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PERFORMANCE FACTORS OF THE LISTED COMPANIES IN THE VISEGRAD COUNTRIES AND ROMANIA

Case
Study

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M40, G30, C40

Abstract

The study includes an analysis of selected listed companies in five countries, the Visegrád countries (Czech Republic, Hungary, Poland, Slovakia) and Romania. The main purpose of the research was to compare the performance of individual countries and to identify the key factors affecting the Market Capitalization / Equity ratio. Financial indicators (profitability and market indicators) were used to analyse countries' performance, and comparisons were made using variance analysis. There was a wide variation in the ratios within and between countries. The analysis also shows that the performance of companies is very different. Considering panel regression is performed, there are groups in which none of the explanatory variables is significant.There are three indicators that most often influence the value of the dependent variable: ROA, ROE, and Debt Ratio.

INTRODUCTION

The subject of the research is the comparative analysis of companies listed on the stock exchanges of five countries: Hungary, Poland, Slovakia, Czech Republic, and Romania. Because listed companies generally play an essential role in the performance of an economy, that was why the authors decided to take a more in-depth look at the performance of these companies. Developments in both corporate stock prices and the financial and market characteristics of listed companies can also provide a "big picture" of the economic performance. The study examines the performance of listed companies and identifies the relationships that can be found between different indicators of the companies. The studies were performed considering five years (2014-2018).

In order to achieve the research objective, statistical analysis of the financial characteristics and indicators of companies by country is important. Statistical comparisons between countries were made based on selected indicators. Variance analysis was used to compare statistical data. The authors used quantile panel regression to explore relationships using financial ratios. Quantile regression can be used to identify key indicators in the case of time-series data of which ratios have a significant impact on the performance of the companies investigated in the countries selected.

THE STOCK EXCHANGE TRADING AND THE ANALYSIS OF LISTED COMPANIES

The stock exchange trading

The stock exchange is an organisation that focuses on the demand and supply of the exchange products, conducts trading, and promotes the development of proper prices for efficient capital flow publicly, the evaluation, and the other risk-sharing (Lentner, 2006).

The stock exchange operates under strict rules, concentrating the supply and demand of traded assets, enabling large volumes of traffic to be conducted quickly and safely. It plays an essential role in price setting and valuation (Demeter, 2015).

Stock exchange trading has also become globalised, and nowadays not only the securities they are quoted can be traded, but also those listed on other stock exchanges. Derivatives markets, which are very leveraged, are playing an increasingly important role in stock trading. Derivatives, due to their high liquidity and huge turnover, play a crucial role in determining the price of traded products but also increase the risk of the markets quite significantly (Kozár, 2011).

The analysis of listed companies

Speculators can be divided into two groups based on their relationship to stock market analysis: technical and fundamental analysts. Those in the latter group make their decisions based on 'fundamentals,' that is, the real sectorial and business factors, whereas the former group only monitors past price movements and base their decisions to analyse charts (Kozár, 2011).

One of the most important differences between the two analysts is the source of information. For fundamental analysts, work from corporate financial reports, while technical analysts use the diagrams (charts). The fundamental analysts are thinking long-term, not infrequently years, while the technical analysts have a much shorter time horizon, often only a few days, but not seldom for hourly or minute trading (Végh, 2016).

The authors performed an analysis based on the financial statements of the companies. Financial and market ratios provide a comprehensive picture of the company investigated. When analysing listed companies, it is essential to distinguish between the book value and the market value of the company. The book value of the company is the value shown in the balance sheet of its equity. Only items that meet the criteria of balance and display are eligible for inclusion in the balance sheet. These are such assets that are owned or controlled by the company that is expected to be profitable - resulting from past economic events - in the future and can be measured reliably (Martin, 2011). Market value, also called market capitalisation, is the number of shares traded multiplied by the current price (market value of one share).

Corporate creditors (credit institutions, suppliers) are primarily interested in liquidity, i.e., how quickly a company can meet its short-term obligations (Sulyok-Pap, 2000). In contrast, stockholders are rather interested in capital structure and profitability ratios (Van Horne & Wachowicz, 2009).

Leverage ratios examine the company's financing structure and its impact on investors. The financial risk of a company depends, to a large extent, on its financing structure. The higher the share of debts in the financing of the company, the higher the volatility and the risk of the yield of the stocks (Baranyai, Fenyves, Takács,& Tarnóczi, 2013).

Among the capital structure ratios, the two most common indicators are the ratio of total indebtedness and the ratio of debt to equity. The debt to equity ratio is a measure of the ratio of debt to shareholders' equity in the company. Until then, the total indebtedness ratio also examines the ratio of debt, the difference being that it measures it as a proportion of total capital (i.e., debt to equity) (Fenyves, Nyúl, Dajnoki, Bács, & Tömöri, 2019).

The fundamental goal of companies is to generate profit and increase their wealth. Corporate value is used to determine the value of a company, which shows how much an external, independent investor would be willing to pay for the company. The determination is not simple, so it is used mainly in

listed companies because there is determined the company value by the market price in this case (Fenyves, Pető, Szenderák, & Harangi-Rákos, 2020).

The market ratios play a crucial role in the stock market trading because they provide a quick way to evaluate the current situation of a company. These calculations also take stock prices into account. In the following, these indicators are briefly presented. Market capitalisation shows how much investors value the company as a whole. The indicator is the number of shares multiplied by the current price.

Earnings per share (EPS) shows the net income per share. There should divide the annual net profit by the number of ordinary shares to calculate this ratio. The price/earnings ratio (P/E ratio) is the most common stock valuation tool. The indicator shows how many units of money investors are willing to pay for one unit of income. The market price should divide by the EPS to calculate this ratio. Its value depends on investors' expectations and the risk of the company (Vincze, 2013).

The Market Value/Book Value (MV/BV) indicator is calculated as the current market value divided by the company's book value. The market value is usually higher than the book value. If a value is lower than one, the company is not well-adjudged in the market because the shares of the company are worth less than the book value of the company's assets (equity) (Kenton & Murphy, 2019).

RESEARCH METHODOLOGY AND DATA

Analysis of variance

Analysis of variance (ANOVA) is a statistical method for comparing the means of groups possessing an identical standard deviation and normal distribution. The analysis assumes that the samples are independent of each other. Different tests can be used to check the conditions.

Models of analysis of variance are flexible statistical tools that are suitable for analysing the relationship of a quantitative (numerical or interval scale) variable (dependent variable) to one or more non-necessarily quantitative variables (independent variables) (Huzsvai, 2013).

There are two main groups of analysis of variance analysis: a univariate or one-way, or multivariate, or multi-way analysis of variance. In the simplest model of variance analysis, a sample of r is taken from the population of k, and then the mean values per sample are compared. According to the null hypothesis (H_0), there is no difference between the means, and according to the alternative hypothesis (H_1), the means differ, i.e., there are differences between the groups.

The variability of the target variable is measured by the sum of the squares of the deviation from the mean. If the variability attributable to differences between groups is significantly higher than the random variability, the null hypothesis is rejected. Testing is performed on the quotient of variances using the F-test.

In Multivariate Analysis of Variance (MANOVA), the effect of the mean values of samples based on multiple criteria is investigated, generally considering some discrete grouping criterion.

Regression analysis: panel regression

Panel data econometrics is a continually evolving field. The increasing availability of time series data for unit cross-sections has resulted in several estimation approaches that use this dual dimension to address typical problems associated with economic data, in particular unobserved heterogeneity (Croissant&Millo, 2019).

The panel regression analysis method allows the regression relationship between the data of n variables in the cross-sectional and time-series form (panel matrix). The significance of the model and its coefficients is tested in a manner known in linear regression. By combining data in two dimensions, panel data gives more significant data change, less collinearity, and more degrees of freedom. Panel data allow for the study of more complex behavioural patterns, such as the effects of technological change or economic cycles (Mishra, 2018). Panel data analysis also has certain drawbacks, such as design and data collection problems, distortion of measurement errors, cross-section dependency, or even a variety of selectivity problems (Baltagi, 2005).

As the data included in the study showed a notable scattering, the authors decided to use quantile regression or rather quantile panel regression. The quantile regression divides the dataset into a given number of quantiles so that each quantile contains more homogeneous data.

Research data

The five stock exchanges have been analyzed for five years, from 2014 to 2018. Figure 1 shows that the market capitalisation of the other four stock exchanges is very low compared to the Warsaw Stock Exchange. Although there is no big difference in the size of the companies (based on their total revenues) as there are smaller companies on the Polish market. It should not be overlooked, however, that there are over 500 companies on the Polish market, while on the Czech market are larger companies, but their number is less than 10.

After the Second World War, all the countries investigated were under Soviet occupation. As a result of nationalisation, the stock exchanges were terminated, which were able to reopen during the privatisation after the regime changes.

The data was downloaded from the www.EMIS.com database system. Companies with incomplete data and financial institutions using different reporting items have been ignored. Only companies that were listed on the stock exchange during the period

investigated (2014-2018) were included in the analysis. There were a total of 640 companies in the research database, of which 540 firms were on the Polish market, and only 100 firms were on the other four stock exchanges. The Warsaw Stock Exchange accounted for nearly 85% of the total dataset. As a result, distortions are likely in the calculations (Table 1).

Examining the data showed a considerable variation within and between countries too. One explanation for this is that there were very different numbers of companies in each country. While in the Czech Republic there are a total of six large companies among the companies examined and their smallest total asset value is over 13,000,000 euros, except for Romania there are companies in the other three countries whose total asset value is less than 1,000,000 euros. The lowest value was observed in Poland, where a company had assets worth EUR 3,000 in 2018.

RESULTS

Country comparisons using performance indicators

Analysts often use performance indicators when analysing companies. The most commonly used performance measures are ROS (Return on Sales), ROA (Return on Assets), and ROE (Return on Equity).

Table 2 illustrates the ROS, ROA, ROE indicators by country using averages over the years. The different colours indicate which indicator, which country has performed better, green represents the highest value, and red indicates the lowest value. The companies on the Polish stock exchange performed the worst considering the investigated companies. Each country showed a rather mixed picture in terms of profitability ratios. Czech companies are the most balanced, probably due to the small number of companies. If values ranked the countries, the result was the following order: Czech Republic, Hungary, Romania, Slovakia, Poland.

Based on significance levels, there is a statistically significant difference between countries for ROA and ROE.

Country comparisons using market ratios

Market ratios include stock quotes in the company valuation. Table 3 shows these ratios by country, in the average of years. As in Table 2, the different colours refer to the relative performance of the countries.

Table 3 shows that Slovakia provides the best performance based on market rankings, while the Czech Republic provides the worst. However, it can also be stated that there is no notable difference between Romania and Hungary. Slovakia is ranked better by three-five points than other countries.

The ratio between market capitalisation and book value is expressed in the first indicator. Based on the average of the years, there was a negative value in Romania. This is because many companies have a negative after-tax profit. The highest average value was in Slovakia, where the market value was nine times of book value, the lowest value - excluding Romania - was in Slovakia, where the ratio was 1.78 times.

The comparison of market capitalisation to total assets is shown in the second row of Table 3. All values in this ratio are greater than one and, except in Romania, show the same order as in the case of the previous indicator. Romania also has a positive value for this ratio and has the highest value after Slovakia.

As shown in Table 3, earnings per share are, in all cases, reasonably high. Romania has the highest value, while the lowest value is almost five times lower than the highest one. The Romanian P / E indicates that Romanian equities are likely to be overvalued, as the average ratio value for Poland and Slovakia is about half as of the Romanian. The table also shows that there is no statistically significant difference between countries for P / E alone.

There is a significant difference in the EPS ratio between the Czech Republic and the other four countries, which may be due to the small number of companies again.

Comparison of countries using more variables

Analysis of variance was performed with the MANOVA module of the statistical program R. Previously, and it was already shown that there was or not a significant difference between countries in terms of profitability and market averages over the years.

As before, when analysing the indicators, it was already evident that there is a large variation between countries and within the countries, so the analysis was also performed with 15 indicators (ROS, ROA, ROE, Return on equity, Operational ROS, Liquidity ratio, Quick ratio, Cash ratio, Indebtedness ratio, Debt to equity ratio, Debt ratio, Long-term debt to equity, Debt to corporate value, P/E, EPS). The results are shown in Table 4, which shows that there is a significant difference between countries in the extended analysis each year.

It is important to note that any distortion maybe because 540 of the 640 companies investigated are located in Poland. This results in a much higher standard deviation within the country than in other cases.

Determination of the influencing factors

The regression analysis was performed with the panel regression module (plm) of the R statistical program. With the regression model, the authors want to reveal which factors influence the Market capitalisation/Equity ratio. As an initial step, 15 variables were included in the multivariate

regression model. The number of variables has been reduced to six variables using step-by-step regression analysis, that can probably significantly impact the result variable: ROA, ROE, Current asset turnover, Total assets turnover, Total indebtedness, Debt to equity ratios. Indicators that did not show a significant effect are unlikely to not affect the result variable in the panel regression model.

The output from the first panel-regression calculation is shown in Table 5. It can be seen that six explanatory variables have a significant effect. In the model, the individual (corporate) effect is 0%; thus, the mixed impact is 100%. The correlation coefficient of 0.296, which shows a weak relationship between the variables, has no clear function-like relationship. The determination coefficient (R^2) is close to zero, which means that the explanatory power of the model is weak, and the dependent variable cannot be explained with these independent variables, which is probably due to the high value of standard deviations.

There was used the Hausmann test to determine which model shows better results: fixed- or random-effect model. Since the p-value is greater than 5%, so a random model was used.

Quantile panel regression was used to obtain a better explanatory power. The entire database was divided into five groups (quintiles). The regression calculations for the quintiles are shown in Table 9. It can be seen from the coefficients of determination that in each case, the values are above 10%, i.e. the model already has explanatory power.

Table 6 shows that, for the third quintile, no indicator was significant in the model, and overall, few indicators resulted in a significant relationship. The most common metrics are ROA, ROE, Debt to equity, and with a weaker impact, but more often occurs in the case of the Indebtedness ratio. The total correlation coefficient is, on average, 0.5313, which indicates a medium function-like relationship between Market Capitalization / Equity and the examined indicators.

CONCLUSIONS

There is a wide variation in the ratios within and between countries. One explanation for this is that in Poland alone, there are more than five times more companies listed on the stock exchange than in the other four countries investigated. Also, outliers often occur. As a result of the above, distortions may occur in various calculations and analyses.

Based on the performance indicators, the Czech Republic performs best, which may be due to the small number of companies. Poland performs poorly, which may be due to the high number of companies. The analysis also shows that the performance of companies is very different. Only the Czech Republic provides balanced performance.

Hungary and the Czech Republic perform similarly well in terms of return on equity, so the companies here produce the highest return on equity. Comparing the countries, the Czech Republic has the least significant difference in terms of ROS, ROA, ROE. In contrast, all three indicators show significant differences between the Czech market and the rest.

In terms of market indicators, Romania has the worst performance and Hungary has the highest market capitalisation per unit of equity.

In the case of analysis of variance for several ratios, there is a significant difference between countries every year.

When panel regression is performed, there are groups in which none of the explanatory variables is significant. No ratio would, in any case, affect the value of Market Capitalization / Equity. There are three indicators that most often influence the value of the dependent variable: ROA, ROE, and Debt Ratio.

In most cases, the correlation coefficient is higher than 0.5 between the explanatory variables and the dependent variable. Thus, a relatively strong function-like relationship can be described.

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FIGURES & TABLES

	2014	2015	2016	2017	2018
Czech Republic	22803	23323	22183	26107	23697
Hungary	12268	16344	21242	26421	25438
Romania	18549	16344	17001	20080	18190
Slovakia	4444	5191	5281	5604	5570
Poland	145348	127769	132814	164828	141277
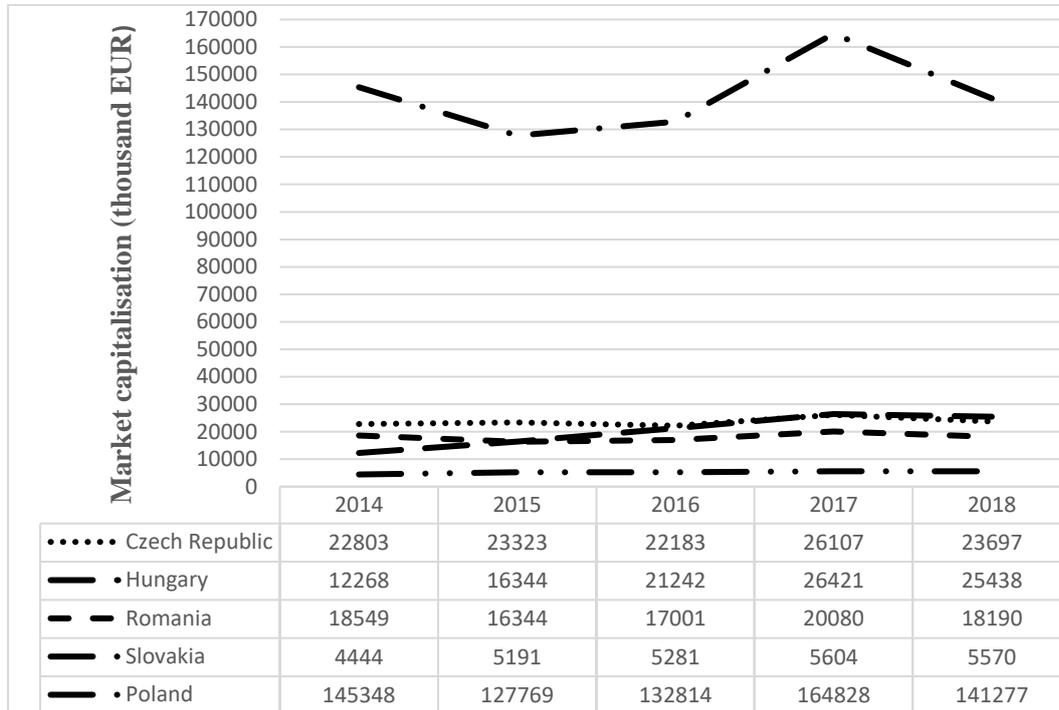
Figure 1
The development of total market capitalisation on the five stock exchanges during the period investigated

Table 1
Distribution of the number of companies by country

Stock exchange	Number of companies
Budapest Stock Exchange	18
Bucharest Stock Exchange	43
Bratislava Stock Exchange	33
Prague Stock Exchange	6
Prague Stock Exchange	540

Table 2
Changes in ROS, ROA, ROE (%)

Ratios	Czech Republic	Poland	Hungary	Slovakia	Romania	Significance level
ROS	21.51	-425.59	-137.91	-23.99	-0.20	98.26%
ROA	9.41	-8.76	48.93	0.16	2.79	0.76%
ROE	17.65	-29.96	227.44	-1.31	6.72	1.54%

Table 3
Market ratios by country

Ratios	Czech Republic	Poland	Hungary	Slovakia	Romania	Significance level
Market cap. / Equity	1.78	2.23	3.65	9.09	-2.36	2.88%
Market cap. / Total assets	1.04	1.20	1.62	3.96	2.85	1.85%
P/E	18.04	37.93	16.09	42.11	78.25	92.39%
EPS	12.16	0.54	1.19	0.00	0.24	0.00%

Table 4
Analysis of variance with 15 indicators

Years	Significance level
2014	0.0000%
2015	0.0002%
2016	0.0000%
2017	0.0218%
2018	0.0082%
Average	0.0010%

Table 5
Panel regression model for six indicators

Variables	Coefficients	Significance level
Regression constant	3.0236	--
ROA	-0.0326	***
ROE	-0.0057	***
Current assets turnover ratio	-1.6104	***
Total assets turnover ratio	5.4264	***
Total indebtedness ratio	-0.0115	**
Debt to equity ratio	2.0005	***
Country - HU	4.0238	--
Country - PL	-3.5285	--
Country - RO	-1.9319	--
Country - SK	-2.1371	--
Determination / Correlation coefficient	0.0878	0.2964
Modified determination coefficient	0.0850	
F-test significance level	***	
Idiosincratic /individual effects	100.00%	0.00%

Significance level	*Notation*
> 0.1	*--*
> 0.05	*.*
> 0.01	***
> 0.001	****
<= 0.001	*****

Table 6
Results of quantile panel-regression

Variables	1		2		3		4		5	
	Coeff.	Sign. level	Coeff.	Sign. level	Coeff.	Sign. level	Coeff.	Sign. level	Coeff.	Sign. level
Regression constant	1.4885	--	2.3838	--	1.1141	--	0.3634	--	0.3557	--
ROA	-0.0803	***	-0.0053	.	0.0000	--	0.0269	***	0.0137	--
ROE	0.0065	.	0.0166	***	-0.0005	--	0.0047	**	0.0232	***
Current assets turnover ratio	-2.7376	*	-0.0018	--	0.0132	--	-0.0028	--	-0.0216	--
Total assets turnover ratio	9.3651	**	0.9281	.	0.1069	--	0.0686	--	0.0897	--
Total indebtedness ratio	-0.0041	--	-0.0158	**	-0.0028	--	-0.0013	**	0.0090	***
Debt to equity ratio	1.7022	*	2.0417	***	0.5785	--	0.4000	***	-0.3645	.
Country - HU			2.5378	--	0.3851	--	2.1553	*	-1.1347	--
Country - PL	-4.6010	--	0.5975	--	0.4057	--	0.5522	--	-0.8222	--
Country - RO	-2.0100	--	-0.6412	--	-0.5609	--	0.3683	--	-1.0325	--
Country - SK	-0.8341	--	-1.7000	--	1.4147	--	-0.2202	--	-1.1593	--
Determination / Correlation coefficient	0.142	0.377	0.668	0.817	0.211	0.460	0.328	0.573	0.185	0.431
Modified determination coefficient	0.130		0.662		0.199		0.317		0.172	
F-test significance level	***		***		***		***		***	
Idiosincratic /individual effects	100.0%	0.0%	81.0%	19.0%	39.7%	60.3%	64.1%	35.9%	33.4%	66.6%

Significance level	Notation
> 0.1	--
> 0.05	.
> 0.01	*
> 0.001	**
<= 0.001	***