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Analysis of Movement of SASX - 30 Stock Exchange Index in Conditions of Slow Ecnomic Growth

Abstract: In the first quarter of 2012, almost all of the observed indexes in regional capital markets registered an increase in value, except for the capital market in BH, i.e. index of the Sarajevo Stock Exchange (SASX - 10) and Banja Luka Stock Exchange securities (BIRS). Therefore, the highest growth was achieved by the Serbian regional index (BELEX 15) in the amount of 6.59%, followed by Croatian (CROBEX) with 5.36%, Macedonian (MBI-10) with 2.56%, Montenegrin (MONEX) with an increase of 2.17% and Slovenian (SBI TOP) with the yield of 1.64 %. The largest decline in the value was registered by the Banja Luka index (BIRS) of 4.69 % and Sarajevo (SASX -10) for 3.57%. In this paper, we analyse the effect of four independent variables through multiple linear regression on a dependent variable. The dependent variable is the stock market index of the Sarajevo Stock Exchange (SASX - 30), while the independent variables in the model are the total turnover of shares, total loans of commercial banks, market capitalization and stock exchange index of the New York Stock Exchange (S&P 500). The main objective of this paper is to determine whether there is interdependence in the movement between the independent and dependent variables in order to better understand the factors that influence the movement of the SASX – 30 stock index.

Keywords: Stock Index, Turnover, Market capitalization, S&P 500, Regression Analysis, Total Loans, The Global Financial Crisis.

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Analiza kretanja berzanskog indeksa SASX - 30 u uslovima usporenog ekonomskog rasta

Apstrakt: *U prvom kvartalu 2012. godine skoro svi posmatrani indeksi na regionalnom tržištu kapitala su zabilježili porast u vrijednosti, izuzev tržišta kapitala u BiH, tj. indeksa Sarajevske berze vrijednosnih papira (SASX-10) i indeksa Banjalučke berze hartija od vrijednosti (BIRS). Dakle, najveći rast je ostvario srbijanski regionalni indeks (BELEX 15) u iznosu od 6,59%, zatim hrvatski (CROBEX) od 5,36%, makedonski (MBI10) od 2,56%, crnogorski (MONEX) s rastom od 2,17% i slovenski (SBI TOP) s prinosom od 1,64%. Najveći pad u vrijednosti ostvarili su banjalučki indeks (BIRS) od 4,69% i sarajevski (SASX-10) u iznosu od 3,57%. U ovom radu se analizira uticaj četiri nezavisne varijable putem višestruke linerane regresije na jednu zavisnu varijablu. Zavisna varijabla je berzanski indeks Sarajevske berze (SASX – 30), dok su nezavisne varijable u modelu ukupni promet akcija, ukupni krediti komercijalnim bankama, tržišna kapitalizacija i berzanski indeks Njujorške berze (S&P 500). Osnovni cilj u ovom radu je utvrditi da li postoji međuzavisnost u kretanju između nezavisnih i zavisnih varijabli u cilju boljeg razumijevanja faktora koji utiču na samo kretanje berzanskog indeksa SASX – 30.*

Ključne reči: *Berzanski indeks, promet, tržišna kapitalizacija, S&P 500, regresiona analiza.*

1. Introduction

Instruments of particular importance for the analysis of the stock exchange market in a given time period are stock indexes. The stock market indexes are primarily used for the analysis of historical trends in the financial markets and they are very important indicators of market movements in general, where based on the analyses performed, forecasts of future developments are made, not only in financial markets but also in the economic environment. Also, stock indexes represent weighted average price and trading volume of stocks or bonds. It is expressed through the movement of the market capitalization of the reporting period for a specific pattern in relation to a change in the value of the market capitalization of the index points. In practice, there are several types of stock exchange indexes used, the most important being composite indexes that represent the broadest base of companies traded on a stock exchange, and lately blue chip indexes are becoming more interesting, representing a selected number of top quality companies traded on a stock

exchange (Jeremić, Z. 2006 , p . 61 - 62). A security is said to be liquid when it is possible to buy or sell a large number of shares on the market without it having too great an influence on the price. Liquidity is a typical measure of the relevance of a share price. Also, liquidity is measured in term of volumes traded daily. Absolute value is the measure of liquidity as a major institutional investor will first try to determine how long it will take to buy (or sell) the amount it has targeted. But volumes must also be expressed in terms of percentage of the total number of shares and even as a percentage of free float. (Quiry, P et al. 2011, p. 532 – 533)

Stock market indexes allow us to measure the average performance of a national market. One or several market indexes may track a national market at any given time. Historically, country stock indexes were computed by the local stock market, but global organizations have started to provide indexes for national markets around the world, as well as a series of global indexes (Solnik, B., McLeavey, D, 2009, p. 172).

Many empirical studies about the returns in the stock market have provided evidence in favour of the feature of a non-constant variance (Fama 1965, Hathaway 1986). Stock returns date have been characterized by volatility and stability. Merton (1980) has criticized the failure of some researchers to account for the effect of changes in the level of risk when estimating expected return. When a stock price drops, its return volatility tends to rise (drop). In other words, less equity implies more leverage and higher financial risk (Apergis, N., Eleptheriou, S. 2001, p. 50). Stock indexes need to provide an answer to their pricing movements to the question: *How does a financial market move?* The stock indexes may be constructed to represent the financial market as a whole or its individual parts, industrial areas or certain securities (Šoškić, D. 2006, p. 85).

Robert J. Shiller (1981) shook the world of economists and financial practitioners when he presented evidence that the stock market was too volatile relative to certain variations in fundamental economic indicators. In order to prove that the stock prices were too volatile, Shiller used the long time series of annual values and the S&P Dividend (market) portfolio in the period 1871-1979. Shiller used reasonable estimate of the discount factor to calculate the present value of all future dividends and present value of the ultimate price, which is performed by a rational price for the market portfolio for that year. The present model of performed rational price assumes that investors' expectations of future dividends and final price were in fact equal to the actual values. The expected dividend was sufficient for a rational calculation of the value of shares, where it is acceptable to use actual dividends as expected divi-

dends., on the other hand, it is not obvious that volatility is the volatility of real dividend fundamentals value of the shares and that the variance of a series of a calculated rational price represents variance that can be expected from the actual price (Bodie, Zvi et al. 2009, p. 651-652).

According to Banz (1981), shares with a low market capitalization typically have high average rates of return. There is also evidence that share values with high carrying amount or ratio of net cash flow and price may have a higher average return than rising shares with a lower value of a given ratio (Eugene, F.F & Kenneth, RF 2012, p. 457-458).

The Croatian Agency for Supervision of Financial Services has done a research on the analysis of the stock market index of the Zagreb Stock Exchange CROBEX using a multiple linear regression model. The aim of the study was to determine whether there is a relationship between the independent variables and the dependent variables, as well as the direction and strength of these connections. In this research, daily data on indexes were used as a dependent variable and CROBIS bond exchange index, the total turnover on the Zagreb Stock Exchange and New York Stock Exchange stock market index S & P 500 for the period 2008 – 2010 were used as independent variables. The results suggest that there is a negative correlation between the price movements of stocks and bond markets, while total daily turnover on the Zagreb Stock Exchange and S & P 500 variables were positively correlated with the dependent variable (The Croatian Agency for Supervision of Financial Services, 2011).

In the period observed, out of the analysed global indexes in the first quarter of 2012, the Japanese index (NIKKEI 225) achieved the highest increase in the amount of 19.26%, followed by the German index (DAX) in the amount of 17.78%. Out of the twenty observed indexes, in the first quarter of 2012, 17 achieved the highest yield over a period of one year. All the observed global indexes, except the Japanese ones, achieved its minimum value during the period observed in the first half of January 2012, while on the other hand the maximum value was achieved in the second half of March 2012, excluding the Canadian and Chinese indexes. Also, in the first quarter of 2012, in the Euro Zone the highest increase was registered by five indexes, namely the German index (DAX) in the amount of 17.78%, followed by Austrian Index (ATX) of 14.13%, French (CAC40) of 8.35%, Polish (WIG20) of 6.62%, Italian (FTSE MIB) of 5.90%, Swiss (SMI) of 5.04%, Dutch (AEX) of 3.53% and the UK (FTSE100) of 3.52% (Hanf 2012, p. 4 - 6). In fact, all of the observed indexes in the Euro Zone, except the Swiss indexes, achieved their minimum positive value in the first quarter of 2012, while the highest value was recorded in the

second half of March. The very growth of the world index is primarily affected by an agreed lowering of key interest rates around the world, as well as a large amount of loans approved by central banks to commercial banks (Institute of Economic Sciences, 2013, p. 51 - 54).

The paper is structured in three parts. The first part describes multiple regression and analysis data, where the analysis is carried out using the least squares via the SPSS 16.0 software package and Microsoft Excel. The second part analyses the movement of stock market indexes in a wider region, with an emphasis on the capital market in BH. The last section presents the results of the research and conclusions.

2. Methodology on Multiple Regression Model

As financial analysts, we often need to use more - sophisticated statistical methods than correlation analysis or regression involving a single independent variable. For example a trading desk interested in the costs of trading Nasdaq stocks might want information on the determinants of the bid – ask spread on the Nasdaq. A mutual fund analyst might want to know whether returns to a technology mutual fund behaved more like the returns to a growth stock index or like the returns to a value stock index. An investor might be interested in the factors that determine whether analysts cover a stock (De Fusco, R, et. al, 2004, p. 442). Statistical methods can analyse interrelationships between multiple occurrences. Connections between phenomena can be functional and stochastic. A statistical analysis of the relationship between two or more phenomena is carried out by methods of descriptive and inferential statistics. The degree of a statistical correlation between the observed phenomena is investigated by methods of a correlation analysis. In order to determine analytical relations between the phenomena, regression models are applied (Kapetanović, R. 2012, p. 116). The regression model is an equation with a finite number of parameters and variables. Depending on whether a model comprised only one or more variables, there is a simple and multiple linear regression models respectively. In addition to a dependent variable and one or more independent variables, each regression models contains a random variable. A Simple linear regression model expresses a relationship between the two parameters as follows:

$$Y_i = \alpha + \beta X_i + \varepsilon_i \qquad i = 1, 2, \ldots \ldots n, \tag{1}$$

where:

Y − dependent variable,

$\alpha\ i\ \beta$ - unknown parameters that need estimate, and

$\varepsilon_i -$ stochastic variable (error distances)

Unlike the simple regression, the multiple linear regression model is different in that it comprises two or more independent variables.

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

$i = 1, 2, \ldots. n.$

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

The degree of the development of secondary financial markets is measured by the amount of market capitalization[2], market size and the ratio of market capitalization to gross domestic product, the volume of trading on the financial markets, liquidity of the market and the number of listed companies. A company that has high liquidity of stocks is observed through an average daily number of shares traded. Average stock trading observed during a longer period of time includes a minimum and maximum number of shares bought and sold in a single day. Therefore, the average gives information about the liquidity of shares, which provides information required to evaluate liquidity of certain stocks. The opportunity to purchase a large number of shares of a company in one day proves high liquidity (Vukicević, M, et. al, 2010, p. 276).

This study used a multiple linear regression model, which assesses the nature and strength of a bond between a dependent variable and K independent variables marked with $X_{i,j} = 1,2,\ldots.,K$. Therefore, daily data on the SASE SASX-30 stock index are taken as a dependent variable in this study to analyse its relationship with four independent parameters: total regular turnover on the Sarajevo Stock Exchange, expressed in thousands, total loans of commercial banks in BH, total market capitalization of the SASX -30 stock index and data on the movement of stock market index in the U.S. capital market, i.e. S&P 500. For data collection, the period between 31 March 2009 and 30 September 2013 was selected, which is a total of 1.648 days, i.e. 1.180 working days. The regression model in this study is presented as follows:

$$SASX - 30 = \alpha + \beta_1 * (turnover_{shares}) + \beta_2 * (cb) + \beta_3 * (mc) + \beta_4 * (s\&p\ 500) + \varepsilon_i \tag{3}$$

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[2] Market capitalization is an indicator of the size and volume of transactions on the stock exchange. It is obtained by multiplying a market price of shares on the stock exchange and the total number of active stocks.

SASX - 30 is a price index, where paid index dividends are not taken into account in the calculation of the index. In the composition of the index, only symbols of issuers included in the primary free market can be included. SASX - 30 can have a maximum of 30 companies in its composition. The initial value of the index is 1.000 index points and it began to be calculated since 31 March 2009. The table below illustrates the structure of the issuers' stock index SASX - 30 as of 14 July 2013.

Table 1. Structure of Issuers within SASX - 30 Stock Exchange Index on 14 July 2013

No.	Symbol	Issuer	Initial price
1.	BIPVR	Bihaćka pivovara, Bihać	8.50
2.	BOATRK2	Bosna auto, Sarajevo	29.50
3.	CTBURK4	Centrotrans - Eurolines, Sarajevo	25.10
4.	FAMSR	Famos , Sarajevo	3.00
5.	NMJGRK2	Nameštaj , Gradacac	6.00
6.	PBSBR	PBS , Sarajevo	87.00
7.	SVKOR	Svetlokomerc, Sarajevo	380.00
8.	UMISRK2	Unis , Sarajevo	4.00
9.	ELGJR	Elektro grupa , Jajce	180.00
10.	ENPSR	Energopetrol ad Sarajevo	8.80
11.	RZRVR	Rudnik željezne rude, Vareš	0.85
12.	VEMTRK2	Vemal , Tesanj	10.00
13.	VKFBR	Vakufska banka , Sarajevo	39.56
14.	RSTTR	Rudnik soli, Tuzla	4.12
15.	VALCRK1	Unis valjcici, Konjic	5.00
16.	SOSOR	Sarajevo osiguranje , Sarajevo	6.10
17.	BORBRK3	Bor banka , Sarajevo	11.11
18.	HTKMR	JP HT, Mostar	11.50
19.	RMUKR	RMU Kamenograd , Sanski Most	70.00
20.	TCMKR	Tvornica cementa, Kakanj	1.00
21.	BHTSR	BH Telecom , Sarajevo	20.00
22.	ENISR	Energoinvest, Sarajevo	5.60
23.	FDSSR	Fabrika duhana , Sarajevo	66.76
24.	HDGSR	Hidrogradnja , Sarajevo	3.50
25.	IKBZRK2	IK banka , Zenica	127.30
26.	JPEMR	JP Elektroprivreda HZHB Mostar	32.00
27.	JPESR	JP Elektroprivreda BiH, Sarajevo	25.94
28.	RMUBR	RMU Banovici , Banovići	26.00
29.	SOLTRK3	Solana , Tuzla	12.92
30.	SPKMR	Šipad komerc , Sarajevo	7.11

Source: http://195.222.43.81/sase-final/language/hr-HR/Tr%C5%BEi%C5%A1te/Indexi/SASX-30.aspx (Access: 09/12/2013)

SASX - 30 is taken into consideration for the simple reason that it describes in the best possible way the movement of the most liquid part of the SASE free market. The used data on the SASX - 30 and the S&P 500 in the period between 31 March 2009 and 30 September 2013 are monthly and in line with the observed dates of other independent variables in the model.

S&P 500 is a regular stock index whose calculation began in 1957. It consists of 500 regular shares of large market capitalization traded in one of the two New York Stock Exchanges - New York Stock Exchange - NYSE and NASDAQ. From its composition, sub-indexes are taken and issued, including: industrial (Standard & Poor's 400 Industrial Stocks Average), transport (Standard and Poor's 20 Transportation Stocks Average), service-commercial (Standard and Poor's 40 Utility Stocks Average) and financial (Standard and Poor's Financial Stocks Average) (Šoškić, D. 2006, p. 87). Companies which are a part of this index are determined by a special committee by selecting companies that represent all the industries that exist in the U.S. and companies that are not liquid are not included in the S&P 500 index.

Total credit activities of commercial banks in 2012 were very slow in comparison to the period before the crisis. Total loans of commercial banks at the end of 2012 amounted to 15.88 billion BAM, which makes 61.5% of the GDP. The annual growth rate of total loans was 4.1%, whereby the share of long-term loans in the total loans continuously decreased and at the end of 2012 it amounted to 73.1%. According to the sectoral structure of loans, private and public non-financial corporations accounted for 51.6%, population to 42.6%, and the government sector to 5.2%. In the first quarter of 2013, total loans in the banking sector amounted to 16.04 billion BAM, which is an increase of about 1%.

The representativeness of the model will be examined by the calculation of the correlation coefficient r, the coefficient of determination R^2 and adjusted coefficient of determination $\overline{R^2}$. Also, the paper will contain the analysis of variance (ANOVA test). In the correlation analysis model we used the following parameters: the Sarajevo Stock Exchange (SASX - 30), Banja Luka Stock Exchange (BIRS), Montenegro Stock Exchange (MONEX 20), Zagreb Stock Exchange (CROBEX), Ljubljana Stock Exchange (SBI TOP), Istanbul Stock Exchange (ISE 100), the Paris stock exchange (CAC 40), the Frankfurt Stock Exchange (DAX), London Stock Exchange (FTSE 100), Vienna Stock Exchange (ATX), Budapest Stock Exchange (Budapest SI), Tokyo Stock Exchange (NIKKEI 225) Milan Stock Exchange (FTSE MIB) and New York Stock

Exchange (S & P 500) stock indexes. The data used in this analysis are daily and referring to the period 28/11/2012 – 30/11/2013.[3]

With a cumulative test, it is assumed in a null hypothesis that all independent variables are equal to zero, i.e. that not a single independent variable included in the model is significant in this model. An alternative hypothesis assumes that at least one of the important independent variables is important in the model.

$$H_0: \beta 1 = \beta 2 = \beta 3 = \beta 4 = 0 \qquad (4)$$

$$H_1: \ni \ \beta_j \ \neq 0, j = 1,2,3,4. \qquad (5)$$

Previous research showed that the application of the statistical model using regression analysis depends primarily on the development of the financial markets, so that the application of the developed financial markets provides statistically significant data, and the usefulness of the results of the application of the capital markets in the region is limited by the shortcomings of the market themselves. Generally, low market capitalization, turnover, small amount of capital issuers, small number of liquid securities and lack of various forms of financial instruments can represent a limitation in the application of certain econometric models.

2.1. Data Analysis of Stock Market Indexes in the Region with Emphasis on Capital Market in BH

Index growth in all stock markets in the region was intensive until the mid-2007, when a high value of the index in this period resulted from of the given growth rate. Since 2008, there has been a greater decrease in prices of securities in all markets. As the increase of the index did not have a basis in the real sector, it gradually had to ease the market and decrease prices of securities. In the same period, the markets in the region lost 50% of their value in average. The market stabilisation in 2009 was modest and moderate ant this trend continued in 2010, when there was a gradual decline in turnover and total capitalization compared to 2009. In 2011, all the observed markets again recorded declines in activity indicators, therefore the index of all the monitored markets in the region also declined in the same year and only in 2012 there was a growth in the stock indexes in several markets observed, including the

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[3] Daily data on all market indexes except the index of the Sarajevo Stock Exchange, Banja Luka Stock Exchange, Zagreb Stock Exchange and Montenegro Stock Exchange are taken from www.investing.com (accessed on 6/12/ 2013). Data for other stock indexes are taken from their official websites.

markets in Austria, Greece and Germany, while the other markets continued a negative trend in the movement of the stock market indexes (Securities Commission of the Republic of Srpska, 2012, p. 10).

Table 2. Movement Tendency of Stock Market Indices of Western Balkan Countries and Certain Countries in the Region for the Period 2009 – June 2013

Market	Index	Changes in Index (in %)					
		2009	2010	2011	2012	June 2013	2009 – June 2013
Greece General Share	ASE	22.9	-35.6	-52.40	34.8	-6.6	*-61.4*
Sarajevo Stock Exchange	SASX-10	-14.0	-7.1	-17.7	-3.9	-0.03	*-26.6*
Belgrade Stock Exchange	BELEX15	23.9	-4.0	-24.3	6.6	-8.4	*-29.0*
Ljubljana Stock Exchange	SBI 20	18.3	-15.0	-30.1	7.1	-3.1	*-38.4*
Banjaluka Stock Exchange	BIRS	-3.3	-3.2	-10.4	-5.8	-6.3	*-23.4*
Zagreb Stock Exchange	CROBEX	14.2	5.4	-18.1	-0.4	3.7	*-10.8*
Spain Madrid General	IGBM	27.2	-19.2	-13.0	-5.5	-5.2	*-37.0*
Austria	ATX	42.5	16.4	-67.0	150.8	-7.4	*-10.9*
Czech Republic	PX 50	32.6	9.6	-24.6	12.4	-15.4	*-21.4*
France CAC 40	CAC	22.3	-3.3	-15.3	13.0	2.7	*-5.0*
Japan Nikkei 225	NIKKEI	19.0	-3.0	-16.3	21.4	31.6	*29.7*
Netherlands AEX General	AEX	36.3	5.7	-10.6	8.2	0.5	*2.8*
Hungary	BUX	70.6	0.5	-19.6	6.0	4.7	*-10.4*
Germany	DAX	23.8	16.1	-12.1	25.3	4.6	*33.6*

Source: http:// www.secrs.gov.ba/Documents/Izvjestaji/9a21a1d1-40b5-47b4-a003-02377623b2e2_sr-Latn-CS.pdf, Information about the state of the securities market, the Commission's activities in the securities of the Republic of Srpska in the first half of 2013, p. 9

From the table above it is clear that the recovery of the capital market in Bosnia and Herzegovina recorded average results when compared to other countries in the region. An indicator of changes in the value of stock market indexes for the period 2009 - June 2013 was negative in almost all of the observed markets. In this period in the Republic of Srpska, the BIRS stock exchange

index lost in the value by approximately 23.4%. The larger decline in value was registered in the market indexes in Greece - ASE (-61.4%), Slovenia - SBI 20 (-38.4%), Spain - IGBM (-37.0%), Serbia - BELEX 15 (-29.0%) and the Federation of Bosnia and Herzegovina - SASX - 10 (-26.6%). From the observed countries, the largest positive index movements were registered by the Netherlands - AEX (2.8%), Japan - Nikkei 225 (29.7%) and Germany - DAX (33.6%) (Commission for Securities of the Republic of Srpska, 2013, p. 10).

In the first quarter of 2013, changes of the regulations referring to financial markets were initiated, primarily of the transformation of tax debt issuers in company shares. The objective of these changes was to enable restructuring of the real sector in order to maintain financial stability.

However, despite the given changes, the value of all stock market indexes in the capital market in BH was reduced in the first quarter of this year, whereby some even recorded a decrease below the initial 1.000 basis points . Also, in the second half of 2013, there was a significant drop in turnover on the BH stock exchanges compared to the same period last year. Therefore, compared to the previous quarter, a turnover on SASE was reduced by a half and on BLSE was reduced by about 40% and the total reduction was estimated at about 43.4%. If the turnover on the stock market is low, the real price of the securities cannot be obtained by the comparison between supply and demand, or a price obtained this way cannot be compared with an internal share price or the fair market price. On the other hand, decrease magnitude, and the duration of the decrease and current value of the index show that there are serious problems in the operation of the stock markets in BH. The value of the stock exchange index BIRS is about 24.4% lower than the baseline value, which amounts to 1.000 basis points. Also, the stock exchange index ERS - 10 follows the trend of decrease but at a greater relative amount, i.e. 32.5% reduction compared to the baseline value. Unlike BLSE, similar tendency of decrease at the SASE is followed by the stock exchange index SASX – 30, whose last value in the second quarter of 2013 was lower by about 8.5% of the initial value, and the SASX - 10 with a difference of 24% compared with the initial value (The Central Bank of BH, 2013).

From the table above, it is quite clear that there was a decline of market indicators of business in the capital market in BH in the reporting period, with the exception of market capitalization whose value in the first half of the 2013 amounted to 8.7 billion BAM, which represents a relative increase of about 5.11%. Unlike the market capitalization, the largest drop in the value was registered by the stock exchange index ERS - 10 of 9.56% or 71.23 index points, followed by BIRS of 6.33% and 51.08 index points, BIFX of 5.74% or

91.74 index points, SASX - 30 of 2.78% or 26.17 index points and SASX - 10 of 0.03% or 0.20 index points.

Table 3. Movements of Market Performance Indicators of SASE and BLSE for the Period 31/12/2012 – 30/06/2013 (in bn BAM)

Market Performance Indicators	31/12/2012	30/06/2013	Changes Compared to Previous Period (in %)
Turnover	878.575.910	302.231.239	34.40%
Market capitalization	8.331.172.537	8.756.614.673	105.11%
BIFX	1.599,62	1.507,88	94.26%
SASX – 10	760,70	760,50	99.97%
SASX – 30	941,13	914,96	97.22%
BIRS	807,23	756,15	93.67%
FIRS	1.886,90	1993,09	105.63%
ERS - 10	745,65	674,42	90.44%

Source: (Calculation by Author) http://195.222.43.81/sase-final/language/hr-HR/Izvje%C5%A1taji/Izvje%C5%A1taji_o_trgovanju/Polugodi%C5%A1nji_i_Godi%C5%A1nji_izvj e%C5%A1taji.aspx http://www.blberza.com/Pages/DocView.aspx?Id=30991

Based on previous analyses of the stock market indexes in the neighbouring region, it can be concluded that these are emerging markets, which are generally always more sensitive to external influences. Many of the studied countries have not completed the process of building the capital market in terms of creating high-quality long-term debt instruments. Also, most countries had a high participation of foreign investors, where in some markets it ranged up to 50% of the total traffic (e.g. Serbia). Instability and an increased risk for foreign investors causes contraction, where many foreign investors reacted by liquidating their positions and by shifting capital to other countries and markets (Eric, D., Djukic, M. 2012, p. 318).

3. Research Results and Discussion

Results obtained by the regression analysis show that there is a correlation between the movement of the stock exchange index SASX – 30 and independent variables: total turnover, total loans, market capitalization and stock exchange index S&P 500.Therefore, the regression analysis was obtained by the coefficient of correlation $r = 0,75$ indicating that there is a strong association between a secondary dependent variable of the exchange index SASX – 30 and independent variables: total turnover, total loans, market capitalization

and stock exchange index S&P 500. The coefficient of determination is $R^2 = 0.56$ while the corrected coefficient of determination is $\overline{R^2} = 0.52$, indicating that the observed model described 56% of deviation of independent variables, which makes this model representative. Also, the conducted test of significance indicates there is a significant effect of independent variables on the dependentones. Testing the first hypothesis (null hypothesis) of significance indicated there was a significant effect of the independent variables at a significance level of α = 5 %, and that empirical F - ratio was 2.56 .[4] The null hypothesis is rejected if the empirical F – ratio is higher than the theoretical. Given that in this study the value of the empirical F relations (15.89) is higher than the theoretical value of F - relations (2.56), the null hypothesis is rejected.

Table 4. Regression Analysis between Stock Exchange SASX - 30, Turnover Shares, Total Loans, Market Capitalization and Stock Exchange Index S&P 500

Regression Statistics	
Multiple R	0.748
R Square	0.560
Adjusted R Square	0.524
Std. Error of the Estimate	59.363

Source: Calculation by Author (SPSS 16.0)

Table 5. Analysis of Variance between Stock Index SASX - 30, Turnover Shares, Total Loans, Market Capitalization and Stock Exchange Index S&P 500

ANOVA	df	SS	MS	F	Significance F
Regression	223.972,413	4	55.993,103	15,889	0.000
Residual	176.198,636	50	3.523,973	-	-
Total	*400.171,049*	*54*	*-*	*-*	*-*

Source: Calculation by Author (SPSS 16.0)

The table below illustrates the calculation of correlations between stock index SASE (SASX - 30) with other market indexes of the Western Balkan countries, some European countries and developed countries. The coefficient of

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[4] This F - ratio refers to the level of significance of 5%, 4 - degrees of freedom in the numerator and 50 in the denominator.

correlation was calculated on 30 November 2013 in the time series of 10, 30, 60, 90 and 250 days.

Table 6. Correlation of Yield Stock Index SASX - 30 with other Market Indexes

State	Index	Number of Days				
		10	30	60	90	250
BH	BIRS	0.321	0.606	0.626	0.525	-0.705
Serbia	BELEX 15	-0.108	-0.717	-0.481	-0.257	-0.618
Montenegro	MONEX 20	-0.150	-0.792	-0.554	-0.574	-0.588
Croatia	CROBEX	0.100	0.561	-0.190	-0.060	-0.310
Slovenia	SBI TOP	-0.263	-0.854	-0.744	-0.695	-0.075
Turkey	ISE 100	0.323	-0.638	-0.681	-0.401	-0.557
French	CAC 40	-0.020	-0.701	-0.638	-0.510	0.447
Germany	DAX	-0.010	-0.733	-0.646	-0.470	0.424
England	FTSE 100	0.018	-0.724	-0.276	-0.180	0.387
Austria	ATX	0.122	-0.838	-0.756	-0.673	-0.088
Hungary	BUDIMPEST SI	0.371	-0.778	-0.588	-0.532	0.011
Japan	NIKKEI 225	-0.033	-0.912	-0.394	-0.072	0.582
Italy	FTSE MIB	0.010	-0.882	-0.810	-0.693	0.063
USA	S&P500	0.391	-0.576	-0.319	-0.100	0.599

Source: Calculation by Author

The coefficient of correlation can have values between -1 and 1. The obtained coefficient indicates the strength of connections between two observed variables. The value of 0 indicates there is no 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. Different authors explain correlation coefficients differently. According to Cohen (1988) correlation coefficient from 0.10 to 0.29 is considered low, from 0.30 to 0.49 is considered medium and a correlation coefficient from 0.50 to 1.0 is considered high.

From the table above it is clear that in the time series of 10 days a relatively weak correlation (positive) was recorded, with the index of Banja Luka Stock Exchange - BIRS (0.321), Zagreb Stock Exchange - equity (0.100), Istanbul Stock Exchange - ISE 100 (0.323), London Stock Exchange - FTSE 100 (0.018), Vienna Stock Exchange - ATX (0.122), Budapest Stock Exchange - Budapest NE (0.371), Milan stock exchange - FTSEMIB (0.010) and New York Stock Exchange - S&P 500 (0.391). Other observed stock exchange indexes over a period of 10 days had a negative correlation with respect to SASX – 30. In the second observed period of 30 days, all observed stock exchange indexes had a negative correlation value in relation to the stock exchange index SASX - 30, with the exception of the Banja Luka Stock Exchange index, which had a medium strong correlation (0.606), as well as the index of the Zagreb Stock Exchange (0.561).

Also, in the third period analysed, all stock exchange indexes had a negative correlation, except Banja Luka Stock Exchange index, whose correlation was moderate and amounted to 0.626. In the fourth analysed period in the time series of 90 days, there was a slight decrease in negative values of correlation coefficients compared to the previous period, except where the Banja Luka Stock Exchange index had a tendency of a slight decrease in the value of a positive correlation. In the final analysed time series of 250 days, the situation changed significantly in the sense that certain indexes that had had a negative correlation to the previous time series acquired positive values, so that the strongest correlation was recorded in the New York Stock exchange index (0.599), followed by Tokyo Stock Exchange (0.582), Paris Stock Exchange (0.447), Frankfurt Stock Exchange (0.424) and London Stock Exchange (0.387).

Table 7. Regression Coefficient Analysis between Stock Index SASX - 30, Turnover Stocks, Total Loans, Market Capitalization and Stock Market Index S&P 500

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B		Correlations			Collinearity Statistics	
	B	Std. Error				Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
Constant	261.003	526.747	-	0.495	0.622	-797.000	1319.006					
Turnover	2.708E-7	0.000	0.054	0.524	0.603	0.000	0.000	-0.173	0.074	0.049	0.817	1.223
Total loans	0.050	0.037	0.444	1.360	0.180	-0.024	0.124	-0.659	0.189	0.128	0.082	12.127
Market capitalization	4.411E-8	0.000	0.743	3.542	0.001	0.000	0.000	0.686	0.448	0.332	0.200	4.998
S&P 500	-0.226	0.086	-0.560	-2.620	0.012	-0.399	-0.053	-0.629	-0.347	-0.246	0.193	5.191

Source: Calculation by Author (SPSS 16.0)

Upon the test of significance of observed independent variables, it was concluded that the null hypothesis was rejected at a significance level of $\alpha = 5\%$, where it was assumed that market capitalization did not significantly affect changes in the dependent variable. The same conclusion applies to turnover and total loans, while the movement of stock market index S&P 500 accepts the null hypothesis. During the reporting period, the movement of the stock SASX - 30 was linearly related to the movement of credit, market capitalization and turnover, while the regression coefficient of stock market index S&P 500 was negative, which indicates the existence of a negative correlation

between the movements of the indexes. The strongest positive correlation to the movement of the index had a market capitalization during the observed period.

Therefore, the table above clearly shows that in the observed period of the stock exchange SASX - 30 was linearly related to a great extent with the movement of the total market capitalization, total loans and partly with the movement of turnover. If the total market capitalization increased by EUR 1.000 and the other three independent variables remain unchanged, SASX - 30 stock index would increase by an average of 0,743 points. Also, if the total loans increased by EUR 1.000 and the other three independent variables remain unchanged, SASX - 30 stock index would increase by an average of 0,444 points. If the total turnover increased by EUR 1.000 and the other three independent variables remain unchanged, SASX - 30 stock index would increase by an average of 0,054 points. The variable of total daily turnover on the Sarajevo Stock Exchange is in part linked to a positive relationship with the dependent variable SASX – 30. This explains that the values of these two variables are moving in the same direction, meaning that higher turnover implies higher liquidity, which ultimately creates optimism that draws investors to the stock market. It can also be noted that the regression coefficient of the stock exchange index S&P 500 in this period was negative (-0.560), indicating a negative association movement of the stock exchange SASX - 30 and the S&P 500. Attracting foreign investors and investments in investment projects is a priority for the capital market in BH. Also, amendments to the Law on Foreign Direct Investment in BH terminates the obligation of foreign investors to register individual investments as they used to, wherefore the method of foreign investor registration has been simplified. Recapitalization and increase in equity of established enterprises and the establishment of new companies could make a move towards substantial investments in new projects (Alihodžić, A. 2012, p. 109).

4. Conclusions

Financial markets in BH are primarily characterized by a small number and low liquidity of securities. The underdevelopment of domestic institutional investors, which should generate demand, launch secondary trading and lower borrowing costs, is an additional reason for the underdevelopment of the capital markets as an alternative source of funding. Also, the high concentration of ownership of companies listed on BH stock markets and the lack of

awareness of the relevant stakeholders on the importance and role of good corporate governance contributed to the illiquidity of the stock markets.

The largest decline in the value of stock market indexes was recorded in individual EU countries and the Western Balkan countries. In fact, the main reason for the observed decline in the value of the stock market indexes in the Western Balkans should not be directly looked for in the financial crisis. On the one hand, the financial crisis has had an indirect impact through the withdrawal of foreign investors and weakening of demand and liquidity, while on the other hand, the direct effect should be looked for in the contraction of domestic demand, i.e. slowdown in credit growth and liquidity growth in the real sector.

Border markets are largely dependent on foreign investors who withdrew their funds to safer investments at the beginning of the crisis. In order to attract foreign investors various projects to promote capital market in BH were prepared, such as the listing BATX index on the Vienna Stock Exchange.

The empirical results obtained in this study indicate there are variables that are more heavily influenced by the movement of the stock exchange SASX - 10 within this period, which is certainly an important indicator of the capital market in BH. The variables that had a significant impact on the movement of the stock exchange index SASE (SASX - 10) certainly include the total market capitalization to a significant degree, and total loans and trade to a lesser extent. The stock market index S&P 500 had a negative value, indicating a minor role in the movement of the stock exchange SASX - 10 as independent variables. Therefore, if S&P 500 stock market index is raised by 1 point, and the other three independent variables remain unchanged, SASX - 30 will be reduced by an average of around 0.560 points. This negative correlation indicates that the stock index of the New York Stock Exchange S&P 500 and the Sarajevo Stock Exchange SASX – 30 index move in opposite directions, meaning that the movement of share prices on the Sarajevo Stock Exchange is not affected by trends in the more developed New York Stock Exchange.

 Therefore, the results indicate a better understanding of the factors that influence the movement of the stock market in BH. A drawback that could be mentioned in this paper, which can be recommended for further study, is that the shares that make up the structure of the SASX - 10 stock exchange index are not individually analysed. Also, the residual deviations are mainly within the limits of one standard error of regression and indicate that the model could be used for the purposes of future forecasts.

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