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Beyond Subsidies: A Study of Sustainable Public Subordinated Debt in Spain

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Abstract: Evidence from business shows that small- and medium-sized enterprises (SMEs) are fragile. They suffer from a high mortality rate that primarily owes to difficulties in securing financing as a result of major information asymmetries. Despite these difficulties, SMEs provide the economic backbone of all economically developed countries. Aware of the key role of SMEs in national economic stability and of the financial problems that SMEs face, governments have designed a range of financial and tax measures to protect them. These financial measures include a highly specific form of public financing called subordinated debt. This concept refers to debt with the lowest credit seniority, just before equity. Subordination makes sense when companies go into liquidation because subordinated debt creditors are the last creditors to receive repayment, making recovery of this debt virtually impossible. Therefore, the risk borne by lenders of subordinated debt is similar to that of shareholders of the borrowing firm. This paper presents an ordinary least squares regression model to estimate the cash flows of SMEs financed by public subordinated debt. This provides public authorities with a tool to estimate the ability of SMEs to repay their debt and to thereby ensure that public subordinated debt financing is sustainable.

Keywords: public subordinated debt; sustainability; cash flow

1. Introduction

Small- and medium-sized enterprises (SMEs) have traditionally been held captive to bank debt because of their limited ability to access capital markets. However, SMEs are the backbone of any developed country's economy. Evidence of this is the fact that more than 90% of firms in developed countries are SMEs. For this reason, their problems are a concern for national and international organizations [1,2]. The undeniable importance of these companies to the macroeconomy, coupled with their difficulties in accessing structural financing, calls for the design of instruments aimed specifically at SMEs. These financial resources include subordinated debt and capital risk.

Subordinated debt is a special type of debt with the lowest credit seniority when debtors go into liquidation. Accordingly, subordinated debt is included in the category of mezzanine financing, or financing that lies between debt and equity. Subordinated debt is typically issued by banks to meet the strict equity requirements they are held to by each country's banking authorities. Perhaps for this reason, studies have devoted special attention to this area [3–5]. Although the strictness of regulations varies by country, throughout Europe, there is a special type of subordinated debt known as *prêt participatif* in France, *vinstandelslån* in Sweden, participation loan in the UK, *partiarisches Darlehen* in

Germany, and *préstamo participativo* in Spain. Although the legal and financial characteristics of these loans differ between countries, all have a common feature: They are all forms of subordinated debt.

In Spain, participation loans (PLs) are regulated by Royal Decree-Law 7/1996 of 7 June and by Law 16/2007 of 4 July. Both laws define the legal characteristics of PLs, which include subordination, interest that is linked to the performance of the borrowing firm, and equity-like credit seniority once the company goes into liquidation. As well as being a form of subordinated debt, PLs typically generate remuneration that is linked to borrowers' profits. However, some lenders prefer to link the interest from PLs to sales or other variables that reflect the borrower's performance such as earnings before interest, tax, depreciation, and amortization (EBITDA) or return on equity (ROE). In Spain, PLs are usually used by venture capital and private equity funds to finance companies. However, they are also used by national and local public authorities to finance SMEs.

Practitioners consider PLs a form of equity [6] to the extent that PL and capital risk providers do not acknowledge major differences between the two forms of financing. Moreover, professionals of this type of financing consider PLs a form of capital risk with a repayment agreement [7]. Credit institutions issue subordinated debt but do not issue PLs because of the high associated risk resulting from their low seniority and the fact that return depends on the borrower's performance. Credit institutions are risk-averse, so these loans are not part of their business culture. In contrast, PLs are strongly rooted in the private sector of venture capital and private equity [8]. In institutional settings, governments have developed different measures to support SMEs, including protective tax policies [9] and credit guarantees [10]. Governments also support high-risk projects undertaken by SMEs through venture capital [11,12] and PLs [13]. Governments thus attempt to guarantee the repayment of public financing to ensure its sustainability over time.

The aim of this paper is to present a tool for private and public providers of PLs to estimate future cash flows of growing SMEs financed by PLs. Through analysis prior to providing this financing, it is possible to estimate SMEs' ability to repay the loan and thus determine the viability of the transaction. This tool can thereby help ensure the sustainability of public financing through PLs. This study contributes to the literature by being the first to provide an econometric model to estimate the cash flows of SMEs financed by PLs and, by extension, by subordinated debt.

The paper is organized as follows. Section 2 presents the theoretical framework, reviews the literature, and presents the hypothesis. Section 3 describes the method, sample characteristics, and variables used in the empirical study. Section 4 presents and discusses the results of the analysis. Finally, Section 5 provides conclusions.

2. Literature Review and Hypothesis

PLs were designed in France, which was the first country to regulate the legal characteristics of this type of loan. The key features are that it is a form of subordinated debt and that remuneration depends on the borrower's performance. The French roots of PLs explain why most studies have been conducted in the context of France [14–18].

Initially, the French PL model was emulated in Spain, although certain modifications were made so that it fits within the national accounting and tax legislation. In the Spanish context, participation loans have elicited considerable interest, as reflected by several studies [7,19–22]. Dhom [23] studied subordinated debt in the German context, and Mokkelbost [24] studied participation loans in Europe.

However, we have not found a single study in the literature on cash flows that estimates cash flows for companies financed by PLs. Because this type of loan is similar to private equity, we drew upon studies by Driessen, Lin, and Phalippou [25], Robinson and Sensoy [26], and Ang, Chen, Goetzmann, and Phalippou [27]. Based on this theoretical background and our research objectives, we propose the following hypothesis:

Hypothesis: *Variations in noncurrent assets, sales, EBITDA, return on assets (ROA), and the number of employees are factors that determine the increase in cash flow of companies financed using PLs.*

3. Data and Method

3.1. Sample

We used a sample of 89 growing European low- and medium-technology SMEs that had received PLs. Data were cleansed before this final sample was obtained. We discarded all firms for which the investment did not correspond to growth capital and firms that reported losses year on year and ultimately went bankrupt. The identity of the firms and the type of operation were provided by ENISA, the Spanish public capital institution that provides funding to SMEs through PLs. The accounting data were obtained from the SABI database, which records information on Spanish firms. We analyzed the evolution of the variables for the period from the financial year immediately prior to receiving the PLS to three years after this event. Consequently, for each firm, a four-year study period was considered.

3.2. Explanatory Variables

Variables were selected to address the aims of this study. The dependent variable used to characterize business growth was cash flow. The independent variables were non-current assets, sales, ROA, number of employees, and EBITDA. These indicators were chosen because they are closely related to business growth. We also included the Madrid Stock Exchange General Index (IGBM) as an external variable to correct the model for the effect of the evolution of the economy in terms of the value of SMEs. This market index is representative of all Spanish listed firms. In addition to share prices, the index includes dividends reinvested in the stocks of the companies paying those dividends.

3.3. Descriptive Statistics

Table 1 shows the descriptive statistics of the variation of each variable.

Table 1. Descriptive analysis of variation (VR) of variables.

	VRCF	VRNCASSET	VREBITDA	VRSALES	VRROA	VREMP
N	87	88	87	86	87	81
Mean	4.0800	2.6065	4.8879	52.1052	1.1876%	1.5599
Std. deviation	8.7990	4.0797	10.7052	439.4200	4.9625	3.8827
Median	1.5581	1.3513	1.4594	0.8166	0.2149	0.4286
Rank	53.4900	29.2800	71.0300	4073.2700	40.1100	30.5000

Table 1 shows that the mean of all variables increased. This increase does not owe to the removal of all loss-making SMEs from the sample. Instead, it owes to natural growth because we did not require a minimum profit level for a firm to be selected for the sample. The only requirement was that the company did not report losses.

The correlations between variables were nonzero in most cases, although they were generally moderate. We thereby discarded the possibility of multicollinearity. Notably, the correlation between the variation of cash flow and the variation of EBITDA was high. The variation of ROA was least highly correlated with the other variables.

4. Empirical Model and Analysis of Results

We introduced the variations of the aforementioned variables between the year prior to receiving the PL and the third year after this event. We therefore worked with first differences. Murray and Goyal [28] reported that this approach can lead to the loss of precision and bias of the coefficients toward zero, but it was not expected to alter the conclusions of the analysis. The model used to test the hypothesis can be stated as follows:

$$\text{VRCF} = f(\text{VRNCASSET}, \text{VRSALES}, \text{VREMP}, \text{VRROA}, \text{VREBITDA}, \text{VRIGBM}), \quad (1)$$

where f is a linear function of the form:

$$\begin{aligned} \text{VRCF} = & \alpha_0 + \alpha_1 \text{VRNCASSET} + \alpha_2 \text{VRSALLES} + \alpha_3 \text{VREMP} + \alpha_4 \text{VRROA} \\ & + \alpha_5 \text{VREBITDA} + \alpha_6 \text{VRIGBM} + \varepsilon. \end{aligned} \quad (2)$$

Initially, we included all independent variables simultaneously to confirm the significance of the full model. We then performed successive trials with different alternatives until we obtained the model that performed best. The first regression model contained the five explanatory business variables. However, the results indicate that only growth of VREMP exerted an individual influence in the model. After including the IGBM in the model, the improvement was small, simply increasing the adjusted R² value. Similarly, the growth of this external variable was not relevant in the model because it did not exert an individual influence on the dependent variable.

To improve the fit of this model, we studied all possible combinations of the five business variables without including the external variable IGBM. To choose the best combination, we selected the combination that maximized the predictive capacity, measured in terms of the adjusted R². The final model is given by the following expression:

$$\text{VRCF} = f(\text{VRNCASSET}, \text{VRSALLES}, \text{VRROA}), \quad (3)$$

where f is a linear function of the form

$$\text{VRCF} = \beta_0 + \beta_1 \times \text{VRNCASSET} + \beta_2 \times \text{VRSALLES} + \beta_3 \times \text{VRROA} + \varepsilon. \quad (4)$$

According to this model, the dependent variable VRCF is defined as the linear combination of the independent variables VRNCASSET, VRSALLES, and VRROA, where each one of these variables is accompanied by its corresponding beta coefficient. The equation also includes a constant, β_0 , and a random term, ε . The final model is thus given by:

$$\text{VRCF} = 1.467 + 0.489 \text{VRNCASSET} + 0.006 \text{VRSALLES} + 0.778 \text{VRROA}.$$

This model was significant, with a p -value of less than 0.001. This value indicates the existence of a linear relationship. The adjusted R² was 0.988. Therefore, the hyperplane defined by the equation provides an excellent fit to the point cloud. Table 2 shows the goodness of fit of the model.

Table 2. Summary of the model.

R	R ²	Adjusted R ²	p -Value
0.994	0.988	0.988	0.000

These results imply that the three chosen independent variables, when considered together, are capable of explaining practically all of the variation of the increase in the cash flow of companies financed by PLs. This finding has wider implications because the high value for the adjusted R² of 0.988 reflects the model's clear predictive capacity, which enhances the model's applicability. Table 3 shows the unstandardized coefficients of the model and the influence of each variable in the model, represented by the standardized beta coefficients.

The signs of the three unstandardized coefficients were positive. These results indicate a direct relationship between the variation of cash flow and the variations of the three independent variables. Similarly, ranking the beta coefficients indicates that the variable with the greatest influence on VRCF was VRNCASSET, followed at a considerable distance by VRROA and VRSALLES. Because the p -values for the three variables were less than 0.005, we may conclude that all variables significantly contribute to explaining VRCF. The independence of the residuals is guaranteed by the value of 1,906 for the Durbin–Watson statistic. This value falls in the interval [1.5–2.5]. The condition of homoscedasticity

of the residuals was also met. We also verified the absence of collinearity between the independent variables because no eigenvalue was close to zero and all the condition indices were well below the maximum limit of 1.5. Table 4 presents these results.

Table 3. Coefficients of the model.

Variables	Unstandardized Coefficients		Standardized Coefficients	p-Value
	Beta	Standard Error	Beta	
(Constant)	1.467	0.781		0.064
VRNCASSET	0.489	0.006	0.981	0.000
VRSALES	0.006	0.002	0.043	0.001
VRROA	0.778	0.170	0.054	0.000

Table 4. Collinearity diagnosis.

Dimension	Eigenvalues	Condition Index
1	1.476	1.000
2	1.129	1.143
3	0.739	1.413
4	0.656	1.500

We observed linearity between the endogenous variable and the three exogenous variables, thereby confirming the absence of specification error. To test the robustness of the findings, we estimated the same regressions, calculating the variation between the year prior to the application for PL and the second year following this (i.e., years -1 and $+2$). The results followed the same pattern, which supports the conclusions regarding the proposed model.

5. Conclusions

PLs are used by public administrations to finance SMEs. However, this form of subordinated debt has high associated risk. Furthermore, PLs are granted with no credit guarantees for loan periods of up to 10 years and long interest-only periods. These highly specific features mean that PLs resemble venture capital. In fact, lenders that provide PLs apply the same criteria for granting these loans as those applied by venture capitalists because lenders consider PLs a form of venture capital with a repayment agreement. The ability to generate cash flow is something that concerns all venture capitalists and lenders that provide PLs because the recovery of their investments depends on this cash flow.

This paper proposes a regression model to estimate the cash flows of SMEs financed by PLs provided by public institutions. The proposed model implies that non-current assets, sales, and ROA significantly influence the increase in cash flow of companies financed by PLs. Furthermore, this influence is direct for the three independent variables, as indicated by their positive coefficients. Based on their beta coefficients, the most important variable is non-current assets, followed by ROA, and then sales. The variables that were excluded from the model were the number of employees, EBITDA, and IGBM. These variables should not be considered irrelevant, although we did not find statistical support for their influence. It is also worth noting that the adjusted R^2 value was 98.8%. This value implies that the three aforementioned variables helped explain cash flow behavior in a significant way. However, this finding does not merely reflect the explanatory capacity of the model. The strong goodness of fit also substantially enriches the model, lending it even greater predictive capacity.

Therefore, our model can prove useful for public institutions that provide PLs because they can use it to help make decisions regarding the financing of SMEs. By doing so, they can reduce the risk of not recovering the loans they grant and can thereby ensure a more sustainable system of public financing. The model is also useful for SMEs financed by PLs because the prediction of cash flows

enables them to negotiate and even renegotiate loan repayment periods and amounts to match their cash flow, their investment plan, and accordingly their growth strategy. Finally, it is worth noting that, although this model is simple, this should not be considered a weakness. Rather, this should be considered a strength because it makes the model more effective for direct implementation by SMEs. This means that the model is highly useful in practice because it supports the work of providers of public finance and the owners of SMEs financed by PLs.

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