

## THE EFFECTS OF THE MACROECONOMIC FACTORS ON THE BUCHAREST STOCK EXCHANGE DURING THE COVID-19 PANDEMIC

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**ABSTRACT.** The purpose of the paper is to observe and analyze how the dynamics of macroeconomic factors influence the evolution of the Bucharest Stock Exchange (BVB) through the lens of the main stock indices (BET, BET-Plus, BET-FI), but also of the stock market capitalization. The research carried out consists of four stages. First, the monthly values of the macroeconomic factors considered were collected (inflation rate, reference interest rate, unemployment rate, RON-EURO and RON-USD exchange rates, producer price index, gold price, average salary and the Covid-19 number of cases) during the period 2020-2021, as well as the monthly values of the Bucharest Stock Exchange market indices (BET-Plus, BET and BET-FI) and of the stock market capitalization. These data were collected from the websites: [www.bvb.ro](http://www.bvb.ro) (Bucharest Stock Exchange), [www.bnr.ro](http://www.bnr.ro) (National Bank of Romania), [www.innse.ro](http://www.innse.ro) (National Institute of Statistics) and [www.ms.ro](http://www.ms.ro) (Ministry of Health). Then, the descriptive statistics was used to describe the collected data (mean value, standard deviation, minimum/ maximum value). This step is followed by the use of the Pearson correlation to capture the correlation between each stock market index and the macroeconomic factor included in the

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analysis. And finally, multiple regression was used to see exactly how the Romanian stock market indices are influenced by any changes of macroeconomic factors.

**Keywords:** macroeconomic factors, Bucharest Stock Exchange, stock market indices, Covid-19 pandemic

**JEL Classification:** B22, C32, G10

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## Introduction and literature review

It is a common belief that asset prices are sensitive to economic news. Daily life appears to be consistent with the idea that various unanticipated events influence individual asset prices, with some events having a more pervasive impact than others.

Fama investigated the connection between economic activity and stock returns in the US and concluded that stock returns have a positive relationship with the gross national product, money supply, industrial production, capital spending, and interest rate, but a negative relationship with inflation rate (Fama, 1981).

In the years 1975 to 1984, Ta & Teo (1985) had previously noted a strong relation between the Singapore market indices and the overall market return.

Chen et al. (1986) used the APT model to link US stock market returns to a linear function of different macroeconomic variables. They argued that economic factors have an impact on the discount rate, the individual cash flows of businesses and upcoming dividend payments.

Aggarwal (1981) discovered a direct correlation between share price changes and US exchange rate changes, but Soenen & Hennigar (1988) discovered a negative correlation.

When in 1989, Martinez & Rubio looked at the performance of the Spanish stock market, they discovered that there was no discernible correlation in terms of pricing between stock returns and macroeconomic variables.

After examining the long-term relationships in Taiwan between stock returns, inflation, gross national product and money supply, Fung and Lee (1990) came to the conclusion that the efficient market hypothesis is invalid also in case on an emerging market.

For instance, Mukherjee & Naka (1995) looked into the effects of 18 specific macroeconomic factors on the British stock market. The authors examined the correlations between the inflation rate, exchange rate, government bond rate on a long term, money supply, real economic activity, call money rate and the Japanese stock market. They came to the conclusion that stock prices contributed to the co-integrating relationship, which existed.

Cheung & Ng (1998) have also observed the relationship between money supply, oil prices and gross domestic product in Germany, Italy and Japan.

Kwanchanok (2000) looked at the associations between Thailand's stock market indices and the gross domestic product, current account balance, money supply, volume and value of trading in securities, value of the Thai Baht, and system of currency exchange.

Macroeconomic factors' effects on the stock markets in South Africa, Zimbabwe, and Botswana in Africa were examined by Jefferis & Okeahalam (2000). They discovered that stock prices in South Africa, Zimbabwe, and Botswana have favorable short-and long-term relationships with real gross domestic product, real exchange rates, and real interest rates. Even so, between the interest rates and the stock prices there is a negative relationship in South Africa.

Gjerde & Saettem (1999) conducted research in Norway on the relationships between stock market returns and macroeconomic factors. The extent to which significant observations about the correlations between stock returns and macroeconomic variables from significant markets are applicable in Norway was their main concern.

For a group of Asian nations, Granger et al. (2000) find no proof of co-integration between stock prices and exchange rates. However,

using impulse response functional analysis and Granger causality tests, the study discovers significant short-run feedback effects.

In the United States, inflation and expected real stock returns are statistically significant and move in opposite directions in response to contractionary monetary policy shocks, according to Park & Ratti (2000).

Using data from Greece, Papapetrou (2001) investigated the dynamic relationship between the price of oil, real stock prices, interest rates, real economic activity, and employment. According to the study, a sudden increase in the price of oil has a detrimental immediate effect on the stock market, industrial output and employment. In other words, real stock returns are decreased by a positive oil price shock.

Using the Granger non-causality, Bhattacharya & Mukherjee (2002) examine the causal relationship in the case of India's stock market and three macroeconomic variables. Exchange rate, foreign exchange reserves, and trade balance are examples of macroeconomic variables. The findings imply that there is no causative relationship between stock prices and the three variables under scrutiny.

Flannery & Protopapadakis (2002) looked at the correlations between US stock prices and economic announcements on a daily basis (1980-1996) and showed that economic news significantly raises stock market volatility, which has an impact on stock returns.

According to Oberuc (2004), among the economic factors frequently taken into account by researchers, and typically linked to stock price movement, are included dividend yield, industrial production, interest rate, term spread, default spread, inflation, exchange rates, money supply, gross national and domestic product and prior stock returns.

For the Istanbul Exchange, Erdem et al. (2005) find contradictory results; they find that while industrial output volatility does not affect stock returns, interest rates and inflation volatility do.

Shaoping (2008) analyzed the impact that money supply has on stock prices and found a very strong correlation between the two in the circumstances of the Chinese market between 2005 and 2007. On the Chinese market, Yuanyuan & Donghui (2004) obtained comparable results.

Ngoc (2009) looked into how the prices of Vietnamese stock returns were affected by a macroeconomic indicator of interest rates. In this paper were also examined the correlations between the macroeconomic indices from US and the stock prices from the Vietnamese market.

In their study, Oskenbayev et al. (2011) looked at the correlation between the Kazakhstan Stock Exchange and macroeconomic indicators like the index of industrial production, inflation, exchange rate, oil price volatility, volume of trade, and long- and short-term interest rates.

Geetha et al. (2011) looked into the correlations between the gross domestic product in Malaysia, the US, and China and the stock market, expected inflation rate, unexpected inflation rate, exchange rate, and interest rate.

Sarbapriya (2012) showed that the foreign exchange reserves have a positive impact on the stock market capitalization in India.

Researchers are therefore interested in studying the factors that affect capital markets (Sabau-Popa et al., 2014; Cevik et al., 2016; Celebi & Hoenig, 2019), but there is not a consensus list of these factors in the empirical literature as yet (Tsaurai, 2018). According to Lupu & Calin (2014) and Tsaurai (2018), a number of macroeconomic factors are thought to have an impact on the capital markets. According to Celebi & Hoenig (2019) and Dumitrescu & Horobet (2009), there are connections between macroeconomic factors and stock prices.

Regarding the emerging financial markets from Central and Eastern Europe, Romania and Hungary are the focus of a second comparative study (Nicolescu, 2020). The stock exchange markets and mutual fund markets are two of these countries' capital markets that are examined in the paper along with the effects on the two components under consideration of five macroeconomic factors: population, gross domestic product per capita, inflation, unemployment and savings. The study concludes that macroeconomic factors had a stronger impact on Romania's capital markets than Hungary's during the studied period, and that stock exchange growth was more influenced by macroeconomic factors than mutual fund growth.

Balint (2010) released her research findings, showing a weak and insignificant correlation between macroeconomic variables and 30 stocks listed on the Bucharest Stock Exchange. This finding was supported by research by Lupu & Calin (2014), who found that, with the exception of Slovenia's stock indexes, all other European countries included in the study showed very little correlation between macroeconomic variables and stock indices.

Another study by Sabau-Popa et al. (2014) aims to show how the real gross domestic product, stock market indices, interest rate, RON-USD exchange rate and inflation rate affect the capital market index in Romania. As a result, a significant correlation has been found between the Romanian gross domestic product and the benchmark index of the Bucharest Stock Exchange.

## **Research methodology**

The study is focused on analyzing the influence of eight macroeconomic variables (inflation rate, bank interest rate, unemployment rate, RON-EURO and RON-USD exchange rates, producer price index, gold price, average salary and the Covid-19 number of cases) on the Bucharest Stock Exchange market indices and stock market capitalization during the Covid-19 pandemic.

Therefore, the research carried out consists of four stages:

1. Data collection: the monthly values of the macroeconomic factors taken into account were collected (inflation rate, reference interest rate, unemployment rate, RON-EURO and RON-USD exchange rates, producer price index, gold price, average salary and the Covid-19 number of cases) in the period January 2020 – December 2021, as well as the monthly values of the stock market indices (BetPlus, BET and BET-FI) and the stock market capitalization in the same period. These data were collected from the websites: [www.bvb.ro](http://www.bvb.ro) (Bucharest Stock Exchange), [www.bnr.ro](http://www.bnr.ro) (National Bank of Romania), [www.innse.ro](http://www.innse.ro) (National Institute of Statistics) and [www.ms.ro](http://www.ms.ro) (Ministry of Health).

2. Using the main indicators of descriptive statistics to describe the collected data (mean value, standard deviation, minimum/ maximum value).

3. Using the Pearson correlation to capture the correlation between each analyzed stock market index and macroeconomic factor included in the analysis.

4. Using multiple regression to see exactly how stock market indices are influenced by changes in macroeconomic factors. The relationship between these two types of variables is captured by the estimation equation:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_n X_n + \varepsilon$$

where:

$Y$  = dependent variable;

$X_{1...n}$  = independent variables;

$\beta_0$  = is the value of  $Y$  when all of the independent variables ( $X_1$  through  $X_n$ ) are equal to zero

$\beta_{1...n}$  = regression coefficients;

$\varepsilon$  = standard error.

At the same time, in order to limit the degree of data distortion and to be able to compare them with each other, it is necessary that they be brought to a common denominator. Thus, each monthly value of the indices and macroeconomic factors from the analyzed period was replaced by its natural logarithm. The collected data were entered into the SPSS program.

## Results and discussion

### ➤ *Descriptive statistics*

#### • **Bucharest Stock Exchange**

During 2020-2021, the BET index had a mean return of 0.0112 and a standard deviation of 0.062. BetPlus, on the other hand, had returns ranging from -0.1784 to 0.0921 and an average return of 0.0112, similar to BET. BetPlus return values deviate from the average of 0.0112 by 0.0614. Over the two years considered, BET-FI had returns between -0.1445 and 0.0920. The average return of this index was 0.0039, with a standard deviation of 0.0584.

The average return on market capitalization was 0.0099. The minimum recorded during this period was -0.2988, and the maximum was 0.1669. At the same time, the return on stock market capitalization deviates from the average of 0.0099 by 0.0861. If we were to look at the standard deviation from the perspective of volatility, it can be seen that this time, the market capitalization carries the highest risk, followed by the BET index, BetPlus and BET-FI. As for the highest return obtained,

still the market capitalization ranks first, followed by the three market indices. The values for BET and BetPlus are very closed as the companies from the reference index (BET) are the ones that will influence the most the entire market.

**Table 1.** Descriptive statistics for the Bucharest Stock Exchange (2020-2021)

	<b>N</b>	<b>Minimum</b>	<b>Maximum</b>	<b>Mean</b>	<b>Std. Deviation</b>
BET	24	-0.1791	0.0924	0.0112	0.0620
BetPlus	24	-0.1784	0.0921	0.0112	0.0614
BET-FI	24	-0.1445	0.0920	0.0039	0.0584
Market capitalization	24	-0.2988	0.1669	0.0098	0.0861

*Source:* Authors' processing based on research data

- **Macroeconomic factors**

In the period 2020-2021, the inflation rate took values between 2.06% and 8.19%. Inflation values deviate from the average of 3.83% with 1.89. The interest rate, on the other hand, recorded an average value of 1.59% and extremes of 1.25% and 2.5%. The values of this macroeconomic variable deviated from the average by 0.38. The unemployment rate during the 24 months analyzed had an average value of 5.8%, with a deviation of 0.45 and values between 4.9% and 6.7%. Regarding the RON-EURO exchange rate, its average value was 4.8788 in the period 2020-2021. The values of this macroeconomic factor fluctuated between 4.7785 and 4.9489, with a deviation from the mean of 0.0514. The other exchange rate taken into consideration (RON-USD) recorded over the observed period an average value of 4.2022, with a deviation of 0.1388 and a minimum/ maximum of 4.0005, respectively 4.4469. In the case of the producer price index, the values of this macroeconomic variable were between -0.022 and 0.058 in the two years analyzed. Their average was 0.010, with a deviation of 0.019. The average value of the gold price was 0.008, and the values it took over the 24 months under consideration were between -0.037 and 0.073. At the

same time, the gold price values deviate from the average of 0.008 by 0.029. In the period 2020-2021, the average salary gain took values between -0.062 and 0.062. Also, their average value was 0.006, with a deviation of 0.031. From a volatility perspective, the inflation rate ranks first, with the highest volatility, reflected by the highest standard deviation value. Then there is the interest rate, unemployment rate, average salary, gold price, producer price index, RON-USD exchange rate and RON-EURO exchange rate.

**Table 2.** Descriptive statistics for the macroeconomic variables (2020-2021)

	<b>N</b>	<b>Minimum</b>	<b>Maximum</b>	<b>Mean</b>	<b>Std. Deviation</b>
Inflation rate	24	2.0600	8.1900	3.8392	1.8944
Interest rate	24	1.2500	2.5000	1.5938	0.3817
Unemployment rate	24	4.9000	6.7000	5.8083	0.4577
RON-EURO exchange rate	24	4.7785	4.9489	4.8788	0.0514
RON-USD exchange rate	24	4.0005	4.4469	4.2022	0.1388
Producer price index	24	98.0000	133.3300	107.4592	10.9191
Gold price	24	216.3300	259.0300	241.0579	10.6019
Average salary	24	5118.0000	6327.0000	5584.8750	284.0467
Covid-19 number of cases	24	.0000	1808891.0000	667347.7500	611302.9899

Source: Authors' processing based on research data

### ➤ *Pearson correlation*

The BET index and BetPlus have a strong direct link in 2020-2021. A significant direct relationship exists between the stock market indices, as well as between the BET and BetPlus indices and market capitalization (Table 3).

Only a few macroeconomic variables have a statistically significant correlation with the BET index, namely the RON-EURO exchange rate and

the Covid-19 number of cases. However, in both cases, the correlation is indirect. The correlation coefficients for the other macroeconomic variables are very low and not statistically significant.

During the examined period, the BetPlus index's situation is strikingly similar to that of the BET index. As a result, BetPlus has direct but weak links with the following macroeconomic factors: inflation rate, bank interest rate, and PPI. The BetPlus index is inversely linked to the unemployment rate, the RON-EURO and RON-USD exchange rates, the price of gold, the average salary, and the number of people infected with Sars-Cov-2. Among them, the indirect link between BetPlus and the RON-EURO exchange rate crosses the -0.3 threshold, indicating a medium intensity. Between the Covid-19 factor and this index there is a link of medium intensity, also indirect, the value of the correlation coefficient being -0.582.

The evolution of the BET-FI index is comparable to that of the indices that were previously studied. The correlation coefficient, which is close to -0.3 at -0.305, shows a more intense relationship between it and the unemployment rate. Additionally, the connections between BET-FI and both the Covid-19 factor and the RON-EURO exchange rate are also considered to be of medium intensity.

In terms of market capitalization, the correlation with macroeconomic factors is medium and indirect in this case, when looking at the RON-EURO exchange rate (-0.548) and the number of Covid-19 cases (-0.684). There are also exceptions in the case of PPI, where the connection is direct (0.292) and the reference interest rate (0.330), with a coefficient very close to the 0.3 threshold, but these are not statistically significant.

The types of existing links between the analyzed macroeconomic variables are as follows (Table 3):

- Moderate/ direct correlation: inflation rate with PPI; interest rate and both the RON-USD exchange rate and PPI; unemployment rate and Covid-19 number of cases and RON-EURO exchange rate with Covid-19 number of cases (all are statistically significant)
- Moderate/ indirect correlation: inflation rate with unemployment rate; reference interest rate with both RON-EURO exchange (not statistically significant) and Covid-19 number of cases; unemployment rate with PPI (not statistically significant); PPI with Covid-19 number of cases and gold price with average salary.

**Table 3.** Pearson correlation between the macroeconomic factors and stock market indices (2020-2021)

	<i>BET</i>	<i>BetPlus</i>	<i>BET-FI</i>	<i>Market capitalization</i>	<i>Inflation rate</i>	<i>Interest rate</i>	<i>Unemployment rate</i>	<i>RON-EURO exchange rate</i>	<i>RON-USD exchange rate</i>	<i>Producer price index</i>	<i>Gold price</i>	<i>Average salary</i>	<i>Covid-19 number of cases</i>
<i>BET</i>	1	1.000**	.799**	.915**	0.045	0.151	-0.151	-.470*	-0.086	0.229	-0.127	-0.058	-.588**
<i>BetPlus</i>	1.000**	1	.802**	.916**	0.042	0.155	-0.153	-.470*	-0.083	0.230	-0.121	-0.061	-.591**
<i>BET-FI</i>	.799**	.802**	1	.658**	0.015	0.195	-0.305	-.415*	-0.070	0.227	-0.061	-0.127	-.526**
<i>Market capitalization</i>	.915**	.916**	.658**	1	0.124	0.292	-0.188	-.548**	-0.018	0.330	-0.024	-0.121	-.684**
<i>Inflation rate</i>	0.045	0.042	0.015	0.124	1	-0.104	-.446*	-0.070	-0.054	.484*	-0.194	-0.115	-0.145
<i>Interest rate</i>	0.151	0.155	0.195	0.292	-0.104	1	-0.036	-0.307	.495*	.602**	0.170	0.168	-.504*
<i>Unemployment rate</i>	-0.151	-0.153	-0.305	-0.188	-.446*	-0.036	1	-0.001	0.117	-0.347	0.055	0.140	.448*
<i>RON-EURO exchange rate</i>	-.470*	-.470*	-.415*	-.548**	-0.070	-0.307	-0.001	1	0.127	-0.133	-0.128	0.130	.623**
<i>RON-USD exchange rate</i>	-0.086	-0.083	-0.070	-0.018	-0.054	.495*	0.117	0.127	1	0.142	0.140	-0.101	-0.091
<i>Producer price index</i>	0.229	0.230	0.227	0.330	.484*	.602**	-0.347	-0.133	0.142	1	-0.184	0.205	-.463*
<i>Gold price</i>	-0.127	-0.121	-0.061	-0.024	-0.194	0.170	0.055	-0.128	0.140	-0.184	1	-.577**	-0.035
<i>Average salary</i>	-0.058	-0.061	-0.127	-0.121	-0.115	0.168	0.140	0.130	-0.101	0.205	-.577**	1	0.090
<i>Covid-19 number of cases</i>	-.588**	-.591**	-.526**	-.684**	-0.145	-.504*	.448*	.623**	-0.091	-.463*	-0.035	0.090	1

\*\* Correlation is significant at the 0.01 level (2-tailed)

\* Correlation is significant at the 0.05 level (2-tailed).

Source: Authors' processing based on research data

➤ **Multiple regression model**

• **Macroeconomic factors and BET-Plus index**

The model's equation is as follows when the variables are replaced by the relevant factors:

$$\text{BET-Plus} = \beta_0 + \beta_1 * \text{inflationrate} + \beta_2 * \text{interestrates} + \beta_3 * \text{unemploymentrate} + \beta_4 * \text{RON - EUROexchangerate} + \beta_5 * \text{RON - USDexchangerate} + \beta_6 * \text{productionpriceindex} + \beta_7 * \text{goldprice} + \beta_8 * \text{averagesalary} + \beta_9 * \text{Covid - 19numberofcases} + \varepsilon$$

The BET-Plus index and macroeconomic factors are moderately correlated with one another in the 2020–2021 timeframe, according to the value of the correlation coefficient R. According to the coefficient of variation, the variation in the observed macroeconomic factors is responsible for 45.4% of the variation in the BET-Plus index.

**Table 4.** Regression statistics (macroeconomic factors and BET-Plus index)

<i>R</i>	<i>R</i> <sup>2</sup>	<i>Adjusted R</i> <sup>2</sup>	<i>Std. error of the Estimate</i>
.674 <sup>a</sup>	0.454	0.104	0.058131261

Source: Authors' processing based on research data

Table 5 shows that the rate of inflation has little effect on BetPlus; for every unit increase, the stock market index only falls by 0.093 units. The RON-USD exchange rate exhibits the same pattern.

During the studied period, the unemployment rate had an impact on BetPlus' evolution. As a result, BetPlus will increase by 0.207 for every unit that this macroeconomic factor increases. The value of the BetPlus index will rise the most (0.812 units) for every unit increase in the PPI and fall the most (4.217 units) for each unit increase in the RON-EURO exchange rate.

Additionally, a one-unit increase in the price of gold causes BetPlus to drop by 0.392 units. Similar effects on the value of the stock market index are caused by the average wage and the interest rate, where the macroeconomic variable will decrease the index's value by 0.265 and 0.222 units, respectively. Last but not least, the coefficient related to the number of Covid-19 cases is very small (-0.028), indicating that this factor has a negligible inverse impact on the development of the BetPlus index.

When it comes to the p-value for macroeconomic variables, the RON-USD exchange rate (0.969) is very close to 1 whereas the p-value for the Covid-19 number of cases is 0.128.

**Table 5.** Regression outputs between macroeconomic factors and BETPlus index (2020-2021)

	<i>Unstandardized coeff.</i>		<i>Standardized coeff</i>	<i>p-value</i>
	<b>B</b>	<b>Std. error</b>	<b>Beta</b>	
<i>(Constant)</i>	0.028	0.022		0.216
<i>Inflation rate</i>	-0.093	0.147	-0.207	0.536
<i>Interest rate</i>	-0.222	0.325	-0.317	0.506
<i>Unemployment rate</i>	0.207	0.440	0.137	0.645
<i>RON-EURO exchange rate</i>	-4.217	8.256	-0.172	0.617
<i>RON-USD exchange rate</i>	-0.045	1.122	-0.012	0.969
<i>Producer price index</i>	0.812	1.314	0.258	0.546
<i>Gold price</i>	-0.392	0.595	-0.189	0.521
<i>Average salary</i>	-0.265	0.569	-0.137	0.648
<i>Covid-19 number of cases</i>	-0.028	0.017	-0.311	0.128

Source: Authors' processing based on research data

- **Macroeconomic factors and BET index**

The model's equation is as follows when the variables are replaced by the relevant factors:

$$\text{BET} = \beta_0 + \beta_1 * \text{inflationrate} + \beta_2 * \text{interestrates} + \beta_3 * \text{unemploymentrate} + \beta_4 * \text{RON} - \text{EUROexchangerate} + \beta_5 * \text{RON} - \text{USDexchangerate} + \beta_6 * \text{productionpriceindex} + \beta_7 * \text{goldprice} + \beta_8 * \text{averagesalary} + \beta_9 * \text{Covid} - 19\text{numberofcases} + \varepsilon$$

A moderate level of prediction is indicated by the multiple correlation coefficient of 0.674, and the independent variables (macroeconomic factors) account for 45.5% of the variability of the dependent variable, the BET index. It can be seen that the values obtained so far are almost the same as those obtained for the BETPlus index.

**Table 6.** Regression statistics (macroeconomic factors and BET index)

<i>R</i>	<i>R</i> <sup>2</sup>	<i>Adjusted R</i> <sup>2</sup>	<i>Std. error of the Estimate</i>
.674 <sup>a</sup>	0.455	0.104	0.058685900

Source: Authors' processing based on research data

During the pandemic, the RON-EURO exchange rate had a greater impact on the BET index (Table 7). Therefore, for every unit increase in this rate, the BET index will decrease by 4.307 units.

The BET index's value is negatively impacted by the inflation rate because it decreases by 0.093 points for every unit increase in this macroeconomic factor. The BET index continues to fall as the interest rate rises, but only by 0.226 units this time. BET is more sensitive to the unemployment rate. For every unit increase in the macroeconomic variable, the stock index will rise by 0.213 points.

For every unit increase in the value of the RON-USD exchange rate, the BET index will only fall by 0.048 units. The impact of the gold

price over the observed time period is -0.404 units. Another change (a 0.265-unit decrease in the index's value) is observed in terms of average wage earnings.

The number of Sars-Cov-2 infections at this time has a detrimental effect on the BET index's evolution. For every additional unit in Covid-19 cases, the BET value will drop by 0.028 units. As one unit change in the macroeconomic factors causes the BET index to increase by 0.831, the PPI factor has the greatest impact on the index.

Furthermore, in the first two years of the pandemic, the p-values for the macroeconomic factors considered are only higher than the 0.05 cutoff, indicating no meaningful significance. The p-value for the RON-EURO exchange rate is close to one.

**Table 7.** Regression outputs between macroeconomic factors and BET index (2020-2021)

	<i>Unstandardized coeff.</i>		<i>Standardized coeff</i>	<i>p-value</i>
	<b>B</b>	<b>Std. error</b>	<b>Beta</b>	
<i>(Constant)</i>	0.028	0.022		0.216
<i>Inflation rate</i>	-0.093	0.148	-0.204	0.541
<i>Interest rate</i>	-0.226	0.328	-0.320	0.502
<i>Unemployment rate</i>	0.213	0.444	0.140	0.638
<i>RON-EURO exchange rate</i>	-4.307	8.335	-0.174	0.613
<i>RON-USD exchange rate</i>	-0.048	1.132	-0.012	0.967
<i>Producer price index</i>	0.821	1.327	0.258	0.546
<i>Gold price</i>	-0.404	0.601	-0.193	0.512
<i>Average salary</i>	-0.265	0.574	-0.135	0.652
<i>Covid-19 number of cases</i>	-0.028	0.018	-0.610	0.128

Source: Authors' processing based on research data

- **Macroeconomic factors and BET - FI index**

The model's equation is as follows when the variables are replaced by the relevant factors:

$$\text{BET - FI} = \beta_0 + \beta_1 * \text{inflationrate} + \beta_2 * \text{interestrates} + \beta_3 * \text{unemploymentrate} + \beta_4 * \text{RON - EUROexchangerate} + \beta_5 * \text{RON - USDexchangerate} + \beta_6 * \text{productionpriceindex} + \beta_7 * \text{goldprice} + \beta_8 * \text{averagesalary} + \beta_9 * \text{Covid - 19numberofcases} + \varepsilon$$

The variation in the macroeconomic factors accounts for 38.5% of the variation in the BET-FI index, the lowest when compared to the other indices, explaining why the adjusted R2 value is negative.

**Table 8.** Regression statistics (macroeconomic factors and BET-FI index)

<i>R</i>	<i>R</i> <sup>2</sup>	<i>Adjusted R</i> <sup>2</sup>	<i>Std. error of the Estimate</i>
.621 <sup>a</sup>	0.385	-0.010	0.058702311

Source: Authors' processing based on research data

Apart from the PPI (0.788), all other macroeconomic variables have an indirect effect on the BET-FI index. The Covid-19 number of cases had the least impact on the index (-0.009).

The BET-FI index was more significantly impacted by the RON-EURO exchange rate than the BET index was. Every unit increase in the exchange rate results in a 7.317 unit drop in the BET-FI index.

The index's value is negatively impacted by the inflation rate because it decreases by 0.153 for every unit increase in this macroeconomic factor. With rising interest rates (0.081) and the RON-USD exchange rate (0.032), the BET index keeps falling. In comparison to the unemployment rate (0.342), gold price (0.466), and average salary earnings (0.454), the BET-FI index's value will decline more.

In the 2020–2021 time frame, the p-values for the macroeconomic factors taken into account are higher than the 0.05 cutoff. Therefore, it can be concluded that there is no meaningful relationship between the BET index and the investigated macroeconomic factors.

**Table 9.** Regression outputs between macroeconomic factors and BET-FI index (2020-2021)

	Unstandardized coeff.		Standardized coeff	p-value
	B	Std. error	Beta	
<i>(Constant)</i>	0.023	0.022		0.301
<i>Inflation rate</i>	-0.153	0.148	-0.356	0.321
<i>Interest rate</i>	-0.081	0.328	-0.121	0.809
<i>Unemployment rate</i>	-0.342	0.444	-0.238	0.454
<i>RON-EURO exchange rate</i>	-7.317	8.337	-0.313	0.395
<i>RON-USD exchange rate</i>	-0.032	1.133	-0.009	0.978
<i>Producer price index</i>	0.788	1.327	0.263	0.562
<i>Gold price</i>	-0.466	0.601	-0.236	0.450
<i>Average salary</i>	-0.454	0.575	-0.246	0.442
<i>Covid-19 number of cases</i>	-0.009	0.018	-0.202	0.622

Source: Authors' processing based on research data

- **Macroeconomic factors and market capitalization**

When the variables are changed to the appropriate factors, the model's equation is as follows:

$$\text{Market capitalization} = \beta_0 + \beta_1 * \text{inflationrate} + \beta_2 * \text{interestrate} + \beta_3 * \text{unemploymentrate} + \beta_4 * \text{RON - EUROexchangerate} + \beta_5 * \text{RON - USDexchangerate} + \beta_6 * \text{productionpriceindex} + \beta_7 * \text{goldprice} + \beta_8 * \text{averagesalary} + \beta_9 * \text{Covid - 19numberofcases} + \varepsilon$$

During the pandemic period, there is a strong correlation between stock market capitalization and macroeconomic factors, with a coefficient of 0.730. The high coefficient of variation value indicates that 53.3% of the variation in stock market capitalization during this time period was caused by macroeconomic factors.

**Table 10.** Regression statistics (macroeconomic factors and market capitalization)

<i>R</i>	<i>R</i> <sup>2</sup>	<i>Adjusted R</i> <sup>2</sup>	<i>Std. error of the Estimate</i>
.730 <sup>a</sup>	0.533	0.234	0.075347273

Source: Authors' processing based on research data

Table 11 demonstrates that the unemployment rate (0.370) has the second-largest impact on market capitalization (0.812), after the PPI (0.812). These are also the only macroeconomic variables with which the index has a direct correlation. The stock market capitalization decreased for all the others due to the factors' one-unit changes, with the RON-EURO exchange fluctuation causing the biggest decline. Even though there is an inverse correlation between the inflation rate and the Covid-19 number of cases, it is still very weak.

P-values are still higher than 0.05 for stock market capitalization and macroeconomic variables. Only the Covid-19 number of cases, with a p-value of 0.088, is within striking distance of this 0.05 threshold. This suggests that, if the null hypothesis were correct, similar results would occur 8.8/100 times.

**Table 11.** Regression outputs between macroeconomic factors and the market capitalization (2020-2021)

	<i>Unstandardized coeff.</i>		<i>Standardized coeff</i>	<i>p-value</i>
	<b>B</b>	<b>Std. error</b>	<b>Beta</b>	
<i>(Constant)</i>	0.035	0.028		0.228
<i>Inflation rate</i>	-0.030	0.191	-0.047	0.879
<i>Interest rate</i>	-0.109	0.421	-0.111	0.800
<i>Unemployment rate</i>	0.370	0.570	0.175	0.527
<i>RON-EURO exchange rate</i>	-5.101	10.701	-0.148	0.641
<i>RON-USD exchange rate</i>	-0.279	1.454	-0.052	0.851
<i>Producer price index</i>	0.812	1.703	0.184	0.641
<i>Gold price</i>	-0.354	0.771	-0.122	0.653
<i>Average salary</i>	-0.460	0.738	-0.169	0.543
<i>Covid-19 number of cases</i>	-0.041	0.023	-0.641	0.088

Source: Authors' processing based on research data

## Conclusions

The results of the Pearson correlation analysis indicate that there is a weak to moderate relationship between the BET and each of the macroeconomic factors that were looked at. The RON-EURO exchange rate and the Covid-19 number of cases are the only exceptions, where there is a medium and indirect correlation. Since the BET companies are the ones with the highest weight in the composite index (BetPlus), the BetPlus index follows the same trend as the reference index from BVB (BET).

With the exception of the RON-EURO exchange rate and the Covid-19 number of cases, the last analysed index, BET-FI, also exhibits similar changes, but the correlations with all of the macroeconomic factors over the entire period are weaker.

The Covid-19 number of cases had an impact not only on the Romanian capital market (indirect and moderate correlation), but also on the majority of the macroeconomic variables studied (moderate correlations, both direct and indirect). The only exceptions, where there is no correlation is between the Covid-19 number of cases and inflation rate, RON-USD exchange rate, gold price and average salary.

Regarding the relationship between the Covid-19 number of cases and the RON-EURO exchange rate in 2020–2021, a moderately strong relationship is found between these two variables.

Multiple regression analysis' findings indicate a favorable correlation between market indices and both the unemployment rate and PPI. The remaining variables have an inverse effect on the analyzed indices, with the RON-EURO exchange rate having the highest value and the Covid-19 number of cases having the lowest one.

The same situation can be seen when examining the relationship between market capitalization and macroeconomic factors; however, in this instance, the p-value for the Covid-19 number of cases is nearly equal to the 0.05 cutoff, which has never happened before.

Three of the analyzed factors—the RON-EURO exchange rate, the number of Covid-19 cases, and PPI—show the same trend when results from the regression model and Pearson correlation are compared. The coefficients for the producer price index are basically the same in both scenarios.

In order to broaden the research and create a much more accurate picture, the following concepts can be taken into account: a larger number of shares listed on the Bucharest Stock Exchange, a larger number of macroeconomic factors, observe and analyze the market over a longer period of time, and use additional models to test potential existing trends.

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