Artikel 9

by Mahrus Kurniawan

Article Type: Research Paper

Analysis of Macroeconomic Indicators Against the Composite Stock Price Index (CSPI) in Indonesia: Vector Error Correction Model (VECM) Approach

Afla Afifa Aminarta* and Mahrus Lutfi Adi Kurniawan

Abstract: The Composite Stock Price Index (CSPI) is one indicator to determine economic growth. The Composite Stock Price Index (CSPI) is formed by counting the stocks listed on the Indonesia Stock Exchange (IDX). Macroeconomic conditions can influence the movement of the CSPI in a country. Macroeconomic indicators that affect the CSPI include inflation, exchange rates, and interest rates represented by the BI rate. This study aimed to determine how much influence the selected macroeconomic indicators had on the CSPI and determine the CSPI movement forecast. This study uses the Vector Error Correction Model (VECM) as an estimation method. The research shows that the inflation, exchange rate, and BI rate variables do not affect the CSPI in the short term, and only the exchange rate variable affects the long term. Forecasting performed on variables shows an over-optimistic forecast for the exchange rate and BI rate variables.
Keywords: VECM; CSPI; Macroeconomics
JEL Classification: H54; F62; E44

AFFILIATION:
Department of Development Economics, Faculty of Economics and Business, Universitas Ahmad Dahlan, Special Region of Yogyakarta, Indonesia.

*CORRESPONDENCE:
aflaaminarta@gmail.com

Introduction

One of the economic conditions can be reflected by the condition of the capital market. In the capital market, there are various shares of companies that are traded. In running the economy, a company is strongly influenced by internal and external factors. One of the factors from outside the company is the macroeconomic condition of a country. Therefore, macroeconomic conditions are a matter of great concern to investors, then used to forecast capital market conditions. Macroeconomic indicators often associated with capital market conditions are inflation, the magnitude of the exchange rate, and the interest rate.

Interest rates are an essential factor in the economy, and this refers to changes in interest rates set by the monetary authority that can affect the economy significantly and have a powerful influence on the capital market (Erawati, & Llewlyn, 2002). Interest rates are used as an instrument by investors related to investing or holding their investment. Interest rates can affect banking activities from deposit rates to loan interest rates (Amin & Herawati, 2012). If the deposit interest rate is high, investors will invest their capital in deposits to generate greater returns and lower risk.

The stock price index is an indicator to see growth or movement in a period. Meanwhile, the composite stock price index (starting now referred to as CSPI) is an index that includes all shares listed on the capital market. So to know the condition of the capital market, especially the stock market, the CSPI can be used as a reference. If the CSPI shows a good trend, it can be seen that the economic condition is in a stable condition and tends to be good. For example, from January 2017 to December 2019, the CSPI chart fluctuated but showed an increase. The fluctuating movement of the CSPI follows economic developments both globally and domestically.
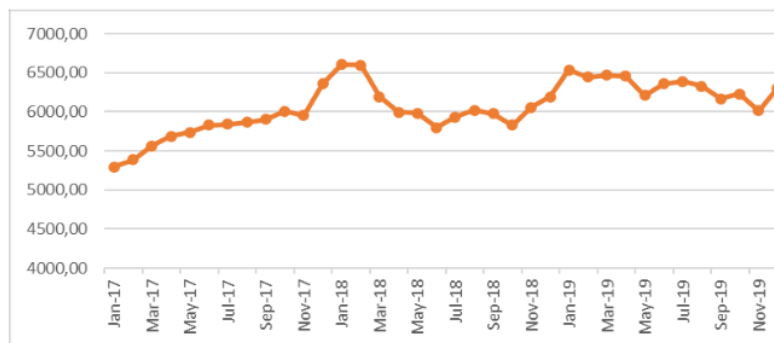

Figure 1 CSPI Chart January 2017-December 2019

To see the development of the capital market in Indonesia, the indicator used is the Composite Stock Price Index (CSPI). CSPI volatility occurred due to changes in existing macroeconomic indicators. Changes in the prices of goods and services can also influence investors in making decisions. If the inflation rate is high enough, it can hold investors to invest because holding cash becomes more critical (Arsiyanto, 2020). Companies listed on the CSPI are large companies and carry out export and import activities. If the rupiah exchange rate appreciates, it can reduce importing raw materials for production, increasing company profits. Investors will invest their capital in companies that show good performance. It indicates that the exchange rate can affect investors' decisions (Nidianti & Wijayanto, 2019). Utami (2018) identifies the dynamic relationship of stock markets in Indonesia, Malaysia, South Korea, Hong Kong, and the United States and shows that stock markets in these five countries are integrated during and after the crisis so that the volatility of the CSPI can be determined by the volatility of the financial markets of 5 other countries.

This study's purpose was to determine whether there is a relationship and influence of inflation, BI rate, and exchange rates as the dependent variable on the volatility of the CSPI variable both in the long term and in the short term. Kusno dan Teja (2019) states that financial market performance can be identified using the volatility of the related variables. In addition, the study also applies to forecast methods to future economic conditions to provide suggestions and conclusions in the future based on economic phenomena that occur in the selected period.

CSPI is an index that shows general stock price movements for stocks listed on the stock exchange and is a reference for developing activities in the capital market. CSPI can assess general market conditions and see whether there is an increase or decrease in the market. CSPI includes all share prices listed on the Indonesia Stock Exchange (Anoraga & Pakarti, 2001). Therefore, CSPI is subject to change due to changes in market prices every day and additional shares. The increase in the number of shares comes from issuers that have just been listed on the stock exchange or can also occur due to corporate actions, such as splits, rights, warrants, stock dividends, bonus shares, and convertible shares. Meanwhile, the demand and supply of these shares cause changes in stock prices in the market. Some that affect supply and demand are company performance, interest rates, inflation rates, growth rates, foreign exchange rates, or stock price indexes of other countries.

The increase in the CSPI does not mean that all stocks have increased, but only some stocks have increased. Likewise, for the decline in the CSPI, which is not necessarily followed by a decrease in all stock prices in the market, only a few stocks have experienced a decline. If there is an increase in the CSPI, the stock will increase. It can be seen that the stock is positively correlated to the CSPI. If a stock decreases when the CSPI value increases, it can be seen that the stock has a negative correlation with the CSPI. However, when we talk about the price of the stock with book equity to market equity, the stock price relative to its book value, so in Indonesia Stock Exchange, the size factor and value factor confirmed in a market with small market capitalization with low to medium in stock price relative to its book value and market with significant market capitalization with high stock price relative to its book value. (Yudhistirangga et al., 2018)

Inflation is a process in which prices generally increase continuously due to the commodity procurement system program (production, pricing, printing money, and others.) with the level of people's income. (Putong, 2015). The price increase that occurs does not have to be at the same percentage, but the critical point is that price increases occur in general and continuously over a certain period. Price increases in certain goods only occur once are not included in the inflation category even though the increase is significant. Inflation is an event that describes conditions and situations where goods have increased and the value of the currency has decreased or weakened. If conditions continuously deteriorate overall economic conditions and shake its political stability (Fahmi, 2015). Tulcanaza Prieto and Lee (2019), in financial market research in Korea and Japan, stated that inflation (as a macroeconomic variable) has a significant effect on financial markets in both the short and long term. Shawtari et al. (2016) found a long-term effect of macroeconomic variables on prices in the financial market.

It can be concluded that inflation is a condition where there is an increase in commodity prices in general, both goods and services, continuously in one period. Price increases that occur seasonally, such as before the fasting month, Eid, Christmas, and others, are not included in inflation because price increases occur only once and have no further effect. However, inflation can have a widespread impact, namely a decrease in people's

purchasing power due to the actual value of money or income experiencing a decline, so that it can be stated that inflation can further affect the state's economic condition.

The exchange rate is one of the essential values for a country in the economic system because the exchange rate is very influential in conducting international transactions in an open economy. The exchange rate measures the domestic currency price against the price of other countries' currencies. For example, the dollar exchange rate is the price of one dollar unit expressed in rupiah. The increase in the domestic currency exchange rate is called the foreign currency's appreciation, while the domestic currency's decrease is called the depreciation of the foreign currency. Wuryandani (2011), in his research, stated that the exchange rate has a stronger contagion to the financial market in Indonesia compared to interest rates.

The exchange rate or exchange rate is a value that shows the amount of domestic currency needed to get one unit of foreign currency. The exchange rate is divided into two: the nominal exchange rate and the real exchange rate. The nominal exchange rate is the relative price of one currency against another currency, while the real exchange rate is the relative price of goods between two countries. Currency stability is essential, especially in the business world. The value of the currency that soared drastically and uncontrollably could cause uncertainty in the business world, especially those who cooperate with other countries. Therefore, exchange rate stability is one of the monetary indicators that support macroeconomic development.

The interest rate, better known as the BI rate, is a sign in the form of numbers in monetary policy that can show the ongoing economic situation, including providing an overview of the challenges in achieving the inflation target. (Natsir, 2014). According to Bank Indonesia, the BI rate is the interest rate determined as a monetary policy instrument set by Bank Indonesia and announced to the public. The BI rate is announced at the board of governors meeting by the Board of Governors of Bank Indonesia, which is realized through liquidity management in monetary operations on the money market to achieve monetary policy targets. Even the sensitivity of the financial market through various news or announcements can change the volatility that occurs in the financial market (Langelo, 2016). Fajri et al.'s research (2019) with a cyclical approach and the Hamilton Filter method shows that financial market sensitivity can be identified using the interest rate variable. The results show that monetary variables (interest rates) significantly affect sectoral index performance in financial markets.

This study identifies the effect of macroeconomic variables such as inflation, interest rates, and exchange rates on the CSPI. Research on CSPI has developed a lot, with that researcher apply the forecasting method to the VECM model to fill the gap from previous research. The forecasting method is used for the early detection of the behavior or movement of a variable.

Research Method

The data analysis method is a method that will be used to process data for further interpretation to answer problems. The data used is time-series data or groupings based on monthly data from January 2017 to December 2019. The data analysis used by the researcher is the Vector Autoregression (VAR) method. If there is stationary data in the first difference in the VAR model, the VAR model will be combined with the Vector Error Correction Model (VECM) model. In the VECM model, corrections will be made to errors that occur in the data. For example, this study converted the CSPI and exchange rate data into a natural log form, while inflation and BI rate were not converted into a natural log form.

Before the VAR/VECM test is carried out, it is necessary to have pre-estimated tests such as classical assumption test, data stationarity test, determination of optimal lag, stability test, and cointegration test. The VAR test is very suitable for use in modeling economic problems. In making the VAR model, there is no need to distinguish between endogenous and exogenous variables. In the VAR model, the theoretical approach is very minimal and focuses more on events or phenomena. Therefore, the VAR model can be used to describe the data and make forecasts. The general equation for VAR is as follows:

$$Y_t = A_0 + A_1 Y_{t-1} + A_2 Y_{t-2} + \cdots + A_p Y_{t-p} + \varepsilon_t$$

Where: Y_t: vector with size (n.1) containing n variables according to the number contained in the VAR. model. A_0: intercept vector with size (n.1). A_i: coefficient matrix of size (nn) for values of i = 1, 2, 3, ..., p. ε_t: vector error with size (n.1).

Besides that, Vector Error Correction Model (VECM) is a VAR model that is not stationary at the level but has cointegration, so this cointegration information is then used in the model. By using the VECM model, it can be seen that the model has adjustments from short to long term. To determine the effect or response of variables to shocks on other variables, the authors use the Impulse Response Function (IRF). It is done because when a shock occurs in a variable, it often affects other variables. Therefore, IRF aims to identify and specify changes to certain variables. Meanwhile, to predict the contribution of variables to changes in certain variables, the author uses Forecast Error Variance Decomposition (FEVD). If IRF is used to see the impact of shocks in one variable on other variables, then FEVD shows how vital the VAR model variables are after the shock.

Result and Discussion

Data Stationarity Test

After performing the classical assumption test on the data and ensuring that the data is free from problems, the normality test, multilinearity test, heteroscedasticity test, and autocorrelation test, the next step is to determine whether the data is stationary or not.

Finally, a stationarity test was carried out using the Augmented Dickey-Fuller (ADF) test using none, intercept, and trend & intercept models.

Table 1 Augmented Dickey-Fuller (ADF) Test Results

Variable Name	ADF Level			ADF First Difference		
	None	Intercept	Trends & Intercept	None	Intercept	Trends & Intercept
CSPI	0.8908	0.1022	0.1031	0.0000	0.0003	0.0017
Inflation	0.4089	0.5756	0.3096	0.0000	0.0000	0.0003
Exchange rate	0.7779	0.3835	0.7652	0.0021	0.0287	0.0000
BI Rate	0.6585	0.2682	0.0798	0.0023	0.0328	0.1150

From Table 1, it is known that the CSPI, inflation, exchange rate, and BI rate variables are not stationary at both the none, intercept, and trend & intercept levels. Furthermore, it is known that the p-value of each variable in each model has a value greater than 0.05. Therefore, the stationarity test is carried out at the first difference level because the four variables are not stationary in the three models.

In the ADF test at the first difference level, it is known that the p-value of the CSPI variable, inflation, exchange rate, and BI rate is less than 0.05 in the none and intercept models. Meanwhile, in the trend & intercept model at the first difference level, the BI rate variable has a p-value of 0.1150 were more than 0.05. Based on these results, it is known that the CSPI, inflation, exchange rate, and BI rate variables are stationary simultaneously in the ADF test at the first difference level with none and intercept models.

Optimal Lag Test

VECM estimation is an estimate that is very sensitive to the length of the lag in data. Determination of the optimum lag length is done by taking into account the values of the Likehood Ratio (LR), Financial Prediction Error (FPE), Akaike Information Crition (AIC), Schwarz Information Crition (SC), Hannan-Quin Critition (HQ). The lag length chosen in the optimal lag test is 0 to 2. The selection of lag 0 to 2 is considered sufficient because the data used is 36, namely data per month from January to December 2019. The results of the optimal lag test are as follows:

Table 2 Lag Test Results

lag	LR	FPE	AIC	SC	HQ
0	NA	4.09	-24,081	-23.902	-24,020
1	173,029*	2.71*	-29,107*	-28,209*	-28.801*
2	17,418	3.61	-28,862	-27,246	-28,311

Based on Table 2, it can be seen that lag 1 is the lag that has the most conformity with the criteria. Lag 1 has conformity with three criteria, namely AIC, SC, and HQ. Based on these test results, the optimal lag used in modeling the VECM equation is lag 1.

VECM Stability Test

After obtaining the optimum lag value, it is necessary to test the VECM stability against the selected lag. It is done to ensure that VECM estimation using the selected lag will produce accurate results.

Table 3 Lag Stability Test Results

Root	Modulus
0.904	0.904
$0.808 - 0.139$	0.820
$0.808 + 0.139$	0.820
0.483	0.483

Based on Table 3, it is known that the modulus value for lag length 1 has a range of values smaller than one. Therefore, a modulus value of less than 1 indicates stability in the VECM when using lag one so that lag one can be used in making equations.

Cointegration Test

After the optimum lag is known and the stability of the VAR is confirmed, the next step is to test whether the data in the model has cointegration. A cointegration test is a test conducted to determine whether the data to be used in the model has a long-term equilibrium relationship or not.

Table 4 Cointegration Test Results

Trace				
Hypothesized No. Of CE(s)	Eigenvalue	Trace Statistics	Critical Value	Prob.**
None	0.417	39,825	47,856	0.229
At most 1	0.247	21.506	29,797	0.327
At most 2	0.185	11,866	15,494	0.164
At most 3*	0.135	4,916	3,841	0.027
Maximum Eigenvalue				
Hypothesized No. Of CE(s)	Eigenvalue	Max-Eigen Statistics	Critical Value	Prob.**
None	0.417	18,318	27,584	0.469
At most 1	0.247	9,641	21.132	0.778
At most 2	0.185	6,949	14,265	0.495
At most 3*	0.135	4,916	3,841	0.027

Based on Table 4, it can be seen that in the Trace Statistics test, there is a p-value of 0.026 where the value is less than 0.05. In addition, there is a Trace statistic value of 4.916 where this value is greater than the critical value of 3.841. A p-value of 0.026 is obtained from the Maximum Eigenvalue test, where the value is less than 0.05. Finally, the Max-Eigen statistic is 4.916, which is greater than the critical value of 3.841.

In the Trace Statistics test and Maximum Eigenvalue test, one variable has a probability value of less than 0.05. Therefore, each test found one equation that is cointegrated. In

the Trace Statistics test, the trace statistic value is greater than the critical value. Then, the Maximum Eigenvalue test shows that the Max-Eigen statistic is greater than the critical value. Based on these statistical facts, it can be concluded that the data has cointegration so that the model has a long-term equilibrium relationship.

Granger Causality Test

The causality test of the data was carried out to determine whether the variables used had a causal relationship and determine which independent variables could affect the dependent variable.

Table 5 Granger Causality Test Results

Null Hypothesis:	Obs	F-Statistics	Prob.
INFLASI_X1 Does Not Granger Cause LOG_CSPI_Y	35	0.236	0.630
LOG_CSPI_Y Does Not Granger Cause INFLATION_X1		2,726	0.109
LOG_KURS_X2 Does Not Granger Cause LOG_CSPI_Y	35	0.353	0.557
LOG_CSPI_Y Does Not Granger Cause LOG_KURS_X2		1.372	0.250
BI_RATE_X3 Does Not Granger Cause LOG_CSPI_Y	35	0.861	0.360
LOG_CSPI_Y Does Not Granger Cause BI_RATE_X3		0.455	0.505
LOG_KURS_X2 Does Not Granger Cause INFLATION_X1	35	1.442	0.239
INFLASI_X1 Does Not Granger Cause LOG_KURS_X2		3.845	0.059
BI_RATE_X3 Does Not Granger Cause INFLATION_X1	35	0.011	0.915
INFLASI_X1 Does Not Granger Cause BI_RATE_X3		3.255	0.081
BI_RATE_X3 Does Not Granger Cause LOG_KURS_X2	35	0.000	0.979
LOG_KURS_X2 Does Not Granger Cause BI_RATE_X3		10,709	0.002

From Table 5, there is a causality test between the inflation variable and the CSPI. In the test, there are H0: Inflation does not affect the CSPI and H1: Inflation affects the CSPI. In this test, it is known that the probability value obtained is 0.6302, where the value is more than α 0.05. Therefore, a probability value greater than 0.05 indicates that H0 is accepted. Thus, it is known that inflation does not affect the CSPI.

On the other hand, H0: CSPI does not affect inflation, and H1: CSPI does not affect inflation. In this test, the probability value of 0.1085 is obtained where the number is more than 0.05, so it states acceptance of H0. Thus, from the causality test between inflation and the CSPI, it can be seen that inflation and the CSPI do not have a causal relationship. This explanation can be used to read the results of the causality test on the following variables.

The Granger method's causality test shows no one-way or two-way causality relationship between the inflation variable and the CSPI, exchange rate and CSPI, Bi rate and CSPI, and Bi rate and inflation. Meanwhile, the relationship between inflation and exchange rate variables and the BI and exchange rate variables has a one-way causality relationship.

VECM

After testing the classical assumptions, knowing the optimal lag, and performing a cointegration test, the equation model suitable for making the model is VECM. This model can explain the long-term and short-term effects between the dependent variable and the independent variable. The results of the short-term estimation based on the VECM model are as follows

Table 6 Short-Term VECM Table

Variable	Coefficient	t-Partial Stats
D(INFLATION_X1(-1))	2,641	[1,237]
D(LOG_EXCHANGE_X2(-1))	-0.152	[-0.442]
D(BI_RATE_X3(-1))	-1.824	[-0.608]

From Table 6, it can be seen that the inflation, exchange rate, and BI rate variables do not have a significant effect on the CSPI variable in the short term. It is indicated by the value of the partial t-statistic, which is smaller than the t-table 1.96.

The CSPI variable does not significantly affect the inflation, exchange rate, and Bi rate variables because the partial t-statistic value is smaller than the t-table 1.96, according to Table 7.

Table 7 CSPI Variable Short-Term VECM Estimation

Variable	Inflation_X1 (-1)	Log_Kurs_X2 (-1)	Bi_Rate_X3 (-1)
Coefficient	-0.006	-0.004	0.007
t-Partial Stats	-0.301	-0.032	0.638

From Table 7 of VECM estimation estimates in the short term, it can be seen that the exchange rate, inflation, and BI rate variables do not have a significant effect in the short term (one month according to the monthly data used in the study). It can happen because the dependent variables require a longer time and an enormous value to affect the independent variables. While the estimation results in the long term are as follows:

Table 8 Long-Term VECM Estimate

Variable	Coefficient	t-Partial Stats
INFLATION_X1(-1)	13,826	[4,536]
LOG_EXCHANGE_X2(-1)	0.119	[0.261]
BI_RATE_X3(-1)	3.958	[1,789]

In the long term, the inflation variable has a significant and positive effect on the CSPI variable. It can be seen from the t-statistic value of the inflation variable, which has a value of 4.535, more than the t-table value of 1.96. The inflation coefficient value is 13,872, meaning that when there is an increase in inflation of one percent in the previous month, the CSPI will increase by 13,872. It can happen because the increase in inflation with a value that can still be tolerated is one of the things that can stimulate the economy, in this case, the CSPI.

IRF (Impulse Response Function) Analysis

Impulse Response Function (IRF) is used to describe how much shock occurs in the variables used in the study. The response of a variable to shocks in the short term tends to fluctuate, while the response in the long term tends to be consistent. Therefore, IRF provides an overview of the variable's response to shocks to other variables in the future. The analysis results are in graphic images that make it easier to read the response, whether the variable responds positively or negatively when shocks occur in other variables. IRF results are as follows:

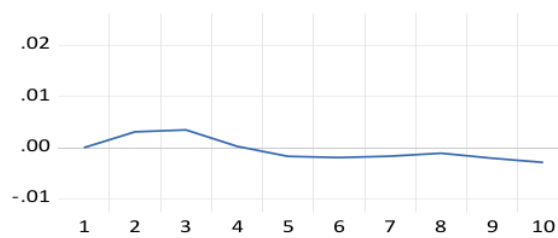**Response of LOG_IHSG_Y to INFLASI_X1**

Figure 2 Graph of CSPI Response to Inflation

In Figure 2, it can be seen that the response of the CSPI variable to shocks that occurred in the inflation variable was from the first period to the third period, experiencing a positive trend and increasing. It is indicated by the IRF line, which tends to increase and is above the horizontal line. Meanwhile, in the third period, the CSPI variable gave a negative response, as seen from the line that tends to decrease until in period 5, the CSPI began to experience a negative trend, seen from the CSPI movement, which was below the horizontal line.
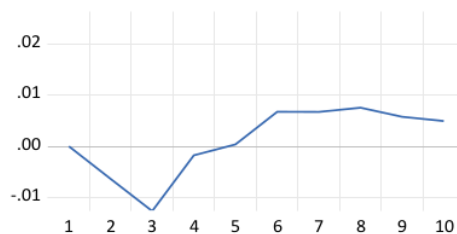
Response of LOG_IHSG_Y to LOG_KURS_X2

Figure 3 Graph of CSPI Response to Exchange Rates

In Figure 3, it can be seen that the response of the CSPI variable to shocks that occurred in the exchange rate variable was from the first period to the third period, experiencing a negative trend and continuing to decline. It is indicated by the IRF line, which tends to decrease and is below the horizontal line. Meanwhile, in the third period, the CSPI variable gave a positive response, as seen from the line that tends to increase until, in period five, the line is above the horizontal line, showing a positive trend.
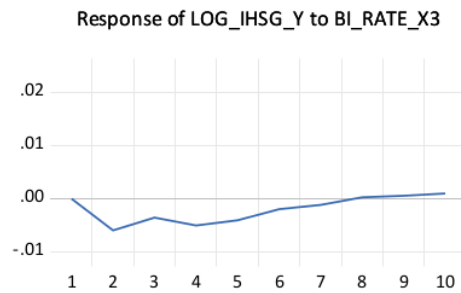
Response of LOG_IHSG_Y to BI_RATE_X3

Figure 4 Graph of CSPI Response to BI rate

In Figure 4, it can be seen that the response of the CSPI variable to the shocks that occurred in the BI rate variable was from the first period to the second period, experiencing a negative and declining trend. It is indicated by the IRF line that is decreasing and is below the horizontal line. However, in the second period and it gave a positive response. Then, it tends to increase until the CSPI experienced a positive trend in the eighth period, as seen from the IRF above the horizontal line.

FEVD analysis (Forecast Error Variance Decomposition)

Forecast Error Variance Decomposition (FEVD) is used to determine changes in variance that occur before and after the shock. In this analysis, an explanation will be given of how changes in one variable are affected by changes in other variables. The results of the Forecast Error Variance Decomposition test are as follows:

Table 9 FEVD Analysis Results

Variance Decomposition of LOG_CSPI_Y:				
Period	SE	LOG_CSPI_Y	INFLATION_X1	LOG_EXCHANGE_X2	BI_RATE_X3
1	0.028376	100,0000	0.000000	0.000000	0.000000
2	0.041347	98.79097	0.038719	0.304657	0.865652
3	0.050083	95.20552	2.020046	0.410963	2.363475
4	0.057727	90.47898	5.596706	0.456828	3.467481
5	0.064664	86.85173	8.565990	0.468280	4.114000
6	0.070977	84.45813	10.57043	0.473237	4.498199
7	0.076766	82.84472	11.92273	0.476570	4.755978
8	0.082142	81.67024	12.90367	0.479446	4.946641
9	0.087183	80.76129	13.66152	0.481787	5.095406
10	0.091949	80.03222	14.26946	0.483666	5.214657

In the first period, the CSPI was strongly influenced by itself, 100%. Inflation, exchange rate, and BI rate variables have not had any effect on the CSPI variable. The proportion of shocks to the CSPI itself in periods 1 to 10 significantly influenced but continued to decline from periods 1 to 10. In the second period, the inflation variable began to contribute 0.038%, and this value continued to increase until period ten. The inflation

variable contributed consistently increased up to period 10; the contribution of the inflation variable was 14.26%.

The exchange rate variable in the second period also began to show its contribution. In the second period, the exchange rate contributed 0.304%. The contribution of the exchange rate to the CSPI continued to increase slowly until period 10. In period 10, the exchange rate contributed 0.483% to the CSPI. The results of the FEVD analysis on the BI rate variable show that in the second period, the BI rate began to show its contribution to the CSPI by 0.86%. The contribution value of the BI rate continued to increase until period 10. In period 10, the BI rate contributed 5.21% to the CSPI. Based on its contribution, inflation has the highest contribution to the CSPI compared to other variables.

Forecasting

Figure 5 shows the results based on the forecasting results with the VECM model by the CSPI, inflation, exchange rate, and BI rate variables. The graph above shows that the forecast for the inflation variable will experience a decrease in the value of high inflation compared to the actual value. Forecasting shows that the CSPI will experience a higher increase than the actual CSPI value in the CSPI variable. Meanwhile, the BI rate and exchange rate variables show that the forecasting results have been over-optimistic, with values far from the actual data.
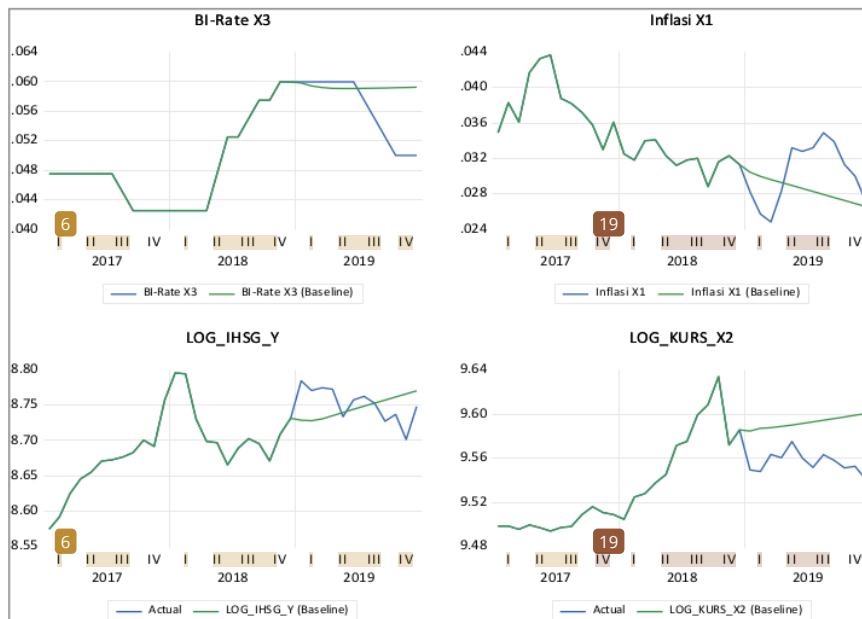

Figure 5 VECM Forecast

Conclusion

Based on the researcher's tests and discussions, it is known that the CSPI, inflation, exchange rate, and BI rate variables can be estimated using the Vector Error Correction Models (VECM) model. It is done because the variable is not stationary at the level. However, it is stationary at the first difference level. Inflation, exchange rate, and BI rate variables do not significantly affect the CSPI variable in the short-term estimation. While in the long-term estimation, the exchange rate variable has a significant influence on the CSPI variable. When there is a shock in the exchange rate variable, the CSPI gives a fairly dynamic response. It can be seen from the response's figure which shows a sharp decline at the beginning, then increased more towards positive trend and continued to increase. While the inflation variable and BI rate, CSPI gave a calmer response, judging by the curve that looks sloping.

The government should maintain the stability of the exchange rate or exchange rate. It can be done by increasing exports to maintain the trade balance to maintain a surplus to minimize the decline in the exchange rate, which can impact the CSPI value. In addition, researchers who will conduct research are expected to use data with the latest timeframe and use more comprehensive data so that the estimated value obtained will be more valid.

References

Amin, M.Z., & Herawati, T.D. (2012). Pengaruh tingkat inflasi, suku bunga SBI, nilai kurs dollar dan Indeks Dow Jones terhadap pergerakan indeks harga saham gabungan di Bursa Efek Indonesia (Periode 2008-2011). *Jurnal Ilmiah Mahasiswa Fakultas Ekonomi dan Bisnis Universitas Brawijaya, 1*(1). Retrieved from https://jimfeb.ub.ac.id/index.php/jimfeb/article/view/145

Anoraga, P., & Pakarti, P. (2001). *Pengantar Pasar Modal.* Jakarta: Rineka Cipta.

Arsiyanto, M. (2020). Analisis pengaruh tingkat inflasi, tingkat suku bunga terhadap Indeks Harga Saham Gabungan (IHSG) di Bursa Efek Jakarta periode tahun 2018. *Dialektika: Jurnal Ekonomi dan Ilmu Sosial, 5*(1), 53–56. Retrieved from http://ejournal.uniramalang.ac.id/index.php/dialektika/article/view/411

Erawati, N., & Llewlyn, R. (2002). Analisa pergerakan suku bunga dan laju ekspektasi inflasi untuk menentukan kebijakan moneter di Indonesia. *Jurnal Manajemen dan Kewirausahaan, 2*(2), 98-107. Retrieved from https://jurnalmanajemen.petra.ac.id/index.php/man/article/view/15626

Fahmi, I. (2015). *Manajemen investasi teori dan soal jawab (Edisi 2).* Jakarta: Salemba Empat.

Fajri, S., Irawan, T., & Andati, T. (2019). Kajian penerapan market timing di pasar modal Indonesia. *Jurnal Manajemen Indonesia, 19*(2), 176-185. Retrieved from https://doi.org/10.25124/jmi.v19i2.1641

Kusno, J. I., & Teja, A. (2019). Stock portfolio performance based on stock volatility: A study of Indonesia stock market. *Jurnal Riset Manajemen dan Bisnis (JRMB) Fakultas Ekonomi UNIAT, 4*(1), 21–30. https://doi.org/10.36226/jrmb.v4i1.238

Langelo, J, S. (2016). Capital market reactions to the announcement of stock split (Studies on go public company that perform a stock split years 2011-2015 in the Indonesia stock

exchange). *Manajemen Bisnis, 6*(1), 22-31. Retrieved form
https://doi.org/10.22219/jmb.v6i1.5387

Natsir, M. (2014). *Ekonomi moneter & kebanksentralan (1st ed.).* Jakarta: Mitra Wacana Media.

Nidianti, E., & Wijayanto, E. (2019). Analisis pengaruh kurs, BI rate dan inflasi terhadap IHSG di BEI periode 2014-2017. *Keunis, 7*(1), 64-76. https://doi.org/10.32497/keunis.v7i1.1533

Putong, I. (2015). *Ekonomi makro: Pengantar ilmu ekonomi.* Buku & Artikel Karya Iskandar Putong.

Shawtari, F, A., Salem, M, A., Hussain, H, I., & Hawariyuni, W. (2016). Long-run relationship between macroeconomic indicators and stock price: The case oof South Africa. *Journal of Internet Banking and Commerce*, 21(2), 1-16.

Tulcanaza Prieto, A. B., & Lee, Y. (2019). Determinants of Stock Market Performance: VAR and VECM Designs in Korea and Japan. *Global Business Finance Review, 24*(4), 24–44. https://doi.org/10.17549/gbfr.2019.24.4.24

Utami, A. T. (2019). Stock market co-integration evidence from Indonesia, Malaysia, South Korea, Hong Kong, and The US Stock Market. *Jurnal Manajemen dan Bisnis: Performa*, 75–86. https://doi.org/10.29313/performa.v0i0.3916

Wuryandani, G. (2011). The behavior and determinants of stock market index in Indonesia. *Indonesian Capital Market Review*, 3(2), 101-116. Retrieved from https://doi.org/10.21002/icmr.v3i2.3626

Yudhistirangga, Y., Siregar, H., & Andati, T. (2018). Finding Size Factor and Value Factor in Indonesia Stock Exchange. Asian Social Science, 14(7), 63-69. https://doi.org/10.5539/ass.v14n7p63

Artikel 9

21% SIMILARITY INDEX

21% INTERNET SOURCES

14% PUBLICATIONS

4% STUDENT PAPERS

PRIMARY SOURCES

1 www.grafiati.com
Internet Source
6%

2 Dipankar Das, Satyajit Chakrabarti. "Forecasting non-linear WPI of manufacture of chemicals and chemical products in India: an MLP approach", International Journal of Advanced Technology and Engineering Exploration, 2021
Publication
2%

3 enrichment.iocspublisher.org
Internet Source
1%

4 Tegar Prasetya, Hakiman Thamrin. "Analysis of Macroeconomic Influence Return on Assets Banking Study on Conventional Commercial Banks in Indonesia for the Year 2018–2020", European Journal of Business and Management Research, 2021
Publication
1%

5 online-journal.unja.ac.id
Internet Source
1%

| 6 | patents.justia.com | 1% |
| Internet Source | |

| 7 | www.coursehero.com | 1% |
| Internet Source | |

| 8 | docplayer.net | 1% |
| Internet Source | |

| 9 | jurnal.umsu.ac.id | 1% |
| Internet Source | |

| 10 | Sandi Mulyadi, Muhammad Ghafur Wibowo. "The Influence and Contribution of Macroeconomics to The Indonesian Sharia Stock Index for The Period 2011-2021", Journal of Islamic Economic Laws, 2023 | 1% |
| Publication | |

| 11 | repository.umy.ac.id | 1% |
| Internet Source | |

| 12 | garuda.kemdikbud.go.id | 1% |
| Internet Source | |

| 13 | Submitted to Universitas Muhammadiyah Yogyakarta | 1% |
| Student Paper | |

| 14 | 123dok.com | 1% |
| Internet Source | |

| 15 | e-journal.ikhac.ac.id | 1% |
| Internet Source | |

16	ejournal.iaingorontalo.ac.id	1 %
	Internet Source	
17	mafiadoc.com	1 %
	Internet Source	
18	koreascience.or.kr	1 %
	Internet Source	
19	www.angelfire.com	1 %
	Internet Source	

| Exclude quotes | On | Exclude matches | < 1% |
| Exclude bibliography | On | | |