PECKING ORDER VERSUS TRADE-OFF:
AN EMPIRICAL APPROACH TO THE SMALL AND MEDIUM ENTERPRISE CAPITAL STRUCTURE

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Abstract

In this paper, we explore two of the most relevant theories that explain financial policy in small and medium enterprises (SMEs): pecking order theory and trade-off theory. Panel data methodology is used to test the empirical hypotheses over a sample of 6482 Spanish SMEs during the five year period 1994–1998. The results suggest that both theoretical approaches contribute to explain capital structure in SMEs. However, while we find evidence that SMEs attempt to achieve a target or optimum leverage (trade-off model), there is less support for the view that SMEs adjust their leverage level to their financing requirements (pecking order model).

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1. Introduction

The vast majority of empirical studies that analyse the determinants of firm financing usually examine large publicly listed companies with a widely spread ownership. These companies often raise finance by issuing corporate debt on the capital markets (Zingales, 2000, p. 1629). In this paper, we examine the financing of small and medium sized companies (SMEs) and explore whether the main theories of firm financing can explain the capital structure of these firms.

SMEs often suffer the problems associated with asymmetric information, such as adverse selection and moral hazard. In this way, they are affected by the typical problems studied in the theory of pecking order. Nevertheless, these firms could also set their financial policy by following a target indebtedness ratio, as maintained by trade-off theory. As both theories, pecking order and trade-off, enable us to describe the financial behaviour of SMEs with some accuracy, we develop the behavioural models necessary to analyse which of the two theories best fits the characteristics of these companies and explains their actions.

Our starting point is that established by Shyam-Sunder and Myers (1999), when developing the analysis of SME financing. This point has been adapted to our specific context, and following the lines suggested by Chirinko and Singha (2000), we propose alternative verification methods in order to give our results greater robustness.

A revision of the empirical literature leads us to conclude that there is insufficient clarity in the degree of applicability of the various theories of firm leverage. Rajan and Zingales (1995) clearly arrive at the same conclusion, while Graham (1996) asks why we cannot better empirically explain firm leverage – given the wide number of available

theories. Shyam-Sunder and Myers (1999) argue that a possible solution to this question may arise from a meticulous study of the predictions associated with each theory, rather than an attempt to simultaneously collect together all the theories. This provides the motivation for our proposal to centre an empirical analysis on a model representing trade-off, and another representing pecking order.

Our research exploits the characteristics of data panel and incorporates dynamic effects, while controlling temporary, as well as specific unobservable company effects. As a result, we obtain a base that is more appropriate for analysing the financial decisions taken by SMEs.

The rest of the paper has been organised as follows. Sections 2 and 3 tackle the theoretical foundations of pecking order and trade-off. The available literature and hypotheses to be verified are also discussed. In Section 4, the process of sample selection is explained and the data is also described. Section 5 covers the methodology used and discusses the principal problems of estimating with panel data models. Section 6 presents the results obtained and verifies the defined hypotheses. Lastly, section 7 sums up the main conclusions of the research.

2. Trade-off model

A. Background and theoretical foundation

In this theoretical framework, companies identify their optimal capital structure and weigh up the advantages and disadvantages of an additional monetary unit of debt. Among the advantages, we can include costs that are 'fiscally deductible' from company tax as a result of paying interests (Modigliani and Miller, 1963; DeAngelo and Masulis, 1980); and a lessening of the free cash flow problem (Jensen, 1986; Stulz, 1990). The disadvantages of debt include the potential costs resulting from financial distress (Kraus and Litzenberger, 1973; Kim, 1978), and the agency costs arising between owners and financial creditors (Jensen and Meckling, 1976; Myers, 1977). At the optimal point for the company capital structure, the benefits and shortcomings of debt are balanced – so achieving equilibrium. Myers (1984) showed that the trade-off

approach implied that the rate of real company indebtedness reverts to a target, or optimal level.

Following this line of reasoning, we propose verifying the prediction of the trade-off theory with respect to the reversion of leverage towards an objective, or optimal point; and estimate the speed with which this adjustment is made. As Fama and French (2002) show, empirical studies made within the framework of trade-off theory and aimed at identifying the determinants of company indebtedness normally estimate a simple cross-section regression – estimating the relation existing between the ratios of observed debt and a set of explanatory variables using non-dynamic models (vid., for example, Bradley et al., 1984, Titman and Wessels, 1988, and Rajan and Zingales, 1995). This type of approach suffers two limitations: (i) observed debt does not necessarily have to be identified with optimal debt, as this implies ignoring the difficulties companies suffer when adjusting their capital structure (Myers, 1977); and (ii) static empirical analysis is unable to explain the dynamic nature of company capital, that is to say, it does not really examine whether company debt shows a reversion to a given objective optimal level, and how quickly this reversion occurs. In fact, there are relatively few papers that analyse the dynamic aspect of capital structure and among them we can highlight: Lev and Pekelman (1975), Ang (1976), Taggart (1977), Marsh (1982), Jalilvand and Harris (1984), Auerbach (1985), Opler and Titman (1993) and Allen and Clissold (1998), although with fairly small sample. More recently we can point to: Shyam-Sunder and Myers (1999), Banerjee et al. (2000), Ozkan (2000), Hovakimian et al. (2001), Miguel and Pindado (2001), Nuri and Archer (2001), Omet (2001), Ozkan (2001), Antoniou et al. (2002) and Fama and French (2002).

In a perfect world, without transaction and adjustment costs, companies would automatically respond to any variation of their debt objective by increasing or decreasing the capital. So, in a given moment of time t, the observed debt of a given company, (D_{it}), should not differ from its debt target (D^*_{it}), that is, $D_{it} = D^*_{it}$. Nevertheless, in reality there are considerable transaction costs that impede companies from completely reaching D^*_{it}, so the adjustment is, in this case, partial. We can represent this process using the following partial adjustment model:

$$D_{it} - D_{it-1} = \lambda_{it} \cdot (D_{it}^{*} - D_{it-1}) \qquad\qquad [1]$$

D_{it} being the ratio of total observed leverage, D_{it}^{*} the ratio of target debt, and λ_{it} its speed of adjustment. The equation [1] establishes up to which point the desired adjustment (from the debt ratio in t-1 to the target ratio in t) depends on its adjustment parameter λ_{it}. According to the trade-off theory, this adjustment coefficient should have an appreciably positive value – near to 1. If $\lambda_{it} = 1$, this implies that the real debt coincides with the debt objective, that is, the capital structure of the company instantly and continuously adjusts to its objective value. As λ_{it} can vary in companies, and over time for the same company, only if $\lambda_{it} = 1$ for all t can we safely state that company I is consistently reaching its debt objective (complete adjustment). If $\lambda_{it} < 1$, the adjustment from the period t-1 to t, has only partially achieved its debt objective; on the other hand, if $\lambda_{it} > 1$, then an over-adjustment has occurred and the company has not achieved its capital structure objective. It should be noted that as λ_{it} represents the degree of adjustment for the period, it can also be seen as the adjustment speed, and in this way a high value for λ_{it} indicates quicker adjustment.

The estimation of the previous model can be undertaken with a two-stage regression analysis. As the debt objective is not directly observable, a proxy is used. The first stage consists of a regression analysis that incorporates those explanatory variables that correspond to those determinants of firm debt that are usually mentioned in the literature. In this way, a value that can serve as an estimation of the objective is obtained. For company i, in moment t, we will have the following equation:

$$D_{it}^{*} = a + \sum_{k} b_{k} \cdot V_{k_{it}} + c_{i} + c_{t} + e_{it} \qquad\qquad [2]$$

Where the companies are represented by the sub-index i = 1,…, n, and time is shown as t = 1,…, T. V_{k} is the vector that takes in the k explanatory variables that correspond to the specific company characteristics. The terms b_{k} represent the unknown parameters associated with earlier variables. c_{i} are the specific unobservable individual effects for each company from the panel, and which do not vary over time, and are identically and independently distributed (iid) with a variance σ_{c}^{2}. Examples of these effects include

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aspects of managerial behaviour such as motivation, skill and performance in the development of their functions, or attitudes towards risk. In addition, c_i may include the specific effects of the economic sector where the firm operates, which is supposed to be constant over time, like entry barriers, conditions of the input market and the economic risk of the industry. The variable c_t captures any specific temporal effect. These temporal effects include macroeconomic factors such as inflation, interest rates and demand shocks. Finally, e_{it} is an error term, which captures possible measurement errors in the independent variables, and any other explanatory variables which have been omitted. It is assumed that these errors are identical and independently distributed (iid), according to a Normal distribution with zero mean and a constant variance ($e_{it} \approx iid\ N(0, \sigma_e^2)$). In addition, it is assumed that errors do not present serial correlation.

Later, in the second stage, the adjusted values in the regression equation [2] are taken as a proxy of the target debt ratio in the estimation of the equation [1].

The verification of the static equilibrium theory can also be made in a single step, if we had previously and adequately combined equations [1] and [2]. In this way, substituting [2] in [1] and reorganising the terms of the resulting equation:

$$D_{it} = \lambda_{it} \cdot a + (1 - \lambda_{it}) \cdot D_{it-1} + \lambda_{it} \cdot \sum_k b_k \cdot V_{k_{it}} + \lambda_{it} \cdot c_i + \lambda_{it} \cdot c_t + \lambda_{it} \cdot e_{it}$$

By simplifying the above equation we arrive at:

$$D_{it} = \delta + \alpha \cdot D_{it-1} + \sum_k \beta_k \cdot V_{k_{it}} + \eta_i + \eta_t + \varepsilon_{it} \qquad [3]$$

Where $\delta = \lambda_{it} \cdot a$, $\alpha = (1 - \lambda_{it})$, $\beta_k = \lambda_{it} \cdot b_k$, $\eta_i = \lambda_{it} \cdot c_i$, $\eta_t = \lambda_{it} \cdot c_t$ and $\varepsilon_{it} = \lambda_{it} \cdot e_{it}$ (ε_{it} has the same properties as e_{it}). Note that the parameter of the variable corresponding to the debt ratio delayed by one period is 1 minus the adjustment coefficient, meaning the transaction costs.

B. Hypotheses and variables

The general hypotheses that we intend verifying with this model, as implied in equation [3], have been taken from the empirical literature and are as follows:

(1) *"Companies follow a process of capital structure adjustment that leads to an optimal leverage level over the long-term"* (Lev and Pekelman, 1975, Ang, 1976, Taggart, 1977, and Jalilvand and Harris, 1984).

The verification of this hypothesis is undertaken with an analysis of the estimated α parameter.

(2) *"The effective tax rate should be positively related to the debt level"* (Haugen and Senbet, 1986, Scott, 1976, and DeAngelo and Masulis, 1980).

The verification of this hypothesis is made using the *effective tax rate* (*ETR*) variable, which is defined as the ratio between tax paid and earnings after interest and before tax (EAIBT).

(3) *"Non–debt tax shields should be negatively related to firm debt"* (DeAngelo and Masulis, 1980).

This hypothesis can be verified using the *non–debt tax shields* (*NDTS*) variable, measured using the ratio between depreciation and assets.

(4) *"Default risk should be negatively related to firm's debt ratio"* (Bradley et al., 1984, and Mackie–Mason, 1990).

The variable *default risk* (*DR*) is obtained using the ratio between interest expenses and earnings before interest and tax (EBIT).

(5) *"Companies with greater growth opportunities will have a greater potential problem of under investment associated with debt financing, and therefore, a smaller target debt ratio"* (Jensen and Meckling, 1976, Myers, 1977, and Stulz, 1990).

This hypothesis is verified using the *growth opportunities* (*GO*) variable, defined as the quotient between the intangible assets and company assets.

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(6) *"Company debt is positively related with the tangibility of the assets"* (Myers, 1977, Scott, 1977, Myers and Majluf, 1984, Williamson, 1988, and Harris and Raviv, 1990).

The *asset structure* (*AS*), proxy variable introduced to verify this hypothesis, is defined as the quotient between the tangible assets (fixed assets and inventories) and assets.

(7) *"The size of the company should be positively related to the level of debt"* (Ang, 1992).

The *firm size* (*SIZE*) is obtained using the natural logarithm of total assets, with the aim of controlling a possible non–linearity in the data, and the consequent problem of heteroskedasticity.

(8) *"There should be a negative relationship between debt ratio and a firm's profitability"* (Myers, 1984).

We define the variable *profitability* (*ROA*) as the quotient between EBIT and assets.

(9) *"A firm's liquidity affects the firm's capital structure"* (Ozkan, 2001).

This hypothesis is verified using the *liquidity* proxy variable (*LIQ*), defined as the quotient between current assets and current liabilities.

Table A.4 in the annex shows a summary of all the hypotheses defined in this research. Besides, Table A.2 describes in detail all the variables incorporated in the estimated models.

3. Pecking order model

A. Background and theoretical foundation

The theory emerges as a result of asymmetric information existing in the financial markets, that is, corporate managers often have better information about the health of their companies than outside investors. Apart from the transaction costs of issuing new

securities, companies have to accept the information costs arising from asymmetric information. In this way, new securities issued on the financial market could be infra–valued because of informational asymmetries, and this is especially true in the case of new equities. This implies that company managers may decide not to launch potentially profitable projects if they have to be financed by risky financial instruments (Myers and Majluf, 1984). At the same time, the director-owners of SMEs may decide not to seek finance that dilutes their shareholding in the company, and therefore limits their ability to act.

Independently of the above, the theory predicts a hierarchical order in the financing policy of a company. This order begins with those financial sources that are least affected by the costs of information and offer, at the same time, less risk. The preferred source of financing is internally generated funds. This is followed by low risk short-term debt and then higher risk long term debt. The last option is new capital, and this is the financial source with the highest information costs (Donaldson, 1961; Myers, 1984; Myers and Majluf, 1984).

From the perspective of this approach, changes in the level of debt are not motivated by the need to reach a given debt target, but are instead motivated by the need for external financing, once internal resources have been exhausted and assuming that opportunities for profitable investment exist.

One way of testing this theory is by examining financing decisions made after short-term changes in profits and investments, that is, using the theoretical relationship between changes in the level of debt and a firm's need for funds. We propose the following pecking order model – based on Shyam-Sunder and Myers (1999).

$$D_{it} - D_{it-1} = \alpha + \beta \cdot FD_{it} + \eta_i + \eta_t + \varepsilon_{it} \qquad [4]$$

D_{it} being the *ratio of total debt*, FD_{it} the *financing deficit* for period t, given by the difference between investment requirements (variation of fixed assets plus variation of working capital) and the cash flow generated by the company (CF). We also include as a component of this deficit, the total of long term debt repayable in period t. This can be

estimated from the difference between long-term debt in t-1 and in t. The financing deficit would be expressed as:

$$FD=[\Delta \text{ Fixed Assets}+\Delta \text{ Working Capital}+\Delta \text{ Long Term Debt]} - CF \qquad [5]$$

Being, Δ Fixed Assets = Fixed Assets$_t$ – Fixed Assets$_{t-1}$, Δ Working Capital = Working Capital $_t$ – Working Capital $_{t-1}$, Δ Long Term Debt = Long Term Debt$_t$ – Long Term Debt$_{t-1}$, CF = Earnings after taxes + Depreciation.

The pecking order theory establishes that the level of debt should be adjusted to the financing needs of the company, taking as exogenous all the variables that form the earlier financing deficit. In this way, the debt is increased or decreased depending on whether the requirements of the investment exceed or not the available funds, respectively.

Additionally, we will test the pecking order theory with the following regression:

$$D_{it}=\alpha + \beta_1 \cdot (CF)_{it}+\beta_2 \cdot (Age)_{it}+\beta_3 \cdot (GO)_{it}+\eta_i+\eta_t+\varepsilon_{it} \qquad [6]$$

Being, *D* the *total debt ratio*, *CF* the *firm′s cash flow*, *Age* the natural logarithm of the *company age in years*, and *GO* the *growth opportunities* already defined in the previous section. All of these variables vary over time, and from company to company.

B. Hypotheses and variables

In equation [4], the hypotheses defined by the pecking order theory are: (i) $\alpha = 0$ and (ii) $\beta = 1$, or approximately equal to 1, so that the variation in the level of debt coincides with the deficit ($\Delta D=FD$); that is, the financing deficit is completely covered by debt. The expression [4] implicitly supposes that companies have not increased their capital during the period under study.

The hypotheses to be tested using the second pecking order model (equation [6]), are the following:

(1) *"The level of firm′s debt should be negatively related to the volume of cash flow"* (Myers, 1984, and Myers and Majluf, 1984).

(2) *"The age of a company should be negatively related to its debt level"* (Weston and Brigham, 1981, and Petersen and Rajan, 1994).

(3) *"Companies with few investment opportunities and high cash flows should have low debt levels, while companies with strong growth perspectives and reduced cash flows should have high debt ratios"* (Myers, 1984).

These hypotheses will be tested using the estimation of parameters corresponding to the implied variables, that is, β_1 for cash flows (CF), β_2 for Age, and β_3 for growth opportunities (GO).

4. Data

A. Sample selection

The sample of SMEs chosen to make this study has been taken from the SABI (Sistema de Análisis de Balances Ibéricos) database, managed by Grupo Informa, S.A. This database contains economic and financial information on more than 190,000 Spanish companies − from 1992 to the present. The firms in the sample meet the definition established by the European Commission for an SME (Recommendation 96/280/EC, 3 April, 1996)[1]. Firms showing extreme, or inconsistent figures, were excluded from the sample. Finally, the sample contained 6482 SMEs with complete information for the period 1994–1998, resulting in a data panel with 32,410 observations.

These firms are representative of Spanish SMEs because they cover all sectors, except financial and insurance due to their specific financial behaviour and particular nature. The industry classification criteria was adapted from the Spanish Economic Activities National Classification (CNAE–93, Real Decreto 1560/1992), adapted to the statistical

notation of economic activities from the European Community (NACE). Table 1 shows this industry classification and the percentage represented by each sector in the whole sample.

Table 1: Sample representation by sector

	Sectors	Firms	%
Sector 1	Agriculture and others	139	2.14
Sector 2	Manufacturing	2053	31.67
Sector 3	Electricity, Gas and Water	21	0.32
Sector 4	Construction	667	10.29
Sector 5	Commerce, vehicles and others	2630	40.57
Sector 6	Hotel and catering	153	2.36
Sector 7	Transport and communications	237	3.66
Sector 8	Property and rental	445	6.87
Sector 9	Education, health and others	137	2.11
TOTAL		6482	100

B. Description of the data

Firm's capital structure constitutes our dependent variable, and the principal objective of our research. Typically, it is measured using the two following ratios:

- Total debt ratio, D_a: $\dfrac{\text{Total debt}}{\text{Total debt} + \text{Equities}}$, whose possible values range between 0 and 1.

- Total debt ratio, D_b: $\dfrac{\text{Total debt}}{\text{Equities}}$, varying its potential values between 0 and $+\infty$.

Below, we present in Table 2 the main descriptive statistics of these two leverage measures for all the observations.

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[1] (1) Less than 250 employees; (2) less than €40 million invoiced; (3) assets less than €27 million and (4) independent firm.

Table 2: Descriptive statistics of debt ratio

Statistic	Total debt / (Total debt + Equities) (D_a)	Total debt/ Equities (D_b)
Mean	0.614	4.071
Standard deviation	0.229	12.308
Maximum	0.999	851.853
Minimum	0	0
First quartile	0.457	0.859
Second quartile	0.648	1.882
Third quartile	0.799	4.088
Skewness	-0.511	36.496
Kurtosis	2.431	2093.429

In Table 2, we can see that the first of the ratios, D_a, has an asymmetric distribution to the left and is moderately platikurtic; while the second, D_b, is asymmetric to the right and shows a strong leptokurtosis.

The evolution of the mean leverage ratio over the period of analysis, 1994–1998, for the global sample, shows a clear downward tendency, as can be seen in Table 3. This contrasts with the upward trend of the economy during this period. This phenomenon would appear to agree with the pecking order theory, because during economic booms companies tend to have greater internal resources and so require less external financing.

Table 3: Mean leverage ratio by year

	Total debt / (Total debt + Equities) (D_a)	Total debt / Equities (D_b)
1994	0.6410	5.9251
1995	0.6273	4.2843
1996	0.6104	3.7141
1997	0.6010	3.3694
1998	0.5907	3.0610

The main statistics of the explanatory variables are shown for the global set of observations in Table 4 below.

Table 4: Descriptive statistics of the explanatory variables

Variable	Mean	Standard deviation	Minimum	Maximum	Median	Skewness	Kurtosis
ETR	0.2836	0.1165	0	0.9946	0.3196	-0.6059	6.4033
NDTS	0.0353	0.03645	0	1.2236	0.0252	4.6027	72.4624
DR	1.0969	190.2891	-12262.33	22338.75	0.3058	89.9581	12096.86
GO	0.0347	0.0722	0	0.9386	0.0034	3.7089	21.3562
AS	0.4404	0.2392	0	1	0.4270	0.1975	2.2073
Size	13.8989	1.1848	8.1682	17.1111	13.8319	0.1376	2.7635
ROA	0.0962	0.0884	-1.0258	3.5468	0.0792	4.8664	125.539
CF	3.0095	190.4611	-330.2389	34019	0.4958	176.5502	31519.75
Age	2.2706	0.7488	0	4.4659	2.3026	-0.4525	3.5494
LIQ	1.9318	10.7829	0	1771.107	1.2886	139.1836	22486.3

ETR: effective tax rate; NDTS: non–debt tax shields; DR: default risk; GO: growth opportunities; AS: asset structure; Size: firm size; ROA: profitability; CF: cash flow; Age: firm age; LIQ: liquidity.

In Table 4 it is worth pointing out that the SMEs in our sample have an average effective tax rate of 28%, which is slightly less than the 30% tax rate officially established for small companies by Spanish tax legislation (Law 24/2001, 27 December, of Fiscal, Administrative and Social Order Measures). The average age of the SMEs analysed is 10 years – with the youngest company aged 5 and the oldest 87. The average profitability, in terms of profitability over assets, reached 9.62% for the period 1994–1998.

Table 5 gives the matrix of correlations among the different variables. It is worth noting that: (i) consistent with the predictions of pecking order theory, the analysis of correlations reveals a negative association between debt and firm profitability and, (ii) the negative correlation between debt and the effective tax rate contradicts the conventional belief that its sign should be positive.

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Table 5: Correlation coefficients of the variables

	D_a	D_b	ETR	NDTS	DR	GO	AS	Size	ROA	CF	Age	LIQ
D_a	1.0000											
D_b	0.9728	1.0000										
ETR	-0.0579	-0.0610	1.0000									
NDTS	-0.1174	-0.1128	-0.1168	1.0000								
DR	0.0001	-0.0015	0.0025	-0.0065	1.0000							
GO	0.0993	0.0885	-0.0308	0.2808	-0.0013	1.0000						
AS	0.0474	0.0454	-0.0942	0.0975	-0.0025	-0.1665	1.0000					
Size	-0.1305	-0.1261	0.0389	-0.0543	0.0045	-0.0287	0.0231	1.0000				
ROA	-0.1682	-0.1667	0.0326	0.0460	-0.0045	0.0321	-0.1271	-0.0402	1.0000			
CF	0.0071	0.0093	-0.0025	-0.0114	-0.0001	-0.0063	-0.0138	-0.0041	0.0074	1.0000		
Age	-0.3388	-0.3523	0.0433	0.0146	0.0070	-0.0498	0.0195	0.4375	0.0705	-0.0142	1.0000	
LIQ	-0.1173	-0.1305	-0.0121	-0.0186	-0.0000	-0.0238	-0.0185	0.0143	0.0012	0.0002	0.0284	1.0000

5. Panel data methodology

The panel character of our data allows us to use panel data methodology for testing our capital structure models discussed in sections 2 and 3, simultaneously combining cross section and time series data. Panel models can be classified into dynamic and static models, depending on whether the lagged dependent variable is included, or not, in

these models. Each kind of model needs a different estimation technique in order to achieve efficient and consistent estimators. Let's see in the following subsections what that estimation process is and the main problems that arise from it.

A. Static panel

In general terms, a static panel data model may be described by the following equation:

$$y_{it} = \beta \cdot x_{it} + \eta_i + \eta_t + \varepsilon_{it} \quad ^2 \qquad [7]$$

Where the terms incorporated in [7] are the same as those in equation [2], and which have already been explained in section 2 (epigraph A).

In order to estimate the model of equation [7], we have to first identify whether the unobservable individual effects (η_i) are random or fixed, that is, if these effects are orthogonal, or not, to the explanatory variables considered in the model. The implications of considering the individual effects as random or fixed are clearly different: in the first case (random effects), it is assumed that every individual effect is an unobservable random variable, independent of the explanatory variables, that belong to a compound random error term. In the second case (fixed effects), these effects are treated as a set of unknown coefficients that can be estimated with the rest of the model parameters. To verify the character of the individual effects in static panel data models, Hausman´s specification test is usually employed over the null hypothesis that the individual effects are not correlated with the independent variables [H_0: $E(\eta_i/x_{it})=0$]. In this sense, if we accept this null hypothesis the individual effects are supposed to be random and, in the opposite case they are supposed to be fixed effects. The random effects model ($E(\eta_i/x_{it})=0$) needs Generalized Least Squares (GLS) estimation, while the fixed effects model ($E(\eta_i/x_{it}) \neq 0$) can be estimated by Ordinary Least Squares (OLS) over the Within Group transformation[3].

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[2] This is the typical structure of the two-way error component model. The one-way error component model would not include the temporal specific effect η_t, and exclusively consider the firm specific effect.

[3] The Within Group regression applies Ordinary Least Squares to the original model [7] transformed or adjusted. The adjustment consists in subtracting the mean of every variable considered: dependent, explanatory and random error.

B. Dynamic panel

The second kind of panel models, dynamic, could be represented by the following mathematical structure (order 1):

$$y_{it} = \alpha \cdot y_{it-1} + \beta \cdot x_{it} + \eta_i + \eta_t + \varepsilon_{it} \qquad [8]$$

The application of static estimations (epigraph A) to dynamic panel regressions, such as equation [8], that include many firms and a limited number of time observations, will result in inconsistent estimators due to correlations that could arise between the unobservable individual effects, the regressors and the error terms, and also due to the existence of regressor endogeneity (Baltagi, 1995). The general estimation approach for these cases, which has been developed in various econometrical literature stances, is based on instrumental variables (IV) estimators (vid. Anderson and Hsiao, 1981, 1982; Arellano and Bond, 1991; Ahn and Schmidt, 1995; Arellano and Bover, 1995), and alternatively, on Generalized Moments Method (GMM) IV estimators (Chamberlain, 1984; Arellano and Bond, 1991; Ahn and Schmidt, 1995; Arellano and Bover, 1995).

Anderson and Hsiao (1982) first suggested a consistent estimation technique for dynamic panel models. Specifically, they suggest Δy_{it-2} (i.e., $y_{it-2} - y_{it-3}$) assuming we have at least four time observations, or y_{it-2} (and also previous lags) as an instrument for the lagged dependent variable in first differences. Both instrument measures are correlated with Δy_{it-1}, but uncorrelated with $\Delta \varepsilon_{it}$ (depending only on ε_{it} and ε_{it-1}), if the level error term ε_{it} do not show serial correlation. The estimation is carried out by Two Stage Least Squares (2SLS). This IV technique will provide consistent estimations of model parameters, although not necessarily efficients, because (i) it does not use all the available moment conditions[4] and (ii) it does not consider the different structure of residual perturbances (Ahn and Schmidt, 1995).

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[4] The moment conditions are conditions over the covariance between the regressors and the error term. The regressors may be orthogonal to the error term, and if this is the case we can use orthogonality conditions, that is, the covariance between the regressors and the error term is zero.

As a solution to the cited problems, Arellano and Bond (1991), using the GMM estimation technique, suggest a dynamic panel data estimator that optimally exploits the linear moment restrictions implicit in these kind of models[5]. Arellano and Bond (1991) prove that their GMM estimations provide lesser variances than those of the Anderson and Hsiao (1982) IV estimators. We can reason the former assertion by arguing that GMM estimator of Arellano and Bond (1991) enables increasing the instruments used in each period as we move throughout the panel, while the Anderson and Hsiao (1982) estimator employs, for instance, only $\Delta y_{i,t-2}$ to instrument $\Delta y_{i,t-1}$. The origin of the additional instruments stays on the orthogonality conditions which exist between the lagged values of the dependent variable and the random perturbances. This GMM methodology allows us to control for error correlation throughout the time, heteroskedasticity between the different firms, simultaneity, and measurement mistakes due to the use of orthogonality conditions of the variance–covariance matrix.

The GMM estimator validity and consistency depends on the two following assumptions: (i) the lagged value of the dependent variable and other explanatory variables are valid instruments, and (ii) the error terms do not show serial correlation[6].

The theoretical discussion carried out in this section leads us to formulate the following test for our three firm capital structure models: two of them (the trade-off model described by equation [3] and the pecking order model of equation [6]) will have to be estimated by instrumental variables because of their dynamicity or potential regressor endogeneity. On the contrary, the other pecking order model, formulated in equation [4], will be tested with static panel data methodology, due to its nearness to this kind of functional structure.

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[5] In general terms, a GMM estimator can be obtained for the true parameter, searching the element of the parameter space that enables the construction of a linear combination of the sample crossed parameters, as close to zero as possible (Hansen, 1982).

[6] For more details on the GMM estimator validity and consistency tests see Arellano and Bond (1991), and Arellano and Bover (1995).

6. Empirical analysis and results

From panel data of a 6482 non-financial Spanish small and medium enterprises sample, covering the five year period 1994–1998, we have tested two groups of theoretical capital structure models, trying at the same time to identify the main determinants of SMEs financial policy.

Several regressions were carried out to exploit the panel character of data, trying to control the potential endogeneity problems that could appear while testing the models. Likewise, we tried to control any time effect not contemplated in the models, and also capture the industry effect.

Below we present a revision of the main results obtained in the research for every model, and the different proofs carried out to give robustness to the results.

A. Trade-Off

In this capital structure model, the estimation techniques employed are (i) Two Stage Least Squares (2SLS) in first differences with Anderson and Hsiao's (1982) estimator, and (ii) GMM with Arellano and Bond's (1991) estimator in first differences. We lose two cross sections in both estimations: one due to the lagged dependent variable (D_{it-1}) and another due to taking first differences to get rid of the firm specific effects (η_i), covering the time period 1996–1998 and ending equation [3] of the model as,

$$D_{it} - D_{it-1} = \alpha \cdot (D_{it-1} - D_{it-2}) + \sum_{k} \beta_k \cdot (V_{k_{it}} - V_{k_{it-1}}) + (\eta_t - \eta_{t-1}) + (\varepsilon_{it} - \varepsilon_{it-1})$$

Or, also:

$$\Delta D_{it} = \alpha \cdot \Delta D_{it-1} + \sum_{k} \beta_k \cdot \Delta V_{k_{it}} + \Delta \eta_t + \Delta \varepsilon_{it} \qquad [9]$$

Where Δ represents first difference.

IV techniques, such as the ones described above, enable us to control the endogeneity problems shown by certain explanatory variables. Specifically, both EA and ROA could

present this kind of endogeneity problem. Consequently, these explanatory variables are not necessarily orthogonal to the error terms, and the OLS regression will result in skewed estimations.

The GMM estimation shows two application levels: (i) Homocedastic one stage estimation and robust one stage estimation, and (ii) Two stage estimation. The latter alternative, which employs the residuals of the one stage estimation to construct an asymptotically weighted optimum matrix, is more efficient than the former if it is supposed that the perturbances show heteroskedasticity for relatively big sample data (Arellano and Bond, 1991; Blundell and Bond, 1998). We will first employ the two stage estimation method and, afterwards, we will apply the one stage robust estimation method, in order to test the consistency of the results.

Below, Table 6 reports the results obtained for the different estimations of our trade-off model [3] with OLS, or in its first differences structure [9], with 2SLS and GMM. Our purpose is to base the analysis on the GMM results, taking the OLS and the 2SLS results as comparative references. All the estimations have been undertaken by the statistical software Stata 7.0 (vid. StataCorp., 2001).

Table 6: Estimation results of trade-off model [3]

Explanatory variable	OLS	Anderson and Hsiao (1982), 2SLS	Arellano and Bond (1991), GMM
D_{it-1}	0.902**	-0.041**	0.138**
	(0.002)	(0.007)	(0.024)
ETR	0.012*	0.023**	0.054**
	(0.005)	(0.006)	(0.012)
NDTS	-0.284**	-0.099**	-0.421*
	(0.016)	(0.027)	(0.183)
DR	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)
GO	0.106**	0.105**	0.054*
	(0.007)	(0.013)	(0.028)
AS	-0.001	0.028**	-0.009
	(0.002)	(0.005)	(0.013)
Size	0.000	0.188**	0.211**

	(0.0004)	(0.003)	(0.009)
ROA	-0.255**	-0.215**	0.021
	(0.006)	(0.009)	(0.028)
LIQ	-0.0004**	-0.0001**	-0.0002
	(0.000)	(0.000)	(0.000)
Number of firms	6482	6479	6468
Number of observ.	25863	12910	12910

Estimated coefficients, with standard errors robust to heteroskedasticity between parentheses. ** and * denote that the coefficient is statistically significant at a 1% and a 5% level, respectively. All the models include time dummies, and sectoral dummies. The first of the estimations is carried out by OLS in levels. The Anderson and Hsiao's (1982) column provides 2SLS estimations of the model in first differences, where ΔD_{it-2} is used to instrument ΔD_{it-1}. The GMM estimation takes the model in first differences where ΔD_{it-2}, ΔAS_{it-2}, and ΔROA_{it-2} are used as instruments. The intercept coefficient is not included. Dependent variable: D_a.

Considering the results of the most powerful estimation (GMM) as our reference, the acceptance of hypotheses (1), (2), (3) and (7) is verified, while hypotheses (4), (5), (6), (8) and (9) are unconfirmed. These results suggest various reflections.

The empirical evidence obtained indicates that SMEs have a target or optimum leverage ratio, which is explained as a function of some specific characteristics of the firm. Specifically, the estimated value of the parameter associated to the lagged leverage ($\alpha = (1 - \lambda_{it})$) turned out to be 0.138, which indicates that the adjustment parameter would be approximately 0.862. The high value of this adjustment coefficient denotes the high adjustment speed of Spanish SMEs which is very close to the target leverage. There are also appreciably reduced transaction costs as SMEs probably compare two kinds of costs when adjusting their capital structure: (i) the costs incurred when making the adjustment to the target leverage, and (ii) the costs of staying at an unbalanced position, that is, far from the target. In this manner, the adjustment coefficient will be close to one if the costs of being unbalanced are very large compared to the costs of self adjustment. Alternatively, such a coefficient will be close to zero if the adjustment costs are much higher than the unbalanced costs. Therefore, it can be deducted that Spanish SMEs seem to find the costs of an unbalanced position more burdensome than the costs of the self adjustment process.

As far as fiscal factors are concerned, the effective tax rate and the non–debt tax shields, we can highlight that both influence SME capital structure. To be precise, the estimated

coefficient of the effective tax rate is positive and statistically significant, meaning that the more taxes SMEs have to pay the higher is the use of debt as a way to reduce tax bills. On the other hand, the existence of non-debt tax shields, such as depreciation, reduces the importance of the fiscal advantage of debt.

Contrary to the conventional wisdom, Table 6 shows a positive and statistically significant impact between growth opportunities and firm leverage. However, this positive relationship is consistent with the Michaelas et al. (1999) argument, based on the idea that in SMEs the trade off between independence and financing availability is more pronounced and the major part of debt financing is short term. In this way, the application to the SMEs of Myers´ (1977) underinvestment problem, which could be resolved by shortening debt maturity, implies that growth perspectives may be positively related to leverage.

On the other hand, this positive sign could be affected by the proxy used to measure growth opportunities (the proportion represented by intangible assets over total assets), which includes, according to Spanish accounting rules, a large proportion of tangible assets, such as assets financed by leasing, patents, trademarks, etc., and therefore constitutes an imperfect measure of the cited variable. Although it is true that a vast majority of the empirical literature has adopted Tobin's q ratio, or a research and development ratio, as a proxy for investment opportunities, it is practically impossible to get such information for SMEs, especially if the database employed is fed from the mercantile registry and abbreviated financial statements.

As seen in Table 6, firm size and leverage are found to be positively related. This result is the same as that obtained by a considerable number of previous studies (Ocaña et al., 1994; Hutchinson, 1995; Chittenden et al., 1996; Berger and Udell, 1998; Michaelas et al., 1999; Romano et al., 2000). The explanation of this relationship could come from the fact that SMEs have to face higher bankruptcy costs, greater agency costs and bigger costs to resolve the higher informational asymmetries. Even within this firm category, SMEs of greater size can access a higher leverage. Consequently, the hypothesis (7) of firm size is confirmed.

Finally, Table 6 shows the non–significance of the variables default risk, asset structure, profitability and liquidity. Default risk has appeared to be not statistically significant under all the estimations techniques, although they all have shown a negative sign (in line with the theory), denoting that the higher a firm´s default risk, the lower the debt level. Asset structure, although not significant with GMM, appears with a significant and positive sign under 2SLS estimation, which would demonstrate the necessity of SMEs to provide collateral assets in order to obtain debt financing. As far as profitability and liquidity is concerned, the relationships obtained by OLS and 2SLS are in agreement with hypotheses (8) and (9), although they loose their significance with GMM.

In short, we present in Table 7, both expected and actual relationships between the explanatory variables and the dependent variable of trade-off model according to GMM estimation:

Table 7: Summary of the relations obtained for the trade-off model [3]

Explanatory variable	Expected relation	Actual relation
D_{it-1}	+	+
ETR	+	+
NDTS	-	-
DR	-	n.s.
GO	-	+
AS	+	n.s
Size	+	+
ROA	-	n.s
LIQ	+/-	n.s

D: total debt ratio. ETR: effective tax rate. NDTS: non-debt tax shields. DR: default risk. GO: growth opportunities. AS: asset structure. Size: firm size. ROA: profitability. LIQ: liquidity. n.s.: not significant.

B. Pecking order

According to the theoretical discussion of section 3, we aim to test the pecking order approach with two models. The first is formulated by equation [4], which can be summed up as:

$$\Delta D_{it} = \alpha + \beta \cdot FD_{it} + \eta_i + \eta_t + \varepsilon_{it}$$

This expression cannot include increasing capital as a mode of financing because the pecking order theory considers this source as the last option. In order to be sure that firms only choose debt financing once they have completely exhausted their internal resources, and that they will not increase capital beforehand, equation [4] will be estimated over a SMEs subsample within the 6482 SME global sample, which had not increased capital throughout the analysis period (1994-1998). Once applied the previous filter, from the original 6482 SMEs we find 1092 SMEs that increased their capital at some time, so that our definitive subsample mounts up to 5390 SMEs (26950 observations).

Again using the statistical package Stata 7.0 (StataCorp., 2001), the results obtained by the OLS, GLS, and the Within Group estimations are the following:

Table 8: Estimation results of pecking order model [4]

Parameter	OLS	GLS (Random Effects)	Within Group (Fixed Effects)
α	-0.0128**	-0.0128**	-0.0130**
	(0.0006)	(0.0006)	(0.0006)
β	0.0000**	0.0000**	0.0000**
	(0.0000)	(0.0000)	(0.0000)
Number of firms	5390	5382	5382
Number of observations	21487	21487	21487

Estimated coefficients, with standard errors robust to heteroskedasticity between parentheses. ** and * denote that the coefficient is statistically significant at a 1% and a 5% level, respectively. The random effects estimation is carried out by GLS and the fixed effects estimation applies OLS to the Within Group estimator. Dependent variable: ΔD_a.

As we can see from Table 8, the hypothesis formulated for this first model of pecking order is not fulfilled for our sample of SMEs. Despite having carefully selected the SMEs subsample to test the pecking order model [4], it has been impossible to confirm that Spanish SMEs adjust their debt level to their financing requirements. The beta parameter, although significant by any of the estimation techniques, shows a value close to zero and, therefore, very far from what it should be in theory (i.e., one).

The second of the pecking order models that is also tested is the one represented by equation [6], with the following mathematical expression:

$$D_{it} = \alpha + \beta_1 \cdot (CF)_{it} + \beta_2 \cdot (Age)_{it} + \beta_3 \cdot (GO)_{it} + \eta_i + \eta_t + \varepsilon_{it}$$

The inclusion of variable *CF* in this model, whose endogeneity has been previously highlighted in the empirical evidence (Hernando and Vallés, 1992), justifies the instrumental variable (IV) estimation. This estimation is undertaken on the original model in first differences and by 2SLS, the method upon which we will base our analysis. Nevertheless, as previously, we will also add OLS estimation as a comparison and to perfect the analysis.

Any dichotomic variable that is constant throughout the time (such as industry dummies), will not be contemplated in the estimation with first differences, as they will be erased when taking time differences for each firm of the panel. Something similar occurs with the variable *Age*, because it is defined as the number of years of an SME´s life and it increases one unit per year, taking a constant value equal to one in a model with first differences. In order to ease this problem, we will use the natural logarithm of *Age*. Both *Age* and growth opportunities (*GO*) are considered exogenous in our analysis, while we assume that *CF* is endogenous.

Using Stata 7.0 (StataCorp., 2001), the estimation of the pecking order model [6] has provided us the following results:

Table 9: Estimation results of pecking order model [6]

Explanatory variable	OLS	2SLS
CF	0.0000	-0.0002**
	(0.000)	(0.000)
Age	-0.101**	-0.033**
	(0.002)	(0.010)
GO	0.262**	0.146**
	(0.017)	(0.016)
Number of firms	6482	6450
Number of observations	32050	12857

Estimated coefficients, with standard errors robust to heteroskedasticity between parentheses. ** and * denote that the coefficient is statistically significant at a 1% and a 5% level, respectively. The first of the estimations corresponds to OLS in levels, while the second provides 2SLS estimations, with Anderson and Hsiao's (1982) estimator, of the model in first differences. In this latter estimation, ΔCF_{it-2} is used to instrument ΔCF_{it}. The intercept coefficient is not included. Dependent variable: D_a.

Given the 2SLS results from Table 9, we find that all the formulated hypotheses for this pecking order model (1), (2) and (3) are verified.

Cash flow is negatively related to firm leverage, so that those SMEs that generate most internal resources are the ones with a lower leverage. This result is consistent with pecking order theory predictions, which point to firms preferences for financing their investments using internal resources instead of external resources.

The results presented in Table 9 show a negative and statistically significant impact of age upon SMEs financing. The older SMEs may have generated sufficient internal resources to not depend as much on debt as the younger SMEs, whose dependence on external resources will be greater.

Finally, the hypothesis referred to growth opportunities in the scope of pecking order theory is fulfilled, obtaining a positive and significant relation between this variable and firm leverage. The previous relationship was already found in the trade-off model. In short, those SMEs which have more investment opportunities will need more financing resources, forcing them to resort to debt financing.

The empirical testing of both pecking order models proposed in our study, have provided the following results:

Table 10: Summary of the relations obtained for the pecking order models [4] and [6]

Explanatory variable	Expected relation	Actual relation
FD	$+ (\simeq 1)$	$+ (\simeq 0)$
CF	-	-
Age	-	-
GO	+	+

FD: financing deficit. CF: cash flow. Age: firm age. GO: growth opportunities. n.s.: not significant.

C. Robustness of the results

A set of tests were undertaken on our models to verify the degree of consistency and robustness of the results obtained.

In the GMM estimation (trade–off model), Sargan´s test of overidentifying restrictions was carried out, whose associated statistic is asymptotically distributed as chi–square under the null hypothesis of instrument validity. This test is important because the GMM estimator provides consistent estimations only if a valid set of instruments is employed. Its value, given in Table 11, denotes that we can accept the null hypothesis on the suitability of instruments for a 15.56% significance level.

Likewise we have carried out the tests of absence of both first and second order autocorrelation of residuals. Again, the consistency of the GMM estimators relies on the absence of the cited correlations, though it is true that the key serial correlation of the residuals is the second order correlation, enabling the first order correlation to adopt a value different from zero (Arellano and Bond, 1991). The values of these tests, which are also presented in Table 11, confirm the absence of second order autocorrelation.

To test the degree of joint significance of the regressors, Wald´s test (Fisher-Snedecor F statistic) was undertaken in three ways: (i) on the estimated coefficients, which is asymptotically distributed as chi–square under the null hypothesis of no relationship, (ii) on the time dummies and (iii) on the industry dummies. Its values are included in Tables 11 and 12, and according to those results we reject the null hypothesis of relationship absence and, therefore, the joint significance of all the variables is confirmed.

We sum up the information of the previous tests for every estimated model, in the following Tables 11 and 12:

Table 11: Statistics tests for the trade-off model [3]

	OLS	Anderson and Hsiao (1982), MC2E	Arellano and Bond (1991), MGM
1st order autocorrelation	---	---	-8.32
			0.0000
2nd order autocorrelation	---	---	0
Wald test 1 (d.f.)	8839.12 (20)	697.16 (10)	68.90 (15)
P – value (F)	0.0000	0.0000	0.0000
Wald test 2 (d.f.)	6.77 (3)	---	---
P – value (F)	0.0001		
Wald test 3 (d.f.)	6.93 (8)	---	---
P – value (F)	0.0000		
Sargan test (d.f.)	---	---	5.23 (3)
P - value (χ^2)			0.1556

d.f.: degrees of freedom. The first two tests indicate the existence, or not, of first and second order autocorrelation, respectively, in the residuals. Wald test 1 is a test of joint significance of the estimated coefficients. Wald test 2 is a test of joint significance of the time dummies. Wald test 3 is a test of joint significance of the industry dummies. The Sargan test enables us to verify the suitability of the instruments; the degrees of freedom are calculated, in this case, as the difference between the number of instruments and regressors.

Table 12: Statistics tests for the pecking order models [4] and [6]

	OLS [4]	Random Effects [4]	Fixed Effects [4]	OLS [6]	2SLS [6]
Wald test (d.f.)	157.85 (1)	---	148.21 (1)	1457.82 (3)	40.80 (3)
P – value (F)	0.0000		0.0000	0.0000	0.0000
Wald test (d.f.)	---	157.85 (1)	---		
P - value (χ^2)		0.0000			

d.f.: degrees of freedom. Test of joint signification of the estimated coefficients.

We have meticulously examined to see if the variables employed in the study are predetermined or, in contrast, they are strictly exogenous regarding the error term. The validity of the instruments depends on the relation between the regressors and the random error. In order to test if x_{it} is predetermined or not with respect to ε_{it}, we start using instruments with 2 lags for every variable included in the set of instruments. We

next add $x_{i,t-1}$ to the existing instruments to analyse the potential bias that could appear from the correlation between $x_{i,t-1}$ and the error term with first differences $\Delta\varepsilon_{it}$. If there really is a measurement error, then the estimated coefficients of the explanatory variables should be reduced, which would suggest a downward bias due to the joint determination of $x_{i,t-1}$ and ε_{it-1}. Repeating the previous procedure for every variable, we can see if there is, or not, some predetermined variable with respect to ε_{it}. We also checked the possibility of strict endogeneity of the variables with respect to ε_{it} including current values. If the estimations of the coefficients are reduced, then we can conclude that none of the variables is strictly exogenous with respect to ε_{it}.

Furthermore, we carried out the estimation analysis with alternative measurements of the dependent variable and some other firm specific characteristics (effective tax rate, size, age), without obtaining significant differences from the original estimations[7].

Lastly, we have estimated the capital structure trade-off model [3], by the one stage robust GMM version, without substantially differing from the results of the two stage version. The results are given in Table 13.

Table 13: Estimation by GMM, robust version of Arellano and Bond (1991)

D_{it-1}	0.139**
	(0.024)
ETR	0.049**
	(0.012)
NDTS	-0.420*
	(0.183)
DR	-0.000
	(0.000)
GO	0.058*
	(0.028)
AS	-0.009
	(0.013)
Size	0.211**
	(0.009)

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[7] If requested, further information is available from the authors.

ROA	0.014
	(0.028)
LIQ	-0.0002
	(0.0002)
Number of firms	6468
Number of observations	12910

Estimated coefficients, with standard errors robust to heteroskedasticity between parentheses. ** and * denote that the coefficient is significant at a 1% and a 5% level, respectively. Dependent variable: total debt ratio (D_a).

7. Conclusions

This paper shows empirical evidence related to the capital structure of small and medium sized Spanish companies as taken from a large data panel covering the period 1994–1998. The hypotheses tested were derived from pecking order and trade-off models. In general, both theoretical approaches appear to help explain the financial behaviour of these companies and the results obtained can be considered robust.

Regarding trade-off theory, the results clearly indicate the existence of an optimal or target debt level where firms partially converge – the transaction costs not being excessively high. The evidence seems to confirm that Spanish SMEs adjust their target ratio very quickly – faster than publicly listed companies. Our parameter for adjustment speed, α, was 0.86 compared to the estimate of 0.79 produced by Miguel and Pindado (2001) for Spanish listed companies. In addition, the adjustment coefficient obtained is clearly higher than that found at the United States of America by Shyam-Sunder and Myers (1999) – 0.41 – and Fama and French (2002) – 0.07-0.1 for dividend firm payers and 0.15-0.18 for non–payers. Small Spanish firms seem to find the costs of an unbalanced position higher than the costs of the process of adjustment. As a result, it is confirmed that bank financing, typical in these companies, offers more advantages than obtaining funds from the capital markets.

With respect to pecking order theory, the reduced value parameter β (equation [4]) seems to indicate that small Spanish firms do not adjust their level of debt to their financial needs. It is possible that this relation would improve with a larger data panel,

as the econometric techniques used have limited our analysis period. Nevertheless, the hypotheses put forward regarding cash flows, firm age, and growth opportunities have been clearly confirmed.

APPENDIX

Table A.1: Dependent variables description

Total Debt Ratio D_a	$\dfrac{\text{Total debt}}{\text{Total debt} + \text{Equities}}$
Total Debt Ratio D_b	$\dfrac{\text{Total Debt}}{\text{Equities}}$

Table A.2: Explanatory variables description

Effective Tax Rate (ETR)	$\dfrac{\text{Taxes}}{\text{EAIBT}}$, where EAIBT denotes Earnings after Interest and before Tax.
Non-Debt Tax Shields (NDTS)	$\dfrac{\text{Depreciation}}{\text{Total assets}}$, where Depreciation is taken as a flow variable.
Default Risk (DR)	$\dfrac{\text{Interests expenses}}{\text{EBIT}}$, where EBIT denotes Earnings before Interest and Tax.
Growth Opportunities (GO)	$\dfrac{\text{Intangible assets}}{\text{Total assets}}$
Asset Structure (AS)	$\dfrac{\text{Tangible assets} + \text{Inventories}}{\text{Total assets}}$
Size	Natural logarithm of total assets
Profitability (ROA)	$\dfrac{\text{EBIT}}{\text{Total assets}}$
Cash Flow (CF)	$\dfrac{\text{EBIT} + \text{Depreciation}}{\text{Fixed asset}}$
Age	Natural logarithm of number of years of firm's life
Liquidity (LIQ)	$\dfrac{\text{Current assets}}{\text{Current liabilities}}$

Table A.3: Capital structure models

TRADE-OFF [3]	$D_{it} = \delta + \alpha \cdot D_{it\text{-}1} + \sum_k \beta_k \cdot V_{k_{it}} + \eta_i + \eta_t + \varepsilon_{it}$
PECKING ORDER [4]	$D_{it} - D_{it\text{-}1} = \alpha + \beta \cdot FD_{it} + \eta_i + \eta_t + \varepsilon_{it}$
PECKING ORDER [6]	$D_{it} = \alpha + \beta_1 \cdot CF_{it} + \beta_2 \cdot Age_{it} + \beta_3 \cdot GO_{it} + \eta_i + \eta_t + \varepsilon_{it}$

Table A.4: Empirical hypotheses

TESTED HYPOTHESES	MODEL
(1) "Firms follow a process of capital structure adjustment that leads to an optimal leverage level over the long-term" (2) "The effective tax rate should be positively related to the debt level" (3) "Non–debt tax shields ought be negatively related to firm debt" (4) "Default risk should be negatively related to the firm's debt ratio" (5) "Companies with greater growth opportunities will have a smaller debt ratio" (6) "Firm debt is positively related with assets tangibility" (7) "The size of the company should be positively related to the level of debt" (8) "There should be a negative relationship between debt ratio and firm's profitability" (9) "A firm's liquidity affects the firm´s capital structure"	TRADE – OFF [3]
(1) "The financing deficit of Spanish SMEs is covered by debt"	PECKING ORDER [4]
(1) "Firm debt level should be negatively related to the volume of firm cash flows" (2) "The age of a company should be negatively related to its debt level" (3) "Firms with few investment opportunities and high cash flows should have low debt levels, while firms with strong growth perspectives and reduced cash flows should have high debt ratios"	PECKING ORDER [6]

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