CAN FINANCIAL RATIOS HELP TO FORECAST STOCK PRICES?

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Abstract. Technical and fundamental analyses are the two investment making decisions widely spread all around the world. The financial crisis of 2008-2009 had a negative impact on the decisions of the Lithuanian investors to choose stock as the best investment option. However, national economics is cyclical and after recession recovery follows. Production volumes are anticipated to increase seeing that analysts forecast further GDP growth. Due to this reason, additional funding for the successful performance of enterprises will be required. Therefore, financial resources must be attracted by issuing new volumes of stocks. On the other hand, the successful performance of an issuer has a positive influence on the stock price in the market which is the subject of forecast made by the investors of Lithuania. Positive changes of stock prices in the market are partially influenced by the expectations of investors that stock prices will grow rapidly in the future. However, this feature is not known and can only be forecasted using different econometric models. At the theoretical level scientists disagree about the effectiveness of the methods used by the Lithuanian investors. Recently technical and fundamental analyses became popular among investors, though there is not much research done in order to test the effectiveness of the applicability of these methods in the Lithuanian stock market. With reference to the above mentioned information, this research is aimed to determine whether it is possible to forecast stock prices by estimating the financial ratios of a particular company. Due to this reason, a link between the return of a stock price and the financial ratios of the selected companies will be evaluated using correlation and covariance as the main analytical tools. Appropriate conclusions and suggestions are provided after obtaining reliable empirical results.

Keywords: Fundamental Analysis, Stock Price, Lithuanian Stock Market, Correlation, Covariance, Finance, Ratio.

1. Introduction

The year 2007 was critical for the Lithuanian financial markets and its economic stability. Volatile macroeconomic environment influenced the decrease of credit rating. Stock prices reacted expeditiously to the global and national changes in the economic environment and, as a result, NASDAQ OMX Vilnius index increased only by 4.4% (Securities Commission, 2007) in 2007.

In the course of the year 2008, the index decreased by 65% (Securities Commission, 2008). Such changes in stock prices were caused not only by the deteriorative situation of the national economy but also by the worse financial results of enterprises. Unfavourable economic conditions in Lithuania led to negative expectations from investors. Downturn was observed in all segments of the Lithuanian financial instruments market. Stock market downturn was affected by the constrained exit of some market players who had invested borrowed finance. Consequently, the total turnover of the stock market was 2.2 times lower than in 2007, i.e. LTL 1.8 billion. During the year 2009 financial markets tended to recover after the unsuccessful period of the financial crisis in 2008. NASDAQ OMX Vilnius index increased by 46.04% (Securities Commission, 2009) because of the rising stock prices. That positive trend in the stock market

was probably supported by the ameliorative expectations of investors associated with the prospects of national economy. In 2009 OMX Vilnius Exchange turnover amounted to LTL 3.2 billion, 77.78% more compared to the year 2008.

Financial crisis and the related fluctuations of national economy have proved that investment is a very risky money-saving tool. Investors assess probable return and risk level and select the most appropriate investment technique. The rapid development of financial markets, especially security, determined the increased interest of investors in the theories and models of stock pricing, e.g. technical and fundamental analyses, the evaluation of the influence of environmental factors.

One of these theories, known as a classical pricing theory, is supported by the fact that the price of stock is affected by fundamental factors. Therefore, fundamental analysis can be described as the research of price trends with respect to macroeconomic variables and is widely used by the Lithuanian investors. In this light, fundamental analysis can be treated as an effective tool for a long-term investment decision making.

In Lithuania investment management is quite a new scientific trend because its stock market was formed and started to develop only 20 years ago. The independence of the Republic of Lithuania was restored in 1991, thus the legal base of the stock market was created only at that time, following the establishment of appropriate financial institutes. This explains the fact why the Lithuanian stock market is not suitable to apply innovative and widely used theoretical investment models. Furthermore, due to the global financial crisis of 2008-2009, the investment into the stocks of companies decreased rapidly. Therefore, the present situation stimulates to examine the possibilities of applying the fundamental analysis in the Lithuanian stock market. The main problem is that not all fundamental factors reflect the current economic situation, the performance of a sector or the financial situation of a company. The Lithuanian scientists mostly investigate macroeconomic issues and propose to use certain indicators. However, sometimes these indicators are treated controversially. Therefore, such cross-purposes at the theoretical level encourage to establish whether it is possible to apply the fundamental analysis in the Lithuanian stock market. Moreover, the previous research of the authors of this paper (Dzikevičius, Šaranda & Kravcionok,

2010; Dzikevičius & Šaranda, 2010; Dzikevičius & Šaranda, 2011) imply that technical analysis can be used in order to predict the trends in stock market but it cannot be treated as an appropriate measure for each stock market. It was concluded that one of the widely spread technical methods – moving average – provides more accurate results to forecast price movements in the Baltic States rather than in the U.S. The latest research of the same authors on the issues of technical analysis revealed that the largest OMX stock market fluctuations can be foreseen due to exponential moving average intersections in the course of several different periods. The above mentioned conclusions raised a new issue to investigate, i.e. whether the mix of technical and functional analyses is a suitable tool to predict financial market bubbles.

Thus the main objective of this research paper is to determine a link between the stock market prices of the enterprises listed on NASDAQ OMX Vilnius Exchange and the financial data provided in the financial statements. The object of the research is the Lithuanian enterprises listed on the official Baltic equity list. With the purpose to conclude which enterprises are most likely to be profitable and should be selected constraining effective investment portfolio, correlation and covariance analysis is used as the main methodology of the research.

2. Literature Review on Fundamental Analysis Issues

Nowadays econometrics allows us to apply some methods in order to forecast stock prices, however, as practice shows, not all of these methods are effective. Marshall *et al.* (2007) and other scientists concluded that stock market return can be predicted but the traders cannot profit from it. Hartmann *et al.* (2008) implies that investors are able to forecast stock market and the return in real time using different forecast methods. For that reason one of the most popular methods used is a technical analysis approach. In the opinion of Dzikevičius, Šaranda & Kravcionok (2010), technical analysis continually causes disputes on the effectiveness of the moving average issues. Much scientific research has been done in order to forecast financial markets, especially stock markets. The results are obtained after investigating weak-form markets with the aim to establish the interdependence between present and future prices.

On the contrary, fundamental analysis is based on

the accurate analysis of the economic and financial performance of the issuers. The analysis is based on the assumptions that the real stock value influences the market price of this investment tool. Such value is determined by macroeconomic, microeconomic and issuer factors. At the microeconomic level the effective functionality of the stock market permits to attract the necessary capital. At the macroeconomic level the stock market allows to accumulate and allocate the capital effectively. Due to this reason the national budget increases (Pekarskienė, 2001).

In spite of this, fundamental analysis is supported by setting the value of the company, estimating revenue, costs and profit, evaluating dividends, the possibility of development etc., i.e. the internal value of a company is held as the main concept of the analysis. Referring to that information, an investor can set the value which can be compared to the current stock price. As a result this type of analysis is aimed to foreknow the long-term fundamental factors. It includes three main types of analysis: economic analysis, sector analysis and company analysis (Nagano *et al.* 2005). Cibulskienė & Grigaliūnienė state (2006) that the opposition of the fundamental analysis criticises this effective market hypothesis. They think that an investor needs to evaluate not only qualitative but also quantitative factors which can influence stock value and market price.

Valakevičius (2007) states that fundamental analysis should include the element of seasonality while some ratios increase or decrease due to a certain season. Hence the information can be used in a twofold way. Firstly, to prepare the overall reliable development scenario and enunciate its results and, secondly, while investigating the specific sectors or companies with the purpose to annotate how they can be influenced by the economic events (Nagano *et al.,* 2003).

In Western Europe investors face instability of the emerging financial markets that is influenced by the political situation of the country (Bistrova & Lace, 2010). Generally, theoretical models aimed to forecast stock prices or returns are substantiated by the neoclassical model of asset pricing which states that there are some ratios which can explain the volatility of stock return or price. It should be noted that some macroeconomic variables are also a powerful tool to forecast the above mentioned values (Grigaliūnienė & Cibulckienė, 2010).

During the period of 1995-2005 a poor interest related

to fundamental analysis at the theoretical level existed in Lithuania. Butkutė & Moscinskas (1998) analysed the issues related to the effectiveness of the Lithuanian capital market. Vasiliauskaitė & Lakstutienenė (1998) and Rasimavičius & Nedzveckas did research in order to analyse the general processes related to capital market. In 2001 Pekarskienė determined the ratios which reflect the situation in the Lithuanian stock market. This author evaluated the influence of the macroeconomic environment on the stock turnover in the market. In 2004 Tvaronavičienė & Rafael performed the first research in Lithuania which was aimed to analyse the activities of investors.

During the period of 2005-2008, Lithuanian economics tended to grow influencing financial markets to rise too. Such situations motivated scientists to perform new analyses and research on the issues of fundamental analysis and to study the influence of information on stock prices and the related volatility (Table 1).

Nevertheless, the relationship among the macroeconomic indicators is a negotiable issue. Agrawalla & Tuteja (2007) and Padhan (2007) researched the relationship between the macroeconomic variables and stock prices in the Indian market. Some scientists (Lin *et al.,* 2007) analysed the empirical links among the real economics reflected by GDP and the production volumes and the stock price in the biggest Asian countries. Elleuch (2007) investigated the general strategies of the fundamental analysis. The results of the study revealed that historical financial data cabe used in order to improve the distribution of the expected return in the future. Other results prove that foreign investors buy and sell the stock of production companies using the fundamental analysis as the basis for the investment decision making. Leverage, profitability and solvency are the ratios that are considered by investors (Saraç 2007). Brickner, Brown & Mying (2007) established that the revenue of a company cannot clarify the abnormal returns of such issuer's stock, though financial indicators are treated to be very valuable because they explain the revenue of the companies mentioned above. Such conclusions reflect the expectations related to the financial indicators of value in the context of certain environment.

Edirisinghe & Zhang (2007) developed the DEA model in order to analyse the financial reports of a company and to determine the financial indicators in the course of fundamental analysis. This information can be used with the purpose to forecast stock prices.

Lewellen (2010) criticises the main five objects of the fundamental analysis, such as risk, forecasted capital costs, transaction costs, size of a company and Mishkin test. Anderson *et al.* (2007) state that the evaluation of the ratios related to sales and operating costs is a regular element in the context of fundamentals analysis.

Abdel-Azim, Mohamed & Eldomiaty (2007) revealed that the disclosure of the financial data can be used as an indicator in the course of stock price forecast in the Egyptian markets. Two years earlier, Eldomiaty (2005) investigated the fundamental analysis in the course of three level values. He determined that financial data is quite an informative tool for shareholders. Additionally, the sensitivity test anticipates that the balance sheets are not as informative as an investor would expect. Controversially, P&L and the financial ratios of a company can be informative if they are applied as a common integrated form of model.

Author	Year	Description of the research done
D. Lekavičienė, R. Stasys	2005	The results showed that the activity of a stock market is closely related to legal acts, EU regional politics, capital movement, competitive environment and the policy of a specific sector. When considering the results of the stock market it has to be noted that fundamental and/or technical analysis should be performed.
M. Tvaronavičienė, J. Michailova	2006	The influence of different factors on the stock market was evaluated.
V. Darskuvienė, J. Sakalytė	2006	The scientists evaluated the reaction of the stock index to the different information provided by mass media.
R. Boreikia, D. Plinkus	2009	The scientists investigated what factors have an impact on the profitably of the performance of the Lithuanian companies. They determined that macroeconomic factors have a direct impact on the behaviour of the stock market. Furthermore, they presume that each macroeconomic ratio is very important when analysing the dynamics of stock prices.
J., Lace, N. Bistrova	2009	In this article the issues related to equity structure were analysed as they were treated as a key element to the fundamental analysis. The research results allowed to claim that this analysis does not generate major alpha values.
S. Danilenko	2009	It was determined that the economic indicators, such as GBP, export and import volumes, and direct investments can be externalised by three factors: the first component shows relationship with direct investments, another one relates to the changes of construction prices and average salaries, and the last one characterises GDP and inflation rates.
E.Racickas, A. Vasiliauskaitė	2010	One of the ratios of the depth of the general financial crisis was established. That is a stock market indicator and its observation allows to determine the current situation in the stock market.
D. Plinkus	2010	The results of the research revealed that some of the macroeconomic ratios can be used as an indicator of stock returns in the Lithuanian market, whereas OMX Vilnius index can be used as the main indicator reflecting macroeconomic ratios.

Table 1. Research on the Issues of the Fundamental Analysis done in 2005-2010

Financial ratio	Abbreviation	Financial ratio	Abbreviation
Gross profit margin	GPM	Current assets to equity ratio	CAER
Operating margin	OM	Current ratio	CR
Net profit margin	NPM	Quick ratio	QR
Return on asset	ROA	Cash ration	CAR
Return on equity	ROE	Working capital to total assets	WCTA
Total liabilities to total assets	TLTA	Inventory turnover	IT
Total liabilities to equity ratio	TLER	Accounts receivables turnover	ART
Equity to total liabilities ratio	ETLR	Accounts payable turnover	APT
Total assets to equity ratio	TAER	Long-term asset turnover	LTAT
Equity ratio	ER	Total asset turnover	TAT

Table 2. Calculated Financial Ratios

3. Data and Methodology

With the reference to the application of the fundamental analysis in the Lithuanian stock market, NASDAQ OMX Vilnius index is used as a background. It was decided to use the financial data of the companies listed on the official Baltic equity list. Historical data used in this research covers the period of 2007-2010. This historical information was selected in order to emphasise the impact of the financial crisis in 2008 and 2009. Although there are 18 companies listed on the official Baltic equity list, only some of them were selected for the purposes of this research. It is presumed that the companies registered since 2005 and listed since 2007 are not qualified to be analysed in this research since the financial data covers the period of 2007-2010. In the present research the financial data stated in the annual reports of the companies was used. Moreover, the information mentioned above covers only the financials of the companies and does not cover the financials of consolidated groups. All the necessary reports are provided by the official NASDAQ OMX Vilnius website.

Due to the reason that some companies provide just the consolidated financials, they were eliminated in order to receive reliable comparable results. Consequently, only the ratios of the following 5 companies can be estimated: *Apranga* AB (APG1L), *Grigi kės* AB (GRG1L), *Panevėžio statybos trestas* AB (PTR1L), *Pieno žvaigždės* AB (PZV1L) and *Vilniaus baldai* AB (VBL1L).

Furthermore, 20 ratios were calculated with the reference to the official methods of ratio calculation advised by NASDAQ OMX[1] (Table 2). They were selected on the basis of the availability of financial data.

As the present research is aimed to find a link between a stock price and the financial ratios of a company, correlation and covariance coefficients were estimated in order to determine whether a relationship between the variables exists. With the purpose to minimise the risk, the present research applies probability theory and modern methods of statistics, one of them being the Stock price correlation method described by Rutkauskas (2002).

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[1] Analysis of Enterprise Finance. Methodology for the Evaluation of Ratios [online]. 2010. Vilnius: NASDAQ OMX Vilnius Stock Exchange [cited 13 May]. Available from the Internet at <http://www.nasdaqomxbaltic.com/files/vilnius/leidiniai/Rodikliu_skaiciavimo_metodika-final.pdf>

Correlation can be described as a parameter of some stochastic processes which are used to model the variations in the price of financial asset. Financial asset prices exist now and were observed in the past but it is not possible to determine exactly what prices there will be in the future. Correlation is a measure of co-movements between two return series (Alexander, 2001). This method is relevant to indexes because if the correlation ratio is negative (R<0), the trend of total stocks (indexes) tends to decrease compared to another (main) index.

It is presumed that the strength of the relationship is evaluated as follows:

- $|0.00–0.19|$ – very weak form of relationship;
- $|0.20–0.39|$ – weak form of relationship;
- $|0.40–0.69|$ – average form of relationship;
- $|0.70–0.89|$ – strong form of relationship;
- $|0.90–1.00|$ – very strong form of relationship.

Covariance (2) coefficient is a quantitative characteristic estimating the linear relationship between two random values (X and Y).

$$\rho = \frac{\text{cov}(X,Y)}{\sqrt{\sigma_x^2 \cdot \sigma_y^2}} \qquad (2)$$

If X and Y are independent, then $\text{cov}(X,Y) = 0$. With respect to this condition, the covariance between ratios (X_n) and normal and logarithmic price return (Y_m) was evaluated. However, in both cases $|\text{cov}(X,Y)| \le \sqrt{\sigma_x^2 \cdot \sigma_y^2}$. Additionally, normal stock price return and logarithmic prices return are used in order to find a link. They are outlined further:

$$R_n = \frac{P_t - P_{t-1} - D_1}{P_{t-1}} \qquad (3)$$

$$R_{\ln} = \ln\left(\frac{P_t}{P_{t-1}}\right) \qquad (4)$$

Here P_t is the stock price and $(t, t-1)$ is any time interval. It is presumed that the dividends for the mentioned periods are not evaluated, so $D_1 = 0$. Moreover, the financial data analysed in this research does not include transactional costs. Furthermore, this research is supported by establishing a link between a simple method for risk evaluation and financial ratios.

The concept of risk has been known but investors did not know how to measure it quantitatively. Modern portfolio theory has shown to investors how risk can be quantified by the standard deviation of profitability. At the same time no quantitative measures can be

related to profitability and risk. These factors were considered separately, i.e. investors are grouped into similar risk investment classes according to the profitability of the standard deviation. Then only certain classes are evaluated in an alternative investment return of risk (Dzikevičius, 2004). Smaller standard deviation means lower investment risk level and vice versa. (Pečiulis & Šiaudinis, 1997).

4. Empirical Results

The present research revealed that the financial reports provided by the companies that were analyzed and represented by NASDAQ OMX are misleading because some mistakes were found. After the elimination of mistakes appropriate results were obtained. Pre-eminently it was determined whether the return on stock prices per quarter and the ratios reflecting the financial performance of the company are dependent values. The results of the research proved that in all cases $cov(X,Y) \neq 0$. Subsequently it was established that stock return and financial ratios are dependent values. Consequently, the correlation analysis was accomplished in order to determine the strength of dependence among the variables. The results of the consolidated correlation analysis are listed in Table 3-Table 7.

Ticker	Min Value	Max Value	|0.00–0.19|	|0.20–0.39|	|0.40–0.69|	|0.70–0.89|	|0.90–1.00|
APG1L	-0,5700	0,6088	GPM; CR; QR; CAR; WCTA; ART	OM; NPM; ROA; ROE; IT	TLTA; TLER; ETLR; TAER; ER; CAER; APT; LTAT; TAT	-	-
GRG1L	-0,4396	0,7587	TLTA; TLER; ETLR; TAER; ER; CAER; ART	OM; NPM; ROA; ROE; CR; QR; WCTA; IT; APT	GPM; LTAT; TAT	CAR	-
PZV1L	-0,3987	0,4220	CR; QR; CAR; WCTA; ART; APT	GPM; OM; NPM; ROA; TLTA; TLER; ELTER; TAER; ER; CAER; IT; LTAT; TAT	ROE	-	-
PTR1L	-0,4272	0,4435	CAER, RC, QR, IT, ART, APT	GPM, OM, NPM, ROA, ROE, TLTA, TLER, ETLR, TAER, ER, CAR	WCTA, LTAT, TAT	-	-
VLB1L	-0,5940	0,7939	CAER, IT, ART	NPM; ROE; CAR; APT; LTAT	ROA, TLTA, TLER, ETLR, TAER, ER, WCTA, TAT	GPM, OM, CR, QR	-

Table 3. Results of Correlation Analysis for R$_n$

Ticker	Min Value	Max Value	|0.00–0.19|	|0.20–0.39|	|0.40–0.69|	|0.70–0.89|	|0.90–1.00
APG1L	-0,5390	0,6118	GPM, NPM, ROA, CR, QR, CAR, ART, OM, ROE	WCTA, IT	TLTA, TLER, ETLR, TAER, ER, CAER, APT, LTAT, TAT	-	-
GRG1L	-0,4956	0,5661	TLTA, TLER, ETLR, TAER, ER, CAER, ART	OM, ROA, CR, QR, WCTA, IT	GPM; NPM, ROE, ROA, CAR, LTAT	-	-
PZV1L	-0,4361	0,4062	ROA, CR, QR, CAR, WCTA, ART, APT	GPM; OM; NPM; ROE; TLTA; ETLR; ER; IT; LTAT	TLAER, TAER, CAER, TAT	-	-
PTR1L	-0,4256	0,5032	CAER, IT, ART, APT	GPM, NPM, ROA, ROE, TLTA, TLER, ER, CR, QR, CAR, TAT	OM, WCTA, LTAT		

| VLB1L | -0,5689 | 0,8013 | ROE, CAER, IT, ART | NPM, CAR, APT, LTAT | ROA, TLTA, TLER, ETLR, TAER, ER, CR, QR, WCTA, TAT | GPM, OM | - |

Table 4. Results of Correlation Analysis for R_{ln}

Ticker	Min Value	Max Value	|0.00–0.19|	|0.20–0.39|	|0.40–0.69|	|0.70–0.89|	|0.90–1.00|
APG1L	-0,2397	0,5185	GPM, NPM, ETLR, CAER, CR, CAR, WCTA, APT	OM; ROA; ROE; TLTA; TLER; TAER; ER; QRL IT	ART; LTAT; TAT	-	-
GRG1L	-0,3062	0,5032	ROA; TLTA; TLER; ETLR; TAER; ER; CAER; CR; QR; CAR; WCTA; IT; LTAT; TAT	GPM; OM; NPM; ROE; APT	ART	-	-
PZV1L	-0,3122	0,3746	GPM, OM, ROA; ROE; CR, QR, WCTA, IT, ART, APT, LTAT, TAT	NPM, TLTA, TLER, ETLR, TAER, ER, CAER, CAR	-	-	-
PTR1L	-0,6368	0,6368	GPM, OM, NPM, WCTA, APT	ROA, ROE, CAER, CR, QR, IT, ART	TLTA, TLER, ETLR, TAER, ER, CAR, LTAT, TAT	-	-
VLB1L	-0,4875	0,6455	CAR, IT, ART	GPM, OM, NPM, ROA, ROE, TLER, TAER, CAER, APT, TAT	TLTA, ETLR, ER, CR, QR, WCTA, LTAT	-	-

Table 5. Results of Correlation Analysis for σ

Ratio	APG1L			GRG1L			PZV1L		
	R_n	R_{ln}	σ	R_n	R_{ln}	σ	R_n	R_{ln}	σ
GPM	-0.1863	-0.1505	0.1638	0.4367	0.5091	-0.2926	0.3277	0.3842	-0.1223
OM	-0.2029	-0.1912	0.2024	0.3052	0.3808	-0.3062	0.3277	0.2705	-0.1122
NPM	-0.2094	-0.1778	0.1352	0.3015	0.4105	-0.2408	0.3935	0.3412	-0.2065
ROA	-0.2022	-0.1718	0.2085	0.2629	0.3597	-0.1876	0.2278	0.1861	0.0832
ROE	-0.2254	-0.1995	0.2426	0.2890	0.4085	-0.2516	0.4220	0.3686	-0.1769
TLTA	-0.5700	-0.5390	0.2400	-0.0779	-0.1584	0.1382	-0.3339	-0.3949	0.3113
TLER	-0.5424	-0.5092	0.2291	-0.0029	0.0519	-0.1691	-0.3550	-0.4106	0.3086
ETLR	0.5682	0.5304	-0.1616	0.0786	0.1038	0.0455	0.3204	0.3843	-0.3122
TAER	-0.5430	-0.5098	0.2291	-0.0079	0.0492	-0.1667	-0.3550	-0.4106	0.3086
ER	0.5708	0.5397	-0.2397	0.0195	-0.0314	0.1810	0.3339	0.3949	-0.3113
CAER	-0.4947	-0.4589	0.1263	-0.0079	0.0492	-0.1667	-0.3987	-0.4361	0.3746
CR	-0.1234	-0.1196	-0.1808	0.2659	0.2483	-0.1125	0.0388	0.0621	-0.0374

QR	-0.0611	-0.0344	-0.2127	0.3582	0.3080	-0.0043	0.0569	0.0883	-0.0435
CAR	0.0083	0.0173	0.0859	0.7587	0.5661	-0.0721	0.0895	0.1566	-0.2176
WCTA	-0.1879	-0.2280	-0.0698	0.2448	0.2140	-0.0241	0.0526	0.0371	-0.1257
IT	-0.3294	-0.2899	0.3374	-0.1835	-0.1792	0.5032	0.3655	0.3819	-0.1931
ART	-0.1072	-0.1255	0.5185	-0.3363	-0.2268	0.3100	0.0866	0.0660	-0.0480
APT	0.6088	0.6118	0.0404	-0.4066	-0.4956	-0.0939	-0.0438	-0.1215	-0.1042
LTAT	-0.4376	-0.4415	0.4735	-0.4396	-0.2842	0.1239	0.2801	0.2958	-0.0382
TAT	-0.4426	-0.4489	0.5173	-0.2029	-0.1783	0.1793	0.3887	0.4062	-0.1416

Table 6. Correlation Matrix for APG1L, GRG1L and PZV1L

As it can be seen from the data in the tables presented above, the dependence between the stock price return and the estimated financial ratios is not as strong as it was expected. In all cases $|R| < 0.9$.

The results revealed that in APG1L case both R_n and R_{ln} can be characterised by the inverted relationship with almost all financial ratios, except for ETLR (0.5682 and 0.5304), ER (0.5708 and 0.5397), CAR (0.0083) and APT (0.6088 and 0.6118). However, σ used in this research as a simple risk measure tool is characterised by linear correlation with the financial ratios, except for ETLR (-0.1616), ER (-0.2397), CR (-.1808), QR (-0.2127) and WCTA (-0.0698). While analysing the relationship between the variables in case of GRG1L, it was concluded that the relationship between R_n and the financial ratios is positive in 54% of the financial ratios and negative in 46% of the financial ratios. However, R_{ln} has a negative link with fewer financial ratios. In case of PZV1L, both R_n and R_{ln} can be characterised by the inverted relationship with TLTA, TLER, TAER, CAER and APT. Moreover, σ has a positive dependence with few ratios such as ROA, TLTA, TLER, TAER and CAER.

During the analysis it was concluded that in the case of PTR1L both R_n and R_{ln} are generally characterised by negative dependence with all profitability ratios. In the case of VBL1L, the lower number of negative links among the variables was observed. Furthermore, VBL1L is the only company when R_n has a strong form of relationship with GPM, OM, CR and QR and R_{ln} might depend on GPM and OM.

Ratio	PTR1L			VLB1L		
	R_n	R_{ln}	σ	R_n	R_{ln}	σ
GPM	-0.2417	-0.3756	-0.0348	0.7675	0.7746	0.2569
OM	-0.3648	-0.4081	0.1625	0.7939	0.8013	0.2701
NPM	-0.2540	-0.2750	0.0498	0.3399	0.2944	0.2925
ROA	-0.3730	-0.3510	0.2404	0.4731	0.4352	0.3332
ROE	-0.3281	-0.2909	0.2991	0.2305	0.1849	0.2226
TLTA	-0.3920	-0.3593	0.6368	-0.5940	-0.5689	-0.4569
TLER	-0.3600	-0.2979	0.6010	-0.5022	-0.4683	-0.3643
ETLR	0.3821	0.3868	-0.6299	0.6467	0.6290	0.5794
TAER	-0.3600	-0.2979	0.6010	-0.5018	-0.4678	-0.3651
ER	0.3920	0.3593	-0.6368	0.5933	0.5679	0.4582
CAER	0.1112	0.1871	0.2276	-0.0406	-0.0892	0.2811

CR	0.1355	0.2074	0.2768	0.7022	0.6864	0.6414
QR	0.1442	0.2127	0.2816	0.7030	0.6810	0.6455
CAR	0.3555	0.3298	-0.5873	0.2342	0.2522	0.1099
WCTA	0.4435	0.5032	-0.1589	0.6142	0.5860	0.4340
IT	0.1143	0.1821	0.2686	0.0726	0.0811	0.0471
ART	-0.1471	-0.0459	0.2446	0.1421	0.1842	0.0758
APT	-0.0361	0.0743	-0.0831	0.2659	0.3161	-0.2907
LTAT	-0.4272	-0.4256	0.4330	-0.3692	-0.3128	-0.4875
TAT	-0.4095	-0.3850	0.4920	0.5778	0.5731	0.2863

Table 7. Correlation Matrix for PTR1L and VBL1L

5. Conclusions

This research was conducted in order to determine whether a link between a stock price return and 20 selected financial ratios exists.

First of all, it was concluded that the financial data presented in quarterly reports might sometimes be fallacious. Thus, while analysing this data, investors should pay more attention to the accuracy of the information provided otherwise wrong decisions on investment issues are expected to be made. Therefore, there is a probability that the Lithuanian stock market cannot be treated as an effective one and this information contradicts the respective existing theory.

On one hand, this issue is related to the registration date in the official list as there are only few companies suitable for the analysis. On the other hand, there is not enough reliable data related to the financial performance of the companies. It can be presumed that the current situation is predetermined by the insufficient maturity level of the Lithuanian stock market as potential investors do not evaluate the performance of the companies appropriately. In the case, if the dependence between a stock price return and the financial ratios that were estimated and presented in this research is evaluated, the stock price return should be calculated by using several methods because different methods provide slightly different results. These results can be treated differently in the context of the evaluation of strength relationship. The empirical results of this research prove that in the Lithuanian stock market fundamental analysis can be used but it should be modified with the reference to the features that are typical to the analysed stock market.

Although the theoretical background of the fundamental analysis is supported by the fact that first of all an economic analysis should be done and only afterwards a sector and company performance analysis can be performed, the authors of this paper would advise to carry out the analysis in an inverted way, i.e. first of all, a company analysis, after that a sector analysis and then an economic analysis. In such a case the link between a company and the external factors can be identified in order to evaluate their impact on the financial performance of a company and its stock price return. In our opinion, the fundamental analysis should be supported by various relative variables in order to be applied in the right way in the Lithuanian stock market.

Moreover, it was determined that the methods that are successfully applied in the other than the Lithuanian markets may be applied in the analysed market in the same way. Due to this reason it was decided to continue and expand the research on the issues of the fundamental analysis as new possibilities emerged after the research was completed.

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