

**COMPARATIBLE ANALYSYS OF THE CAPITAL STRUCTURE
DETERMINANTS IN POLISH AND HUNGARIAN ENTERPRISES
- EMPIRICAL STUDY - ***

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Abstract. *Changes in corporate financing policies are among the most striking features of the economic transition. The aim of this paper is to explore the determinants of corporate capital structure in Poland and Hungary. The previous empirical research of corporate capital structure, which has been mainly focused on G7 countries, has found the following variables as being most consistently related to corporate capital structure: tangibility, size, profitability and growth opportunities. In order to assess the correlation between the four proposed determinants of corporate capital structure and leverage, this study performs a multiple linear regression model using the samples of companies listed in Hungary and Poland.*

1. INTRODUCTION

Empirical research of corporate capital structure has been focused primarily on firms from developed countries with special relevance to the G7 member countries.¹ According to this research, the most significant determinants of corporate capital structure are: size, proportion of tangible fixed assets in total assets, profitability and growth opportunities.

This study is focused on corporate financing patterns in Poland and Hungary, which belong to the group of the most advanced transition countries. The process of transition from a centrally planned to a fully operating market economy entails fundamental changes in behaviour of enterprises from these countries. Furthermore, the economic transition of Poland and Hungary is also directed towards a deeper integration of these countries into

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¹ The authors of this study have not come across a study focused on the corporate financing patterns in the so-called transition countries.

the international markets, which is reflected in their aspirations towards the entry into the European Union. Hence, there is a considerable increase in interest of advanced market economies in the process of economic transition in Poland and Hungary.

Some of the most striking features of the economic transition refer to the development of capital markets and changes in investment decisions of banks. These changes in transition countries have a considerable impact on financial policies of firms from these countries.

2. METHODOLOGY AND DATA

The method applied in this study in order to test the significance of the four determinants of corporate capital structure is based on a multiple regression model. The dependent variable is leverage, whereas the independent variables are: size, profitability, growth opportunities and tangibility.

Linear multiple regression model relying on the method of ordinary least squares has been chosen to explore the correlation between the proposed four determinants of corporate capital structure and leverage as that model fits the data used in this study better than other regression models.² The model used in this study can be presented with the following equation:

$$Y_i = \alpha + \beta_{11}X_1 + \beta_{12}X_2 + \beta_{13}X_3 + \beta_{14}X_4 + \varepsilon_i$$

where Y_i presents leverage, X_j ($j = 1..4$) presents an independent variable, β_{ij} ($j = 1, \dots, 4$) presents a regression coefficient and ε_i is the error term. All explanatory variables are expressed as two-year averages preceding the year for which leverage is calculated. It has been done for two reasons. First, the values of explanatory variables are calculated as two-year averages in order to minimize the effect of year-to-year fluctuations. Second, leverage is calculated for the year following the years for which the values of explanatory variables are calculated because it is usually argued that firms do not instantly change their policies regarding leverage in response to changes in values of the four proposed determinants of corporate capital structure.

Before presenting the definitions of leverage used in this study, it is necessary to present the main accounting identities that are used in order to define leverage. These accounting identities may be presented with the following equations:

$$\begin{aligned} \text{Total liabilities} &= \text{equity} + \text{non-equity liabilities} \\ \text{Non-equity liabilities} &= \text{provisions} + \text{deferred income} + \text{liabilities due within one year} \\ &\quad (\text{short-term liabilities}) + \text{liabilities due after one year (long-term liabilities)} \\ \text{Short-term liabilities} &= \text{short term debt} + \text{creditors} + \text{other short-term liabilities} \\ \text{Long-term liabilities} &= \text{long-term debt} + \text{other long-term liabilities} \\ \text{Total debt} &= \text{short-term debt} + \text{long-term debt} \\ \text{Total debt} &= \text{bank loans} + \text{debt securities} \\ \text{Capital} &= \text{total debt} + \text{equity} \end{aligned}$$

² Furthermore, the previous empirical research has also predominantly used linear multiple regression model for this purpose.

In order to provide evidence regarding the relationship between the four proposed determinants of corporate capital structure and leverage as well as to make this study more comparable with other research on corporate capital structure, leverage is defined in four ways. First, it is defined as a ratio of non-equity liabilities to total assets. Second, leverage is expressed as a ratio of long-term liabilities to the sum of long-term liabilities and a firm's equity. Third, leverage is defined as a ratio of the sum of short-term liabilities and long-term liabilities to the sum of the numerator and a firm's equity. Finally, leverage is defined as the ratio of total debt to capital.

Another important point regarding the definition of leverage is the choice between the book and the market values of debt and equity. If only the market value of equity is used in order to compute leverage and firms' use book value of equity in their decisions on leverage, then we shall underestimate the leverage of firms whose market to book ratio is very high. Similarly, if only the book value of equity is used when measuring leverage and firms' use the market value of equity in their decisions on the level of debt financing, then we shall overestimate the level of leverage of firms that have high market to book ratio.

Additionally, it is possible that some firms may use book value of equity whereas other firms use market value of equity in their financing patterns decisions. That would result in making a biased measure of leverage whichever method we choose. Fortunately, these two biases are of the opposite directions and they cancel out to a large extent.

There is also another aspect related to the choice between book values and market values. Book values tend to be influenced by the choice of accounting methods whereas market values tend to vary considerably, which may result in changes in leverage without changes in either the amount of outstanding debt or the book value of equity.

In order to alleviate the impact of these biases, this study includes regressions for both measure of leverage using the book value of equity and the measure of leverage using the market value of equity. The market values are calculated using the data on market capitalisation on the balance sheet date.

As for the valuation of debt, the available data do not allow calculating the market value of a firm's debt. Provided that the cross-sectional correlation between the book value and the market value of debt is large, the misspecification caused by using the book values to compute leverage is not severe. Bowman (1980) found evidence that this correlation is indeed strong. Additionally, Titman and Wessels (1988) argue that the cross-sectional differences between the market values and the book values of debt are not supposed to be correlated with any of the determinants of capital structure suggested by theory. Furthermore, Citron (1992) provides evidence that creditors in the United Kingdom tend to use book values when defining financial ratio covenants in debt contracts. Unfortunately, this study does not have available data as to whether creditors use market or book values when estimating credit worthiness of firms in Poland and Hungary. However, the findings presented by Citron (1992) imply that the use of book values of debt when analysing the determinants of leverage may not be unjustified.

This study defines profitability as a ratio of profit before interest, taxes and depreciation to net sales. The proxy for size is the natural logarithm of annual sales. Tangibility is expressed as a ratio of tangible fixed assets to total assets and growth opportunities are expressed as a ratio of the market value of equity to the book value of equity.

This study will also include comparisons between Poland and Hungary in terms of the level of leverage. Since the number of observations for each country is smaller than 30,

Man-Whitney test will be applied in this study. The hypotheses tested in this study may be defined as follows:

H₀: There are no significant differences in leverage between Hungary and Poland

Or: leverage in Hungary = leverage in Poland

H_a: Differences in leverage between Hungary and Poland are significant

Or: leverage in Hungary ≠ leverage in Poland.

A comparison of the level of leverage in Poland and Hungary is justified since Extel database adjusts for differences in accounting. Furthermore, reported balance sheets are consolidated. The fact that reported balance sheets are consolidated diminishes a bias that occurs when a company reports unconsolidated balance sheet. Firms with unconsolidated balance sheets report an affiliate's net assets as a long-term investment and hence these firms appear to have lower leverage than otherwise identical firms that report consolidated balance sheets.

It is also important to note that, to the extent that a parent company borrows from its subsidiaries, consolidation may understate the company's leverage. Another bias might stem from the fact that multinationals may consolidate foreign subsidiaries and thereby all the leverage will be attributed to the parent firm. Fortunately, these two biases are of the opposite direction (see Rajan and Zingales, 1995).

The sample data has been provided from Extel database. The sample contains 38 companies, excluding firms from finance sector.³ There are 20 firms from Hungary and 18 firms from Poland.

The sample provided by Extel database includes only listed companies, which means that it might not be representative of an average firm. That limits the scope for possible generalisations to the rest of the economy. However, broader implications may be formulated to the extent that common institutions and macroeconomic conditions within a country influence both listed and non-listed companies.

The sample of Polish firms comprises 9.09% of all listed companies or 10.60% of the total market capitalisation of all listed companies. Sample of Hungarian firms comprises 36.36% of all listed companies or 24.17% of the total market capitalisation of all listed companies.⁴ However, these percentages would be higher if the data on financial companies listed in Hungary and Poland were available. Unfortunately, another bias is stemming from unavailability of these data. Although the samples used in these studies appear to be fairly unbiased in terms of the size of the sample companies as the shares in the total number of listed companies do not appear to depart considerably from the shares in total market capitalisation of all listed companies, it is not possible to argue that it would still be the case if the data on the number of listed financial companies as well as the data on their market capitalisation were known.

³ Firms which belong to the finance sector have been excluded from the analysis because their debt like liabilities are not strictly comparable to those of non-financial companies. Furthermore, the leverage of financial institutions is influenced by deposit insurance schemes as well as by the minimum capital requirements.

⁴ The number of listed companies in Hungary was 55, whereas the number of listed companies in Poland was 198 in 1998.

3. PRINCIPAL RESULTS AND INTERPRETATIONS

This section presents the result of regressions of the previously defined measures of leverage on the four proposed determinants of corporate capital structure using samples of Hungarian and Polish firms. The tests for comparisons between the levels of leverage in Hungary and Poland as well as comparisons with results regarding the level of leverage in G7 countries are also presented.

3.1 Regression results

The table 3.1.1 presents the results of the regression coefficients for the sample of Polish firms. Each of variables regressed on the following four independent variables: profitability, tangibility, size and market-to-book ratio. The basic assumptions of the model used to run these regressions refer to the absence of multicollinearity and heteroscedasticity. According to the values of Durbin-Watson statistic, autocorrelation is not present in these regressions. Furthermore, autocorrelation can be removed simply by altering the order of observation in the data set, which is allowed given that this study uses cross-sectional data.

Although not all variables are significant in the regressions for the sample of Polish firms, regressions with reduced number of variables have not been performed in order to avoid omitted variable bias. The correlation between independent variables does not present a problem for the performed regressions, as it is suggested by the values of the variance inflation factor. However, this correlation would cause biased estimates of regression coefficients for included variables if some of the variables that are not significant at conventional levels of significance were excluded from these regressions.⁵

Size seems to be the most significant determinant of corporate capital structure among the four chosen determinants as it is significant in six out of eight regressions. The regression coefficients imply a positive correlation between size and leverage. Should size be a proxy for the inverse probability of bankruptcy, the positive correlation between size and leverage will comply with the predictions of the trade-off theory of capital structure.

On the other hand, the fact that size is not found to be significant when leverage is defined as a ratio of total debt to capital contradicts the assumption that size presents an inverse proxy for the probability of default. Furthermore, one would expect correlation between size and the ratio of total debt to capital to be stronger than correlation between size and measures of leverage including both debt and some other liabilities such as accounts payable. The rationale for this stems from the fact that debt liabilities result in interest payments whereas some other liabilities, such as liabilities to suppliers of inputs, are usually interest-free. Hence, the effects of the trade-off between tax shield of debt and bankruptcy costs on leverage should be by far more pronounced when leverage includes only debt liabilities than otherwise.

Therefore, size might not be a proxy for bankruptcy costs. It may be a proxy for the strength of relationships between a company and its suppliers. Provided that strength of these relationships is positively related to both a firm's size and its leverage, larger com-

⁵ It is important that the fact that a variable is not significant at 10% level of significance does not mean that this variable is not correlated with dependent variable. Hence, excluding such a variable might cause the omitted variable bias.

panies may be expected to have higher leverage compared with smaller firms.⁶

A support for this explanation may be found in the features of the sample firms as well as in the features of the Polish economy. The fact that all sample firms had been state-owned enterprises before they were privatised in early 1990s implies that some remnants of the system of centrally planned economy might still exist. Since the system of inter-company relationships permeates a centrally planned economy, it is possible that this system of relationships still presents an important factor influencing a company's ability to increase leverage. Given that larger companies might be more involved in that system, a positive correlation between size and leverage is hardly surprising.

It is important to note that linear regression results themselves do not imply anything about causal relationship between variables. Hence, it is possible that leverage influences size as some companies may become larger using their opportunities to increase leverage. In order to test this proposition, it is necessary to observe times series patterns of changes in size of firms and changes in leverage. Should there be a strong correlation between leverage and size of a firm relative to the size of the other firms, it will be possible to argue that firms become larger partly due to increases in their leverage. However, this analysis awaits future research.

On the other hand, size is not significantly correlated with the ratio of total debt to capital although it may be expected that system of relationships between banks and enterprises be also inherited from the period of centrally planned economy. One possible explanation for this is that high interest rates in Poland present a major obstacle to relying on bank loans more heavily.⁷

According to the signs of the regression coefficients, profitability is negatively related to leverage, which is in accordance with the predictions of the pecking order hypothesis of capital structure.

Tangibility is significant in regressions of total debt to capital when capital is measured using either the book or the market value of equity. The positive relation between tangibility and these measures of leverage squares with the predictions of the trade-off theory of capital structure.

On the other hand, tangibility is not significant when liabilities other than debt are also included in the measure of leverage. It is possible to offer an explanation similar to that for the relation between size and leverage. Hence, it might be argued that relationships that have been built between a company and its suppliers play a more important role in defining the terms of payments than the proportion of tangible fixed assets in the firm's total assets. Furthermore, the fact that collateral is by far more frequent provision in bank loans contracts compared with the contracts between a company and its suppliers of inputs supports the finding that tangibility is positively related to leverage defined as the ratio of total debt to capital.

Market-to-book ratio is not found to be significant in explaining leverage in Poland. However, negative signs of the regression coefficients pertaining to the correlation between market-to-book ratio and leverage conform to the predictions of the pecking order theory.

⁶ This reasoning is justified since accounts payable dominate non-debt short-term liabilities and short-term liabilities dominate the total liabilities.

⁷ Interest rate spread over LIBOR was 16 percentage points in Hungary and 18.9 percentage points in Poland, whereas the inflation rates in these countries were 14.5% and 11.6%, respectively (World bank, 1999).

Table 3.1.1 Results of linear regressions for the sample of Polish firms⁸

Dependent variables (ratios presenting different measures of leverage) - predictors (four proposed determinants of capital structure)	Profitability	Tangibility	Size	Market-to-book ratio	Adjusted R2	Chi-square statistic
Non-equity liabilities to book value of total assets (***)	-2.366 ^{**} (0.919)	0.397 (0.317)	0.169 ^{***} (0.036)	-0.141 (0.103)	0.589	5.281
Non-equity liabilities to market value of total assets (**)	-1.604 (1.002)	0.126 (0.346)	0.114 ^{**} (0.039)	-0.168 (0.112)	0.403	7.133
Long-term liabilities to the sum of these liabilities and book value of equity (**)	-1.385 [*] (0.780)	0.033 (0.269)	0.081 ^{**} (0.030)	-0.043 (0.087)	0.369	6.745
Long-term liabilities to the sum of these liabilities and the market value of equity (*)	-1.472 (0.888)	0.199 (0.306)	0.081 ^{**} (0.030)	-0.043 (0.087)	0.610	6.826
The sum of long-term liabilities and the sum of short term-liabilities to the sum of the numerator and the book value of equity (***)	-2.212 ^{**} (0.0965)	0.486 (0.333)	0.157 ^{***} (0.037)	-0.149 (0.108)	0.501	5.512
The sum of long-term liabilities and the sum of short term-liabilities to the sum of the numerator and the market value of equity (**)	-1.790 (1.641)	0.183 (0.566)	0.172 ^{**} (0.064)	-0.250 (0.184)	0.313	6.777
Total debt to the book value of capital (*)	-1.063 [*] (0.591)	0.824 ^{**} (0.293)	0.0534 (0.033)	-0.088 (0.095)	0.286	5.030
Total debt to the market value of capital (*)	-1.151 [*] (0.620)	0.503 ^{**} (0.214)	0.022 (0.024)	-0.062 (0.069)	0.253	7.209

All explanatory variables are expressed as two-year averages (1996-1997). Dependent variables refer to the year of 1998. Chi-square statistics presents the results of the Breusch-Pagan-

⁸ * ** and *** present significance at 10%, 5% and 1% level of significance, respectively, whereas (*), (**) and (***) present overall significance of a regression at 10%, 5% and 1%, respectively.

Godfrey test. The critical values for 10%, 5% and 1% levels of significance are: 7.779, 9.488 and 13.277, respectively. The values of the variance inflation factor are below 10.

Table 3.1.2 Results of linear regressions for the sample of Hungarian firms⁹

Dependent variables (ratios presenting different measures of leverage) - predictors (four proposed determinants of capital structure)	Profitability	Tangibility	Size	Market-to-book ratio	Adjusted R2	Chi-square statistic
Non-equity liabilities to book value of total assets	-0.641 (0.590)	0.112 (0.236)	0.019 (0.030)	-0.029 (0.066)	0.09	5.52
Non-equity liabilities to market value of total assets (**)	-1.741 *** (0.541)	0.241 (0.256)	0.026 (0.032)	-0.062 (0.071)	0.325	6.69
Long-term liabilities to the sum of these liabilities and book value of equity	-0.018 (0.451)	0.177 (0.180)	0.022 (0.023)	-0.037 (0.050)	0.021	7.48
Long-term liabilities to the sum of these liabilities and the market value of equity (*)	-1.164 ** (0.482)	0.377 * (0.193)	0.0054 (0.024)	-0.013 (0.054)	0.239	6.45
The sum of long-term liabilities and the sum of short term-liabilities to the sum of the numerator and the book value of equity	-0.719 (0.577)	0.071 (0.231)	0.015 (0.029)	-0.026 (0.064)	0.03	6.37
The sum of long-term liabilities and the sum of short term-liabilities to the sum of the numerator and the market value of equity (**)	-1.778 ** (0.635)	0.273 (0.254)	0.029 (0.032)	-0.060 (0.071)	0.336	7.09
Total debt to the book value of capital	-1.022 (0.699)	0.366 (0.279)	0.013 (0.035)	-0.003 (0.078)	0.058	6.26
Total debt to the market value of capital (**)	-2.04 ** (0.777)	0.676 ** (0.310)	0.055 (0.039)	-0.015 (0.086)	0.244	6.77

⁹ * ** and *** present significance at 10%, 5% and 1% level of significance, respectively, whereas (*), (**) and (***) present overall significance of a regression at 10%, 5% and 1%, respectively.

All explanatory variables are expressed as two-year averages (1996 - 1997). Dependent variables refer to the year of 1998. Chi-square statistics presents the results of the Breusch-Pagan-Godfrey test for heteroscedasticity. The critical values for 10%, 5% and 1% level of significance are: 7.779, 9.488 and 13.277, respectively. All values of the variance inflation factor are below 10.

Regression results for Hungary are presented in the table 3.1.2. As for the model assumptions, these regressions do not seem to suffer from either multicollinearity or autocorrelation. According to the Breusch-Godfrey-Pagan test, there is no evidence of heteroscedasticity.

Regressions excluding variables that are not significant at conventional levels of significance have not been performed because it would have caused omitted variable bias. The correlation between independent variables does not present a problem for the regressions of different measures of leverage on the four proposed determinants of corporate capital structure. However, owing to that correlation, the omission of the variables that are not significant at 10% level of significance would have resulted in biased estimates of the regression coefficient of the variables that have been included into the regressions.

Regression results suggest that only profitability and tangibility seem to be significant among the four proposed determinants of corporate capital structure. The negative relation between profitability and leverage is in accordance with the assumptions of the pecking order theory of corporate capital structure.

Tangibility is positively related to leverage defined as the ratio of long term-term liabilities to the sum of these liabilities and the market value of equity. A positive correlation between tangibility and the ratio of total debt to the market value of capital has also been detected in the sample data. These correlations between tangibility and leverage concur with the predictions of the trade-off theory of corporate capital structure.

Interestingly, tangibility is not related to leverage including both debt and some short-term liabilities other than debt. Since liabilities to the suppliers of inputs dominate short-term liabilities of the Hungarian sample firms, it is possible to offer an explanation similar to that for Poland. Therefore, it may be argued that system of relationships developed between a company and its suppliers of inputs reduces the importance of the proportion of tangible assets in the firm's total assets for the firm's capacity to increase leverage.

Another interesting finding regarding the results for the sample of Hungarian firms is that none of the proposed four determinants of corporate capital structure is found to be significant when the book value of equity is used to calculate leverage. This suggests that the market value of equity might be more relevant for the firms' decisions on leverage than the book value of equity. On the other hand, it might be argued that profitability is significantly correlated with leverage when it is defined by using market values of equity because investors push up stock prices of profitable firms. However, in that case, market-to-book ratio would be significant in explaining leverage defined by using the market values of equity. Since market-to-book ratio is not significant in explaining differences in leverage across the sample firms, it is possible to argue that results for profitability support the conclusion that market values appear to be more important than book values as regards decisions on leverage.

Table 3.1.3. Some economic and financial facts

		Hungary	Poland
Number of listed companies	1998	55	198
	1997	49	143
	1996	45	83
Stock market capitalisation (millions USD)*	1998	14028 (29.3)	20461 (12.9)
	1997	14975 (32.8)	12135 (8.9)
	1996	5273 (11.7)	8390 (6.2)
GDP (millions USD)	1998	47807	158602
	1997	45725	135659
	1996	45176	134570
Trading value**	1998	16135 (113.9)	8921 (54.4)
	1997	7684 (73.4)	7977 (78.4)
	1996	1641 (41.6)	5538 (84.8)
GNP pc (USD) 1997		4510	3590
GNP pc PPP (international USD) 1997		6970	6510
Consumer price indices (1995 = 100)	1996	123.47	119.91
	1997	146.07	137.75
	1998	166.75	153.69
External debt as % of GDP 1998		0.49	0.28

Source: *International financial corporation* (1999)

* the figures in brackets are percentages of GDP.

** the numbers in brackets present the values of the turnover ratio, which is the ratio of the value of shares traded to market capitalisation.

Interestingly, the results for the sample of Polish firms suggest that the book values of equity might be more relevant than the market values of equity in companies' financing decisions on leverage whereas the results for Hungarian firms suggest the opposite. The differences in results might stem from the differences in importance of securities markets as providers of finance in these countries. The fact that, according to the data for 1998, total market capitalisation of all listed firms expressed as a fraction of GDP is much larger in Hungary than in Poland supports this claim. Additionally, turnover ratio is also considerably larger in Hungary than in Poland. This implies that market values might indeed play a more important role in decisions on leverage in Hungary than they do in Poland (see Table 3.1.3).

4. INTER-COUNTRY COMPARISONS OF THE LEVEL OF LEVERAGE

The table 4.1 presents the results of measurements of the overall level of leverage in Poland and Hungary as well as the tests of comparisons between Hungary and Poland regarding the level of leverage. The aggregate leverage was calculated as the ratio of the sum of the numerator across the sample companies to the sum of the denominator across the same firms.

According to the results of the Mann-Whitney test, Hungarian listed companies tend to take on relatively more debt compared with Polish listed firms, which suggests that debt-finance is more important a source of finance in Hungary than it is the case in Po-

land. The results presented in table 4.1 also imply that the listed companies in Hungary tend to take on relatively more long-term liabilities compared with the listed companies in Poland.

As for the mean leverage including both long-term and short-term liabilities, Hungary seems to be more levered. However, the differences in leverage are significant at 10% level only in the case of leverage defined as the ratio of non-equity liabilities to the sum of the numerator and the book value of equity. Hence, it appears that the share of non-equity finance in total finance might not differ significantly between Poland and Hungary whereas the structure of that finance tends to differ significantly between these countries. The differences between Poland and Hungary with respect to the structure of total liabilities might be a result of differences in development of relevant institutions and financial markets, which is the subject of the next section of this study.

Aggregate leverage tends to be considerably higher than mean leverage in the case of Poland, whereas the results for Hungary are not that indicative. Since larger firms tend to influence aggregate leverage to a much larger extent compared with their influence on mean leverage, the results from the table 4.1 conform to the previous finding that size is a more important determinant of corporate capital structure in Poland than it is in Hungary.

One of the most striking features of the results for Poland and Hungary is the fact that short-term borrowing presents the dominant source of finance. The average proportion of short-term finance in total borrowing is approximately 76% for the sample of Hungarian companies and approximately 90% for the sample of Polish firms. As for the share of short-term debt in total debt, the figures for the samples of Polish and Hungarian firms are 79% and 91%, respectively. One possible explanation for the dominance of short-term finance is that the high inflation rate volatility in these countries adversely influences availability of long-term financing.¹⁰ Another explanation refers to the influence of foreign banks as they predominantly approve short-term loans and these loans reach approximately half of the total loans to private non-bank sector (see EBRD, 1998). Bonin et al. (1998) explain this behaviour of foreign banks by risk-aversion and lack of sources of long-term funds.

Abel et al. (1998) found that the share of long-term loans in new loans declined radically as a result of the transition in Poland and Hungary. Consequently, the share of short-term assets in banks' assets portfolios increased immensely. They explained this phenomenon using factors related to both the supply of finance and the demand for finance. First, they argue that financial investors are reluctant to hold long-term financial assets in larger amounts. Second, commercial banks have little capacities to carry out maturity conversions, i.e. converting shorter-term deposits into longer-term loans, due to prudent regulations introduced during the transition process. Third, banks are found to have little experience with and the knowledge of commercial lending. The weaknesses they especially stress refer to the credit appraisal and monitoring. Finally, enterprises have to compete with the government for longer-term loans since vast budget deficits created as a result of large rescue operations such as bad-loans schemes create strong demand for long-term finance on the part of the government.

¹⁰ Consumer price indices for Poland and Hungary are presented in the Table 3.1.3.

Table 4.1 Measures of leverage in Poland and Hungary¹¹

Measure of leverage / country		Hungary	Poland	Mann-Whitney test
Non-equity liabilities to book value of total assets	Mean	0.428 (0.1545)	0.3601 (0.206)	116 (0.063)
	Aggregate	0.4307	0.5851	
	Median	0.4327	0.2814	
Non-equity liabilities to market value of total assets	Mean	0.4009 (0.2134)	0.303 (0.186)	125 (0.112)
	Aggregate	0.2616	0.4046	
	Median	0.3099	0.2630	
Long-term liabilities to the sum of these liabilities and book value of equity	Mean	0.1194 (0.1226)	0.067 (0.1411)	111 (0.044)
	Aggregate	0.248	0.1770	
	Median	0.0575	0.0239	
Long-term liabilities to the sum of these liabilities and the market value of equity	Mean	0.1227 (0.1669)	0.0455 (0.0625)	115 (0.059)
	Aggregate	0.1337	0.095	
	Median	0.0528	0.0211	
The sum of long-term liabilities and the sum of short term-liabilities to the sum of the numerator and the book value of equity	Mean	0.3758 (0.157)	0.316 (0.196)	124 (0.102)
	Aggregate	0.3983	0.5113	
	Median	0.3739	0.2415	
The sum of long-term liabilities and the sum of short term-liabilities to the sum of the numerator and the market value of equity	Mean	0.3584 (0.2173)	0.2622 (0.1683)	128 (0.133)
	Aggregate	0.2366	0.338	
	Median	0.1337	0.0266	
Total debt to the book value of capital	Mean	0.1865 (0.1783)	0.0680 (0.1394)	88.5 (0.006)
	Aggregate	0.2797	0.1417	
	Median	0.1337	0.0266	
Total debt to the market value of capital	Mean	0.1944 (0.2345)	0.0516 (0.0968)	86.5 (0.005)
	Aggregate	0.1533	0.0746	
	Median	0.1115	0.0318	

The table 4.2 presents the extent of leverage in G7 countries according to the study by Rajan and Zingales (1995) as well as comparable data on leverage for Poland and Hungary.

¹¹ As for the columns "Hungary" and "Poland", numbers in brackets are standard deviations. The column "Mann-Whitney Test" displays Mann-Whitney U and the numbers in brackets present the exact significance.

Table 4.2 Extent of leverage in different countries

Country	Non-equity liabilities to total assets (means (aggregate) medians)			Total debt to capital (means (aggregate) medians)				
	Book		Market	Book		Market		
	United States	0.66 (0.69)	0.58	0.44 (0.49)	0.44	0.37 (0.53)	0.37	0.32 (0.34)
Japan	0.67 (0.75)	0.69	0.45 (0.55)	0.45	0.52 (0.63)	0.53	0.31 (0.41)	0.29
Germany	0.72 (0.76)	0.73	0.56 (0.65)	0.60	0.39 (0.39)	0.38	0.28 (0.28)	0.23
France	0.69 (0.78)	0.71	0.61 (0.68)	0.64	0.46 (0.57)	0.48	0.41 (0.45)	0.41
Italy	0.67 (0.73)	0.70	0.67 (0.73)	0.70	0.46 (0.53)	0.47	0.47 (0.52)	0.46
United Kingdom	0.57 (0.56)	0.54	0.42 (0.42)	0.40	0.29 (0.34)	0.28	0.19 (0.23)	0.19
Canada	0.61 (0.64)	0.56	0.47 (0.55)	0.49	0.39 (0.50)	0.39	0.36 (0.43)	0.35
Poland	0.36 (0.59)	0.28	0.30 (0.40)	0.26	0.07 (0.14)	0.03	0.05 (0.075)	0.03
Hungary	0.43 (0.43)	0.43	0.40 (0.26)	0.31	0.19 (0.28)	0.13	0.19 (0.15)	0.11

Source: Rajan and Zingales (1995), p. 1430 and Table 4.1 in this study

A statistical test for comparison between the level of leverage in Poland and Hungary and the level of leverage in G7 countries is not feasible due to the lack of sufficient statistical data in samples of the firms from G7 countries. However, some facts may provide ground for further analysis.

Both Poland and Hungary appear to have a lower ratio of non-equity liabilities to the book value of total assets compared to G7 countries. Furthermore, sample data suggest that Hungary and especially Poland appear to have considerably lower leverage than any of the G7 countries when leverage includes only a company's debt. This might be a consequence of the differences in sampling methodologies as the samples used by Rajan and (1995) are definitely biased towards largest listed companies. On the other hand, the differences might partly be a result of the differences in the observed periods since Rajan and Zingales present data for 1991, whereas the data for Poland and Hungary refer to the year of 1998. Finally, the differences in development of capital markets and financial institutions between Poland and Hungary, on one hand, and G7 countries, on the other hand, might account for the observed differences in the level of leverage.

Hence, the next section of this study is focussed on the characteristics of the institutional settings and financial system that are relevant for corporate capital structure in Poland and Hungary.

CONCLUSIONS

The results for Poland suggest that size is the most important determinant of corporate financing patterns. Profitability is significant only when book values of equity are used in computation of leverage. This suggests that book values are probably used by Polish enterprises when making decisions on leverage. This argument is supported by the fact that size is found to be more significant in explaining leverage when the book values of equity are used than in the case when the market values of equity are entered into the formula for calculating leverage.

Inverse relation between profitability and leverage supports the pecking order theory of capital structure, whereas positive relation between size and leverage may be supportive of the trade-off theory of corporate capital structure. However, it is not clear whether

size has positive relation to leverage because large companies are better diversified and hence have lower probability of default compared with smaller firms, or because larger companies are more able to develop strong relationship with creditors, which enables them to obtain funds under more favourable conditions, compared with smaller firms. Given that Poland presents an economy going through the process of the economic transition from a centrally planned to a fully operating market economy, it may be argued that relationship - based finance is dominant in explaining the relationship between size and leverage. However, a definite answer to this question awaits further research.

The fact that tangibility is significant when leverage excludes short-term liabilities other than debt implies that predictions of trade-off theory and theories based on information asymmetries are not applicable to finance stemming from suppliers of inputs. It is expected that relationship with creditors is crucial to obtaining interest-free finance and importance of that type of finance is augmented by relatively high interest rates. Hence, a further insight into the impact of relationships between firms and their creditors on corporate financial patterns in Poland presents another opportunity for future research.

The results for Hungary suggest that profitability is the most significant in explaining leverage in the sample of companies from this country. An inverse relation between profitability and leverage complies with the assumptions of the pecking order theory of capital structure. Tangibility is found to be significantly positively related to the ratio of total debt to the market value of capital. This is in accordance with the predictions of the trade-off theory of corporate capital structure. Interestingly, the argument referring to the relationship between an enterprise and its suppliers of inputs can also be applied in the case of Hungary when explaining why tangibility is not significant when leverage includes both short-term and long-term liabilities.

The fact that profitability and tangibility are found to be significant only when market values of equity are used, whereas market-to-book ratio is found not to be significant in these regressions, provides a basis for argument that market values are more important than the book as far as decisions on leverage in Hungary are concerned. Comparison of the level of development of securities markets in Hungary and Poland supports the finding that market values seem to be more relevant than book values in the case of Hungary as opposed to Poland.

An additional insight into the correlation between the four proposed determinants of corporate capital structure and leverage might be provided by a larger sample size, which would provide scope for comparisons of the level of leverage across different industries. This would enable testing the hypothesis that mature and more regulated industries tend to have higher leverage compared with the so-called high tech industries.

Of course, it is possible to argue that high tech industries in Poland and Hungary might significantly differ from those in developed countries as the costs of research and development are extremely high and only the largest firms from the most advanced economies might be able to afford them. Additionally, it is not clear whether growth opportunities are presented by the market-to-book ratio in Poland and Hungary in the same way as it is the case in developed economies, since firms with a lot of growth opportunities tend to belong to relatively new sectors, which are less likely to be developed in transition economies compared with advanced market economies. Hence, an investigation into the infrastructure related to research and development and market opportunities for

small, high growth firms belonging to the most propulsive sectors such as information technology awaits further research.

Another scope for further research as regards the determinants of corporate capital structure in Poland and Hungary presents the inclusion of additional explanatory variables such as the uniqueness of the product.¹² Additionally, a longer time horizon as regards sample data would enable analysis of the changes in tax regulations on firms' leverage.

As regards institutional differences and leverage, the findings of this study mainly support the claim that firms from Poland and Hungary have relatively low leverage compared with firms from G7 countries. This is especially the case when leverage is measured as a ratio total debt to capital, which may be explained by the negligibility of the markets for debt securities as providers of finance in Poland and Hungary and relatively high costs of bank loans in these countries. On the other hand, since both Poland and Hungary are transition countries, it is reasonable to expect that development of capital markets in these countries can be more rapid compared with that of advanced market economies. This expectation provides another scope for future research.

Evidence of difficulties with enforcement of creditor rights in both Hungary and Poland is also supportive of the relatively low level of leverage in these countries, which is especially relevant to the differences as to the ratio of total debt to capital. On the other hand, the changes in the quality of enforcement of creditor rights are possible as the time passes. Hence, future work in this field is justified.

The results of this study imply relatively high concentration of corporate ownership in these countries. According to the theories based on agency costs of debt, high concentration of ownership may provide an explanation for relatively low level of leverage in these countries. However, the results for Poland suggest that bank ownership of firms might result in an inverse relation between concentration of corporate ownership and leverage.

In conclusion, the features of institutional settings in Poland and Hungary support the findings of this study regarding the level of leverage in Poland and Hungary compared with developed economies. However, the question as to the relative importance of particular institutions for the relationship between institutional differences and leverage in these countries awaits future research.

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¹² Firms producing unique products or products requiring specialised service tend to be lowly leveraged as increased probability of default adversely affects beliefs of their customers as regards a firm's future ability to deliver spare parts and other components critical to maintenance of these products. Empirical findings for developed countries support that assumption (see Harris and Raviv, 1991). Of course, this would require a more detailed data on products of the sample companies, apart from the larger sample size.

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KOMPARATIVNA ANALIZA DETERMINANTI STRUKTURE KAPITALA PREDUZEĆA U MAĐARSKOJ I POLJSKOJ -EMPIRIJSKO ISTRAŽIVANJE-

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Promene u politici finansiranja preduzeća predstavljaju jednu od glavnih odlika procesa tranzicije. Cilj ovog rada je da istraži determinante strukture kapitala preduzeća u Poljskoj i Mađarskoj. Prethodno sprovedeno empirijsko istraživanje strukture kapitala preduzeća na koje se fokusirala G7, je istražilo određene varijable koje su vezane za strukturu kapitala preduzeća, kao što su: opipljiva imovina, veličina, profitabilnost i mogućnosti za rast. Da bi se procenila korelativna veza između četiri navedene determinante strukture kapitala i leveridža, ovo istraživanje koristi regresioni model na osnovu određenog uzorka Mađarskih i Poljskih kompanija.