

43

Working Paper



**SILESIAN
UNIVERSITY**
SCHOOL OF BUSINESS
ADMINISTRATION IN KARVINA

Institute of Interdisciplinary Research



**Working Papers in Interdisciplinary
Economics and Business Research**

The Effect of Financial Ratios on the Stock Price
Development

Tomáš Pražák, Daniel Stavárek

August 2017

Working Papers in Interdisciplinary Economics and Business Research

Silesian University in Opava
School of Business Administration in Karviná
Institute of Interdisciplinary Research
Univerzitní nám. 1934/3
733 40 Karviná
Czech Republic
<http://www.iivopf.cz/>
email: iiv@opf.slu.cz
+420 596 398 237

Citation

PRAŽÁK, T. and D. STAVÁREK, 2017. The effect of financial ratios on the stock price development. *Working Paper in Interdisciplinary Economics and Business Research no. 43*. Silesian University in Opava, School of Business Administration in Karviná.

Abstract

Tomáš Pražák, Daniel Stavárek: **The effect of financial ratios on the stock price development**

This study examines the effect of the main microeconomic factors on the stock prices of select energy industry companies listed and traded on the Prague Stock Exchange and Warsaw Stock Exchange. The microeconomic factors are based on the financial situation in companies. The financial ratios (debt/equity ratio, liquidity ratio, financial leverage ratio, return on equity ratio and return on investment ratio) are gained from the financial statements. The existence of relationship between stock prices and financial ratios is tested with the Generalized Method of Moments. During the period 2006 - 2015 we revealed a positive impact of financial leverage ratio on stock prices in both countries and a negative effect of liquidity ratio on stock prices in both countries.

Key words

Financial ratios, stock prices, regression analysis, Czech Republic, Poland, energy industry

JEL: C58, D24, G21, M21

Contacts

Tomáš Pražák, Department of Finance and Accounting, School of Business Administration, Silesian University, Univerzitní nám. 1934/3, 733 40 Karviná, Czechia, e-mail: prazak@opf.slu.cz.

Daniel Stavárek, Department of Finance and Accounting, School of Business Administration, Silesian University, Univerzitní nám. 1934/3, 733 40 Karviná, Czechia, e-mail: stavarek@opf.slu.cz.

Acknowledgement

Publication of this paper was supported by the Student Grant System of Silesian University [project SGS/23/2016]: "The effect of fundamental factors and corporate governance on stock prices." The support is gratefully acknowledged.

Introduction

History has shown that the stock price development and financial ratios are an important aspect of the dynamics of economic activity. Stock prices can be an indicator of social mood and a leading indicator of the real economic activity. Therefore, economic policy makers keep an eye on the behavior and supervision of stock market, as its smooth and risk free operation is essential for economic and financial stability. Investment in stock market with the intend of generating a positive return without risk is complicated and challenging. The decision of investment is made based on the published financial statement information. Managers need detailed financial analysis on each of the firm's financial statements in order to understand the patterns and to use the outcome of the analysis while communicating with other stakeholders.

This paper investigates the dynamic linkages between microeconomic factors and stock market developments. The aim of this paper is to examine the character of the relationship between the financial ratios and the stock prices of select energy companies in the Czech Republic and Poland during the period 2006-2015. In order to estimate these effects, the paper applies a method of regression analysis; the Generalized Method of Moments.

The microeconomic factors are based on the financial situation in companies. For the analysis are used financial ratios, gained from the financial statements of the individual companies. The financial ratios under investigation are the debt/equity ratio, the liquidity ratio L2, the financial leverage ratio, the return on assets ratio and the return on investments ratio. These variables are chosen because they have been frequently mentioned in the literature and used as variables that explain performance of corporate entities.

Selected countries have experienced a transformation process to a market economy in last decades. Together, they are members of Visegrad Pact. The very creation of the Visegrad Pact was prompted by a desire to establish mutual cooperation, sharing, knowledge transfer and for the purposes of furthering their European integration, as well as for advancing military, economic and energy cooperation with one another.

The chosen energy industry is one of the most important industries. It ensures the running of the others economic sector. The energy industry includes companies focused on primarily acquisition and distribution of all forms of energy, and also the exploitation and utilization of energy resources such as coal, oil, natural gas, uranium, etc. The most important position in the energy industry has the production and distribution of electricity. Selected companies belong among the largest energy companies in the Czech Republic and Poland which are listed on the Prague Stock Exchange and Warsaw Stock Exchange.

The remainder of this paper is organized as follows. The relevant literature is reviewed in Section 1. The data characteristics are introduced in Section 2. The methodology used and results of the empirical estimation are reported in Section 3. The conclusion and summary of the main findings is in Section 4.

1. Review of Relevant Literature

The existing literature provides strong evidence on the existence of linkages between stock prices and microeconomic fundamentals mainly for the general stock market indices. Two

basic theoretical approaches and interpretations of this relationship are frequently used. The efficient market hypothesis (Fama 1970) assumes that stock prices already contain all the relevant information; the theory of arbitration (Ross 1976, or Chen et al. 1986) provides a framework in which the effect of the macroeconomic and microeconomic variables on stock prices is confirmed.

These theories suggest that stock prices change in response to knowledge of a number of variables. Some of these important variables include: earnings, dividends, cash flow projections, net assets, returns on capital employed, debt to equity ratio, etc. Most of these variables are usually announced in the financial statements or are derived from information contained in the financial statements.

Dimitropoulos and Asteriou (2009) indicated a survey of 101 companies listed in the Athens Stock Exchange for a period of 10 years accruals simultaneously, for each profit Share and six special relativity as an indicator of stock price manipulation in the financial statements were reviewed. This study confirms that the variable accounting profitability is the most relevant variable.

In this connect, Bradshaw et al. (2006) examined the relation between firms' external financing activities, future stock returns, future profitability and analysts' forecasts. Their findings are that there exists a negative and statistically significant relation between net external financing and future stock returns, and future profitability, and a positive relation with optimism in analysts' forecasts. The overall results on the relation between external financing and future stock returns and future profitability imply that investors do not correctly infer the negative relation between financing activities and future performance.

Schrimpf (2010) in his study determined the predictability of the profitability of companies in the Stock Exchange using their financial ratios. In his own research, he concludes that a financial ratio analysis can have a high correlation with profitability and predictability by multiple regression financial ratios, including a profitability test contract. The companies with low and high profitability were divided into two groups and the results of his research indicate a high potential for profitability in the projected financial ratios.

The importance of financial ratios for predicting stock price trends was an important, debatable issue for Lewellen (2002). According to the regression results of the paper, the dividend yield, the book-to-market and the earnings-price ratio predict stock market returns in the long horizon. Similarly, Džikevičius and Šaranda (2011) aimed to determine a predictive ability of the financial ratios in the Lithuanian stock market. The paper investigated 5 companies and 20 financial ratios and the correlation analysis and the covariance analysis were used as the main analytical tools. The researchers found positive and rare examples of negative linkages between stock returns and financial ratios, depending on the ratios and the method used. By the contrast, Bistrova, Lace and Titko (2013) analyzed the relationship between the market and economic performance of the Central and Eastern European companies'. The research including Czech Republic, Poland, Slovakia and Slovenia were processed by correlation and quartile analysis. They declared that correlation was insignificant or even negative in the majority of cases.

Michalski (2013) investigated a classification of financial consequences of managerial decisions in current assets investments level. Empirical illustration collected from Polish firms shows that efficiency measure ROA is linked with one period lag with current ratio, liquidity ratio and without lag with current ratio and collection period. That confirms that individual risk sensitivity is an important part of managerial decisions.

Syed and Bilal (2010) studied the relationship between financial ratios and stock prices in the metallic and non-metallic minerals industry. The results indicate that the linear and non-linear relationship between financial ratios and stock prices. The proportion of activity in the circulation and Profitability ROE, return on capital and the percentage of non-profit special sales can better explain the stock price.

In general, ratios measuring profitability, liquidity and solvency prevailed as the most significant indicators. The order of their importance is not clear since almost every study cited a different financial ratio as being the most effective indication of impending problems.

2. Data Characteristics

The financial ratios under investigation are the debt/equity ratio, the liquidity ratio (L2), the financial leverage ratio, the return on assets ratio and the return on investments ratio. Based on the literature review, Tab. 1 shows expected relationships between individual financial ratios and stock prices.

Tab. 1: Theoretical Effects of Financial Ratios on the Stock Price Developments

Financial ratios	D/E	L2	LEV	ROE	ROI
Stock prices	negative	Positive/negative	positive	positive	positive

Source: Brealey, Myers and Allen (2014)

The effect of D/E on stock prices is negative, when the ratio indicates how much debt a company is using to finance its assets relative to the amount of value represented in shareholder's equity. DE ratio measures a company's debt relative to the total value of its stock and may often be referred to as risk or gearing.

By the contrast, the effect of liquidity ratio on stock prices is not clear. The company is liquid if it has the money to pay its short-term liabilities with no delays in payments to creditors. But high liquidity ratio is usually accompanied by high own capital and is often associated with a conservative approach. On the contrary, too low a liquidity uses foreign sources to finance.

The following three microeconomic variables has positive effect on stock price development. The financial leverage ratio (LEV) observes how much capital comes in the form of debt, or assesses the ability of a company to meet financial obligations. The ratio of ROE measures a corporation's profitability by revealing how much profit a company generates with the money shareholders have invested. Similarly like ROE, ROI can be used as a rudimentary estimation of an investment's profitability.

The financial companies selected are listed on the Prague Stock Exchange and the Warsaw Stock Exchange and the sample period of dataset is composed of stock prices at the end of the year from 2006 to 2015.

Tab. 2: Basic Characteristics of Selected Energyal Companies (August 2017)

<i>Company</i>	Market capitalization (in CZK, PLN)	% of market index
<i>ČEZ (CZE)</i>	227 569,7	19,15
<i>Energoaqua</i>	1 829,6	0,15
<i>Toma</i>	1 774,2	0,15
<i>Unipetrol</i>	53 493,8	4,50
<i>Enea (POL)</i>	3 403 840,2	0,99
<i>Kogenera</i>	647 318,1	0.19
<i>PGE</i>	11 465 606,6	3.35
<i>Polenergia</i>	243 842,5	0.07

Source: Prague Stock Exchange, Warsaw Stock Exchange (2017)

Basic characteristic of selected companies can be seen in Tab. 2. Selected companies are quoted on Prague Stock Exchange and Warsaw Stock Exchange. The importance of selected companies can be seen also from their market capitalization and shares. The energetic production is mainly provided by heat power plants. Heat power plants have around 60 % share of electricity generation in the Czech Republic and more than 96 % of electricity generation in Poland. Nuclear power plants are located only in the Czech Republic; Dukovany and Temelín. Their share is 33 % of total electricity. The third highest electricity production in both countries; around 3,5 %, is provided by hydroelectric power plants.

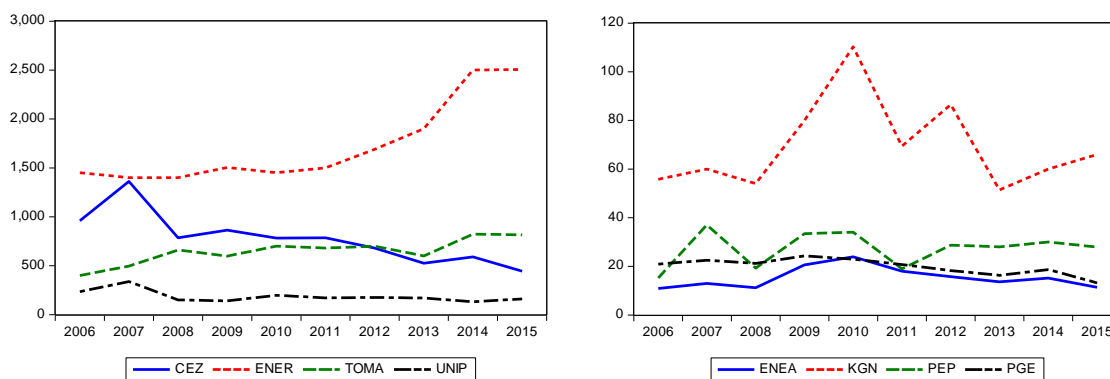


Fig. 1: Development of Stock Prices
(Source: Authors' calculations)

Figure 1 depicts development of the closing stock prices of the selected energetical companies. Although the Warsaw Stock Exchange has the highest market capitalization in the Visegrad Group, its stock prices had the greatest fluctuation because of the pronounced strengthening in capital after 2005. All the stock exchanges experienced declines thereafter, from 2008 to 2011. This was caused by both the global financial and the European debt crises. In CHF. There can be seen that oscillation of stock prices of ČEZ, Energoaqua, Toma and

Unipetrol is very similar. On the other hand, the stock prices of ENEA, Kogenera, PGE and Polenergia are characteristic by higher volatility.

3. Methodology and Results

According to Hall (2005), the Generalized Method of Moments (GMM) is used for constructing a regression model. This model (1) investigates individual functional dependencies or relationships. The GMM can be considered an estimation technique that suggests that unknown parameters should be estimated by appropriate theoretical moments and with appropriate sample moments. In order to ensure that the results are statistically significant, all variables will be tested for their statistical significance by J-statistic.

$$L_{it} = \alpha_1 + \beta_1 * \Delta L_{it-1} + \beta_2 * X_{1it} + \beta_3 * X_{2it} + \dots + \beta_n * X_{nit} + \varepsilon_{it} \quad (1)$$

Where L_{it} represents the dependent variable, which is presented through the selected stock prices of companies in the Czech Republic and Poland. The explanatory variable X representing financial ratios and coefficients β_0 to β_k are the parameters of the regression function, which estimates implementing the GMM method. Other characters represent the constant of the model and the residual component of the model.

Observed variables; stock prices and financial ratios, are implemented to characterized model. The results shown in Tab. 3 contain resultant relationships and effects. Important part of table is also the coefficient of determination R^2 , which determines the suitability of the model. It specifies, how many percent of total data variability is explicit using the regression model. The determination coefficient takes values from the interval $\langle 0,1 \rangle$.

Tab. 3: Estimated Effects and Coefficients

CZE	ČEZ	ENER	TOMA	UNIP	Resulting Effect
DE	-	+	+	-	None*
L2	-	-	-	-	Negative*
LEV	+	-	+	+	Positive*
ROE	-	+	-	+	None*
ROI	+	-	+	-	None*
R²	0.9466	0.7086	0.2971	0.5701	high

PLN	ENEA	KGN	PEP	PGE	Resulting Effect
DE	+	+	-	-	None*
L2	-	-	+	-	Negative*
LEV	-	+	+	+	Positive*
ROE	-	-	+	+	None*
ROI	+	+	-	-	None*
R²	0.8936	0.5498	0.3430	0.3639	medium

*denotes significance at 5 % level

Source: Authors' calculations

The results can be summarized in several key findings. First, only two selected financial ratios have impact on stock prices development. First, both countries bring us similar relationships. The liquidity ratio L2 has a negative effect on most of the stock prices and on the contrary, the financial leverage has a positive effect. Second, each of the analyzed model is statistically significant at the significance level of 5 %. Third, GMM model for the companies in the Czech Republic has higher explanatory ability measured by the coefficient of determination. Five companies (ČEZ, ENER, UNI, ENEA and KGN) have more than 50 % of total data variability explicit using the regression model. Models for energy companies in the Czech Republic has high predictive ability especially in the case of ČEZ and ENER. Polish energy company ENEA is only one that has high predictive ability.

Conclusion

The primary aim of financial reporting is to provide information about the financial position and performance of companies. Results and trends in financial reports could affect investor confidence in financial markets. Investors are looking for opportunities to invest additional resources in the most efficient capital markets. One of the main factors that every investor has in making his decision, is to give special attention to stock price development. It is known that financial ratios are the oldest and simplest practical tools in evaluating and planning companies' performance. The use of accounting data and financial ratios to explain changes in stock prices is frequently referred to in the literature. Financial ratio analysis can be largely attributed to changes in stock prices.

Based on literature review, we found that financial ratios, such as leverage, profitability, or liquidity affect the stock price developments. We analyzed this relationship on energy industry in the Czech Republic and Poland. Chosen energy companies belong among companies with highest market share. Electricity production in the Czech Republic is dominated by ČEZ, as, which produces about 75% of the total electricity production in the country. It operates 10 coal, 2 nuclear, 12 water, 1 wind and 1 solar power stations. The largest power producing company in Poland is Polska Grupa Energetyczna. The PGE Group operates two large lignite mines and more than 40 power stations.

For the purpose of this paper, the Generalized Method of Moments (GMM) is used to examine the character of the relationship between observed variables. The results found prevailing negative, statistically significant effect between liquidity ratio L2 and stock prices in both countries. Similarly, for both countries, the financial leverage ratio had a positive statistically significant impact on stock prices. These findings confirmed expected effects with an exception of the debt/equity ratio, ROE and ROI whose effect on stock prices was not clear.

References

- [1] Bistrova, J., Lace, N. and J. TITKO, 2013. CEE companies: Economic vs. market performance. *17th World Multi-Conference on Systemics, Cybernetics and Informatics*, vol. 2, pp. 1 – 6.
- [2] Bradshaw, M., Richardson, S. and R. G. Sloan, 2006. The Relation between Corporate Financing Activities, Analysts' Forecasts and Stock Returns. *Journal of Accounting and Economics*, vol. 42, no. 2, pp. 53-85.

- [3] Brealey, R. A., Myers, S. C. and F. Allen, 2014. *Teorie a Praxe Firmeních Financí*, 2nd Ed. Brno: Bizbooks.
- [4] Chen, N. F., Roll, R. and S. A. Ross, 1986. Economic forces and the stock market. *Journal of Business*, vol. 59, no. 3, pp. 383 – 403.
- [5] Dimitropoulos, P. and D. Asteriou, 2009. The Value Relevance of Financial Statements and Their Impact on Stock Prices, Evidence from Greece. *Managerial Auditing Journal*, vol. 24, no. 3, pp. 248-265.
- [6] Džikevičius, A. and S. Šaranda, 2011. Can financial ratios help to forecast stock prices? *Journal of Security and Sustainability Issues*, vol. 1, no. 2, pp. 147 – 157.
- [7] Fama, E., 1970. Efficient capital markets: A review of theory and empirical work. *Journal of Finance*, vol. 25, pp. 383 – 417.”
- [8] Lewellen, J., 2002. Predicting returns with financial ratios. *MIT Sloan School of Management: Working paper*, pp. 4734-4742.
- [9] Michalski, G., 2013. Financial consequences linked with investments in current assets: Polish firms case. In: *European Financial Systems 2013: proceedings of the 10th International Scientific Conference*. Brno: Masaryk University, 2013, pp. 213-220.
- [10] Ross, S. A., 1976. The arbitrage theory of capital asset pricing. *Journal of Economic Theory*, vol. 13, pp. 341 – 360.
- [11] Schrimpf A., 2010. International stock return predictability under model uncertainty. *Journal of International Money and Finance*, vol. 29., no. 7, pp. 1256-1282.
- [12] Syed, J. A. and Z. O. Bilal, 2010. Does dividend policy impact stock market prices? *Ijaber*, vol. 13, no. 9, pp. 6873-6883.