CAPITAL STRUCTURE: SOME EVIDENCE FROM EUROPEAN PANEL DATA(*)

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ABSTRACT:
This study examines the relationship between the level of debt and different firm characteristics (non-debt tax shield, financial distress cost, investment and cash flow) using a target adjustment model. The results for a sample of companies from five countries (France, Germany, Italy, Spain and the UK) during the period 1998-2008 reveal, in general terms, that debt has an inverse relationship to non-debt tax shields and cash flow, and a direct relationship with investment in fixed assets. Furthermore, the inverse relationship between cash flow and debt diminishes when the level of asymmetric information is less important. The relationship between financial distress cost and debt level is not clear and varies across countries as well. Finally, our results support the relevance of institutional differences across countries to explain the level of leverage. In particular, the singularity of the UK (a market-oriented country) as opposed to France, Germany, Italy and Spain (bank-oriented countries).

KEYWORDS: Capital structure, non-debt tax shield, financial distress cost, cash flow.

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1. INTRODUCTION

Since the 1950s, financial economists have proposed different theories about the financial structure of firms and its influence on the value of their stocks. However, despite the huge number of studies published on this subject, there is still no consensus among academics on whether an optimal financial structure actually exists or on the factors that influence this financial structure.

In this way, Modigliani and Miller (1963), when examining the influence of corporate tax on capital structure, concluded that due to the fiscal deductibility of interest, the market value of an indebted company must be greater than that of the same company without debts. DeAngelo and Masulis (1980) argued that companies that enjoy non-debt tax shields have fewer incentives to become indebted.

Two main theories currently dominate the capital structure debate: the trade off theory and the pecking order theory. The trade off theory supports the existence of an optimal capital structure, an optimal debt ratio that is determined by the contrasting benefits of debt (tax shield, disciplinary role of debt, reduction of free cash flow problems and the fact that debt suffers less from informational costs than outside equity) and the cost of debt (bankruptcy costs and the agency costs between shareholders and bondholders) (Jalilvand and Harris, 1984 and Frank and Goyal, 2000). Therefore, an increase in company cash flow or profitability allows companis to increase their levels of debt in order to maintain it at an optimal level. However, according to pecking order theory (Myers and Majluf, 1984; Fama and French, 2002) the existence of informative asymmetry between the company and the market, as well as the disciplinary effect exerted by the market on companies, means that businesses prefer internally-generated funds for financing to external financing.

This dialectic controversy, fuelled by the importance that different authors have attributed to the variables used to explain company debt levels, may be influenced by the different institutional frameworks of the countries where firms obtain revenue. In this paper we focus our analysis on five developed European countries (France, Germany, Italy, Spain and the United Kingdom), offering the possibility of analysing how the differences in institutional contexts

across countries influence capital structure. The challenge of using international data is that we have to analyse the differences between the countries, ranging from accounting[1] or legal practices and institutional environments (market for corporate control, historical role played by banks and securities markets, etc.).

The countries analysed can be classified into two categories according to the size of their banking sector: bank-oriented countries (France, Germany, Italy and Spain) and market-oriented countries (UK). Many studies on financial structure have focused on companies that obtain their revenues in financial systems based on the Anglo-Saxon or Common Law system (Johnson, 1997), countries where financial markets are highly developed, where funds used by companies are extremely diversified and are obtained from numerous investors, either shareholders or bondholders. The few studies on Non-Anglo-Saxon companies include those by Rajan and Zingales (1995), Wald (1999) and Mccluren et al. (1999), who analysed samples of companies based in G7 countries. The results of these studies showed that the different institutional frameworks of the different countries could affect companies' characteristics and capital structures.

But bank versus market based countries is just one of the institutional and legal differences between these countries. Tax laws, bankruptcy laws and patterns of ownership may also matter. In regards to the institutional characteristics related to ownership, in the Anglo-Saxon countries firm financing is mainly provided by widely dispersed small shareholders, while in continental Europe ownership is largely in the hands of a small number of shareholders that have direct access to internal financial information.

Furthermore, according to Bancel and Mittoo (2004) and LaPorta et al. (1998), the legal system plays a key role in the availability of external financing in a country. Barcel and Mitoo (2004) conclude that the Common-Law system (UK) provides better protection for investors than the Civil-Law system (France, Germany, Italy, Spain). Legal structures with little investor and creditor protection exacerbate information asymmetries and contracting costs.

Most research mentioned above, however, has two problems: a) it does not shed any light on the adjustment process of the capital structure and, b) it uses statistical methods to check the different hypotheses presented (regression, general linear model, etc.) that do not take into account the presence of unobservable heterogeneity, omitted variables that affect the outcome of interest and are correlated with the covariates.

In regards to the adjustment process, some studies have addressed the dynamic nature of capital structure decisions, but with the limitations that arise out of the use of future information on leverage as a proxy for the optimal debt ratio (Taggart, 1977; Marsh, 1982; Jalilvand and Harris, 1984). They have developed models of debt adjustments in which the optimum level of debt was determined externally, using either historical data or adjustment processes with lags of more than one year (e.g. Jalilvand and Harris, 1984; Shyam Sunder and Myers, 1999). In our model, following the papers of De Miguel and Pindado (2001) and Gaud et al., (2005), the companies tried to adjust their debt levels to the desired objective; the latter was not fixed externally but was included in the model as a linear function of the factors determining capital structure. In this study, when explaining capital structure we used a target adjustment model to explain current debt according to past debt and the firm's target debt level. In the explanation of target debt level, we used a series of variables derived from financial theories that explain the capital structure of companies. We used this to obtain a dynamic model with predetermined variables, estimated using the Generalized Method of Moments, which allowed us to solve endogeneity problems by using instruments. In regards to the second problem, in this work, by using panel data methodology we also took into account unobservable heterogeneity since the companies had different characteristics that were difficult to observe, obtain or measure.

Taking the aforementioned reasoning into account, in this study we address the following question: Are there any substantial differences in the capital structure choices of firms across five European countries? So far, the literature has focused on the capital structure determinants of a single country or on cross-country comparisons of capital structure determinants not taking into account their dynamic nature. The aim of this paper is to analyse the determinants of capital structure in five major European countries. We add to the relatively limited literature on the dynamics of the capital structure decision by examining the dynamics of the relationship between leverage and a set of explanatory variables. As far as we know, there is currently no work studying the financial structure of public companies in five major European economies with the panel data methodology.

The article is divided into six sections. Section two summarises previous studies on capital structure. Section three describes the database and defines the variable used in the study. Sections four and five present the econometric specification of the model and the empirical evidence. The final section presents the main conclusions that can be drawn from the analysis.

[1] Bias due to financial reporting practices are expected to be low not only because we are speaking about European countries but also because, to ensure consistency across countries, the data are all drawn from the same database (i.e. Worldscope), which takes differences in financial reporting principles across countries into account by collecting data based on standardized definitions.

2. DETERMINANTS OF CAPITAL STRUCTURE: PREVIOUS STUDIES AND HYPOTHESES

2.1. TAX ASPECTS OF CAPITAL STRUCTURE

DeAngelo and Masulis (1980) state that companies with larger non-debt tax shields are less indebted. These companies have less need to issue debt in order to take advantage of interest tax deductions because they already enjoy tax benefits.

The empirical evidence of the relationship between non-debt tax shields and capital structure varies enormously (Harris and Raviv, 1991). While some papers have found a direct relationship (Bathala et al., 1994; Grier and Zychowicz, 1994; Barclays et al., 1995), others have found an inverse one (Graham, 1996; Wald, 1999; Fama and French, 2002). This may be due to the fact that these tax shields are also sometimes related to other variables that also affect indebtedness. Some non-debt tax shield measures (for instance, depreciation) are usually proportional to the value of physical assets such as buildings, plants and equipments, that act as collateral and provide security for lenders. Debt will be the preferred method of financing such tangible assets. In this case, the relationship between non-debt tax shields and capital structure will be positive (Balakrishnan and Fox, 1993).

Another reason that may explain the diverse empirical evidence of the relationship between debt level and non-debt tax shields is the different tax legislation (institutional characteristics) in force in each country. Demirgüç-Kunt and Maksimovic (1996), Saá-Requejo (1996) argue that there are great differences in non-debt tax shields in G7 countries: on the one hand, the United States, Canada and Japan, with few non-debt tax shields; and on the other hand, the European countries (United Kingdom, France, Germany, Italy, Spain) with more tax shields.

Taking the aforementioned into consideration, we proposed the following hypotheses:

H1a: "*An inverse relationship is expected between debt level and non-debt tax shields because companies with a non-debt tax shield already enjoy tax benefits.*"

H1b: "*A direct relationship is expected between debt level and non-debt tax shields because companies with a non-debt tax shield have a high proportion of tangible assets that act as collateral and provide security for lenders.*"

2.2. FINANCIAL DISTRESS COST AND CAPITAL STRUCTURE

The cost of indirect expenses associated with bankruptcy procedures can be substantial. The liquidation value of a company's assets depends on the characteristics of those assets (Alderson and Betker, 1996). Thus, the liquidation value of a company with many real estate assets (land, buildings, etc.) is not the same as that of other companies with mainly intangible assets (technology, human capital, brand image, patents, R&D activities, etc.). In the event of bankruptcy, these assets lose substantial value; hence lenders, since they have fewer guarantees, react by providing the company with less financing, and charge larger risk premiums on the cost of debt (Hovakimian et al., 2001). Thus, we proposed the following hypothesis.

H2a: "*An inverse relationship is expected between financial distress cost and debt level because intangible assets have lower liquidation value.*"

On the other hand, intangible assets are related to growth opportunities. Rapidly growing firms are likely to have insufficient earnings to finance all of their growth internally and they will seek external financing. Growth is likely to put a strain on retained earnings and push the firm into borrowing (Myers, 1984; Michaelas et al. 1999). Furthermore, this debt will act as a tax shield. Grossman and Hart (1982) argue that managers of firms with growth opportunities are more likely to take opportunistic actions. According to this explanation, there will be a direct relationship between growth opportunities and debt in order to reduce the free cash flow and discipline the firm's managers. Between the empirical papers that find a direct relationship between growth opportunities and leverage we have De Miguel and Pindado (2001), Goyal et al. (2002) and Murray and Goyal (2003).

Following this line of reasoning, the hypothesis could be established as:

H2b: "*A direct relationship is expected between financial distress cost and debt level because intangible assets represent growth opportunities which must be financed with leverage.*"

2.3. INVESTMENT AND CAPITAL STRUCTURE

Tangible assets are likely to have an impact on the borrowing decisions of a firm because they are less subject to information asymmetries and usually they have a greater value than intangible assets in case of bankruptcy. If a large fraction of a firm's assets are tangible assets, then the assets should serve as collateral, thus diminishing the lender's risk of suffering the agency costs derived from debt. Various studies have presented

empirical evidence of the existence of a direct relationship between investment in fixed assets and debt levels (Boot et al., 2001; De Miguel and Pindado, 2001). This relationship is indicative of the fact that companies look for funds to finance their investment projects, which represent guarantees for lenders.

Therefore, based on the aforementioned theoretical framework, we propose the following hypothesis:

H3: "*A direct relationship is expected between investment in fixed assets and debt level since investment in fixed assets acts as collateral and provides security for lenders.*"

2.4. ASYMMETRIC INFORMATION AND AGENCY PROBLEMS

The existence of informative asymmetry and agency costs in debt-to-equity ratios also influence financial structure. According to pecking order theory (Myers and Majluf, 1984), managers prefer internal to external financing because cash flow generated internally is not affected by problems of informative asymmetry and because the managers are not subject to the disciplinary effects of the market. If they need external funds, they prefer debt to capital in order to reduce the informative asymmetry. All things being equal, the more profitable companies are, the more internal financing they will have, and therefore we should expect a negative relationship between leverage and cash flow.

Nevertheless, the trade off theory and the free cash flow theory (Jensen, 1986) suggests a direct relationship between debt and cash flow. According to the trade off theory, when firms are profitable, they should prefer debt in order to maintain their optimal capital structure and also to take advantage of the benefits from the tax shield (Haugen and Senbet, 1986). In addition, firm's managers with free cash flow tend to invest in projects with a negative net present value (over investment problem). One possible solution to this problem is the issue of debt forcing the payment of interest. Debt mitigates the agency costs associated with an excess of cash flow and disciplines the firm's managers (Jensen, 1986).

Most previous empirical studies have identified an inverse relationship between cash flow and debt, supporting the pecking order theory (Myers, 2001; Fama and French, 2002; Giannetti, 2003), but the relationship is not clear. Consequently, in the presence of asymmetric information and agency problems, we proposed two hypotheses:

H4a: "*An inverse relationship is expected between cash flow and debt level in order to avoid problems of asymmetric information and market discipline.*"

H4b: "*A direct relationship is expected between cash flow and debt level in order to benefit from the debt tax shield and mitigate agency costs associated with free cash flow*."

3. DATABASE DESCRIPTION AND VARIABLE DEFINITION

Our database was formed by individualized information (standardised balance sheets and income statements) of public companies from five strongly representative countries in the European economy (France, Germany, Italy, Spain and United Kingdom) obtained from an international database –Worldscope– for the period 1998-2008. We limit our attention to the largest European economies where there are sufficient public firms represented to make comparisons meaningful. To avoid problems of unobservable heterogeneity and endogeneity, for each country we construct an unbalanced data panel comprising companies for which information was available for at least five consecutive years between 1998 and 2008. As a result, we obtained an unbalanced panel, whose structure by number of companies and number of observations per country is shown in Table 1. We exclude financial companies (code 40 GICS) since they have their own distinctive features in capital structure.

Table 1. Structure of the sample by country

Number of annual observations per company	France		Germany		Italy		Spain		United Kingdom		Total	
	Number of companies	Number of observations	Number of companies	Number of observations	Number of companies	Number of observations	Number of companies	Number of observations	Number of companies	Number of observations	Number of companies	Number of observations
5	34	170	31	155	10	50	7	35	59	295	141	705
6	47	282	32	192	19	114	12	72	87	522	197	1,182
7	32	224	21	147	9	63	3	21	36	252	101	707
8	38	304	21	168	10	80	5	40	33	264	107	856
9	19	171	10	90	4	36	4	36	122	1,098	159	1,431
10	72	720	49	490	33	330	29	290	0	0	183	1,830
Total	242	1,871	164	1,242	85	673	60	494	337	2,431	888	6,711

Note: For each country, data of companies for which the information is available for at least five consecutive years between 1998-2008 have been extracted. The resultant unbalanced panel comprises 242 France (1,871 observations), 164 Germany (1,242 observations), 85 Italy (673 observations), 60 Spain (494 observations) and 337 UK (2,431 observations) non-financial quoted companies.

The variables used in the model explaining capital structure were:

Leverage (D_{it}), defined as the ratio of the book value of total debt over book value of total assets (Gaud et al., 2005): D_{it} = Total debt $_{it}$ / Total asset $_{it}$.

Non-debt tax shield (NDTS $_{it}$) was defined according to Titman and Wessels (1988) and De Miguel and Pindado (2001) as the difference between earnings before taxes (EBT_{it}) and the division of taxes paid and the tax rate, and, therefore, reflects non taxed earnings due to the existence of non-debt tax shields: $NDTS_{it}$ = EBT_{it} – (Tases paid $_{it}$ / Tax rate $_{it}$).

Financial distress costs (FDC $_{it}$), try to capture asset specificity and their relationship with growth opportunities, was measured according to the importance of the intangible assets (Bradley et al., 1984; Titman and Wessels, 1988): FDC_{it} = Intangible assets $_{it}$.

Investments (I_{it}) were measured according to Lewellen and Badrinath (1997) as the difference between net fixed assets in the current (NFA_{it}) and previous (NFA_{it-1}) periods, plus depreciation expenditure in the current period: I_{it} = NFA_{it} – NFA_{it-1} + Depreciation $_{it}$.

Cash flow (CF_{it}) was defined as the addition of earnings after interest and taxes (net earnings) and non-cash deductions (depreciations): CF_{it} = Net earning $_{it}$ + Depreciation $_{it}$.

Asymmetric information was measured as the proportion of tangible fixed and intangible assets. The presence of intangible assets revealed greater problems of asymmetric information than tangible fixed assets. A factor analysis with principal components was performed using variable tangible fixed assets and intangible assets (De Miguel and Pindado, 2001). We constructed a factor that would be negative when the company had a high proportion of tangible fixed assets and, consequently, fewer problems of asymmetric information. This factor would be positive if intangible assets were the main assets and there would therefore be greater problems of asymmetric information. Starting with this factor, we constructed a variable dummy – AI_{it} – which took the value 1 when the factor was negative (therefore, predominately tangible fixed assets) and 0 when the factor was positive (therefore, predominately intangible assets). This variable was interacted with cash flow in order to determine the sensitivity of indebtedness to cash flow with varying degrees of asymmetric information.

The variables were scaled according to the book value of total assets (K_{it}). Table 2 shows the descriptive results of the level of indebtedness and its explanatory variables. This table show that the extent to which firms are levered is fairly similar across the five countries, with only the United Kingdom being relatively less levered.

Table 2.- Summary statistic by country

Variable	Country	Mean	Standard Deviation	Minimun	Maximun
D_{it}	France	0.6010	0.1623	0.0833	0.9683
	Germany	0.5855	0.1696	0.0900	0.9603
	Italy	0.6002	0.1695	0.1700	0.9809
	Spain	0.6011	0.1803	0.0529	0.9386
	United Kingdom	0.5313	0.1749	0.0453	0.9790
	Total	0.5728	0.1732	0.0453	0.9809
$(NDTS/K)_{it}$	France	-0.0088	0.0444	-0.7735	0.2014
	Germany	-0.0261	0.0393	-0.2793	0.2000
	Italy	-0.0237	0.0364	-0.2087	0.1999
	Spain	0.0038	0.0361	-0.1584	0.3371
	United Kingdom	0.0133	0.0376	-0.1766	0.4328
	Total	-0.0045	0.0427	-0.7735	0.4328
$(FDC/K)_{it}$	France	0.1674	0.1577	0	0.7333
	Germany	0.1268	0.1532	0	0.7632
	Italy	0.1526	0.1499	0	0.6651
	Spain	0.1039	0.1155	0	0.6888
	United Kingdom	0.1666	0.1855	0	0.9081
	Total	0.1534	0.1655	0	0.9081
$(I/K)_{it}$	France	0.0596	0.0607	-0.7314	0.5685
	Germany	0.0683	0.0678	-0.5321	0.5114
	Italy	0.0725	0.0673	-0.3944	0.4282
	Spain	0.0800	0.0942	-0.5441	0.6822
	United Kingdom	-0.2189	9.892	-469.77	0.9480
	Total	-0.0368	5.9547	-469.77	0.9480
$(CF/K)_{it}$	France	0.1008	0.0510	0.0147	0.4580
	Germany	0.1156	0.0545	0.0061	0.4027
	Italy	0.0951	0.0467	-0.0004	0.4602
	Spain	0.1557	0.0676	0.0248	0.5297
	United Kingdom	0.1163	0.0587	0.0073	0.5248
	Total	0.1089	0.0560	-0.0004	0.5297

Note: This table presents descriptive statistics for the variables used in our estimations. D_{it} denotes the ratio of the book value of total debt over book value of total assets; $(NDTS/K)_{it}$ denotes the non-debt tax shield to total assets, defined the non-debt tax shield as the difference between earnings before taxes and the division of taxes paid and the tax rate; $(FDC/K)_{it}$ denotes the financial distress costs to total assets, measured the financial distress cost as the intangible assets; $(I/K)_{it}$ denotes the investment in net fixed assets to total assets, measured the investment in net fixed assets as the difference between net fixed assets in the current and previous periods, plus depreciation expenditure in the current period, and $(CF/K)_{it}$ denotes the cash flow to total assets, obtained the cash flow by the addition of earnings after interest and taxes (net earnings) and non-cash deductions (depreciations).

4. ECONOMETRIC SPECIFICATION OF THE MODEL

According to the theoretical framework described above, the target debt level of a firm i at time t (D^*_{it}) may be explained by the non-debt tax shields, financial distress costs, investments and cash flow.

$$D^*it = \beta_1 + \beta_2 \cdot \left(\frac{NDTS}{K}\right)_{it} + \beta_3 \cdot \left(\frac{FDC}{K}\right)_{it} + \beta_4 \cdot \left(\frac{I}{K}\right)_{it} + \beta_5 \cdot \left(\frac{CF}{K}\right)_{it} + \varepsilon_{it} \quad (1)$$

Capital structure decisions are dynamic by nature and should be modelled as such. If there is a target debt level, then firms should take the appropriate steps to reach this objective. But the existence of transaction costs means that companies do not automatically adjust their levels of indebtedness to the target level, therefore:

$$D_{it} - D_{it-1} = \alpha \,.\, (D^*_{it} - D_{it-1}), \text{ with } 0 < \alpha < 1 \quad (2)$$

where a α measures the transaction costs. If the transaction costs are null ($\alpha = 1$), the companies automatically adjust their indebtedness level to the targeted level of indebtedness: $D_{it} = D^*_{it}$. If, in contrast, transaction costs are very high ($\alpha = 0$), companies prefer to do nothing: $D_{it} = D_{it-1}$. When transaction costs are at an intermediate level $0 < \alpha < 1$, companies adjust their level of indebtedness to the target debt level inversely to transaction costs. Equation 2 provides the current level of indebtedness:

$$D_{it} = \alpha \,.\, D^*_{it} + (1 - \alpha) \,.\, D_{it-1}, \text{ with } 0 < \alpha < 1 \quad (3)$$

By integrating Equations 1 and 3, and bearing in mind that we are working with panel data, we obtained:

$$D_{it} = \alpha \cdot \beta_1 + (1-\alpha) \cdot D_{it-1} + \alpha \cdot \beta_2 \cdot \left(\frac{NDTS}{K}\right)_{it} + \alpha \cdot \beta_3 \cdot \left(\frac{FDC}{K}\right)_{it} +$$
$$+ \alpha \cdot \beta_4 \cdot \left(\frac{I}{K}\right)_{it} + \alpha \cdot \beta_5 \cdot \left(\frac{CF}{K}\right)_{it} + d_t + \eta_i + \varepsilon_{it} \quad (4)$$

where d_t is the time-specific or temporal effect (effect of macroeconomic variables on capital structure), η_i is the firm-specific effect (to control for unobservable heterogeneity) and ε_{it} is a white noise or random disturbance.

Equation model (4) can be modified taking into account the influence of the existence of asymmetric information on cash flow. The model to be estimated would be:

$$D_{it} = \alpha \cdot \beta_1 + (1-\alpha) \cdot D_{it-1} + \alpha \cdot \beta_2 \cdot \left(\frac{NDTS}{K}\right)_{it} + \alpha \cdot \beta_3 \cdot \left(\frac{FDC}{K}\right)_{it} +$$
$$+ \alpha \cdot \beta_4 \cdot \left(\frac{I}{K}\right)_{it} + \alpha \cdot (\beta_5 + \beta_6 \cdot AI_{it}) \cdot \left(\frac{CF}{K}\right)_{it} + d_t + \eta_i + \varepsilon_{it} \quad (5)$$

where AI_{it} takes the value 0 for the companies with problems of asymmetric information and the value 1 for companies with fewer problems of asymmetric information.

The dynamic model with predetermined variables was estimated using a two-step Generalised Method of Moments (GMM) to avoid problems of unobservable heterogeneity and endogeneity. Unobservable heterogeneity refers to omitted variables that affect the outcome of interest and are correlated with the covariates. We taken into account the unobservable heterogeneity through the individual effect η_i which is then eliminated by taking the first differences of the variables. It was also evident from the specification of the model that endogeneity problems could arise in the regressors due to: a) the time normally lapsing between the taking of the decision to change the capital structure and its execution; and b) the possible relationship between certain explanatory variables (for instance, investment) and the variable to be explained. As a result, all the right-hand side variables of the models lagged twice (or more) are included as instruments, which also allowed for the consideration of possible errors in the measurement of the variables.

Additionally, we perform an analysis of the sensitivity of the coefficients to establish a suitable interpretation of the determinants of capital structure. The model is estimated for the full sample including a country dummy variable, c_t in the error term (i.e. $\nu_{it} = d_t + \eta_i + c_t + \varepsilon_{it}$). The model was estimated using the Stata programme (version 9).

5. EMPIRICAL EVIDENCE AND DISCUSSION

To check for potential misspecification of the models, we used m_2 statistics, which tested for lack of second-order serial correlation in first-difference residuals. The results obtained did not allow us to reject the null hypothesis of absence of second-order serial correlation between the errors. However, because of the transformation, there was no lack of first-order serial correlation m_1 in the differenced residual. Nor could we reject the null hypothesis of absence

of correlation between the instruments and the error term of Sargan's test of over identifying restrictions (see Table 3). This table also shows the three contrasts of Wald's test (z_1, z_2 and z_3 statistics). The null hypothesis of the former check the joint significance of the explanatory variables, whereas the second and third check the joint significance of the time and country dummies. The results of Wald's test validated the proposed partial adjustment model.

In accordance with the specification of the model proposed (equation 5), the results show that the coefficient of the level of indebtedness delayed one year is significant. This means that firms bear transaction costs when they decide to adjust the debt level of the previous period to the target level in the current period. The transaction costs borne by companies in France and Spain are sensibly higher that those of the United Kingdom (Table 3). Therefore, UK companies can adjust their levels of indebtedness to match their desired objectives more rapidly.

The relationship between non-debt tax shields and debt is significantly inverse for France, Spain and UK. These results are consistent with findings reported in previous studies and reveal that companies with non-debt tax shields already enjoy tax benefits and, therefore, they have no tax incentives to issue debt (Graham, 1996; Wald, 1999; Fama and French, 2002).

Financial distress costs show a significant direct relationship with debt for France and Spain, whereas in the UK the relationship is significantly inverse. This may be due to the close relationships between firms and their debt providers in continental bank-oriented Europe, which could solve some of the asymmetric information associated to the Anglo-Saxon market-oriented system (Bah and Dumontier, 2001), and the importance of intangible assets (R&D, patents, trademarks, design, goodwill, etc). Correa et al. (2002) and Casson et al. (2008) state that investment in intangible assets is important for growth and is a source of competitive advantage. Growth will push firms into seeking external financing, as firms with high growth opportunities are more likely to exhaust internal funds and require additional capital (Michaelas et al. 1999). Growth is likely to put a strain on retained earnings and push the firm into debt.

Our results, in line with the theoretical framework and findings reported in previous studies (Boot et al., 2001; De Miguel and Pindado, 2001) reveal that the relationship between investment in fixed assets and debt is significant and positive, with the exception of the UK, where it is insignificant. Therefore, investment decisions and financing are inter-related. Thus, these types of business investments (fixed assets) in addition to increasing debt capacity, also serve as collateral, reducing lenders' risks of suffering agency costs of debt.

Table 3. Model estimation of debt by country

Variable/Test	France	Germany	Italy	Spain	United Kingdom	Total
D_{it-1}	0.8557* (0.000)	0.6523* (0.000)	0.5092* (0.000)	0.8129* (0.000)	0.3913* (0.000)	0.7710* (0.000)
$(NDTS/K)_{it}$	-0.1356* (0.000)	-0.0072 (0.955)	-0.1010 (0.646)	-0.2874* (0.000)	-0.0336*** (0.052)	-0.2367* (0.003)
$(FDC/K)_{it}$	0.0110** (0.048)	-0.0870 (0.572)	0.1275 (0.392)	0.1305* (0.000)	-0.2284* (0.000)	0.0557* (0.004)
$(I/K)_{it}$	0.2495* (0.000)	0.2235** (0.044)	0.5559** (0.011)	0.3454* (0.000)	9.69e-06 (0.607)	-0.0008 (0.444)
$(CF/K)_{it}$	-0.4248* (0.000)	-1.7130* (0.000)	-1.2676* (0.001)	-0.7025* (0.000)	-0.4749* (0.000)	-0.3914* (0.000)
AI_{it} . $(CF/K)_{it}$	0.0382** (0.036)	0.5648* (0.002)	0.9545** (0.032)	0.2277** (0.022)	0.0131 (0.746)	0.3063* (0.000)
z_1	5087.78 (6)	28.44 (6)	15.08 (6)	901.47 (6)	2216.12 (6)	2601.73 (6)
z_2	53.14 (9)	8.86 (9)	4.12 (9)	43.55 (9)	175.10 (8)	9.25 (9)
z_3	-------	-------	-------	-------	-------	2.59 (3)
m_1	-8.07	-4.78	-3.38	-3.26	-7.11	-11.63
m_2	-0.52	1.48	-0.84	1.62	-0.00	0.84
Sargan	215.81 (198)	44.72 (43)	17.16 (18)	45.39 (48)	209.70 (210)	146.75 (144)

Notes: D_{it} denotes the ratio of the book value of total debt over book value of total assets; $(NDTS/K)_{it}$ denotes the non-debt tax shield to total assets, defined the non-debt tax shield as the difference between earnings before taxes and the division of taxes paid and the tax rate; $(FDC/K)_{it}$ denotes the financial distress costs to total assets, measured the financial distress cost as the intangible assets; $(I/K)_{it}$ denotes the investment in net fixed assets to total assets, measured the investment in net fixed assets as the difference between net fixed assets in the current and previous periods, plus depreciation expenditure in the current period; $(CF/K)_{it}$ denotes the cash flow to total assets, obtained the cash flow by the addition of earnings after interest and taxes (net earnings) and non-cash deductions (depreciations), and AI_{it} . $(CF/K)_{it}$ denotes the interaction between the dummy variable AI_{it} (which take the value 1 when the factor is negative –therefore, predominately tangible fixed assets– and zero when the factor is positive –therefore, predominately intangible assets–) and the cash flow to total assets $(CF/K)_{it}$,defined before. Other information needed to read this table is: (i) Heteroskedasticity consistent asymptotic error in parentheses; *, **, *** indicates significance at the 1%, 5% and 10% level; (ii) z_1 is a Wald test of the joint significance of the reported coefficients, asymptotically distributed as chi-square under the null of no relationship, degrees of freedom in parentheses; z_2 is a Wald test of the joint significance on the time dummies, asymptotically distributed as chi-square under the null of no relationship, degrees of freedom in parentheses; z_3 is a Wald test of the joint significance on the country dummy variables asymptotically distributed as chi-square under the null of no relationship, degrees of freedom in parentheses; (iii) m_i is a serial correlation test of order i using residuals in first differences, asymptotically distributed as N(0,1) under the null of no serial correlation; (iv) Sargan is a test of the over-identifying restrictions, asymptotically distributed as chi-square under the null of no relation between the instruments and the error term, degrees of freedom in parentheses.

As reported in many previous studies (Rajan and Zingales, 1995; Wald, 1999; Myers, 2001; Fama and French, 2002; Giannetti, 2003), our results revealed an inverse relationship between cash flow and indebtedness, thus supporting the theoretical framework proposed in the pecking order theory. In other words, the companies in our sample, in order to avoid asymmetric information and market disciplinary effects, preferred internally-generated funds to external resources to finance their investment projects.

The results of the model, when we take into account the influence of asymmetric information, indicate that this variable is significantly positive for all countries with the exception of the UK. Therefore, the level of asymmetric information influences the relationship between cash flow and debt level. Thus, when the asymmetric information is low the inverse relationship between cash flow and the debt level is weaker. These results again confirm the pecking order theory and also show that when there are fewer problems of asymmetric information, the inverse relationship between cash flow and debt displayed by the companies is less important.

Finally, the study is replied for the full sample including a country dummy variable. The last column of Table 3 presents the results of this global model. The coefficients of all explanatory variables are significant with the exception of the investment in fixed assets. In short, the leverage has a negative relationship with non-debt tax shields and cash-flow. This last relationship supports the idea, for the full sample, that firms prefer using internal sources of financing to debt. This inverse relationship between cash flow and leverage is weaker when there are less problems of asymmetric information. Furthermore, the relationship between financial distress cost and debt is significantly positive and the results obtained for the third Wald test support the relevance of institutional differences across countries for the analysis of capital structure.

6. CONCLUSIONS

This study examines the relationship between the level of debt and different firm characteristics (non debt tax shield, financial distress cost, investment and cash flow) using a target adjustment model. The results for a sample of companies from five countries (France, Germany, Italy, Spain and the UK) during the period 1998-2008 reveal that companies from these countries bear transaction costs when they decide to adjust the debt level of the previous period to the target level in the current period. In particular, UK companies can adjust their levels of indebtedness to match their desired objectives more rapidly.

We have also found an inverse relationship between debt and non-debt tax shields (although for Germany and Italy this is not significant). These results reveal that firms that have non-debt tax shields already enjoy tax benefits and therefore have no tax incentives to issue debt.

The observed relationship between leverage and cash flow is significantly inverse supporting the theoretical framework proposed in pecking order theory. Thus, companies with high cash flow and, therefore, with high internally generated funds will not have the need to issue debt. Furthermore, the inverse relationship between cash flow and debt diminishes when the level of asymmetric information decreases (with the exception of the UK, where it is insignificant).

Our results also reveal that the relationship between investment in fixed assets and debt is significantly positive (with the exception of the UK where it is insignificant). Thus, investment in fixed assets in addition to increasing debt capacity, also serve as collateral, reducing lenders' risks of suffering agency costs of debt.

The relationship between financial distress cost and debt level is not clear and varies across countries. This relationship is significantly positive for France and Spain, whereas in the UK the relationship is significantly inverse.

Finally, our results support the relevance of institutional differences across countries in the analysis of capital structure. In particular, the singularity of the UK (a market-oriented country) as opposed to France, Germany, Italy and Spain (bank-oriented countries).

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