The Effect of Consumer Price Index, Exchange Rate, Interest Rate, and Commodity Price on Indonesia's Nickel Stock Prices

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Abstract
The high level of public enthusiasm for electric vehicles certainly has an impact on many sectors, including the nickel industry. Nickel is an important component of Indonesia's electric vehicle battery manufacturing industry. The high demand for nickel is currently a good moment for nickel-related companies to obtain investors. However, investors have to consider not only the companies' performance but also macroeconomic stabilization to invest in the long term. This study aims to analyze the factors that influence the share price of nickel companies listed on the Indonesia Stock Exchange (IDX). External factors of macroeconomy variables, such as the Consumer Price Index (CPI), exchange rates, interest rates, and nickel commodity prices, are expected to influence the share prices of nickel companies. The samples used in this study are 3 nickel companies listed on the IDX. This study uses secondary data collected from q12006 to q32022, and the VECM analysis method. The results show that in the short term, CPI has a significant effect on nickel stock prices, whereas, in the long term, CPI and nickel commodity prices have significant effects on stock prices.

Keywords*: Stock prices, nickel companies, CPI, exchange rate, interest rate, VECM.*
JEL : *G1, E44*

A. INTRODUCTION

The capital market has an important role as the main indicator of a country's economic development. This is due to the role of the capital market as an additional source of funding for companies, which has become one of the key elements in economic progress (OJK, 2016). Companies that have the intention to raise funds from the public can sell some of their shares and use them to develop their business. In addition, people who buy shares from these companies can benefit either from the difference in share prices or from the dividends paid by the company. Thus, this stock market instrument can generate benefits for both parties, both the company and the public.

The large profit opportunities that can be obtained from the capital market attract the interest of the Indonesian people who are interested in investing, especially in stocks. Over the past four years, there has been a significant increase in the number of stock investors in Indonesia, the biggest increase occurred in 2021, reaching 103.6%, where the number of investors rose from 1.69 million to 3.45 million people. (Statistic of Indonesia, 2020) This was also triggered by the Covid-19 pandemic, so many people were interested in stocks because they wanted to find additional income.

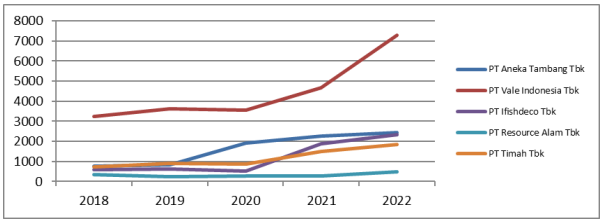
According to the Statistics of Indonesia (2020), there was an economic recession in Indonesia with a negative economic growth of 3.49% in the third quarter of 2020. However, in 2021 the Indonesian economy began to recover with economic growth of 3.69%. The mining sector is one of the sectors that play an important role in increasing commodity output and encouraging economic activities during 2021- -

2023 (Ditjen Minerba, 2021). Indonesia plays a crucial role in the global mining industry, especially in nickel production. Its vast mineral resources significantly contribute to the country's economy. The mining sector's impact on Indonesia's GDP, at 11.9 percent in 2023, highlights how essential it is to the nation's economic structure. The country's rich deposits of various metals and minerals not only support domestic industries but also play a vital role in global supply chains (CSIS, 2024). According to Kusnandar (2022a) in 2021, the mining sector plays a major role in the Indonesian economy and contributes 8.98% of the total Gross Domestic Product (GDP), as well as grew by 4% compared to the previous year.

Nickel is an important component in the manufacture of batteries for electric vehicles. In 2019, there were 3,269,671 units of electric vehicles on the global market, and it is predicted to reach 26,951,318 units in 2030 (BKPM, 2022). The increasing demand for electric vehicles has made Indonesian nickel the target of many countries in the world. This resulted in an upward trend in nickel commodity prices reaching USD 32,171.8/ton in early 2022.

Indonesia, as the world's largest nickel producer, greatly benefited from the impact of increased demand, which was accompanied by rising nickel commodity prices, around 32.7% of the world's nickel reserves are found in Indonesia (Setiawan, 2022). This shows a large potential for Indonesia's nickel supply. Based on data from Kementerian ESDM (2021) Indonesia has nickel resources of 11,887 million tons. In 2020, exports of nickel commodities were only worth US$ 794.5 million, in 2021 it rose 63.62% to US$ 1.3 billion, and in 2022 there was a significant increase of 230.76% to US$ 4. 1 billion (Kusnandar, 2022b).

Indonesia's nickel resources are currently managed by various parties, both private companies and state-owned companies. The high demand for nickel is currently a momentum for companies to optimize their company's performance and to obtain fresh investment funds from investors. Figure 1 shows the history of the share prices of 5 nickel companies in Indonesia, that the increase in the price of nickel commodities was followed by an increase in the prices of shares of nickel companies in Indonesia.



Source: Google Finance (2022)

Figure 1. Share Prices of Nickel Companies 2018 -2022

Currently, individuals who are interested in investing in the stock market could gain significant profits through the positive performance of nickel companies listed on the Indonesia Stock Exchange. Based on a report from Stockbit (2022), there are several companies included in the nickel sub-sector on the Indonesia Stock Exchange, namely PT Aneka Tambang Tbk (ANTM), PT Vale Indonesia Tbk (INCO), PT Central Omega Resources Tbk (DKFT), PT Ifishdeco Tbk (IFSH), PT Resource Alam Indonesia Tbk (KKGI), PT Timah Tbk (TINS), and PT PAM Mineral Tbk (NICL). To obtain large profits, investors must be aware of not only the companies' performance but also macroeconomic stability. Investment in the nickel sector is, then the investors will consider the economic national condition to make sure the business will run well in the long term. A study by Abdullah et al. (2018) shows that there is a link between macroeconomic volatility and the inflow/outflow of funds in a country.

Various macroeconomic factors influence stock price fluctuations. In this study, four external factor variables are used, namely the Consumer Price Index (CPI), exchange rates (IDR/USD), interest rates, and world nickel

commodity prices. The results of a study show that the CPI has a positive and significant correlation to stock prices, while the exchange rate and interest rate have a negative and significant relation to stock prices (Rizki, 2017). In another study, it was found that the world nickel commodity price variable had a positive significant relationship with company stock prices (Antono, Jahardal, & Khatibi, 2019). Rusiti and Puspitawati (2020) reveal that inflation and a commodity price are variables that must be considered to stabilize an economy.

This study aims to analyze the external factors that influence the stock prices of nickel companies listed on the Indonesia Stock Exchange (IDX). The factors of macroeconomy variables include the Consumer Price Index (CPI), exchange rates, interest rates, and nickel commodity prices. This is an interesting topic to study in line with the phenomenon that has occurred because not many studies have discussed the factors that influence the share price of nickel companies in Indonesia.

B. LITERATURE REVIEW

1. Stock price

Sivilianto & Endri (2019) divide stock prices into three categories, namely the nominal price, the initial price, or the price when the company conducts an Initial Public Offering (IPO), and the market price which is the selling price of shares between investors in the secondary market. The share price is defined as the market price or selling price between investors. Stock prices are important for investors because they can reflect information on fluctuations in the supply and demand for company shares. If investors buy a lot of shares of a company, the stock price will rise, whereas if investors sell more shares, the stock price will fall (Melati & Suselo, 2022). Agustina & Sumartio (2014) explained that the rise and fall of stock prices are influenced by two factors, namely internal factors, and external factors. Internal factors are factors that have a direct bearing on the company's fundamentals or performance, while external factors are factors that do not directly affect the company's performance but are very important to look at, such as economic conditions, government policies, and the political situation.

Martina (2019) states that stock prices are influenced by demand and supply in the stock market. If the demand for the shares exceeds supply, then the stock prices will rise. If supply exceeds demand, the stock prices will fall. This is in line with the economic theory regarding supply and demand. The price of the shares traded in the stock market is based on an agreement between supply and demand on the stock market. Investor decisions in conducting stock transactions are based on internal and external factors. According to Mubaroq (2020), external factors are factors that come from outside the company, such as macroeconomic factors, and are important for looking further.

2. Consumer Price Index (CPI)

The Consumer Price Index (CPI) is an economic indicator used to assess the prices of goods and services that are commonly used or needed by consumers (Aziz, Kamludin, & Pudjiastuti, 2020). The increase or decrease in the CPI becomes a benchmark for the community in determining prices for everyday goods and services. This economic indicator is very important for investors because it is closely related to the determination of inflation. High inflation can increase a company's production costs and reduce its profitability. This can affect company performance and reduce stock prices (Rahmatika, 2017). The CPI is carried out using the following formula (BPS, 2022):

$$\text{Consumer Price Index (CPI)} = \frac{Price\ now\ (Pn)}{Basic\ price\ (P0)}$$

3. Exchange rate (IDR/USD)

According to Wicaksono (2018), the exchange rate or exchange rate is the price of foreign currency in domestic currency or vice versa. The exchange rate policy is set by the government or monetary authority to maintain currency value stability to support economic growth. The exchange rate plays an important role in a company because it can affect various business aspects, including the costs that must be incurred by the company and the foreign debt it has. If currency prices weaken, it means that the company's debt burden will be greater and will harm stock prices (Aini, et al., 2020).

4. Interest Rates

According to Mishkin (2008), the interest rate is the fee or reward given in a loan. The interest rate plays an important role in determining investment because the higher the interest rate, the greater the investment risk and the more profitable it is for investors to keep money in savings. The increase in interest rates causes investors to shift their investment to other instruments, causing the supply of shares to increase beyond demand so that stock prices fall. Interest rates are divided into nominal and real interest rates, where real interest rates have been adjusted to the current inflation rate while nominal interest rates have not been adjusted (Maronrong & Nugroho, 2017).

5. Nickel Commodity Prices

According to Wanta, et al. (2019), nickel is one of the most important commodities. This material is used in the production of various products, such as stainless steel and steel alloys, nonferrous alloys and superalloys, batteries, catalysts, and the electroplating industry. Indonesia is the largest nickel producer in the world, with production in 2021 reaching 1 million metric tons or around 37.04% of world production (Rizaty, 2022). The importance of nickel in the electric vehicle industry causes the demand for nickel to continue to increase every year, thereby triggering an increase in nickel prices on the global market. To anticipate price fluctuations, the Ministry of Energy and Mineral Resources (ESDM) sets the price of nickel for a certain period, which follows the price of nickel on the world market.

The results of previous research regarding variables that affect stock prices are used as a reference in this study, focusing on external factors that play a role in determining the share price of nickel companies listed on the Indonesia Stock Exchange. In addition, there is a variable that has never been used in previous research, namely the variable price of nickel commodities, this is also a differentiator in this study compared to previous studies.

Several variables influence stock price movements, as revealed in Alam, Miah, & Karim's (2016) study which explores the factors that influence the stock prices of cement companies in Bangladesh. In that study, the variables were classified into the categories of fundamental factors (EPS, NAVPS, & PER) and technical factors (GDP, CPI, & interest rates), and it was found that EPS, NAVPS, PER, and CPI significantly influenced stock prices. Cement company in Bangladesh. The results of research by Rizki (2017) show that exchange rates and interest rates have a negative and significant effect on stock prices, while the CPI variable has a positive and significant effect.

The price factor of nickel commodities reflects global commodity transactions, where higher demand for nickel commodities will increase commodity prices. The high demand for nickel indicates bright business prospects in the nickel sub-sector and can attract investors to buy nickel company shares, which in turn can increase the company's share price. According to research by Sivilianto & Endri (2019), commodity prices, especially coal commodity prices, are positively and significantly related to company stock prices.

6. Hypothesis Development

The following are the hypotheses that will be discussed in this study:

1) The Consumer Price Index (CPI) is predicted to have a positive and significant effect on nickel stock prices.
2) The exchange rate (IDR/USD) is predicted to have a negative and significant effect on nickel stock prices.
3) The interest rate is predicted to have a negative and significant effect on nickel stock prices.
4) Nickel commodity prices are predicted to have a positive and significant effect on nickel stock prices.

C. RESEARCH METHODS

The data used in this study is secondary data, taken from credible sources. The purposive sampling technique is used to select data samples to be used in research. In this case, the data sample taken relates to nickel companies listed on the Indonesia Stock Exchange (IDX), which meet criteria such as providing complete data from q12006 to q32022.

Out of a total of seven registered nickel companies, three companies were selected, namely PT Aneka Tambang Tbk (ANTM), PT Vale Indonesia Tbk (INCO), and PT Mitra Energi Persada Tbk (KKGI), based on several indicators that have been considered, especially related to the availability of company data.

The three selected companies represent all nickel companies listed on the IDX. The market capitalization of the 3 companies represents 88.69% of the capitalization of all existing companies. Therefore, the results of this study can describe the condition of all nickel companies listed on the IDX.

For the data analysis, this study uses quantitative methods. Using time series data the Vector Autoregressive (VAR) or Vector Error Correction Model (VECM) approach is applied. The VAR approach is used when several variables have a unit root and are not cointegrated with each other, while the VECM approach is used when the variables have a unit root and are cointegrated with each other. In time series analysis, each variable only represents one individual, so in this study, the endogenous variables used data on average stock prices from three companies, namely PT Aneka Tambang Tbk (ANTM), PT Vale Indonesia Tbk (INCO), and PT Mitra Persada Energy Tbk (KKGI).

Table 1. Market Capitalization of Nickel Companies listed on the IDX.

No	Company Name	Market Capitalization (Trillion IDR)	%
1	PT Aneka Tambang Tbk (ANTM)	49.98	37.16 %
2	PT Vale Indonesia Tbk (INCO)	67.32	50.05 %
3	PT Central Omega Resources Tbk (DKFT)	0.67	0.5 %
4	PT Ifishdeco Tbk (IFSH)	2.75	2.04 %
5	PT Resource Alam Indonesia Tbk (KKGI)	1.99	1.47 %
6	PT Timah Tbk (TINS)	8.86	6.58 %
7	PT PAM Mineral Tbk (NICL)	2.92	2.17 %
	Total	134.49	100 %

Source: Google Finance (2023)

According to Sinay (2014), there are several procedures in VAR/VECM analysis, as follows:

1) Unit Root Test (Stationary Test)

To determine whether the data is stationary or not, a stationary test is carried out using the Augmented Dickey-Fuller (ADF) method. The decision to reject H0 is taken if the p-value is less than alpha or the significance level. If H0 is rejected, then the data is considered stationary.

2) Optimal Lag Test

Optimal lag testing in VAR/VECM modeling is important to eliminate autocorrelation symptoms. This test can be obtained through the information criteria Schwarz Criteria (SC) and Akaike Information Criteria (AIC).

3) Stability Test

To ensure the stability of the VAR/VECM model, it is necessary to check the roots, which must have a modulus of less than one (<1).

4) Cointegration Test

The Johansen Cointegration Test method can be used to test whether there is cointegration between variables in the VAR/VECM model. If there is cointegration between one variable and another, then the analysis can be continued using the VECM method. Conversely, if there is no cointegration, then the analysis can be carried out using the VAR method.

5) Model Estimation

In the VAR/VECM modelling, estimates are made to determine the relationship between variables in the short and long term and the effect of the independent variables on the dependent variable. Determining the significance of a variable can be seen from the p-value and compared to alpha (5% significance level). If the p-value is smaller than the alpha then H0 is rejected, so that the variable is considered to have a significant effect on other variables.

According to Saputra & Afifah (2021) in the VAR/VECM approach all variables can affect one another, therefore the VAR/VECM model in general is as follows:

$$ECT_{t-1} = \beta_1 \Delta y_{t-1} + \beta_2 \Delta y_{t-2} + \cdots + \beta_p \Delta y_{t-p+1} + \alpha e_{t-1}$$

Where:

ECT = *Error Correction Term*

$\Delta yt-1$ = dependent variable's first derivative vector with 1st lag

εt = residual vector

α = cointegration coefficient matrix

βt = the i-th dependent variable coefficient matrix, where i = 1, 2, … , p

6) Forecasting and Structural Analysis

In this procedure, Impulse Response Function (IRF) and Forecast Error Variance Decomposition (FEVD) analysis are performed. IRF is used to show the response of a variable to the influence of other variables, while FEVD is used to see how much the independent variable contributes to the dependent variable within a certain period.

D. RESULTS AND DISCUSSION

1. Data Stationarity Test

In this study, stationary testing was carried out using the Augmented Dicky Fuller (ADF) method to evaluate whether the data used is stationary or not. The researcher aims to determine whether the p-value of the ADF test results is less than 5% alpha, which indicates that the data is stationary at the level, or greater than alpha, which indicates that the data is not stationary at the level. In this case, stationary testing is required at the first difference level.

Table 2. Stationary Data Test

Variable	*Root Unit*	*P-value*	Information
Stock price	Level	0.1392	Not *Stationer*
	First difference	0.0000	*Stationer*
IHK/CPI	Level	0.0739	Not *Stationer*
	First difference	0.0000	*Stationer*
Exchange rate	Level	0.7860	Not *Stationer*
	First difference	0.0000	*Stationer*
Interest Rates	Level	0.3908	Not *Stationer*
	First difference	0.0036	*Stationer*
World Nickel Prices	Level	0.2180	Not *Stationer*
	First difference	0.0000	*Stationer*

The results of the stationary data test in the table above show that all the variables used are stationary at the first difference level, this is indicated by the p-value which is smaller than the alpha value (0,05).

2. Optimal Lag Test

The optimum lag selection in this study is based on FPE, AIC, HQIC, and SBIC values. Table 3 is the output of the optimum lag test analysis results. The optimum lag chosen is indicated by the most * sign, namely lag 2.

Table 3. Optimal Lag Test

Lag	LL	LR	df	p	FPE	AIC	HQIC	SBIC
0	-2129.9				2.3e+22	65.68	65.75	65.85
1	-1880.7	498.29	25	0.00	2.4e+19	58.79	59.18	59.79*
2	-1832.6	96.22*	25	0.00	1.2e+19*	58.0*	58.80*	59.92

3. Stability Test

A VAR/VECM model is declared stable if it has a modulus value of less than one. From Table 4. it can be seen from the results of stability testing. all modulus are less than one, meaning that the model used in this study is stable.

Table 4. Stability Test

Eigenvalue		Modulus
0.9900831		0. 990083
0.7830078	0.3404227	0.853808
0.7830078	0.3404227	0.853808
0.8490104	0.07980425	0.852753
0.8490104	0.07980425	0.852753
0.3207044	0.4683371	.0.567619
0.3207044	0.4683371	0.567619
-0.468418		0.468418
-0.2345386		0.234539
0.0731302		0.07313

4. Cointegration Test

In this study, to find out whether there is cointegration in the model, the Johansen Cointegration Test method is used. Cointegration can occur if the value of the trace statistic is greater than the critical value of 5%. The test results can be seen in Table 5.

It can be seen that at rank 0 the value of the trace statistic is greater than the value of 5% critical value. This shows that in this model there is cointegration and with cointegration between one variable and another, the analysis will be continued with the Vector Error Correction Model method.

Table **5.** Cointegration Test

Max rank	*Perms*	LL	*Eigenvalue*	*Trace statistic*	5% *critical value*
0	30	-1870,84	.	76,40	68,52
1	39	-1850,06	0,47	34,84*	47,21
2	46	-1840,27	0,25	15,27	29,68

5. VECM Model Estimation

In this study, an estimation of the VECM model was carried out to find out what factors affect the share price of nickel companies listed on the Indonesia Stock Exchange in the short and long term. In addition, the results of this estimate can also provide answers to research problems regarding the influence of external factors on stock prices. The image shown is the output result of estimating the VECM model in the short term.

Table 6. VECM Estimation in the Short-Term

D_ stockprice	*Coef.*	*Std. Err.*	Z	P>|z|	95% *Conf. Interval*	
_cel	-0.5	0.11	-4.41	0.000	-0.73	-0.28
L1. stockprice	0.13	0.14	0.92	0.35	-0.14	0.41
LD. CPI	18.82	7.15	2.63	0.009*	4.79	32.84
LD. Exchangerate	0.33	0.10	0.31	0.753	-0.17	0.24
LD. InterestRate	-97.36	126.08	-0.77	0.440	-344.47	149.75
LD. Worldnickelprice	-0.03	0.02	-1.62	0.106	-0.07	0.0077
_cons	63.38	65.92	0.96	0.33	-65.83	192.59

*= significant at alpha 5%

Based on Table 6, in the short term only one variable influences stock price significantly, namely the CPI 1 quarter ago with a p-value (0.009) smaller than alpha (0.05). If there was a one-unit increase in the Consumer Price Index 1 quarter ago, then the current share price would fall by 18.82 units. Meanwhile, other variables such as stock prices, exchange rates, interest rates, and world nickel prices are not significant in changes in current stock prices.

Table 7. VECM Estimation in the Long Term

beta	*Coef.*	*Std. Err.*	Z	P>|z|	95% *Conf. Interval*	
_cel stockprice	1	.	.	.	.	.
CPI	31.13	6.33	4.91	0.000*	18.71	43.51
Exchangerate	-0.07	0.04	-1.63	0.104	-0.17	0.01
InterestRate	82.03	47.8	1.72	0.086	-11.66	175.73
Worldnickelprice	-0.11	0.01	-7.32	0.000*	-0.14	-0.08
_cons	-3750.42	.	.	.	.	.

*= significant at alpha 5%

The VECM model estimation results table shows that in the long term, several variables have a significant effect on the share price of nickel companies on the IDX. The Consumer Price Index (CPI) and World Nickel Price in the long term have a significant effect on stock prices, while the Exchange Rate and Interest Rate variables have no significant effect. Based on the cointegration equation, it can be concluded that changes in CPI and World Nickel Prices have a positive effect on stock prices. The following is the long-term model in VECM which shows the relationship between these variables:

ECT_{t-1}= $Stockprice_{t-1}$ + $31.13CPI_{t-1}$ – $0.079Exchangerate_{t-1}$ +$82.03Interestrate_{t-1}$ – $0.11Worldnickelprice_{t-1}$ – 3750.42.

Therefore, if we target the stock price variable as the dependent variable, the interpretation of the independent variable coefficients is the opposite of the estimates shown (Saputra & Afifah, 2021).

From the results of this study, the CPI variable has a significant negative effect on stock prices. Every time there is an increase in the CPI by one unit, the share price will decrease by 31.13 units. This is consistent with the initial hypothesis which states that the CPI negatively affects stock prices. The decline in share prices occurred because an increase in the CPI meant that the company's production costs also increased so that net profit decreased. This reduces investor interest and ultimately lowers the share price. This finding is in line with previous research by Rahmatika (2017) and Aziz, Kamludin, & Pudjiastuti (2020).

In addition, the world nickel commodity price variable also has a significant positive effect on stock prices. Every time there is an increase in world nickel prices by one unit, the share price will increase by 0.11 units. These results are in line with the initial hypothesis which states that nickel prices have a positive and significant effect on stock prices. This finding is supported by previous research by Sivilianto & Endri (2019) and Antonoa, Jaharadaka, & Khatibia (2019). The increase in world nickel prices meant that nickel mining companies' profits increased so investor interest and share prices also increased.

From this research, 2 variables have no significant effect, namely exchange rates and interest rates. The exchange rate (IDR/USD) has been considered stable in recent years, so it has no significant effect on nickel companies. In addition, in recent years the interest rates set by BI have not shown significant changes and tend to benefit the company so the influence received by the company is not significant because of changes in this variable. This is supported by research conducted by Abbas (2022) and Maronrog & Nugroho (2017).

6. Impulse Response Function (IRF)

IRF analysis is used to see the response of a variable due to a change or shock of 1 standard deviation, either from the variable itself or other variables. Table 8. shows how one variable affects stock prices from period 1 to period 10.

Table 8 below exhibit how the stock price variable responds to changes and other variables in the next 10 periods. When there is a change in the stock price itself, the variable stock price will respond with an increase. In the next 10 periods, changes in the stock price itself will positively affect the stock price variable until the 6th period, when the stock price stabilizes again.

Table 8. Output Impulse Response Function

Step	Stockprice (1) oirf	CPI (2) oirf	Exchange Rate (3) oirf	Interest Rate (4) oirf	Nickelprice (5) oirf
0	495.78	0	0	0	0
1	347.77	24.68	10.54	-60.47	65.83
2	269.30	-130.01	-60.85	-129.98	359.38
3	214.6	-130.01	-60.85	-104.27	223.16
4	216.02	-146.92	-77.38	-134.87	407.36
5	231.31	-138.83	-78.31	-132.1	401.22
6	244.16	-128.07	-74.06	-128.63	380.24
7	248.20	-122.52	-70.65	-127.57	367.19
8	246.91	-122.21	-69.56	-128.15	364.84
9	244.45	-123.98	-70.07	-129.11	367.86
10	243.02	-125.48	-70.87	-129.7	371.12

When shocks occur on the Consumer Price Index (CPI) variable, the stock price variable will respond to fluctuating. In the first period, stock prices responded positively to the shocks experienced by the CPI. However, in periods 2 to 10, stock prices respond negatively to changes in CPI. The same thing happened to changes in exchange rates, where stock prices responded positively in the first period, but turned negative in the 2nd to 10th periods.

When there is a change in interest rates, stock prices will respond negatively from period 1 to period 10. However, when there is a shock to the nickel commodity price, the share price will respond positively from the beginning of the period to the end of the period.

7. Forecast Error Variance Decomposition (FEVD)

FEVD analysis was conducted to see the contribution of stock price variables, CPI, exchange rates, interest rates, and nickel commodity prices to the changes experienced by stock price variables.

Table 9 shows that the contribution of share prices to changes in share prices in the first period is 100%, but this contribution decreases in the following period. During the 10 forecasting periods, the other variable that contributes the most to changes in stock prices besides the stock price itself is the commodity price of nickel, with the largest contribution in the 7th to 10th periods. Other variables observed, namely the CPI, exchange rates, and interest rates, only made a small contribution to changes in stock prices. The largest CPI contribution only reached 5.7% in the 10th period, while the largest contribution of the exchange rate and interest rate respectively only reached 1.69% and 6% in the 10th period.

Table 9. Output Forecast Error Variance Decomposition (FEVD)

Period	Stockprice (1) fevd	CPI (2) fevd	Exchangerate (3) fevd	Interestrate (4) fevd	Nickleprice (5) fevd
0	0	0	0	0	0
1	1	0	0	0	0
2	0.97	0.001	0.0002	0.009	0.011
3	0.85	0.013	0.001	0.02	0.105
4	0.66	0.03	0.006	0.04	0.2
5	0.53	0.04	0.01	0.05	0.35
6	0.47	0.051	0.013	0.05	0.41
7	0.43	0.05	0.01	0.056	0.44
8	0.41	0.05	0.015	0.05	0.45
9	0.39	0.056	0.01	0.05	0.47
10	0.37	0.05	0.01	0.06	0.48

E. CONCLUSION

Based on the results, the external factors that influence the share price of nickel companies listed on the IDX can be divided into short and long terms. In the short term, the variable that has a significant effect is the Consumer Price Index (CPI). Changes in the CPI in the previous quarter have a significant effect on the current stock price. Meanwhile, in the long run, the influencing variables are CPI and nickel commodity prices. The results of the study show that changes in the CPI are negatively related to stock prices, due to increased production costs which reduce the company's net profit and ultimately lower stock prices. In addition, other variables such as the exchange rate (IDR/USD) and interest rates do not have a significant effect on the share price of nickel companies in the short or long term.

The government as the party with the authority to regulate macroeconomic variables should be able to control inflation or the prices of circulating goods and services. This can be done using monetary policy, such as by controlling the money supply or interest rates so that there are no significant price Increases that can affect the production costs of Indonesian nickel companies. The government has already issued the Regulation of the Minister of Trade concerning Export Provisions for Processed and Refined Mining Products (Minister of Energy and Mineral Resources Regulation Number 11 of 2019).

The government can control export regulations related to nickel commodities export until the nickel downstream industry has been developed. This is parallel with a study by Pambudi et al. (2019) that the Indonesian government should focus on the development of downstream and alternative energy industries, since the increasing importance of alternative energy commodities in the world. When momentum such as an increase in nickel commodity prices rises, companies can optimize their income and contribute economically to the Indonesian economy.

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