

Influence of macroeconomic indicators in the development of the Macedonian Stock Exchange - period 2017-2022

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ABSTRACT

In this paper, through different methods, are analyzed the macroeconomic effects on the development of the capital market, that is, the Macedonian Stock Exchange. The regression analysis shows the relationship between the dependent variable-performance of the Macedonian Stock Exchange, shown through the MBI10 stock index and the independent variables (economic growth, inflation rate, interest rate and exchange rate). Secondary data published by the State Statistics Office, the National Bank of the Republic of North Macedonia and the Macedonian Stock Exchange were used. Also, within the framework of this paper, a comparative analysis of the movement of macroeconomic indicators in the given period is shown.

Through the regression analysis, it was established that the independent variables (economic growth and inflation) have a positive and significant influence (impact) on the dependent variable (the value of MBI10). While the other variables (interest rates and exchange rate) have an insignificant and negative impact on the dependent variable (the value of MBI10).

Through the comparative analysis, analyzing the quarterly data in the period 2017-2022, we can conclude that the value of the stock market index MBI10, which contains the shares of the 10 best listed companies on the stock exchange, has been in constant growth in the last 5 years, taking into account the shocks that happened to the global economy, not neglecting the national one as well. In 2022, we have a fall in the value of the index, as a result of macroeconomic and global destabilization. In the case of interest rates, we have a slight decrease until the beginning of 2022, when interest rates begin to rise.

Keywords

Index; Securities; Interest rates; Inflation

Introduction

For a better functioning of the economy, the existence of a developing securities market that will contribute to a more stable financial market, and thus attract foreign investors to invest in our economy, is indisputable.

The importance of foreign investment is particularly important for economies in transition and developing countries, given the lack of domestic savings to achieve higher growth rates.

Investing in the capital market also depends on the political situation in the country, and on the movement of the economy at the global level. In countries where there is an unstable political situation, the work of the Stock Exchange declines, in contrast to stable political countries, where stock market operations take place continuously.

The stock market is a mirror and barometer of general developments in society (Dimitrova, 2015). Taking into account the importance of the stock exchange in the overall development of the financial stability of the state, of particular importance is the relationship of the development of the capital market with macroeconomic indicators as indicators of the economic and financial stability of the entire state. With this analysis of the influence between the above indicators, we can conclude which indicators have a positive and which negative influence on the stock exchange operation.

Literature Review

Macedonian Stock Exchange

The Macedonian Stock Exchange is a relatively new market compared to other capital markets in the world. The beginnings appear after the transition of our country from socialism to pluralism, that is, the transition period. On September 13, 1995, it was held the Founding Assembly of the Macedonian Stock Exchange AD Skopje. The establishment of the Stock Exchange was realized with the technical assistance of the British Know-How Fund, provided by the Government of the Republic of Macedonia¹. On March 28, 1996, the stock exchange bell rang for the first time in the Republic of Macedonia and the first trading day of the Stock Exchange took place. The Stock Exchange was traded twice a week, on Tuesday and Thursday. On October 16 of the same year, the Macedonian Stock Exchange was accepted as a full member of the Federation of Eurasian Stock Exchanges.

The stock exchange was founded as a joint venture company and was intended to operate on a non-profit basis with a founding capital of 500,000 euros. The stock exchange was founded by 19 members: 13 banks, 3 insurance companies and 3 savings banks.

The basic governing bodies of the Stock Exchange are:

- Shareholders assembly
- Board of Directors
- Executive director

Shares and bonds are traded on the Macedonian Stock Exchange for long-term securities, and other instruments (convertible certificates, shares, etc.) are traded with special approval from the Securities Commission of the stock exchange. Trading takes place four times a week through the stock exchange's electronic trading system, according to the order system. The clearing of the transactions is carried out by the Stock Exchange, and the settlement and re-registration of the ownership of the securities is realized through the Central Depository of Securities Ad Skopje (Vitanova, 2003).

The success of the financial market is reflected through various indicators to reveal the development of the financial market, the so-called stock market indexes. An index is a group or basket of securities, derivatives or other financial instruments that represents and measures the performance of a particular market, asset class, market sector or investment strategy. In other words, an index is a statistically representative sample of any observable set of securities in a given market segment. For example, the well-known S&P 500 is a representation of the US capital market segment. In the case of the Macedonian Stock Exchange, we will explain one of those indices - the Macedonian Stock Exchange Index (MBI).

From 01.11.2001, the Macedonian Stock Exchange AD Skopje started calculating the Macedonian Stock Exchange Index (MBI), which was composed of the five most liquid stocks on the Macedonian Stock Exchange: Alkaloid AD Skopje, Europe AD Skopje, Komercijalna banka AD Skopje, Makpetrol AD Skopje and Toplifikacija AD Skopje. MBI was a price-unweighted index, which as the first stock market index in the Republic of Macedonia, performed its function of introducing an aggregate indicator for quantifying stock market movements². Even during the introduction of MBI in 2001, it was concluded that after a certain time and further development of the capital market, the Macedonian Stock Exchange should introduce a weighted index. For those

¹ <https://www.mse.mk/mk/content/22/1/2008/history>

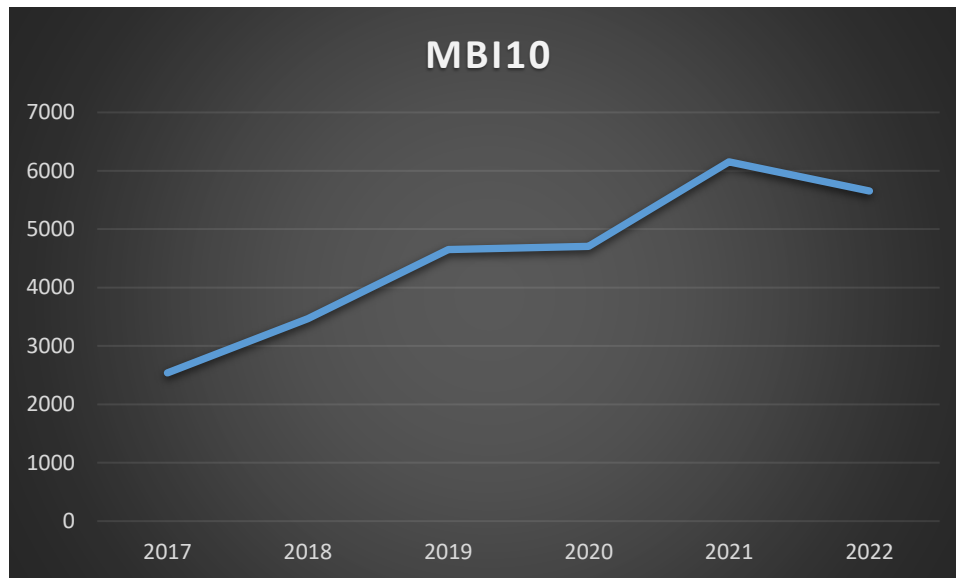
² <https://www.mse.mk/mk/content/13/3/2010/structure-of-index-mbi10>

reasons, the new Macedonian Stock Exchange Index (MBI10) was introduced on January 4, 2005, whose weighting through market capitalization enables a more realistic presentation of price movements on the Macedonian Stock Exchange. The table below shows the structure of the MBI10 Index.

Table 1. Structure of MBI10

Publisher	Code	Total issued shares	FF Market capitalization on the date of the last revision in EUR (before adjustment)	Weights from last revision
<u>Alkaloid Skopje</u>	<u>ALK</u>	1.431.353	356.190.540	20,00%
<u>Stopanska Banka Skopje</u>	<u>STB</u>	17.460.180	20.543.392	4,92%
<u>Granit Skopje</u>	<u>GRNT</u>	3.071.377	43.751.890	10,48%
<u>Komercijalna Banka Skopje</u>	<u>KMB</u>	2.279.067	359.134.266	20,00%
<u>Makpetrol Skopje</u>	<u>MPT</u>	112.382	82.188.885	19,68%
<u>TTK Banka Skopje</u>	<u>TTK</u>	907.888	11.678.526	2,80%
<u>Makedonski Telekom Skopje</u>	<u>TEL</u>	95.838.780	23.179.739	5,55%
<u>Makedonijaturist Skopje</u>	<u>MTUR</u>	452.247	18.696.028	4,48%
<u>NLB Banka Skopje</u>	<u>TNB</u>	854.061	42.523.211	10,18%
<u>UNI Banka Skopje</u>	<u>UNI</u>	545.987	7.939.450	1,90%

Historically, the Macedonian Stock Exchange, shown through the MBI10 index, is not a very developing stock market compared to other stock markets at the regional and world level, therefore the data intended for comparative analysis have been taken for the last 5 years, years where we see increased market growth in terms of increasing the value of the MBI10 index, as well as increasing the market capitalization of the stock exchange. Graph 1. shows the data on the price movement of the MBI10 index, the period analyzed is shown on the horizontal axis, and the MBI10 value expressed in index points is shown on the vertical axis. From the comparative analysis, we can conclude that there is an increase in the value of the stock market index MBI10 from 2538.86 index points in 2017 to 6153.48 index points in 2021, or for a period of 4 years we have an increase in the value of the index by 142.37%.



Graph 1. The movement of the value of MBI10 - period 2017-2022

Table 2. shows the data on the value of MBI10 for the months in 2022. and we see oscillations in the value of the index, but compared to December 2021 we have a significant decrease in the value of 8.14%.

Table 2. Value of MBI0-monthly 2022

Month	MBI10
January	6226.37
February	5819.46
March	6097.34
April	6278.19
May	6070.62
June	5787.23
July	5880.2
August	5764.57
September	5586.34
October	5655.25
November	5557.94
December	5652.33

Macroeconomic indicators in R.N.M 2017-2022

Macroeconomic indicators as indicators that show us the real state of the economy as a whole, also show us the movements of the most important economic phenomena and occurrences for the state economy as a whole. In order to be able to make a good analysis of the effects of macroeconomic indicators on the capital market, we will first show the movements of some of these indicators: gross domestic product, inflation, interest rates and exchange rate in the period 2017-2022.

Gross Domestic Product (GDP)- The definition of GDP according to Mankiw (2010) is: Gross Domestic Product, or GDP, is often considered the best measure of how well an economy is doing. This statistic is calculated every three months by the Bureau of Economic Analysis, part of the US Department of Commerce, from a number of primary data sources. Primary sources include both administrative data, which are byproducts of government functions such as tax collection, educational programs, defense, and regulation, and statistical data, which come from government surveys of, for example, retail establishments, manufacturing firms, and agricultural activities. The purpose of GDP is to summarize all of this data with a single number that represents the dollar value of economic activity over a given period of time. Summarized GDP represents the value of all goods and services within the national economy in a certain period of time (usually 1 year). The economic growth data presented in this paper are shown as a percentage of the difference in real GDP between two analyzed years.

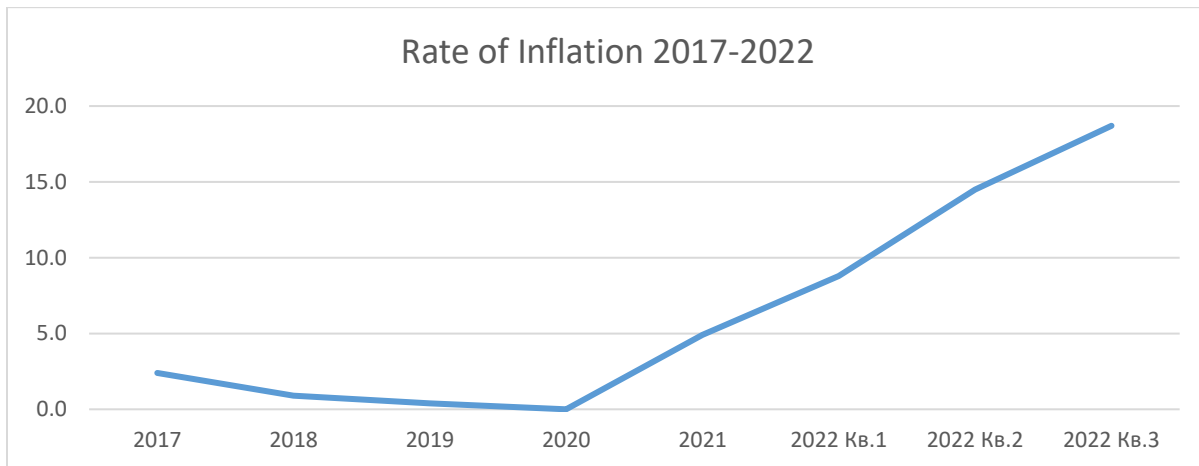
The Republic of North Macedonia as a country is characterized by economic growth of about 2-3% on an annual basis, with the exception of the period 1991-1995. In the period 2010-2019, economic growth varies from 3.4% in 2010 and maintains a constant growth of 2-3% with an upward trend in 2019 (Xhaferi & Mehmedi, 2022). The exception is the period from 2012 when the economy of North Macedonia recorded a decline (entered a recession phase) of -0.5% (State Statistics Office, 2021).

At the beginning of 2020, that is, in the first quarter, a period that coincides with the beginning of the global pandemic, noticeable is the effect of slow economic growth, in other words, the economy is already starting to enter recession. The biggest recession in R.N.M is the period where the recession recorded a negative double-digit number, i.e. -16.4%. This drastic reduction comes as a result of the reduction of the Gross Domestic Product at the beginning of the year, that is, from 159,090 million denars in the first quarter to 141,610 million denars in the second quarter of 2020. In the future period, an improvement in economic growth is seen - a period of recovery of the global economy from the consequences of the global pandemic COVID-19. Thanks to this analysis, we can say that the improvement in economic growth does not last long, more precisely until the second quarter of 2022, where as a result of global factors and the destabilization of world markets, the economy of R.N.M begins to take a direction of decreasing values, hopefully that this trend will not result in entering a recession.



Graph 2. Rates of economic growth R.N.M 2017-2022

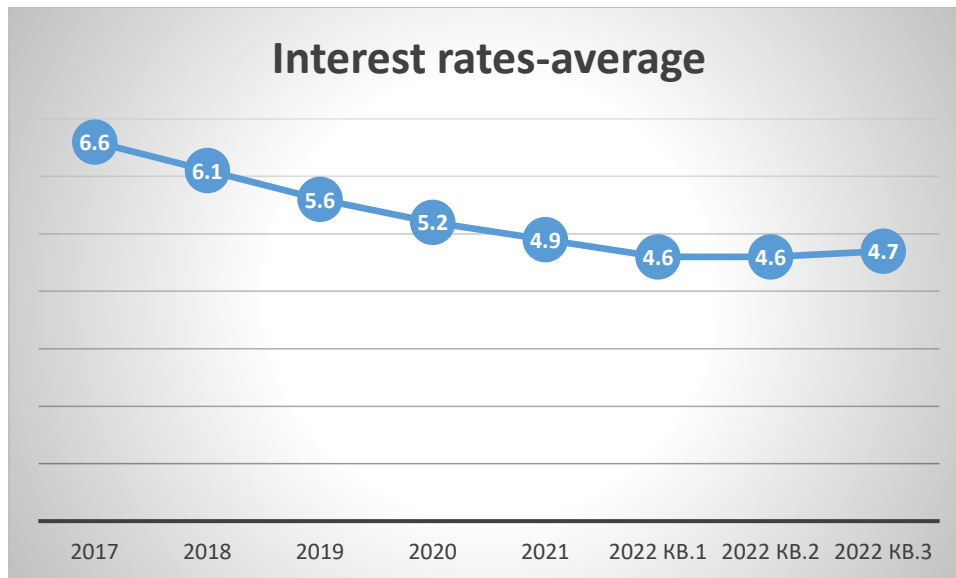
Inflation- According to NBRM³, in the third quarter of 2022 the annual inflation rate accelerated further and reached an average of 17.2%. Domestic inflation still mostly results from external factors, that is, from the increase in the import prices of food and energy, including the domestic price of electricity and thermal energy, which are influenced by developments in the global energy market. Analyzing through the years that are the subject of this research paper, we can conclude that the annual inflation rate in 2017 was 2.4%, holding a solid level until the end of 2021. and the beginning of 2022, where international developments contributed to the deterioration of the situation (see graph 3).



Graph 3. Rate of Inflation 2017-2022

Interest rate- Interest rate as an essential macroeconomic variable, it is capable of changing, transforming and redirecting the patterns of savings, investment, inflation and production of a country (Umeora, 2010 as cited in Okoi & Comfort 2022). Also according to Mishkin (2010) the price of bonds is negatively correlated with the interest rate, so interest rates at a higher level will reduce the expected yield of long-term bonds, and this results in falling demand for bonds. Our data is taken from the NBRM's annual reports on weighted interest rates on total denar loans granted for the period 2017-2022.

³ Quarterly Report November 2022



Graph 4. Interest rate in R.N.M

Exchange rates- According to Xhaferi (2013) the exchange rate represents the relative price of two currencies, such as the price of the Japanese yen expressed in US dollars, the price of the pound in euros or the price of lek in denars. Due to the great need for the development of international financial markets, it is obvious that the comparison of two currencies is very important in both international trade and capital markets. Also, the strength of the national currency is a sign that tells us how developed the economy of that country is and how internationally the country is involved in financial transactions. As a rule, reduced exchange rate shows us that for a certain amount of foreign currency, we can convert a smaller amount of domestic currency (it automatically means that our currency strengthens compared to the foreign currency) and vice versa.

A study conducted examined the relationship between two financial variables - the exchange rate and stock prices in India. For that purpose, daily stock prices and daily exchange rates were considered. Through simple correlation and Granger Causality test, it was concluded that the correlation results show a negative relationship between exchange rates and stock prices (Srivastava A. 2005 as cited in Bagh et al., 2017). In our research paper we will present the data on the exchange rate of the denar against the US dollar taken as a quarterly average during the years 2017-2022.

The impact of macroeconomic indicators on stock markets

From many authors in the economy, we can conclude that there is a connection between the financial stability of the stock market and the macroeconomic situation of the country. Spasoska & Hristoski (2022) found a positive relationship between the Gross Domestic Product rate and the stock market turnover ratio and confirmed the results of related research that capital market development can accelerate economic growth. Also, the inflation rate has a positive and statistically significant impact on stock market turnover in relation to GDP. Their empirical study is based on the analysis of time series data based on relevant secondary data sources, based on the use of the Johansen cointegration test and the development of an appropriate vector error correction model (VECM) to estimate the relationship, the impact, size and significance of the determinants

that support and affect the liquidity of the stock market in North Macedonia in the period from 2008- Q1 to 2021- Q4.

Anifowose (2021) concludes that interest rate significantly affects stock market performance in Nigeria. The reason is that of the four independent variables considered in his study, the interest rate appears to be one of the two that has shown a significant effect on stock market performance. The results of the Jarque-Bera (JB) test show that all data series used in the study were normally distributed, while the Philippe Ferron (PP) test revealed that all variables were stationary at first difference. The regression results (OLS) show that the interest rate has a significant negative impact on stock market performance. The results of the cointegration test confirm that there is a cointegrative relationship between macroeconomic indicators and stock market performance.

According to Almira (2021) interest rates have a significant and negative impact on the development of the Indonesian capital market. She in the study through regression analysis, it expresses the value of the regression coefficient that is greater than 1, it means that the value of the elasticity of the interest rate for the development of the Indonesian capital market shows that the increase in the value of the interest rate is elastic to the development of the Indonesian market of capital. In his study Molefhi (2019) as cited in Babarinde & Ogbeide (2022) concluded that both inflation and money supply show an affirmative and significant relationship with the development of the stock market in the short term, while the exchange rate showed a negative relationship.

Methodology

As a dependent variable, we present the value of the index (MBI10), as an indicator of the performance of the Macedonian Stock Exchange, and the independent variables: Economic Growth (EG), Interest Rate (INT), Inflation Rate (INF) and Exchange Rate (EXC). Economic growth, interest rates and inflation rate are expressed in percent (%), while the exchange rate is expressed in Macedonian Denar (MKD) against the US Dollar (USD). MBI10 is expressed in index points. In the model, the data is quarterly, in the period from the first quarter of 2017 to the third quarter of 2022. The data are secondary, taken from the respective institutions that publish them on a quarterly basis. The data analyzed were processed through the computer program Excel.

The model can be displayed as a function:
 $MBI10 = f(EG, INT, INF, EXC)$

Variables:

MBI10- Macedonian Stock Exchange Index

EG- Economic Growth

INT- Interest rate

INF- Inflation rate

EXC- Exchange rate

Through regression analysis, we will be able to determine the connection and influence of the independent variables on the dependent variable.

$$MBI10 = \beta_0 + \beta_1 EG + \beta_2 INT + \beta_3 INF + \beta_4 EXC + \varepsilon$$

Data analysis and results

Table 3. Descriptive statistics

	<i>MBI10</i>	<i>Economic Growth</i>	<i>Interest rate</i>	<i>Inflation rate</i>	<i>Exchange rate</i>
Mean	4160.8622	1.6652	5.5435	3.2957	54.1588
Standard Error	256.4690	1.0528	0.1488	0.9639	0.5440
Median	4116.6600	2.0000	5.4000	1.7000	53.9300
Mode	#N/A	0.1000	5.3000	1.5000	#N/A
Standard Deviation	1229.9819	5.0493	0.7134	4.6228	2.6089
Sample Variance	1512855.5622	25.4951	0.5089	21.3704	6.8065
Kurtosis	-1.0910	7.0191	-1.1761	6.1504	0.6237
Skewness	0.0751	-1.1299	0.3142	2.5474	0.7484
Range	3902.3900	29.9000	2.2000	18.4000	10.9100
Minimum	2251.0900	-15.4000	4.6000	0.3000	50.1000
Maximum	6153.4800	14.5000	6.8000	18.7000	61.0100
Sum	95699.8300	38.3000	127.5000	75.8000	1245.6516
Count	23.0000	23.0000	23.0000	23.0000	23.0000
Confidence Level(95.0%)	531.8841	2.1835	0.3085	1.9991	1.1282

Analyzing the data for Skewness statistics, the result of the description of the variable implies that the economic development is symmetrical, therefore it is negatively skewed. The other variables MBI10, interest rates, inflation rates and exchange rate are not symmetric because they are greater than zero, they are positively skewed because the majority of the corresponding observations are higher than their average values.

SUMMARY OUTPUT

<i>Regression Statistics</i>	
Multiple R	0.971373
R Square	0.943565
Adjusted R Square	0.931024
Standard Error	323.0335
Observations	23

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	13627.19	1744.711	7.810573	3.44E-07
EG	22.76447	13.94088	1.632929	0.119854
INT	-1586.88	119.364	-13.2944	9.54E-11
INF	22.61987	22.2059	1.018642	0.32187
EXC	-14.4383	33.32996	-0.43319	0.67002

RESIDUAL OUTPUT

<i>Observation</i>	<i>Predicted MBI10</i>	<i>Residuals</i>
1	2103.807	147.2825
2	2220.893	61.44666
3	2439.082	249.5785
4	2780.453	-241.593
5	2958.628	-192.518
6	3139.662	192.998
7	3437.531	92.5487
8	3625.264	-156.234
9	3736.585	-71.9246
10	3937.139	-115.529
11	4046.91	281.1803
12	4321.817	327.0727
13	4414.262	-791.032
14	4094.774	21.8855
15	4714.008	-228.828
16	4868.551	-163.701
17	5004.349	-159.299
18	5504.129	-222.989
19	5372.183	325.0673
20	5528.362	625.1182
21	5782.871	314.4687
22	5912.064	-124.834
23	5756.504	-170.164

Based on the results made with the computer program Excel, we present the linear regression model:

$$MBI10 = 13627.19 + 22.764EG - 1586.877INT + 22.619INF - 14.438EXC + 323.033$$

Discussions

If t-statistics > 0 then the independent variable is significantly important, if t-statistics < 0 then the variable is not significantly important. Consequently:

The independent variables (economic growth and inflation) are significant, while the independent variables (interest rate and exchange rate) are not significant.

The independent variable Economic Growth (EG) shows the positive relationship (positive effect) on the dependent variable (the value of the stock market index MBI10). The value of the regression coefficient 22,764 shows us that with an increase in the percentage of economic growth of 1 percent, the value of the MBI10 index will increase by 22,764 index points on average, if the other factors remain unchanged.

The independent variable Inflation (INF) shows the positive relationship (positive effect) of the dependent variable (the value of the stock market index MBI10). The value of the regression coefficient 22,619 shows us that with an increase in the inflation rate by 1 percent, the value of the MBI10 index will increase by 22,619 index points on average, if the other factors remain unchanged.

The independent variable Interest rate (INT) shows the negative relationship (negative effect) on the dependent variable (the value of the stock market index MBI10). The value of the regression coefficient -1586,877 shows us that with the increase of the interest rate by 1 percent, the value of the MBI10 index will decrease by 1586,877 index points on average, if the other factors remain unchanged.

The independent variable Exchange rate (EXC) shows the negative relationship (negative effect) of the dependent variable (the value of the stock market index MBI10). The value of the regression coefficient 14,438 shows us that with the increase of the exchange rate USD/MKD by 1 denar, on average the value of the MBI10 index will decrease by 14,438 index points, if the other factors remain unchanged.

Noting that the coefficient of determination r^2 is 0.9435, this tells us that about 95.35% of the variation of the dependent variable (MBI10 stock index) is explained by the independent variables included in the model, while only 4.65% of the variation is explained with other variables not included in a model. In the observations 1,2,3,6,7,11,12,14,19,20 and 21 the residual is positive, which means that the estimated regression line overestimates the true values of γ , while in the observations 4,5,8,9,10,13,15,16,17,18,22 and 23 the residual is negative, which means that the estimated regression line underestimates the true values of γ .

Conclusions

Given the significance of the macroeconomic indicators included in our analysis, we can conclude that economic growth, as an indicator of the movement of the economy, should be in constant growth for the capital market to function and have continuous development. We have shown that although the inflation rate has a positive impact on the capital market, the enormous increase results in a fall of the value of the domestic currency and a decrease in the standard of living for the citizens of that economy.

The impact of the exchange rate can be compared to the fact that with the increase in the value of the exchange rate USD/MKD, the value of traded shares in the capital market decreases because automatically a higher value of the foreign currency results in a decrease in the value of the domestic currency.

Although interest rates have a negative impact on the value of shares in the capital market, they should also be at a level that is acceptable to both owners of capital and users of capital in the transactions made in the capital market..

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Дневна официјална листа на Македонска берза на хартии од вредност, бр. 204 од 31.10.2022

ISSN 2661-2666 (Online) International Scientific Journal Monte (ISJM) DOI:
[10.33807/monte.20232860](https://doi.org/10.33807/monte.20232860) Volume 7, (No).2 (2023): April

Месечен статистички билтен на Македонска берза на хартии од вредност, број 259, март 2017 год.

Месечен статистички билтен на Македонска берза на хартии од вредност, број 336, септември 2022 год.

НБРМ- Квартален извештај, ноември 2022 г.