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FIRM CAPITAL STRUCTURE IN EUROPE

A comparative analysis of CEE firms vs. Western firms in the changing financial environment

Karin Jõeveer¹

Introduction

The global financial crisis triggered the deleveraging of the financial sector. Capitalisation of the euro area banks has increased. At the same time the total assets of the banking sector declined by 17 per cent from 2008 to 2015 and the share of loans in total assets has decreased from 70 per cent to 64 per cent (ECB 2016). Have these substantial changes in the financial sector had an impact on company finances? This chapter has a deeper look at the capital structure of European firms before and after the crisis comparing the evolutions in both East and West.

The financial sector in Central and Eastern European (CEE) economies is in a different development stage than in Western Europe. The financial sector saw a revival in the 1990s after decades of central planning in CEE. There has been a wave of new and foreign institutions entering the sector bringing along improved methods of allocating credit (Cassano et al. 2013) and increasing the availability of financial sources in the market. Now, foreign financial institutions dominate most of the CEE financial markets (ECB 2016). The global financial crisis and its aftermath have thrown financial sectors into a series of reforms. Basel III regulatory framework requires banks to gradually increase their capitalisation and liquidity. The changes in the financial sector are likely to spill over to the high street as well.

Capital structure research focuses on firm choice between debt and equity in financing investments. Two major competing theories of capital structure are the trade-off theory and pecking order theory. Graham and Harvey (2001) surveyed US chief financial officers and found evidence supporting both theories. Frank and Goyal (2009) show that firm choice between debt and equity may be influenced by many firm-specific features but also by the country's institutional and macroeconomic variables. In the context of CEE economies, the latter are expected to be very important since most of the companies are small, young and therefore more dependent on domestic financial markets.

The structure of this chapter is as follows. First, an overview of the major theories of capital structure and the estimation method is given. Then, firm-level data from nine CEE countries and from five core EU countries is used to show the trends in capital structure and to provide evidence for how well the different capital structure theories work in practice.

Theories of capital structure

The inception of the extensive literature on capital structure theories dates back to a 1958 paper by Modigliani and Miller.² Modigliani and Miller (1958) proved the irrelevance of capital structure in perfect and frictionless capital markets. They showed that in those conditions, it does not matter whether the investor holds the shares of a levered company or invests in an unlevered company³ and uses financial leverage on its own. By using homemade leverage the investor is able to replicate the cash flows of the levered firm. Based on this arbitrage pricing proof the two firms should have the same value. Hence, it does not matter whether the firm uses debt and how much debt compared to equity; the value of the firm is unaffected.

A few years later Modigliani and Miller (1963) relaxed their assumptions, introducing corporate taxes into the model. The asymmetric treatment of debt and equity from a tax perspective⁴ reveals large benefits from debt financing. This leads to the prediction that firms should use as much debt as possible. However, empirical findings do not support this expectation.

Trade-off theory

The relatively low actual leverage of the firms compared to the Modigliani and Miller (1963) leverage prediction motivated the further development of the theory. It seemed reasonable to expect that there are some offsetting forces for the benefits of the debt. Hence, firms are balancing the benefits and costs of debt financing. This is the argument laid out in trade-off theory. Among the benefits of debt is notably its tax shield. While among the costs of debt are bankruptcy costs (the higher leverage leads to higher risk and higher likelihood of failure). Trade-off theory argues that there is an optimal combination of debt and equity that maximises the firm's value.

In addition, agency problems may explain the trade-off in debt financing. Conflicts may arise between managers and owners as well as between creditors and shareholders. Jensen and Meckling (1976) show that debt financing can be used to confine managers' self-interested actions. Managers might prefer to keep lower debt levels since this would leave them higher cash flows to manage (giving them more flexibility). Owners can assert control over management and decrease the free cash flow problem by using debt financing. Conflicts between creditors and shareholders rise when the debt is risky. Because the shareholders have a residual claim in the firm, they have a tendency to shift to riskier investments to increase the 'upside' while the downside is limited by the limited liabilities. As creditors realise this problem, the possibility of default will limit the debt usage of the firm. Hence, the debt can mitigate manager-shareholder conflicts but it may increase creditor-shareholder conflicts.

Trade-off theory has several empirically testable predictions:

Companies that are more profitable are expected to have higher leverage ratios. More profitable firms can benefit more from the tax shields and they should face lower default probabilities.

Firm size and asset tangibility are expected to be positively related to leverage. Firms with more assets and with more tangible assets should face lower default risk and should be able to offer more collateral.

Higher-growth firms should face lower leverage. Higher-growth firms are related to increased financial distress and reduced cash flow problems.

Industry median leverage is related to firm leverage. For example, firms in higher-growing industries should have lower leverage ratios.

Higher corporate tax rates should be related to higher firm leverage since the benefits of the tax shields are higher.

Higher expected inflation is related to higher debt ratio since the real benefits of the tax shields are higher.

A weaker institutional environment is related to lower leverage since agency conflicts between the creditors and shareholders are likely to be high. Based on trade-off theory the firm leverage is influenced by the firm-specific as well as the country's macroeconomic and institutional factors. CEE economies have weaker institutions compared to Western counterparts and based on trade-off theory we should observe lower levels of leverage.

Pecking order theory

Another line of thought argues that a firm's capital structure is purely driven by its investment opportunities and the cost of capital. This is known as a pecking order theory established by Myers and Majluf (1984) and Myers (1984). The cost of capital of different sources varies due to asymmetric information. The firm's outsiders (creditors and new equity investors) know less about the firm and its prospects than the insiders do. The bigger the information differences, the higher the cost of external financing. Asymmetric information is most severe for new equity funding and therefore the cost of new equity is the highest. Hence, the firm will observe its investment opportunities and start financing them with the cheapest source – internal funds (so that there is no asymmetric information problem). Next, if the investment opportunities are larger than the internal funds available, debt funding will be used. Finally, once debt funding is exhausted external equity funding will be used. The pecking order theory therefore does not assume any particular target debt ratio.

The pecking order theory also has several empirically testable predictions. Some of them contradict the trade-off theory.

Companies that are more profitable are expected to have lower leverage ratios. More profitable firms have more internal funds and therefore do not need to rely so much on external financing.

Firm size and tangibility of assets are expected to be negatively related to leverage since the larger firms or firms with more tangible assets are expected to face fewer asymmetric information problems. Hence, external equity funding should be relatively less costly.

Higher-growth firms should face higher leverage. Higher-growth firms need more funds for investment (keeping the profitability constant).

Industry median leverage is related to firm leverage. For example, firms from industries that are more dependent on external finance should have higher leverage ratios.

A firm's leverage is negatively related to the business cycle since internal funds increase during economic expansion (all else equal). In CEE economies the asymmetric information is rather severe (e.g. corruption levels are higher) and therefore we should expect to see lower levels of leverage.

Market timing theory

Finally, Baker and Wurgler (2002) offer a market timing theory of capital structure to explain firm leverage. They argue that companies issue equity when the market-to-book ratio is high and buy back shares when the market-to-book ratio is low. By doing this, companies are trying to take advantage of the relative cost of capital. Hence, the capital structure is related to historic market values and is an outcome of attempts to time the equity market. Since few CEE firms are listed on the stock market, this theory is less relevant in the CEE context and so is not further discussed here.

Empirical methodology for analysing capital structure

Shyam-Sunder and Myers (1999) offer an empirical testing strategy to evaluate whether firms are following trade-off theory or pecking order theory. They use a version of the partial adjustment model to estimate trade-off theory. They regress the change in the debt level on leverage gap (deviation from the leverage target). They expect the coefficient in front of the leverage gap to be between 0 and 1 if the trade-off theory holds. Actually, this result should not be exclusively interpreted as the trade-off theory holds and pecking order theory does not because of the mean reverting nature of leverage. For estimating the pecking order theory, Shyam-Sunder and Myers regress the change in debt on external finance needed. They argue that the coefficient on this measure should be close to 1 if pecking order theory holds – the debt financing is moving one-to-one to investment opportunities of the firm (the external equity financing is ignored since this is considered such a rare event).

We start by estimating the leverage regression to see how the different theories hold in practice. First, we estimate leverage on well-known firm- and country-specific factors. This is in the spirit of Rajan and Zingales (1995) except that we pool all firms from different countries into one specification and therefore we can control for the country-specific factors as in Jõeveer (2013a). In addition, we include external finance dependence (EFD) as in Shyam-Sunder and Myers (1999) to our leverage regression. Second, we estimate a partial adjustment model³ to see what factors explain the changes in leverage and whether we observe a target adjustment behaviour in our data.

Equation (1) is the basic model estimated:

$$\text{Leverage}_{it} = \alpha + \beta X_{it-1} + \gamma C_{jt-1} + D_j + T_t + u_{it}, \quad (1)$$

Where i is firm index, t is year index and j is the country index. X is a set of firm-specific control variables – profitability (defined as earnings before interest, taxes, depreciation and amortisation (EBITDA) to total assets), tangibility (defined as tangible fixed assets to total assets), logarithm of total assets, median industry leverage and EFD (defined as (change in fixed assets + change in receivables + change in inventories - change in payables - cash flows) / total assets). C is a set of country-specific variables – ratio of banking sector non-performing loans to GDP, corruption perception index, corporate tax rate, GDP growth rate, inflation index, largest three banks' assets share in the banking market and legal rights index. D and T are country and year dummies respectively, and u is the error term.

The partial adjustment model assumes that a company has a leverage target and the estimation shows how much of the current period's deviation from the target is closed by the change in leverage this period. We follow here Lemmon, Roberts and Zender's (2008) specification:

$$\Delta \text{Leverage}_{it} = \alpha + \lambda(\mu_{it}^* - \text{Leverage}_{it-1}) + \varepsilon_{it}, \quad (2)$$

Where μ^* is a leverage target and is given by $\mu_{it}^* = \beta X_{it-1} + \gamma C_{jt-1} + \eta_i + T_t$, where η_i is a firm fixed effect and ε_{it} is the error term. We follow Lemmon, Roberts and Zender (2008) who argue that the leverage has a large time invariant component and therefore the target leverage should include firm-specific fixed effects.

Equation (3) is the partial adjustment model estimated:

$$\Delta \text{Leverage}_{it} = \alpha + \lambda(\beta X_{it-1} + \gamma C_{jt-1} - \text{Leverage}_{it-1}) + \eta_i + T_t + \varepsilon_{it} \quad (3)$$

Coefficient λ is the speed of adjustment parameter – how much of the leverage gap (deviation from the leverage target) in one period is closed.

Leverage ratio may be defined in many different ways (see for example Rajan and Zingales 1995). In the following, we use two measures: total liabilities to total assets (liabilities ratio) and total debt to capital ratio (capital is defined as total debt plus equity) (debt ratio).

Data

Firm-level data (unconsolidated financial statements) are from the Amadeus database provided by Bureau van Dijk. Data cover the years 2006–2014. The firms with total assets less than 1 million euros are left out of the analyses and we also leave out the extreme values (top and bottom 1 per cent for each variable). Table 22.1 provides summary statistics for the sample in 2014. The number of companies covered varies by countries. The largest sample of firms is from Italy – 208,687 firms – and the least from Latvia – 188 firms. Unfortunately, more detailed firm-level data is limited for several countries. Therefore, the debt ratio estimation excludes Hungarian and Romanian firms.

Institutional and macroeconomic variables are from different sources. GDP growth rate and annual consumer price changes (inflation) are from IMF (2017). Domestic credit to private sector to GDP and non-performing loans to GDP are from World Bank World Development Indicators (World Bank, 2017a). Corruption perception index is from Transparency International (2017). Data for corporate tax rates is from KPMG (2017). Index of legal rights of borrowers/lenders in the case of bankruptcy is from the World Bank 'Doing Business' survey (World Bank, 2017b). Financial sector competitiveness is proxied by the asset share of the three largest banks. The World Bank Global Financial Dataset (World Bank, 2017c) provides this measure.

Firm capital structure in a changing financial environment

CEE economies have been catching up their Western counterparts since the fall of the Berlin Wall. Ever since returning to market-based economies the goal has been to reach the living standards of the West. The changes have been apparent in many dimensions. In this section, we present the time dynamics in a couple of financial sector indicators and firms' capital structure.

Figure 22.1 plots the GDP per capita (in constant 2010 USDs) versus the domestic credit to private sector (as a percentage of GDP) in years 2006 and 2014 for selected CEE economies as well as France, Germany, Italy, Spain and the UK. There is a clear positive relationship between the level of per capita GDP and the credit to GDP ratio. Higher economic development goes hand in hand with higher financial development.

In Figure 22.2 we see the time dynamics of the domestic credit to GDP ratio from 2001 to 2014. It has an inverted U-shape. The 2007–2008 global financial crisis has left its mark on the further advancement of the credit to GDP ratio. Still, compared to the early 2000s when the average credit to GDP ratio for the CEE region was 27 per cent the figure in 2014 is sizably larger – 50 per cent. At the same time, the Western countries' ratio went up from 95 per cent to 106 per cent. The gap between the East and West is narrowing but it is still wide and will not be closed any time soon based on the current trends.

In Figure 22.3 non-performing loans to GDP are presented. The impact of the global financial crisis is clear. For most countries in the CEE sample, the share of non-performing loans jumped up significantly. The increase in the Western countries has been at the same time marginal.

Higher levels of non-performing loans might explain the decrease in lending by the financial institutions. Given that CEE financial institutions were exposed to higher levels of

Table 22.1 Summary statistics of firm-specific variables in 2014 across European countries

	Bulgaria	Czech Republic	Estonia	Hungary	Latvia	Poland	Romania	Slovakia	Slovenia	France	Germany	Italy	Spain	United Kingdom
<i>Liability ratio</i>														
mean	0.525	0.517	0.418	0.551	0.533	0.494	0.603	0.668	0.570	0.600	0.605	0.696	0.482	0.573
median	0.502	0.495	0.381	0.551	0.535	0.482	0.600	0.706	0.577	0.619	0.628	0.773	0.480	0.587
st. dev.	0.366	0.322	0.288	0.283	0.329	0.298	0.328	0.325	0.289	0.281	0.258	0.274	0.312	0.304
<i>Debt ratio</i>														
mean	0.319	0.286	0.268	0.355	0.355	0.364	0.425	0.425	0.518	0.409	0.377	0.434	0.405	0.355
median	0.200	0.181	0.166	0.291	0.291	0.304	0.356	0.356	0.501	0.368	0.322	0.425	0.362	0.275
st. dev.	0.358	0.314	0.292	0.343	0.343	0.301	0.373	0.373	0.292	0.297	0.307	0.353	0.309	0.315
<i>Profitability</i>														
mean	0.045	0.047	0.058	0.051	0.048	0.060	0.034	0.023	0.035	0.082	0.114	0.058	0.052	0.064
median	0.025	0.031	0.046	0.035	0.035	0.039	0.022	0.010	0.022	0.071	0.101	0.047	0.040	0.049
st. dev.	0.095	0.084	0.097	0.095	0.087	0.097	0.098	0.084	0.073	0.092	0.093	0.070	0.073	0.094
<i>Tangibility</i>														
mean	0.390	0.428	0.320	0.385	0.533	0.394	0.411	0.453	0.425	0.187	0.323	0.331	0.316	0.226
median	0.343	0.397	0.214	0.351	0.627	0.358	0.395	0.439	0.408	0.071	0.235	0.209	0.220	0.094
st. dev.	0.305	0.311	0.310	0.293	0.310	0.300	0.271	0.322	0.292	0.257	0.290	0.327	0.302	0.279
<i>Total assets</i>														
(in millions of €)														
mean	8,891	13,000	7,873	15,900	16,300	14,100	37,900	11,300	11,300	20,638	46,020	9,350	12,153	125,894
median	2,461	3,103	2,452	4,138	2,322	3,463	9,741	2,691	2,438	2,815	12,663	2,705	2,560	11,398
st. dev.	54.4	79.7	32.8	262	99.9	125	206	119	91.6	311	250	148	174	1590
number of firms	12,313	17,640	2,988	7,238	188	11,352	4,202	10,733	5,937	83,737	20,506	208,687	121,891	15,813

Note: Liabilities ratio is defined as total liabilities to total assets, debt ratio is defined as total debt to capital ratio (capital is defined as total debt plus equity), profitability is defined as EBITDA to total assets and tangibility is defined as tangible fixed assets to total assets.

Firm capital structure in Europe

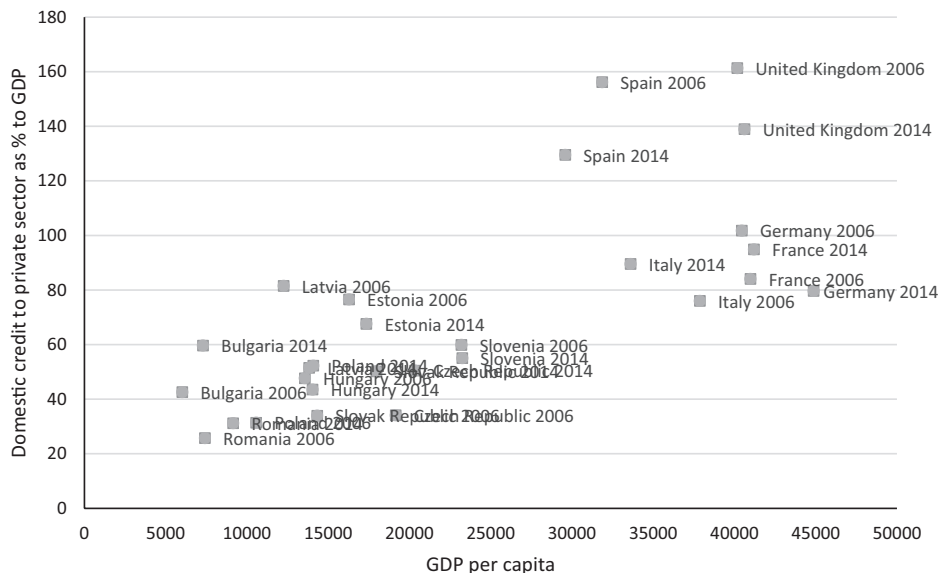


Figure 22.1 Domestic credit to private sector (% of GDP) versus GDP per capita in 2006 and 2014 across selected European countries

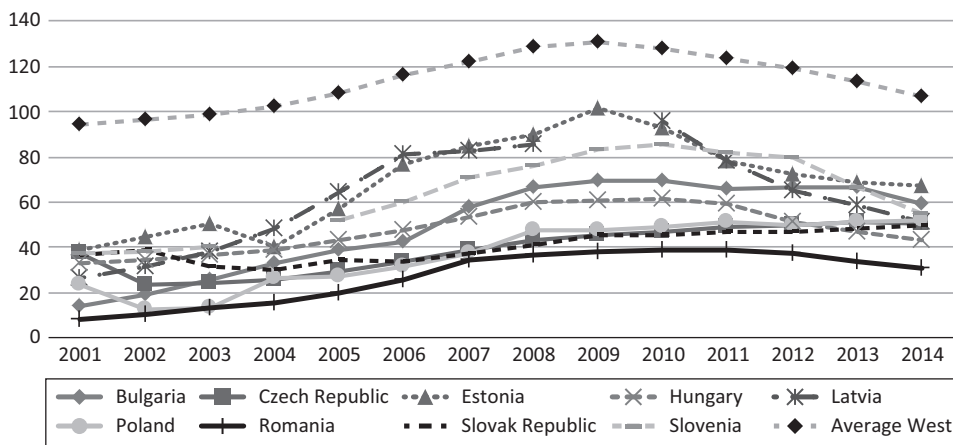


Figure 22.2 Domestic credit to private sector (% of GDP) from 2001 to 2014 across Central and Eastern European countries. Average West is calculated based on data from Germany, France, Italy, Spain and United Kingdom

non-performing loans, it would be natural to expect stronger impact to the corporate capital structures in CEE economies.

In Figure 22.4 the median firm's liabilities ratios over time by country are plotted. For most countries, the median firm's leverage has gone down. Leverage is rather stable for Hungarian, Polish and Romanian samples. In the case of Latvia, we observe an inverse U-shape in leverage and only in the case of Slovakia the increase in liability ratio is observed over time. There is quite noticeable cross-country variation in leverage levels. Western European firms' leverage

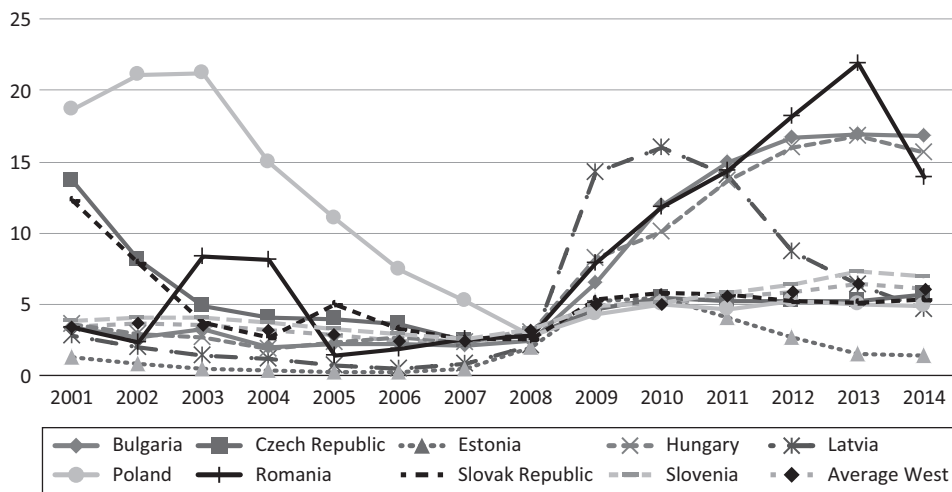


Figure 22.3 Non-performing loans (% to GDP) from 2001 to 2014 across Central and Eastern European countries. Average West is calculated based on data from Germany, France, Italy, Spain and United Kingdom

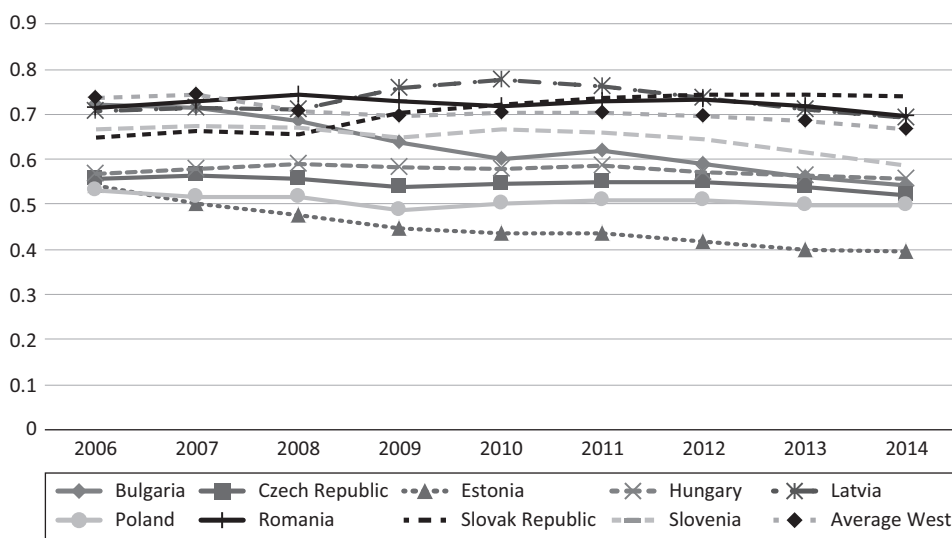


Figure 22.4 Median firm's liabilities to total assets ratio from 2006 to 2014 across Central and Eastern European countries. MedianWest is calculated based on data from Germany, France, Italy, Spain and United Kingdom

has decreased from 73 per cent to 66 per cent while the CEE leverage has gone down from 61 per cent to 58 per cent. Jõeveer (2013b) has shown that the mean liabilities to assets ratio was around 75 per cent in ten Western European countries firms in the year 2000. In addition, Jõeveer (2013a) showed that over the period 1995–2002, the median liabilities to assets ratio increased from 50 per cent to 72 per cent in nine Eastern European economies. Hence, compared to the early 2000s we observe a deleveraging in both East and West.

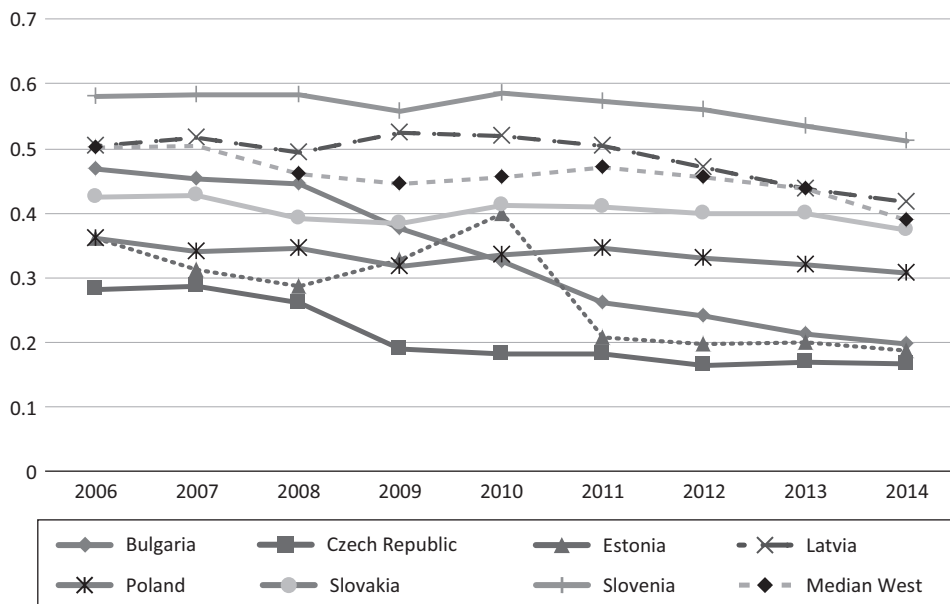


Figure 22.5 Median firm's debt to capital ratio from 2006 to 2014 across Central and Eastern European countries. MedianWest is calculated based on data from Germany, France, Italy, Spain and United Kingdom

Next, in Figure 22.5 the median firm's debt to capital ratios across countries and over time are plotted. The debt ratio has decreased from 50 per cent to 39 per cent in the Western European sample and from 37 per cent to 27 per cent in CEE economies. This ratio varies quite a bit across countries. A noticeable pattern is presented by Estonia, where during the years of the global financial crisis the median firm's leverage went up but it also came quickly down in 2011.

It is interesting to notice the decreasing trends in leverage levels but those changes have not been particularly sharp, and the decreases started before the 2007–2008 global financial crisis and have worsened since. The same trends are visible when the firms are split into size classes. Hence, the decreasing leverage is common for all sizes of firms.

Estimation results

Table 22.2 presents estimation results for equation (1). The first two columns contain the results for the CEE sample and the last two columns the results for the Western firms. From firm-specific variables, profitability is statistically significant in all specifications. It has a negative coefficient confirming the pecking order theory. Tangibility has a negative coefficient, but it is only statistically significant at the 10 per cent level for the liability ratio estimation in the CEE sample. The logarithm of total assets has a negative coefficient but it is not statistically significant. Those results do not support the trade-off theory. External finance dependence enters with a positive and statistically significant coefficient for both leverage measures and samples. This result provides support to the pecking order theory.

From country-specific variables, non-performing loans to GDP enters with an expected negative sign. So worse conditions in the banks are related to lower leverage of the firms. The size of the coefficients are very similar across the CEE and Western European samples contradicting

Table 22.2 Results of leverage regressions across CEE and Western samples

	<i>CEE sample</i>		<i>Western sample</i>	
	<i>Liability ratio</i>	<i>Debt ratio</i>	<i>Liability ratio</i>	<i>Debt ratio</i>
Tangibility	-0.038 (0.036)	-0.052* (0.022)	-0.094 (0.103)	-0.055 (0.113)
Profitability	-0.933*** (0.075)	-0.711*** (0.049)	-0.335** (0.109)	-0.332*** (0.036)
Ln(total assets)	-0.002 (0.004)	-0.001 (0.009)	-0.007 (0.009)	-0.003 (0.006)
EFD	0.140*** (0.017)	0.100*** (0.015)	0.138*** (0.008)	0.128*** (0.005)
Industry median leverage	0.498*** (0.099)	0.443*** (0.059)	0.621*** (0.065)	0.565*** (0.050)
Nonperforming loans	-0.002** (0.001)	-0.001 (0.002)	-0.002** (0.000)	-0.003** (0.001)
Corruption	-0.000 (0.001)	0.000 (0.001)	0.002** (0.001)	-0.002** (0.001)
Corporate income tax	0.005*** (0.001)	0.003 (0.002)	-0.002 (0.001)	0.001 (0.002)
GDP growth	0.001 (0.001)	-0.003 (0.002)	0.000 (0.001)	0.001 (0.002)
Inflation	0.005*** (0.001)	0.007*** (0.002)	0.004* (0.002)	0.004 (0.002)
Bank concentration	0.003*** (0.001)	0.003* (0.002)	0.002*** (0.000)	0.002*** (0.000)
Legal rights	-0.016*** (0.005)	-0.006 (0.004)	0.019** (0.006)	-0.000 (0.012)
year==2009	-0.020** (0.008)	-0.060*** (0.009)	-0.017** (0.006)	-0.012 (0.018)
year==2010	-0.005 (0.009)	-0.056** (0.022)	-0.006 (0.008)	-0.002 (0.023)
year==2011	0.006 (0.006)	-0.032* (0.015)	-0.011 (0.006)	-0.010 (0.012)
year==2012	0.000 (0.007)	-0.044*** (0.011)	-0.013 (0.010)	-0.008 (0.015)
year==2013	0.005 (0.009)	-0.055** (0.015)	-0.021** (0.007)	-0.003 (0.018)
year==2014	0.004 (0.008)	-0.053** (0.016)	-0.025** (0.005)	-0.030 (0.017)
Constant	0.280** (0.088)	0.180 (0.156)	-0.024 (0.201)	0.294** (0.074)
Observations	389,158	312,580	2,524,175	2,344,848
R-squared	0.145	0.112	0.132	0.056

Notes: Liabilities ratio is defined as total liabilities to total assets, debt ratio is defined as total debt to capital ratio (capital is defined as total debt plus equity), profitability is defined as EBITDA to total assets, tangibility is defined as tangible fixed assets to total assets and EFD is defined as (change in fixed assets + change in receivables + change in inventories - change in payables - cash flows) / total assets). Standard errors are clustered by country.***, ** and * denotes significance at 1%, 5% and 10% level respectively.

the expectations that the share of non-performing loans in the financial sector have a larger impact on the capital structure of the CEE firms. The corruptions perception index enters with a positive significant coefficient only for the Western sample. Hence, in less corrupted Western European economies a firm's debt ratio is higher. This is against the expectations that the institutions might affect the capital structure more in CEE economies. GDP growth is not having a statistically significant impact. Inflation is positively related to leverage. This is in line with the trade-off theory. Higher bank concentration is associated with higher leverage in both Eastern and Western samples. Stronger legal rights are related to a lower liability ratio in CEE firms and a higher liability ratio in Western European firms. The CEE sample results contradict the trade-off theory, since based on that theory stronger legal protection should lead to lower bankruptcy costs and therefore to higher leverage. To sum up, the leverage level estimation provides support to pecking order theory and minimal support to the trade-off theory.

Tables 22.3 and 22.4 present the results for the partial adjustment model estimation. Columns one and three contain results of equation (3) estimated with Ordinary Least Squares (OLS) (neglecting firm-specific effects η) and columns two and four present results for the firm fixed effects estimations. The latter are preferred and discussed below. The predictive power of the model is substantially better for fixed effects estimation. Lagged leverage enters with statistically significant negative coefficient. It has a slightly larger coefficient compared to the Flannery and Rangan (2006) and Lemmon et al. (2008) book leverage estimations based on US firms. Hence, CEE firms close around 40 per cent of the gap in the total liability ratio in one period and they close around 52 per cent of the gap in the debt ratio in one period (38 per cent and 60 per cent respectively for the Western firms). This finding supports an existence of the leverage target and is consistent with the trade-off theory. Profitability enters with a negative statistically significant coefficient and logarithm of the assets with negative coefficient as in leverage level regressions. Tangibility is now statistically significant and confirms that firms with more tangible assets are associated with increased leverage. This finding is consistent with trade-off theory. EFD enters with positive statistically significant coefficient – higher external finance dependence is related to increased leverage.

To summarise, findings from the leverage level estimations present more support for the pecking order theory but the partial adjustment estimation shows that also trade-off theory forces are in action in determining firm leverage. The impact of the global financial crisis is observed in negative year 2009 dummy (the reference year is 2008). For example, compared to 2008 the liabilities ratio is around 2 per cent lower for both CEE and Western European samples (Table 22.2, columns 1 and 3) in 2009. In addition, we observe more negative effects in subsequent years (in most specifications) confirming the downward trend in leverage since the global crisis.

Conclusions

The global financial crisis in 2007–2008 has had a substantial impact on countries' macroeconomic and financial sector outcomes. The impact has been more severe for the CEE economies, where the GDP growth rates have not yet recovered to the pre-crisis level. In addition, the credit to GDP ratio has decreased after the crisis, while the percentage of non-performing loans has jumped up to a higher level in this region. In light of this, we studied the firms' financing choices. Surprisingly, we do not observe a particular crisis-related impact on corporate leverage ratios. We do observe a decrease in firm leverage but it is rather smooth over time and is not directly attributable to the crisis.

Table 22.3 Results of partial adjustment model for liabilities ratio across CEE and Western samples

	<i>CEE sample</i>		<i>Western sample</i>	
	<i>OLS</i>	<i>FE</i>	<i>OLS</i>	<i>FE</i>
Leverage	-0.040*** (0.004)	-0.399*** (0.002)	-0.021*** (0.004)	-0.385*** (0.001)
Tangibility	0.004** (0.001)	0.038*** (0.002)	-0.001 (0.004)	0.041*** (0.001)
Profitability	-0.098*** (0.014)	-0.061*** (0.003)	-0.100*** (0.011)	-0.105*** (0.001)
Ln(total assets)	-0.001 (0.000)	-0.026*** (0.001)	-0.000 (0.001)	-0.017*** (0.000)
EFD	0.005* (0.003)	0.013*** (0.001)	-0.001 (0.002)	0.006*** (0.000)
Industry median leverage	0.021*** (0.005)		0.011 (0.009)	
Non-performing loans	0.000 (0.000)	0.000 (0.000)	0.000 (0.001)	0.000*** (0.000)
Corruption	0.000* (0.000)	0.001*** (0.000)	0.000 (0.001)	0.001*** (0.000)
Corporate income tax	0.000 (0.000)	0.001*** (0.000)	-0.005 (0.004)	-0.005*** (0.000)
GDP growth	-0.000* (0.000)	-0.000*** (0.000)	-0.003 (0.004)	-0.002*** (0.000)
Inflation	0.001* (0.000)	0.001*** (0.000)	-0.004 (0.006)	-0.003*** (0.000)
Bank concentration	-0.001 (0.001)	0.000*** (0.000)	0.001 (0.001)	0.001*** (0.000)
Legal rights	-0.002* (0.001)	-0.002*** (0.001)	0.016 (0.020)	0.024*** (0.000)
year==2009	-0.014*** (0.004)	-0.017*** (0.001)	-0.018 (0.021)	-0.031*** (0.000)
year==2010	-0.000 (0.002)	-0.009*** (0.001)	-0.035 (0.052)	-0.046*** (0.001)
year==2011	0.006*** (0.002)	-0.002** (0.001)	-0.013 (0.019)	-0.029*** (0.000)
year==2012	-0.003 (0.003)	-0.010*** (0.001)	-0.013 (0.014)	-0.030*** (0.000)
year==2013	-0.003 (0.003)	-0.014*** (0.001)	-0.022 (0.027)	-0.042*** (0.000)
year==2014	-0.003 (0.002)	-0.015*** (0.001)	-0.028 (0.034)	-0.050*** (0.001)
Constant	0.062* (0.033)	0.546*** (0.013)	0.007 (0.180)	0.481*** (0.004)
Observations	384,575	386,280	2,496,477	2,505,410
R-squared	0.023	0.210	0.027	0.221

Notes: Liabilities ratio is defined as total liabilities to total assets, debt ratio is defined as total debt to capital ratio (capital is defined as total debt plus equity), profitability is defined as EBITDA to total assets, tangibility is defined as tangible fixed assets to total assets and EFD is defined as (change in fixed assets + change in receivables + change in inventories - change in payables - cash flows) / total assets). Standard errors are clustered by country.***, ** and * denotes significance at 1%, 5% and 10% level respectively.

Table 22.4 Results of partial adjustment model for debt ratio across CEE and Western samples

	<i>CEE sample</i>		<i>Western sample</i>	
	<i>OLS</i>	<i>FE</i>	<i>OLS</i>	<i>FE</i>
Leverage	-0.112*** (0.007)	-0.526*** (0.002)	-0.108*** (0.021)	-0.602*** (0.001)
Tangibility	-0.004 (0.003)	0.024*** (0.003)	-0.007 (0.012)	0.031*** (0.001)
Profitability	-0.091*** (0.015)	-0.069*** (0.004)	-0.063*** (0.010)	-0.121*** (0.002)
Ln(total assets)	-0.001 (0.001)	-0.020*** (0.001)	0.000 (0.002)	-0.004*** (0.000)
EFD	0.023*** (0.004)	0.022*** (0.002)	0.037*** (0.006)	0.020*** (0.001)
Industry median leverage	0.043*** (0.010)		0.062*** (0.006)	
Non-performing loans	-0.001 (0.001)	-0.000 (0.000)	-0.002* (0.001)	-0.001*** (0.000)
Corruption	-0.001 (0.001)	0.000*** (0.000)	-0.003*** (0.001)	-0.002*** (0.000)
Corporate income tax	0.001 (0.001)	0.002*** (0.000)	-0.010 (0.005)	-0.005*** (0.000)
GDP growth	-0.002 (0.001)	-0.003*** (0.000)	0.002 (0.003)	0.002*** (0.000)
Inflation	0.001 (0.001)	0.002*** (0.000)	0.018*** (0.003)	0.010*** (0.000)
Bank concentration	-0.002 (0.001)	0.000 (0.000)	0.001 (0.001)	0.001*** (0.000)
Legal rights	0.002 (0.005)	-0.005*** (0.001)	0.027 (0.017)	0.015*** (0.001)
year==2009	-0.024* (0.010)	-0.037*** (0.002)	-0.064** (0.021)	-0.045*** (0.001)
year==2010	-0.016 (0.014)	-0.044*** (0.002)	0.006 (0.017)	-0.011*** (0.002)
year==2011	-0.005 (0.011)	-0.023*** (0.001)	-0.033 (0.023)	-0.035*** (0.001)
year==2012	-0.011 (0.007)	-0.032*** (0.001)	-0.053* (0.023)	-0.046*** (0.001)
year==2013	-0.011 (0.009)	-0.042*** (0.002)	-0.036* (0.013)	-0.039*** (0.001)
year==2014	-0.015* (0.007)	-0.046*** (0.002)	-0.028 (0.016)	-0.049*** (0.001)
Constant	0.145 (0.076)	0.501*** (0.024)	0.331 (0.162)	0.519*** (0.010)
Observations	305,044	306,093	2,339,815	2,347,703
R-squared	0.059	0.278	0.063	0.296

Notes: Liabilities ratio is defined as total liabilities to total assets, debt ratio is defined as total debt to capital ratio (capital is defined as total debt plus equity), profitability is defined as EBITDA to total assets, tangibility is defined as tangible fixed assets to total assets and EFD is defined as (change in fixed assets + change in receivables + change in inventories - change in payables - cash flows) / total assets). Standard errors are clustered by country.***, ** and * denotes significance at 1%, 5% and 10% level respectively.

Predictions on capital structure theories are assessed with leverage regressions. We find support for the pecking order theory – profitability is negatively related to leverage and EFD is positively related to leverage. The partial adjustment model confirms also the trade-off theory prediction that firms have leverage targets.

We find that European firms in both East and West are less reliant on debt and use more equity financing. Even though we observe that the leverage levels still somewhat differ across the regions (with lower leverage in CEE) we find that the determinants of the leverage and leverage changes are the same and have similar size impacts in both regions. Based on the analyses the lower share of non-performing loans in the banking sector and a more concentrated banking sector are positively related to corporate leverage. Hence, the financial sector's characteristics have an impact on corporate capital structure and the policy-makers who may want to influence the leverage in a corporate sector may do that through influencing the financial sector.

In addition, policy-makers may want to keep a close eye on the alternative online financial markets (peer-to-peer lending and equity crowd funding, for example), which have popped up in recent years. Those market segments are still in their infancy (crowd-funding amounts to a few million euros in most countries studied here (Crowdfunding Hub 2016)) but are growing at very high speed (achieving 144 per cent growth in the European alternative financial market from 2013 to 2014 (Wardrop et al. 2015)). The emergence of alternative online funding is expected to influence firms' capital structures in the coming years.

Notes

- 1 This work was supported by Tallinn University of Technology under grant B57 'Efficiency in Financial Sector in Light of Changing Regulatory Environment'.
- 2 Williams had made a similar argument to Modigliani and Miller as early as 1938, but the research in the field of capital structure theory took off after the Modigliani and Miller 1958 article.
- 3 The levered and unlevered company are considered to be identical in all aspects except the financing structure.
- 4 The interest payments to creditors are made from pre-tax profit while the shareholders receive the dividend from the after-tax profit. Hence, the debt has a tax shield.
- 5 See Flannery and Rangan (2006) for more about leverage estimation with the partial adjustment model.

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