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# CORRELATION OF FUNDAMENTAL AND TECHNICAL INDICATORS FOR A PARTICULAR STOCK AT THE BANJA LUKA STOCK EXCHANGE

# UZAJAMNA POVEZANOST FUNDAMENTALNIH I TEHNIČKIH POKAZATELJA POSLOVANJA ZA ODREĐENE DIONICE NA BANJALUČKOJ BERZI HARTIJA OD VRIJEDNOSTI

#### ABSTRACT

The fundamental business indicators are based on an analysis of previous incomes and financial research statements of companies. Unlike the fundamentals, a technical analysis (indicator) is based on the forms related to the movement of stock prices, and determines whether they are repetitive and whether they are predictable. In the capital market in BH, there is a common phenomenon that indicates that certain shares are not traded for more than one day, due to low liquidity, and because of the lack of information and high risk. Also, this paper will analyze one segment of the capital market in BH, i.e. shares of stock index BIRS (Banja Luka Stock Exchange of Securities). The main objective of this research is to determine whether there is a mutual dependence and interdependence in the movement of technical and fundamental analysis indicators, i.e. whether fundamental indicators can affect the movement of stock prices through a multiple linear regression. As independent variables will be used: return on average equity - ROAE, then earnings before interest, taxes, depreciation and amortization – EBITDA, the ratio of total debt to total assets (Leverage) and dividend per share. The price – earnings ratio will be observed as a dependent variable. This study covers the period from 2005 to 2013.

*Keywords:* technical indicators, fundamental indicators, *P/E* ratio, undervaluation of stock, slow economic activity.

## SAŽETAK

Fundamentalni pokazatelji poslovanja se zasnivaju na analizi ranijih prihoda te proučavanjem financijskih izvještaja preduzeća. Za razliku od fundamentalnih pokazatelja, tehnička analiza (pokazatelji) se bazira na obrascima u vezi kretanja cijena dionica, odnosno utvrđivanju da li se ponavljaju i da li su predvidivi. Na tržištu kapitala u BiH je uobičajena pojava da se određenom dionicom ne trguje jedan ili više dana, kako zbog niske likvidnosti, tako i zbog neinformisanosti i visoke rizičnosti. U vom radu će se analizirati jedan segment tržišta kapitala u BiH, tj. dionice berzanskog indeksa BIRS (Banjalučka berza hartija od vrijednosti). Osnovni cilj ovog rada je da se utvrdi da li postoji međusobna zavisnost i uslovljenost u kretanju tehničkih i fundamentalnih pokazatelja analize, tj. da li fundamentalni pokazatelji mogu utjecati na kretanje cijene dionica putem višestruke linearne regresije. Kao nezavisne varijable će se koristiti: povrat na prosječni dionički kapital – ROE, zatim zarada prije kamata, poreza, deprecijacije i amortizacije –EBITDA, racio ukupnog duga prema ukupnoj aktivi (leveridž) i dividenda po dionici. Racio tržišna cijena/zarada –P/E će se posmatrati kao zavisna varijabla. Ovo istraživanje obuhvata razdoblje od 2005 do 2013. godine.

*Ključne riječi:* tehnički indikatori, fundamentalni indikatori, P/E racio, podcjenjenost dionica, usporena ekonomska aktivnost.

## 1. Introduction

Similar companies use different national accounting standards to report different earnings. Some accounting standards are more conservative than others in terms that lead to lower reported earnings. Some comparative studies have attempted to measure the relative conservatism of national standards. According to research Radebauugh and Gray (1997) accounting principles in the United States are far more conservative than U.K. accounting principles but significantly less conservative than Japanese and Continental European accounting principles. If the United States earnings are arbitrarily scaled at 100, Japanese earnings will scale at 66, German earnings at 87, French earnings at 97, and British earnings at 125. These national accounting principles also affect the reported book value of equity.

Price-earnings (P/E) ratios are of great interest to international investors, who want to compare the P/E ratios of companies in the same industrial sector across the world. The P/E ratio divides the market price of a share by its current or estimated annual earnings. Japanese companies have traditionally traded at high P/E ratios in comparison with U.S. companies. For comparison purposes, P/E ratios should be adjusted because of the accounting differences in reporting earnings (Solnik & McLeavey, 2009, p. 215-216).

In the most developed financial market, i. e. the US financial market dividends paying ratio ranging from 0.33 to 0.56. In the Republic of Srpska average annually in the form of dividends paid 1.5% of GDP. Applied conservative model recommends that the share of GDP should be around 2.6% of GDP in the form of dividend payments. First of all, the low dividend affects low accumulation of the economy of the Republic of Srpska.

Investors are more willing to pay for shares of companies whose earnings grow rapidly, less for companies whose earnings are declining, more during periods of optimism, less during period of pessimism, also more when interest rate are low (meaning less competition for bond investment), less when interest rate are high (Appel, 2007, p. 182 – 183). Usually, risky companies have a more required rate of return, which implies a lower P / E ratios. Thus, the present value of any expected earnings or dividends is lower when the risk is higher cash flows. If you look at The Wall Street Journal, we will find many small, risky companies with very high P / E ratios. This is the reason that the market of the company expects high growth rates (Bodie, at al. 2009, p. 407).

The structure of the financial system of the Republic Srpska remains extremely bank type orientaited and an inadequate attitude towards saving and investments have a significant impact on companies that although have a need for the new capital still insufficiently use the capital market as the primary source of financing its own development. The beginning of the development of the capital market in the Republic Srpska is linked to the privatization process and the formation of capital market institutions; the Securities Commission in 2000, the Central Registry of Securities and the Banja Luka Stock Exchange, in 2001. The first transaction on the Banja Luka Stock Exchange was conducted in March 2002. Small market, inadequate development of privatized companies and problems arising in the privatization process had the decisive influence on the degree of development of the Republic Srpska capital market. The beginning of the development of the capital market in the Republic Srpska is linked to the privatization process and the formation of capital market institutions; the Securities Commission in 2000, the Central Registry of Securities and the Banja Luka Stock Exchange, in 2001. The first transaction on the Banja Luka Stock Exchange was conducted in March 2002. Small market, inadequate development of privatized companies and problems arising in the privatization process had decisive influence on the degree of development of the Republic Srpska capital market (Securities Commission of the Republic Srpska, 2014, p. 6)

This research is designed and presented in three sections of this paper. The first part looks at the variables of the price-to-earnings ratio and the selected indicators of the financial health of the capital market of the Republic of Srpska. The second part describes the theoretical assumptions and perceptions, the regression model and gives a definition of significant independent variables that affect the price-to-earnings ratio alone. The last part of the paper discusses the results of my research on the application of the regression model. In this context, it is stated that the observed independent variables have the greatest impact on the growth or decline price-to-earnings ratio for the capital market in the Republic of Srpska. We will test the significance of observed financial variables in the model, where the null hypothesis is the reason the independent variables do not significantly affect the dependent. In this context, it is stated that the observed independent variables have the greatest impact on the growth or decline of the reason the independent variables do not significantly affect the dependent. In this context, it is stated that the observed independent variables have the greatest impact on the growth or decline of the price-to-earnings ratio for the capital market in the Republic of Srpska.

### 2. Literature Review

According to research by Banz (1981), the small size company have higher average return than large size company even after adjusted for their systematic risks. Bhandari (1988) finds that there is a positive relation between leverage and average returns in tests that include both (market equity – ME) and  $\beta$ . According to research by Reilly et al. (1983) concerning the relationship between the variables of price-earnings ratio – P/E and stock index S & P 500 through multiple regression analysis as well as for the period from 1963 to 1980 they came to the conclusion that the P / E ratio increases with the payment of dividends, realized earnings growth and dividend growth rate also increases, and on the other hand it decreases with increasing business failures, i.e. negative financial results, risk-free rate of return, inflation and volatility of earnings.

Shamsudin and Hiller (2004) conducted a study on the Austrian market, which refers to the analysis of the main factors affecting the P / E ratios within the stock index of the Austrian Stock Exchange - ASE 200 and for the quarterly period from1984 to 2001 and from 2001 to 2003. Results research showed that the P / E ratios increasing function of dividend payments, the appreciation of the Austrian currency, growth of gross domestic product and improving consumer confidence. On the other hand, the P / E ratio decreases as a function of interest rates and market volatility.

Companies can sell shares at different prices, which appear different understanding of whether it is better to sell them with higher or lower P / E ratio. A higher P / E ratio tells investors about major development opportunities of the company. However, one should be very cautious when making decisions on the basis of P / E indicators, because it very differ between branches. Usually, the higher the P / E ratio is in the fields of high technology, which does not automatically mean that it is a high-quality company. Therefore, for the consideration of the company's success requires a wider analysis that includes other aspects of development opportunities, competitive position analysis, financial analysis and so on (Eric, 2003, p. 368).

In the finance literature, there are two approaches that explain the volatility of stock prices under the influence of certain variables. The first approach is based on parsing raids dividend-price into two components, namely the expected return and expected cash flow. Results of the study the first access point to the fact that the aggregate expected cash flows do not affect significantly the volatility of stock prices. The second methodology is a methodology that studies the volatility of stock returns rather than dividend – price ratios (Campbell, 1991 & Vuolteenahoo, 2002). Anderson and Brooks (2006) have analyzed all the companies in the UK for the period from 1975 to 2003, where they came to the conclusion that the P / E ratio affects the following specific variables: the size of the company, the year in which the P / E ratio is calculated and the effect of industries.

#### 3. Market And Financial Indicators in the Capital Market in Republic of Srpska

In the past ten-year, a good infrastructure and regulatory framework of the Republic of Srpska capital markets have been created. The market development was primarily based on the concept of mass voucher privatization of state-owned capital. The global economic and financial crises, which has been manifested in large declines in stock prices and turnovers (BLSE, Annual Report, 2013, p. 11).

Significantly rapid growth of turnover and prices on the Banja Luka Stock Exchange by the first half of 2007 followed the stock market trends in neighbouring countries, after which, as in most capital markets, influenced by the global financial and economic crisis, a decline and stagnation of activities occurred (Securities Commission of the Republic of Srpska, Annual Report, 2013, p. 6).

Indicator	2008	2009	2010	2011	2012	2013	2014	Index	Index
1	2	3	4	5	6	7	8	9(8/2)	10(8/7)
Turnover	140.651	92.285	90.087	217.532	133.412	192.172	299.927	113.24%	56,07%
Market Capitalization	1.884.484	1.920.689	1.908.297	1.961.022	1.956.515	2.112.618	2.271.062	20.51%	7.50%
Number of Trading Days	-	250	-	249	248	247	248	-	0.40%
Number of Transaction	28	11	10	9	15	16	11	(60.71%)	(31.25%)

 Table 1: Exchange Transactions on BLSE for the period: 2008 – 2014 (million EUR)

Source:http://www.blberza.com (Adjusted by Author)

The degree of the development of secondary financial markets is measured by the amount of market capitazlization, market size, and the ratio of market capitalization to gross domestic products, the volume of trading on the financial markets, liquidity of the market and the number of listed companies (Alihodžić, 2014, p. 176). As can be seen in Table 1 on Banja Luka Stock Exchange, the turnover recorded an increase in the value of 56.07% compared to 2013., and increase of 113.24% compared to 2008. Turnover on BLSE was increased due to issues of treasury bills and bonds of the Republic of Srpska. Despite, in absolute term, the large turnover growth it is still relatively small, because turnover accounts for only 1,4% of total market capitalization (Bulletin, CBBH, 2014, p. 68). The total market capitalization of all securities traded on the Banja Luka Stock Exchange of 30 December 2014 amounted to EUR, 2.271.062 which represent a relative increase by 7,50% compared to 2013., and also was recorded increase by 20.51% compared to 2008. Market depth measured by the turnover ration (as relation between market capitalization and turnover) is on approximately the same level as in the previous two quarters, but is still below the maximal level reached at the beginning of the year (1%). In the fourth quarter, turnover accounted for 0.7% of market capitalization, which is an extremely low relative value of turnover. On average, in the past two years, quarterly BLSE turnover represented only 0.66% of market capitalization of all financial instruments in BLSE quotation (Bulletin, CBBH, 2013, p. 80). As can be seen in Table 1 on Banja Luka Stock Exchange, the turnover recorded an increase in the value of 56.07% compared to 2013., and increase of 113.24% compared to 2008. Turnover on BLSE was increased due to issues of treasury bills and bonds of the Republic of Srpska. Despite, in absolute term, the large turnover growth it is still relatively small, because turnover accounts for only 1,4% of total market capitalization (Bulletin, CBBH, 2014, p. 68). The total market capitalization of all securities traded on the Banja Luka Stock Exchange of 30 December 2014 amounted to EUR. 2.271.062 which represent a relative increase by 7,50% compared to 2013., and also was recorded increase by 20.51% compared to 2008. Market depth measured by the turnover ration (as relation between market capitalization and turnover) is on approximately the same level as in the previous two quarters, but is still below the maximal level reached at the beginning of the year (1%). In the fourth quarter, turnover accounted for 0.7% of market capitalization, which is an extremely low relative

value of turnover. On average, in the past two years, quarterly BLSE turnover represented only 0.66% of market capitalization of all financial instruments in BLSE quotation (Bulletin, CBBH, 2013, p. 80).

Growth of indices in all markets in the region was strong until the half of the year 2007 and the high value of indices in that period was the result of this growth. Since 2008, there was a larger drop in the price of securities in all markets in the region. Markets in the region, in the same period, lost the value in the range of 11.3%, which records the Croatian market to 34.4% decline in the value that captures the Slovenian market. Market recovery in 2009 was modest and moderate, and this trend continued in 2010, when there was a slight fall in turnover and total capitalization compared to the year 2009. In 2011, all observed markets again recorded declines of indicators of capital market activities, for this reason, this year there was a decline in the indices of all of these markets. Only in 2012 there has been a rise in the index in a few of observed market, such as the markets in Austria, Greece, and Germany, while the other observed market continued its negative trend in the movement of stock indices. This trend continues in the year 2013 (Securities Commission of the Republic of Srpska, Annual Report, 2013, p. 9-10).

**Table 2 :** Analysis of financial and market indicators of the financial health of certain companies in composition of BIRS index for the period: 2012 - 2013

Financial	2012								
variables	HEDR-R-A	RITE-R-A	BOKS-R- A	TLKM-R-A	KRJN-R- A	BVRU-R- A			
Sales	14.229.350	52.322.038	19.036.697	244.320.114	3.827.317	5.980.948			
EBITDA	8.085.658	15.374.837	2.761.438	120.030.161	578.329	1.644.187			
Capital	299.394.015	231.570.370	18.184.041	355.411.671	27.263.818	19.633.835			
Market capitalization	83.382.252	16.707.254	5.656.989	399.472.433	9.004.441	11.166.673			
Return on Assets - ROA	0.79	-0.94	1.05	12.73	0.55	2.42			
Return on equity - ROE	0.82	-1.09	1.70	15.82	0.66	2.76			
P/S	5.86	0.32	0.30	1.63	2.35	1.87			
Net Income Per Share - EPS	0.01	-0.01	0.03	0.22	0.03	0.03			
Book Value Per Share	0.67	0.61	1.05	0.72	2.41	0.58			
Price – to – earnings ratio –P/E	34.15	-6.61	18.48	7.10	50.38	20.79			
Dividend per Share	0.01	-	0.02	0.22	-	0.04			
<b>F</b> <sup>1</sup> · 1			20	13					
variables	HEDR-R-A	RITE-R-A	BOKS-R- A	TLKM-R-A	KRJN-R- A	BVRU-R- A			
Sales	20.954.776	67.648.387	21.067.433	238.345.428	3.492.086	6.203.360			
EBITDA	13.697.842	20.106.035	3.087.869	111.941.550	718.293	1.682.562			
Capital	303.816.190	233.918.729	18.837.620	354.083.016	27.642.436	19.684.273			
Market capitalization	83.382.252	16.707.254	5.656.989	399.472.433	9.004.441	11.166.673			
Return on Assets - ROA	2.53	0.83	2.19	11.89	1.22	2.49			
Return on equity - ROE	2.64	0.98	3.53	14.46	1.38	2.84			

P/S	3.98	0.25	0.27	1.68	2.58	1.80
Net Income						
Per Share -	0.03	0.01	0.07	0.20	0.06	0.03
EPS						
Book Value	1 3/	0.61	1.08	0.71	2.45	0.58
Per Share	1.54	0.01	1.00	0.71	2.45	0.58
Price - to -						
earnings	10.45	7.29	8.65	7.79	23.78	20.03
ratio –P/E						
Dividend per	0.03	_	_	0.20	_	_
Share	0.05	_	_	0.20	-	_

Source: http://www.blberza.com (Adjusted by Author)

The table above illustrates the analysis of the fundamental and technical performance indicators for a number of companies that are part of stock index - BIRS, and for the period from 2012 to 2013. Given that the subject of research P / E ratio for a number of companies included in the stock index -BIRS which is in the last three years has had a positive financial result, if we compare the profitability ratios, i.e. ROA and ROE with a P / E ratio, then we can come to conclude that between them there is an inverse proportionality, i.e., with increasing profitability ratios lead to decreased P / E ratio.From the first payment of dividends on the financial market of the Republic of Srpska, has passed a little more than 10 years a very long period of significance analysis of market indicators of the Banja Luka stock exchange. Yield strength of companies on the Banja Luka Stock Exchange has averaged a little, where the payment of dividends is not yet an alternative interest, where no shares are not yet an alternative to bank savings deposit. Dividends paid to companies whose shares are traded on the Banja Luka Stock Exchange takes place in a way that leads one company while other companies follow a policy of a given company.

#### 4. Methodologies And Date

Price-to-earnings ratio is one of the most important and most used methods of fundamental analysis to assess the value of the shares. This relationship establishes a direct connection between the current market price of shares and earnings per share. A P/E index is defined the weighted average

of the individual companies price-to-earnings  $\frac{p_j}{e_j}$  weights are companies earnings  $\frac{e_j}{n_j}$  relative to market earnings E:

$$\frac{P}{E} = \sum \left[ \left( \frac{p_j}{e_j} \right) \right] \left( \frac{e_j n_j}{E} \right)$$
(1)

By multiplying the numerator and the denominator by  $\mathfrak{N}_{\mathbb{J}}$ , the aggregate P/E can also be shown to equal the market value of all companies relative to their total earnings:

$$\frac{P}{E} = \sum \frac{V_j}{E}$$
(2)

Therefore, a P/E index can be interpreted as a weighted average of companies price –earnings as in equation (1) also is equal to the total market value relative to total earnings as in (2) equation.

The regression model is an equation with a finite number of parameters and variables. Depending onwhether amodelcomprisedonly oneor more variables, there are simple and multiplelinear regression models respectively. In addition to a dependent variable andoneor more independent/variable, eachregressionmodelcontainsarandom variable. A simple linear regressionmodelexpresses are lationship between the two parameters as follows:

$$Y_i = \alpha + \beta X_i + \varepsilon_i \qquad i = 1, 2, \dots, n, \qquad (3)$$

where:

Y - dependent variable,  $\alpha \ t \ \beta$  - unknown parameters that needes timate, and  $\varepsilon_i -$  stochastic variable (error distances)

Unlike thesimpleregression, the multiple-linear regressionmodelis differentin that itcomprises two or moreindependent variables.

$$Y_i = \alpha + \beta_1 X_{i,1} + \beta_2 X_{i,2} + \dots + \beta_i X_{i,j} + \dots + \beta_k X_{i,k} + \varepsilon_i$$

$$\tag{4}$$

i = 1, 2, ..., n.

Specifically, this model consists of one dependent variableY, and Kindependent variables, which are referred to as:  $X_{i,j} = 1, 2, \dots, K$ .

This empirical study refers to the selected stock company into the stock exchange index of Banja Luka Stock Exchange - BIRS for the period from 2005 to 2013. The data used for this study are the official data (statistical analysis) of the Banja Luka Stock Exchange

The BIRS market index is a weighted index, which means that the share of individual stocks in the BIRS is determined by a market capitalization of each issuer. The market capitalization included ordinary shares held by public (free float). Maximum participation of each issuer in the BIRS on the date of the formation and revision is limited to 25%. The BIRS is also a price index and does not include dividends paid in cash. Shares of 5 to 30 issues can be included in the BIRS. The number of issuers whose shares are part of BIRS depends on the number of issuers that meet the requirements for the composition of BIRS.

Symbol	Issuer	Adjusted Number	% of BIRS
		of Shares	
BLPV-R-A	Banjalučka pivara, Banja Luka	20.775.188	4,98%
BOKS-R-A	Boksit, Milići	17.287.671	1,76%
BVRU-R-A	ZTC Banja Vrućica, Teslić	33.600.177	4,63%
CIST-R-A	Cistoća, Banja Luka	9.603.944	1,06%
DEST-R-A	Hemijska industrija destilacije, Teslić	23.228.364	1,52%
EKBL-R-A	Elektrokrajina, Banja Luka	92.276.622	1,30%
ELBJ-R-A	Elektro Bijeljina, Bijeljina	38.486.953	0,64%
ELDO-R-A	Elektro Doboj, Doboj	31.117.961	1,50%

Table 3: Composition of BIRS Index on 23 November 2014

Symbol	Issuer	Adjusted Number of Shares	% of BIRS
HEDR-R-A	Hidroelektrane na Drini, Višegrad	441.955.312	13,59%
HELV-R-A	Hidroelektrane na Vrbasu, Mrkonjić Grad	102.354.487	3,90%
HETR-R-A	Hidroelektrane na Trebišnjici, Trebinje	385.164.196	13,45%
IPBL-R-A	Industrijske plantaže, Banja Luka	108.393.599	5,41%
KRJN-R-A	Krajina GP, Banja Luka	11.289.203	0,94%
LJUB-R-A	Rudnici željezne rude Ljubija, Prijedor	50.777.428	1,52%
MRDN-R-A	Meridian, Banja Luka	7.842.578	0,61%
NOVB-R-E	Nova Banka, Banja Luka	94.435.314	11,55%
RITE-R-A	RiTE Gacko, Gacko	379.959.879	2,97%
RNAF-R-A	Rafinerija nafte, Brod	262.914.061	0,25%
RTEU-R-A	RiTE, Ugljevik	256.013.165	3,41%
TLKM-R-A	Telekom Srpske, Banja Luka	491.383.755	25,00%

Source: http://www.blberza.com/Cms2FileCache/files/cms2/docver/44734/files/BIRS%2021%20redovna%20revizija.pdf

In this research are taken into account the companies that had in the past three years a positive financial result, and that paid dividends in the past 10 years. The companies that are the subject of research include: Hidroelektrane na Drini, Višegrad – HEDR-R-A, RiTE, Ugljevik RiTE, Ugljevik – RiTE, Boksit, Milići –BOKS-R-A, Telekom Srpske, Banja Luka – TLKM-R-A, Krajina GP, Banja Luka - KRJN-R-A, ZTC Banja Vrućica, Teslić –BVRU-R-A.

This study used a multiple-linear regression model which assesses the nature and strength of the bond between a dependent variable, and K independent variables that are marked with  $X_{(i, j)} = 1,2, ..., K$ . Therefore, in this study, the price-earnings ratio (PE) is used as dependent variable, and the following ones as independent variables: Return on average earnings (ROAE), Earnings before interest, taxes, depreciation and amortization (EBITDA), ratio of total debt to total assets (LEV), and dividend payout. (DP).

Variable	Symbol	Description
Price-earnings ratio	PE	Calculated by ratio of share price to earnings per share of company
Return on average	DOVE	The ROAE indicator is the ratio between net profit and average equity
equity	KUAE	capital, and is often referred to as the yield on shareholder equity
Earnings before		
interest, taxes,	EDITDA	
depreciation and	EDIIDA	
amortization		
The ratio of total	IEV	Lavarage computed a ratio of total debt to total assets the company
debt to total assets	LEV	Leverage – computed a ratio of total debt to total assets the company
Dividend payout	DP	Measured by ratio of dividend per share to earnings per share, the
Dividence payout	DF	company

Table 4: Descriptive explanation of the variables in the model

Source: Calculation by Author

In this research, we took the price – earnings ratio as the dependent variable. The independent variables are as follows. The regression model in this study is presented as follows:

$$(PE)_{it} = \alpha + \beta_1 ROAE_{it} + \beta_2 EBITDA_{it} + \beta_3 LEV_{it} + \beta_4 DP_{it} + \varepsilon$$
(5)

Where:

**PE***it* – Price-earnings ration;

ROAE<sub>ir</sub> – Return on average earnings;

EBITDA<sub>it</sub> - Earnings before interest, taxes, depreciation and amortization;

 $LEV_{it}$  – Leverage - ratio of total debt to total assets;  $DP_{it}$  = Dividend Payout.

The representativeness of the model will be examined by the calculation of the correlation coefficient r, the coefficient of determination  $\mathbb{R}^2$  and adjusted coefficient of determination  $\mathbb{R}^2$ . Also, the paper will contain the analysis of variance (ANOVA test). With a cumulative test it is assumed in a null hypothesis that all independent variables are equal to zero, i.e. than not a single independent variable included in the model is significant in this model. An alternative hypothesis assumes that at least one the important independent variables is important in the model.

 $H_0: \ \beta_1 = \beta_2 = \beta_2 = \beta_4 = 0$ 

 $H_1 \colon \ni \ \beta_j \neq 0, j = 1, 2, 3, 4.$ 

Dependent and independent variables in the model	Means	Std. Deviation	Ν
P/E	25.09	41.30	45
ROAE	8,26	13.53	45
EBITDA	36,61	18.56	45
LEV	0.19	0.12	45
DP	0.10	0.34	45

Table 5: Descriptive statistics of the observed variables for the period: 2005 – 2013

Source: Calculation by Author (SPSS 16.0)

Growth in price-to-earnings ratio for certain companies within the stock index BIRS, as well as the EBITDA ratio showed their highest volatility with a standard deviation of 41.30% and 18.56% for the period from 2005 to 2013 year. Differences in P/E rates of different companies are based on different expectations in terms of growth of these companies. Thus, the P/E rate reflects the optimism of the market in terms of development opportunities companies (Alihodzic & Plakalovic, 2013, p. 210). Most companies in the capital market of the Republic of Srpska in the observed period had very high volatility of P/E ratios, i.e. low P/E ratio. Companies with low P / E ratio may be unstable earnings, little likelihood of generating profit, and poor prospects for growth.

## 4.1. Research Results and Discussion

Result obtained by the regression analysis show that there is a correlation between the movement of the price-earnings ratio - P/E and independent variables: return the average equity - ROAE, earnings before interest, taxes, depreciation and amortization - EBITDA, the ratio of total debt to total assets - LEV and dividend per share - DP. The regression analysis was obtained by the coefficient of correlation r = 0.54 that there is a medium correlations between a dependent variable of the price-earnings ratio - P/E and independent variables: EBITDA, the ratio of total debt to total assets - LEV and dividend per share - DP. The coefficient of determination is  $R^2 = 0.29$ , while

the corrected coefficient of determination is  $\overline{R}^2 = 0.22$ , indicating that the observed model described 22% of deviation of independent variables, which makes this model relatively representative. Also, the conducted test of significance indicates there is a significance effect of independent variables on the dependentones. Testing the first hypothesis of significance indicated there was a significant effect of the independent variables at a significance level of  $\alpha = 5\%$ , and that empirical F – ratio was 4,04. As for this study, the value of the empirical F – ratio (4,04) is greather than the theoretical value of F – ratio (2,61) for the 4 – degree of freedom in the numerator and 40 in the denominator, when we come to the conclusion to reject the null hypothesis that the independent variables have a significant impact on the dependent variable. Darbin-Watson statistics shows high correlation with the value of over 1.

**Table 6:** Regression Analysisbetween the price – earnings ratio – P/Eandreturn on average equity - ROEE, earnings before interest, taxes, depreciation and amortization – EBITDA, the ratio of total debt to total assets (Leverage) - LEV and dividend per share – DP

Regression Statistics	
Multiple R	0.536
R Square	0.288
Adjusted R Square	0.216
Std. Error of the Estimate	36.563
Durbin - Watson	1.597

Source: Calculation by Author (SPSS 16.0)

**Table** 7: Analysis of Variance between the price – earnings ratio – P/Eand return on average equity - ROEE, earnings before interest, taxes, depreciation and amortization – EBITDA, the ratio of total debt to total assets (Leverage) - LEV and dividend per share – DP

ANOVA	df	SS	MS	F	Significance F
Regression	4	21.586,953	5.396,738	4.037	0.005
Residual	40	53.474,433	1.336,861	-	-
Total	44	75.061,387	-	-	-

Source: Calculation by Author (SPSS 16.0)

**Table 8:** The matrix of correlation coefficients between the parameters of:the price – earnings ratio – P/Eand return on average equity - ROEE, earnings before interest, taxes, depreciation and amortization – EBITDA, the ratio of total debt to total assets (Leverage) - LEV and dividend per share – DP, for the period: 2005 – 2013

share DI, J	for the period	u. 2005 20	15		
	P/E	ROAE	EBITDA	LEV	DP
P/E	1.000	-0.291	0.208	-0.502	0.160
ROAE	-0.291	1.000	0.327	0.362	0.855
EBITDA	0.208	0.327	1.000	-0.509	0.141
LEV	-0.502	0.362	-0.509	1.000	0.234
DP	0.160	0.855	0.141	0.234	1.000
		a		(CDCC 1( 0)	

Source: Calculation by Author (SPSS 16.0)

The coefficient of correlation can have values between -1 and 1. The obtained coefficient indicates the strength of the connection; the value of 1.0 indicates that the correlation is complete and positive while the value of -1.0 indicates that the correlation is complete and negative. The table above clearly shows that most of the explanatory variables are slightly positively correlated, and, on the other hand, it shows that the small number of observed variables have a negative correlation.

Given the case analysis of the influence of independent variables on the dependent variable, and the price-earnings ratio, it can be seen that the strongest positive correlation was observed between the

price-to-earnings ratio and the earnings before interest, taxes, depreciation and amortization – EBITDA (0,208). Companies with a high growth rate, lower funding costs and higher return on financing should have a higher value of the EBITDA, and vice versa, companies with lower growth rates in significant costs of depreciation should have a lower value of the EBITDA (Damodaran, 2010, p. 306). For this reason, with increasing values of EBITDA comes to increasing the value of P/E ratios. There was also a positive correlation (0,160) between the dividend payout ratio and price-to-earnings ratio, which is quite logical, because DP explain that investors are willing to pay high value for those companies which pay high dividends to their shareholders. According to White (2000) an increase of 1% in DP ratio leads to a 20 times increase in P/E ratio.On the other hand, the strongest negative correlation was observed between the price-to-earnings ratio and the ratio of total debt to total assets -leverage (-0,502).

**Table 9:** Regression analysis coefficients between the following parameters: the price – earnings ratio – P/Eand return on average equity - ROEE, earnings before interest, taxes, depreciation and amortization – EBITDA, the ratio of total debt to total assets (Leverage) - LEV and dividend per share – DP, for the period: 2005–2013

Model	el Unstandardized Coefficients		Standardized Coefficients	t	Sig	95% Confide nce Interval			Correla tions	
			Beta			for B				
	В	Std. Error				Lower Bound	Upper Bound	Zero order	Partial	Part
(Constant)	37.267	28.495	-	1.308	0.198	-20.323	94.857	-	-	-
ROAE	-1.664	1.238	-0.545	-1.344	0.187	-4.166	0.838	-0.291	-0.208	-0.179
EBITDA	0.423	0.542	0.190	0.779	0.440	-0.674	1.519	0.208	0.122	0.104
LEV	-95.158	79.070	-0.289	-1.203	0.236	-254.965	64.649	-0.502	-0.187	-0.161
DP	42.423	38.558	0.347	1.100	0.278	-35.505	120.351	-0.160	0.171	0.147

Source: Calculation by Author (SPSS 16.0)

From the table above it is clear that the price-to-earnings ratio (PE)has the strongest positive linear relationship to the dividend per share - DP (0.347), and the earnings before interest, taxes, depreciation and amortization - EBITDA (0.190) On the other hand, the weakest linear relationship was observed at the return on average earnings - ROAE (-0.545) and the ratio of total debt to total assets - LEV (-0.289). For this reason, this result is quite logical because the increase in the cost of financing leads to decreasing in P/E ratio. Also, high earnings growth or trade-off between return and risk leads to an increase in investor's confidence and the price-to-earnings ratio. Also, the negative correlation was observed between the price-to-earnings ratio and the return on average equity(-0.291). It is quite reasonable and understandable because a high return on equity is very good point, however, but we must be cautious not to pay too high of a P/E ratio. Mathematically, a high P/E stock has a higher price-to-book value ratio, and on the other hand given the same return on equity (www.investorsfriend.com). Also, the DP ratio has a positive correlation with the P / E ratio. Dividend payout ratio differs from company to company. Stable and large companies have higher dividend payout ratio. On the other hand, companies which are young and seeking growth such as the companies in the capital market of the Republic of Srpska have lower or modest dividend payout ratio. If the companies pays high levels of dividends, it may become for it to maintain such level of dividends if the earnings fall in the future. For this reason, high dividend payout ratio can have implications for the cash management and liquidity of the company (http://www.readyratios.com).

In practice, it also can identify situations in which a high P / E ratio does not mean that shares have a high value. Business enterprises in the highly growing sectors with excellent growth prospects, high level of investor confidence in management forecasts, the predictability of future gains, high

barriers to entry for other companies, creating added value are some of the elements that indicate that it is worth to pay a high price for the shares to be issued higher yields in the future.

### 5. Conclusion

This paper analyzes the variables of the price-to-earnings ratio of certain companies in the capital market of Republic of Srpska in the period between 2005 and 2013, using multiple linear regression models. In the quantitative analysis, we assume the price-to-earnings ratio (PE) is used as dependent variable, and the following ones as independent variables:return on average earnings (ROAE), Earnings before interest, taxes, depreciation and amortization (EBITDA), ratio of total debt to total assets (LEV), and dividend payout. (DP). The null hypothesis was rejected because it was not shown that the independent variables affect the dependent variable.

On the highly developed markets, the market price reflects the available information about the company, which affects the formation of the real equilibrium prices, as well as the real P / E ratio. On inefficient and underdeveloped markets such as capital market in the Republic of Srpska appear absurd values of P/ E ratio. Therefore, unbalanced supply and demand, market illiquidity, lack of information have consequences for the impossibility of forming a realistic price of shares. This research suggests that the price-to-earnings ratio with dividend payout ratio as the most influential indicators, that investors are willing to pay high for those companies which pay high dividends to their shareholders.

At the peak of the business cycle when operating profit reached the highest value usually is the P / E ratio at the lowest level, and vice versa, as one might notice in the analysis of the studied companies within the stock index BIRS. In addition, if the economic activity is stable and P / E ratio is stable. Analyzing the P / E ratio is very difficult to conclude whether high or low if you do not take into account the growth rate of the company and the industry average, which suggests that we should not make investment decisions only on the basis of this indicator. At the peak of the business cycle when operating profit reached the highest value usually is the P / E ratio at the lowest level, and vice versa, as one might notice in the analysis of the studied companies within the stock index BIRS. In addition, if the economic activity is stable and P / E ratio is stable. Analyzing the P / E ratio is very difficult to conclude whether high or low if you do not take into account the growth rate of the studied companies within the stock index BIRS. In addition, if the economic activity is stable and P / E ratio is stable. Analyzing the P / E ratio is very difficult to conclude whether high or low if you do not take into account the growth rate of the company and the industry average, which suggests that we should not make investment decisions only on the basis of this indicator.

According to current indicators in the capital market of the Republic Srpska, significant structural changes are indispensable, primarily in the part related to the efficiency of the real sector and credibility of individual issuers of securities. Frontier markets such as the capital market of the Republic Srpska are highly dependent on foreign investors who at the time of the crises withdrew substantial funds. In order to attract foreign investors various project to promote capital market in BH were prepered, such as the listing BATX index on the Vienna Stock Exchange.

Further development of the securities market will depend on the ability of management and entrepreneurs to adequately prepare development project, and on their willingness to carry out their own duties in terms of fair treatment of all interested parties in the work of a business company, in order to gain the confidence of investors in their honest intentions and the sincere desire to provide effective protection of minority shareholder.

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