University of Economics in Katowice

Volume 18 2014

Journal of Economics & Management

Luisa Anderloni, Alessandra Tanda

Department of Economics, Management
and Quantitative Methods
University of Milan

THE DETERMINANTS OF LEVERAGE: A COMPARATIVE ANALYSIS

Abstract

This paper develops an analysis of the determinants of leverage in European listed companies in the last decade. To test the impact of firm characteristics on the capital structure, we use panel data of companies located in 7 countries (Austria, Czech Republic, Germany, Hungary, Italy, Poland, and Slovakia) from 2001 to 2012. Results show that several firm characteristics, such as size, profitability, and the tangibility of assets are able to influence the capital structure and overall confirm the theories developed by the literature.

Keywords: *leverage, financial structure*, *pecking order*, *static trade off*.
JEL Classification: *G32*, *G33*.

Introduction

The literature has deeply investigated which are the driving forces that determine the capital structure of firms. Despite the amount of empirical and theoretical investigations, some issues still remain unresolved. Additionally, most of the researchers have traditionally focused on the US or on Western Europe, while other countries in Europe and other areas in the world have received growing attention only more recently. Among the topics covered, many contributions shed light on which are the determinants of leverage in companies. Three main theories coexist in the literature, i.e. pecking order, agency theory and static trade off, which provide the economic explanation of the positive or negative impact of firm characteristics on the leverage ratio. Pecking order claims that because of asymmetries of information, firms have a preference in the order in which they access internal and external finance. More in detail, generally firms prefer internal funds (retained earnings) then debt and finally equity, as these are subject respectively to more asymmetries of information (Myers and Majluf, 1984). The trade off theory instead maintains that firms have a desired level of leverage they wish to hold and tend to adjust their actual leverage ratio to reach the optimal level. According to the agency theory, finally, managers set leverage in order to convey information on the firm for uninformed investors (Ross, 1977). Several papers have tried to identify which theories describe best the leverage decisions taken by firms (Shyam, Sunder, and Myers, 1999).

The aim of this study is to empirically evaluate which variables impact the determination of leverage by listed companies. More in detail, we test if firm and

country characteristics traditionally identified by the literature as the main determinants of leverage are still valid in determining the financial structure of European firms in the most recent years. To this purpose, we analyse the leverage determinants of a sample of listed firms that are located in Austria, Czech Republic, Germany, Hungary, Italy, Poland, and Slovakia from 2001 to 2012.

This study contributes to the wide discussion on capital structure providing an updated assessment of the leverage of listed firms and its determinants. Additionally, we describe country characteristics using several indicators which have not been used extensively in previous contributions on the topic, instead of relying exclusively on country dummies.

The paper is organized as follows: the first section covers a concise literature review; the second describes the methodology implemented and the variables used in the regression; the third presents the sample and the descriptive statistics; the fourth discusses the results and the last section concludes.

1. Literature review

Several studies have tried to solve the "capital structure puzzle" as defined by Myers (Myers and Majluf, 1984), but contrasting theories have been developed and ambiguous evidence has emerged. The literature has identified three main theories to explain how firms take their decisions on leverage: the static trade off, the pecking order hypothesis and signalling models (such as market timing or manager theory). The static trade off hypothesises that firms have a target leverage ratio and adjust the ratio determinants to reach the desired leverage. Accordingly, variations in the ratio represent adjustments toward the target. The pecking order hypothesis supposes that firms have a preference in the order in which they access internal and external funds. Because of asymmetries of information, firms tend to prefer internal funds (retained earnings), then external funds and among them, more in detail, they prefer debt and then equity, as the latter is more subject to asymmetries of information (Myers and Majluf, 1984). Other theories rely on asymmetric information as well and claim that managers have superior information about the firm than uninformed investors and therefore they can use the leverage ratio to signal the quality of the firm to the market (Ross, 1977).

In the literature, several studies have identified the determinants of capital structure and interpreted the sign of the relationship according to the above mentioned theories. We here recall briefly the main empirical findings. For a more complete review see Graham and Leary (2011) and Kayo and Kimura (2011).

With reference to firm characteristics, size is among the main determinants of financial structure, as larger firms have generally a higher leverage (Fama and French, 2002; Flannery and Rangan, 2006; Antoniou et al., 2008). This might derive from more stable cash flows which allow the firm to increase its debt. However, other studies find a negative relationship between size and leverage, according to the pecking order theory, as smaller firms are more opaque and more subject to adverse selection costs (Kester, 1986; Titman and Wessels, 1988).

Besides, growth opportunities are found to have a positive or negative impact. The latter emerges when considering the indirect costs of debt. Firms with higher growth opportunities have lower equity agency costs and are able to limit debt (Fama and French, 2002; Flannery and Rangan, 2006; Antoniou et al., 2008). A positive impact instead is found when growth opportunities have to be financed with external funds and among them, firms prefer debt (Titman and Wessels, 1988).

Tangibility has a positive link to leverage because firms with more tangible assets tend to preserve their value over time and, in case of default, they offer more guarantees to creditors. In this case, firms do not have to limit debt growth to bind the bankruptcy costs (Titman and Wessels, 1988; Flannery and Rangan, 2006; Antoniou et al., 2008). Some studies however find a negative link between the two variables (Hovakimian et al., 2001). If tangibility is a proxy for the collateral value of assets, a higher tangibility reduces asymmetries of information and therefore equity is cheaper to issue.

Profitability has generally a negative relationship with leverage: more profitable firms can use retained earnings to strengthen their capital, without accessing debt or additional equity, in line with the pecking order hypothesis (among others, Shyam, Sunder and Myers, 1999; Fama and French, 2002; Flannery, Rangan, 2006; Antoniou et al., 2008). Nevertheless some studies find a positive sign (Jensen, 1986; Hovakimian, 2004).

The amount of dividends is also relevant because past dividend distributions might create the expectation of new dividends and therefore fewer resources are available as retained earnings. This explains a positive relationship between leverage and dividends (Antoniou et al, 2008; Frank and Goyal, 2003).

Also R&D expenses and advertising costs are sometimes considered in relation to growth opportunities and the empirical investigations generally find a negative link with leverage (Titman and Wessels, 1988).

Another important determinant is taxation, as interests on debt are deductible and therefore create incentives to opt for debt instead of other financing sources (Titman and Wessels, 1988; Antoniou et al., 2008). Debt, however, can-

not rise over a certain threshold, otherwise the probability of bankruptcy of the firms would grow too much. Because of these reasons, the relationship between taxation and leverage emerging from the empirical studies is not always clear. The theory also claims that the probability of bankruptcy is relevant: firms closer to bankruptcy have a lower leverage.

For listed firms, also stock returns play a role and generally have a negative impact on leverage.

2. Methods

We use panel data techniques to estimate the impact of firm characteristics and country features on leverage. The main model used in this paper is described by the following equation.

$$Leverage_{i,t} = \alpha + \beta_{i,t} X_{i,t} + \gamma_{i,t} Y_{i,t} + \varepsilon_{i,t},$$

where $X_{i,t}$ includes firm specific characteristics, $Y_{i,t}$ describes the country characteristics and $\varepsilon_{i,t}$ is the error term. We define two different measures of leverage: *lev* and *lev1*. Lev is determined as the ratio between total debt and total assets, while lev1 is equal to total debt divided by the sum of total debt and equity. We analyze the determinants of leverage using the most common measures individuated by previous contributions. The independent variables included in $X_{i,t}$ are summarized in Table 1, while the variables describing the country characteristics are reported in Table 2.

Table 1. Firm characteristics

Variable	Definition	Expected sign
1	2	3
Size	Natural logarithm of total assets	+/–
Tangibility	Natural logarithm of tangible assets	+
Profitability	ROE; natural logarithm of EBITDA; natural logarithm of EBIT (as robustness checks)	–/+
Dividends	Dividends per share	+
Incidence of R&D	$\frac{R\&D\ expenses}{Total\ assets}$	–/+
Taxation	$\frac{Taxes}{Pretax\ earnings}$	+/–
Growth opportunities	$\frac{Market\ value}{Total\ assets}$	–/+

table 1 cont.

1	2	3
Probability of bankruptcy	$Z = 3.3\left(\frac{EBIT}{total\ assets}\right) + 1\left(\frac{sales}{total\ assets}\right) + 1.4\left(\frac{retained\ earnings}{total\ assets}\right) + 1.2\left(\frac{working\ capital}{total\ assets}\right) + 0.6\left(\frac{market\ value}{total\ debt}\right)$	–
Stock returns	Net and gross stock returns	–

Source: Compiled by authors

Table 2. Country characteristics

Variable	Definition
GDP growth	Annual percentage growth rate of GDP at market prices based on constant local currency
Credit depth of information index	Credit depth of information index measures rules affecting the scope, accessibility, and quality of credit information available through public or private credit registries. The index ranges from 0 (low) to 6 (high), with higher values indicating the availability of more credit information, from either a public registry or a private bureau, to facilitate lending decisions
Domestic credit provided by the banking sector (% of GDP)	Domestic credit provided by the banking sector includes all credit to various sectors on a gross basis, with the exception of credit to the central government, which is net. The banking sector includes monetary authorities and deposit money banks, as well as other banking institutions where data are available (including institutions that do not accept transferable deposits but do incur such liabilities as time and savings deposits): Examples of other banking institutions are savings and mortgage loan institutions and building and loan associations
Lending interest rate (%)	Lending rate is the bank rate that usually meets the short and medium term financing needs of the private sector. This rate is normally differentiated according to creditworthiness of borrowers and objectives of financing. The terms and conditions attached to these rates differ by country, however, limiting their comparability
Listed domestic companies	Listed domestic companies are the domestically incorporated companies listed on the country's stock exchanges at the end of the year. This indicator does not include investment companies, mutual funds, or other collective investment vehicles
Market capitalization of listed companies (% of GDP)	Market capitalization (also known as market value) is the share price times the number of shares outstanding. Listed domestic companies are the domestically incorporated companies listed on the country's stock exchanges at the end of the year. Listed companies do not include investment companies, mutual funds, or other collective investment vehicles
Stocks trades, total value (% of GDP)	Stock trades equals to the total value of shares traded during the period. This indicator complements the market capitalization ratio by showing whether market size is matched by trading
Strength of legal rights index	Strength of legal rights index measures the degree to which collateral and bankruptcy laws protect the rights of borrowers and lenders and thus facilitate lending. The index ranges from 0 (weak) to 10 (strong), with higher scores indicating that these laws are better designed to expand access to credit

Source: The World Bank, World Development Indicators

3. Sample description

We select all the active listed firms operating in Austria, Czech Republic, Germany, Hungary, Italy, Poland and Slovakia incorporated before 2009. We exclude from the sample the firms of the financial services and utilities industries and we eliminate the firms with less than four consecutive years of data. The final sample is made of 1,046 firms. Most of the firms are located in Germany (50.57%), but also Poland and Italy are highly represented in the sample with respectively 25% and 16% (Table 3). The average size of the firms in the sample is around €2.1 billion. The number of employees on average is around 7,300. The main descriptive statistics of the final sample are reported in Table 4, while Table 5 presents the leverage measures breakdown by country, industry and size of the firms in the sample (see the appendix for additional statistics).

Table 3. Sample breakdown by country

Country	Number	Percentage
Austria	49	4.68%
Czech Republic	11	1.05%
Germany	529	50.57%
Hungary	22	2.10%
Italy	164	15.68%
Poland	260	24.86%
Slovakia	11	1.05%
Total	1046	100%

Source: Authors' calculations.

Table 4. Main descriptive statistics

Variable	mean	min	max
Total Assets	2,127,507	0,000	301,729,000
Total Debt	703,610	0,000	117,663,000
Employees	7,398	1,000	549,763
Sales	1,612,289	– 3,358	192,676,000
EBIT	117,120	– 21,150,000	26,890,000
ROE	0.639	–239.920	90.640
Lev	0.235	0.000	62.544
Lev1	0.300	–72.804	60.352

Note: Total assets, debt, sales, EBIT and operating income are reported in thousand Euros. Employees are units and ROE, Lev1 and Lev are percentages.

Source: Ibid.

Table 5. Average leverage

	Lev	**Lev1**
By country		
Austria	0.251	0.380
Czech Republic	0.175	0.233
Germany	0.247	0.279
Hungary	0.173	0.241
Italy	0.280	0.441
Poland	0.177	0.233
Slovakia	0.160	0.307
By industry		
traditional manufacture	0.214	0.292
life science	0.241	0.287
ICT	0.200	0.278
food and beverages	0.220	0.339
other	0.227	0.301
By size		
employees < 250	0.197	0.204
employees ≥ 250	0.249	0.338
total assets < 43 mln	0.229	0.170
total assets ≥ 43 mln	0.238	0.371

Source: Ibid.

4. Results

Results for leverage determinants are obtained using both random effects and fixed effects estimations. Overall, results remain similar when using random and fixed effects: all the coefficients keep their sign in the two specifications, but some of the variables describing the country characteristics, which however are statistically insignificant (Table 6).

Table 6. Regression results

ROE	Lev						Lev1					
	random effects			fixed effects			random effects			fixed effects		
	coeff	t–stat	p–value	coeff	t–stat	p–value	coeff	t–stat	p–value	coeff	t–stat	p–value
Size	0.078	3.08	0.002	0.065	1.980	0.049	0.079	1.820	0.068	0.064	1.180	0.241
Growth	–29.283	–2.08	0.037	–15.995	–0.980	0.327	–44.721	–1.860	0.062	–15.170	–0.560	0.578
Tangibles	–0.059	–2.3	0.021	–0.020	–0.590	0.558	–0.070	–1.570	0.116	–0.039	–0.690	0.491
ROE	–0.001	–2.47	0.013	0.000	–1.320	0.188	–0.001	–3.040	0.002	–0.001	–1.890	0.060
Tax	0.001	1.24	0.217	0.001	0.970	0.332	0.001	0.390	0.693	0.001	0.260	0.797
Div	0.000	–1.67	0.096	0.000	–2.510	0.013	0.000	–3.890	0.000	0.000	–4.490	0.000
Rd_ta	–0.582	–3.16	0.002	–0.513	–2.470	0.014	–1.165	–3.750	0.000	–1.204	–3.470	0.001
Z score	–0.043	–5.1	0.000	–0.080	–5.040	0.000	–0.076	–4.880	0.000	–0.122	–4.610	0.000
Stock return	–0.023	–2.29	0.022	–0.008	–0.750	0.454	–0.027	–1.570	0.116	–0.007	–0.400	0.691
Manufacture	–0.044	–1.2	0.229				–0.121	–1.770	0.077			
Life science	–0.116	–2	0.045				–0.272	–2.520	0.012			
Ict	–0.081	–2.27	0.023				–0.205	–3.070	0.002			
Food and beverages	–0.082	–1.34	0.182				–0.164	–1.440	0.151			
Credit depth	–0.010	–0.71	0.481	–0.004	–0.230	0.815	–0.001	–0.060	0.955	0.000	–0.010	0.993
Domestic credit	–0.001	–1.41	0.160	0.000	–0.650	0.516	–0.001	–1.520	0.129	–0.001	–0.990	0.321
Lending interest rate	0.005	0.95	0.344	0.005	0.920	0.358	0.009	0.980	0.326	0.008	0.830	0.407
Listed domestic firms	0.000	–0.72	0.469	0.000	0.130	0.894	0.000	0.130	0.896	0.000	0.100	0.919
Market capitalization	–0.001	–1.16	0.244	0.000	–0.450	0.655	–0.002	–1.680	0.093	–0.002	–1.130	0.260
Stocks traded	0.000	0.31	0.757	0.000	–0.120	0.906	0.000	0.630	0.529	0.000	0.350	0.725
Strength of legal rights	–0.033	–2.35	0.019	–0.099	–2.270	0.024	–0.057	–2.240	0.025	–0.098	–1.34	0.181
GDP growth	0.000	–0.22	0.826	0.000	0.180	0.860	0.003	1.000	0.315	0.004	1.090	0.278
Cons	0.427	2.09	0.037	0.155	0.420	0.673	0.891	2.500	0.012	0.677	1.100	0.271
R–sq	within	=	0.319	within	=	0.345	within	=	0.280	within	=	0.292
	between	=	0.244	between	=	0.147	between	=	0.240	between	=	0.143
	overall	=	0.304	overall	=	0.170	overall	=	0.222	overall	=	0.157

Source: Ibid.

Evidence is in general in line with what predicted by the theory. More in detail, size shows a positive and significant sign in all the specifications, suggesting that larger firms have a higher leverage. Growth opportunities, the level of tangible assets, the profitability and the stock return all show a negative sign in both specifications and are in line with the theoretical hypotheses discussed previously. The incidence of taxes shows a positive sign differently than what believed by the theory, but it is not statistically different from zero. The same holds for the incidence of research and development, which has a negative sign, in line with previous investigations. The measure "Z" for the probability of failure shows a negative sign significant at 5% significance level, suggesting that when firms are close to the bankrupt, they tend to increase their leverage, in contrast with some previous empirical findings, probably suggesting that some firms adopt moral hazard behavior. Additionally, life science and ICT industries show a lower leverage if compared with other industries, suggesting that more technology intensive firms have a lower leverage than more traditional activities. With reference to country characteristics, only the strength of legal rights and market capitalisation appear statistically significant with random effects regression, respectively when using lev for legal rights and lev or lev1 for market capitalisation as measures of the financial structure.

As a robustness check we employ the logarithm of EBIT and the logarithm of EBITDA, as a measure of profitability instead of ROE and results remain substantially unchanged, although some explanatory variables lose statistical significance (see Table A.3 and A.4 in the Appendix).

Conclusions

This study has evaluated which are the determinants of leverage in a sample of listed European firms. We focus on firms located in seven countries and analyze balance sheet data spanning from 2001 to 2012 to give an updated assessment of which firm and country characteristics have more relevance in determining the financial structure of listed firms. Results highlight that firm characteristics have a relevant role in leverage definition, especially with reference to size, growth opportunities, tangible assets, profitability (measured as ROE, EBIT and EBITDA), the distance to bankruptcy, and stock returns. Moreover, high tech firms (life science and ICT) show a lower leverage if compared to more traditional activities. Finally, among the country characteristics, the strength of legal rights appears the most relevant variable. Our findings confirm prior investigations and set the stage for further research on the determinants of leverage.

References

Antoniou A., Guney Y., Paudyal K. (2008): *The Determinants of Capital Structure: Capital Market-Oriented versus Bank-Oriented Institutions*. "Journal of Financial and Quantitative Analysis", Vol. 43 (1), pp. 59-92.

Fama E.F., French, K.R. (2002): *Testing Trade-off and Pecking Order Predictions about Dividends and Debt.* "Review of Financial Studies", Vol. 15 (1), pp.1-33.

Flannery M.J., Rangan K. (2006): *Partial Adjustment Toward Target Capital Structures*. "Journal of Financial Economics", Vol. 79 (3), pp. 469-506.

Frank M.Z., Goyal V.K. (2003): *Testing the Pecking Order Theory of Capital Structure*. "Journal of Financial Economics", Vol. 67, No. 2, pp. 217-248.

Graham J.R., Leary M.T. (2011): *A Review of Empirical Capital Structure Research and Directions for the Future*. "Annual Review of Financial Economics", Vol. 3, pp. 309-345.

Hovakimian A. (2004): *The Role of Target Leverage in Security Issues and Repurchases*. "Journal of Business", Vol. 77 (4), pp. 1041-1072.

Hovakimian A., Opler T., Titman S. (2001): *The Debt-Equity Choice*. "Journal of Financial and Quantitative Analysis", Vol. 36 (1), pp. 1-24.

Jensen M.C. (1986): *Agency Costs of Free Cash Flow, Corporate finance and Takeovers*. "American Economic Review", Vol. 76 (2), pp. 323-329.

Kayo E.K., Kimura H. (2011): *Hierarchical Determinants of Capital Structure*. "Journal of Banking and Finance", Vol. 35, pp. 358-371.

Kester C.W. (1986): *Capital and Ownership Structure: A Comparison of United States and Japanese Manufacturing Corporations*. "Financial Management", Vol. 15 (1).

Myers S.C, Majluf N. (1984): *Corporate Financing and Investment Decisions when Firms Have Information that Investors Do Not Have*. "Journal of Financial Economics", Vol. 13, pp. 187-221.

Ross S.A. (1977): *The Determination of Financial Structure: The Incentive Signalling Approach*. "Bell Journal of Economics", Vol. 8, pp. 23-40.

Shyam-Sunder L., Myers S.C. (1999): *Testing Static Trade-off Against Pecking Order Models of Capital Structure*. "Journal of Financial Economics", Vol. 51, pp. 219-244.

Titman S., Wessels R. (1988): *The Determinants of Capital Structure Choice*. "Journal of Finance", Vol. 43 (1), pp. 1-19.

Appendix

Table A.1. Leverage descriptive statistics (lev)

	Obs.	Mean	Standard deviation	Min	Max
2001	619	0.210	0.184	0	1.168
2002	682	0.233	0.252	0	3.809
2003	767	0.239	0.288	0	3.977
2004	851	0.215	0.253	0	3.799
2005	944	0.258	1.631	0	49.658
2006	977	0.240	1.355	0	41.873
2007	1001	0.255	1.982	0	62.544
2008	1007	0.217	0.273	0	5.647
2009	1000	0.221	0.282	0	5.227
2010	993	0.221	0.376	0	8.960
2011	979	0.278	1.751	0	54.375
2012	954	0.218	0.213	0	2.082

Source: Authors' calculations.

Table A.2. Leverage descriptive statistics (lev1)

	Obs.	Mean	Standard deviation	Min	Max
2001	619	0.32	0.33	–3.18	2.19
2002	682	0.37	0.43	–1.02	6.92
2003	767	0.35	0.85	–11.81	8.89
2004	850	0.32	2.95	–58.79	58.10
2005	943	0.20	2.46	–72.80	3.75
2006	976	0.29	0.54	–7.06	8.93
2007	1001	0.27	1.10	–20.05	24.96
2008	1007	0.29	1.65	–46.98	19.05
2009	1000	0.30	0.72	–17.25	6.00
2010	994	0.23	2.25	–67.96	7.55
2011	980	0.40	2.07	–10.96	60.35
2012	955	0.31	0.61	–9.29	5.86

Source: Ibid.

Table A.3. Regression results with profit defined as ln(ebit)

	Lev						Lev1					
	random effects			fixed effects			random effects			fixed effects		
	coeff	t-stat	p-value	coeff	t-stat	p-value	coeff	t-stat	p-value	coeff	t-stat	p-value
Size	0.122	4.430	0.000	0.130	3.410	0.001	0.150	3.920	0.000	0.183	3.720	0.000
Growth	–32.913	–1.920	0.055	–20.419	–0.960	0.336	–60.352	–2.580	0.010	–36.125	–1.320	0.187
Tangibles	–0.068	–2.510	0.012	–0.020	–0.550	0.581	–0.078	–2.060	0.039	–0.055	–1.180	0.240
Profit	–0.027	–3.940	0.000	–0.026	–2.960	0.003	–0.038	–4.110	0.000	–0.036	–3.130	0.002
Tax	0.002	1.630	0.103	0.001	1.170	0.243	0.002	1.120	0.264	0.001	0.750	0.455
Div	0.000	1.440	0.149	0.000	0.280	0.778	0.000	2.590	0.009	0.000	1.580	0.116
Rd_ta	–0.550	–1.570	0.117	–0.353	–0.870	0.383	–0.674	–1.430	0.154	–0.614	–1.180	0.239
Z score	–0.025	–2.570	0.010	–0.038	–1.470	0.143	–0.038	–2.500	0.012	–0.045	–1.360	0.174
Stock return	–0.016	–1.460	0.145	–0.006	–0.480	0.633	–0.010	–0.740	0.457	–0.001	–0.070	0.947
Manufacture	–0.028	–0.740	0.462				–0.075	–1.180	0.238			
Life science	–0.060	–0.940	0.345				–0.157	–1.500	0.134			
Ict	–0.067	–1.740	0.081				–0.167	–2.610	0.009			
Food and beverages	–0.111	–1.770	0.077				–0.221	–2.140	0.033			
Credit depth	–0.001	–0.070	0.947	–0.004	–0.250	0.803	0.0115	0.610	0.540	–0.001	–0.050	0.963
Domestic credit	0.000	–0.760	0.448	–0.001	–1.320	0.188	–0.000	–0.600	0.551	–0.001	–1.540	0.124
Lending interest rate	0.009	1.630	0.103	0.008	1.280	0.201	0.021	2.750	0.006	0.017	2.220	0.028
Listed domestic firms	0.000	–0.170	0.862	–0.001	–0.680	0.494	0.000	0.110	0.916	–0.001	–1.180	0.238
Market capitalization	0.000	–0.380	0.704	–0.001	–0.610	0.541	–0.001	–0.580	0.564	–0.002	–1.150	0.252
Stocks traded	0.000	–0.340	0.736	0.000	0.070	0.942	–0.000	–0.460	0.647	0.000	0.310	0.754
Strength of legal rights	–0.026	–1.870	0.061	–0.010	–0.210	0.835	–0.041	–1.980	0.048	0.021	0.320	0.748
GDP growth	0.001	0.310	0.755	0.000	0.200	0.839	0.004	1.550	0.121	0.004	1.240	0.215
Cons	0.023	0.110	0.912	–0.623	–1.570	0.118	0.055	0.180	0.858	–0.548	–1.070	0.286
R-sq	within	=	0.338	within	=	0.366	within	=	0.345	within	=	0.365
	between	=	0.296	between	=	0.119	between	=	0.308	between	=	0.022
	overall	=	0.337	overall	=	0.207	overall	=	0.339	overall	=	0.091

Source: Ibid.

Table A.4. Regression results with profit defined as ln(ebitda)

	Lev						Lev1					
	random effects			fixed effects			random effects			fixed effects		
	coeff	t-stat	p-value	coeff	t-stat	p-value	coeff	t-stat	p-value	coeff	t-stat	p-value
Size	0.129	4.33	0.000	0.115	2.7	0.007	0.169	4.100	0.000	0.175	3.170	0.002
Growth	–26.693	–1.66	0.097	–13.752	–0.72	0.473	–51.281	–2.350	0.019	–29.586	–1.200	0.233
Tangibles	–0.080	–2.94	0.003	–0.029	–0.8	0.426	–0.106	–2.810	0.005	–0.070	–1.490	0.138
Profit	–0.026	–2.51	0.012	–0.010	–0.63	0.53	–0.036	–2.540	0.011	–0.022	–1.080	0.281
Tax	0.001	1.29	0.199	0.001	0.91	0.364	0.001	0.780	0.437	0.001	0.490	0.625
Div	0.000	1.51	0.130	0.000	0.37	0.715	0.000	2.690	0.007	0.000	1.670	0.095
rd_ta	–0.495	–1.40	0.163	–0.190	–0.47	0.637	–0.587	–1.230	0.218	–0.379	–0.730	0.467
Z score	–0.035	–3.48	0.001	–0.072	–2.54	0.012	–0.052	–3.280	0.001	–0.080	–2.190	0.030
Stock return	–0.021	–2.02	0.043	–0.008	–0.68	0.498	–0.018	–1.330	0.182	–0.005	–0.320	0.746
Manufacture	–0.035	–0.89	0.374				–0.078	–1.230	0.219			
Life science	–0.077	–1.15	0.252				–0.173	–1.580	0.114			
Ict	–0.054	–1.40	0.160				–0.126	–2.000	0.045			
Food and beverages	–0.112	–1.77	0.077				–0.218	–2.120	0.034			
Credit depth	–0.006	–0.44	0.663	–0.005	–0.28	0.779	0.004	0.220	0.824	–0.002	–0.090	0.925
Domestic credit	–0.001	–1.35	0.178	–0.001	–1.35	0.177	–0.001	–1.160	0.246	–0.001	–1.590	0.113
Lending interest rate	0.008	1.38	0.169	0.006	1.03	0.304	0.019	2.550	0.011	0.016	2.090	0.038
Listed domestic firms	0.000	–0.50	0.615	0.000	–0.28	0.781	0.000	–0.130	0.898	–0.001	–0.750	0.454
Market capitalization	0.000	–0.51	0.609	0.000	–0.36	0.721	–0.001	–0.690	0.491	–0.001	–0.910	0.363
Stocks traded	0.000	–0.18	0.859	0.000	–0.13	0.896	0.000	–0.310	0.754	0.000	0.120	0.906
Strength of legal rights	–0.034	–2.39	0.017	–0.072	–1.64	0.102	–0.055	–2.610	0.009	–0.059	–1.030	0.302
GDP growth	–0.002	–0.88	0.380	–0.001	–0.69	0.494	0.001	0.400	0.692	0.001	0.410	0.683
Cons	0.217	1.02	0.310	–0.280	–0.74	0.458	0.341	1.120	0.261	–0.149	–0.310	0.760
R-sq	within	=	0.318	within	=	0.353	within	=	0.323	within	=	0.344
	between	=	0.249	between	=	0.166	between	=	0.245	between	=	0.106
	overall	=	0.325	overall	=	0.232	overall	=	0.300	overall	=	0.202

Source: Ibid.