



# THE EFFECT OF GROSS DOMESTIC PRODUCT, INFLATION, INTEREST RATES AND EXCHANGE RATE ON IDX30 DURING THE COVID-19 PANDEMIC PERIOD JANUARY 2019 – DECEMBER 2021

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## ABSTRACT

*This study analyzes the Effect of Gross Domestic Product, Inflation, Interest Rates, and Exchange Rates on IDX30 during the Covid-19 pandemic period from January 2019 – December 2021. Quantitative Research Methods are carried out using the Vector Errors Correction Models (VECM) Method. The results of this study are to determine the effect of Gross Domestic Product on IDX30, the effect of Inflation on IDX30, the effect of Interest Rates on IDX30, and the effect of Exchange Rate on IDX30. From the results of the VECM analysis, it can be seen that GDP, Inflation, and Exchange Rates have a negative effect on IDX30 for the short and long term during the Covid-19 pandemic, in contrast Interest Rates have a positive effect on IDX30 for the short and long term during the pandemic. Covid-19.*

**KEY WORD:** *Gross Domestic Product, Inflation, Interest Rate, Exchange Rate*

## INTRODUCTION

Investment is the activity of investing in a business in a company to make a profit. These investment activities can be influenced by macroeconomic factors such as Gross Domestic Product, Inflation, Interest Rates, and the Rupiah-Dollars Exchange Rate. Another factor can be in the form of natural disasters that occur which can hinder the process of economic turnover in Indonesia. In December 2019, the world was shocked by the emergence of a very deadly virus called Severe Acute Respiratory Syndrome 2 (SARS-Cov-2) is known as Covid-19. This virus originated in the city of Wuhan, Hubei, China, until it eventually became a pandemic determined by the WHO.

The first case in Indonesia was on March 2, 2020, and at the same time became the beginning of panic in Indonesia. The government issued a policy in an effort to prevent the spread of Covid-19 through Large-Scale Social Restrictions. Covid-19 has slowed down the economic cycle in Indonesia, and the activities of the community, government, and industrial sector have been temporarily suspended. Companies that have large market capitalization and high liquidity levels in Indonesia that are members of IDX30 have fallen amid the Covid-19 pandemic and even touched the lowest level (311.88) or decreased by -34.69% on March 24, 2020.

Figure 1. IDX30



Source: Jakarta Composite Index (2022)

Figure 1 shows the movement of IDX30 has decreased due to the Covid-19 pandemic. The deepest decline occurred in March 2020 as a result of the weakening economic cycle in the Covid-19 pandemic situation. Until finally it increased and fluctuated until December 2021.

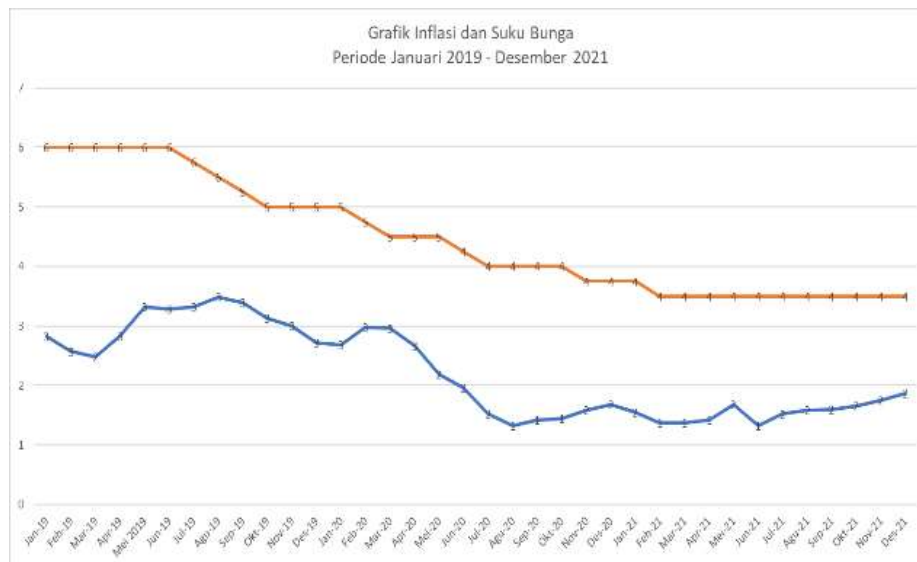
DX30 price movements are also influenced by Gross Domestic Product, Inflation, Interest Rates, and Exchange Rates. Indonesia's GDP during the Covid-19 pandemic in Q1 only grew by 2.97% when compared to Q4 in 2019 of 4.97%. It can be seen that GDP growth is declining. The rapid increase in Covid-19 in Indonesia made GDP growth in Q2 2020 enter the recession zone of -5.32%, and experienced a recovery starting from Q3 (-3.49%), Q4 (-2.07%), in 2021 Q1 (-0.71%), in Q2 experienced growth of (7.07%), and fluctuated again in Q3, and Q4 in 2021.

**Figure 2. GDP**



Source: Jakarta Composite Index (2022)

**Figure 3. Inflation and Interest Rate**



Source: bi.go.id

Other factors affected by the Covid-19 pandemic are inflation, interest rates, and the rupiah-dollar exchange rate. Inflation and Interest Rates were recorded to have been sloping from January 2019 to December 2021. This is because the Government is trying to control the level of Inflation and Interest Rates in Indonesia during the Covid-19 pandemic, and also to maintain people's ability to buy and keep the investment market in Indonesia stable.

**Figure 4. Exchange Rate**

Source: Investing.co.id

Meanwhile, the IDR-\$ exchange rate was relatively stable before the Covid-19 pandemic. The peak of the weakening of the IDR-\$ Exchange Rate occurred during Covid-19 which occurred on March 24, 2020. The rupiah weakened to touch IDR. 16,575 per \$1, then slid in July 2020, and finally fluctuated until December 2021. This study focuses on knowing the effect of GDP, Inflation, Interest Rates and Exchange Rates on the movement of IDX30 in the midst of the Covid-19 pandemic.

## LITERATURE REVIEW

### Arbitrage Pricing Theory

Arbitrage Pricing Theory is an asset pricing model based on the idea that the return on an asset can be predicted using the relationship that exists between the same asset and risk factors in general. This theory was created by Stephen A. Ross in 1976 which was developed from the CAPM theory. This theory predicts the relationship between the rate of return of a portfolio and the return of a single asset through a linear combination of many independent macroeconomic variables.

### Gross Domestic Product

Gross Domestic Product (GDP) is basically the amount of added value produced by all business units in a particular country, or is the total value of final goods and services produced by all economic unions (BPS, 2014). According to Sousa et al (2018), it states that gross domestic product has an influence on stock prices on the Latin American stock exchange. Sahoo et al (2020) state that gross domestic product has a different effect on stock prices on the two exchanges.

### Inflation

Keynes's theory states that people want to live beyond the limits of their economic capacity. The inflation process, according to this view, is nothing but the process of grabbing a share of the fortune among social groups who want a larger share than the community can provide. Haryanto (2021) states that inflation has a negative effect on the Composite Stock Price Index. While Epaphra and Salema (2018) and Gwahula (2018), state that the inflation rate affects stock prices in Tanzania. According to (Samuelson, 2004) The inflation rate is the rate of change in general prices and is measured as follows:

$$\text{Inflation ( } th_t \text{ )} = \frac{\text{Price ( } th_t \text{ )} - \text{Price ( } th_{t-1} \text{ )}}{\text{Price ( } th_t \text{ )}} \times 100\%$$

### Interest Rate

According to the classical theory, that public saving is a function of the interest rate. The higher the interest rate, the higher the people's desire to save. According to Mankiv (2003), the real interest rate is an increase in people's purchasing power, while the nominal interest rate is the interest paid by banks. The real interest rate is divided into two, namely the ex ante real interest rate, which is the real interest expected by the

lender and the borrower, and the ex post real interest rate, where the interest rate is actually realized. Qing and Kusairi (2019) only conducted research on interest rates and stated that interest rates had an effect on stock prices in Malaysia. Sahoo et al (2020) stated that interest rates have no effect on the stock price index of America and India.

### Exchange Rate

According to Krugman (2005), the exchange rate is one of the most important things in an open economy, because it has a very large influence on the current account balance and other macroeconomic variables. According to Surepno et al (2019), the results of the exchange rate study have an influence on the price of the Jakarta Islamic Index. Meanwhile, according to Djazuli (2017), stated that the results of the study of currency exchange rates had no effect on stock prices.

### HYPOTHESES AND FRAMEWORK

- a. The effect of Gross Domestic Product on IDX30  
H1 : Gross Domestic Product has a positive effect on IDX30
- b. The effect of Inflation on IDX30  
H2 : Inflation is thought to have a negative effect on IDX30
- c. The Effect of Interest Rates on IDX30  
H3 : Interest rates are suspected to have a negative effect on IDX30
- d. The exchange Rate Against IDX30  
H4 : The exchange rate is suspected to have a negative effect on IDX30

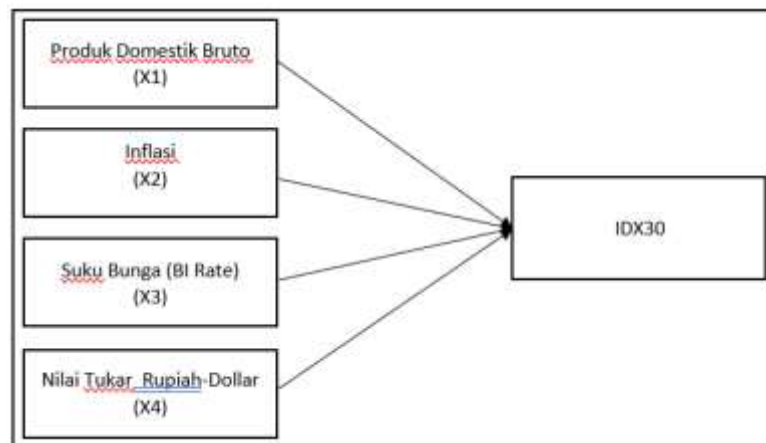


Figure 5. Framework

### RESEARCH METHOD

#### Research Design

This research is a causal research that aims to test the hypothesis about the effect of one variable or several variables on other variables. This study uses a quantitative descriptive approach of each phenomenon of interconnected variables to obtain results related to variables systematically and logically.

#### Operational Variable

this research there are variables that have a variety of values that can be measured to get the results of the relationship of one variable or several variables to the variables to be tested. The following variables contained in this study are:

- a. Dependent Variable  
this research, the dependent variable is IDX30 (Variable Y). IDX30 is an index that measures the performance of stocks that have a high level of liquidity and large market capitalization in Indonesia.
- b. Independent Variable  
this research, the independent variable is economic growth (Variable X1) measured by Gross Domestic Product (GDP) for the period January 2019 - December 2020. Inflation is measured by data on the inflation rate (Variable X2) for the period January - December 2020, interest rates (Variable X3) are measured with BI Rate interest rate data for the period January 2019 – December 2020, and the Rupiah-Dollar exchange



rate (Variable X4) measured by data on the daily closing price (middle rate) for the period January 2019 – December 2020.

### **Collecting Data Method**

The method of collecting data in this research is a method of collecting secondary data from various official sources that can be accessed via the internet. Details of research data collection are presented in the table below:

- a. GDP (bps.go.id)  
Historical data from January 2019 – December 2021
- b. Inflation (bi.go.id)  
Historical data from January 2019 – December 2021
- c. Interest Rate (bi.go.id)  
Historical data from January 2019 – December 2021
- d. Exchange Rate (bi.go.id)  
Historical data from January 2019 – December 2021
- e. IDX30 (idx.co.id and investing.com)  
Historical data from January 2019 – December 2021

## **DATA ANALYSIS METHOD**

### **Stationer Test**

Stationary data is needed to influence the results of the VECM estimation test. In this study, to be able to detect whether each variable is stationary or not, the ADF (Augmented Dickey Fuller) test is carried out using the intercept model.

### **Optimal Lag Test**

The lag test is intended to determine the time required for each variable to the variable in the past. To estimate the VAR model, you must first determine the optimal lag that will be used in the VAR estimation.

### **VAR Stability Test**

VAR stability needs to be tested before conducting further analysis, because if the VAR estimation results to be combined with the error correction model are unstable, the Impulse Response Function and Variance Decomposition will be invalid.

### **Cointegration Test**

If the data in the stationary test is not stationary at the level level but is stationary in the data differentiation process, then it must then be tested whether the data has a long-term relationship or not by performing a cointegration test. The concept of cointegration is basically intended to see the long-term balance between the observed variables. Cointegration test is a test used to determine the long-term stable relationship. If there is no cointegration between variables, then there is no long-term relationship.

### **Granger Causality Analysis**

Causality test is conducted to determine whether an endogenous variable can be treated as an exogenous variable. This stems from ignorance of the influence between variables.

### **Impulse Response Function (IRF)**

IRF analysis is a method used to determine the response of an endogenous variable to the shock of a particular variable. IRF is also used to see shocks from one variable to another and how long the effect lasts. IRF traces the impact of a disturbance of one standard error as an innovation in one endogenous variable on another endogenous variable.

### **Variance Decomposition**

Forecast Error Variance Decomposition (FEVD) or the decomposition of forecasting error variance describes the innovation in a variable against the components of other variables in the VAR. The information conveyed in the FEVD is the proportion of sequential movements caused by the shock itself and other variables.

## RESULT AND DISCUSSION

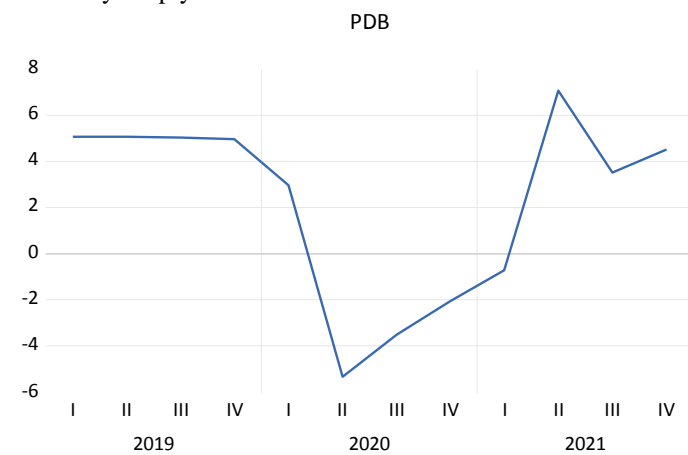
### Descriptive Statistics



Source: Eviews 12 (Data Processing)

**Figure 6. IDX30**

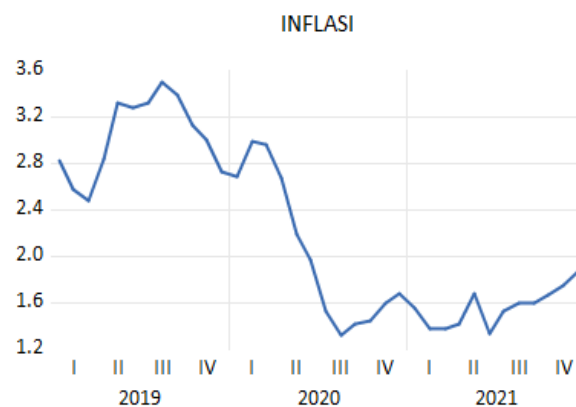
Figure 6 explains the movement of IDX30 both before the Covid-10 pandemic, and during the Covid-19 pandemic. IDX30 weakened very deeply in March 2020.



Source: Eviews 12 (Data Processing)

**Figure 7. GDP**

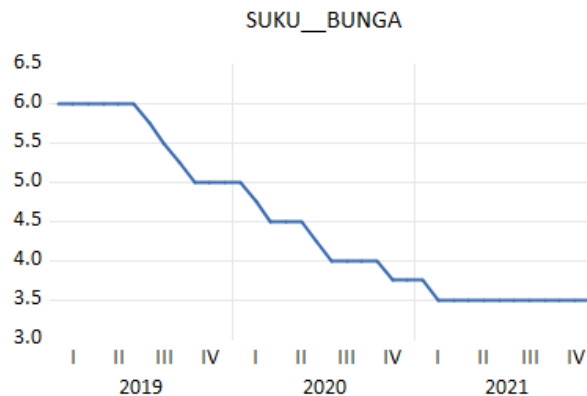
Figure 7 explains that GDP experienced fluctuating movements from 2019 - 2021. The lowest point of GDP was in Q2 2020, and the highest point of GDP was in Q2 2021.



Source: Eviews 12 (Data Processing)

**Figure 8. Inflation**

Figure 4, it can be seen that the movement and changes in inflation were very significant from January 2019 to December 2021. This change was an action by the government in restraining the inflation rate during the pandemic in a positive direction.



Source: Eviews 12 (Data Processing)

**Figure 9. Interest Rate**

Interest rates from January 2019 to December 2021 experienced a drastic decrease due to the Covid-19 pandemic.

**INFERENTIAL STATISTICS**

**Stasioner Test**

**Table 1. IDX30**

Null Hypothesis: D(IDX30) has a unit root  
 Exogenous: Constant  
 Lag Length: 2 (Automatic - based on SIC, maxlag=21)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-17.89500	0.0000
Test critical values: 1% level	-3.436122	
5% level	-2.863977	
10% level	-2.568118	

\*MacKinnon (1996) one-sided p-values.

Source: Eviews 12 (Data Processing)

Table 1 describes the IDX30 data at the first difference (1st) level in a stationary state because < 5%.

**Table 2. GDP**

Null Hypothesis: D(PDB) has a unit root  
 Exogenous: Constant  
 Lag Length: 0 (Automatic - based on SIC, maxlag=21)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-33.04548	0.0000
Test critical values: 1% level	-3.436111	
5% level	-2.863972	
10% level	-2.568116	

\*MacKinnon (1996) one-sided p-values.

Source: Eviews 12 (Data Processing)



Table 2 describes the GDP data at the first difference (1st) level in a stationary state because  $< 5\%$ .

**Table 3. Inflation**

Null Hypothesis: D(INFLASI) has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=21)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-33.06169	0.0000
Test critical values: 1% level	-3.436111	
5% level	-2.863972	
10% level	-2.568116	

\*MacKinnon (1996) one-sided p-values.

Source: Eviews 12 (Data Processing)

Table 3 describes the Inflation data at the first difference (1st) level in a stationary state because  $< 5\%$ .

**Table 4. Interest Rate**

Null Hypothesis: D(SUKU\_BUNGA) has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=21)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-33.35169	0.0000
Test critical values: 1% level	-3.436111	
5% level	-2.863972	
10% level	-2.568116	

\*MacKinnon (1996) one-sided p-values.

Source: Eviews 12 (Data Processing)

Table 4 describes the Interest Rate data at the first difference (1st) level in a stationary state because  $< 5\%$ .

**Table 5. Exchange Rate**

Null Hypothesis: D(NILAI\_TUKAR) has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=21)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-26.56782	0.0000
Test critical values: 1% level	-3.436111	
5% level	-2.863972	
10% level	-2.568116	

\*MacKinnon (1996) one-sided p-values.

Source: Eviews 12 (Data Processing)

Table 5 describes the Interest Rate data at the first difference (1st) level in a stationary state because  $< 5\%$ .



### Optimal Lag Test

**Table 7. Optimal Lag Test**

VAR Lag Order Selection Criteria  
 Endogenous variables: D(LOG(IDX30)) D(PDB) D(INFLASI) D(SUKU\_BUNGA) D(...  
 Exogenous variables: C  
 Date: 07/26/22 Time: 10:41  
 Sample: 1/01/2019 12/31/2021  
 Included observations: 1087

Lag	LogL	LR	FPE	AIC	SC	HQ
0	11473.29	NA	4.72e-16	-21.10081	-21.07785*	-21.09212*
1	11502.45	57.99251*	4.68e-16*	-21.10846*	-20.97071	-21.05632
2	11511.97	18.85593	4.82e-16	-21.07999	-20.82744	-20.98439
3	11525.01	25.68495	4.92e-16	-21.05797	-20.89063	-20.91892
4	11534.61	18.82523	5.07e-16	-21.02963	-20.54750	-20.84713
5	11542.11	14.64131	5.23e-16	-20.99743	-20.40051	-20.77148
6	11545.82	7.218390	5.44e-16	-20.95827	-20.24656	-20.68887
7	11554.72	17.20939	5.60e-16	-20.92865	-20.10214	-20.61579
8	11566.26	22.20165	5.74e-16	-20.90387	-19.96258	-20.54757

\* indicates lag order selected by the criterion  
 LR: sequential modified LR test statistic (each test at 5% level)  
 FPE: Final prediction error  
 AIC: Akaike information criterion  
 SC: Schwarz information criterion  
 HQ: Hannan-Quinn information criterion

Source: Eviews 12 (Data Processing)

Optimal Lag test is carried out to eliminate autocorrelation problems in the VAR system. The optimal lag test results show that the test results are in Lag 1 with more asterisks (\*) indications.

### VAR Stability Test

**Table 8. VAR Stability Test**

Roots of Characteristic Polynomial  
 Endogenous variables: D(LOG(IDX30))  
 D(PDB) D(INFLASI)  
 D(SUKU\_BUNGA) D(LOG(NILAI\_TUK  
 AR))  
 Exogenous variables: C  
 Lag specification: 1 1  
 Date: 07/26/22 Time: 10:44

Root	Modulus
0.216391	0.216391
-0.027423	0.027423
0.010197	0.010197
-0.001805 - 0.001573i	0.002395
-0.001805 + 0.001573i	0.002395

No root lies outside the unit circle.  
 VAR satisfies the stability condition.

Source: Eviews 12 (Data Processing)

Based on the VAR Stability Test shown, it can be concluded that the estimated stability of the VAR that will be used for IRF and FEVD analysis has been stable because the modulus range < 1 meets the stability conditions.



## Cointegration Test

Table 9. Cointegration Test

Date: 07/26/22 Time: 10:46  
 Sample (adjusted): 1/04/2019 12/31/2021  
 Included observations: 1093 after adjustments  
 Trend assumption: Linear deterministic trend  
 Series: D(LOG(IDX30)) D(PDB) D(INFLASI) D(SUKU\_BUNGA) D(LOG(NILAI\_TUKAR))  
 Lags interval (in first differences): 1 to 1

## Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.376035	2169.914	69.81889	0.0000
At most 1 *	0.338867	1654.389	47.85613	0.0000
At most 2 *	0.333767	1202.105	29.79707	0.0000
At most 3 *	0.326516	758.2201	15.49471	0.0000
At most 4 *	0.258006	326.1665	3.841465	0.0000

Trace test indicates 5 cointegrating eqn(s) at the 0.05 level

\* denotes rejection of the hypothesis at the 0.05 level

\*\*MacKinnon-Haug-Michelis (1999) p-values

## Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.376035	515.5249	33.87687	0.0000
At most 1 *	0.338867	452.2839	27.58434	0.0000
At most 2 *	0.333767	443.8850	21.13162	0.0000
At most 3 *	0.326516	432.0535	14.26460	0.0000
At most 4 *	0.258006	326.1665	3.841465	0.0000

Max-eigenvalue test indicates 5 cointegrating eqn(s) at the 0.05 level

\* denotes rejection of the hypothesis at the 0.05 level

\*\*MacKinnon-Haug-Michelis (1999) p-values

Source: Eviews 12 (Data Processing)

The purpose of the cointegration test in this study is to determine whether the group of non-stationary variables at the 1st Difference level meets the requirements of the integration process, namely where all variables are stationary at the same degree, namely degree 1. It can be seen that the trace statistic value is greater than 2169, 914 from a critical value of 0.05, which is 69.81889, so see the table and the maximum eigenvalue at  $r = 0$  is greater than the critical value with a significance level of 1% and 5%, which is 515.5249 greater than the critical value of 33.87687 and so on.

Ho : Stating that there is no cointegration is rejected

Ha : The alternative hypothesis which states that there is no cointegration cannot be rejected

Based on the econometric analysis above, it can be seen that the trace statistic has 1 cointegration at the 1% and 5% levels, and at the maximum eigenvalue there is 1 cointegration at the 5% level. Thus, the cointegration test results indicate that among the movements of GDP, Inflation, Interest Rates, Exchange Rates and Stock Prices, IDX30 has a stability/balance relationship and the similarity of movements in the long term and in each short term period all variables adjust to each other to achieve long-term equilibrium.

## Granger Causality Test

Table 10. Granger Causality Test

Pairwise Granger Causality Tests			
Date: 07/28/22 Time: 10:51			
Sample: 1/01/2019 12/31/2021			
Lags: 1			
Null Hypothesis:	Obs	F-Statistic	Prob.
PDB does not Granger Cause IDX30	1095	0.07794	0.7802
IDX30 does not Granger Cause PDB		0.21252	0.6449
INFLASI does not Granger Cause IDX30	1095	0.02284	0.8799
IDX30 does not Granger Cause INFLASI		1.96244	0.1615
SUKU_BUNGA does not Granger Cause IDX30	1095	0.31432	0.5752
IDX30 does not Granger Cause SUKU_BUNGA		0.01333	0.9081
NILAI_TUKAR does not Granger Cause IDX30	1095	0.35360	0.5522
IDX30 does not Granger Cause NILAI_TUKAR		0.15194	0.6968
INFLASI does not Granger Cause PDB	1095	0.85496	0.3554
PDB does not Granger Cause INFLASI		6.59388	0.0104
SUKU_BUNGA does not Granger Cause PDB	1095	0.05766	0.8103
PDB does not Granger Cause SUKU_BUNGA		1.63646	0.2011
NILAI_TUKAR does not Granger Cause PDB	1095	1.23478	0.2667
PDB does not Granger Cause NILAI_TUKAR		1.27350	0.2594
SUKU_BUNGA does not Granger Cause INFLASI	1095	4.85607	0.0278
INFLASI does not Granger Cause SUKU_BUNGA		1.42664	0.2326
NILAI_TUKAR does not Granger Cause INFLASI	1095	0.11917	0.7300
INFLASI does not Granger Cause NILAI_TUKAR		0.04795	0.8267
NILAI_TUKAR does not Granger Cause SUKU_BUNGA	1095	0.23914	0.6249
SUKU_BUNGA does not Granger Cause NILAI_TUKAR		0.00031	0.9860

Source: Eviews 12 (Data Processing)

The results of this test are to see whether two variables have a reciprocal relationship or not. In other words, does one variable have a significant causal relationship with other variables. The results of the Granger Causity Test show that those who have a causal relationship are those that have a probability value that is smaller than alpha 0.05 so that later Ho will be rejected, which means a variable will affect other variables. From the results of the Granger test, it can be seen that the reciprocal relationship is as follows:

- a. GDP variable statistically does not significantly affect IDX30, on the contrary IDX30 statistically does not significantly affect GDP variable as evidenced by the probability values greater than 0.05, namely (0.78) and (0.64). Both results accept the null hypothesis. Thus, it can be concluded that there is no causality for both PDB and IDX30 variables.  
Ho : There is no effect of GDP on IDX30 during the pandemic Covid-19 period January 2019 – December 2021.  
H1 : There is an effect of GDP on IDX30 during the pandemic Covid-19 period January 2019 – December 2021.
- b. Inflation variable statistically does not significantly affect IDX30, on the contrary IDX30 statistically does not significantly affect the Inflation Variable as evidenced by the probability values greater than 0.05, namely (0.87) and (0.16). Both results accept the null hypothesis. Thus it can be concluded that there is no causality whatsoever for both the Inflation Variable and IDX30.  
Ho : There is no effect of inflation on IDX30 during the pandemic Covid-19 period January 2019 – December 2021.  
H2 : There is an effect of inflation on IDX30 during the pandemic Covid-19 period January 2019 – December 2021.
- c. Interest Rate Variables statistically did not significantly affect IDX30, on the contrary IDX30 statistically did not significantly affect Interest Rate Variables as evidenced by the probability values greater than 0.05, namely (0.57) and (0.90). Both results accept the null hypothesis. Thus, it can be concluded that there is no causality whatsoever for both Interest Rate Variables and IDX30.



- Ho : There is no effect of Interest Rate on IDX30 as long as Covid-19 pandemic period January 2019 – December 2021.
- H3 : There is an effect of interest rates on IDX30 during the pandemic Covid-19 period January 2019 – December 2021.
- d. The Exchange Rate Variable did not significantly affect IDX30, on the contrary IDX30 did not statistically significantly affect the Exchange Rate Variable as evidenced by the probability values greater than 0.05, namely (0.55) and (0.69). Both results accept the null hypothesis. Thus it can be concluded that there is no causality whatsoever for both Exchange Rate Variables and IDX30.
- Ho : There is no influence of the Exchange Rate on IDX30 during Covid-19 pandemic period January 2019 – December 2021.
- H4 : There is an effect of the Exchange Rate on IDX30 during the pandemic Covid-19 period January 2019 – December 2021
- e. Inflation variable statistically does not significantly affect GDP (0.35) so that it accepts the null hypothesis while the Inflation Variable has a statistically significant effect on GDP (0.01) thus rejecting the null hypothesis. Thus, it is concluded that there is a unidirectional causality between the variables of inflation and GDP.
- Ho : There is no effect of Inflation on GDP during the Covid-19 pandemic period January 2019 – December 2021.
- H6 : There is an effect of inflation on GDP during the pandemic Covid-19 period January 2019 – December 2021.
- f. Interest Rate Variable Statistically does not significantly affect GDP, on the contrary GDP does not statistically significantly affect Interest Rate Variable as evidenced by the probability values greater than 0.05, namely (0.81) and (0.20). Both results accept the null hypothesis. Thus it can be concluded that there is no causality whatsoever for both Interest Rate and GDP Variables.
- Ho : There is no effect of Interest Rates on GDP during Covid-19 pandemic period January 2019 – December 2021.
- H7 : There is an effect of interest rates on GDP during the pandemic Covid-19 period January 2019 – December 2021.
- g. The Exchange Rate Variable does not significantly affect GDP, on the contrary, GDP does not statistically significantly affect the Inflation Variable as evidenced by the probability values greater than 0.05, namely (0.25) and (0.26). Both results accept the null hypothesis. Thus it can be concluded that there is no causality whatsoever for both the Exchange Rate and GDP Variables.
- Ho : There is no influence of the Exchange Rate on GDP during Covid-19 pandemic period January 2019 – December 2021.
- H8 : There is an effect of the Exchange Rate on GDP during the pandemic Covid-19 period January 2019 – December 2021.
- h. Interest Rate Variables statistically significantly affect Inflation (0.02) thus rejecting the null hypothesis, while Inflation statistically did not significantly affect Interest Rates (0.23) thus accepting the null hypothesis. Thus, it is concluded that there is a unidirectional causality between the Interest Rate and Inflation variables.
- Ho : There is no effect of Interest Rates on Inflation during Covid-19 pandemic period January 2019 – December 2021.
- H9 : There is an effect of Interest Rates on Inflation during the pandemic Covid-19 period January 2019 – December 2021
- i. Statistical Exchange Rate Variables did not significantly affect Inflation, on the other hand, Statistical Inflation did not significantly affect the Exchange Rate Variables as evidenced by the probability values greater than 0.05, namely (0.73) and (0.82). Both results accept the null hypothesis. Thus it can be concluded that there is no causality whatsoever for the two Variables of Exchange Rate and Inflation.
- Ho : There is no influence of Exchange Rate on Inflation during Covid-19 pandemic period January 2019 – December 2021.
- H10: There is an effect of the Exchange Rate on Inflation during the pandemic Covid-19 period January 2019 – December 2021.

- j. The Exchange Rate Variable did not significantly affect the Interest Rate, on the other hand, the Interest Rate did not significantly affect the Exchange Rate Variable as evidenced by the probability values that were greater than 0.05, namely (0.62) and (0.98). Both results accept the null hypothesis. Thus it can be concluded that there is no causality whatsoever for the two Variables of Exchange Rate and Interest Rate.
- Ho : There is no influence of Exchange Rate on Interest Rates during Covid-19 pandemic period January 2019 – December 2021.
- H11: There is an effect of Exchange Rate on Interest Rates during Covid-19 pandemic period January 2019 – December 2021.

### VECM Model

**Table 11. Short Term Relationship**

Variable	Coefficient	t-Statistic	Description
CoimEq1	0,004070	[0,13067]	Significant (+)
d(log(IDX30(-1)))	-0,005338	[-0,17587]	Significant (-)
d(GDP(-1))	-0,000767	[-0,64038]	Significant (-)
d(Inflation(-1))	-0,011381	[-0,98601]	Significant (-)
d(Interes_Rate(-1))	0,010321	[0,54134]	Significant (+)
d(log(Exchange_Rate(-1)))	-0,098244	[-0,90582]	Significant (-)

Source: Eviews 12 (Data Processing)

The amount of adjustment for short term and long term is 0.004070. The results of the short-term estimation show that there is 1 significant variable that has a positive (+) effect at the 5% level, namely the Interest Rate Variable.

- The GDP variable at lag 1 has a negative effect (-) at the 5% level of -0.000767, meaning that if there is an increase of 1% in the previous period, it will decrease IDX30 by -0.08%.
- Inflation variable at lag 1 has a negative effect (-) at the 5% level of -0.011381 meaning that if there is an increase of 1% in the previous period it will decrease IDX30 by -1.14%.
- The Exchange Rate variable at lag 1 has a negative effect (-) at the 5% level of -0.098244 meaning that if there is an increase of 1% in the previous period it will decrease IDX30 by -9.82%
- Interest Rate variable has a significant (+) effect on IDX30.

**Table 12. Long Term Relationship**

Variable	Coefficient	t-Statistic	Description
IDX30(-1))	1.000000		
GDP(-1))	0,304386	3,03925	Significant (+)
Inflation(-1))	-3,093807	[-3,13094]	Significant (-)
Interest Rate(-1))	1,487280	[1,98414]	Significant (+)
Exchange Rate(-1))	10,14533	[0,72302]	Significant (+)

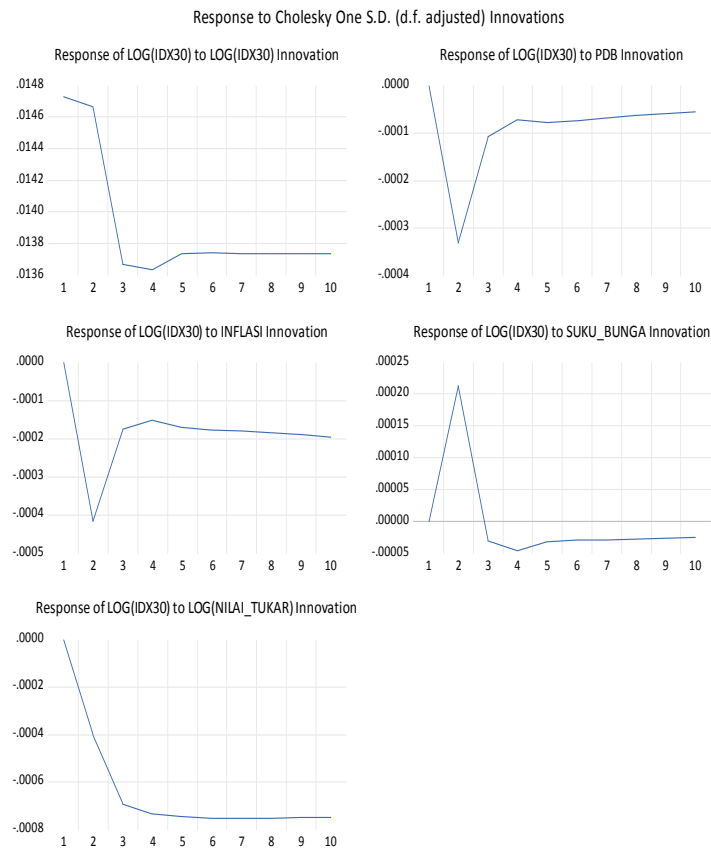
Source: Eviews 12 (Data Processing)

In the long-term relationship there are 3 variables that have a significant (+) influence on IDX30, meaning that if there is an increase in GDP, Interest Rates, and Exchange Rates, there will be an increase in IDX30 by the value of these variables.

- Inflation variable has a significant (-) effect on IDX30.
- GDP, Interest Rate, and Exchange Rate variables have a significant (+) effect on IDX30.

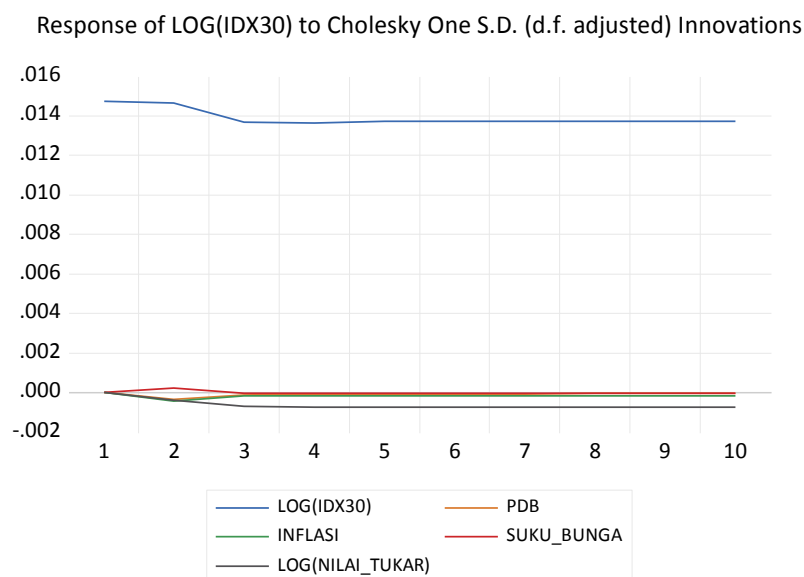
## Impulse Response Function (IRF)

### Figure 6. Impulse Response Function



Source: Eviews 12 (Data Processing)

### Figure 7. Combine IRF



Source: Eviews 12 (Data Processing)



IRF analysis explains the impact of shocks on one variable to another variable, which in this analysis is not only in the short term but can analyze several future horizons as long term information. From the results of the IRF, it can be seen that the period of shock that occurs is as follows:

- IDX30's response to the shock itself was in shock during the Covid-19 pandemic from periods 1, 2, and 3 with a value of 0.0147 – 0.0137 and then sloped down to period 10.
- IDX30's response to negative GDP shocks from period 1 to 2 decreased by -0.000332 and then in the third period, the decline was quite far to -0.000108 due to the shock that occurred during the Covid-19 pandemic, and then moved steadily from the third period. 4 to 10 period.
- IDX30's response to shocks to the inflation rate during the Covid-19 pandemic is also negative, which means that if there is a shock of 1 standard deviation from the inflation rate, IDX30 will react negatively. Seen in period 1 to period 2 Inflation decreased, and in period 3 it rose and then sloped down to period 10.
- IDX30's response to interest rate shocks during the Covid-19 pandemic tends to react negatively. Seen on the chart, you can see the period 1 to 10 of the downward movement.
- IDX30's response to Exchange Rate shocks during the Covid 19 Pandemic tends to react negatively. It can be seen from period 1 to 10 the movement of the Rupiah value weakened during the Covid-19 Pandemic.

## Variance Decomposition

Table 13. Variance Decomposition

Variance Decomposition of LOG(IDX30):						
Period	S.E.	LOG(IDX30)	PDB	INFLASI	SUKU_B...	LOG(NILA...
1	0.014732	100.0000	0.000000	0.000000	0.000000	0.000000
2	0.020801	99.88595	0.025521	0.040445	0.010535	0.037550
3	0.024901	99.83566	0.019695	0.033193	0.007515	0.103939
4	0.028400	99.80322	0.015791	0.028378	0.006051	0.146565
5	0.031558	99.78100	0.013379	0.025880	0.005010	0.174733
6	0.034431	99.76494	0.011706	0.024410	0.004284	0.194658
7	0.037078	99.75308	0.010431	0.023435	0.003759	0.209290
8	0.039549	99.74417	0.009424	0.022802	0.003356	0.229249
9	0.041874	99.73729	0.008605	0.022411	0.003035	0.228660
10	0.044077	99.73186	0.007920	0.022192	0.002771	0.235259

Variance Decomposition of PDB:						
Period	S.E.	LOG(IDX30)	PDB	INFLASI	SUKU_B...	LOG(NILA...
1	0.377376	0.002019	99.99798	0.000000	0.000000	0.000000
2	0.533780	0.028357	99.96689	0.000466	0.000116	0.004169
3	0.653682	0.018959	99.97599	0.000894	0.000409	0.003751
4	0.754918	0.014216	99.98023	0.001723	0.000408	0.003422
5	0.844351	0.011405	99.98254	0.002514	0.000393	0.003145
6	0.925379	0.009534	99.98384	0.003399	0.000359	0.002866
7	1.000037	0.008187	99.98449	0.004406	0.000318	0.002599
8	1.069661	0.007174	99.98467	0.005529	0.000280	0.002350
9	1.135176	0.006384	99.98448	0.006765	0.000249	0.002125
10	1.197257	0.005749	99.98399	0.008112	0.000227	0.001924

Variance Decomposition of INFLASI:						
Period	S.E.	LOG(IDX30)	PDB	INFLASI	SUKU_B...	LOG(NILA...
1	0.039070	0.095822	0.644652	99.25953	0.000000	0.000000
2	0.054905	0.053833	0.646143	99.29236	0.006057	0.001611
3	0.066916	0.114745	0.641730	99.22344	0.017368	0.002716
4	0.076905	0.145413	0.669573	99.16160	0.019794	0.003625
5	0.085626	0.159066	0.720829	99.09616	0.020109	0.003839
6	0.093422	0.169547	0.783023	99.02490	0.019122	0.003413
7	0.100509	0.178776	0.853056	98.94764	0.017579	0.002952
8	0.107032	0.186792	0.929724	98.86472	0.015904	0.002862
9	0.113091	0.193954	1.012381	98.77594	0.014330	0.003397
10	0.118758	0.200557	1.100609	98.68112	0.012995	0.004721

Variance Decomposition of SUKU_BUNGA:						
Period	S.E.	LOG(IDX30)	PDB	INFLASI	SUKU_B...	LOG(NILA...
1	0.023814	0.036123	0.195602	1.879216	97.88906	0.000000
2	0.033525	0.267690	0.206159	1.817201	97.69745	0.011503
3	0.040804	0.189576	0.216826	1.724089	97.86059	0.008923
4	0.046965	0.147321	0.206169	1.661802	97.97785	0.006861
5	0.052429	0.124284	0.193801	1.595719	98.08064	0.005559
6	0.057386	0.109294	0.180424	1.531799	98.17354	0.004947
7	0.061956	0.098470	0.166854	1.470750	98.25902	0.004904
8	0.066221	0.090427	0.153681	1.412136	98.33840	0.005358
9	0.070236	0.084283	0.141228	1.355716	98.41251	0.006269
10	0.074043	0.079463	0.129668	1.301395	98.48187	0.007604

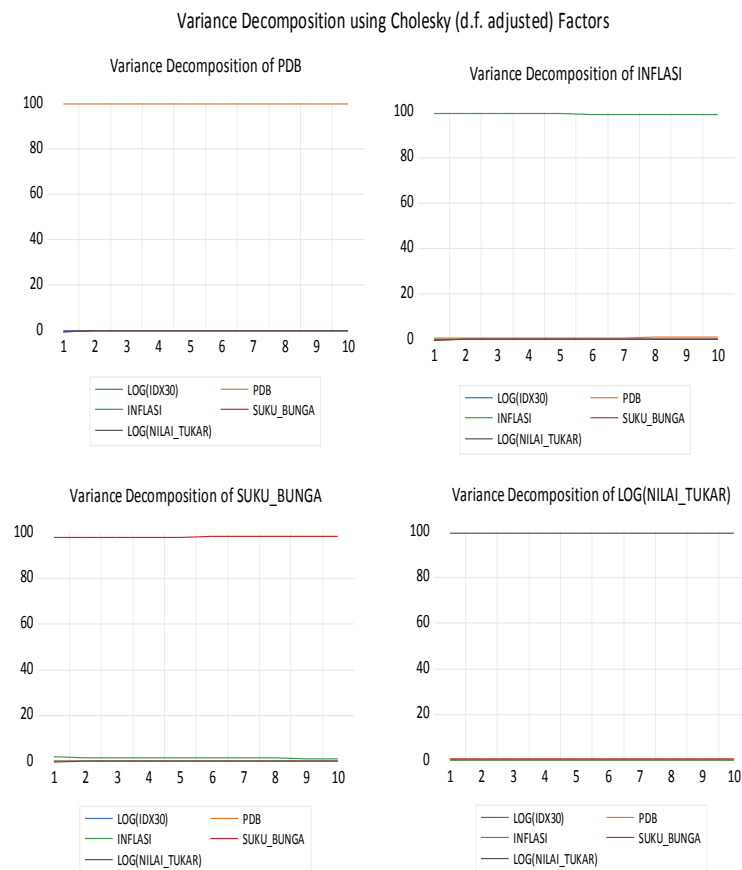
  

Variance Decomposition of LOG(NILAI_TUKAR):						
Period	S.E.	LOG(IDX30)	PDB	INFLASI	SUKU_B...	LOG(NILA...
1	0.004133	0.018326	0.000139	0.011349	0.591935	99.37825
2	0.006444	0.034534	0.001426	0.005689	0.533105	99.42525
3	0.008369	0.052352	0.010498	0.003799	0.519943	99.41341
4	0.009995	0.060394	0.020295	0.003255	0.513318	99.40274
5	0.011412	0.066105	0.029817	0.003484	0.507961	99.39263
6	0.012677	0.070334	0.038573	0.004365	0.502512	99.38422
7	0.013826	0.073510	0.046911	0.005815	0.497011	99.37675
8	0.014885	0.075995	0.055071	0.007793	0.491473	99.36967
9	0.015871	0.078033	0.063217	0.010274	0.485924	99.36255
10	0.016798	0.079764	0.071454	0.013238	0.480382	99.35516

Cholesky One S.D. (d.f. adjusted)  
Cholesky ordering: LOG(IDX30) PDB INFLASI SUKU\_BUNGA LOG(NILAI\_TUKAR)

Source: Eviews I2 (Data Processing)

Figure 8. Varian Decomposition Graph



Source: Eviews 12 (Data Processing)

From the results of the Variance Decomposition test of each independent variable, its contribution to the dependent variable is described as follows:

- The IDX30 variable from period 1 (100,000) decreased in period 2 (99.88416) and so on, it fluctuated until period 10.
- The variables of GDP, Interest Rate, and Exchange Rate contributed significantly positive (+).
- For the Inflation variable, the contribution is not significant to the changes and movements of IDX30 during the Covid-19 Pandemic.

## CONCLUSIONS AND SUGGESTION

### Conclusions

From the results of the above test regarding the influence of the Interest Rate, Exchange Rate, Covid-19 Cases and GDP variables on the stock index variable in Indonesia from 2019 to 2021, it can be concluded several things as follows:

- The unit root test using the ADF method shows that the stock index, interest rate, inflation, GDP and exchange rate variables are integrated at the first difference degree.
- From the cointegration test results and Granger causality, it shows that there is a relationship both in the short term and in the long term, or it can be said that there is a cointegration relationship between variables, and between variables also has causality such as inflation variables that affect Covid cases, GDP variables and interest rates. which affects the inflation variable.
- The results of the VAR stability test of all the independent and dependent variables tested were stable and feasible for IRF (Impulse Response Function) and VD (Variant Decomposition) testing.
- Meanwhile, through the VECM test, it shows that there is a short-term relationship and a long-term relationship between interest rates and stock indices with coefficient values (0.54) and (1.98) which have a significant (+) effect both before the Covid-19 pandemic and during the Covid-19 pandemic and after the Covid-19 pandemic.
- In the Granger causality test, it can be concluded that the variables of GDP, Interest Rate Inflation, and Exchange Rates do not have any causal relationship, both unidirectional and bidirectional because the value of each probability is  $> 0.05$  against IDX30.





6. Through the IRF (Impulse Response Function) test, a negative IDX30 response was obtained during the Covid-19 Pandemic due to fluctuations in the movement of GDP, Inflation, Interest Rates, and Exchange Rates due to the shock caused by the Covid-19 Pandemic.
7. Through the Variance decomposition test, it can be seen that the variables of GDP, Interest Rates, and Exchange Rates contributed Significantly (+) to IDX30 during the Covid-19 pandemic. Meanwhile, inflation does not significantly affect IDX30.

### Suggestion

The suggestions that can be given in this research are as follows:

1. The government should pay more attention to the implementation of policies in terms of economic policies related to the stock price index because it can be a driver of economic development, the programs planned by local governments in their implementation need to have supervision and evaluation carried out in stages.
2. The local government in implementing government policies on the prevention and control of the Covid-19 pandemic, because it has a very negative effect on all types of economic activities.
3. Finally, for the community, if they can improve their understanding and skills in responding, responding and studying government policies and current conditions. The community must have sufficient insight to Together build the economy including knowledge about investment and stocks. The public should obey and not be indifferent to the appeals made by the government in order to stop the Covid-19 pandemic.

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