How SME Uniqueness Affects Capital Structure: Evidence from Central and Eastern Europe Panel Data

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The purpose of this paper is to empirically test how firm and country-specific characteristics affect SMEs' capital structure using a unique dataset of micro, small, and medium-sized firms in Central and Eastern Europe. We investigate whether the leverage of firms follows more closely the predictions of the trade-off theory or the pecking order theory. We do find strong evidence in favour of the pecking order theory, given that there is a negative and significant correlation between profitability and leverage. When we control for other firm specific characteristics such as future growth opportunities, liquidity, sales growth, size, and assets structure, we obtain similar results: the relationship between cash flow and leverage remains negative and significant. Country-specific factors such as credit volume, foreign direct investment and corporate tax rate have a strong and positive effect on SMEs' capital structure. The results do not change when we control for differences in age, size, industry and growth characteristics of the sample.

Introduction

In this paper we empirically test some of the predictions of the pecking order theory using a unique dataset of micro, small, and medium-sized enterprises (SMEs) in Central and Eastern Europe. Some scholars (Sogorb-Mira, 2005) argue that the actions taken by managers of SMEs regarding financial decisions can be explained by the same theories that are usually applied to large listed companies, i.e. trade-off and pecking order theories.

The trade-off theory argues that firms choose their optimal level of debt by trading off the benefits of debt financing against its costs. The benefits of debt include tax deductibility of interest expenses and reduction of agency costs of equity derived from excess free cash flows. The costs of debt includes higher interest rates and bankruptcy costs, either direct or indirect, and these may occur in a situation of excessive debt. According to this theory, there is an optimal level of debt which

occurs when the marginal benefit equals the marginal cost of an additional unit of debt (Bradley et al., 1984).

In the framework of the trade-off theory it is hard to argue that SMEs would not face the same trade-off between interest tax shield and distress costs as large firms. However, it is possible that SMEs might face problems that large listed companies do not encounter. One possible reason that could explain why SMEs might not follow the trade-off theory is the potential financial constraint of SMEs. If some SMEs are, in fact, financially constrained, it would mean that independently of whether managers are aware of the trade-off theory and recognize the advantage of debt, they might not be able to lever up to their optimal capital structure. Another explanation why SMEs might have a different capital structure than their large counterparts could be that their "experienced" bankruptcy costs are higher due to the fact that lots of them are family owned. Besides the expected financial distress costs and the economic loss due to bankruptcy, a family owned company most likely also represents a great amount of sentimental value to the owners. Therefore, one can argue that this dimension of distress costs will increase the expected cost of debt, and therefore lower the optimal capital structure of family owned companies.

The pecking order theory is an alternative and more recent theory of capital structure. This theory argues that a pecking order in financing exists if there are information asymmetries in companies between the insiders, either shareholders or managers, and outsiders, mainly investors. In such case, the cost of issuing new securities is the most important issue and it goes beyond a discussion of benefits and costs of debt. The main prediction of this theory is that there is a hierarchy of financing sources. Hence, firms prefer to use retained earnings as their first financing source, followed by debt and, lastly, by equity. Equity is less interesting to firms, given that it entails larger information asymmetry costs, making its issuance more expensive relative to other funding sources (Baskin, 1989).

The pecking order theory is, therefore, able to explain why profitable firms have low level of debt compared to less profitable companies. The reason is not that they have a low target debt ratio, but mostly because they are able, to a higher degree, to generate sufficient internal funds to finance their investments (Myers, 2001). It turns out that there are very compelling reasons why the pecking order theory should be able to explain the behavior of SMEs regarding capital structure.[i] One reason is that small firms are often owned by only one shareholder who is at the same time the manager of the company. The issue of new equity would dilute the shareholding of the owner-manager, and can, therefore, lead to a loss of control in the company. To avoid this, the manager would turn to debt instead of equity as a source of financing. The size of a company also has an impact on the availability of debt financing. This is reflected in the fact that smaller firms rely more strongly on short-term financing than larger firms, since financial constraints are mainly present when attempting to acquire long-term financing. Therefore, the pecking order for SMEs is expanded in

the sense that there is a propensity towards short-term financing over long-term financing (Lopez-Gracia and Sogorb-Mira, 2008).

The aim of this paper is to investigate the main determinants of capital structure of SMEs in Central and Eastern Europe. In other words, we discuss whether the leverage of firms follows more closely the predictions of the trade-off theory or the pecking order theory. By using cash flow as an explanatory variable, we are able to test some of the predictions of the pecking order theory. According to this theory, firms with more internal funds available will use less external funding. We do find strong evidence in favour of the pecking order theory, given that there is a negative and significant relationship between cash flow and leverage. When we control for other firm specific characteristics the cash flow coefficient remains negative and statistically significant. We also find that country-specific factors such as credit volume, FDI flows and statutory tax rate are important determinants of SMEs' capital structure.

The rest of the paper is organized as follows: section 2 studies how the existing capital structure theories can be used to explain the financing decisions in the small and medium-sized firms. Also, we present the empirical hypotheses extracted from the theoretical background that will be tested using a large sample of SMEs from Central and Eastern Europe. Section 3 briefly characterizes the dataset and all the valriables used in the econometric model. In section 4 we discuss the empirical results of our study with their implications. Some concluding remarks are offered in the final section.

Literature Review and Empirical Hypotheses

The seminal work of Modigliani and Miller (1958) sets up the basis for the development of a growing body of theoretical work on firm capital structure issue. Subsequent approaches based on information asymmetries, potential agency problems and signaling effects have given rise to a large volume of theoretical and empirical studies on the financing decision in publicly quoted companies. The theoretical approaches based on information asymmetries and potential agency costs are particularly relevant for SME financing.

The conventional analysis of capital structure states that firms determine their leverage levels trading off the benefits against the shortcomings of using debt financing (Scott, 1976; Bradley et al., 1984). The so-called trade-off theory emerges under this line of reasoning and includes fiscal, financial distress and agency conflicts issues. Concerning the fiscal approach of trade-off theory, Modigliani and Miller corrected their original paper in 1963 (Modigliani and Miller, 1963), concluding that firms would prefer debt to other financing resources due to the tax deductibility of interest payments.[ii] This would induce firms to be completely financed by debt. However, as this is not usually observed, several authors, including Modigliani and Miller themselves, argued that bankruptcy costs and other costs

associated with debt, could explain why firms were not totally financed by debt. This discussion on the benefits and costs of debt is central to the trade-off theory of capital structure.[iii]

From a financial distress perspective, Warner (1977), Ang et al. (1982), and Pettit and Singer (1985) state that larger firms tend to be more diversified and fail less often, so size can be an inverse proxy for the probability of bankruptcy. Likewise, small companies usually have bigger bankruptcy costs in relative terms (Ang et al., 1982). Thus one may expect that firm size is positively related to debt level. The restriction of maturity length of credits offered by lenders may explain partially debt structure used by SMEs. In this sense, smaller firms may use less long-term debt, but probably more short-term debt, than larger firms. Following Bevan and Danbolt (2000b), and Hall et al. (2000), this would suggest the following relationship between firm leverage and size:

H1 (a) Firm size is positively related to long-term debt, and

H1 (b) Firm size relates negatively to short-term debt.

Agency theory investigates the conflict of interests between the various stakeholders of the firm. Basically, this theory considers the conflict of interest, on the one hand, between shareholders and debtholders and, on the other hand, between shareholders and managers.[iv] SMEs are not likely to suffer from this second problem due to the fact that their property identifies almost exactly with their management, and thereby there will be a unique financial objective for these two groups. Notwithstanding, the agency conflict between shareholder/owners and debtholders may be particularly severe for small firms, increasing both the moral hazard and adverse selection problems (Van der Wijst, 1989; Ang, 1992).

The existence of debt agency costs like risk shifting, and the potential problems of adverse selection and moral hazard, may induce creditors to require guarantees to their lending, materialized in collateral assets (Myers, 1977; Scott, 1977; Harris and Raviv, 1991). This kind of assets will retain value in case of a potential liquidation of the firm, and could be sold in the market to meet the firm's payment commitments. Thus one may propose that firm leverage relates positively to asset tangibility. Myers's (1977) debt overhang problem deals with the fact that firm managers may forego profitable investments (with NPV > 0) if these projects were to benefit exclusively creditors. In fact, firm owners will try to embark on those investments that generate short-term cash flows (managers myopia); however, creditors will only be willing to lend resources at a greater degree of seniority, that is, collateralized debt. According to this view our second hypothesis would suggest that:

H2 (a) Assets structure is positively related to long-term debt, and

H2 (b) Assets structure relates negatively to short-term debt.

The main predictions of trade-off theory on firm leverage are related to the profitability of firms. In fact, profitability has a positive impact on leverage for three main reasons. First of all, as profitability increases bankruptcy costs decrease pushing firms to higher levels of debt. Second, as DeAngelo and Masulis (1980) argue, more profitable firms face higher expected tax rates than less or non-profitable firms. This asymmetric taxation of profits and losses drives more profitable firms to higher levels of debt as they would benefit more from the resulting tax benefits of debt. Third, more profitable firms tend to have more free cash flow, that is, more excess earnings over profitable investments.

Past firm growth has typically been found to be positively related to leverage in previous SME studies. Financial distress costs are greater for firms with larger growth opportunities as growth opportunities represent an intangible asset. Thus the trade-off theory predicts a negative relationship between growth opportunities and leverage (Myers, 1977). The pecking order theory is somewhat ambiguous on its predictions relating to growth.[v] Firms with a higher potential for growth, requiring new investment, are more likely to exhaust internal funds, suggesting a positive relationship between growth and leverage (Michaelas et al., 1999; Shyam-Sunder and Myers, 1999). However, growth opportunities are very difficult to value for outsiders, causing informational asymmetries to be more severe, which would suggest a negative relationship between growth and leverage. Thus, our third hypothesis would be:

H3 (a) Growth opportunities are negatively related to long-term debt, and

H3 (b) Growth opportunities relate positively to short-term debt.

The existence of informational asymmetries between investors and managers takes us to the pecking order theory. In this context Myers (1984), and Myers and Majluf (1984) argue that there exists a hierarchy in the financing of firms. Due to informational asymmetries, firms will prefer internal to external capital sources. This suggests that highly profitable firms will tend to finance their investments primarily with retained earnings rather than employing debt. It is worth stressing that this way of financing could easily be applied to SMEs under the following reasoning: SME managers, that are at the same time shareholders of these firms, do not like to lose their property and control over their own firms (Holmes and Kent, 1991; Hamilton and Fox, 1998) and therefore, the acceptance of new shareholders will be almost insignificant, thus preferring internal to external sources of financing of firm activities. If external capital is needed, SMEs would choose debt that does not reduce

managers' flexibility, that is, short-term debt, which is not likely to include restrictive covenants. Based on this last theoretical stance, we propose the following hypotheses:

H4 (a) Firm profitability is negatively related to long-term debt, and

H4 (b) Firms prefer short-term debt if external funding is needed.

Since smaller firms usually have a higher proportion of current liabilities in their capital structure compared with larger firms, a firm's capability to sustain short-term liquidity is expected to be positively related to its growth. Thus, firms with more growth opportunities will keep higher liquidity levels and thus will face less severe financing constraints. So, our next hypothesis would suggest that:

H5 (a) Firm liquidity is negatively related long-term debt, and

H5 (b) Firm liquidity relates positively to short-term debt.

The supply of capital depends on many factors, including the stage of development or life cycle of the firm. Start-up and early stage firms may face particular difficulty in securing finance for investment for a number of reasons. Firstly, internal equity is limited as sufficient profits may not be generated, and the personal resources of the firm owner and his family are limited. Secondly, a combination of information asymmetries and agency problems related to the lack of a trading history restricts firms access to external debt, which may be exacerbated by the lack of collateralizable assets. For these reasons, start-up and early stage firms may resort to external financing, particularly bank loans and bond issues. Thus, we propose the following hypothesis: [vi]

H6 (a) Firm age is negatively related to long-term debt, and

H6 (b) Firm age relates negatively to short-term debt.

Empirical literature emphasizing on capital structure of SMEs in Eastern Europe finds that, on average, firms in transition economies operate at lower debt levels than comparable Western European firms. Nivorozhkin (2005) and Cornelli et al. (1996) conclude that the reason for the lower leverage in Eastern Europe is a supply side phenomenon, which means that sufficient financing is not available to the firms who are actually willing to take on more debt. The lack of financial supply is interpreted as being a consequence of country-specific factors like underdeveloped financial markets and weak legal environment. Thus we may expect that financial constraints problem will be more severe for firms in Eastern Europe than in their Western

counterparts given the potential heterogeneity between those two groups of countries.

Even though it is possible to interpret some of these country-specific factors in the context of the traditional capital structure theories discussed above, it is believed that they do not explicitly incorporate these factors. The reason is that the traditional theories of capital structure do, to a large extent, assume perfect capital markets in the sense that companies can frictionless acquire the financing they need. Thus, the impact of country-specific factors on leverage can be seen as an indicator that these traditional theories are, to a large extent, incomplete in the real world where stronger assumptions apply. To test this proposition we investigate the country-specific effects related to the economic development of a transition economy on firm leverage. Following Jensen and Uhl (2008) our last hypothesis would suggest that:

H7 (a) Economic development is positively related to long-term debt, and

H7 (b) Economic development relates positively to short-term debt.

Some predictions of the pecking order theory are at odds with those of the trade-off theory.[vii] In the first place, there is no target leverage as each firm chooses its leverage ratio based on financing needs. Firms choose to use debt only when internal funds are not enough to meet their investment needs and not because there are benefits and costs from using debt. Secondly, profitable firms use less amount of debt than less profitable ones. This effect derives from the fact that more profitable firms can finance a larger portion of their activities with internally generated funds. Finally, holding profitability constant, leverage is higher for firms with higher investments, as firms need to issue debt when investment exceed internally generated earnings.

Dataset and Model Variables

In this research we have adopted the European Commission's SME definition. According to it, SMEs are defined as enterprises in the non-financial business economy (NACE C-I, K) that employ less than 250 persons.[viii] The enterprises that employ 250 or more persons are defined as large scale enterprises (LSEs). We only consider the time period 2001 - 2005, as the dataset covers a substantially lower number of firms with complete data in the previous years and we want to work with comparable sample sizes in all the years under analysis. For the purpose of this paper, we apply some filters to the data. Firstly, we remove from the dataset observations with a negative value of assets and observations with missing or non-positive value of operating revenues, in order to enhance the quality of data used in our analysis. Secondly, we remove observations for which there are less than four consecutive years of accounting data and without a complete record for each variable over the period of examination. Finally, we clean the dataset from spurious outlier

observations in order to arrive at an economically meaningful sample. We end up with a total number of 13,456 observations for the period from 2001 to 2005. These observations correspond to about 3,257 firms.

Table 1 presents the debt structure of all the firms included in the sample. We observe that long-term debt (mainly bank loans and other noncurrent liabilities) is an important source of external funding for the firms included in our sample, accounting for more than 22 percent of the total debt. Short-term debt (including short-term loans and other current liabilities) is the main source of financing for SMEs in Central and Eastern Europe, accounting for more than 77 percent of firms' total debt, and its importance has slightly increased during the sample period. Whereas nonfinancial debt (of which 43.8 percent are trade credits) is the most important source of financing for micro firms (76.9 percent), bank loans (both long-term and short-term) are the main source of external funding (19.8 percent) for medium-sized firms. Small firms use predominantly short-term bank loans and trade credits (84.9 percent in total). Table 1 also displays summary statistics for the leverage ratio, defined as long-term or short-term debt as a percentage of total assets. When long-term leverage is considered, the leverage ratio decreases from 27 percent to around 4.2 percent, showing the diminishing importance of this source of funding for SMEs in our sample. At the same time, short-term leverage ratio remains relatively stable over the observation period (except for 2001), standing at around 5 percent.

Table 1–Debt Decomposition and Leverage Ratio by Years and Type of Firms, Total Sample

	Debt decomposition of the total sample (% of total debt)				Leverage ratio (debt/total assets)		
	LT Bank Loans	Other Noncurrent Liabilities	ST Bank Loans	Other Current Liabilities	Total leverage	Long-term leverage	Short-term leverage
2001	23.80%	25.94%	10.84%	39.42%	0.4004	0.2708	0.1296
2002	10.93	8.53	10.04	70.50	0.1325	0.0665	0.0659
2003	8.80	10.51	8.37	72.32	0.0938	0.0455	0.0483
2004	8.23	11.35	8.07	72.35	0.0881	0.0424	0.0457
2005	8.31	11.44	8.51	71.74	0.0915	0.0419	0.0496
Mean	*10.38*	*11.99*	*8.89*	*68.74*	*0.1284*	*0.0693*	*0.0591*
Micro	6.53	7.77	8.75	76.95	0.1169	0.0504	0.0665
Small	7.81	7.51	9.02	75.66	0.1240	0.0554	0.0686
Medium	10.97	12.93	8.88	67.22	0.1296	0.0724	0.0572
Mean	*10.38*	*11.99*	*8.89*	*68.74*	*0.1284*	*0.0693*	*0.0591*
Number of observations	13,456	13,456	13,456	13,456	13,456	13,456	13,456
Number of firms	3,257	3,257	3,257	3,257	3,257	3,257	3,257

Source: AMADEUS database (2008). Author's calculations.
Note:

Leverage is taken as ratio of debt to total assets. Total leverage includes both long-term and short-term debt. Long-term leverage ratio is taken as long-term debt to total assets; short-term leverage ratio is taken as short-term debt to total assets. Reported values for leverage ratios are mean values. Leverage ratios include only financial debt, that is, non-financial debt like trade credits are excluded from the analysis.

We grouped the firms in our sample in three size classes (following the European Commission's SME definition), taking into account their annual sales, scaled by total assets (see Table 2, Panel A). A relatively small percentage of all companies in the sample are micro firms (3.6 percent), having less than 10 employees and annual sales of 2.65 of total assets. As it would be expected, some of these firms do use external financing, more specifically short-term bank loans and trade credits. The median leverage ratio for this group is 0.9 percent during the sample period. Small firms (with less than 50 employees) account for only 13.8 percent of the total sample, with a median leverage ratio of 2.7 percent. Medium-sized firms represent 82.6 percent of all firms in our sample and are the most leveraged ones (with a median leverage ratio is 4.1 percent). We also grouped firms according to their age in four classes (see Table 2, Panel B). The average age of a firm in our dataset is 15 years. We observe that leverage seems to be (non-linearly) increasing with firm age.

Finally, we also examine differences between economic sectors (see Table 2, Panel C), observing that the most leveraged sector (taking into account median values) is agriculture, fishing and mining (10.5 percent), followed by manufacturing (5.6 percent) and public administration, education, health and social work (4.5 percent).

Table 2–Sample Distribution by Firm Size, Age and Sector, Total Sample

	Annual sales scaled by Total assets	Number of observations	Number of firms	Leverage ratio (median)
Panel A:				
Size (as of 2005)				
Micro (< 10 employees)	2.6494	484	117	0.0095
Small (< 50 employees)	2.4307	1,858	450	0.0269
Medium (< 250 employees)	1.4680	11,114	2,690	0.0407
Total sample	*1.5781*	*13,456*	*3,257*	*0.0379*
Panel B:				
Age				
≤ 5 years	1.7255	413	100	0.0000
6 - 10 years	1.8017	2,870	695	0.0072
11 - 20 years	1.6390	8,996	2,177	0.0482
> 20 years	0.6023	1,177	285	0.0705
Total sample	*1.5781*	*13,456*	*3,257*	*0.0379*

Table 2 (cont.)–Sample Distribution by Firm Size, Age and Sector, Total Sample

Panel C:				
Sector				
Agriculture, Fishing& Mining	0.6898	675	163	0.1049
Construction	1.8741	1,169	283	0.0039
Hotels and Restaurants	0.7592	133	32	0.0054
Manufacturing	1.4103	5,444	1,318	0.0559
Public Administration, Education, Health and Social Work	0.9568	155	38	0.0452
Real Estate, Renting and Business Activities	1.0082	1,151	279	0.0209
Transport, Storage and Communication	1.9674	660	160	0.0201
Utilities	0.3709	361	87	0.0323
Wholesale and Retail Trade	2.6962	3,282	794	0.0316
Other	1.2650	426	103	0.0202
Total sample	*1.5781*	*13,456*	*3,257*	*0.0379*

Source: AMADEUS database (2008). Author's calculations.

Note:

Leverage ratio is taken as ratio of total debt to total assets. Total leverage includes only financial debt, that is, nonfinancial debt like trade credits are excluded from the analysis.

Dependent Variable

In Section 2 we formulated a number of empirical hypotheses in order to test which of the two most relevant capital structure theories (trade-off and pecking order theory) better explains the capital structure of SMEs in Central and Eastern Europe. We begin by analysing the main determinants of the leverage ratio. Although there is little agreement in the existing literature on how to measure those attributes, previous empirical work can help us define objectively the proxy variables to be used in our study.

The variable that we intend to explain is debt capital structure. Following Jordan et al. (1998), Michaelas et al. (1999), and Sogorb-Mira (2005) we measure capital structure by total leverage ratio (TOT_LEV), that is, Total debt/Total assets. However, as argued by Van de Wijst and Thurik (1993), Chittenden et al. (1996), Barclay and Smith (1999), and Bevan and Danbolt (2000a), any analysis of leverage determinants based only on total liabilities may screen the important differences between long-term and short-term debt. Consequently, in order to shed some light on this question and to get a better understanding of capital structure and its determinants, we also consider the following two measures of leverage: (i) Long-term leverage ratio (LT_LEV), defined as Long-term debt/Total assets, and (ii) Short-term leverage ratio (ST_LEV), defined as Short-term debt/Total assets. Following Bonfim (2010) our analysis uses only financial leverage as dependent variable, that is, nonfinancial debt such as trade credits is excluded from the analysis.

Explanatory Variables

We have selected several proxies for explanatory variables that have been widely used in the empirical literature. Tables 3 shows a summarized description of both dependent and explanatory variables.

The main variable of interest in our study is cash flow ratio (CF_RATIO), which is computed as net earnings before provisions and depreciation, scaled by a firm's total assets.[ix] The estimated coefficient of this variable will play a central role in testing the pecking order theory, given that only negative (and significant) values will be considered as evidence in favour of this theory. In order to accurately estimate our model, we need to control for relevant firm characteristics which may also affect a firm's leverage. We use a set of control variables, which includes future growth opportunities, current liquidity, sales growth, age, size, and assets structure. All these variables are firm-specific and time-varying.

Future growth opportunities (INTA_ASSETS) are defined as the ratio between intangible assets and a firm's total assets (Michaelas et al., 1999; Sogorb-Mira, 2005). Intangible assets include research and development expenditure, trademarks, patents and copyrights. The trade-off theory predicts a negative relationship between growth opportunities and leverage (Myers, 1977). Firms whose assets are mostly comprised of intangibles may find it harder to obtain bank financing, thus displaying lower leverage ratios. Assets structure (TAN_ASSETS) is measured by the share of a firm's tangible assets (fixed assets and inventories) in total assets (Michaelas et al., 1999; Bevan and Danbolt, 2000(a,b); Sogorb-Mira, 2005). This variable is used to control for assets structure of the firm, and also for the collateral assets potentially available for debt contracts. In fact, as bankruptcy costs play a prominent role in the trade-off theory, assets structure is predicted to have a positive impact on leverage.

Table 3–Dependent and Explanatory Variables

Variable	Definition	Explanation	Expected Sign
Dependant Variables			
TOT_LEV	Total leverage ratio	Total debt to total assets, in period *t*	
LT_LEV	Long-term leverage ratio	Long-term debt to total assets, in period *t*	
ST_LEV	Short-term leverage ratio	Short-term debt to total assets, in period *t*	
Explanatory variables			
CF_RATIO	Cash flow/Total assets, proxy for internally generated funds	The ratio of net earnings plus depreciation to total assets in period *t*	-
INTA_ASSETS	Intangible assets/Total assets, proxy for future growth opportunities	The ratio of intangible assets to total assets in period *t*	-

Table 3 (cont.)–Dependent and Explanatory Variables

CURR_RATIO	Current assets/Current liquidity, proxy for short-term liquidity	The ratio of current assets to current liabilities in period *t*	-/+
G_OPREV	Growth in operating revenues, proxy for firm profitability (in percent)	Log difference of firm's revenues in periods *t* and *t – 1*	-
TOT_ASSETS	Book value of total assets, proxy for firm size (in euro)	Logarithm of firm's total assets in period *t*	+
TAN_ASSETS	Tangible assets/Total assets, proxy for assets structure	The ratio of tangible assets to total assets in period *t*	+
AGE	Number of years since the date of incorporation, proxy for firm age	Log of firm age (number of years of existence) in period *t*	-
CR_VOLUME	Volume of domestic credits to private sector as a share of GDP, proxy for credit activities (in euro)	The ratio of credit volume to GDP in period *t*	+
FDI	Foreign Direct Investment (FDI) flows, proxy for economic activities (in euro)	The ratio of FDI flows to GDP in period *t*	+
TAX_RATE	Statutory tax rate, proxy for tax burden on business (in percent)	Corporate income tax rate in period *t*	+/-
TIME	Temporal (year) dummy	A dummy used to control for different time periods	+/-
INDUSTRY	Industry dummy	A dummy used to control for specific industry characteristics	+/-

Current liquidity (CURR_RATIO) is constructed by taking the ratio of current assets to current liabilities and is used to control for short-term liquidity effects. In line with previous research we expect short-term liquidity to be negatively correlated with a firm's leverage ratios. Size (TOT_ASSETS) is obtained using the natural logarithm of a firm's total assets, with the aim of controlling a possible non-linearity in the data, and the consequent problem of heteroskedasticity (Cardone and Cazorla, 2001; Fama and French, 2002; Sogorb-Mira, 2005). Our expectation for the size is that it is positively related to firm leverage.

Firm growth (G_OPREV) is defined as one-year change in sales revenues, and is included in the regressions to control for firm growth. A negative relationship between firm leverage and sales growth is consistent with the trade-off theory. Age (AGE) is measured as the number of years since the date of incorporation of a firm. Following Pfaffermayr et al. (2008) we expect a negative relation between leverage and firm age. Older firms have in general the opportunity to accumulate more retained earnings over the years than younger firms and should therefore be able, to a higher degree, to finance their projects with internal funds. Based on this empirical evidence, one should expect that older firms rely more on internally generated funds and use less external (debt) financing.

Credit volume (CR_Volume) is defined as total volume of domestic credits to private sector as a share of GDP, and is included as proxy for credit activities in a transition economy. Increase in Foreign Direct Investment (FDI) inflows is also a sign for healthy economy and better investment opportunities. Thus, both variables are expected to be positively related to firm leverage. Statutory tax rate (TAX_RATE) is included in our analysis as proxy for tax burden on businesses in CEE countries. The empirical evidence on tax effect on leverage is mix. According to the trade-off theory, the benefit of a tax shield is affected by the statutory tax rate, which is highly individual from country to country. A higher tax rate should, all else equal, increase the potential gain from a tax shield, and will therefore make the use of debt more attractive. In terms of the pecking order theory, it is more difficult to see the same relevance of this country-specific factor for firms' capital structure choice.

The correlation matrix of dependent and explanatory variables is presented in Table 4 (total sample) and is used to examine the possible degree of collinearity among these variables. As we observe in Table 4, the correlation coefficients are not sufficiently large to cause collinearity problems in the regressions and are statistically significant at the usual levels of significance.

Table 5 presents summary statistics for the whole sample of 3,257 firms. We see that the sample consists of micro, small and medium-sized firms with average assets of €7.4 million and average sales revenues of 1.58 times total assets. The median growth rate in revenues is 14 percent, and represents a relatively high growth achieved by these firms over the period 2001 – 2005. SMEs in our sample exhibit low degree of leverage, with a ratio of total debt to total assets of 0.13 (on average). The current ratio, used as a proxy for short-term liquidity, is relatively high (a median of 1.21), and shows that the average firm in our sample has no problem with meeting its current obligations. At the same time the ratio of intangible assets to total assets (used as a proxy for a firm's future growth opportunities) is relatively low (a median of 0.0006). The reason may be that small and medium-sized firms invest fewer funds in R&D, patents and copyrights compared to large firms. The statistics for internally generated funds by the firms in our sample shows that €1 invested in total assets generates €0.19 of free cash flow on average. The data for assets structure reveal that, on average, the share of tangible assets in a firm's total assets is 37.7 percent. Table 5 shows that the statutory tax rate is, on average, 24 percent for the countries included in our sample.

Table 4a–Correlation Matrix of Model Variables

	TOT_ LEV	LT_ LEV	ST_ LEV	CF_ RATIO	INTA_ ASSETS	CURR_ RATIO	TAN_ ASSETS	TOT_ ASSETS	AGE
TOT_LEV	1.0000								
LT_LEV	0.8204***	1.0000							
ST_LEV	0.6543***	0.1045***	1.0000						
CF_RATIO	0.3153***	0.3434***	0.0943***	1.0000					
INTA_ASSETS	0.3652***	0.3655***	0.1518***	0.2904***	1.0000				
CURR_RATIO	-0.0101	0.0576***	-0.0938***	0.0678***	0.0711***	1.0000			
G_OPREV	-0.0215**	0.0140	-0.0488***	0.1895***	-0.009	-0.0199**	1.0000		
TOT_ASSETS	-0.0032	-0.0244**	0.0266***	-0.2675***	-0.2054***	0.0264***	-0.0577***	1.0000	
TAN_ASSETS	-0.0176**	0.0564**	-0.1053***	-0.0464***	-0.1168***	-0.0264***	-0.0416***	0.0396***	1.0000
AGE	-0.0057	0.0074	-0.0196**	-0.1278***	-0.0702***	0.0190**	-0.1969***	0.2684***	0.1428***
CR_VOLUME	0.2148***	0.1604***	0.1615***	-0.0796***	-0.0532***	0.0229***	-0.1907***	0.3408***	-0.0876***
FDI	0.0800***	0.0826***	0.0299***	0.0223***	-0.0246***	-0.0021	0.1665***	0.0813***	-0.0589***
TAX_RATE	0.1432***	0.1100***	0.1036***	0.1061***	0.0590***	0.0045	0.0189*	-0.0126	-0.1302***

Table 4b–Correlation Matrix of Model Variables

	G_OP REV	CR_ VOLUM E	FDI	TAX_ RATE
TOT_LEV				
LT_LEV				
ST_LEV				
CF_RATIO				
INTA_ASSETS				
CURR_RATIO				
G_OPREV				
TOT_ASSETS				
TAN_ASSETS				
AGE	1.0000			
CR_VOLUME	0.2454***	1.0000		
FDI	-0.0102	0.3563***	1.0000	
TAX_RATE	-0.2397***	0.2609***	0.1630***	1.0000

* indicates that correlation is significant at the 10 percent level
** indicates that correlation is significant at the 5 percent level
*** indicates that correlation is significant at the 1 percent level

Note:
The dependant variables in model (1) are long-term leverage (LT_LEV), short-term leverage (ST_LEV), and total leverage (TOT_LEV). The explanatory variables in model (1) are Cash flow ratio (CF_RATIO), Future growth opportunities (INTA_ASSETS), Current ratio (CURR_RATIO), Sales growth (G_OPREV), Total assets (TOT_ASSETS), Assets structure (TAN_ASSETS), Age (AGE), Credit volume (CR_VOLUME), Foreign direct investment (FDI) and Statutory tax rate (TAX_RATE). Country-specific variables (except tax rate) are computed as a percentage of GDP. All variables are taken as ratios except Sales growth and Tax rate (in percent), Age (years), and Total assets (in Euros, thousands).

Table 5–Summary of Sample Statistics

Variable	Obs.	Percentile			Mean	Standard Deviation	Min	Max
		50th	75th	90th				
TOT_LEV	13,456	0.0379	0.1888	0.3907	0.1284	0.1920	0	0.9994
LT_LEV	13,456	0.0014	0.0584	0.2434	0.0693	0.1460	0	0.9978
ST_LEV	13,456	0.0000	0.0750	0.1973	0.0591	0.1104	0	0.9984
CF_RATIO	13,456	0.1098	0.2255	0.4560	0.1915	0.3109	-3.3970	8.2528
INTA_ ASSETS	13,456	0.0006	0.0042	0.0331	0.0305	0.1155	0	0.9963
CURR_ RATIO	13,456	1.2121	1.9044	3.4142	1.9414	4.3810	0	125
G_OPREV	9,730	14.01	32.29	60.91	19.53	38.56	-197.73	199.99
TOT_ ASSETS	13,456	3,450	7,163	15,906	7,405.20	14,328	3	195,221
TAN_ ASSETS	13,456	0.3560	0.5639	0.7355	0.3774	0.2504	0	0.9955
AGE	13,456	12.5	14.4	16.7	14.57	17.49	3	59.4
CR_ VOLUME	13,456	28.94	32.61	36.96	25.86	9.34	8.70	51.31
FDI	13,456	5.74	9.68	15.14	7.43	4.31	2.28	17.90
TAX_RATE	13,456	25	28	31	24.14	5.82	10	31
Number of observations	*13,456*							
Number of firms	*3,257*							

Note:
The dependant variables in model (1) are long-term leverage (LT_LEV), short-term leverage (ST_LEV), and total leverage (TOT_LEV). The explanatory variables in model (1) are Cash flow ratio (CF_RATIO), Future growth opportunities (INTA_ASSETS), Current ratio (CURR_RATIO), Sales growth (G_OPREV), Total assets (TOT_ASSETS), Assets structure (TAN_ASSETS), Age (AGE), Credit volume (CR_VOLUME), Foreign direct investment (FDI) and Statutory tax rate (TAX_RATE). Country-specific variables (except tax rate) are computed as a percentage of GDP. All variables are taken as ratios except Sales growth and Tax rate (in percent), Age (years), and Total assets (in Euros, thousands).

Empirical Tests and Results

The panel character of our data allows us to use a panel data methodology for our empirical research. This type of analysis can control firm heterogeneity, and reduce collinearity among the variables that are contemplated (Arellano and Bover, 1990). Likewise, this technique enables us to eliminate the potential biases in the resulting estimates due to correlation between unobservable individual effects and the explanatory variables included in the study. Our panel data model may be represented as follows:

$$\frac{D}{A_{it}} = \alpha_i + \beta_1 \frac{D}{A_{it-1}} + \beta_2 \frac{CF}{A_{it}} + \beta_3 X_{it} + \beta_3 Z_{it} + \eta_t + \varepsilon_{it} \quad (1)$$

Our dependent variable is

$$\frac{D}{A_{it}},$$

the leverage ratio defined as long-term or short-term debt to total assets;

$$\frac{CF}{A_{it}}$$

is the cash flow (net earnings before provisions and depreciation), scaled by a firm's total assets; vector X_{it} refers to the set of control (firm specific) variables, which includes *Future growth opportunity, Liquidity, Sales growth, Size, Assets structure*, *and Age*; and vector Z_{it} represents the set of country-specific variables, namely *Credit volume, Foreign Direct Investment, and Statutory tax rate*, as defined in Table 3. Additionally, in all regressions presented below we control for time and industry specific effects.[x]

To estimate the dynamic regression model (1) using panels containing many firms and a small number of time periods, we use GMM-system estimator developed by Arellano and Bover (1995), and Blundell and Bond (1998). This estimator controls for the presence of unobserved firm-specific effects and for the endogeneity of explanatory variables.[xi]

The results for GMM estimators are presented in Table 6 (total sample). We run the regression for three different models using long-term, short-term and total leverage as dependant variable. First, we present the results for a simple estimation, in which we consider as explanatory variable only the cash flow ratio, which is our main variable of interest (see Model specifications 1, 4 and 7). We control, as in all other regressions, for time and industry specific effects. We obtain negative and highly statistically significant coefficients for cash flow variable for all model specifications except for long-term leverage (estimated coefficients are negative but

statistically insignificant). The insignificant relationship between cash flow and long-term debt may be an evidence of the 'supply' constraint problem with long-term debt.[xii] The preliminary results do support the pecking order theory (POT) according to which firms with more internal funds available will use less external (debt) financing than other comparable firms. Thus, in line with previous empirical research, we find strong evidence that firm profitability and leverage are negatively correlated.

Table 6–GMM-System Results for Total, Long-Term and Short-Term Leverage: Total Sample[1, 2, 3]

Explanatory variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
TOT_LEV	0.38***	0.38***	0.41***						
(lagged 1)	(0.00)	(0.00)	(0.00)						
LT_LEV				0.60***	0.58***	0.60***			
(lagged 1)				(0.00)	(0.00)	(0.00)			
ST_LEV							0.27***	0.27***	0.30***
(lagged 1)							(0.00)	(0.00)	(0.00)
CF_RATIO	-0.07***	-0.06***	-0.06***	-0.00	-0.00	-0.00	-0.06***	-0.05***	-0.06***
	(0.00)	(0.00)	(0.00)	(0.78)	(0.74)	(0.74)	(0.00)	(0.00)	(0.00)
INTA_ASSETS	-	0.08	0.07	-	0.15**	0.15**	-	-0.06	-0.07
		(0.31)	(0.36)		(0.02)	(0.02)		(0.31)	(0.23)
CURR_RATIO	-	-0.00	-0.00	-	0.00***	0.00***	-	-0.00***	-0.00***
		(0.34)	(0.34)		(0.00)	(0.00)		(0.00)	(0.00)
G_OPREV	-	-0.01***	-0.02***	-	-0.01**	-0.01**	-	-0.01**	-0.01**
		(0.00)	(0.00)		(0.02)	(0.01)		(0.02)	(0.01)
TOT_ASSETS	-	0.03***	0.03***	-	0.02***	0.02***	-	0.01**	0.01***
		(0.00)	(0.00)		(0.00)	(0.00)		(0.03)	(0.00)
TAN_ASSETS	-	0.02	0.02	-	0.04***	0.04***	-	-0.02	-0.02
		(0.28)	(0.36)		(0.01)	(0.01)		(0.16)	(0.13)
AGE	-	-0.03	0.03		-0.01	0.04		-0.03	-0.01
		(0.37)	(0.48)		(0.76)	(0.14)		(0.21)	(0.82)
CR_VOLUME	-	-	0.43***	-	-	0.24**	-	-	0.21**
			(0.00)			(0.02)			(0.01)
FDI	-	-	0.11**	-	-	-0.02	-	-	0.14***
			(0.05)			(0.75)			(0.00)
TAX_RATE	-	-	0.24***	-	-	0.20***	-	-	0.06*
			(0.00)			(0.00)			(0.10)
INDUSTRY DUMMIES	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
TIME DUMMIES	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	3,06	3,06	3,51	3,06	3,06	3,51	3,06	3,51	3,51
Arellano-Bond test - Prob > z	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sargan test – Prob > χ^2	0.33	0.41	0.06	0.23	0.33	0.14	0.57	0.51	0.19

Notes for table on following page.

Notes:

1.) Models 1, 4 and 7 include only cash flow ratio as explanatory variable; all other models include both cash flow ratio and control variables (firm-specific and country-specific). We use three different types of dependent variables: long-term leverage, short-term leverage, and total leverage, rounded at two significant decimals. 2) *, **, and *** represent significance at 10, 5, and 1 percent, respectively. All regressions include dummies to control for time and industry effects, 3) *P*-values in brackets.

However, this specification is clearly insufficient for more definite conclusions to be reached, given that several other firm characteristics are also likely to be important in explaining leverage ratios. Hence, in Table 6 we present another regression, in which we include the control variables specified above (see Model specifications 2, 5 and 8). The results obtained with this specification show that the coefficients associated with cash flow ratio remain stable and statistically significant at 1 percent level of significance. The negative coefficient on cash flow implies evidence for the pecking order theory, which argues that more profitable firms tend to use lesser debt when financing their activities.[xiii] This result supports our hypotheses that leverage is negatively related to firm profitability, and that SMEs employ predominantly short-term debt if external funds are needed.

The coefficients we obtained for the control variables are all statistically significant at 1 and 5 percent level of significance (except AGE variable). The results show that firms with stronger sales growth employ lower leverage ratios, even though this effect is relatively small. If this variable is seen as a proxy for growth opportunities, the negative coefficient is consistent with the trade-off theory, as risk tends to be higher for these firms, pushing up bankruptcy costs. However, it is also consistent with the complex view of the pecking order theory, which argues that firms would rather maintain low-risk debt capacity to avoid foregoing future investments or having to finance them with new risky securities. Thus, we find evidence in support of our hypothesis that growth opportunities are negatively related to firm leverage (both long-term and short-term debt.)

Firm size seems to be extremely important in explaining leverage ratios (see Model specifications 2, 5 and 8), as larger firms show much higher leverage ratios than other firms, other firm characteristics being controlled for. This is consistent with the view that larger firms tend to be more diversified and, hence, less volatile, as discussed by Fama and French (2002). Regarding the decomposition of debt structure, we observe positive relationship between firm size and leverage (both long-term and short-term), with estimated coefficients of TOT_ASSETS being strongly statistically significant in each case. We may conclude that larger firms seem to employ more debt independently of its maturity, perhaps because they can hold a greater bargaining power towards creditors. Contrary to Hall et al. (2004) we do not find evidence that smaller firms tend to use more short-term debt if external funds are needed.

We also find that leverage ratios are strongly correlated with a firm's assets structure. Remember that SMEs are more likely to suffer from moral hazard and

adverse selection problems, therefore the collateral value of their tangible assets could help to reduce this sort of problems. As we can see from the results in Table 6 the relationship between leverage and assets structure changes significantly depending on the type of leverage ratio firms employ. Specifically, we find that long-term debt ratio is positively correlated with assets structure, whereas this relationship becomes negative (and statistically insignificant) if leverage is short-term. Similar results are obtained by Van der Wijst and Thurik (1993), Chittenden et al. (1996), Hall et al. (2000 and 2004), and Sogorb-Mira (2005).[xiv]

In general, SMEs with more growth opportunities will include more debt in their capital structures. Similarly to Sogorb-Mira (2005) we find evidence in support of this hypothesis only for firms that use long-term debt. According to trade-off theory a negative relationship between growth opportunities and leverage should exist. The results in Table 6 do not support the predictions of trade-off theory and thus we have to reject our hypothesis for negative correlation between future growth opportunities (represented by the ratio of intangible assets to total assets) and long-term leverage.[xv] The relationship is negative but statistically insignificant if short-term leverage is used.

In contrast to some previous research (Hall et al., 2004) we do not find evidence in support of the hypothesis that firm age is negatively correlated with leverage.[xvi] AGE variable has the expected sign but is statistically insignificant for all model specifications. Finally, the results in Table 6 show a positive correlation between current ratio and long-term leverage; therefore we have to reject our hypothesis that firm liquidity is negatively related to long-term debt. In contrast, we find that firms that use more short-term debt to finance their investment activities keep lower liquidity levels. The results of the Arellano-Bond and Sargan tests (shown at the bottom of the table) confirm that all models are well specified.

Nevertheless, the results for this second specification may be seriously affected by simultaneity issues. In fact, it is possible that there are some unobserved time-varying variables which simultaneously affect the leverage ratio and other firm-specific variables, thus leading to potentially serious endogeneity problems. In order to minimize this potential problem, we consider an alternative specification (not presented here), in which all explanatory variables are lagged by one period. The results show that the estimated coefficients for cash flow remain statistically significant for all model specifications, except for long-term debt. For all other control variables, the results are generally consistent with those obtained in the previous regressions.

When we control for country-specific characteristics such as credit volume, FDI inflows and statutory tax rate (see Model specifications 3, 6 and 9), the estimates coefficients of cash flow (and other firm specific) variables remain stable and with the expected signs. At the same time we find strong evidence in support of our

hypothesis that country-specific factors related to the economic development of a transition economy have a strong impact on firm leverage.

The results obtained so far suggest that the determinants of firm leverage may be considerably different depending on firms' size, age, or industry structure. In order to check the robustness of our results we split the sample based on age, size, industry and growth characteristics, and estimate the regression using the same explanatory variables as in model (1). The results of these estimations are displayed in Tables 7 through 10.

From these results we observe that the estimated coefficients for cash flow ratio are negative and statistically significant only for firms older than 10 years (see Table 7). Firms with more than 10 years of existence seem to employ more short-term debt than long-term financing in case of insufficient internal funds. The results we obtained for other firm specific and economy-wide variables are broadly consistent with those previously reported. Future growth opportunities and current liquidity are positively correlated with long-term leverage but the relationship becomes negative if short-term debt is used (see Model specifications 2 and 3 for older firms sub-sample.) The trade-off between sales growth and leverage is negative and statistically significant for both younger and older firms. Both size (as measured by a firm's total assets) and assets structure seem to be important determinants of leverage only in firms older than 10 years. The impact of country-specific effects on firm leverage is statistically significant for all model specifications (except for FDI variable), with stronger effect on older SMEs.

We obtain similar results when regressions are estimated by firm size: medium-sized firms seem to employ more short-term debt than long-term financing in case of insufficient internal funds (see Table 8). Thus, we may conclude that larger SMEs with more internal funds available will use less external (debt) funding than smaller firms; for micro and small firms the cash flow coefficient is negative but statistically insignificant. Future growth opportunities as represented by the ratio of intangible assets to total assets have a statistically significant effect on leverage only in firms that employ long-term debt; the remaining variables hold the same signs, if statistically significant. The main finding is that firm specific characteristics such as liquidity, sales growth, and assets structure have larger impact on capital structure of medium-sized firms than micro and small firms. As expected, credit volume, FDI inflows and tax rate are important determinants of a firm's capital structure for both types of SMEs.

Table 7–GMM-System Results for Total, Short-Term and Long-Term Leverage: Age Sample[1, 2, 3]

	By Age					
	Less than 10 years			Greater than 10 years		
Explanatory variables	**Model 1**	**Model 2**	**Model 3**	**Model 1**	**Model 2**	**Model 3**
TOT_LEV	0.238***			0.443***		
(lagged 1)	(0.004)			(0.000)		
LT_LEV		0.310***			0.669***	
(lagged 1)		(0.000)			(0.000)	
ST_LEV			0.196**			0.310***
(lagged 1)			(0.016)			(0.004)
CF_RATIO	-0.029	-0.002	-0.025	-0.071***	-0.006	-0.068***
	(0.226)	(0.870)	(0.203)	(0.000)	(0.703)	(0.000)
INTA_ ASSETS	-0.014	0.002	-0.019	0.051	0.169**	-0.096*
	(0.932)	(0.981)	(0.890)	(0.562)	(0.027)	(0.101)
CURR_ RATIO	-0.001	-0.001	-0.001*	0.001	0.003***	-0.002***
	(0.170)	(0.888)	(0.070)	(0.921)	(0.000)	(0.000)
G_OPREV	-0.022***	-0.011**	-0.012**	-0.015***	-0.009**	-0.007*
	(0.004)	(0.041)	(0.046)	(0.009)	(0.057)	(0.061)
TOT_ ASSETS	0.002	0.002	-0.001	0.054***	0.033***	0.020***
	(0.783)	(0.672)	(0.988)	(0.000)	(0.000)	(0.000)
TAN_ASSETS	0.041	0.038*	0.002	0.012	0.043**	0.026*
	(0.228)	(0.103)	(0.929)	(0.572)	(0.029)	(0.085)
CR_VOLUME	0.418*	0.162	0.173	0.469***	0.340***	0.207**
	(0.083)	(0.340)	(0.373)	(0.001)	(0.004)	(0.024)
FDI	0.164	-0.101	0.286***	0.080	0.002	0.084*
	(0.223)	(0.278)	(0.008)	(0.251)	(0.962)	(0.072)
TAX_RATE	0.047	0.169**	0.115	0.320***	0.209***	0.134***
	(0.666)	(0.024)	(0.185)	(0.000)	(0.002)	(0.010)
INDUSTRY DUMMIES	Yes	Yes	Yes	Yes	Yes	Yes
TIME DUMMIES	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	741	741	741	2,318	2,318	2,318
Arellano-Bond test - Prob > *z*	0.0035	0.0769	0.0008	0.0000	0.0009	0.0333
Sargan test - Prob > χ^2	0.0640	0.0713	0.2118	0.0664	0.0731	0.2490

Notes:

1.) Models 1 through 3 include both cash flow ratio and control variables (firm-specific and country-specific). Age samples include firms with less than 10 years of existence and firms older than 10 years. We use three different types of dependent variables: long-term leverage, short-term leverage, and total leverage. 2) *, **, and *** represent significance at 10, 5, and 1 percent, respectively. All regressions include dummies to control for time and industry effects. 3) *P*-values in brackets.

Table 8–GMM-System Results for Fotal, Short-Term and Long-Term Leverage: Size Sample[1, 2, 3]

	By Size					
	Micro and small firms			Medium-sized firms		
Explanatory variables	**Model 1**	**Model 2**	**Model 3**	**Model 1**	**Model 2**	**Model 3**
TOT_LEV	0.151			0.455***		
(lagged 1)	(0.192)			(0.000)		
LT_LEV		0.407***			0.619***	
(lagged 1)		(0.005)			(0.000)	
ST_LEV			0.046			0.352***
(lagged 1)			(0.710)			(0.000)
CF_RATIO	-0.065	-0.024	-0.036	-0.056***	-0.009	-0.059***
	(0.137)	(0.352)	(0.336)	(0.001)	(0.499)	(0.003)
INTA_ASSETS	-0.347	-0.142	-0.203	0.099	0.166**	-0.054*
	(0.347)	(0.525)	(0.517)	(0.218)	(0.016)	(0.101)
CURR_RATIO	-0.002	-0.003	-0.002	-0.001	0.002***	-0.002***
	(0.126)	(0.748)	(0.140)	(0.834)	(0.001)	(0.000)
G_OPREV	-0.010	-0.006	-0.006	-0.018***	-0.010**	-0.009***
	(0.302)	(0.305)	(0.478)	(0.001)	(0.025)	(0.007)
TOT_ASSETS	0.026**	0.018**	0.010*	0.039***	0.023***	0.016***
	(0.027)	(0.011)	(0.087)	(0.000)	(0.001)	(0.001)
TAN_ASSETS	-0.022	-0.001	-0.024	0.032	0.050***	-0.015
	(0.662)	(0.997)	(0.573)	(0.1229)	(0.005)	(0.272)
AGE	-0.090	-0.023	-0.087	-0.031	-0.047	-0.001
	(0.497)	(0.765)	(0.445)	(0.397)	(0.142)	(0.945)
CR_VOLUME	0.626*	0.541**	0.176*	0.417***	0.185*	0.234***
	(0.105)	(0.018)	(0.091)	(0.001)	(0.083)	(0.005)
FDI	0.240	-0.018	0.313**	0.089	0.009	0.094**
	(0.148)	(0.244)	(0.028)	(0.184)	(0.873)	(0.048)
TAX_RATE	0.174	0.229**	0.012	0.263***	0.179***	0.094**
	(0.307)	(0.033)	(0.933)	(0.000)	(0.003)	(0.048)
INDUSTRY DUMMIES	Yes	Yes	Yes	Yes	Yes	Yes
TIME DUMMIES	Yes	Yes	Yes	Yes	Yes	Yes

Table 8 (cont.)–GMM-System Results for Fotal, Short-Term and Long-Term Leverage: Size Sample[1, 2, 3]

Number of observations	403	403	518	2,656	2,656	2,656
Arellano-Bond test - Prob > *z*	0.0243	0.0262	0.0012	0.0000	0.0000	0.0061
Sargan test - Prob > χ^2	0.2537	0.3456	0.7421	0.2089	0.1991	0.2414

Notes:

1.) Models 1 through 3 include both cash flow ratio and control variables (firm-specific and country-specific). Size samples include micro and small firms, and medium-sized firms. We use three different types of dependent variables: long-term leverage, short-term leverage, and total leverage. 2.) *, **, and *** represent significance at 10, 5, and 1 percent, respectively. All regressions include dummies to control for time and industry effects. 3.) *P*-values in brackets.

For robustness purposes, we also estimate the regression for different sectors. In Table 9 we present the results for manufacturing firms (compared with other industries), as these represent a large part of our sample (40 percent of all firms). The results are broadly consistent with those previously obtained and there is a slight improvement in the model's adjustment quality. We find strong evidence that firms which are able to generate more internal funds use less external (debt) financing, independent of the industry. The relationship is negative but statistically insignificant if firms employ long-term debt. Firm size and liquidity also play a significant role in explaining a firm's capital structure. For SMEs operating in industries other than manufacturing, the results show that firms with stronger sales growth employ lower leverage ratios. Assets structure shows a marginally significant effect on leverage only in manufacturing firms. As expected, economy-wide variables used as proxies for country-specific factors play a significant role in explaining SMEs' capital structure both in manufacturing and other industries.

In order to test the hypothesis that high-growth firms may have capital structure different from low-growth firms, we run model (1) separately for slow-growing and fast-growing firms, with the same explanatory variables (see Table 10).[xvii] For both types of firms we find strong evidence in support of the pecking order theory according to which firms with more internal funds available will use lesser debt. Sales growth seems to be an important determinant of leverage only in firms with less than 20% increase in assets over the observation period. Firm size and liquidity variables play a significant role in explaining a firm's capital structure in both types of SMEs. As in all previous estimations, future growth opportunities are found to have only a marginally statistically significant effect on firm leverage. The impact of country-specific factors on leverage is strong and positive.

Table 9 – GMM-System Results for Total, Short-Term and Long-Term Leverage: Sector Sample[1,2,3,4,5]

	By Sector					
	Manufacturing			Other industries		
Explanatory variables	**Model 1**	**Model 2**	**Model 3**	**Model 1**	**Model 2**	**Model 3**
TOT_LEV (lagged 1)	0.272*** (0.000)			0.477*** (0.000)		
LT_LEV		0.473***			0.636***	
(lagged 1)		(0.000)			(0.000)	
ST_LEV			0.173***			0.417***
(lagged 1)			(0.001)			(0.000)
CF_RATIO	-0.076***	-0.017	-0.053***	-0.045**	-0.019	-0.060***
	(0.001)	(0.357)	(0.000)	(0.027)	(0.229)	(0.000)
INTA_ASSETS	0.178	0.407**	-0.176	0.050	-0.095	-0.046
	(0.456)	(0.048)	(0.254)	(0.5529)	(0.157)	(0.473)
CURR_RATIO	0.001	0.002***	-0.001***	-0.001*	0.001*	-0.003***
	(0.644)	(0.007)	(0.009)	(0.109)	(0.088)	(0.000)
G_OPREV	-0.011	-0.002	-0.010**	-0.021***	-0.015***	-0.007*
	(0.151)	(0.759)	(0.027)	(0.001)	(0.002)	(0.096)
TOT_ASSETS	0.046***	0.023***	0.022***	0.030***	0.021***	0.008*
	(0.000)	(0.007)	(0.000)	(0.000)	(0.000)	(0.102)
TAN_ASSETS	0.027	0.048**	-0.017	0.003	0.031	-0.024
	(0.305)	(0.041)	(0.331)	(0.893)	(0.135)	(0.217)
AGE	-0.006	-0.045	-0.022	-0.003	-0.017	-0.006
	(0.889)	(0.279)	(0.469)	(0.893)	(0.666)	(0.860)
CR_VOLUME	0.551***	0.070	0.400***	0.406***	0.356***	0.089
	(0.004)	(0.678)	(0.001)	(0.007)	(0.002)	(0.429)
FDI	-0.008	-0.049	0.080	0.154***	-0.015	0.167***
	(0.933)	(0.5600	(0.192)	(0.050)	(0.800)	(0.004)
TAX_RATE	0.250**	0.151*	0.084*	0.216**	0.224***	0.037*
	(0.014)	(0.086)	(0.098)	(0.011)	(0.001)	(0.106)
INDUSTRY DUMMIES	No	No	No	No	No	No
TIME DUMMIES	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	1,206	1,206	1,206	1,853	1,853	1,853
Arellano-Bond test - Prob > *z*	0.0018	0.0000	0.0052	0.0000	0.0000	0.0262
Sargan test - Prob > χ^2	0.1771	0.0330	0.0709	0.8507	0.1170	0.2640

Notes:
1) Models 1 through 3 include both cash flow ratio and control variables (firm-specific and country-specific). Sector sample includes firms from manufacturing industry and firms from all other industries. We use three different types of dependent variables: long-term leverage, short-term leverage, and total leverage. 2) *, **, and *** represent significance at 10, 5, and 1 percent, respectively. All regressions include dummies to control for time effects. 3) *P*-values in brackets.

Table 10–GMM-System Results for Total, Short-Term and Long-Term Leverage: Growth Sample[1, 2, 3]

	By Growth					
	Slow growing			Fast growing		
Explanatory variables	**Model 1**	**Model 2**	**Model 3**	**Model 1**	**Model 2**	**Model 3**
TOT_LEV	0.574***			0.182***		
(lagged 1)	(0.000)			(0.000)		
LT_LEV		1.035***			0.237***	
(lagged 1)		(0.000)			(0.000)	
ST_LEV			0.211***			0.189**
(lagged 1)			(0.000)			(0.030)
CF_RATIO	-0.099***	-0.038	-0.100***	-0.041**	-0.013	-0.026**
	(0.000)	(0.133)	(0.000)	(0.017)	(0.317)	(0.030)
INTA_ASSETS	-0.452*	0.038	-0.251	0.119*	0.158***	-0.038
	(0.068)	(0.868)	(0.114)	(0.102)	(0.006)	(0.466)
CURR_RATIO	-0.001	0.003**	-0.004***	-0.004	0.001***	-0.001***
	(0.368)	(0.024)	(0.000)	(0.604)	(0.024)	(0.001)
G_OPREV	-0.031***	-0.026***	-0.012**	-0.006	-0.003	-0.003
	(0.001)	(0.004)	(0.026)	(0.227)	(0.452)	(0.310)
TOT_ASSETS	0.044***	0.001	0.024**	0.022***	0.015***	0.006*
	(0.008)	(0.923)	(0.023)	(0.000)	(0.001)	(0.054)
TAN_ASSETS	0.066	0.038	-0.005	0.001	0.018	-0.145
	(0.116)	(0.332)	(0.831)	(0.951)	(0.219)	(0.287)
AGE	-0.033	-0.115*	-0.059	-0.021	-0.001	-0.020
	(0.628)	(0.072)	(0.158)	(0.579)	(0.969)	(0.444)
CR_VOLUME	0.166	0.054	0.168	0.674***	0.357***	0.303***
	(0.413)	(0.776)	(0.195)	(0.000)	(0.001)	(0.002)
FDI	0.115	00.048	0.160***	0.107	0.031	0.085
	(0.210)	(0.576)	(0.006)	(0.195)	(0.626)	(0.142)
TAX_RATE	0.254**	0.165*	0.087	0.254***	0.183***	0.066
	(0.032)	(0.104)	(0.246)	(0.001)	(0.002)	(0.227)
INDUSTRY DUMMIES	Yes	Yes	Yes	Yes	Yes	Yes
TIME DUMMIES	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	1,398	1,398	1,398	1,654	1,654	1,654
Arellano-Bond test - Prob > *z*	0.0001	0.0000	0.0013	0.0000	0.0000	0.0000
Sargan test - Prob > χ^2	0.4135	0.9734	0.2441	0.1020	0.2256	0.0710

Notes:
1) Models 1 through 3 include both cash flow ratio and control variables (firm-specific and country-specific). Growth samples include fast-growing (with at least 20% annual growth in assets, on average) and slow-growing firms. We use three different types of dependent variables: long-term leverage, short-term leverage, and total leverage. 2) *, **, and *** represent significance at 10, 5, and 1 percent, respectively. All regressions include dummies to control for time and industry effects. 3) *P*-values in brackets.

Conclusion

This paper investigates the main determinants of capital structure of firms. Using panel data analysis for a set of 3,257 SMEs in Central and Eastern Europe, we find tha firm leverage is determined not only by the availability of internally generated funds, but also depends on other firm specific characteristics such as future growth opportunities, leverage, sales growth, size and assets structure. Country-specific factors (credit volume, foreign direct investment and statutory tax rate) are found to play an important role in explaining SMEs' capital structure.

If cash flow is used as the only explanatory variable in the regression, the results do support the pecking order theory according to which firms with more internal funds available will use less external (debt) financing than other comparable firms. When we control for other firm specific characteristics such as future growth opportunities, liquidity, sales growth, size, age and assets structure the coefficients associated with cash flow ratio remain stable and statistically significant at 1 percent, except for long-term debt.

We find that growth in operating revenues is strongly (and negatively) correlated with firm leverage. Contrary to our expectations, the results show that firms with stronger liquidity buffers use more long-term debt to finance their investment activities than similar firms with low liquidity levels. In general, SMEs with more growth opportunities will include more debt in their capital structures. Similarly to Sogorb-Mira (2005) we do find evidence in support of this hypothesis only for firms that employ long-term leverage. In line with previous empirical research (Hall et al., 2004) we find that the relationship between leverage and a firm' assets structure significantly depends on the type of leverage employed. Specifically, long-term debt is positively correlated with assets structure, whereas this relationship becomes negative if firms employ short-term debt.

In contrast to Hall et al. (2004) we do not find evidence in support of the hypothesis that firm age is negatively correlated with leverage (both short-term and long-term). One possible explanation may be that SMEs in Central and Eastern Europe are, in general, younger than their counterparts in Western Europe (with an average age of 15 years in our sample). This could suggest that in the early years of existence, age is negatively associated with firm leverage (or has no significant impact on a firm's capital structure) but then the relationship becomes positive in the later years.

Firm size seems to be extremely important in explaining leverage ratios as larger firms usually show much higher leverage ratios than other comparable firms, other firm characteristics being controlled for. In line with Jensen and Uhl (2008) who find that SMEs in Central and Eastern Europe seem to have used less long-term debt as they grow older, our results show that larger firms in the sample (which also tend to be more mature) are less levered. They rely strongly on internally generated funds to finance their operations, which is in compliance with the pecking order theory.

However, we believe that these hypotheses do not explain everything in terms of SMEs' capital structure since there are variations in the effects of the determinants on capital structure between countries. The variations could well be due to differences in attitudes to borrowing, disclosure requirements, relationships with banks, taxation and other national economic, social and cultural differences (Hall et al., 2004). Our research provides further evidence that economy-wide factors such as credit volume, FDI inflows and statutory tax rate do play a significant role in explaining firms leverage in CEE countries.

The results obtained suggest that the determinants of firm leverage may be considerably different depending on firms' size, age, or industry structure. In order to check the robustness of our results we split the sample based on age, size, industry and growth characteristics, and estimate the regression using the same explanatory variables. If cash flow is used as the only explanatory variable, the results do support the pecking order theory. When we control for other firm specific and economy-wide variables in each sample, the results are broadly consistent with those obtained for the total sample.

It is worth mentioning that country-specific factors do not only have a direct impact on firms leverage, but also an indirect effect, through influencing the impact of firm specific variables. This expectation could be further investigated by including interaction terms into our regression model. It would also be interesting to compare the impact of country-specific variables on leverage between large listed companies and SMEs. One may expect that their impact on SMEs will be larger because small firms do not have same access to international capital markets. Large listed companies can, to some degree, circumvent the effects of country-specific factors through this access.

Also, it would be very interesting to further investigate the impact of institutional reforms on SMEs' capital structure in Central and Eastern Europe. The information from a similar research will be very important for policy makers initiating reforms directed to enhancing the environment for SMEs. Especially, the fact that the marginal impact of changes in institutional factors can be different across different regions in Europe, asks for a careful assessment of those factors before implementing massive reforms.

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