

## Comparative Analysis of Economic Forces and Stock Market Movements: The U.S. and Indonesia



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**ABSTRACT:** The economies of many developed and developing countries are experiencing instability, characterized by a decline in economic performance. In a macroeconomic context, global instability affects several key indicators such as production indices, exchange rates, interest rates, and inflation rates. The occurrence of shocks to macroeconomic indicators certainly increases the volatility of a country's capital markets. This quantitative research examines the correlation of shocks to each key indicator of capital market performance in Indonesia and the United States. This research uses the VECM method. The research shows that the influence of macroeconomic indicators tends to fluctuate in the short term and is stable in the long term. Where the production and inflation indices have a positive and significant effect on the IDX Composite and the DJI, this is different from interest rates, which negatively impact the IDX Composite and DJI. Meanwhile, the exchange rate indicator has no significant effect on IDX Composite or DJI. The research also found that the IDX Composite was predominantly influenced by exchange rates and inflation, while the DJI was predominantly influenced by production index indicators, inflation, and interest rates.

**KEYWORDS:** Macroeconomics Indicator, IDX Composite, Dow Jones Industrial Average (DJI)

### INTRODUCTION

In this ever-developing and dynamic era, technology has become the main driving force behind global transformation, including in the fields of economics and finance. Technological advances have fundamentally changed the economic landscape, affecting various aspects of economic activity from production to distribution, and even how we interact. Developments in technological fields such as Artificial Intelligence (AI), Internet of Things (IoT), blockchain, and robotics have opened the door to unprecedented efficiency in production and service processes (Afandi & Kurnia, 2023).

Meanwhile, in the financial sector, technology has changed the way transactions are carried out, speeding up the flow of information and increasing financial accessibility. Innovations such as financial technology (fintech) have expanded the reach of financial services, providing access to individuals who were previously marginalized from the formal financial system. According to Antwi & Kong, (2023), access to financial services such as credit, investments, and payment processing has become simpler for individuals because of technological advancements and the internet. This affects the stability of the financial system and the acceleration of financial inclusion.

However, in addition to promoting the growth of the financial sector, the presence of digital financial technology also creates chances for many problems. This view is supported by Vives, (2016), who claims that when digital financial technology is used more widely, there is a greater chance of digital risks such as data theft, disruptions to payment systems, and a rise in non-performing loans. The rise of digital financial technology innovation also endangers traditional financial services (Board, 2017). In a macroeconomic context, according to Chinoracky et al., (2021), digital technology has increased efficiency and productivity in various functional areas of business such as finance, supply chain management, and human resources as well as expanding access to information, thereby increasing opportunities for digital transformation in all sectors. However, the transformation of digital technology can cause a decline in employment opportunities caused by the presence of sophisticated robots that can replace the role of humans. Apart from that, if it is not balanced with innovation, digital transformation will also have the effect of being left behind and decreasing the competitive level of a field in the economic sector.

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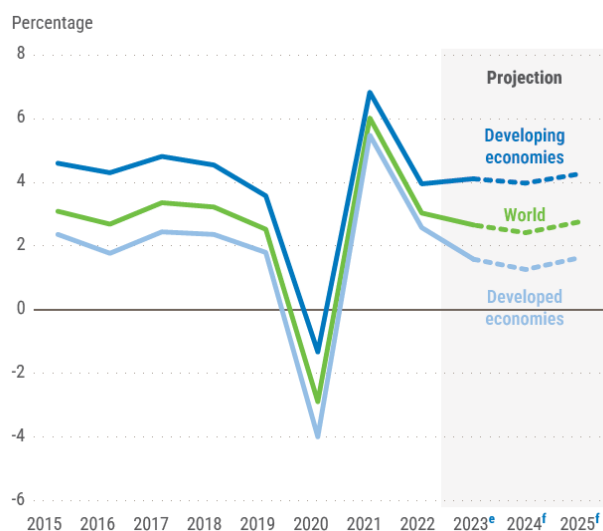


Figure 1. Growth of Economic Output

In the last few decades, the economies of many developed and developing countries have experienced instability. The downturn in the economies of many nations, including Indonesia, serves as evidence of this. In the latest Global Economic Prospects Report it is estimated that there will be a slowdown in global economic growth due to the COVID-19 pandemic from 5.5 percent in 2021 to 4.1 percent in 2022 then experiencing a decline again to 3.2 percent in 2023. This is due to reduced demand and instability in fiscal and monetary conditions throughout the world (Bank, 2022). The geopolitical turmoil is expected to cause a slowdown in world economic performance, reaching 2.7 percent in 2023 and 2.4 percent in 2024 (United Nations, 2024). If this condition occurs over a long period, it could result in a setback to sustainable economic development.

As a developing country with a small open economy, Indonesia's economic conditions are still dependent on global economic conditions. So the existence of global phenomena will influence the determination of policies and macroeconomic conditions in Indonesia. Global phenomena and the global economic downturn also give rise to capital market volatility for developing countries such as Indonesia. This global issue is inversely proportional to the economic condition of the United States (U.S.), which shows the opposite performance. In the same research period, the U.S. economy will grow by 2.5 percent in 2023. The difference in conditions between the two countries is caused by strong consumer spending driven by sustainable job growth and high real wages in the United States. As the ruling country of the global economy, the U.S. currency which is still the global currency also supports the strong performance of the U.S. amidst the ongoing uncertainty and instability (United Nations, 2024).

In the context of a country's macroeconomic performance, global instability can affect several key indicators, including production indices, currency exchange rates, interest rates, inflation rates, and stock indices. Changes in the production index, which reflects a country's industrial production, can be affected by declining global demand due to economic instability in trading partner countries. Apart from that, fluctuations in currency exchange rates are also an important concern, since they affect the competitiveness of a nation's exports and imports and affect inflation and external balance. On the other hand, interest rate policy by the central bank, which is the main instrument in controlling inflation and responding to global economic instability, also plays an important role in domestic economic growth and investment. The inflation rate, which can be influenced by fluctuations in global commodity prices and currency exchange rates, is also a key indicator of how well a nation's economy is. Instability will cause sluggishness and economic losses because it will cause more frequent policy shifts which will create volatility and have a negative impact on macroeconomic performance. Global instability can also create volatility in the stock market, with the index being sensitive to changes in market sentiment and global economic conditions resulting from policy changes (Pentinger, 2020).

Macroeconomic performance also has a strong relationship with the capital market, especially stock indices, which are very close and influence each other (Megaravalli & Sampagnaro, 2018). Strong economic growth tends to create a climate conducive to business growth and investment, which in turn can move the stock market. In addition, good macroeconomic conditions, such as increasing production indexes, strong consumption, and increasing investment, can provide a positive boost to overall stock prices. On the other hand, a low and stable inflation rate, along with accommodative interest rate policies from central banks, can also increase investors' interest in investing in the stock market because investment alternatives such as bonds become less attractive. However, economic instability, both domestically and globally, can create volatility in the stock

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market Wu & Chong, (2021). Uncertain economic conditions or political turmoil can cause investors to become cautious and possibly steer away from risky investments, including stocks.

Based on previous research studies, it was found that there was a lack of in-depth studies regarding the relationship between the performance of macroeconomic indicators and stock indices. Differences in results were found regarding the relationship between macroeconomic variables, production index, exchange rate, interest rates, and inflation. In the research of Septiarini et al., (2020), the results showed that the interest rate and exchange rate variables had a significant effect on the stock index, on the other hand, the results showed that there was no significant influence between the inflation variable and the stock index. Different results were found in the research of Nwaolisa & Chijindu, (2016), Yuspita et al., (2019), and Nugroho et al., (2023) Where the exchange rate variable had a negative and significant influence on the stock index, while the production index had a positive influence on the stock price. In research by Megaravalli & Sampagnaro, (2018), the results found that the exchange rate has a positive and significant long-term influence, while inflation has a negative and insignificant long-term influence. Apart from that, the results also found that in the short term, there was no significant relationship between macroeconomic variables and the stock market. In Algaed, (2021) Research, results showed that capitalization and liquidity in the capital market were negatively correlated with economic growth in Saudi Arabia. Meanwhile, in research by Mahmood & Rehman, (2019), the results showed that the development of capital markets contributed significantly to increasing economic growth in European countries. This difference shows that the impact of capital market performance on economic growth can vary depending on economic conditions in the country.

This research examines the correlation of fluctuations in several key indicators, such as production indices, currency exchange rates, interest rates, and inflation rates, on capital market performance in developed and developing countries. The association between macroeconomic factors and capital market performance has been found in earlier studies, but no research has yet investigated this correlation comprehensively and across countries. In this case, the U.S. is a developed country that rules the world economy and a country that is still developing like Indonesia. This research is important to carry out because the results of this research can be used as a literature review for investors to see capital market trends in developing and developed countries and as a study to measure the volatility of investment returns. For policymakers, this research can be a literature review to provide a structural understanding of policy, capital markets, and macroeconomic conditions and how macroeconomic indicators influence economic performance and capital markets in developing and developed countries. Where in today's increasingly connected and mutually influencing economic conditions. Apart from that, this research can also provide perspectives and literature for researchers and academics to broaden their insight into capital markets globally.

### LITERATURE REVIEW

#### Index Industrial Production (IIP)

The Production Index is a macroeconomic indicator created by the US Federal Reserve Bank board as a measure of changes in the value of total inflation which takes into account the total output of industrial production. The production index itself is used to measure fluctuations in production output in a country. The reference year for the production index is 2000 and the base level is set at 100. The formula commonly used to measure the index value is The Fischer Index or what is also called the Factory Output Index (Isnan, 2017).

Purnamasari & Sukmana, (2017) Define the production index as an indicator that measures total production output in the industrial sector. This is in line with the definition of the Industrial Production Index according to Febrina et al., (2018) Which states that the production index is an index measuring the output of production in a country.

Based on the expert opinion above, it can be concluded that the production index is an index that measures fluctuations in the rise and fall of total production output from the industrial sector in aggregate in an economic area. The production index covers the total output of the mining, gas, electricity, and water supply industries.

#### Exchange Rate

The price of one currency unit in another currency unit is known as the exchange rate, according to (Fauji, 2016). The price of a currency relative to foreign currency, or how much domestic currency is valued by foreign currency, is also known as the exchange rate, according to (Hernadi Moorcy et al., 2021). Mahyus, (2014) Put forward a similar understanding. The price that one country's currency sets against another's currency is known as the exchange rate.

Based on the expert opinion above, it can be concluded that the exchange rate is defined as a comparison of the value or price set against different currencies. The exchange rate plays an important role in an economy because it contributes to the stability of the financial balance and other key economic indicators.

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## Interest Rate

Investors potential returns from their investments are gauged by the interest rate (Suteja & Gunardi, 2016). Interest rates are also defined as the price for the use of funds which can be a factor in investment decision-making (Boediono, 2014). According to Ivena, (2023), interest rates can also be defined as the investor's reward or return on investment. The amount awarded fluctuates based on the debtor's capacity to pay back the creditor.

From the definition above, the interest rate can be interpreted as the fee that has been determined for a loan within the agreed period.

## Inflation Rate

Inflation is one of the key indicators that determines the economic stability of a country. Triuspitorini, (Triuspitorini, 2021) Define inflation as a situation of continuous price increases. Meanwhile, according to Manuela Langi Theodores, Masinambow Vecky, (2014) Inflation refers to a situation where there is an increase in commodity prices within a certain period. In the meantime, inflation, as defined by Fahmi (2014), is the outcome of rising commodity prices coupled with a depreciation of the currency's value, which, if it persists, will have a detrimental effect on the economy as a whole. Thus, we can conclude that inflation is the phenomenon of persistent price increases for products and services, which affects a nation's macroeconomic circumstances.

## Stock Index

An index is an indicator measuring a variable. From a capital market perspective, it is an indicator that measures stock price fluctuations in a particular region or market. Samsul (2015) Defines a stock index as the price of ownership expressed in index numbers to facilitate analysis of stock returns. Dewi, (2022) Defines a stock index as an indicator that represents the performance of shares on the market. The stock price index, according to Immanuel & Satria (2015), displays changes in stock prices. In addition to measuring the operational performance of shares listed on a stock exchange, the index serves as a market trend indicator that allows comparisons between the same actions conducted at two different points in time.

Based on the definition above, a stock index is a representation or description of the performance of a group of shares in the capital market in the form of numbers calculated based on certain criteria.

## METHODOLOGY

This research approach is classified as quantitative research since it involves calculating research data in numbers, based on the data obtained. Associative research is used in this kind of study. The goal of associative research is to establish a connection between two or more variables. This research uses secondary data. The secondary data used is monthly time-series data for January 2013 – December 2023. Industrial production index data was obtained from the official publication of the Indonesian Central Bureau of Statistics and the Federal Reserve Economic Data (FRED). Data regarding exchange and interest rates are taken from official publications by Bank Indonesia and the Federal Reserve Economic Data (FRED). Meanwhile, inflation rate data was obtained from official publications by Bank Indonesia and the U.S. Bureau Of Labor Statistics. Stock index data is obtained from the macroeconomic indicator website.

This research utilizes the VAR model to analyze data. The Vector Autoregressive (VAR) data analysis model, was first proposed by Sims Christopher A, 1980 in research by Saputra & Mirtawati, (2020), is an a priori method for economics. This method emerged as a solution to the problems faced using a structural approach for simultaneous models. When using a structural approach, the link between the variables to be investigated is typically described using economic theory. The VAR method indicates that each variable in the model is related to the past fluctuations of that variable and other variables' past fluctuations in the equation structure. The VAR method is usually used to predict systems of time series variables and examine the dynamic effects of disturbances in the related equations.

The stages in research using the VAR method include several main steps. The first is the stationarity test. Using the Augmented Dickey-Fuller (ADF) approach with decision criteria at a significance level  $(1 - \alpha)$  100%, data stationarity was observed. Data is declared stationary if the average value in the variant does not change systematically over time (Emy Widyastuti & Nena Arinta, 2020).

Next is the optimal lag test. Lag is helpful in VAR for removing autocorrelation and illustrating how long a variable responds to other variables. The test employs multiple criteria, which include the Likelihood Ratio (LR), Hannan Quinnon Criterion (HQ), Akaike Information Criterion (AIC), and Schwarz Criterion (SC). The ideal lag length for use in subsequent analysis is found via the lag test. If every unit root in a VAR system is contained within the unit circle and has a modulus of less than one, the system is considered stable or stationary (Emy Widyastuti & Nena Arinta, 2020).

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After that, a cointegration test was carried out. A long-term link between the independent and dependent variables is tested using the cointegration test. A long-term stable relationship exists if the variables are cointegrated. Conversely, the absence of cointegration suggests that there isn't a lasting relationship between the variables. We have a Vector Error Correction Model (VECM) if cointegration is present. Because cointegration indicates that there is a long-term relationship between the variables in the VAR system, the VECM model is a restricted model (restricted VAR) (Ansofino et al., 2016). The cointegration test method used in this research is the Johansen Cointegration Test.

Next, a causality test is carried out. The Granger Causality Test is a technique used to examine the causal link between observable variables. Granger causality, according to Gujarati in research by Roman & Kartiko (2020), It is a test that looks for a causal or reciprocal relationship between two research variables to see if there is a unidirectional relationship or if there is a statistical relationship (two-way or reciprocal relationship) between the variables. Or there isn't a relationship (they don't affect one another). A model with lag, such as an autoregressive model, Vector Autoregressive (VAR), or Vector Error Correction Model (VECM), is needed for the Granger Causality test.

After that, the VAR model is estimated. The VAR model estimates are influenced by the results of stationarity and cointegration tests. As we previously knew, if the data is stationary, the model will be estimated using the ordinary VAR method (unrestricted VAR). However, if the data is not stationary but has the same degree of stationarity after differentiation and shows cointegration, the model will be estimated using ECM (Error Correction Model). VECM or Vector Error Correction Model is a restricted form of VAR (Widarjono, 2018).

After that, a study of the Impulse Response Function (IRF) was done. Impulse response analysis clarifies how shocks to one variable impact other variables. Impulse response analysis, according to Widarjono, (2018), is used to monitor how endogenous variables in the VAR system react to shocks or modifications in disturbance variables.

Finally, Variance Decomposition (VD) analysis. Measuring the contribution or makeup of each independent variable's influence on the dependent variable is the goal of variance decomposition. An overview of each variable's relative importance in the VAR system as a result of shocks is given via variance decomposition. Because some variables in the VAR system Widarjono fluctuate, variance decomposition helps anticipate the proportion contribution of variation in each variable (Widarjono, 2018).

## RESULT AND DISCUSSION

From tests conducted in Indonesia and the U.S. The following results were obtained.

**Table I. Stationary Test**

Variabel	U.S.		Indonesia	
	t-Stat.	Prob.*	t-Stat.	Prob.*
Interest Rate	-3.11	0.03	-4.74	0.00
Inflation	-6.87	0.00	-9.11	0.00
Exchange Rate	-8.78	0.00	-12.25	0.00
Composite Stock Index	-10.2	0.00	-9.90	0.00
IIP	-9.63	0.00	-3.34	0.01

The unit root test or stationary test in this research was carried out using the Augmented Dicky Fuller (ADF) model using the first different data. Where table 1 shows that the variables FFR, BI Rate, Inflation, Exchange Rate, IIP, IDX Composite, and DJI are free from unit root (stationary). This is proven by the probability value of all variables <0.05.

This research uses data from two countries, Indonesia and the United States. So in this optimal lag test, the results obtained are presented in Table 2 and Table 3 as follows.

**Table II. Optimal Lag Test (Indonesia)**

Lag	LogL	LR	FPE	AIC	SC	HQ
0	52.1	NA	3.20	-0.7	-0.*	-0.7
1	97.5	86.2	2.30*	-1.*	-0.4	-0.*
2	113.9	29.8	2.65	-0.9	0.29	-0.4
3	125.7	20.4	3.30	-0.7	1.08	-0.0
4	142.1	27.2	3.83	-0.6	1.79	0.3
5	159.1	26.8	4.42	-0.4	2.49	0.7

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From the results of the optimal lag test in Table 2, lag 1 is the most recommended alternative. Judging from the FPE, AIC, and HQ values, the smallest is at lag 1.

**Table III. Optimal Lag Test (U.S.)**

Lag	LogL	LR	FPE	AIC	SC	HQ
0	309.5	NA	0.00	-4.9	-4.8	-4.9
1	402.7	177.3	0.00	-6.0	-5.3	-5.7
2	430.3	50.3	0.00	-6.1	-4.8	-5.5
3	451.1	36.2	0.00	-6.0	-4.2	-5.2
4	475.6	40.6	0.00	-6.0	-3.6	-5.0
5	496.3	32.6	0.00	-5.9	-2.9	-4.7

In Table 3, two alternative recommendations for optimal lag are obtained at lag 1 and lag 2. Bozdogan, 1987 said the best model is the model with the smallest complexity (Pushkar, 2023). In this case, the model with the lowest Akaike Information Criterion (AIC) value. Based on Table 3, the lowest AIC value is at lag 2. So it can be concluded that in the lag test carried out, the optimal lag value for Indonesian data is at lag 1, while US data is at lag 2.

The cointegration test using the Johansen Cointegration test shows the comparison between trace statistics and critical values. Trace statistics are the criteria underlying cointegration testing. An equation is cointegrated if the trace statistic is greater than the critical value of 5 percent.

**Table IV. Johansen Cointegration Test**

Hypothesized No. of CE(s)	U.S.		Indonesia	
	Trace Stat.	0.05 C.V.	Trace Stat.	0.05 C.V.
None *	213.8	69.82	305.9	69.82
At Most 1 *	124.2	47.86	203.5	47.86
At Most 2 *	72.1	29.8	116.5	29.8
At Most 3 *	38.2	15.49	61.1	15.49
At Most 4 *	7.4	3.84	19.75	3.84

Based on Table 4, it can be seen that five equations have a cointegration relationship, both in the United States and Indonesia. This can be seen from the trace statistical value which exceeds the significance level of 5 percent of the critical value. So, it can be concluded that the variables of the industrial production index, exchange rate, interest rate, inflation, and stock index have a long-term relationship (cointegration) with each other. Therefore, the next stage uses the Vector Autoregression Correction Method (VECM).

Table 5 displays the findings of the Granger Causality test for the country data from the United States, and Table 6 displays the results for the country data from Indonesia.

**Table V. Causality Test (U.S.)**

Null Hypothesis:	Obs	F-Statistic	Prob.
INFLATION does not Granger Cause IIP	130	1.38634	0.2538
<b>IIP does not Granger Cause INFLATION</b>		<b>3.39606</b>	<b>0.0366</b>
<b>FFR does not Granger Cause IIP</b>	<b>130</b>	<b>13.8882</b>	<b>4.E-06</b>
IIP does not Granger Cause FFR		2.19668	0.1154
<b>DJI does not Granger Cause IIP</b>	<b>130</b>	<b>8.43918</b>	<b>0.0004</b>
IIP does not Granger Cause DJI		2.61747	0.0770
EXCHANGE RATE does not Granger Cause IIP	130	0.50323	0.6058
<b>IIP does not Granger Cause EXCHANGE RATE</b>		<b>4.73203</b>	<b>0.0104</b>
FFR does not Granger Cause INFLATION	130	1.38746	0.2535
<b>INFLATION does not Granger Cause FFR</b>		<b>7.57878</b>	<b>0.0008</b>

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<b>DJI does not Granger Cause INFLATION</b>	<b>130</b>	<b>10.0460</b>	<b>9.E-05</b>
INFLATION does not Granger Cause DJI		1.95363	0.1461
<b>DJI does not Granger Cause FFR</b>	<b>130</b>	<b>4.15191</b>	<b>0.0180</b>
<b>FFR does not Granger Cause DJI</b>		<b>3.33993</b>	<b>0.0386</b>

Table 5 of the Granger causality test results shows that the IIP variable has a one-way influence on inflation with a probability value less than 0.05, indicating the following reciprocal relationship between the variables. The exchange rate is influenced by IIP in a single direction, but not the other way around. With a probability value < 0.05, the FFR variable influences IIP in a single direction, but not vice versa. IIP is influenced by the DJI variable only in one direction, with a probability value less than 0.05. Additionally, DJI has a one-way impact on inflation, but not the other way around. With a probability value < 0.05, the inflation variable influences FFR in a single direction, but not vice versa. The DJI variable has a causal relationship or two-way influence on the FFR variable with a probability value below 0.05.

**Table VI. Causality Test (Indonesia)**

Null Hypothesis:	Obs	F-Statistic	Prob.
<b>INFLATION does not Granger Cause IIP</b>	<b>131</b>	<b>5.63803</b>	<b>0.0191</b>
IIP does not Granger Cause INFLATION		1.48163	0.2258
<b>BI RATE does not Granger Cause IIP</b>	<b>131</b>	<b>4.42925</b>	<b>0.0373</b>
IIP does not Granger Cause BI RATE		0.67160	0.4140
<b>EXCHANGE RATE does not Granger Cause IIP</b>	<b>131</b>	<b>12.7619</b>	<b>0.0005</b>
IIP does not Granger Cause EXCHANGE RATE		1.31181	0.2542
<b>IDX COMPOSITE does not Granger Cause IIP</b>	<b>131</b>	<b>37.1691</b>	<b>1.E-08</b>
IIP does not Granger Cause IDX COMPOSITE		0.47469	0.4921
BI RATE does not Granger Cause INFLATION	131	0.68372	0.4098
<b>INFLATION does not Granger Cause BI RATE</b>		<b>28.3657</b>	<b>4.E-07</b>
<b>BI RATE does not Granger Cause INFLATION</b>	<b>131</b>	<b>11.7783</b>	<b>0.0008</b>
INFLATION does not Granger Cause BI RATE		0.00676	0.9346
IDX COMPOSITE does not Granger Cause INFLATION	131	0.25370	0.6153
<b>INFLATION does not Granger Cause IDX COMPOSITE</b>		<b>4.44467</b>	<b>0.0370</b>
<b>IDX COMPOSITE does not Granger Cause BI RATE</b>	<b>131</b>	<b>6.90650</b>	<b>0.0096</b>
BI RATE does not Granger Cause IDX COMPOSITE		2.51101	0.1155

Table 6 of the Granger causality test results shows that the inflation variable has a one-way influence on IIP with a probability value less than 0.05, indicating the following reciprocal relationship between the variables. Additionally, inflation has a one-way impact on the IDX Composite and the BI Rate, but not the other way around. Additionally, with a probability value below 0.05, the BI Rate variable influences IIP in a single direction but not vice versa. The BI Rate affects inflation in a one-way manner as well, but not the other way around. IIP is influenced by the exchange rate variable only in one direction, with a probability value less than 0.05. IIP is influenced by the IDX Composite variable only in one direction, with a probability value less than 0.05. The BI Rate is likewise affected by IDX Composite in a one-way fashion, but not the other way around.

The estimation equation for the VECM model for the United States is as follows:

$$IIP = 0.00 - 0.98 \text{ CoInt} + 0.05IIP_{t-1} - 0.05IIP_{t-2} + 0.08Inflation_{t-1} - 0.03Inflation_{t-2} + 3.50Interest\ Rate_{t-1} + 0.49Interest\ Rate_{t-2} - 22.83DJI_{t-1} - 11.71DJI_{t-2} - 7.06Exchange\ Rate_{t-1} - 4.18Exchange\ Rate_{t-2}.$$

From the equation above, it is known that the IIP variables, inflation, interest rates, exchange rates and stock index (DJI) have no effect in the short term on the IIP variable. However, this variable has the potential to influence the IIP variable negatively in the long term by 0.98 percent. And from the equation above, the IIP variable has an influence of 0.00 on the variable itself.

$$Inflation = 0.00 - 0.11 \text{ CoInt} + 0.09IIP_{t-1} + 0.01IIP_{t-2} - 0.29Inflation_{t-1} - 0.28Inflation_{t-2} - 0.18Interest\ Rate_{t-1} - 0.08Interest\ Rate_{t-2} - 1.72DJI_{t-1} - 1.27DJI_{t-2} + 0.83Exchange\ Rate_{t-1} - 1.95Exchange\ Rate_{t-2}.$$

From the equation above, it is known that the IIP variable has a positive and significant influence in the short term on the inflation variable. When inflation rises by 1 percent, IIP will also experience an increase of 0.09 percent in lag 1 and 0.01 percent in lag 2. For the inflation variable, interest rates, exchange rates and stock index (DJI) have no effect in the short term but have

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the opportunity to affect the inflation variable negatively in the long term by 0.11 percent. And from the equation above, the inflation variable has an influence of 0.00 on the variable itself.

$$\text{Interest Rate} = 0.00 - 0.02 \text{ Coint} + 0.02\text{IIP}_{t-1} + 0.00\text{IIP}_{t-2} - 0.00\text{Inflation}_{t-1} + 0.03\text{Inflation}_{t-2} - 0.42\text{Interest Rate}_{t-1} - 0.36\text{Interest Rate}_{t-2} + 0.03\text{DJI}_{t-1} - 0.10\text{DJI}_{t-2} + 0.40\text{Exchange Rate}_{t-1} + 0.08\text{Exchange Rate}_{t-2}.$$

From the equation above, it is known that the IIP variable has a positive and significant effect in the short term on the interest rate variable. Where when the interest rate increases by 1 percent, the IIP will also experience an increase of 0.02 percent in lag 1 and 0.00 percent in lag 2. The inflation variable also has a negative-positive and significant effect in the short term on the interest rate variable. When the interest rate increases by 1 percent, inflation will decrease by 0.00 percent in lag 1, and when the interest rate increases by 1 percent, inflation will also increase by 0.03 percent in lag 2. For the interest rate, exchange rate and stock index variables (DJI) have no effect in the short term but have the potential to influence the interest rate variable negatively in the long term by 0.02 percent. From the equation above, the interest rate

$$\text{DJI} = 0.00 + 0.01 \text{ Coint} - 0.00\text{IIP}_{t-1} - 0.00\text{IIP}_{t-2} - 0.01\text{Inflation}_{t-1} + 0.00\text{Inflation}_{t-2} - 0.07\text{Interest Rate}_{t-1} - 0.07\text{Interest Rate}_{t-2} - 0.26\text{DJI}_{t-1} - 0.12\text{DJI}_{t-2} + 0.11\text{Exchange Rate}_{t-1} + 0.19\text{Exchange Rate}_{t-2}.$$

From the equation above, it is known that the IIP and interest rate variables have a negative and significant effect in the short term on the stock index variable (DJI). When the stock index (DJI) rises by 1 percent, the IIP and interest rate will decrease respectively by 0.00 percent and 0.07 percent in lag 1, and 0.01 percent and 0.07 percent in lag 2. The inflation variable also has a negative-positive effect and is significant in the short term for the stock index variable (DJI). When the stock index (DJI) increases by 1 percent, inflation will decrease by 0.01 percent in lag 1 and when the interest rate increases by 1 percent, inflation will also increase by 0.00 percent in lag 2. For the exchange rate, the variable stock index (DJI) has no effect in the short term but has the potential to influence the stock index variable (DJI) positively in the long term by 0.01 percent. From the equation above, the stock index variable (DJI) has an influence of 0.00 on the variable itself.

$$\text{Exchange Rate} = 0.00 - 0.00 \text{ Coint} + 0.00\text{IIP}_{t-1} + 0.00\text{IIP}_{t-2} - 0.01\text{Inflation}_{t-1} - 0.00\text{Inflation}_{t-2} + 0.00\text{Interest Rate}_{t-1} + 0.00\text{Interest Rate}_{t-2} - 0.07\text{DJI}_{t-1} - 0.02\text{DJI}_{t-2} - 0.53\text{Exchange Rate}_{t-1} - 0.21\text{Exchange Rate}_{t-2}.$$

From the equation above, it is known that the IIP and interest rate variables have a positive and significant effect in the short term on the exchange rate variable. When the exchange rate increases by 1 percent, the IIP and interest rate will also experience an increase of 0.00 percent and 0.00 percent respectively in lag 1, and 0.00 percent and 0.00 percent in lag 2. The inflation variable and stock index (DJI) have a negative and significant effect in the short term on the exchange rate variable. Where when the exchange rate increases by 1 percent, inflation will decrease by 0.01 percent in lag 1, and when the exchange rate increases by 1 percent, inflation and the stock index (DJI) will decrease by 0.00 percent and 0.02 percent respectively in lag 2. The exchange rate variable has no effect in the short term but has the potential to influence the exchange rate variable negatively in the long term by 0.00 percent. From the equation above, the exchange rate variable has an influence of 0.00 on the variable itself.

The estimation equation for the VECM model for Indonesia is as follows:

$$\text{IIP} = -0.06 - 1.29 \text{ Coint} - 0.06\text{IIP}_{t-1} + 3.36\text{Inflation}_{t-1} - 0.69\text{Interest Rate}_{t-1} - 77.76\text{Exchange Rate}_{t-1} - 33.21\text{IDX Composite}_{t-1}.$$

From the equation above, it is known that the variables IIP, inflation, interest rate, exchange rate, and stock index (IDX Composite) have no effect in the short term on the IIP variable. However, this variable has the potential to influence the IIP variable negatively in the long term by 1.29 percent. From the equation above, the IIP variable has a negative influence of 0.06 on the variable itself.

$$\text{Inflation} = -0.01 - 0.04 \text{ Coint} + 0.02\text{IIP}_{t-1} - 0.17\text{Inflation}_{t-1} + 0.33\text{Interest Rate}_{t-1} - 7.54\text{Exchange Rate}_{t-1} - 2.70\text{IDX Composite}_{t-1}.$$

From the equation above, it is known that the IIP variable has a positive and significant influence in the short term on the inflation variable. When inflation rises by 1 percent, IIP will also experience an increase of 0.02 percent. For the inflation variable, interest rate, exchange rate, and stock index (IDX Composite) have no effect in the short term but have the potential to influence the inflation variable negatively in the long term by 0.04 percent. From the equation above, the inflation variable has an influence of 0.01 on the variable itself.

$$\text{Interest Rate} = 0.00 + 0.00 \text{ Coint} - 0.00\text{IIP}_{t-1} + 0.01\text{Inflation}_{t-1} - 0.41\text{Interest Rate}_{t-1} + 0.11\text{Exchange Rate}_{t-1} + 0.11\text{IDX Composite}_{t-1}$$

From the equation above, it is known that the IIP variable has a negative and significant effect in the short term on the interest rate variable. When the interest rate increases by 1 percent, the IIP will decrease by 0.00 percent. The inflation variable has a positive and significant effect in the short term on the interest rate variable. When the interest rate increases by 1 percent, inflation will also increase by 0.01 percent. The interest rate, exchange rate, and stock index (IDX Composite) variables have no



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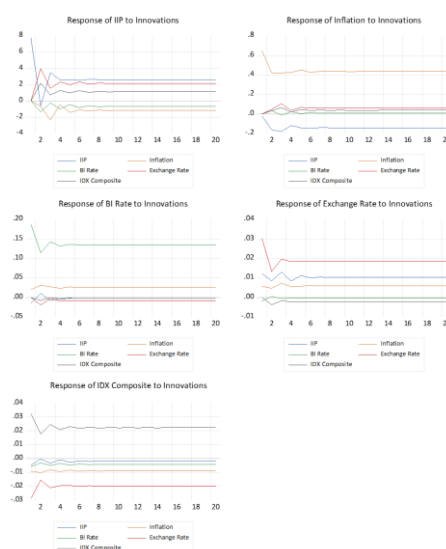
effect in the short term but can influence the interest rate variable positively in the long term by 0.00 percent. From the equation above, the interest rate variable has an influence of 0.00 on the variable itself.

**Exchange rate** = - 0.00 + 0.00 - **0.00IIP**<sub>t-1</sub> - **0.00Inflation**<sub>t-1</sub> - **0.00Interest Rate**<sub>t-1</sub> - 0.38**Exchange Rate**<sub>t-1</sub> - 0.01**IDX Composite**<sub>t-1</sub>.

From the equation above, it is known that the IIP, inflation, and interest rate variables have a negative and significant effect in the short term on the exchange rate variable. When the exchange rate increases by 1 percent, IIP, inflation, and interest rates will each experience a decrease of 0.00 percent. The exchange rate variable for the stock index (IDX Composite) has no effect in the short term but has the potential to influence the exchange rate variable positively in the long term by 0.00 percent. From the equation above, the exchange rate variable has an influence of 0.00 on the variable itself.

**IDX Composite** = - 0.00 + 0.00 + **0.00IIP**<sub>t-1</sub> - **0.00Inflation**<sub>t-1</sub> + **0.00Interest Rate**<sub>t-1</sub> + 0.01**Exchange Rate**<sub>t-1</sub> - 0.44**IDX Composite**<sub>t-1</sub>.

From the equation above, it is known that the IIP and interest rate variables have a positive and significant effect in the short term on the stock index variable (IDX Composite). When the stock index (IDX Composite) rises by 1 percent, the IIP and interest rate will also increase by 0.00 percent each. The inflation variable has a negative and significant effect in the short term on the stock index variable (IDX Composite). When the stock index (IDX Composite) rises by 1 percent, inflation will decrease by 0.00 percent. The exchange rating variable for the stock index (IDX Composite) has no effect in the short term but has the potential to influence the stock index variable (IDX Composite) positively in the long term by 0.00 percent. From the equation above, the exchange rate variable has an influence of 0.00 on the variable itself.



**Figure 2. IRF Test Results (Indonesia)**

The IRF test was carried out on two country objects, namely Indonesia and the U.S., by considering the response of each stock index of the two countries due to shocks caused by related variables, namely BI Rate, FFR, exchange rate, inflation, and IIP. The first IRF test was conducted in Indonesia which we can see in the picture above.

The IDX Composite responded positively to shocks from the variable itself in the 1st period worth 0.03 points. Then it decreased until the 4th period at 0.02, then increased in the 5th period to 0.023 points. In subsequent periods, the IDX Composite response tended to stagnate at 0.02 points until the last period.

IDX Composite began to respond negatively to changes in the BI Rate value in the 2nd period with a value of -0.008 points. Then it rose in the 3rd period to -0.00 points and fell again in the 4th period to -0.003 points. Furthermore, the IDX Composite response to BI Rate shocks fluctuated between -0.002 to -0.003 points, until in the 9th to final period the IDX Composite response stagnated at -0.002 points.

Similar to the IDX Composite's response to the BI Rate, the IDX Composite also responded negatively in the 2nd period with a value of -0.004 to changes in the exchange rate value. Then in the 3rd period, it increased to -0.001. Furthermore, until the last period, the IDX Composite response to changes in the exchange rate tended to decrease and stagnate at 0.02 points.

In contrast to the BI Rate and exchange rate, changes in inflation and IIP values are responded to positively by the IDX Composite. The IDX Composite, inflation variable, responded in the 2nd period by 0.03 points. Then it rose by 0.07 points in the 3rd period and decreased in the 4th period to 0.02 points. Furthermore, in the 5th period, there was an increase in responses of 0.04 points and experienced stagnation in the following periods until the end of the research period at 0.03 points.

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Similar to the IIP value, the IDX Composite responded to the IIP shock in the 2nd period with a value of 2.18 points. Then it decreased in the 3rd period to 0.72 points and increased by 1.27 in the 4th period. Furthermore, in the 5th period, it decreased by 0.99 points and stagnated between the values of 1.04 to 1.14 until the following period. The next period is until the end of the research method.

The IDX Composite response to the variable itself and macroeconomic variables such as the BI Rate, exchange rate, inflation, and IIP in Indonesia is considered very small, where the value is never more than 2 points. From the IRF test results above, it is also known that the IDX Composite response to macroeconomic variables tends to fluctuate only in the short-term period, and experiences stagnation in the long-term period.

Next is an analysis of the results of the IRF test in the U.S., where this test also aims to see the response of the stock index variable (DJI) to shocks from each macroeconomic variable, namely FFR, exchange rate, inflation, and IIP which are described as follows.

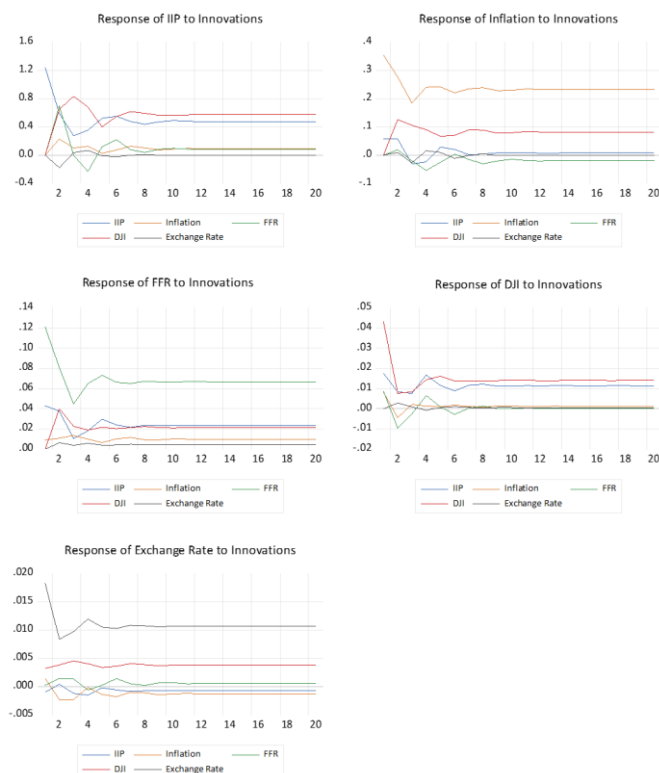


Figure 3. IRF Test Results (U.S.)

Based on Figure 3, DJI responded positively to the variable itself in the first period with a value of 0.04 points. Then it fell by 0.008 points in the 2nd and 3rd periods. Furthermore, there was an increase in the 4th period of 0.14 points and 0.16 points in the 5th period. In the following period, DJI's response to the variable itself stagnated between 0.13 and 0.14 points until the last period of the study.

In the IIP variable, DJI also responded positively in the second period with a value of 0.64 points. Then in the 3rd period, there was an increase of 0.83 points, and fell in the 5th period to 0.4 points. Furthermore, in the 6th and 7th periods, it rose to 0.6 points and stagnated at 0.5 in the following periods until the end of the research period.

In the IRF test carried out on U.S. time series data, it is known that the FFR variable and the DJI variable have a two-way relationship or influence each other. Where in Figure 8, the DJI variable responds positively to changes in the value of the FFR variable in the first period worth 0.04 points. Then it decreased in the 2nd and 3rd periods until it reached a value of 0.008 points. Furthermore, it experienced an increase of 0.014 and 0.016 points in the 4th and 5th periods and decreased by 0.013 points until the 8th period. In the following periods until the end of the research period, DJI's response to FFR shocks stagnated at 0.014 points.

Meanwhile, the FFR variable responded positively and negatively to DJI shocks in several research periods. In the first period, FFR responded positively with a value of 0.009 points. Then it responded negatively in the 2nd period with a value of -0.10 and increased in the 3rd period to -0.002 points. Then they continued to rise until they reached positive numbers in the 4th and 5th periods with values of 0.006 and 0.0009 points and decreased in the 6th period to -0.003 points. In the following

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periods, the FFR response increased until the 10th period reaching a value of 2.11 points, and stagnated at 0.000 points until the end of the research period.

DJI responded positively to shocks from the exchange rate variable in the first period of 0.003 points. Then it continued to increase until the 4th period reaching a value of 0.004 points and fell again to reach a value of 0.003 points in the 5th and 6th periods. In the following period, it again increased by 0.004 points and remained stagnant at 0.003 points until the end of the research period.

Not much different from the exchange rate variable, the DJI inflation variable also responded positively in the second period, amounting to 0.13 points. Then it continued to decline until the 6th period reaching a value of 0.07 points and an increase of 0.08 points in the 7th and 8th periods. In the 9th and 10th periods, there was a decrease in responses of 0.07 points and stagnated at 0.08 in the following periods until the end of the research period.

In contrast to the response of the stock index variable due to shocks from macroeconomic variables in Indonesia, which experienced fluctuations only in the short term and was stagnant in the long term until the end of the research period, the U.S. showed different response fluctuations. The U.S. stock index responds to shocks from macroeconomic variables fluctuating in the medium-term period and stagnating in the long term until the end of the research period.

The IRF test was carried out on two country objects, namely Indonesia and the U.S., by considering the response of each stock index of the two countries due to shocks caused by related variables, namely BI Rate, FFR, exchange rate, inflation, and IIP. The first IRF test carried out in Indonesia is described as follows:

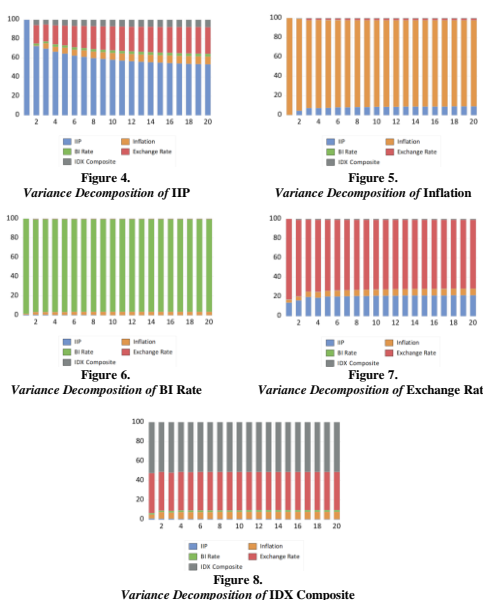


Figure 4 shows that the variance of the IIP variable is more influenced by itself than other variables throughout the research period. In the first period, IIP contributed fully, then there was a decline of 64.7 percent in the fifth year, and it continued to decline until it reached 53 percent at the end of the research period. Inflation contributed 0 percent in the first period, increased to 6 percent in the fifth year, and continued to increase until it reached 8.2 percent at the end of the research period. The interest rate contributed 0 percent in the first period, increased to 2.3 percent in the fifth year, and continued to increase until it reached 2.9 percent at the end of the research period. The exchange rate initially contributed 0 percent, increased to 20 percent in the fifth year, and continued to increase to 28 percent at the end of the research period, making it the largest contribution apart from IIP. IDX Composite also contributed 0 percent in the first period, increased to 6 percent in the fifth year, and continued to increase to 7.7 percent at the end of the research period.

Furthermore, figure 5 shows that the variance of the inflation variable is more influenced by itself than by other variables throughout the research period. In the first period, inflation contributed 99.8 percent, decreased to 90.4 percent in the fifth year, and continued to decline to 88.7 percent at the end of the research period. IIP initially contributed 0.2 percent in the first period, increased to 7.4 percent in the fifth year, and continued to increase until it reached 8.9 percent at the end of the research period, making it the largest contribution apart from inflation. The interest rate contributed 0 percent in the first period, increased to 0.14 percent in the fifth year, and reached 0.07 percent at the end of the research period. The exchange rate contributed 0 percent, increased to 1.5 percent in the fifth year, and reached 1.65 percent at the end of the research

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period. IDX Composite also contributed 0 percent in the first period, increased to 0.6 percent in the fifth year, and continued to increase until it reached 0.64 percent at the end of the research period.

Figure 6 shows that the variance of the interest rate variable is more influenced by itself than other variables throughout the research period. In the first period, the interest rate contributed 98.3 percent, decreased to 96 percent in the fifth year, and the value remained at 96 percent until the end of the research period. IIP contributed 0.5 percent in the first period, decreased to 0.3 percent in the fifth year, and became 0.1 percent at the end of the research period. Inflation initially contributed 1.1 percent in the first period, increased to 3.1 percent in the fifth year, and continued to increase to 3.5 percent at the end of the research period, making it the largest contribution besides the interest rate. The exchange rate contributed 0 percent in the first period, increased to 0.4 percent in the fifth year, and remained at 0.4 percent until the end of the research period. IDX Composite also contributed 0 percent in the first period, increasing to 0.07 percent in the fifth year, and 0.05 percent at the end of the research period.

Furthermore, figure 7 shows that the variance of the exchange rate variable is more influenced by itself than other variables throughout the research period. In the first period, the exchange rate contributed 82.9 percent, decreasing to 73 percent in the fifth year, and 70 percent at the end of the research period. IIP initially contributed 13 percent in the first year, then increased to 19 percent in the fifth year, and reached 20 percent at the end of the research period, making it the largest contribution apart from the exchange rate. Inflation contributed 3 percent in the first period, increased to 5 percent in the fifth year, and became 7 percent at the end of the research period. The interest rate contributed 0.3 percent, decreased to 0.1 percent in the fifth year, and to 0 percent at the end of the research period. IDX Composite contributed 0 percent in the first period and increased to 0.9 percent at the end of the research period.

Figure 8 shows that the variance of the IDX Composite variable is more influenced by itself than other variables throughout the research period. In the first period, IDX Composite contributed 52 percent, fell to 51.3 percent in the fifth year, and remained stable at 51 percent until the end of the research period. IIP contributed 1.1 percent in the first period, then decreased to 0.6 percent in the fifth year, and to 0.4 percent at the end of the research period. Inflation contributed 4 percent in the first period, increased to 7 percent in the fifth year, and reached 8 percent by the end of the research period. Interest rates remained stable, contributing 1.7 percent from the beginning to the end of the research period. The exchange rate initially contributed 40.8 percent, fell to 39.2 percent, and then remained stable at 39 percent until the end of the 20th period, making it the largest contribution apart from the IDX Composite itself.

Next, the results of the Variance Decomposition test for the United States are described as follows:

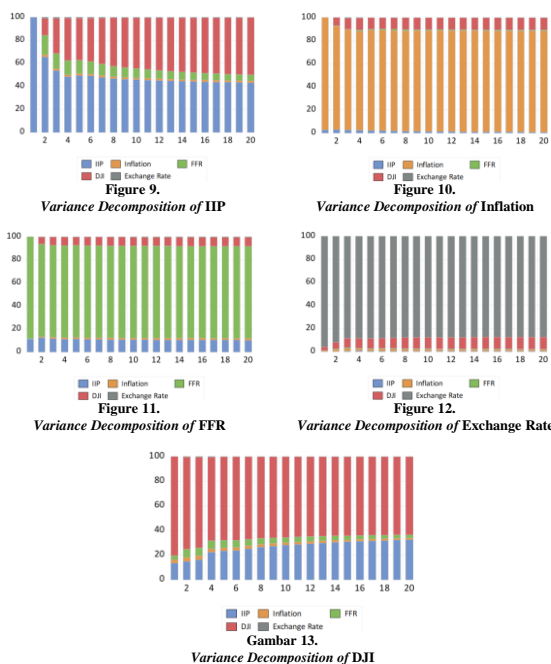


Figure 9 shows that the variance of the IIP variable is more influenced by itself than other variables throughout the research period. In the first period, IIP contributed fully, then there was a decline of 49 percent in the fifth year and continued to decline until it reached 43 percent at the end of the research period. Inflation contributed 0 percent in the first period, increased to 1.6 percent in the fifth year, and stabilized at 1.5 percent until the end of the research period. The interest rate contributed 0 percent in the first period, increased to 11 percent in the fifth year, then fluctuated and reached 5 percent at the end of the

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research period. The exchange rate contributed 0 percent in the first period, increased to 0.8 percent in the fifth year, and continued to decline until it reached 0.2 at the end of the research period. DJI also initially contributed 0 percent, then increased to 36 percent in the fifth year, and continued to increase until it reached 49 percent at the end of the research period, which made it the largest contribution besides IIP itself.

Furthermore, Figure 10 shows that the variance of the inflation variable is more influenced by itself than by other variables throughout the research period. In the first period, inflation contributed 97.4 percent, then decreased to 86 percent in the fifth year, and continued to increase to 87 percent at the end of the research period. IIP contributed 2.6 percent in the first period, then decreased to 2.2 percent in the fifth year, and continued to decline to reach 0.7 at the end of the research period. The interest rate contributed 0 percent in the first period, increased to 1 percent in the fifth year, and remained stable at 0.8 percent until the end of the research period. The exchange rate contributed 0 percent in the first period, then increased to 0.2 percent in the fifth year, and stabilized at 0.1 percent until the end of the research period. DJI also initially contributed 0 percent, then increased to 9.7 percent in the fifth year, and continued to increase until it reached 10.6 percent at the end of the research period, making it the largest contribution apart from inflation itself.

Figure 11 shows that the variance of the interest rate variable is more influenced by itself than other variables throughout the research period. In the first period, interest rates contributed 88 percent, then decreased to 80 percent in the fifth year, and remained stable at 79 percent until the end of the research period. IIP contributed 11 percent from the first year to the fifth year, then fell to 10 percent at the end of the research period, making it the largest contribution besides the interest rate. Inflation initially contributed 0.5 percent in the first period, then increased to 1.3 percent in the fifth year, and stabilized at 1.6 percent until the end of the research period. The exchange rate contributed 0 percent in the first period, then increased to 0.2 percent in the fifth year, and remained stable at 0.3 percent until the end of the research period. DJI also contributed 0 percent in the first year, then increased to 7.2 percent in the fifth year, and continued to increase until it reached 7.9 percent at the end of the research period.

Furthermore, Figure 12 shows that the variance of the exchange rate variable is more influenced by itself than other variables throughout the research period. In the first period, the exchange rate contributed 96 percent, then decreased to 88 percent in the fifth year, and continued to decline until it reached 87.4 percent at the end of the research period. IIP initially contributed 0.2 percent, then increased to 0.5 percent in the fifth year, and remained stable at 0.4 percent until the end of the research period. Inflation contributed 0.6 percent in the first period, increased to 1.7 percent in the fifth year, and continued to decline until it reached 1.4 percent at the end of the research period. The interest rate contributed 0 percent, increased to 0.5 percent in the fifth year, and reached 0.4 at the end of the research period. DJI initially contributed 3 percent, then increased to 8.6 percent in the fifth year, and remained stable at 10 percent until the end of the research period, making it the largest contribution apart from the exchange rate itself.

Figure 13 shows that the variance of the DJI variable is more influenced by itself than by other variables throughout the research period. In the first period, DJI contributed 80 percent then fell to 67 percent in the fifth year and reached 64 percent at the end of the research period. IIP contributed 13.3 percent in the first period, then increased to 23.4 percent in the fifth year, and reached 32.4 at the end of the research period, making it the largest contribution besides DJI. Inflation contributed 3 percent in the first period, decreased to 2.5 percent in the fifth year, and reached 1.3 percent at the end of the research period. The interest rate contributed 3.2 percent in the first period, then increased to 6 percent in the fifth year, and then continued to decline until it reached 2.6 percent at the end of the research period. Finally, the exchange rate contributed 0 percent in the first period, increased to 0.2 percent in the fifth year, and reached 0.1 percent at the end of the research period.

Based on the results above, during the research method period, global economic conditions experienced instability. Where there has been a decline in economic performance in many developed and developing countries, including Indonesia. This condition occurred due to instability in fiscal and monetary conditions throughout the world due to the COVID-19 pandemic. In addition, the geopolitical turmoil that occurred during the research period caused a slowdown in world economic performance. This global economic instability has certainly affected the macroeconomic conditions of countries with small open economies such as Indonesia.

This global phenomenon causes shocks to key macroeconomic indicators such as the production index, interest rate, inflation rate, and currency exchange rate. In their research, Megaravalli & Sampagnaro, (2018), argue that the macroeconomic performance of a country and the capital market, especially the stock index, have a very close relationship and influence each other. Where strong economic growth will create a conducive climate for business growth and investment. An increase in the production index, strong public consumption, increased investment balanced by a low level of inflation, and an accommodative interest rate policy also indicate good economic conditions, this will move the capital market and encourage an increase in a

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country's stock index. However, economic instability will certainly cause capital market volatility in developing countries like Indonesia.

This research explains the impact of shocks on key macroeconomic indicators such as the production index, interest rate, inflation, and currency exchange rates on the IDX Composite in Indonesia. The research results show that each of these key indicators has an influence on IDX Composite Indonesia has an immediate and long-term impact. However, each indicator has a varying relationship, influence, response, and contribution to the stock index in Indonesia. Therefore, the discussion is divided into three parts.

First, the research results show that the Index Industrial Production (IIP) and inflation variables have a positive and substantial correlation with the IDX Composite Indonesia. Theoretically, production theory considers the distribution of income and its influence on the economy. This suggests that industrial production conditions can be an important factor influencing the stock market, as industrial production performance often reflects overall economic conditions. Strong industrial production conditions can provide a positive signal for investors and encourage share prices to rise, while weak industrial production conditions can be an indicator of an economic slowdown and can trigger a decline in share prices.

Throughout the research period, IIP tended to continue to increase in Indonesia. The highest growth for Indonesia will occur in 2023 in the second quarter, precisely in August. According to a report published by the Ministry of Industry & SIIINas, (2023), this condition was caused by an increase in industrial areas registered with SIIINas, and in this period there was a growth in the export performance of non-oil and gas processing industries and a decrease in the value of imports in the same commodities so that there was a surplus condition in the trade balance this month. This finding is in line with research from Fuad and Yuliadi, (2021) Which states that the industrial production index has a positive influence on stock prices on the IDX Composite.

The inflation variable and the IDX Composite exhibit a similar relationship, whereas in this study inflation shows a substantial positive relationship. This shows that inflation fluctuations can affect overall stock market performance. The results of this research contradict the "Random Walk Theory" which states that information on increasing inflation levels received by investors will reduce stock prices. From the standpoint of the consumer, higher inflation will result in lower purchasing power and a declining value of the currency. But when looking at it from the standpoint of the business, inflation is a good thing. The prices of goods and services will rise in tandem with an increase in the inflation rate, hence augmenting the revenue of the corporation. Additionally, this requirement will stimulate a rise in business share value, which will contribute to the IDX Composite's total increase. The results of a poll carried out by the Center for Economics and Law Studies (CELIOS) and posted on the Kata Data website, indicate that investors seek to raise income levels and the value of money to prevent inflation from undermining their gains, further support the positive impact of inflation on the IDX Composite in this research (Sri Rahayu & Diatmika, 2023). This result is also reinforced by the trend in Indonesia, where when there is an increase in inflation this will encourage investors to invest to protect the value of the assets they own from inflation.

Second, the results of the study show a strong and unfavorable association between the IDX Composite and the interest rate (BI Rate) variable. These results suggest that the interest rate policy, as set by the central bank, has a major impact on the stock market. Research by Intan Nurkhikmatul Aini et al., (2020), This suggests that the level of interest rates affects the IDX Composite, supports the findings of this study.

During the study period, there was an increasing tendency in the US Federal Reserve's (FFR) interest rate trend, which prompted a rise in the benchmark interest rate (BI Rate). When inflation was high, the central bank implemented its interest rate hike policy. to manage the monetary environment. An increase in interest rates affected how people invest. Theoretically, when the interest rate rises, people tend to protect the assets they own by saving in banks. This condition can also make investing in shares less attractive, which will cause the overall share price index to fall. Conversely, a drop in interest rates may inspire investors to take more daring and high-risk investments, but it may also result in larger returns. This condition will encourage investment volume, which will encourage an increase in overall share prices.

Third, the research results show that currency exchange rates are not significantly impacted in the near term on the IDX Composite in immediate. But in the long run, the exchange rate variable has the largest impact. according to the VD test, following the variable itself. This is because currency exchange rates often experience significant fluctuations in the short term but tend to be more stable in the long term, so investors are more likely to take into account other factors that have a clearer and more predictable impacted market in the near term on the stock market. Other factors, such as company performance, macroeconomic conditions, monetary policy, and market sentiment, are more dominant in influencing the stock market. Not only that, but the stock market has also adjusted to fluctuations in currency exchange rates so that the impact has been

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reduced. Research by Murtadho, (2016), which claims that the IDX Composite is not significantly impacted by the rupiah's exchange rate versus the dollar, supports the findings of this study.

In the long term, however, the exchange rate has a significant impact on the Indonesian IDX Composite. This is because the exchange rate variable also serves as a gauge for the economic performance of a nation. An appreciation in a nation's currency exchange rate will draw foreign investors to the area. Exchange rate appreciation reflects confidence in a strong and stable economy, which encourages investors to buy domestic assets because they expect greater profits. This can increase capital inflow, strengthen the stock market, and encourage an increase in the IDX Composite.

Conversely, when the value of a currency depreciates, this often indicates that the country's economic performance is experiencing problems. Depreciation of the exchange rate can cause concerns among investors about economic stability and prospects for investment returns. As a result, capital market volatility increased, as investors withdrew their capital and sought safer investments abroad. This reduces capital inflows into the domestic stock market, which can suppress share prices and cause a decline in the IDX Composite.

Therefore, the stability and movement of the exchange rate is an important factor monitored by investors in making investment decisions. A stable and strong exchange rate tends to support IDX Composite growth, while a volatile or weakening exchange rate can cause uncertainty and pressure on the stock index. As a result, long-term capital market dynamics and investment decisions are greatly impacted by fluctuations in the exchange rate. These findings are consistent with studies by Sihombing, Irsad, and Tanjung, (2021) and Hijrianti *et al.*, (2024), who found that the IDX Composite is very adversely affected by the rupiah currency rate.

On the other hand, the U.S. responded differently to global phenomena and instability due to geopolitical turmoil. If in Indonesia this global phenomenon has a negative impact and causes a decline in economic performance, this is different from the U.S. which shows significant growth. Amid the global economic downturn, the U.S. continues to experience an increase. This condition is caused by strong consumer power and high real wages in the United States. Apart from that, as the ruler of the global economy, the U.S. dollar is still the currency used for global transactions, this supports the strength of the U.S. economy amidst the ongoing uncertainty and instability of the global economy (United Nations, 2024).

So, apart from wanting to study the influence of shocks on key macroeconomic indicators on the Indonesian stock index, researchers also want to compare the condition of stock indices in the U.S. due to global phenomena and shocks from related key macroeconomic indicators. Just like in Indonesia, the research results show that each of these key indicators has an influence on the DJI stock index in the U.S. in the near term and long term. However, each indicator has a varying relationship, influence, response, and contribution to the stock index in the United States. Below we divide our discussion into three parts.

First, the study results show that IIP has a positive and significant affected on the Dow Jones Index in the United States. The Index of IIP is one of the main economic indicators used to measure the output of the manufacturing, mining, and utilities sectors in the United States. This index reflects the level of industrial activity and is often seen as a reflection of the overall health of the economy. The impact of IIP on DJI is very significant because DJI consists of 30 large companies whose operations cover major industrial sectors. Changes in IIP often translate directly into stock price movements of these companies.

At the end of 2018, IIP showed a significant decline triggered by trade tensions between the U.S. and China. This trade war introduced high tariffs on a variety of goods, which disrupted global supply chains and increased production costs for American companies. As a result, industrial output experienced a decline as these companies had to adjust to higher import costs and market uncertainty.

This decline in IIP sparked investor concerns about an economic slowdown, which resulted in a sharp decline in DJI. Companies that rely heavily on global supply chains will experience substantial stock price declines as uncertainty in international trade directly affects stock performance. Investors are becoming more careful and tend to withdraw their investments from industrial sector stocks, considering the potential for decreased profits and operational disruptions. This finding is in line with Fuad and Yuliadi, (2021) Who stated that the IIP is positively impacted on the stock price index.

The same relationship also occurs between the inflation variable and DJI, where in this study inflation shows a significant positive relationship. Inflation is one of the key macroeconomic indicators, so fluctuations in this variable will affect other macroeconomic variables. When inflation increases, this can reflect an increase in economic activity and higher demand for goods and services. This increase will be followed by an increase in company revenue and profits, especially large companies included in the DJI index.

Companies that can manage rising production costs by increasing the prices of their products or services can increase their profitability, which ultimately drives their share prices up. Additionally, controlled inflation is often considered a sign of a

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healthy and growing economy, which ultimately increases investor confidence and encourages them to invest more in the stock market. This finding is in line with Alvian et al., (2019) Which states that inflation positively impacted the stock index.

Second, the study's findings indicate a substantial and negative correlation between DJI and the interest rate variable (FFR). These results suggest that the central bank's interest rate policy has a big impact on the stock market. The stock market will react favorably to a rate drop by the Federal Reserve because reduced borrowing costs can stimulate investment and consumption. On the other hand, since higher borrowing costs have the potential to stifle corporate profitability and lower consumer spending power, an increase in interest rates frequently causes a decrease in stock indices.

Not only that, fluctuations in interest rates also affect investors' expectations of future profits. When interest rates increase, investors shift their funds from the stock market to safer investment instruments such as bonds, which offer higher returns. This resulted in a decrease in demand for shares, thereby putting pressure on share prices and the stock index. On the other hand, falling interest rates make investment instruments such as bonds less attractive, so investors prefer to invest in the stock market which has the potential for higher profits, which ultimately drives the stock index up. This finding is strengthened by research conducted by Chasan, (2017) Which states that a substantial and negative correlation between the stock index.

Third, the findings of the study show that DJI is not much impacted by foreign exchange rates. Accordingly, changes in exchange rates have no direct impact on the rise and fall of the stock price index. Differences in the operational focus of the companies that make up the DJI stock price index, the majority of which rely on imports, while others are more export-oriented may be the reason for the exchange rate's negligible impact. Furthermore, some long-term investors do not let exchange rate swings affect their investment choices since they see them as a passing occurrence. Research by Kurniawati, (2021) Shows that the exchange rate has no appreciable impact on the stock price index supports the findings of this study.

To determine each variable's short- and long-term effects, the VECM model test was also run. The increase in the IIP variable causes different influences on the inflation variable in the U.S. and Indonesia. Where in the U.S., the increase in IIP has a negative effect on the inflation variable in the long term. This is caused by an increase in IIP which indicates an increase in output and production efficiency, thereby encouraging economic stability. This increase in economic stability creates an environment that is more conducive to controlling inflation because higher productivity can withstand inflationary pressures by reducing production costs and increasing the supply of goods on the market. Meanwhile, in Indonesia, the increase in IIP has a positive effect on inflation. When IIP increases, this reflects an increase in production and company performance which leads to an increase in company revenue. An increase in company income can then encourage an increase in people's per capita income. People's purchasing power will rise in tandem with their income, stimulating demand for a range of goods and services. There will be a shortage if the rise in demand is not offset by an increase in the supply of goods. Due to the condition of shortage, prices for goods and services will rise, which will ultimately raise the rate of inflation (Theodora, 2022).

Different influences also occur on the inflation variable. In the United States, increasing inflation has a detrimental short- and long-term impact on the interest rate variable. The increase in inflation in the long term encourages the Fed to increase its benchmark interest rate aggressively to reduce inflation (Kusnandar, 2022). This condition is also by The Taylor Rule, namely an econometric model that states that the Federal Reserve must increase the interest rate when the level of inflation or GDP exceeds the target value (Twomey, 2024). In the meantime, the interest rate in Indonesia is positively impacted by the rise in inflation. This occurs as a result of the government enacting a contractionary monetary policy, which involves raising interest rates and lowering the money supply to lower the level of public consumption when long-term inflation increases. For the nation's economy to improve, this contractionary monetary policy will be implemented, which will lower both the level of inflation and public demand. Additionally, the impact of this inflation increase on Indonesian and US exchange rates varies. In this scenario, a spike in inflation benefits the US dollar while adversely affecting the Indonesian currency. This occurred as a result of the policy of aggressively increasing the interest rate carried out by the Fed. This policy had an impact on strengthening the U.S. dollar which caused the depreciation of world currencies, including the rupiah (Kusnandar, 2022). The increase in the interest rate by the Fed increases the attractiveness of investment in the U.S., inviting greater capital inflows to the country. As a result, demand for U.S. dollars increased significantly, strengthening the exchange rate. On the other hand, in Indonesia, capital outflows tend to increase because investors are looking for higher returns in the U.S. so that the rupiah exchange rate weakens. The inability of the Indonesian domestic economy to match the attractiveness of the high interest rate in the us has exacerbated the depreciation of the rupiah.

Based on the discussion above, it is known that all macroeconomic indicators in the research affect stock indices in both Indonesia and the United States. However, there are differences in the relationship and magnitude of influence of each variable in Indonesia and the U.S., both in the short and long term. Whereas a developed country ruling the world economy, in the U.S. the stock index (DJI) is dominantly influenced by the country's internal conditions, so fluctuations in macroeconomic variables



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such as IIP, interest rate, and inflation levels greatly influence the stock index in the United States. Fluctuations in these variables reflect the health of the domestic economy which directly influences investors' confidence and their investment decisions. In addition, the dominance of the U.S. dollar in the global market reduces the impact of exchange rate fluctuations on the stock index (DJI). Although the rated dollar exchange can influence international trade and multinational companies, its direct influence on the U.S. stock index (DJI) is not as great as the impact of internal macroeconomic variables. Therefore, the internal economic stability and growth of the U.S. remain the main factors in determining stock index (DJI) movements (Hidayat, 2023), while external influences, including exchange rate fluctuations, have a relatively smaller impact.

Unlike Indonesia, the exchange rate, inflation, and interest rate have a greater impact on the Indonesian stock index (IDX Composite). Due to its relatively modest open economy, Indonesia is impacted by both local and global economic factors. This makes the IDX Composite very vulnerable to changes in economic policies implemented by countries that dominate the world economy, such as the United States. For example, every change in monetary policy implemented by the Federal Reserve, such as adjusting the interest rate, can trigger changes in the domestic interest rate and rupiah exchange rate, which in turn have a direct impact on the IDX Composite (Heriyanto, 2023).

In addition, international occurrences like economic downturns and geopolitical conflicts have a significant impact on Indonesia's macroeconomic stability. The demand for Indonesian exports may fall during a downturn in the world economy, which will affect state revenue and financial stability. Geopolitical tensions, such as international conflicts or trade wars, can also disrupt the flow of foreign investment and trade, which are important components of the Indonesian economy (Annur, 2023). These conditions create high levels of uncertainty in the market, which is often reflected in IDX Composite fluctuations.

### CONCLUSIONS

This research examines the relationship between macroeconomic indicators and capital market performance in developed and developing countries. Based on the VECM test, it was found that in the short term, fluctuations in macroeconomic variables influence the IDX Composite. The IIP, inflation, and exchange rate variables show an insignificant negative influence, while the interest rate variable shows an insignificant positive influence. On the other hand, the IIP variable and inflation on the IDX Composite have a long-term, positive, and significant association. However, there is a notable and negative correlation between the interest rate variable and the IDX Composite. In the long run, however, there is no discernible relationship between the exchange rate variable and anything. The exchange-rated and inflation variables have a dominant long-term influence on the IDX Composite variable, according to the variance decomposition (VD) test.

A similar thing is also found in the US. Where in the short term, fluctuations in macroeconomic variables influence DJI. The industrial production and inflation index variables show an insignificant negative effect. Meanwhile, the exchange rate variable, in the short term, shows an insignificant negative influence in the first period and changes to a significant negative in the following period. The interest rate variable in the first period showed an insignificant positive influence on DJI, then changed to a negligible negative impact in the next research period.

On the other hand, over the long run, the IIP variable and inflation on DJI have a positive and significant association. However, there is a clear and negative correlation between DJI and the interest rate variable. In the long run, however, there is no discernible relationship between the exchange rate variable and anything. The industrial production index, interest rate, and inflation variables have a dominant long-term influence on the DJI variable, according to the variance decomposition (VD) test.

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