the interest of the community. Politicians' characteristics may influence their commitment to sound financial management and, consequently, affect the ability of governments to repay debts.

Therefore, taking as a reference a conceptual framework based on these four theories, and considering the findings of previous research, we believe that demographic, socioeconomic, financial and political variables can affect the default risk of small and medium-sized local governments, which justifies the interest of studying them in this paper. To this end, we justify the selection of variables for our empirical study on the findings of previous studies.

In fact, previous research has analyzed demographic, social, financial, and political variables that can influence the level of local government debt (Dzialo et al. 2019; Pina et al. 2022; Gómez-Miranda et al. 2022; MacKay 2017; Greer 2016), financial (Balaguer-Coll and Ivanova-Toneva 2019; Ehalaiye et al. 2017;

Ribeiro et al. 2019; Santis 2020; Shon and Kim 2019) and political (Balaguer-Coll and Ivanova-Toneva 2021; Benito et al. 2016; Gómez-Miranda et al. 2022; Navarro-Galera et al. 2017). Also, an increase in debt may imply an increase in default risk (Navarro-Galera et al. 2021; Buendía-Carrillo et al. 2020). Below, we use the above-cited works to build our model of explanatory variables.

Even though most EU municipalities have less than 20,000 inhabitants, previous research has mostly focused on the analysis of the financial risks of large municipalities (Lara-Rubio et al. 2017; Navarro-Galera et al. 2017; Padovani et al. 2018). Generally, the number of inhabitants of municipalities conditions the economic capacity of municipalities, since funding from tax revenues depends on the number of taxpayers, and as the number of inhabitants decreases, transfers from other public administrations also decrease (García and Muñiz 2020). Moreover, the effectiveness of fiscal policies aimed at reducing the risk of noncompliance may depend on the size of the municipality because the number of inhabitants conditions the need for current spending and investments (Alam et al. 2019; Padovani et al. 2018). For all these reasons, in this paper, we analyze whether the size of municipalities can affect the default risk of local governments.

Our study analyses 43 independent variables, comprising 12 demographic, 10 socioeconomic, 12 financial, and 9 political variables. Beginning with demographic and socioeconomic characteristics may significantly influence the capacity of local governments to meet their financial obligations. In this context, Buendía-Carrillo et al. (2020), in line with the findings of Vera (2018), identified a positive association between population size and the default risk of local governments. Consequently, this study suggests a similar positive relationship between the variable representing population size and the likelihood of default in local governments.

Regarding population density, Lara-Rubio et al. (2017) found that the risk of default is high in large cities with a low population density. However, in medium-sized cities, the effect is the opposite; in small ones, this variable turned out to be non-significant (Buendía-Carrillo et al. 2020). Therefore, the sign of this variable can be positive or negative depending on the population size of the municipality.

However, Spain is a country with a high rate of dependent population (54.6%) (Instituto Nacional de Estadística INE 2023). According to Rodríguez-Bolivar et al. (2016), a high dependency ratio favours high public debt in large municipalities. Thus, we expect a positive sign of the relationship of this variable with the default risk.

Another demographic variable associated with a higher volume of debt is the immigrant population (Mahía 2018; Bermúdez Morata et al. 2009). Immigration can pose significant financial challenges to host countries (Guerron-Quintana 2020), and local economies can be influenced by the specific characteristics of the immigrant population (Alessandria et al. 2020). This association has been studied for large municipalities (Vera 2018; Gómez-Miranda et al. 2022); we believe it is appropriate to extend the examination of variables related to the immigrant population to smaller municipalities. In this case, the expected sign of the estimator is positive.

In addition, according to the Instituto Nacional de Estadística INE (2023), Spain, like the rest of Europe, is a country that is aging – that is, experiencing a displacement of the economically active population towards the retired population (Eurostat 2023). Population aging, measured by the generational renewal index, has important economic implications for the demand for infrastructure and public services (Merino and Prats 2020), especially in smaller municipalities with high levels of youth unemployment (Pinilla and Sáez 2017). We believe that this variable may have a positive or negative sign, depending on whether the decrease in generational turnover impoverishes or enriches municipal finances.

Turning to the socioeconomic variables, some studies indicate that high unemployment rates can have an unfavourable effect on the finances of large local governments, since debt increases could lead to payment difficulties (Gómez-Miranda et al. 2022; García 2019; Balaguer-Coll and Ivanova-Toneva 2019; Lara-Rubio et al. 2017; Navarro-Galera et al. 2017). On this basis, it is novel to analyse the influence of unemployment—disaggregated by sectors of activity, by gender and by age—in different population sizes. We expect to obtain a positive sign between each of the variables related to unemployment and the default risk.

Likewise, although the increase in per capita income is associated with an increase in public spending (García 2019) and a lower probability of default in large local governments (Lara-Rubio et al. 2017; Navarro-Galera et al. 2017; Padovani et al. 2018), it is interesting to study whether this relationship is maintained in small and medium-sized municipalities, for which we expect to obtain a negative sign.

Regarding the financial variables, those related to revenue (financial autonomy, fiscal pressure, real estate tax, vehicle tax, public fees, and charges) have been studied by previous literature, finding a positive relationship with the financial health of local governments (Olmo and Brusca 2021; Buendía-Carrillo et al. 2020; Alam et al. 2019; Benito et al. 2016). In this study, we hope to find a negative relationship between each of these variables and the default risk. An increase in the per capita financial liabilities variable could increase the risk of non-payment, so we expect a positive sign for this variable. Moreover, the greater the proportion of the budget allocated to repaying the principal of a loan, the lower the probability of default, since this leads to a reduction in outstanding debt. Therefore, we expect a negative sign for the coefficient associated with this variable.

In contrast, following previous research, the variables related to expenses (investments, personnel costs, current expenditures, financial costs, structure of expenditures) can increase the volume of local government debt and repayment difficulties (Dzialo et al. 2019; Vera 2018). Thus, we expect to obtain a positive sign for each of these variables.

In addition, following the International Federation of Accountants IFAC (2012) pronouncement, where debt is considered an aspect of the fiscal sustainability of governments, the interest in

studying all these financial variables is justified because the increase in the volume of debt implies greater payment difficulties and, therefore, may increase the default risk.

Finally, previous research has studied the possible influence of political variables on the financial behaviour of local governments (Slegten et al. 2019; Cabaleiro-Casal and Buch-Gómez 2021; Navarro-Galera et al. 2017). However, these studies have not analysed the effect of political factors on the default risk based on the size of the municipality, so our study may have interesting findings.

Regarding the political factors related to gender, Balaguer-Coll and Ivanova-Toneva (2021) have studied the variables "gender of the mayor" and "index of women councillors," analysing their influence on compliance with budget stability and financial sustainability in Spanish local governments. They find that when the mayor is a woman and/or the specific weight of the number of women councilors over the total number of councilors is greater, the probability of compliance with the fiscal rules on budgetary stability is greater. Cabaleiro-Casal and Buch-Gómez (2021) used these variables to analyse their influence on the fiscal performance of local governments, concluding that the majority presence of women in municipal government favours an increase in the level of taxes. Gómez-Miranda et al. (2022) also used these variables to analyse the probability of default, concluding that when there is a greater female presence in large local governments, the probability of default is lower. Therefore, we expect a negative sign for both variables in relation to default risk.

The political factors related to the profile of the local government (absolute majority, political sign, political strength, and political fragmentation) have also been studied by previous literature. Thus, in relation to the Abs_Maj variable, Benito et al. (2012) found that when an absolute majority governs, the propensity to increase the tax burden is lower. Balaguer-Coll and Ivanova-Toneva (2021) and Navarro-Galera et al. (2017) did not find conclusive results for this variable. In our case, the expected sign for this variable is negative, since we believe that the absolute majority may favour fiscal responsibility in paying debts.

The political ideology sign variable has been used in previous literature (Navarro-Galera et al. 2020), concluding that progressive parties are more likely to increase public spending and, consequently, indebtedness than conservative parties. However, authors such as Balaguer-Coll and Ivanova-Toneva (2021) did not find conclusive results. In our analysis, we expect to find a positive sign in relation to default risk.

The degree of political strength (H_Index) and the degree of political fragmentation (PF_Index) are two political factors that can influence the probability of default. Authors such as Cabaleiro-Casal and Buch-Gómez (2021) and Guillamón et al. (2011) concluded that high levels of debt are fundamentally associated with governments with high political strength. In contrast, Galli and Padovano (2002) detected a higher volume of debt due to less political strength, so it could be informative to continue studying the degree of influence of political strength. In addition, other studies (Geys and Revelli 2011; Ashworth et al. 2005) show that highly fragmented governments are associated with high levels of debt and deficit, and the least politically fragmented governments have higher levels of surplus (Hagen and Vabo 2005).

Another interesting factor for analysing the influence on default risk in local governments is the existing ideological alignment between the different levels of government (state and regional). Schneider et al. (2022) point out that when there is ideological alignment between different levels of government, the granting of subsidies between them increases, especially those of small amounts. Auteri and Cattel (2022) indicate that arbitrariness in granting subsidies works in favour of the government aligned with the central government, especially when the receiving government is highly fragmented. Borrella-Mas and Rode (2021) show that municipalities aligned with the regional government are more corrupt than non-aligned ones, an effect that is also associated with absolute majorities at both levels of government and higher capital transfers. Thus, taking into account that a greater receipt of subsidies would imply a lower need for loans to finance public spending, we expect to obtain a negative sign in both variables.

Finally, Hlynsdóttir (2016) affirms that a mayor's educational level is indicative of her professionalism and qualifications. Naff (2009) and Avellaneda (2009) point out that qualified mayors contribute to improving local public finances. Therefore, we consider that the mayor's educational level is a factor that can influence the probability of a local government's non-compliance, since the higher the mayor's academic preparation, the better he will manage resources; the expected sign of this variable is thus negative.

3 | Variables and Data

3.1 | Sample Selection

Our empirical study focuses on Spanish local governments. Spain is a good case for studying the financial management of local governments (Pina et al. 2022; Lara-Rubio et al. 2022; Balaguer-Coll and Ivanova-Toneva 2021) because it has one of the highest debt rates of European countries (118.3% of its GDP, where the EU average is 87.9%) (Eurostat 2022), only surpassed by Greece, Portugal and Italy. In addition, Spain is a clear example of depopulation, since 42% of the municipalities are at risk of depopulation, compared to other countries such as Germany, Italy or France, where the problem is between 1% and 7%. (Bank of Spain 2021). In addition, Spain is the fourth country after Estonia, Finland and Latvia with the most municipalities at risk of depopulation (Eurostat 2023). Like these countries, Spain has weaker socioeconomic characteristics—greater population residence dispersion, aging population, lower per capita income—and provides less accessibility to public services (Bank of Spain 2021).

Our sample is made up of 6456 Spanish local governments (see Table 1) with data for the 2009–2018 period. These governments have been structured into four segments based on the services that they must provide according to their size (article 26 of Law 7/1985, Local Government Bases Law). This segmentation is

consistent with that used in previous literature (Buendía-Carrillo et al. 2020; Balaguer-Coll and Ivanova-Toneva 2019; Navarro-Galera et al. 2020).

3.2 | Dependent Variable

To identify the factors that influence the default risk of local governments, we define the dependent variable as a dummy variable with a value of 1 in the event that the local government is at risk of insolvency according to legal criteria and a value of 0 otherwise. In this sense, we measure the insolvency risk in LGs as the probability of default, identified as a variable of proximity to the actual default situation.

In line with the definition of default proposed by the Basel Committee on Banking Supervision (Basel Committee on Banking Supervision BCBS 2017), and in accordance with the *Royal Decree-Law 17/2014, December 26, on financial sustainability measures for the autonomous communities and local entities and other economic nature*, and *Royal Decree-Law 8/2013, June 28, on urgent measures against late payment by public administrations and support for local entities with financial problems*, this paper considers a local government as being at risk of insolvency to meet its payment obligations when it meets at least one of the three conditions defined in Table 2. These conditions have been used in previous studies on financial risks in local governments (Gómez-Miranda et al. 2022; Lara-Rubio et al. 2022; Ehalaiye et al. 2017; Navarro-Galera et al. 2020; Buendía-Carrillo et al. 2020).

Starting in 2011, Royal Decree 8/2010 established that local governments with a volume of debt between 75% and 110% of their current income need prior authorization from the financial protection body to contract long-term loans. However, considering our study period (2009–2018), we take the limit of 110% of current income to ensure the homogeneity and comparability of the statistical results.

3.3 | Independent Variables

Following the arguments and previous research analyzed in the Literature Review Section, in our empirical analysis we have selected the following variables, for which we show their measurement form and expected sign (Table 3).

4 | Methods

The logit data panel is a powerful tool used to analyse longitudinal data, as an extension of logistic regression that allows for the combination of the time dimension with the cross-sectional dimension in the available data. Therefore, the main advantage of this method is that it considers both differences between individuals and differences over time.

In this research, we use a sample that constitutes a vector composed of 43 independent variables (X_{it}) for N subjects (6456 local governments) in T time periods (10 years), with the aim of explaining and predicting the dependent variable.

From the performance of the Hausman (1978) test, we deduce whether the statistical procedure should be based on fixed effects or random effects by comparing the difference between the estimators of the two models and measuring whether this difference is statistically significant.

TABLE 1 | Segments of the sample by population sections.

Segments: Inhabitants	Total (n)	Sample (s)	% Sample/Total (s/n) x 100
1: ≤ 5,000	6,813	5208	76.46%
2: 5,001–20,000	905	859	94.91%
3: 20,001–50,000	254	247	97.04%
4: ≥ 50,001	145	142	97.72%
Total	8117	6456	79.54%

TABLE 2 | Description of the dependent variable.

Indicator	Description
$D_{it}(d_1) \in \{0,1\}$	Outstanding debt as of December 31 of the immediately preceding year exceeds 110% of settled or accrued current income – Article 53.2 of Royal Legislative Decree 2/2004 prohibits formalizing loans if this condition is met.
$D_{it}(d_2) \in \{0,1\}$	Negative net savings (difference between income and current expenses, minus loan repayment annual obligations) – Article 53.1 of Royal Legislative Decree 2/2004 prohibits formalizing loans if this condition is met, in line with Article 221 of the Basel Committee on Banking Supervision BCBS (2017).
$D_{it}(d_3) \in \{0,1\}$	Negative treasury surplus for general expenses (sum of liquid funds and rights pending collection minus obligations pending payment, in the short term) – This insolvency risk criterion is established in article 193 of Royal Legislative Decree 2/2004 and articles 220 and 221 of the Basel Committee on Banking Supervision BCBS (2017).

TABLE 3 | Description of the independent variables.

Variable	Description	Expected sign (β)
Demographic variables		
Pop_seg	Population segment to which the municipality belongs	+
Pop_size	Population of the municipality (in millions of inhabitants) – numeric variable	+
Pop_dens	Population density	+/−
Depend_pop16	Proportion of population aged under 16 years	+
Depend_pop65	Proportion of population aged over 65 years	+
Male_depend	Proportion of male dependent population (aged < 16 and > 65 years)	+
Female_depend	Proportion of female dependent population (aged < 16 and > 65 years)	+
Male_immigr	Proportion of male immigrant population	+
Female_immigr	Proportion of female immigrant population	+
Depend_immigr	Proportion of dependent immigrant population	+
Gen_change	Index of generational change: population aged 15–19 years/total population	+/−
Source: Spanish Office of Statistics (INE)		
Socioeconomic variables		
Male_unempl	Proportion of male unemployed population	+
Agric_unempl	Proportion of unemployed population in the agricultural sector	+
Industr_unempl	Proportion of unemployed population in the industrial sector	+
Constr_unempl	Proportion of unemployed population in the construction sector	+
Serv_unempl	Proportion of unemployed population in the services sector	+
Unempl_pop	Proportion of unemployed population who have never worked	+
Unempl_25	Proportion of unemployed population aged < 25 years	+
Unempl_25_44	Proportion of unemployed population aged 25–44 years	+
Unempl_44	Proportion of unemployed population aged > 44 years	+
BRPC	Budget revenue per capita	−
Source: INE, Ministry of Labour and Social Security and Ministry of Finance and Public Administration		
LGs financial variables		
Fin_aut	Own revenue as a proportion of total revenue	−
Fiscal_pressure	Fiscal pressure	−
RETax_Rev	Real estate tax as a proportion of total revenue	−
VTax_Rev	Vehicle tax as a proportion of total revenue	−
PubFees_Rev	Public fees and charges as a proportion of total revenue	−
Invest_Rev	Investment finance as a proportion of total revenue	+
PersCost_BudSp	Personnel costs as a proportion of budget spending	+
CurrSp_BudSp	Current expenditure as a proportion of budget spending	+
FinC_BudSp	Financial costs as a proportion of budget spending	+
Repay_BudSp	Loan repayments as a proportion of budget spending	−
FinL_Inhab	Financial liabilities per inhabitant	+
CurrSp_CapSp	Spending structure: current expenditure/capital expenditure	+
Source: Ministry of Finance and Public Administration		
Political variables		
Gen	Mayor's gender—dummy variable: (0) male, (1) female	−
Coun_W	Proportion of female councillors	−
Abs_Maj	Absolute majority—dummy variable: (0) absolute majority, (1) no absolute majority	−

(Continues)

TABLE 3 | (Continued)

Variable	Description	Expected sign (β)
Political_Sign	Political ideology – dummy variable: (0) conservative, (1) progressive	+
H_Index	Indicator of fragmentation of political parties (Herfindahl index)—numerical variable: $\sum_{i=1}^{0} \frac{S_i^2}{S^2}$; Si = councillors from party "i" (in power); S = total number of councillors	+/−
PF_Index	Index of political fragmentation: number of parties with representation/total number of councillors)	+/−
Local_St	Ideological alignment between the city council and the central government—dummy variable: (0) no alignment, (1) alignment	−
Local_Reg	Ideological alignment between the city council and the regional government—dummy variable: (0) no alignment, (1) alignment	−
Study_Level	Educational background—dummy variable: (0) no university degree, (1) university degree	−

Source: Ministry of the Interior.

In our research, the result of this test suggests the use of the theoretical framework proposed by McFadden (2001) to build a discrete choice panel data model with random effects, in which for each observation i there can be j alternatives within time t, given a deterministic indirect utility function of the alternative j that can be explained by the independent variables.

The default criteria defined in the dependent variable section allows us to set the dependent variable Y_{it} as a dummy variable according to:

$$Y_{\text{it}} = \begin{cases} 1 & \text{if LG } i \text{ is declared as a default risk} \\ 0 & \text{if LG } i \text{ is not declared as a default risk} \end{cases}$$

In a logit data panel with random effects, the focus is on separately estimating the permanent and transitory variations of the variable Y_{it} ahead of consistently estimating the regression coefficient beta, such that:

$$Y_{it} = \alpha_i + \sum_{j=1}^{k} \beta_k \quad X_{k,it} + \varepsilon_{it} + \eta_i$$

where the independent parameter is denoted as α_i, the vector of independent variables explaining and predicting the probability of default is summarized as $X_{k,it}$, the unobservable component or idiosyncratic error is ε_{it} and η_i reflects the unobservable and time invariant heterogeneity measuring the unobservable factors with impacts on the dependent variable across local governments (Train 2003).

Next, if we maximize the likelihood function, we estimate the $\hat{\alpha}$ and $\hat{\beta}_i$ parameters and measure and quantify the probability of default for each local government using the following expression:

$$Prob \quad (Y_{it} = 1) = PD_{it} = \frac{e^{\hat{\alpha}_i + \sum_{j=1}^{k} \hat{\beta}_k \quad X_{k,it}}}{1 + e^{\hat{\alpha}_i + \sum_{j=1}^{k} \hat{\beta}_k \quad X_{k,it}}}$$

By using a random effects estimator in the logistic regression, we manage to control for individual heterogeneity because local governments are observed at different points in time. In a panel data logit model such as ours, endogeneity is related to the correlation between the unobserved (individual-specific) effects and the explanatory variables.

The Hausman (1978) test compares the coefficients of both models (fixed effects and random effects). If the coefficients are similar, then there is no evidence of endogeneity, and the null hypothesis is accepted (random effects can be used). If the coefficients are significantly different, the null hypothesis is rejected, indicating that there is endogeneity and that the unobserved effects are correlated with the explanatory variables. In this case, the fixed effects model should be more appropriate.

The robustness and correct fit of the model can be observed in the significance of the variables, in the same Hausman (1978) test to determine whether the fixed or random effects model is preferable, and in the analysis of the absence of multicollinearity by means of the VIF (Variability Inflation Factor) test. The VIF is a measure used in regression analysis to assess multiple multicollinearity among predictor variables, which is not always evident in the correlation matrix (Shrestha 2020). The VIF test quantifies how much the variances of the regression coefficients are inflated due to multicollinearity. Generally, a VIF greater than 10 is considered to indicate significant multicollinearity, while lower values suggest moderate (values between 5 and 10) or non-existent multicollinearity (O'Brien 2007; James et al. 2013; Salmerón et al. 2020), which may affect the precision of the coefficient estimates and make the model difficult to interpret. Consequently, the variables could be found to be highly correlated.

Logit data panel is also more flexible in dealing with multicollinearity, therefore improving the performance and efficiency of the model and its results (Roodman 2009; Wooldridge 2010).

The use of credit risk measurement methodology is justified by its alignment with Basel III (Basel Committee on Banking Supervision BCBS 2017), a regulatory framework widely

adopted globally as a standard for financial risk management. Furthermore, it has been utilized in numerous prior studies, validating its relevance and reliability in assessing credit risks and contributing to the development of models applicable to international financial systems, thereby ensuring rigour and comparability in academic research.

5 | Results

Table 4 shows our results on estimated coefficients β for the variables that are statistically significant at 1%, 5% and 10%. The appendix contains the Table A1 with all results. The high significance obtained in the variable population segment in the total model justifies a comparative analysis of the results obtained for the four population sections of our sample.

Table 5 summarizes the predictive power obtained in the different models of our research. In general, we have achieved very high percentages in the correct classification, with the section of small municipalities having the greatest predictive power (93.75%). This table also shows the average number of municipalities that have been observed in default risk for each population segment (with values ranging from 0.2492 to 0.4601), as well as the standard deviation of the municipalities that have defaulted for each population section, and the average probability of default, which reaches minimum values of 19.38% for small municipalities and 44.94% for large municipalities. The value of both indicators shows that as we change population brackets, the greater the number of municipalities that on average default (mean of municipalities in default), as well as the probability of municipalities defaulting (mean of probability of default).

On the other hand, the results of the Hausman test (1978) shown in Table 6 verify the absence of endogeneity of the variables, indicating that we find no evidence that our estimators are not consistent and unbiased. More specifically, in the models estimated for each population segment, the test was greater than 0.05, and therefore the null hypothesis is not rejected. According to these results, we conclude that there is insufficient evidence to affirm that the random effects estimators are inconsistent. This indicates that there is no evidence of endogeneity.

In the appendix we show the results of the VIF test (Table A2), where we verify a low multiple multicollinearity and correlation of the independent variables, which allows us to be confident in the reliability and robustness of our results.

Having justified the relevance of the analysis by population segments and referring to the demographic variables, for small municipalities (Segment 1: up to 5000 inhabitants), the Pop_size, Male_inmigr and Gen_Change variables are significant with a positive sign. For medium-sized municipalities (Segment 2: 5001–20,000 inhabitants), the dependent population (Depend_pop16 and Depend_pop65) is significant with a negative sign, and the male dependent population (Male_depend) is significant with a positive sign. In large municipalities (Segment 3: 20,001–50,000 inhabitants) only two demographic variables are significant (Depend_pop65, with a negative sign and Female_depend, with a positive sign). Finally, in the larger municipalities (Segment 4: more than 50,000 inhabitants) only two variables were also significant with a positive sign (Depend_pop16 and Male_immigr).

With regard to the socio-economic variables, four variables related to the unemployment of the population are significant in all population segments, with a positive sign. Specifically, those related to the construction and services sectors (Constr_unempl, Serv_unempl), those who have not previously worked and therefore cannot be assigned to a sector of activity (Unempl_pop) and those aged under 25 who are unemployed (Unempl_25). Moreover, male unemployment (Male_unempl) is only significant and with a positive sign in small municipalities (Segment 1). Unemployment in the industrial sector (Industr_unempl) -only in municipalities of segments 1 and 2-, unemployment of people between 25 and 44 years old (Unempl_25_44) -in municipalities of segments 1, 2 and 3-, and unemployment of people over 44 years old (Unempl_44) in municipalities of segments 2 and 3 positively affect the probability of default.

Regarding the financial variables, in all population segments the variables Invest_Rev, PersCost_BudSp and FinC_BudSp (with positive sign), Fiscal_pressure (with negative sign) and Fin_aut, PubFees_Rev, and Repay_BudSp (with positive or negative sign, depending on the population segment studied) are significant. The BRPC and RETax_Rev variables have a negative effect on the risk of default only in small municipalities (Segment 1). The VTax_Rev and CurrSp_BudSp variables affect default risk negatively and positively, respectively, in municipalities ofwith up to 20,000 inhabitants (Segments 1 and 2). The variable FinL_Inhab negatively affects the dependent variable only in small and very large municipalities (Segments 1 and 4). Finally, the variable CurrSp_CapSp was significant and with a positive sign for the largest municipalities (Segment 4).

Concerning the political variables, for small municipalities (Segment 1), 5 variables are significant, 2 with a positive sign (Political_Sign and Local_Reg) and 3 with a negative sign (H_Index, Coun_W and Study_Level). In medium-sized municipalities (Segment 2), 3 variables (Abs_Maj, PF_Index and Coun_W) are significant, with a negative sign. In large municipalities (Segment 3) only 2 political variables are significant (PF_Index, with a negative sign and Local_St, with a positive sign). Finally, in the largest municipalities (Segment 4) 3 variables are significant with a negative sign (PF_Index, Local_St and Study_Level).

6 | Discussion

Our results demonstrate that increase in population volume, by itself, represents a risk factor for insolvency in local governments, since the probability of default is higher in larger municipalities than in smaller municipalities. This finding represents an advance of previous research, which was mainly devoted to the volume of debt in large municipalities. In addition, the high significance of the categorical variable population section (pop_seg) in the model built with the entire sample demonstrates the relevance and opportunity to empirically

TABLE 4 | Logit data panel parameters (random effects).

Variable	Total sample Coef. (β)	Segment 1 (≤ 5,000 inhabitants) Coef. (β)	Segment 2 (5,001–20,000 inhabitants) Coef. (β)	Segment 3 (20,001–50,000 inhabitants) Coef. (β)	Segment 4 (≥ 50,001 inhabitants) Coef. (β)
Demographic variables					
Pop_seg	0.3024***				
Pop_size		1.6013***			
Depend_pop16			−1.7541***		2.009***
Depend_pop65	−1.0935***		−7.4299***	−0.3265***	
Male_depend			1.8231***		
Female_depend				2.9892**	
Male_immigr	2.1026***	2.1000***			4.1914*
Gen_Change	0.2748***	0.2965***	0.8045***		
Socioeconomic variables					
Male_unempl	1.2912***	1.2303***			
Industr_unempl	1.1144***	1.0853***	3.2047***		
Constr_unempl	2.0091***	2.2835***	7.4244***	8.9521***	2.8416***
Serv_unempl	1.2112***	1.1774***	3.9947***	2.9554***	5.1326***
Unempl_pop	1.3648***	1.3903***	5.8982***	1.8083***	1.9055***
Unempl_25	0.9396***	0.9361***	9.3188***	2.1681***	2.5308***
Unempl_25_44	1.3264***	1.3798***	3.6305***	1.6135***	
Unempl_44			3.5624*	2.4567**	
Financial variables					
BRPC		−0.0803**			
Fin_aut	1.8090***	1.7596***	−0.0385***	6.1889***	4.3188**
Fiscal_pressure	−0.1250***	−0.0144***	−4.3122***	−0.0851***	−0.0088***
RETax_Rev	−5.8801***	−6.1902***			
VTax_Rev	−8.2002***	−7.7263***	−3.4154***		
PubFees_Rev	−1.7809***	−1.6706***	6.9701***	−4.3565***	−9.4917***
Invest_Rev	2.6228***	2.6148***	7.7478***	8.3206***	6.5633***
PersCost_BudSp	5.1809***	5.1618***	6.5695***	5.5971***	4.4337**
CurrSp_BudSp	5.9328***	5.1036***	5.0314***		
FinC_BudS	5.1766***	4.8741***	6.7365***	3.9830***	4.4556***
Repay_BudSp	4.4213***	4.6221***	−0.0229***	4.5984***	3.4376***
FinL_Inhab	−0.0229***	−0.0222***			−0.0309***
CurrSp_CapSp	0.0403**				0.1094***
Political variables					
Abs_Maj			−0.1319*		
Political_Sign	0.1622***	0.1402***			
H_Index	−0.2071***	−0.3153**			
PF_Index			−3.3668***	−3.1213**	−4.7573***
Local_St				0.1950**	−0.2807**
Local_Reg	0.1212***	0.1077***			
Coun_W	−0.3452***	−0.5272***	−2.0160***		

(Continues)

TABLE 4 | (Continued)

Variable	Total sample Coef. (β)	Segment 1 (≤ 5,000 inhabitants) Coef. (β)	Segment 2 (5,001–20,000 inhabitants) Coef. (β)	Segment 3 (20,001–50,000 inhabitants) Coef. (β)	Segment 4 (≥ 50,001 inhabitants) Coef. (β)
Study_Level		−0.0790*			−0.6581*
Cons	−9.2231***	−9.5848***	−12.1022***	−14.4470***	−15.6543***

Note: *** indicates significance at 1% ** at 5% and * at 10%.

examine the explanatory and predictive factors of the financial risks of local governments by population segment.

Beginning with the demographic variables, our results show a varied influence depending on the population section. As the number of inhabitants increases, the dependent population (under 16 years of age and over 65 years of age) begins to be an influencing factor in the default probability. However, in medium-sized municipalities, we detected an influence opposite to that obtained in large municipalities, taking into account that leaders are closer to their citizens in medium-sized municipalities, implementing policies that increase the viability of public services for dependent people. In large municipalities, this proximity between government and citizen is reduced, the influence of the variable changes direction. For these reasons, our results expand on previous literature (Rodríguez-Bolívar et al. 2016), since they support the idea that default risk varies by population section. So, the dependent population is a risk factor in segment 2, but not in segments 1 and 3. The immigrant population is a risk factor in segments 1 and 4, but not in the rest. Furthermore, in line with previous research (Mahía 2018; Bermúdez Morata et al. 2009), our results indicate that an increase in the immigrant population could increase the default risk (except in municipalities between 20,001 y 50,000 inhabitants). Finally, special mention must be made of the variable 'generational turnover rate', which is significant in the models built for smaller municipalities. It shows a positive influence with the probability of default, which could be due to the greater demand for infrastructure and public services focused on supporting the next generation, in line with the findings of Merino and Prats (2020).

Our results on demographic variables corroborate the value of institutional theory and stakeholder theory as a framework to explain the probability of default in LGs. Moreover, they deepen previous research findings, showing how the effect of the dependent population, immigrant population and the generational turnover rate on financial risks depends on the municipality's population size; this implies that policies to combat depopulation must use different financial measures in small municipalities and in medium and large municipalities.

Turning to the socioeconomic variables, the statistical relationship of unemployment with the probability of default is influenced by gender, sector of economic activity and age of the unemployed population. In addition, according to previous literature (Gómez-Miranda et al. 2022; Balaguer-Coll and Ivanova-Toneva 2019; Lara-Rubio et al. 2017), the positive signs of the estimators corroborate that an increase in unemployment could increase the default probability. Specifically, our results show an influence of unemployment in all activity sectors except agriculture, where the impact is greater in medium-sized municipalities. Likewise, our results indicate the positive influence of unemployment by age range, mainly in medium-sized municipalities, where the influence is stronger. Therefore, measures to reduce unemployment as an instrument to reduce depopulation must be adapted to the size of the population. Our findings on population factors corroborate the value of institutional theory and stakeholder theory as frameworks for explaining the risk of default by LG.

Financial factors assert the most influence on the likelihood of default for small municipalities. Furthermore, in accordance with previous literature (García 2019; Lara-Rubio et al. 2017; Padovani et al. 2018), we find a negative relationship between per capita budget revenue and the probability of default, although only in smaller municipalities. The financial autonomy variable is the only one that shows a sign opposite to that expected (positive, in our case). The main influence with a positive sign occurs in municipalities with more than 20,000 inhabitants, which could be because that a greater fiscal pressure could imply a greater volume of public services and, therefore, public spending. However, it could also be the case that the cost of additional public services could not be offset by sufficient resources; thus, financial autonomy acts as a risk factor rather than as a mitigating factor. The statistical significance of the rest of the variables related to income and expenses corroborates the findings of previous research (Olmo and Brusca 2021; Buendía-Carrillo et al. 2020; Dzialo et al. 2019; Vera 2018) in all sections of the population. The least influential one is the expenditure structure variable, which is significant only in large municipalities.

Therefore, these novel findings on financial factors confirm the validity of agency theory and intergenerational equity theory to explain the financial default of LGs, and reveal that depopulation policies must take into account the effect of financial variables on default risk (even more than demographic and socioeconomic factors). Thus, depopulation policies could be based on increasing the specific weight of the vehicle tax and the property tax in total revenues. This increase would improve the payment capacity of governments.

Finally, our results indicate that the influence of political variables changes as the size of the population increases. Only in municipalities under 5000 inhabitants are the political sign and the political strength significant. Regarding the first variable, our results reinforce the conclusions of the previous literature (Navarro-Galera et al. 2020), which shows that progressive parties are more likely than conservative governments to adopt

TABLE 5 | Classification matrix (%).

Observed		Prediction Y: Payment	Prediction Y: Default	Correct prediction (%)
Model 1–5000 < = 5000 inhabitants				
Y	Payment	37,124	1987	94.92
	Default	1268	11,714	90.23
Overall correct prediction				93.75
Mean of municipalities in Default: 24.92%				
Standard deviation: 43.25%				
Mean of probability of default: 19.38%				
Model 5001–20,000 inhabitants				
Y	Payment	4.845	567	89.52
	Default	446	2.732	85.97
Overall correct prediction				88.21
Mean of municipalities in Default: 37.00%				
Standard deviation: 48.28%				
Mean of probability of default: 33.40%				
Model 20,001–50,000 inhabitants				
Y	Payment	1364	173	88.74
	Default	161	768	82.67
Overall correct prediction				86.46
Mean of municipalities in Default: 37.68%				
Standard deviation: 48.47%				
Mean of probability of default: 33.74%				
Model > 50.000 inhabitants				
Y	Payment	658	108	85.90
	Default	122	530	81.29
Overall correct prediction				82.30
Mean of municipalities in Default: 46.01%				
Standard deviation: 49.85%				
Mean of probability of default: 44.94%				
Model Total sample				
Y	Payment	44,117	2706	94.22
	Default	1879	15,862	89.41
Overall correct prediction				92.90
Mean of municipalities in Default: 27.47%				
Standard deviation: 44.64%				
Mean of probability of default: 21.76%				

expansive spending policies, leading to higher volumes of debt and greater difficulties in meeting payment obligations.

Our results are in line with the findings of Galli and Padovano (2002), who found a negative relationship between political strength and default probability in small municipalities. Also, in municipalities with less than 5000 inhabitants the ideological alignment between local and regional governments, the percentage of women councillors and the mayor's educational level are explanatory of the probability of default along the same lines as the conclusions of previous research on large municipalities (Balaguer-Coll and Ivanova-Toneva 2021; Cabaleiro-Casal and Buch-Gómez 2021; Schneider, Wech, and Wrede; Naff 2009; Avellaneda 2009). Likewise, our results support that the mayor's education level influences the financial risk of large municipalities, so that a higher education level of the mayor reduces the financial risk of LGs.

Political fragmentation negatively influences the probability of default in municipalities with over 5000 inhabitants. This may be explained by two main factors. First, greater political fragmentation complicates the arrangement of debt operations. Second, limitations in decision-making capacity are associated with greater risk aversion. Whereas, according to previous research (Geys and Revelli 2011; Ashworth et al. 2005), an increase in fragmentation could lead to budget deficits and, consequently, an increase in municipal debt and repayment difficulties.

In addition in the second population segment (5001–20,000), we detected a statistically significant and negative relationship between the absolute majority of the ruling party and the percentage of women councillors.

Among municipalities with a larger population, political alignment between the local and state governments is shown as an influential variable. Although in the third population segment the sign of the estimator coincides with that expected, our research builds on previous findings (Auteri and Cattel 2022) by demonstrating that this alignment may lead to a greater volume of resources or subsidies in large local governments and, consequently, a comparatively lower default probability. On the other hand, while some studies (Balaguer-Coll and Ivanova-Toneva 2021; Cabaleiro-Casal and Buch-Gómez 2021; Gómez-Miranda et al. 2022) have highlighted the impact of the mayor's gender on certain aspects of government management, our analysis finds no empirical evidence of its influence on default probability across any population size. These findings on political factors reinforce the validity of institutional and agency theories in explaining local government insolvency risk.

TABLE 6 | Hausman test.

	Total sample	Segment 1 (≤ 5000 inhabitants)	Segment 2 (5001-20,000 inhabitants)	Segment 3 (20,001–50,000 inhabitants)	Segment 4 (≥ 50,001 inhabitants)
Hausman (1978) Test	8.59: sig.: 0.1296	9.91: sig.: 0.1228	10.90: sig.: 0.1168	12.47: sig.: 0.1024	13.25: sig.: 0.0972

In short, our results represent an advance over previous research that only analyzed large local governments (Navarro-Galera et al. 2017; Lara-Rubio et al. 2017; Rodríguez-Bolívar et al. 2016; Benito et al. 2015; Guillamón et al. 2011). Moreover, they allow us to advance previous literature by revealing that certain factors (such as dependent population, immigrant population, population aging, financial autonomy, tax burden, real estate tax, vehicle tax, income from fees and public prices, personnel expenses, current expenses, financial expenses, expenditure structure, absolute majority, political sign, political strength or fragmentation), in addition to influencing the volume of debt, influence the probability of servicing it, while others (such as the unemployment rate according to activity, gender and age, ideological alignment with the regional administration or the mayor's level of education), may not influence the volume of debt but do influence the risk of default on LGs.

7 | Conclusions

The analysis of the financial behaviour during the 2009–2018 period of 6456 Spanish local governments, structured in population segments (small, medium and large), reveals that population size can condition the influence of demographic, socioeconomic, financial and political factors on insolvency risks.It also reveals that in the design of anti-depopulation policies, financial measures should be adapted based on population size, since the determining factors of financial risk depend on the number of inhabitants. At a general level, our results indicate that the influence of socioeconomic and financial factors on default risks is greater than the effect of demographic and political factors, which suggests that the contribution of local government financial management to the fight against depopulation should pay special attention to the population and the socioeconomic structure of the municipality. Therefore, our findings indicate that in smaller municipalities those fighting against depopulation should adopt measures improving socio-economic and demographic factors because this will likely reduce financial risk and increase the sustainability of public services.

More specifically, in the smallest municipalities (population less than 5000 inhabitants), the demographic factors of financial risk are an increase in male immigration and generational turnover rate. In medium-sized municipalities, meanwhile, the demographic risk factors are different—increase in the male dependent population and decrease in the dependent population (under 16 years of age and over 65 years of age). These results suggest that, unlike small municipalities, the dependent population in medium-sized municipalities can encourage more prudent and responsible government behaviours in terms of indebtedness.

Regarding the socioeconomic variables, our results indicate that unemployment rate by sector and unemployment rate by age are financial risk factors across all sizes, although with a higher incidence in small and medium-sized municipalities than in large municipalities. In parallel, financial variables also carry more risks in smaller municipalities than in medium-sized and large municipalities. In the smallest municipalities, the financial risk factors are the reduction of five variables (fiscal pressure, real estate tax, vehicle tax, rates and indebtedness per person) and the increase of another six variables (investment financing, financial autonomy, personnel expenses, current expenses, financial expenses and repayment of loans). Thus, small local governments could fight depopulation if they reduce these risks, which would increase the sustainability of public services.The results on political variables also indicate differences based on population size. In smaller municipalities, the risk factors are the progressive political sign, low political strength, political alignment with the regional government, male gender of the mayor and mayor without a university degree. Therefore, in smaller municipalities, the fight against depopulation could be helped by analysing their specific political conditions.

All of these findings have political implications, since they allow us to consider the usefulness of some measures to fight against depopulation in small municipalities. First, the permissiveness of financial protection bodies should be made more flexible to authorize the formalization of loans in small local governments, provided that the resources are allocated to investments aimed at promoting employment for the youngest population over 19 years of age. In this regard, central governments could adopt the following measures to enhance the contribution of financial policies in the fight against depopulation: (a) authorize the formalization of loans based on the financial risks of each LG; and (b) subsidize the interest rates borne by the LG when the loans are destined to investments that involve the creation of youth employment. So, an increase in current subsidies to smaller municipalities are likely to increase the viability of public services because they increase the capacity of the local government to generate resources through taxes. Finally, political variables should be evaluated in the analysis of the effects of financial policies against depopulation, such as political sign, political strength and educational level of the mayor. In addition, these conclusions can help smaller LGs comply with tax rules, for three reasons. First, knowing the risk factors can help reduce expenses linked to the identified variables. Second, these variables reflect early warning indicators for preventive decision making. Third, if a LG reduces its risk factors, it will achieve borrowing operations with lower financial costs. In short, from a public policy perspective, these findings provide LGs with highly relevant information for taking preventive measures in advance to avoid financial risks. Risk reduction can thus promote the financing of investments to revitalize territories as well as the sustainability of public services through increased revenue from vehicle taxes and property taxes.

Our findings may be interesting for other countries with a similar municipal structure, in terms of size, like Spain (Portugal, France, Germany or Austria) because the municipal competencies in the different European countries are very similar and depend on population size. They can also be useful for those countries with a high bank debt at country level (above 100% of GDP) and at municipal level (above 5% of GDP) such as Italy or Portugal.

At the same time, our results also suggest opportunities for carrying out future research, such as studying the effect of

systematic variables (GDP, risk premium, etc.) and comparative analysis between countries, which may be useful for designing common policies throughout Europe to combat depopulation through measures that reduce financial risks.

However, our results have some limitations. First, the level of LG default may be affected by commercial debt, and not only by financial debt. Most LGs borrowed to pay commercial debt. In addition, we have not been able to access interesting data such as the per capita income of the immigrant population and of the dependent population. Third, results may be affected by systematic variables at the national level, such as GDP or the country risk premium of the country.

Finally, these findings raise the usefulness and timeliness of future works, dedicated to the analysis of time periods beyond 2018, or to the study of the effect of fiscal discipline rules on default risk and the impact of the pandemic caused by Covid-19.

Acknowledgements

Funding for open access charge: University of Granada/CBUA.

References

Alam, A. B. M. M., M. Alam, and A. Hoque. 2019. "Spending Pressure, Revenue Capacity and Financial Condition In Municipal Organizations: An Empirical Study." *Journal of Developing Areas* 53, no. 1: 243–256. https://doi.org/10.1353/jda.2019.0014.

Alamá-Sabater, L., V. Budí, N. Roig-Tierno, and J. M. García-Álvarez-Coque. 2021. "Drivers of Depopulation and Spatial Interdependence in a Regional Context." *Cities* 114: 103217. https://doi.org/10.1016/j.cities.2021.103217.

Alessandria, G., Y. Bai, and M. Deng. 2020. "Migration and Sovereign Default Risk." *Journal of Monetary Economics* 113: 1–22. https://doi.org/10.1016/j.jmoneco.2020.04.007.

Ashworth, J., B. Geys, and B. Heyndels. 2005. "Government Weakness and Local Public Debt Development in Flemish Municipalities." *International Tax and Public Finance* 12, no. 4: 395–422. https://doi.org/10.1007/s10797-005-2317-3.

Auteri, M., and A. Cattel. 2022. "Political Fragmentation and Coalition Alignment effects: Evidence From health Transfers to Italian Regions." *Italian Economic Journal* 1–36. https://doi.org/10.1007/s40797-022-00205-3.

Avellaneda, C. N. 2009. "Mayoral Quality and Local Public Finance." *Public Administration Review* 69, no. 3: 469–486. https://www.jstor.org/stable/27697887.

Balaguer-Coll, M. T., and M. Ivanova-Toneva. 2019. "The Importance of Spatial Effects in Municipal Debt." *Revista de Contabilidad - Spanish Accounting Review* 22, no. 1: 61–72. https://doi.org/10.6018/rc-sar.22.1.354311.

Balaguer-Coll, M. T., and M. Ivanova-Toneva. 2021. "The Impact of Women's Leadership in Local Governments: The Case of Spain." *International Public Management Journal* 24, no. 4: 455–475. https://doi.org/10.1080/10967494.2021.1897718.

Bank of Spain. 2021. *Informe anual del Banco de España 2020*. Servicio de publicaciones del Banco de España.

Basel Committee on Banking Supervision (BCBS). 2017. *Basel III: Finalising Post-Crisis Reforms*. Basel.

Benito, B., F. Bastida, and C. Vicente. 2012. "Political Budget Cycles in Local Governments." *Lex localis - Journal of Local Self-Government* 10, no. 4: 341–361. https://doi.org/10.4335/10.4335/10.4.341-361(2012).

Benito, B., M. Guillamón, and F. Bastida. 2016. "The Impact of Transparency on the Cost of Sovereign Debt in Times of Economic Crisis." *Financial Accountability & Management* 32, no. 3: 309–334.

Benito, B., M. D. Guillamón, and F. Bastida. 2015. "Non-Fulfilment of Debt Limits in Spanish Municipalities." *Fiscal Studies* 36, no. 1: 75–98. https://doi.org/10.1111/j.1475-5890.2015.12046.x.

Bermúdez Morata, L., M. Guillén Estany, and A. Solé Auró. 2009. "Escenarios del impacto de la inmigración en la longevidad y la dependencia de los mayores en la población española' [Scenarios for the impact of immigration on longevity and dependency among the elderly in the Spanish population]." *Revista española de geriatría y gerontología* 44, no. 1: 19–24. https://doi.org/10.1016/j.regg.2008.05.003.

Borrella-Mas, M. Á., and M. Rode. 2021. "Love Is Blind: Partisan Alignment and Political Corruption in Spain." *SERIEs* 12: 423–451. https://doi.org/10.1007/s13209-021-00228-6.

Buendía-Carrillo, D., J. Lara-Rubio, A. Navarro-Galera, and M. E. Gómez -Miranda. 2020. "The Impact of Population Size on the Risk of Local Government Default." *International Tax and Public Finance* 27, no. 5: 1264–1286. https://doi.org/10.1007/s10797-020-09591-9.

Cabaleiro-Casal, R., and E. Buch-Gómez. 2021. "Female Politicians in Municipal Councils and Fiscal Performance." *Economics & Politics* 33: 289–314. https://doi.org/10.1111/ecpo.12171.

Dowling, J., and J. Pfeffer. 1975. "Organizational Legitimacy: Social Values and Organizational Behavior." *Pacific Sociological Review* 18, no. 1: 122–136. https://doi.org/10.2307/1388226.

Dzialo, J., B. Guziejewska, A. Majdzińska, and A. Żółtaszek. 2019. "Determinants of Local Government Deficit and Debt: Evidence From Polish Municipalities." *Lex Localis-Journal of Local Self-Government* 17, no. 4: 1033–1056. https://doi.org/10.4335/17.4.1033-1056(2019).

Ehalaiye, D., N. Botica-Redmayne, and F. Laswad. 2017. "Financial Determinants of Local Government Debt in New Zealand." *Pacific Accounting Review* 29, no. 4: 512–533. https://doi.org/10.1108/PAR-11-2016-0104.

European Commission. 2021. *Questions and Answers: Communication on Fiscal Policy Response to Coronavirus Pandemic*.

European Observation Network for Territorial Development and Cohesion (ESPON). 2020. *Fighting Rural Depopulation in Southern Europe*. ESPON EGTC.

Eurostat. 2022. *General Government Debt (General Government Consolidated Gross Debt, % of GDP)*.

Eurostat. 2023. *Population by Age Groups*. Available on: https://ec.europa.eu/eurostat/databrowser/view/tps00010/default/line?lang=en.

Freeman, R. E. 1984. *Strategic Management: A Stakeholder Approach*. Pitman Publishing.

Galli, E., and F. Padovano. 2002. "A Comparative Test of Alternative Theories of the Determinants of Italian Public Deficits (1950–1998)." *Public Choice* 113, no. 1/2: 37–58. https://doi.org/10.1023/A:1020398628277.

García, A. V., and V. L. Muñiz. 2020. "Actuaciones desde la Administración Pública para evitar la despoblación del medio rural. ¿Qué se puede hacer desde los ayuntamientos y diputaciones?' [Actions by the Public Administration to Prevent Depopulation in Rural Areas. What Can be Done by Town Councils And Regional Councils?]." *Revista Galega de Economía* 29, no. 2: 6723–6737. https://doi.org/10.15304/rge.29.2.6723.

García, M. J. 2019. "Modelos Alternativos Para Explicar la Evolución Del Gasto Público Español." *[Alternative Models to Explain the Evolution of Spanish Public Spending]. Semestre Económico* 22, no. 51: 169–199. https://doi.org/10.22395/SEEC.V22N51A8.

Geys, B., and F. Revelli. 2011. "Economic and Political Foundations of Local Tax Structures: An Empirical Investigation of the Tax Mix of Flemish Municipalities." *Environment and Planning C: Government and Policy* 29, no. 3: 410–427. https://doi.org/10.1068/c10116r.

Gómez-Miranda, M. E., A. Navarro-Galera, D. Buendía-Carrillo, and J. Lara-Rubio. 2022. "An Empirical Analysis of Women's Influence on Management of Financial Risk in Local Governments." *Revista de Contabilidad* 25, no. 2: 271–281. https://doi.org/10.6018/rcsar.447901.

Greer, R. A. 2016. "Local Government Risk Assessment: The Effect of Government Type on Credit Rating Decisions in Texas." *Public Budgeting & Finance* 36, no. 2: 70–90.

Guerron-Quintana, P. A. 2020. "Migration and Sovereign Default Risk: A Comment." *Journal of Monetary Economics* 113: 23–27. https://doi.org/10.1016/j.jmoneco.2020.04.011.

Guillamón, M. D., F. Bastida, and B. Benito. 2011. "The Determinants of Local Government's Financial Transparency." *Local Government Studies* 37, no. 4: 391–406. https://doi.org/10.1080/03003930.2011.588704.

Hagen, T. P., and S. I. Vabo. 2005. "Political Characteristics, Institutional Procedures and Fiscal Performance: Panel Data Analyses of Norwegian Local Governments, 1991–1998." *European Journal of Political Research* 44: 43–64. https://doi.org/10.1111/j.1475-6765.2005.00218.x.

Hausman, J. A. 1978. "Specification Tests in Econometrics." *Econometrica* 46: 1251–1271. https://doi.org/10.2307/1913827.

Hlynsdóttir, E. V. 2016. "Professionalism Among Icelandic Mayors: Job Postings, Experience and Education as Determinants of Professionalism at the Icelandic Local Level." *Icelandic Review of Politics and Administration* 12, no. 1: 1–22. https://doi.org/10.13177/irpa.a.2016.12.1.1.

Instituto Nacional de Estadística (INE). 2023. *Indicadores de estructura de población. Índice de envejecimiento 2022*. [Population structure indicators. Ageing index 2022] Available on: https://www.ine.es/jaxiT3/Datos.htm?t=1418.

International Federation of Accountants (IFAC). 2012. Reporting on the Long-Term Sustainability of a Public Sector Entity's Finances. New York.

International Federation of Accountants (IFAC)., 2013. *Reporting on the Long-Term Sustainability of an Entity's Finances*. RPG 1. Toronto.

International Monetary Fund. (IMF). 2021. *Debt Management Responses to the Pandemic. Special Series on COVID-19*.

James, G., D. Witten, T. Hastie, and R. Tibshirani. 2013. *An Introduction to Statistical Learning With Applications in R*. Springer.

Jensen, M. C., and W. H. Meckling. 1976. "Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure." *Journal of financial economics* 3, no. 4: 305–360.

Lara-Rubio, J., A. Navarro-Galera, D. Buendía-Carrillo, and M. E. Gómez-Miranda. 2022. "Analysing Financial Risks of Local Governments to Design Sustainability Policies for Public Services: An Empirical Study by the Population Size." *Cities* 128: 103795. https://doi.org/10.1016/j.cities.2022.103795.

Lara-Rubio, J., S. Rayo-Cantón, A. Navarro-Galera, and D. Buendia-Carrillo. 2017. "Analysing Credit Risk in Large Local Governments: An Empirical Study in Spain." *Local Government Studies* 43, no. 2: 194–217. https://doi.org/10.1080/03003930.2016.1261700.

Letelier S., L. E. 2011. "Theory and Evidence of Municipal Borrowing in Chile." *Public Choice* 146, no. 3–4: 395–411.

MacKay, R. C. 2017. "The Impact of Fiscal Stress on Local Government Fiscal Structures: An Event Study of the Orange County Bankruptcy." *Public Budgeting & Finance* 37, no. 2: 102–124.

Mahía, R. 2018. "Población Extranjera Residente en España: Evolución, Características e Integración Económica." *Anuario CIDOB de la inmigración*: 80–113. https://doi.org/10.24241/AnuarioCIDOBInmi.2018.80.

McFadden, D. 2001. "Economic Choices." *American Economic Review* 91, no. 3: 351–378. https://doi.org/10.1257/aer.91.3.351.

Merino, F., and M. A. Prats. 2020. "Why Do Some Areas Depopulate? The Role of Economic Factors and Local Governments." *Cities* 97: 102506. https://doi.org/10.1016/j.cities.2019.102506.

Miyauchi, T., T. Setoguchi, and T. Ito. 2021. "Quantitative Estimation Method for Urban Areas to Develop Compact Cities in View of Unprecedented Population Decline." *Cities* 114: 103151. https://doi.org/10.1016/j.cities.2021.103151.

Naff, K. C. 2009. "Nancy Alfaro as an Exemplary Collaborative Public Manager: How Customer Service Was Aligned With Customer Needs." *Public Administration Review* 69: 487–493. https://doi.org/10.1111/j.1540-6210.2009.01994.x.

Navarro-Galera, A., L. Alcaide-Muñoz, M. D. López-Subires, and M. P. Rodríguez-Bolivar. 2021. "Identifying Risk Determinants of the Financial Sustainability of Regional Governments." *Public Money & Management* 41, no. 3: 255–263. https://doi.org/10.1080/09540962.2019.1684025.

Navarro-Galera, A., D. Buendía-Carrillo, J. Lara-Rubio, and S. Rayo-Cantón. 2017. "Political Factors Affect the Risk of Local Governments Default? Recent Evidence From Spain." *Lex localis - Journal of Local Self-Government* 15, no. 1: 43–66. https://doi.org/10.4335/15.1.43-66(2017).

Navarro-Galera, A., J. Lara-Rubio, D. Buendía-Carrillo, and S. Rayo-Cantón. 2020. "Analyzing Political and Systemic Determinants of Financial Risk in Local Governments." *Transylvanian Review of Administrative Sciences* 16, no. 59: 104–123. https://doi.org/10.24193/tras.59E.6.

O'Brien, R. M. 2007. "A Caution Regarding Rules of Thumb for Variance Inflation Factors." *Quality & quantity* 41: 673–690. https://doi.org/10.1007/s11135-006-9018-6.

OECD. (2021a) OECD Regional Outlook 2021.

OECD. (2021b) OECD Sovereign Borrowing Outlook 2021.

OECD. 2021c. *OECD Economic Surveys: Spain 2021*. OECD Publishing.

Olmo, J., and I. Brusca. 2021. "Determinantes Del Periodo Medio de Pago Municipal y Eficacia Del Principio de Sostenibilidad de la Deuda Comercial." *Revista de Contabilidad* 24, no. 1: 1–18. https://doi.org/10.6018/rcsar.370531.

Padovani, E., L. Rescigno, and J. Ceccatelli. 2018. "Municipal Bond Debt and Sustainability in a Non-Mature Financial Market: The Case of Italy." *Sustainability* 10, no. 9: 3249. https://doi.org/10.3390/su10093249.

Pérez-López, G., A. M. Plata-Díaz, J. L. Zafra-Gómez, and A. M. López-Hernández. 2014. "Operaciones Fuera de Presupuesto (off Budget), Factores Políticos y Deuda Municipal." *Gestión y Política Pública* 23, no. 1: 185–218.

Pina, V., P. Bachiller, and L. Ripoll. 2022. "Analysis of the Effectiveness of Regulation on Financial Health of Spanish Local Governments." *Spanish Journal of Finance and Accounting/Revista Española de Financiación y Contabilidad* 51, no. 3: 350–370. https://doi.org/10.1080/02102412.2021.1956092.

Pinilla, V., and L. A. Sáez. 2017. "La Despoblación Rural en España: génesis de un Problema y políticas Innovadoras." [Rural Depopulation in Spain: Genesis of a Problem and Innovative Policies]." *Informes CEDDAR* 2: 1–24.

Ribeiro, J. A., and R. W. Scapens. 2006. "Institutional Theories in Management Accounting Change: Contributions, Issues and Paths for Development." *Qualitative Research in Accounting & Management* 3, no. 2: 94–111. https://doi.org/10.1108/11766090610670640.

Ribeiro, N. A., S. M. Jorge, and S. P. Nogueira. 2019. "A New Approach to Determinant Factors of Local Government Debt." Pp. 6475-6491 *in 34th IBIMA Conference International Business Information Management Association. Vision 2025: Education Excellence and Management of Innovations Through Sustainable Economic Competitive Advantage*. International Business Information Management Association.

Rodríguez-Bolívar, M. P., A. Navarro-Galera, L. Alcaide-Muñoz, and M. D. López-Subirés. 2016. "Risk Factors and Drivers of Financial Sustainability in Local Government: An Empirical Study." *Local*

Government Studies 42, no. 1: 29–51. https://doi.org/10.1080/03003930.2015.1061506.

Rodríguez-Bolívar, M. P., A. Navarro-Galera, M. D. López, and L. Alcaide. 2018. "Analysing the Accounting Measurement of Financial Sustainability in Local Governments through Political Factors." *Accounting, Auditing & Accountability Journal* 31, no. 8: 2135–2164. https://doi.org/10.1108/AAAJ-10-2016-2754.

Roodman, D. 2009. "How to Do xtabond2: An Introduction to Difference and System GMM in Stata." *Stata Journal: Promoting Communications on Statistics and Stata* 9, no. 1: 86–136. https://doi.org/10.1177/1536867X090090010.

Rusconi, G. 2007. Introduzione. Edited by R. Edward Freeman, Gianfranco Rusconi, and Michele Dorigatti. Teoria Degli Stakeholder. Milano: Franco Angeli, Fondazione Acli Milanesi.

Salmerón, R., C. García, and J. García. 2020. "Overcoming the Inconsistences of the Variance Inflation Factor: A Redefined VIF and a Test to Detect Statistical Troubling Multicollinearity." *arXiv preprint arXiv:2005.02245*. https://doi.org/10.48550/arXiv.2005.02245.

Santis, S. 2020. "The Demographic and Economic Determinants of Financial Sustainability: An Analysis of Italian Local Governments." *Sustainability* 12, no. 18: 7599. https://doi.org/10.3390/su12187599.

Schneider, L., D. Wech, and M. Wrede. 2022. "Political Alignment and Project Funding." *International Tax and Public Finance* 29: 1561–1589. https://doi.org/10.1007/s10797-022-09758-6.

Shon, J., and J. Kim. 2019. "The Impact of Revenue Diversification on Municipal Debts: Comparing Short-Term and Long-Term Debt Levels." *Local Government Studies* 45, no. 2: 241–261.

Shrestha, N. 2020. "Detecting multicollinearity in regression analysis." *American Journal of Applied Mathematics and Statistics* 8, no. 2: 39–42.

Sinervo, L. 2014. "Interpreting Financial Balance in Local Government: A Case Study From Finland." *Public Money & Management* 34, no. 2: 123–130.

Slegten, C., B. Geys, and B. Heyndels. 2019. "Sex Differences in Budgetary Preferences Among Flemish Local Politicians." *Acta Politica* 54, no. 4: 540–563. https://doi.org/10.1057/s41269-018-0090-4.

Train, K. E. 2003. *Discrete Choice Methods With Simulation*. Cambridge University Press.

UN. (2019) The Sustainable Development Goals Report.

UN. (2021) G20 Policy Actions in the Time of COVID-19.

Vera, J. O. 2018. "Explanatory Factors and Limitations of Spanish Local Debt." *Academia Revista Latinoamericana de Administración* 31, no. 2: 360–377. https://doi.org/10.1108/ARLA-12-2015-0330.

Wooldridge, J. M. 2010. *Econometric Analysis of Cross Section and Panel Data*. Cambridge: The MIT Press.

World Bank. 2021. *What the Pandemic Means for Government Debt, in Five Charts*.

Appendix

TABLE A1 | Logit data panel parameters (random effects).

	Total sample			Segment 1 (≤ 5000 inhabitants)			Segment 2 (5001–20,000 inhabitants)		
Variable	**Coef. (β)**	**Std. err.**	**Exp (β)**	**Coef. (β)**	**Std. Err.**	**Exp (β)**	**Coef. (β)**	**Std. err.**	**Exp (β)**
Demographic variables									
Pop_seg	0.3024***	0.1184	1.3804						
Pop_size				1.6013***	0.5072	4.9593			
Pop_dens									
Depend_pop16							−17.541***	42.565	0.1731
Depend_pop65	−1.0935***	0.3425	0.3452				−74.299***	25.761	0.0006
Male_depend							18.231***	0.8492	61.910
Female_depend									
Male_immigr	2.1026***	0.3965	8.1872	2.1000***	0.3398	8.1662			
Female_immigr									
Depend_immigr									
Gen_Change	0.2748***	0.1259	1.3428	0.2965***	0.0466	1.3451	0.8045***	0.2675	2.2355
Socioeconomic variables									
Male_unempl	1.2912***	0.5202	36372	1.2303***	0.4475	3.4223			
Agric_unempl									
Industr_unempl	1.1144***	0.2699	3.1945	1.0853***	0.2178	2.9603	3.2047***	0.9561	24.6482
Constr_unempl	2.0091***	0.2654	10.3720	2.2835***	0.2119	9.8111	7.4244***	0.9980	1676.4052
Serv_unempl	1.2112***	0.2354	3.3575	1.1774***	0.1766	3.2458	3.9947***	0.8826	54.3118
Unempl_pop	1.3648***	0.3432	4.0342	1.3903***	0.3022	4.0160	5.8982***	1.5485	364.3679
Unempl_25	0.9396***	0.2643	2.6107	0.9361***	0.2099	2.5500	9.3188***	2.2866	11145.4988
Unempl_25_44	1.3264***	0.1973	3.7675	1.3798***	0.1321	3.9740	3.6305***	2.3122	37.7328
Unempl_44							3.5624*	2.0725	35.2475
Financial variables									
BRPC				−0.0803**	0.0427	0.9228			
Fin_aut	1.8090***	0.2850	6.6128	1.7596***	0.2323	5.8102			
Fiscal_pressure	−0.1250***	0.1005	0.9003	−0.0144***	0.0182	0.9857	−0.0385***	0.0498	0.9622
RETax_Rev	−5.8801***	0.4117	0.0025	−6.1902***	0.3765	0.0020	−4.3122***	0.8558	0.0134
VTax_Rev	−8.2002***	1.0505	0.0003	−7.7263***	1.1378	0.0004			
PubFees_Rev	−1.7809***	0.3690	0.1685	−1.6706***	0.3269	0.1881	−3.4154***	0.8169	0.0329
Invest_Rev	2.6228***	0.2915	13.7736	2.6148***	0.2417	13.6646	6.9701***	0.9578	1064.3718
PersCost_BudSp	5.1809***	0.3876	177.8394	5.1618***	0.3516	174.4754	7.7478***	1.1972	2316.3779
CurrSp_BudSp	5.9328***	0.3834	377.1959	5.1036***	0.3475	164.6151	6.5695***	1.1605	712.9847
FinC_BudS	5.1766***	1.5193	168.4511	4.8741***	1.6463	130.8546	5.0314***	1.1534	153.1534
Repay_BudSp	4.4213***	0.4850	81.5557	4.6221***	0.4645	101.7094	6.7365***	0.9031	842.6233
FinL_Inhab	−0.0229***	0.0976	0.9773	−0.0222***	0.0157	0.9780	−0.0229***	0.0387	0.9773
CurrSp_CapSp	0.0403**	0.0956	1.0621						
Political variables									
Gen									
Abs_Maj							−0.1319*	0.0929	0.8765
Political_Sign	0.1622***	0.1233	1.1879	0.1402***	0.0460	1.1506			

(Continues)

TABLE A1 | (Continued)

Variable	Total sample			Segment 1 (≤ 5000 inhabitants)			Segment 2 (5001–20,000 inhabitants)		
	Coef. (β)	Std. err.	Exp (β)	Coef. (β)	Std. Err.	Exp (β)	Coef. (β)	Std. err.	Exp (β)
H_Index	−0.2071***	0.2001	0.8130	−0.3153**	0.1398	0.7296			
PF_Index							−3.3668***	0.7890	0.0345
Local_St									
Local_Reg	0.1212***	0.1158	1.1632	0.1077***	0.0368	1.1137			
Coun_W	−0.3452***	0.1898	0.6803	−0.5272***	0.1255	0.5903	−2.0160***	0.5489	0.1332
Study_Level				−0.0790*	0.0488	0.9240			
Cons	−9.2231***	0.3128		−9.5848***	0.1792		−12.1022***	2.9527	
Hausman (1978) test:	8.59: sig.: 0.1296			9.91: sig.: 0.1228			10.90: sig.: 0.1168		

Variable	Segment 3 (20.001–50.000 inhabitants)			Segment 4 (≥ 50.001 inhabitants)		
	Coef. (β)	Std. Err.	Exp (β)	Coef. (β)	Std. Err.	Exp (β)
Demographic variables						
Pop_seg						
Pop_size						
Pop_dens						
Depend_pop16				2.009***	18.053	74.566
Depend_pop65	−0.3265***	29.278	0.7214			
Male_depend						
Female_depend	29.892**	33.143	198.706			
Male_immigr				41.914*	32.572	661.181
Female_immigr						
Depend_immigr						
Gen_Change						
Socioeconomic variables						
Male_unempl						
Agric_unempl						
Industr_unempl						
Constr_unempl	89.521***	22.150	77.244353	28.416***	46.274	17.1428
Serv_unempl	29.554***	12.130	192.090	51.326***	22.566	1694.556
Unempl_pop	18.083***	33.434	61.003	19.055***	51.798	67.227
Unempl_25	21.681***	48.005	87.417	25.308***	65.366	125.633
Unempl_25_44	16.135***	49.036	50.203			
Unempl_44	24.567**	40.829	11.6661			
Financial variables						
BRPC						
Fin_aut	61.889***	13.403	4.873005	43.188**	27.933	750.985
Fiscal_pressure	−0.0851***	0.0013	0.9184	−0.0088***	0.0018	0.9913
RETax_Rev						
VTax_Rev						
PubFees_Rev	−43.565***	1.8409	0.0128	−94.917***	42.771	0.0001
Invest_Rev	83.206***	1.2564	41.077430	65.633***	28.242	7086.275
PersCost_BudSp	55.971***	1.9906	2.696452	4.4337**	42.961	84.2456
CurrSp_BudSp						

(Continues)

TABLE A1 | (Continued)

Variable	Segment 3 (20.001–50.000 inhabitants)			Segment 4 (≥ 50.001 inhabitants)		
	Coef. (β)	**Std. Err.**	**Exp (β)**	**Coef. (β)**	**Std. Err.**	**Exp (β)**
FinC_BudS	39.830***	61.251	536.784	44.556***	34.497	861.061
Repay_BudSp	45.984***	16.684	99.3279	3.4376***	3.3616	311.130
FinL_Inhab				−00309***	0.0160	0.9696
CurrSp_CapSp				0.1094***	0.0687	11.156
Political variables						
Gen						
Abs_Maj						
Political_Sign						
H_Index						
PF_Index	−31.213**	20.289	0.0441	−47.573***	38.844	0.0086
Local_St	0.1950**	0.1435	12.153	−0.2807**	0.2059	0.7552
Local_Reg						
Coun_W						
Study_Level				−0.6581*	0.4428	0.5178
Cons	−144.470***	53.181		−156.543***	23181	
Hausman (1978) test:	12.47: sig.: 0.1024			13.25: sig.: 0.0972		

TABLE A2 | VIF test.

Variable	VIF	1/VIF
Male_immigr	9.74	0.0996
Female_immigr	9.00	0.1111
Female_depend	8.03	0.1245
Male_depend	7.90	0.1265
Agric_unempl	7.64	0.1310
Coun_W	7.54	0.1326
Unempl_44	6.66	0.1500
Depend_pop16	6.64	0.1507
Serv_unempl	6.57	0.1522
Depend_pop65	6.49	0.1541
Industr_unempl	6.14	0.1629
Constr_unempl	5.87	0.1704
Depend_immigr	4.87	0.2051
Unempl_pop	4.85	0.2060
H_Index	4.23	0.2364
Unempl_25	4.21	0.2373
Unempl_25_44	4.08	0.2453
Local_St	3.54	0.2822
Gen	3.54	0.2825
PubFees_Rev	3.46	0.2886
Pop_size	2.96	0.3382
FinC_BudS	2.77	0.3616
PersCost_BudSp	2.59	0.3865
Abs_Maj	2.54	0.3937
VTax_Rev	2.44	0.4100
CurrSp_BudSp	2.34	0.4269
Study_Level	2.32	0.4303
Invest_Rev	2.12	0.4708
Repay_BudSp	1.97	0.5080
Fin_aut	1.84	0.5425
FinL_Inhab	1.55	0.6457
Gen_Change	1.53	0.6549
BRPC	1.45	0.6875
PF_Index	1.43	0.6983
Pop_seg	1.39	0.7202
Political_Sign	1.34	0.7463
CurrSp_CapSp	1.32	0.7551
Local_Reg	1.31	0.7628
RETax_Rev	1.26	0.7929
Fiscal_pressure	1.22	0.8168
Male_unempl	1.15	0.8701
Pop_dens	1.01	0.9869
Mean VIF	3.84	