Journal of Business Research 64 (2011) 649–655

Contents lists available at ScienceDirect

Journal of Business Research

Tax effect on Spanish SME optimum debt maturity structure

José López-Gracia *, Reyes Mestre-Barberá

Universitat de València, Facultad de Economía, Departamento de Contabilidad, Campus dels Tarongers, 46071-Valencia, Spain

ARTICLE INFO

Article history:
Received 1 February 2010
Received in revised form 1 March 2010
Accepted 1 June 2010
Available online 10 July 2010

Keywords:
Small and medium-sized enterprises
Debt maturity structure
Dynamic model
Tax effect
System-GMM

ABSTRACT

This paper analyzes the influence of the tax effect on small and medium-sized enterprise (SME) debt maturity structure. This study builds a dynamic adjustment model which endogenizes optimum structure and assumes the existence of adjustment costs. Using Spanish data, the model is estimated using a system-GMM regression to a complete panel (11,028 firms) covering 1997–2004. SMEs adjust to their target at a speed of about 37% annually, the equivalent of employing about 20 months to cover only half of the existing gap. This rate is lower than those reported in other similar papers studying large companies with publicly tradable equity.

1. Introduction

The empirical evidence on debt maturity focuses mainly on large firms with publicly tradable equity (Barclay and Smith, 1995; Stohs and Mauer, 1996). As regards taxes (tax approach), the topic this study addresses, research by Brick and Ravid (1985, 1991) and Kane, Marcus and McDonald (1985) figures prominently. Recently, however, the debt maturity behavior of small and medium-sized enterprises (SMEs) has also been studied (García-Teruel and Martínez-Solano, 2007; Scherr and Hulburt, 2001).

Empirical research exclusively addressing tax models is rare (e.g., Harwood and Manzon, 2000). Although many theorists focus on debt maturity from the angle of new debt issues, others assume that firms continuously follow an optimal policy, and therefore define the dependent variable in terms of debt maturity structure (Ravid, 1996). The characteristics of our data, discussed below, recommend this second approach.

SMEs are the focus of the paper due to the important role they play in the Spanish economy and how different they are from large firms. The different strategies followed by SMEs versus large firms regarding their debt maturity structure are well documented (Scherr and Hulburt, 2001). Typical financial restrictions affecting SMEs due to their financial opacity, higher information asymmetry, and higher business risk may produce significant agency costs of debt. Consequently, SMEs use mostly short term financing to lower agency costs. SME profit volatility tends to be higher, making them an interesting subject to analyze using the tax effect. Barclay and Smith (1995) do not find strong evidence of a tax effect on debt maturity in large firms, probably because of these firms' lower earnings variability. Our paper specifically analyzes the tax effect on the debt maturity structure of SMEs, a subject that, to our knowledge, previous research has not addressed.

This research focuses on the Spanish economy, which recorded much faster growth over the sample period, 1997–2004, than its European counterparts. SMEs were the main contributors to this growth. SMEs accumulated high levels of debt, taking advantage of low interest rates and tax relief. The Spanish tax code provided some advantages targeted at small business, including incentives to make new investments and hire new employees.

Our sample consists of an eight-year panel on 11,028 firms. This research assumes a certain survivorship bias in estimation results due to the high rate of bankruptcy of small firms (Céspedes et al., 2010).

This study proposes a dynamic adjustment model that makes it possible to confirm whether SMEs adopt an optimum debt maturity structure and examine the speed at which they adjust to their target. Capital structure research often employs this approach (Flannery and Rangan, 2006; López-Gracia and Sogorb-Mira, 2008 and Serrasqueiro and Nunes, 2009), but not so maturity structure (Antoniou et al., 2006; Ozkan, 2000). As optimum debt structure is not observable, the model endogenizes optimum debt structure by replacing it with a vector of observable explanatory variables. The advantage of this approach is that our model captures the adjustment costs firms face in seeking their optimum level. Otherwise, estimates would erroneously reflect that firms do not face such costs and that the financial markets they use are friction-free, thus producing bias.

This paper extends previous research on SME debt maturity, particularly that of Scherr and Hulburt (2001) and García-Teruel and Martínez-Solano (2007). While the former focuses on the determinants of debt maturity through cross-sectional data (US firms), the latter

* Corresponding author.
E-mail addresses: jose.lopez@uv.es (J. López-Gracia), reyes.mestre@uv.es (R. Mestre-Barberá).

0148-2963/$ – see front matter
doi:10.1016/j.jbusres.2010.06.001

analyzes a data panel of Spanish manufacturing firms and considers a trade-off between risk and return as per Jun and Jen (2003). In contrast, this paper focuses on the tax effect on debt maturity and uses a dynamic analysis approach.

This research contributes to the current literature in several specific ways. First, our sample includes all SMEs from a relatively new database. Second, this research focuses on the tax effect on debt maturity, which has been seldom applied to SMEs. Third, our empirical methodology consists of estimating a dynamic adjustment model, which is also uncommon in the debt maturity literature. Finally, the research applies a novel estimation technique, system-GMM regression, which improves the efficiency of estimates, makes it possible to estimate the speed of adjustment to optimal debt maturity, and incorporates industry effects.

The main results indicate that the model fits the data well and that SMEs seem to adopt an optimum debt maturity structure, which they converge to slowly due to the high adjustment costs they face. Average adjustment speed is estimated at around 37%, the equivalent of taking some 20 months to cover half the existing gap. This adjustment rate is slower than the 50% estimated for large firms with publicly tradable debt (Antoniou et al., 2006; Ozkan, 2000). The effective tax rate is highly significant and both the interest rate gap and interest rate volatility also have a significant impact on debt maturity.

2. Theory and relevant background

According to Brick and Ravid (1985), choosing between short and long term debt becomes important when the interest rate curve is not flat and the long term interest rates are taken as an accurate indication of future short term interest rates. Thus, when the yield curve is positively sloped, investors conclude that firms will pay higher interest on long term debt than on short term debt. Firms anticipate the tax deductions that debt provides when they choose longer maturities.

In a later paper, Brick and Ravid (1991) extend the model to include interest rate uncertainty. The need to refinance short term debt at an unknown interest rate results in long term financing being the optimum strategy, regardless of whether the term structure is positively sloped or flat. The cost of interest rate uncertainty could exceed the advantages of short term debt when the yield curve is negatively sloped and, consequently, long term debt would be the optimum strategy. In addition, since only profitable firms pay taxes and tax relief is fixed or subject to certain limits, the current value of tax deductions on short term debt interest will decrease in proportion to the variability of such interest payments. Consequently, when short term interest rate volatility is high, firms will choose long term debt, as tax deductions for the interest paid remain fixed (Emery et al., 1988).

Kane et al. (1985) indicate that optimum debt maturity should increase if the effective tax rate drops, such that the tax deductions exceed the transaction costs that firms accrue every year. Optimum maturity increases if firm value volatility decreases, as the firm would not have to readjust its capital structure so regularly.

Finally, Scholes and Wolfson (1992) point out that firms subject to a high marginal tax rate will choose long term debt, as they are more capable of using the tax deductions the interest on this type of financing provides. The marginal tax rate is difficult to calculate, but tax deductions other than those obtained through debt, also called alternative tax shields, commonly proxy them. The firms that enjoy such shields have a lower incentive to use the tax benefits of debt.

This study is based on the expected positive relationship between both the term structure of interest rates and short term interest rate volatility and debt maturity structure, on the one hand, and the expected negative relationship between both the effective tax rate and the volatility of firm value and the debt maturity structure, on the other. Furthermore, this research contemplates the effect of the marginal tax rate on debt maturity structure and controls for some other factors, as discussed below.

3. Empirical specifications and estimation methodology

3.1. Static model

Although our research is mainly based on a dynamic model, the study first introduces a more general (static) model that most scholars have used. This model takes the following form:

$$Y_{it} = \beta_0 + \sum \beta_j X_{jit} + v_i + u_{it} \quad (1)$$

Y_{it} is the debt maturity structure observed in the current (t) period for company i. X_j is a vector of j characteristics that vary among firms and over time, β_0 is a constant and β_j is an associated vector of coefficients. Eq. (1) also incorporates specific or fixed firm effects (v_i) and, therefore, does not include industry dummies. Furthermore, two of the characteristics included in Eq. (1) do not vary from one firm to another, only over time. As a result, this model can not include time dummies as the main goal is to analyze the separate effect of these variables. Finally, u_{it} is an error term.

Eq. (1) is estimated using fixed effects for comparative reasons alone. The intention is to provide a benchmark for comparison with previous research. Second, the regression is a reference to compare to the system-GMM technique. Note that Eq. (1) assumes that adjustment costs are not relevant while moving towards optimum debt maturity, representing the traditional approach.

Dependent variable

In previous research, debt maturity structure is measured as (i) the value-weighted average maturity of the firm's various debt issues (Easterwood and Kadapakkam, 1994) and (ii) the long term debt to total debt ratio (Antoniou et al., 2006). Although the latter measure is easier to operationalize it is less precise, as all long term debts are aggregated, regardless of each issue's term.

The firms in this paper are SMEs whose stock is not traded on public exchanges. Relatively poor data disclosure forces us to measure debt maturity structure as the proportion of total debt represented by long term debt due in more than one year. Table 1 defines the variables, along with their notation and expected sign.

Explanatory variables of debt maturity structure

(1). Term structure of interest rates

Firms supposedly have a larger proportion of long term debt when the term structure of interest rates slopes upwards. However, Antoniou et al. (2006) do not confirm this effect. This paper approaches the term structure of interest rates (denoted *term*) as the spread between the yields on ten-year Spanish public debt and one-year Spanish Treasury bills. Each of these two rates is obtained as monthly averages from the Bank of Spain. This measure varies over time, but is constant for all firms.

Another way to analyze the variable *term* is as a dummy variable. Defined as a continuous variable, any fluctuation in the term spread, no matter how small, is expected to affect debt maturity structure. However, this may not necessarily be so (Newberry and Novack, 1999). When the spread is particularly wide, the effect could be opposite to that when it is narrow. For this reason, the variable *term* is also defined as a trend proxy (denoted *dum_term*) that takes noncontinuous values.

(2). Short term interest rate volatility

Long term debt allows firms to maintain high interest tax deductions even when short term rates are volatile. Hence, we expect short term interest rate volatility (denoted *interestvolatility*) to have a positive effect on debt maturity structure. Cai, Fairchild and Guney