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The reaction of stock market indices of the Sarajevo Stock Exchange – (SASX-30) and the Banja Luka Stock Exchange – (BIRS) to changes in macroeconomic variables

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***Abstract**: This study aims to identify the impact of macroeconomic and market variables on the Bosnian and Herzegovinian stock market. Two stock market indices on the capital market of Bosnia and Herzegovina are considered: the SASX-30 and BIRS. At the same time, macroeconomic and market variables include turnover (TRN), market capitalization (MC), exports (EXP), imports (IMP), gross domestic product (GDP), consumer price index (CPI), and foreign direct investment (FDI). The study adopts panel regression analysis for the period from 2013 to 2022. The results of the panel regression analysis showed that export and import values have the strongest influence on the movement of returns for the SASX-30 and BIRS stock market indices in the capital market of Bosnia and Herzegovina. On the other hand, the variables achieved the lowest*

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significance: turnover, market capitalization, foreign direct investments, and consumer price index.

***Keywords**: stock market, turnover, export, GDP, panel regression analysis.*

Reakcija berzanskih indeksa Sarajevske berze - (SASX-30) i Banjalučke berze – (BIRS) na promene makroekonomskih varijabli

***Apstrakt**: Ova studija ima za cilj da identifikuje uticaj makroekonomskih i tržišnih varijabli na tržište akcija u Bosni i Hercegovini. Razmatraju se dva indeksa na tržištu kapitala Bosne i Hercegovine, naime indeks berze SASX-30 i BIRS. Istovremeno, makroekonomske i tržišne varijable su: promet (TRN), tržišna kapitalizacija (MC), izvoz (EXP), uvoz (IMP), bruto domaći proizvod (BDP), indeks potrošačkih cena (CPI) i strane direktne investicije (FDI). Studija sprovodi panel regresionu analizu za period od 2013., do 2022. godine. Rezultati panel regresione analize pokazali su da vrednosti izvoza i uvoza imaju najveći uticaj u kontekstu značaja na kretanje prinosa na berzanskim indeksima SASX-30 i BIRS na tržištu kapitala Bosne i Hercegovine. S druge strane, varijable koje su postigle najmanji značaj su sledeće: promet, tržišna kapitalizacija, strane direktne investicije, i indeks potrošačkih cena.*

***Ključne reči**: berza, promet, izvoz, BDP, panel regresiona analiza.*

1. Introduction

The capital market is an important source of financing sustainable investment projects and further economic development. The stock market and stock exchange business, that is, the capital market, plays a particularly significant role in the development of modern economies, as it serves as an intermediary between lenders and borrowers. The stock markets have special importance, contributing to a large extent to the economic development of developing countries over the last two decades, with the positive influence particularly evident when the economy enjoys pronounced macroeconomic stability. The capital market is a place where buyers and sellers, or demand and supply, meet to transact in assets, which can take the form of securities, debt, shares, or derivatives. Given that the economic concept is applied in traditional markets, demand and supply play a dominant role in determining the prevailing price in the capital market.

Therefore, if demand exceeds supply, prices will rise. Conversely, if supply exceeds demand, prices will decrease (Singh, 2014). Various macroeconomic

variables influence stock market behavior in accordance with intuitive financial theory (Maysami & Koh, 2000), for which existing literature provides numerous theories that illustrate the link between stock market behavior and macroeconomic variables.

The development of the stock market in developing countries is a continuous process that aims to put capital in the service of growth and development, which does not necessarily mean that even the most advanced stock markets in developing countries are mature and developed. Trading occurs only with a few stocks that account for a significant share of the total market capitalization. Apart from shares that are actively traded, there are serious deficiencies in the company's information regarding the advantages and potential of the capital market. Also, there are serious weaknesses in the transparency of transactions in these markets. Compared with the well-organized, well-regulated stock markets in the US and the UK, most emerging markets lack such well-functioning markets. Young companies in emerging markets do not have long enough experience to build a reputation. As a result, stock prices in emerging markets are expected to be arbitrary and volatile (Tirole, 1991).

The development of the stock market has been measured using different indicators by different researchers. Tsaurai (2018) measures stock market development using stock market capitalization, i.e., the percentage of GDP. Celebi and Honig (2019) measure stock market development by observing stock prices. Others measure stock market development through stock returns and their volatility (Errunza & Hogan, 1998; Shah, 2018).

The structure of the financial system in the Federation of Bosnia and Herzegovina and the Republic of Srpska is still highly bank-centric in nature, where inadequate attitudes towards savings and investments have a significant impact on the fact that companies in need of new capital continue to underutilize the capital market as the primary source of financing their own development (Republic of Srpska Securities Commission, 2022). Therefore, the capital market in Bosnia and Herzegovina belongs to the group of young and small frontier capital markets, which are characterized by small market capitalization and liquidity, as well as relative openness and accessibility for foreign investors, but also possible greater economic and political instability, as well as potentially higher long-term returns and low correlation with other capital markets (Republic of Srpska Securities Commission, 2020).

The relationship between capital markets and macroeconomic variables is well-documented in developed financial markets, but is still evolving in emerging financial markets. This study focuses on the stock market and macroeconomic variables in Bosnia and Herzegovina. The aim of the study is to examine the relationship between the returns of the Sarajevo and Banja Luka stock market

indices and macroeconomic variables. In that sense, the central research question is: "Does the capital market in Bosnia and Herzegovina respond to changes in key macroeconomic variables?"

This paper is structured in four parts. The first part presents the introductory discussion, which provides definitions of the capital market, describes the current level of development of the capital market in Bosnia and Herzegovina, and sets the research goal. The second part provides an overview of the relevant literature, as well as descriptions and impacts of various macroeconomic variables on capital market indicators. The third part describes the chosen research methodology and the set of research hypotheses. The fourth part provides a broader overview of empirical findings and results. And the last part refers to concluding considerations.

2. Review of relevant literature

In addition to a large number of papers in the international literature that analyze the impact of macroeconomic variables on movements in capital markets, empirical research focused on small, shallow, and underdeveloped capital markets, such as Bosnia and Herzegovina's market, remains very limited.

Levine and Zervos (1998) included measures of macroeconomic and institutional determinants of capital market development in 42 transition countries and found positive and significant effects on economic activity. They pointed out that both banks and capital markets are integral parts of the financial system, which is co-evaluated, and that they complement each other. The long-term development of the financial market is crucial, not only for developed-market financial systems but also for those based on banks.

Flannery and Protopapadakis (2002) empirically examined the impact of macroeconomic variables on the American stock market. The study considered the impact of six macroeconomic variables, namely: producer price index, trade balance, employment, housing, M1, and consumer price index. The results revealed that the observed variables significantly affect stock returns.

Eita (2012) investigated macroeconomic determinants affecting stock prices on the Namibian stock market. Using the VECM empirical methodology, it was discovered that stock prices on the Namibian stock exchange are mainly determined by economic activity, interest rates, inflation, money supply, and exchange rates. Increases in economic activity and the money supply raise stock prices, while increases in inflation and interest rates lower them. The results suggest that Namibian stocks are not inflation-protected and that contractionary monetary policy generally reduces stock prices. Goh and Wang

(2013) conclude that the stock market of one nation can influence another nation's market in a globalized world. The study reveals that American macroeconomic factors began to affect the Chinese stock market after China joined the World Trade Organization (WTO) in 2001.

Ibrahim and Musah (2014) investigated the relationship between macroeconomic indicators and stock returns in Ghana. They found a long-term relationship between stock market returns and macroeconomic indicators: money supply and inflation had a positive impact on stock prices, whereas industrial production, the exchange rate, and the interest rate had a negative impact.

The macroeconomic determinants of stock market development identified in the literature vary widely. Yusoff and Guima (2015) observed the following variables in the Middle East and North Africa (MENA) region as factors influencing the development of the stock market: oil price growth, income per capita, domestic savings, interest rates, exchange rate, and inflation.

Barakat et al. (2015) analyzed Egypt and Tunisia as emerging markets. They concluded that CPI, the exchange rate, and the money supply have a positive effect on the stock market index, while the interest rate has a negative effect. Interest rates, gold prices, exchange rates, and money supply have a significant impact on stock returns in India (Nisha, 2015).

Salimullah (2016) analyzed the stock market in Sri Lanka and found that GDP, the balance of payments, and the exchange rate have a positive impact on the stock market index, whereas the interest rate has a negative impact on its movement. GDP, exchange rate, and interest rate have a significant impact on stock market performance (Islam & Alam, 2019). Chowdhury et al. (2018) found that changes in money supply and government spending affect liquidity in Asian emerging markets. Huong (2018) found that inflation has a positive impact, whereas the corporate tax rate has a negative impact on the structure of corporate capital in the Vietnamese stock market.

3. Research methodology

The research method is a key part of any research study. This research is based on secondary data. The study's sample consists of stock market indices on the capital markets of Bosnia and Herzegovina: the SASX-30 index on the capital market in the Federation of Bosnia and Herzegovina and the BIRS index on the capital market of the Republic of Srpska. Macroeconomic and market variables in this research include the following: turnover (TRN), market capitalization (MC), exports (EXP), imports (IMP), gross domestic product

(GDP), consumer price index (CPI), and foreign direct investment (FDI). The research period spans from the first quarter of 2013 to the fourth quarter of 2022. Panel data were used in this research. Data on the movements of the SASX-30 and BIRS stock indexes were collected from the Sarajevo and Banja Luka Stock Exchanges. Data on the movement of macroeconomic and market-independent variables were collected from the Central Bank of Bosnia and Herzegovina, the World Bank, and the Agency for Statistics of Bosnia and Herzegovina. The least-squares, robust least-squares, and quantile regression models were applied in the study. The following equations were derived to conclude the objectives of the study:

$$Y_{SASX\text{-}30} = \alpha + \beta_1 * (TRN) + \beta_2 * (MC) + \beta_3 * (EXP) + \beta_4 * (IMP) + \beta_5 * (GDP) + \beta_6 * (CPI) + \beta_7 * (FDI) + \varepsilon \quad (1)$$

$$Y_{BIRS} = \alpha + \beta_1 * (TRN) + \beta_2 * (MC) + \beta_3 * (EXP) + \beta_4 * (IMP) + \beta_5 * (GDP) + \beta_6 * (CPI) + \beta_7 * (FDI) + \varepsilon \quad (2)$$

The alpha value level is 5%. If the research results indicate that the p-value is less than 0.05, then the null hypothesis is accepted, and the result is statistically significant. On the other hand, if the p-value is greater than 0.05, then the hypotheses are rejected, and the result is insignificant for this study. The three models used in this study are econometric models that compare the parameters of the estimators using a panel data regression. Based on the above, the following research hypotheses were set in this study:

H1: Stock market turnover has a positive impact on the returns on the SAXS-30 and BIRS stock indices.
H2: Market capitalization has a positive impact on returns on the SASX-30 and BIRS stock indices.
H3: The movement in the value of exports of goods and services has a positive impact on the return on the SASX-30 and BIRS stock indexes.
H4: The movement in the value of imports of goods and services has a positive impact on the return on the SASX-30 and BIRS stock indexes.
H5: The gross domestic product of Bosnia and Herzegovina has a positive influence on the return on the SASX-30 and BIRS stock indexes.
H6: The consumer price index of Bosnia and Herzegovina has a positive influence on the return on the stock market indices SASX-30 and BIRS.
H7: Foreign direct investments in Bosnia and Herzegovina have a positive impact on the return on the stock market indices SASX-30 and BIRS.

4. Empirical findings

4.1. Descriptive statistics

Average rates of return exhibit very small deviations from zero, consistent with the theoretical assumption of many approaches and models for measuring market risk, which assume the long-term average daily return is zero. The value of the stock exchange index SASX-30 at the end of 2022 was 1.736 index points, up about 93% from 2013, while compared to 2021, it decreased by about 2% (The Sarajevo Stock Exchange, 2022). In this research, the average value of the stock exchange index (SASX-30) was found to be greater than 1%. The table below presents descriptive statistics for the dependent and independent variables used in this paper. Bearing in mind the fact that SASX-30 and BIRS will be used as dependent variables and that SASX-30 is a variable from the Sarajevo Stock Exchange operating in the Federation of Bosnia and Herzegovina (an entity in Bosnia and Herzegovina), and BIRS is a variable from the Banja Luka Stock Exchange operating in the Republic of Srpska (an entity in B&H), it is important to note that when testing the hypotheses, data for the entities will be used on turnover, market capitation, export and import of goods and services and that data on GDP, CPI and FDI should be used for the B&H level. The total number of observations is 40, which represents a relatively representative sample both in terms of the available data on the capital market in Bosnia and Herzegovina and of the time frame.

Table 1. Descriptive statistics between first dependent variable (SASX-30) and independent variables for the period: 2013:Q1 - 2022:Q4

Variables	Obs.	Mean	Std.	Min	Max	Skewness	Kurtosis
SASX-30	40	1,52	4,36	-5,31	16,19	1,02	4,63
TRN	40	342,86	633,01	-3.389,9	448,39	-3,33	15,66
MC	40	68,92	278,21	-528,17	1.095,69	2,01	9,29
EXP	40	3,52	8,96	-14,27	21,64	0,13	2,30
IMP	40	2,74	9,56	-17,28	19,22	-0,15	2,22
GDP	40	2,05	9,17	-21,19	21,39	0,19	3,34
CPI	40	0,46	1,51	-2,10	6,00	1,71	6,54
FDI	40	379,28	2.327,83	-887,06	14.473,88	5,77	35,36

Source: Calculation by the authors

It is evident from the previous table that the most volatile trend, in terms of the first measure of risk, i.e., standard deviation, was observed for the following variables: foreign direct investments with a standard deviation of about 2.328% and turnover on the Sarajevo Stock Exchange with a standard deviation of about 633%. A parallel pattern of movement was also noted for the mean value, with direct foreign investments at about 379% and turnover at about 343%.

Governments in Bosnia and Herzegovina borrowed on the primary capital market by issuing bonds and treasury bills primarily intended to finance the budget deficit, which did not end up on the secondary capital market (The Central Bank of Bosnia and Herzegovina, 2023). In the period from 2010 to 2020, the inflow of direct foreign investments in B&H was significantly variable. A significant drop in direct foreign investment was registered in 2013 due to the crisis in EU countries, which are among the most important investors in B&H. The COVID-19 pandemic did not cause a dramatic drop in FDI in B&H, like the drop in global direct investments in 2020. A significant drop in FDI in B&H was registered in 2019, considering the negative amount in the fourth quarter of the observed year. A significant increase in FDI was registered in 2021 and 2022, amounting to 37.2% and 27.5%, respectively (Agency for the Promotion of Foreign Investments in B&H, 2023).

Table 2. Descriptive statistics between second dependent variable (BIRS) and independent variables for the period: 2013:Q1 - 2022:Q4

Variables	Obs.	Mean	Std.	Min	Max	Skewness	Kurtosis
BIRS	40	0,23	7,641	-14, 649	27,708	1,560	6,391
TRN	40	-980,6	4.754,85	-30.094,5	1.926,6	-5,950	36,969
MC	40	0,47	3,185	-5,168	7,970	0,533	2,822
EXP	40	3,06	8,353	-15,483	21,001	-0,006	2,815
IMP	40	2,50	12,256	-29,214	30,410	-0,178	3,215
GDP	40	2,05	9,172	-21,194	21,390	0.197	3.343
CPI	40	0.46	1,508	-2,100	6,00	1,710	6,538
FDI	40	379,28	2.327,83	-887,06	14.473,8	5,77	35,368

Source: Calculation by the authors

The results from the previous table are similar to those in Table 1. The most fluctuating trend in movement for the first measure of risk, i.e., standard deviation, was observed for the following independent variables: foreign direct investment, with a standard deviation of about 2.328%, and turnover on the Banja Luka stock exchange, with a standard deviation of about 4.754%. The turnover on the Banja Luka Stock Exchange during the observed period was highly volatile. At the end of 2022, bonds and treasury bills accounted for about 90.9% of total turnover on the Banja Luka Stock Exchange (Republic of Srpska Securities Commission, 2022). The value of the BIRS stock market index at the end of 2022 amounted to about 839 index points, an increase of about 13% compared to 2013, and about 26% compared to 2021 (The Sarajevo Stock Exchange, 2022). In this research, the average value of the BIRS stock market index was 0.23. The following table shows the correlation matrix between the SASX-30 index and observed macroeconomic variables.

4.2. Research results

This section of the paper presents the research results. First, the correlation coefficients are calculated, followed by the regression analysis results.

Table 3. Coefficient of correlation between stock market index (SASX-30) and macroeconomic variables for the period: 2013:Q1 - 2022:Q4

	SASX_30	TRN	MC	EXP	IMP	GDP	CPI	FDI
SASX_30	1.000	-0.241	0.025	0.896	- 0.819	0.868	0.632	- 0.280
TRN	- 0.241	1.000	-0.133	0.313	0.295	0.287	-0.161	-0.171
MC	0.025	-0.133	1.000	-0.056	-0.010	-0.010	-0.115	0.110
EXP	0.896	0.313	-0.056	1.000	0.967	0.884	0.775	0.338
IMP	- 0.819	0.295	-0.010	0.967	1.000	0.848	0.765	0.266
GDP	0.868	0.287	-0.010	0.884	0.848	1.000	0.523	0.336
CPI	0.632	- 0.161	-0.115	0.775	0.765	0.523	1.000	0.239
FDI	- 0.280	-0.171	0.110	0.338	0.266	0.336	0.239	1.000

Source: Calculation by the authors

It is evident from the previous table that the strongest positive correlation was recorded between the Sarajevo Stock Exchange (SASX-30) index and the independent variables such as export (0.896) and GDP growth rate (0.868), which leads to the conclusion that economic growth and exports promote the development of the stock market, which is supported by numerous studies (Garcia and Liu, 1999). Therefore, it is expected that GDP growth will positively impact the development of the stock market. On the other hand, the strongest negative correlation was achieved with the following independent variables: the growth rate of import (-0.819), the growth rate of foreign direct investment (-0.280), and turnover on the Sarajevo Stock Exchange (-0.241). The following table presents the correlation matrix between the BIRS index and observed macroeconomic variables.

Table 4. Coefficient of correlation between stock market index (BIRS) and macroeconomic variables for the period: 2013:Q1 - 2022:Q4

	BIRS	TRN	MC	EXP	IMP	GDP	CPI	FDI
BIRS	1.000	-0.103	0.177	0.060	- 0.300	0.030	0.298	-0.011
TRN	-0.103	1.000	0.135	0.204	0.140	0.285	-0.002	0.098
MC	0.177	0.135	1.000	-0.297	0.285	0.260	-0.381	-0.069
EXP	0.060	0.204	-0.297	1.000	0.874	0.875	0.784	0.323
IMP	- 0.300	0.140	0.285	0.874	1.000	0.706	0.737	0.180
GDP	0.030	0.285	0.260	0.875	0.706	1.000	0.523	0.336
CPI	0.298	-0.002	-0.381	0.784	0.737	0.523	1.000	0.239
FDI	-0.011	0.098	-0.069	0.323	0.180	0.336	0.239	1.000

Source: Calculation by the authors

The previous table shows that the strongest positive correlation was observed between the Banja Luka Stock Exchange (BIRS) index and the independent variables: consumer price index (CPI) (0.298) and market capitalization (MC)

(0.177). In the capital market of Republika Srpska, market capitalization increased in 2022, a trend also recorded in the Federation of Bosnia and Herzegovina. Developed capital markets in the world had a significant recovery from the economic crisis in 2009, while on the other hand, small and underdeveloped markets of South-Eastern Europe only slightly felt the effects of economic recovery in 2013, and slight changes in the development of their markets (Republic of Srpska Securities Commission, 2022).

Any variable in the model with a VIF greater than 3 is considered multicollinear and is thus rejected from the model. In the case of multicollinearity, the coefficients of the variables became unstable, leading to overestimated standard errors. Table 5 presents the results of the multicollinearity analysis among the observed variables in the model.

Table 5. Multicollinear analysis using variance inflation factor (VIF)

Variables	**VIF**	**1/VIF**
TRN	1,20	0,835773
MC	1,12	0,894059
EXP	2,32	0,431034
IMP	2,87	0,3484320
GDP	1,18	0,845273
CPI	2,88	0,347762
FDI	1,27	0,790349
Mean VIF	**1,83**	

Source: Calculation by the authors

As shown in the previous table, each independent variable has a VIF coefficient less than 3. It is clear that there is no multicollinearity between the variables; therefore, the set model is valid. In this research, the Breusch-Pagan-Godfrey test and the Breusch-Pagan-Harvey test were used to test for heteroskedasticity. The Breusch-Pagan-Godfrey test results in a p-value of 0.5089, which is greater than 5% and indicates that there is no heteroskedasticity in the regression model. Likewise, the probability result from the Breusch-Pagan-Hausman test is 0.5985, which also confirms that there is no heteroskedasticity in the regression model.

In this research, the statistical significance and stationarity of the previous variables will be tested using the generalized unit root test, i.e., the Dickey-Fuller test with and without trend and constant. The results in Table 6 show that all variables in the model are stationary.

Table 6. Dickey-Fuller test results without origin and trend width

Variables	t-Statistic	Possibility value	Result
SASX-30	-6.271711	0.000	Stationary
BIRS	-6.722149	0.000	Stationary
TRN	-8.059239	0.000	Stationary
MC	-5.879613	0.001	Stationary
EXP	-6.526847	0.000	Stationary
IMP	-7.027840	0.000	Stationary
GDP	-10.49108	0.000	Stationary
CPI	-6.848886	0.000	Stationary
FDI	-10.19314	0.000	Stationary

Source: Calculation by the authors

Table 7. Coefficients of independent variables under multiple regression, least squares, robust least squares and quantile regression for the period: 2013:Q1 - 2022:Q4

Regression Model	Least Squares			Robust Least Squares			Quantile Regression (Median)		
Dependent variable - SASX-30									
Independ. variables	Coef.	Std. Error	Prob.	Coef.	Std. Error	Prob.	Coef.	Std. Error	Prob.
C	290.5	199.9	0.15	334.9	224.6	0.13	411.9	289.6	0.16
TRN	-0.029	0.061	0.63	-0.029	0.068	0.66	-0.016	0.087	0.84
MC	6.271	3.511	0.08	6.287	3.944	0.11	4.315	4.687	0.36
EXP	0.573	0.124	0.00	0.599	0.139	0.00	0.534	0.201	0.01
IMP	-0.263	0.075	0.00	-0.272	0.084	0.00	-0.239	0.125	0.04
GDP	0.081	0.038	0.04	0.073	0.043	0.08	0.066	0.071	0.35
CPI	4.081	22.48	0.85	2.037	25.256	0.93	15.92	50.52	0.75
FDI	-0.234	0.139	0.10	-0.248	0.157	0.11	-0.245	0.175	0.17
R- Squared	0.881			0.664					
Pseudo R-Squared							0.669		
Adjusted R - Squared	0.856			0.590			0.597		
F-Statistic	34.166								
Prob (F-statistic)	0.000								
Prob (Rn-squared st)									
Prob (Quasi -LR stat)							0.000		

Source: Calculation by the authors

From the previous table, it can be noted that the highest value of the adjusted coefficient of determination was recorded in the least squares model, which points to the conclusion that the independent variables in the model describe the influence on the dependent variable, i.e., return on the SASX-30 stock index, with about 88.10%. Also, the F-statistic for the least-squares model (34.17) is high, and the p-value is 0, indicating that the model is highly significant. It is interesting that certain developing countries, such as Bosnia and Herzegovina, which are said to have high market capitalization and turnover, have low average GDP. Therefore, the trend shows an inverse relationship between turnover, market capitalization, and GDP. Also, from the previous table, it is evident that the indicator of stock market operations, as an independent variable (market capitalization), had a positive relationship with the return on the SASX-30 stock index, but the relationship was not significant at the 5% level. Macroeconomic indicators with very strong significance (less than 5%) in relation to the return on the SASX-30 stock exchange index are exports and imports, but with different signs. A positive correlation (0.573) was recorded between exports and the rate of return on the SASX-30 stock index. Therefore, if exports increase by 1%, the return on the SASX-30 stock index will increase by about 0.573, assuming other variables remain unchanged. This can be explained by the fact that an increase in exports from Bosnia and Herzegovina leads to higher profit and yield potential for the company, reflected in an increase in the market value and, consequently, the rate of return.

The first research hypothesis in this study is that stock market turnover has a positive impact on returns on the SAXS-30 and BIRS stock indices. From Table 5, it is evident that there is inverse causality between turnover and returns on the SASX-30 stock index, and the significance is greater than 5% in all three models, which rejects the first research hypothesis, that is, an increase in turnover on the Sarajevo Stock Exchange cannot have a predictive effect on the return movement of the SASX-30 stock index. This can be described as the situation in which the Government of the Federation of Bosnia and Herzegovina repeatedly issued bonds and treasury bills to finance the budget deficit, although these securities were not actively traded on the secondary market of the Sarajevo Stock Exchange.

The second research hypothesis in this paper is as follows: Market capitalization has a positive influence on the returns on the SASX-30 and BIRS stock indexes. From the previous table, it can be seen that market capitalization has a positive influence on the return of the SASX-30 stock index, but the significance is greater than 5%, thereby rejecting the second research hypothesis that market capitalization has a predictive influence on the return of the SASX-30 stock index.

The third research hypothesis is as follows: Changes in the value of exports of goods and services have a positive impact on the returns of the SASX-30 and BIRS stock indexes. The results based on all three models (least squares model, robust least squares model, and quantile regression model) point to the conclusion that the significance is less than 5%, which confirms the third research hypothesis that there is a positive influence of the export value on the return on the SASX-30 stock index. Tursoy et al. (2008) investigated the influence of macroeconomic factors, primarily exports and imports, on stock exchange operations at the Istanbul Stock Exchange using the Arbitrage Price Theory (APT) model. They concluded that there is a significant relationship between export and import values on the Istanbul Stock Exchange. Exports of goods and services also increase a country's GDP and industrial production, and increase the purchasing power of the observed country. Theoretically, an increase in export value is positively correlated with stock market returns (Bellalah et al., 2008).

The fourth research hypothesis is as follows: Changes in the value of imports of goods and services have a positive impact on the returns of the SASX-30 and BIRS stock indexes. The results from all three models (least squares, robust least squares, and quantile regression) indicate significance at the 5% level, confirming the fourth research hypothesis that a decrease in imports is associated with an increase in returns on the SASX-30 stock index. Therefore, if imports decrease by 1%, the return on the SASX-30 stock index will increase by about 0.263 in the least squares model, by about 0.272 in the robust least squares model, and by about 0.239 in the quantile regression model, assuming other variables are held constant.

The fifth research hypothesis is as follows: The gross domestic product of Bosnia and Herzegovina has a positive influence on the return on the stock market indices SASX-30 and BIRS. According to the panel regression analysis, specifically the least squares model, GDP has a positive influence on the return of the SASX-30 stock index, with significance at the 5% level. For the remaining two methods, i.e., the robust least squares method and the quantile regression method, there is a positive impact, but the significance is greater than 5%. In this regard, we conclude that we can partially accept the fifth research hypothesis, namely that the growth rate of GDP has a positive influence on the growth rate of the stock exchange index SASX-30.

The sixth research hypothesis is as follows: The consumer price index of Bosnia and Herzegovina has a positive influence on the return on the stock market indices SASX-30 and BIRS. In all three observed models, the influence of the consumer price index on the return on the SASX-30 stock index is positive, but with significance above 5%, which points to the conclusion to reject

the given hypothesis, that is, that the consumer price index has no predictive value on the return on the SASX-30 stock index.

The seventh research hypothesis is as follows: Foreign direct investment in Bosnia and Herzegovina has a positive impact on the returns of the stock market indices SASX-30 and BIRS. From Table 5, it is evident that in all three models, there is a negative influence of foreign direct investments on the return on the SASX-30 stock index of the Sarajevo Stock Exchange with a significance greater than 5%, which points to the conclusion to reject the given hypothesis where foreign direct investments do not have a predictive function on the return on the SASX-30 stock index. Table 8 presents the results of the panel regression analyses using the least squares, robust least squares, and quantile regression models for the independent variables and the return on the Banja Luka stock market index (BIRS).

Table 8. Coefficients of independent variables under multiple regression, least squares, robust least squares and quantile regression for the period: 2013:Q1 - 2022:Q4

Regression Model / Dependent variable - BIRS	Least Squares			Robust Least Squares			Quantile Regression (Median)		
Independent variables	Coef.	Std. Error	Prob	Coef.	Std. Error	Prob	Coef.	Std. Error	Prob.
C	484.8	132.3	0.00	474.9	147.9	0.00	456.7	206.4	0.03
TRN	-0.004	0.036	0.91	-0.003	0.040	0.93	-0.006	0.044	0.89
MC	1.315	4.193	0.75	1.226	4.689	0.79	2.359	5.856	0.68
EXP	0.001	0.001	0.00	0.001	0.001	0.00	0.001	0.001	0.04
IMP	-0.001	0.001	0.00	-0.001	0.001	0.00	-0.001	0.001	0.02
GDP	0.025	0.026	0.34	0.028	0.029	0.33	0.036	0.048	0.46
CPI	36.83	16.50	0.03	36.81	18.45	0.04	37.57	23.34	0.11
FDI	0.046	0.093	0.62	0.036	0.104	0.72	7.73E-05	0.121	0.99
R- Squared	0.394			0.363					
Pseudo R-Squared							0.312		
Adjusted R-Squared	0.262			0.452			0.161		
F-Statistic	2.978								
Prob (F-statistic)	0.015								
Prob (Rn-squared st)									
Prob (Quasi –LR stat)							0.019		

Source: Calculation by the authors

The results presented in Table 8 are similar to those in Table 7, except that we present the results of the tested hypotheses: the influence of independent variables on the dependent variable, i.e., the return to the Banja Luka stock exchange index (BIRS).

The first research hypothesis in this study is as follows: Stock market turnover has a positive impact on returns on the SAXS-30 and BIRS stock indices. From Table 7, it is evident that stock market turnover has a negative impact on the return on the BIRS stock index, with the significance being greater than 5% in all three models, which rejects the first research hypothesis, i.e., the variable of stock market turnover on the Banja Luka Stock Exchange cannot have a prediction on the return movement of the BIRS stock index.

The second research hypothesis in this paper is as follows: Market capitalization has a positive influence on the returns on the SASX-30 and BIRS stock indices. From the previous table, it can be seen that market capitalization has a positive influence on the return of the BIRS stock index, but the significance level is greater than 5%, thus rejecting the second research hypothesis that market capitalization has a predictive influence on the return of the BIRS stock index.

The third research hypothesis is as follows: Changes in the value of exports of goods and services have a positive impact on the returns of the SASX-30 and BIRS stock indexes. The results based on all three models (least squares model, robust least squares model, and quantile regression model) point to the conclusion that the significance is less than 5%, which confirms the third research hypothesis that there is a positive influence of the export value on the return on the BIRS stock index. Therefore, with a 1% increase in exports, the return on the BIRS stock index will increase by about 0.001, assuming that other variables are held constant.

The fourth research hypothesis is as follows: Changes in the value of imports of goods and services have a positive impact on the returns of the SASX-30 and BIRS stock indexes. The results based on all three models (least squares model, robust least squares model, and quantile regression model) lead to the conclusion that the significance is less than 5%, which confirms the fourth research hypothesis that with a decrease in the value of imports, there is an increase in the return on the BIRS stock index.

The fifth research hypothesis is as follows: The gross domestic product of Bosnia and Herzegovina has a positive influence on the return on the stock market indices SASX-30 and BIRS. According to all three models, the value of gross domestic product positively influences the return on the BIRS stock index, with significance at the 5% level. Based on the results, we conclude that GDP

does not have a predictive role for the Banja Luka Stock Exchange (BIRS) index.

The sixth research hypothesis is as follows: The consumer price index of Bosnia and Herzegovina has a positive influence on the return on the stock market indices SASX-30 and BIRS. The consumer price index is used to measure macroeconomic stability. Macroeconomic stability can be an important factor in the development of the stock market. It is expected that greater macroeconomic stability will lead to stronger incentives for companies and investors to participate in the stock market. Also, it is expected that the stock market in countries with a stable macroeconomic environment will be more developed. Although there is no consensus on the relationship between macroeconomic stability and stock market development, it is argued that higher macroeconomic stability encourages investors to participate in the stock market, as the environment is more predictable. In all three observed models, the influence of the consumer price index on the return of the BIRS stock index is positive, though with different levels of significance. With the least squares method as well as with the robust least squares model, the significance is less than 5%, while with the quantile regression model, the significance is greater than 5%, which points to the conclusion of the partial acceptance of the sixth research hypothesis that the consumer price index has a certain influence on the movement of returns on the BIRS stock index. Therefore, if the CPI increases by 1%, the return on the BIRS stock index will increase by about 36.83 with the least squares method and by about 36.81 with the robust least squares method, assuming that other variables are held constant. The above is also based on macroeconomic theory, given that the CPI can rise due to increased demand for products and services, and that demand positively affects companies' business performance.

The seventh research hypothesis is as follows: Foreign direct investment in Bosnia and Herzegovina has a positive impact on the returns of the SASX-30 and BIRS stock indices. From Table 6, it is evident that in all three models, there is a positive influence between foreign direct investments and the return on the stock index of the Banja Luka stock exchange BIRS with a significance greater than 5%, which points to the conclusion to reject the given hypothesis where foreign direct investments do not have a predictive function on the return on the stock index BIRS.

5. Conclusions

Capital markets in developing and emerging markets, such as those in Bosnia and Herzegovina, are usually characterized as shallow and unstable, leading to extreme sensitivity of stock returns to economic movements. These characteristics highlight the role that macroeconomic variables play in capital market performance. In this regard, it is clear that the performance of the stock market depends on the overall macroeconomic environment.

The conducted research examines the influence of macroeconomic and market variables on the capital market in Bosnia and Herzegovina, and identifies 2 markets at the entity level within the state: the Sarajevo Stock Exchange (entity FB&H) and the Banja Luka Stock Exchange (entity RS). The research results show that the export of goods and services has a positive impact on the return on the SASX-30 and BIRS stock indexes. These results also align with Flannery and Protopapadakis' (2002) research on the American stock market. The above points to the conclusion that the companies listed on the Sarajevo and Banja Luka Stock Exchanges are export-oriented, in which an increase in export activity increases returns. In addition, the returns of these companies can be boosted by growth in total exports, as increased total exports can also boost sales for companies listed on these stock exchanges.

The results indicate that reduced imports have a positive effect on returns for SASX-30 and BIRS, suggesting that when imported goods are substituted by domestic production, stock values and prices increase. Also, based on this result, it can be concluded that companies listed on the stock exchanges in B&H face competition encouraged from outside, which represents a special challenge. Overall, it can be concluded that the trade balance of Bosnia and Herzegovina significantly determines the returns of companies listed on the Sarajevo and Banja Luka Stock Exchanges, and that these companies are open to doing business with foreign countries. This conclusion is significant for designing economic policy measures that will ensure the mentioned companies maintain a competitive advantage, which should ultimately result in higher returns. The current unstable business environment in B&H certainly does not support the exploitation of the potential of SASX-30 and BIRS companies, and it is clear that they are highly dependent on international economic flows.

Regarding the impact of GDP on returns for SASX-30 and BIRS, the results show no impact on BIRS, but the least-squares model indicates a positive impact on SASX-30. Eita (2012) found that an increase in economic activity raises stock prices in Namibia. This conclusion also has a logical theoretical basis: when total economic activity (GDP) increases, demand increases and, analogously, production and sales, ultimately leading to higher income, profits,

and returns. However, there is no significant influence in B&H because the relative market capitalization is extremely small compared to the total value of capital in B&H's economic system. Therefore, in an underdeveloped capital market like that in B&H, economic activity and GDP have little influence on share prices.

When it comes to the impact of the CPI on stock market indices and stock prices, results from different studies vary. Eita (2012) shows that an increase in inflation reduces stock prices, while Ibrahim and Musah (2014), Barakat et al. (2015), and Huong (2018) show that inflation has a positive impact on stock prices. The results for B&H show that the CPI has a positive effect on the BIRS, but no effect on the SASX-30. Macroeconomists sometimes emphasize that controlled inflation can stimulate economic growth and increase income and returns, and in this context, it is always important to clarify whether inflation is controlled, as this can ultimately determine the research's outcome. The CPI's limited influence on the Sarajevo Stock Exchange stems from the fact that returns are determined by other variables.

The specificity of the stock market in B&H is the fact that the share of business entities listed on the stock exchange in the overall structure of business entities is quite small, where changes in macroeconomic variables are not significantly reflected on the capital market, which is also evident from the influence of FDI, while this influence was absent on SASX-30 and BIRS.

Turnover and market capitalization, as independent variables, did not predict returns for the SASX-30 and BIRS stock indices. First of all, the capital market in Bosnia and Herzegovina is shallow and underdeveloped, characterized by frequent trading halts and highly volatile turnover and market capitalization. In the last few years, higher amounts of turnover and market capitalization related to the issue of treasury bonds that were not actively traded on the secondary market, but served as a mechanism for financing the budget of Bosnia and Herzegovina.

According to the presented indicators, significant structural changes are needed for the further development of the capital market in Bosnia and Herzegovina, especially in the part related to the efficiency of the real sector, and the credibility of individual issuers of securities.

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