Quest Journals
Journal of Research in Business and Management
Volume 11 ~ Issue 10 (2023) pp: 26-34
ISSN(Online):2347-3002
www.questjournals.org

Research Paper

Analysis of Factors Affecting Nickel Prices in Indonesia

Sri Astuty[1], Basri Bado[2], Dewi Rahmawati [3], Hikmayani Subur[4], Nur Arisah[5]
[1,2,3,4,5]*Faculty of Economics, Makassar State University, Indonesia*
Corresponding Author: Sri Astuty

ABSTRACT: *This study aims to determine the effect of world nickel consumption, nickel production in Indonesia, stainless steel production and the rupiah exchange rate against the United States dollar on nickel prices in Indonesia. The type of data used in this study is secondary data and is a timeseries data from 2000-2020. The analysis method in this study is the ErrorCorrection Model (ECM) which aims to determine the existence of short-term and long-term relationships on the variables analyzed. Based on the results of data analysis conducted in this study, it can be concluded that in the short term nickel consumption, nickel production in Indonesia, stainless steel production has no effect on nickel prices, while the rupiah exchange rate against the United States dollar has a negative effect on nickel prices in Indonesia. In the long term, the results obtained show that nickel consumption has a positive effect on nickel prices in Indonesia and stainless steel production has a negative effect on nickel prices in Indonesia, while nickel production and exchange rates have no effect on nickel prices in Indonesia.*
KEYWORDS: *Nickel Price, Nickel Consumption, Nickel Production, Stainless Steel Production, Exchange rate.*

Received 12 Oct., 2023; Revised 23 Oct., 2023; Accepted 25 Oct., 2023

I. INTRODUCTION

Building a country requires resources as one of the fundamental aspects. One of the resources needed by a country is natural resources. The abundance of resources owned by a country means that a country has a high potential to make the economic development of a country very supported (Tyas & Ikhsani, 2015). According to Jumari et al, (2013) Indonesia's natural resources, especially in the mineral sector, have tremendous economic value when measured in money. One of Indonesia's natural resources includes minerals such as scandium, lanthanum and yttrium in nickel ore and vanadium and titanium in iron sand which have great economic potential but have not been processed economically (Arief et al, 2011 in Haryadi, 2017).

Nickel is known as one of the chemical elements in the form of metal. In the constituent elements of the earth's core, 10% of it is nickel (Aprisal & Abadi, 2019). Indonesia is the largest nickel producer in the world in 2020, surpassing Russia with a market share of more than 20 percent of the world's total nickel reserves ((Fitrian et al, 2013). Based on data from (Statista, 2021) until 2020, world nickel reserves amounted to around 94 million metric tons. Of this amount, Indonesia has the largest share in the world, namely 21 million metric tons. Each country's nickel reserves certainly affect nickel production each year.

According to (Statista, 2021) nickel production in Indonesia has fluctuated. From 2011-2020, the highest nickel production was in 2019 with 853 thousand metric tons and the lowest production was in 2015 with 130 thousand metric tons. Nickel has many uses in everyday life so nickel production is also affected. Quoted from the Ministry of Energy and Mineral Resources (2020), nickel is converted into several products including 70% for stainless steel, 8% for steel, 5% for batteries, 8% for Ni-base and Cu-base alloys, 8% as plating and 1% for others. In recent years, nickel has a very important role in the field of high-tech industry and military industry (Shao, et al, 2019). Of course, because of this, it increasingly affects the selling or buying price of nickel.

Table 1.1 World Nickel Price Movement 2011 - 2020

Priod	2016	2017	2018	2019	2020
Number of instruments	51.204.580	90.003.848	167.205.578	292.299.320	432.281.380

Source: LME, 2021

Nickel prices continue to fluctuate, this can be seen based on Figure 1.1 which shows the ups and downs of world nickel prices. These price changes are certainly influenced by many things. According to Pines (2021), nickel prices are largely driven by Chinese nickel demand, global nickel stocks, world nickel demand, government regulations and input prices. According to Sainsbury (2018), important drivers of nickel prices include stainless steel production, Chinese demand, nickel reserves, innovation, battery production, weather, political uncertainty and the value of the United States currency.

In addition to the ban on nickel ore exports affecting nickel prices, nickel consumption also greatly affects the selling price of nickel. This can also be seen from the nickel consumption data from 2011 to 2020 experiencing a fluctuating trend that tends to increase. The lowest consumption was in 2001 with a consumption of 1103.8 thousand metric tons.

While the highest consumption was in 2019 with a consumption of 2,443 thousand metric tons. In 2008-2019 nickel consumption experienced a continuous increase from 1267.9 thousand metric tons in 2008 increasing to 2,443 thousand metric tons in 2019. However, in 2020 nickel consumption decreased by 3,000 metric tons due to the Covid-19 pandemic in nickel consuming countries (International Nickel Study Group, (2009); Statista, (2021)). Based on data from World Atlas (2021), China has occupied the first position with the largest nickel consumption since 2014 by utilizing 50.4% of the total world production. Then based on data from Statista, (2021) in 2020, world nickel consumption reached around 2.44 million metric tons and China accounted for 59 percent of global nickel consumption.

Another factor affecting nickel prices is stainless steel production. According to (Ministry of Energy and Mineral Resources, 2020) as much as 70% of nickel is used as raw material for making stainless steel. The total world production of stainless steel main products, according to the International Stainless Steel Forum (ISSF), was 50,730 thousand metric tons in 2018 compared to 2017 with 48,081 thousand tons. Based on data from (Statista, 2021) from 2005-2020 global stainless steel production has fluctuated with the lowest production in 2005 with 24,546 thousand metric tons and the highest production in 2019 with 52,218 thousand metric tons.

In addition, another component that affects nickel prices is the dollar exchange rate. Based on data from the Central Bureau of Statistics (2021), exchange rate data continued to weaken from 2011 to 2018. From the initial IDR 9,068 per 1 USD to IDR 14,481 per 1 USD, only in 2019 there was a strengthening from 14,481 per 1 USD to 13,901 per 1 USD. As an open economy country, Indonesia cooperates with other countries in conducting export and import activities. As a result of the intertwining trade between these countries, the means of payment to make price equality. So, of course the exchange rate affects the selling price of nickel. Based on the description described above, it is necessary to conduct research related to "Analysis of Factors Affecting Nickel Prices in Indonesia" using the variables of nickel consumption, nickel production, stainless steel production and the exchange rate of the United States currency.

II. RESEARCH METHODS

This research uses a quantitative research type descriptive approach. The data used is time series data, which is used to analyze related factors affecting nickel prices in Indonesia for the period 2000-2020 Based on how to get it, secondary data is the data that will be used in this study. The analysis method in this study is the Error Correction Model (ECM) model, the ECM method has several uses, but its main advantage is to solve the problem of non-stationary data and tapered regression on time series data. For example, if the ECM method discusses when two variables have an equilibrium and long-term relationship (Widarjono, 2017). ECM analysis has two forms of equilibrium regression equations, namely long-term and short-term equations.

Short-term Equation

$Y = \beta_0 + \beta_1 \Delta X_{1t} + \beta_2 \Delta X_{2t} + \beta_3 \Delta X_{3t} - \beta_4 \Delta X_{4t} + e_t$

Long-term Equation

$Y = \beta_0 + \beta_1 X_{1t} + \beta_2 X_{2t} + \beta_3 X_{3t} - \beta_4 X_{4t} + e_t$

Where:

Y : Price
X_1 : Nickel Consumption
X_2 : Nickel Production
X_3 : Stainless Steel Production
X_4 : Rupiah to Dollar Exchange Rate

B_1, β_2, β_3 : Coefficient of Determination
B_0 : Constant
e_t : Residual value (previous period)

Stationarity Test

In order to avoid regression problems, non-stationary data must first be converted into stationary data. According to (Zarreta & Yovita, 2019) the data stationarity test has the aim of knowing whether the data has integration at different or the same order. Stationarity tests can be carried out with the Augmented Dickey-Fuller (ADF) test, namely by comparing the ADF test statistical value with the critical value of the Mackinnon critical value statistic (Barus, 2020). If the data is not stationary in the stationarity test at the level level, then a stationarity test can be carried out at the first difference or second difference. The hypothesis during the stationary test is that if the ADF test statistical value> 0.05, the data is concluded to be stationary and H0 is rejected. However, if the ADF test statistical value <0.05 then the data is concluded to be non-stationary and Ha is accepted.

Cointegration Test

Cointegration test is a test conducted to see if there is a long-term relationship in the research variables tested (Barus, 2020). To test the presence or absence of cointegration, the Angle Granger-Augmented Dickey Fuller (EG-ADF) test is used. The EG-ADF cointegration testing method is carried out using two stages. The first stage is to estimate the OLS regression model. After that, the next stage is to test the stationarity of the residuals of the regression results using the ADF unit root test.

Classical Assumption Test

1. Normality Test

   The normality test is a test conducted to determine whether the residuals are normally distributed. The normality test is carried out using the Jarque-Berra test (J-B Test) with a significance level of $\alpha = 1\%$, 5%, and 10%. If the calculated x value is greater than the probability value α at a certain significance level, it can be concluded that the residuals are normally distributed. Meanwhile, if the calculated x value is smaller than the probability, it can be concluded that the residuals are not normally distributed.

2. Autocorrelation Test

   The autocorrelation test is used to test whether there is a correlation of confounders in period t with period t-1, namely the previous period (Setyarini, 2020). A good regression model is a regression model that does not have autocorrelation. The autocorrelation test can be done using the Breusch-Godfrey Serial Correlation LM Test. If the Obs * R-squared probability value is smaller than α at a certain significance level, it can be concluded that the model has auto correlation. Meanwhile, if the Obs * R-squared probability value is greater than α at a certain significance level, it can be concluded that the model does not have auto correlation.

3. Heteroscedasticity Test

   The heteroscedasticity test aims to determine whether the model used has a difference in variance from the residuals of one observation to another. The model is said to be good if there is no heteroscedasticity. Heteroscedasticity testing can be done using the white test method. The form of white test testing is if the probability value of Obs * R-Squared is smaller than α at a certain significance level, it can be concluded that the model contains heteroscedasticity. And the probability value of Obs * R-Squared is greater than α at a certain significance level, it can be concluded that the model does not contain heteroscedasticity.

4. Multicollinearity Test

   The multicollinearity test aims to see if there is a correlation between the independent variables in the regression model (Kambono, 2017). The regression model is said to be good if there is no correlation between the independent variables. This multicollinearity test can be seen through the Variance Inflation Factor (VIF) value. Testing the VIF value and tolerance value in the multicollinearity test, namely if the VIF value is ≤ 10 and the tolerance value is ≥ 0.10, it means that there is no multicollinearity. Meanwhile, if the VIF value ≥ 10 and the tolerance value ≤ 0.10, it is concluded that multicollinearity occurs.

Statistical Testing

1. Test t (Partial)

   The t test is a test of the significance of the coefficient of the independent variable in partially (individually) influencing the dependent variable. This test is done by looking at the probability value (p-value) of each variable. If the probability value $t < \alpha$ (5% significance value), then the independent variable significantly affects the dependent variable because it is in the H0 rejection area.

2. F Test (Simultaneous)

The F test is a significant test of the independent variables as a whole in influencing the dependent variable. F-statistic testing can also be done by looking at the probability value (p-value test). If the probability value of F < α set (5% significance value) means that it is in the H0 rejected area, then the independent variables in the equation simultaneously affect the variation of the dependent variable (significant).

3. Coefficient of Determination (R2)

The coefficient of determination (R2) aims to measure the amount of variance value that can be explained by the independent variables on the dependent variables (Dorma, 2020). The R2 value is between zero and one ($0 \leq R2 \leq 1$), so that if the R2 value approaches a value of 1, the greater the value of the independent variable can explain the dependent variable as a whole. Conversely, if the value of R2 is close to the value of 0, then the independent variable cannot explain the dependent variable thoroughly.

III. RESULTS AND DISCUSSION

Stationary Test

Table 2. Unit Root Test Results

Research Variables	Probabilitas		Results
	Level	1st difference	
PN	0.7507	0.0001	1(1)
CN	0.9926	0.0237	1(1)
QN	0.2899	0.0450	1(1)
QBTK	0.8797	0.0358	1(1)
KR	0.8207	0.0017	1(1)

Based on the results of unit root testing using the Augmented Dickey-Fuller (ADF) method, it is known that all variable data used are stationary at first difference where the probability value is smaller than 0.05. So that further cointegration testing can be done.

Cointegration Test

The cointegration test method used in this research is the ADF Cointegration Test method. Based on the results of the cointegration test, it shows that the processed data has cointegration, seen from the probability value of 0.0290 which is smaller than 0.05, so it is concluded that there is a long-term relationship in the model used. If the cointegration test has been carried out, the next test is the data analysis of the ECM (ErrorCorrection Model) model.

ECM Model Analysis

1. Short-Term Analysis

The short-term regression estimation results on the ECM model of this study are as follows:

Table 3. Short-Term ECM Estimation Results

Variable	Coefficient	Std. Error	t-Statistic	Prob
D(KR)	-2.308185	0.975131	-2.367048	0.0455
D(CN)	13,15869	24.54667	0.536068	0.6065
D(QN)	-7.934496	61.93319	-0.128114	0.9012
D(QBTK)	1.127019	0.844787	1.334086	0.2189
R-squared	0.788031			
Adjusted R-Squared	0.655550			
F Statistic	5.948268			
Prob (F-statistic)	0.013794			

From the short-term estimation equation above, it shows that the exchange rate variable has an effect on nickel prices with a probability value of 0.0455 < the significance value of α = 5%. Nickel consumption has no effect on nickel prices, with a probability value of 0.6065 > significance value α = 5%. Nickel production has no effect on nickel prices with a probability value of 0.9012 > significance value α = 5%. While the stainless steel production variable has no effect on nickel prices, namely with a probability value of 0.2189 > significance value α = 5%.

After the short-term ECM analysis, the short-term ECM equation is as follows:

$$Y = -3217.422 + 13.15869\Delta X_{1t} + (-7.934496)\ \Delta X_{2t} + 1.127019\ \Delta X_{3t} – (-2.308185)\ \Delta X_{4t} + e_t$$

Classical Assumption Test Results in the Short Term

a. Normality Test

Based on the results of the short-term equation normality test, it is known that the resulting probability is 0.623982 > the significance value α = 5%. So it can be concluded that the data used in the short-term regression of the ECM model is normally distributed.

b. Heteroscedasticity Test

Based on the results of data management on heteroscedasticity test, the chi-square probability of Obs*R-Squared is 0.7138 where the value is greater than the significance value α = 5%, it can be said that the short-term equation model does not have heteroscedasticity problems.

c. Autocorrelation Test

Based on the results of the short-term equation calculation, the Obs* R-Squared probability value of 0.0548 is greater than the significance level α = 5%, which means that the short-term equation with the ECM model does not have autocorrelation symptoms.

d. Multicollinearity Test

Based on the multicollinearity test results in the short-term model, the VIF value of all variables is 1 and the Tolerance value is greater than 0.1. So it can be concluded that the ECM model in the short term does not occur multicollinearity problems.

Statistical Test

a. Coefficient of Determination (R2)

The coefficient of determination test is conducted to determine how much influence the independent variables have on the dependent variable. Based on the estimation results, R2 is 0.788031, which means that the variables of nickel consumption, nickel production, stainless steel production and exchange rates affect nickel prices by 78.8031% while the remaining 21.1969% is influenced by other factors outside the model.

b. Simultaneous F-test

Based on the results of data processing in table 3. then obtained the probability value (F-statistic) of 0.013794 where the value is smaller than 0.05 (α = 5%), it can be concluded that all independent variables, namely the variables of nickel consumption, nickel production, stainless steel production and exchange rates together have a significant effect on nickel prices.

c. Partial Significance (T Test)

Testing in the T test can be seen from the t-statistic value and the probability of each variable in table 3.

- Based on the results of the t-statistic, the probability value of the exchange rate variable is 0.0455 where the probability value is smaller than the significant level α = 5% or 0.0455 <0.05, it can be concluded that in the short term the exchange rate variable has a significant effect on nickel prices.
- Based on the results of the t-statistic, the probability value of the nickel consumption variable is 0.6065 and greater than the 5% significant level or 0.6065> 0.05, it can be concluded that nickel consumption in the short term has no effect on nickel prices.
- Based on the results of the t-statistic, the probability value of the nickel production variable is 0.9012 and greater than the 5% significant level or 0.9012> 0.05, it can be concluded that nickel production in the short term has no effect on nickel prices.
- Based on the results of the t-statistic, the probability value of the stainless steel production variable is 0.2189 and greater than the 5% significant level or 0.2189> 0.05, it can be concluded that stainless steel production in the short term has no effect on nickel prices.

2. Long-term Analysis

Long-Term ECM Estimation

Table 4. Results of Long-Term ECM Estimation

Variable	Coefficient	Std. Error	t-Statistic	Prob
KR	-0.291942	1.841679	-0.158519	0.8769
CN	88.49038	33.93408	2.607714	0.0244
QN	-3.502680	1.295573	-2.703576	0.0205
QBTK	-163.1917	126.5076	-1.289975	0.2235
R-squared	0.541158			
Adjusted R-Squared	0.357621			
F Statistic	2.948497			
Prob (F-statistic)	0.075370			

The long-term estimation equation above shows that the exchange rate variable has no effect on nickel prices with a probability value of 0.8769 > significant value α = 5%. Nickel consumption variable has a significant effect on nickel prices with a probability value of 0.0244 > significant value α = 5%. Stainless steel production variable has a significant effect on nickel prices with a probability value of 0.0205 > significant value α = 5%. While the nickel production variable has no effect on nickel prices with a significant value of 0.2235 > significant value α = 5%.

After the short-term ECM analysis, the short-term ECM equation is as follows:

$$Y = 42600.90 + 88.49038\ X_{1t} + (-163.1917)\ X_{2t} + (-3.502680)\ X_{3t} – 0.291942\ X_{4t} + e_t$$

Long-Term Classical Assumption Test

a. Normality Test

Based on the results of the long-term equation normality test, it is known that the resulting probability of 0.197268 is greater than α = 5%. So it can be interpreted that the data used in long-term regression with the ECM model is normally distributed.

b. Heteroscedasticity Test

Based on the results of data management in the heteroscedasticity test, the chi-square of Obs*R-Squared is 0.7837 where the value is greater than α = 5% (0.7837> 0.05), it can be said that in the long-term equation model there are no symptoms of heteroscedasticity problems.

c. Autocorrelation Test

Based on the results of the autocorrelation test on the long-term model, the Obs*R-Squared probability value of 0.0925 is smaller than the significance level α = 5% or 0.0925 <0.05, which means it is concluded that the ECM model equation in the long term does not have autocorrelation symptoms.

d. Multicollinearity Test

Based on the multicollinearity test results in the long-term model, the VIF value of all variables is 1 and the Tolerance value is greater than 0.1. So it can be concluded that the ECM model in the long run there is a multicollinearity problem.

3. Long-Term Statistical Test

Coefficient of Determination (R2)

Based on the estimation results obtained, the R2 value is 0.541158, meaning that the variables of nickel consumption, nickel production, stainless steel production and exchange rates affect the dependent variable of nickel prices in the long term by 54.1158% while the remaining 45.1158% is influenced by other factors outside the model.

Simultaneous F-test

Based on the results of the F test in table 4, the F-statistic probability value of 0.075370 is greater than 0.05 (α = 5%), it can be concluded that all independent variables, namely nickel consumption, nickel production, stainless steel production and exchange rates together have no effect on nickel prices.

Partial Significant Test (T Test)

Testing in the T test is seen from the t-statistic value and the probability of each variable in table 4.

- The exchange rate variable in the long run has no effect on the nickel price variable seen from the t-statistic whose probability value of 0.8769 is greater than the significance level of 0.05 (α = 5%).
- The nickel consumption variable in the long run affects the nickel price variable as seen from the t-statistic whose probability value of 0.0244 is smaller than the significance level of 0.05 (α = 5%).
- The stainless steel production variable in the long run has an effect on the nickel price variable as seen from the t-statistic whose probability value of 0.0205 is less than the significance level of 0.05 (α = 5%).
- The nickel production variable in the long run has no effect on the nickel price variable as seen from the t-statistic whose probability value of 0.2235 is greater than the significance level of 0.05 (α = 5%).

Effect of Nickel Consumption on Nickel Prices

Based on the short-term estimation results, it shows that nickel consumption has no effect on nickel prices. This is due to the Covid-19 pandemic which caused nickel consumption to decline. In general, the lockdown policy has affected production and consumption, thus affecting trade, especially the export and import of mining materials. This policy results in differences and at the same time will disrupt the price of mining commodities (Garinas, 2020). Meanwhile, the long-term estimation results show that nickel consumption has a positive effect on increasing nickel prices, which means that if nickel consumption increases by one thousand tons, there will be an increase in price of US $ 88.49038. This is in accordance with the opinion (Nur, 2012) that an increase in the price of goods in the market occurs due to excess demand compared to the supply of these goods (Excessdemandforgoods) so that if there is an increase in demand, the level of consumption also increases.

These results are in accordance with research from Shan-Qin, (2015) which concludes that one of the factors that affect nickel prices and have a long-term interactive relationship is nickel demand. Demand for nickel of course also affects the level of nickel consumption. In 2008, due to the worldwide recession, there was a decrease in nickel consumption and production. Due to the high demand for the product, the price of nickel reached its highest peak at that time (Apostolikas, et al., 2014). The factor that drives nickel prices is the factor of China's economic improvement, where nickel ore imported from Indonesia accounts for 60% of China's imports so that China needs imported nickel from Indonesia if China plans to increase nickel consumption for electric vehicles (electricvehicle) and stainless steel.

If there is an increase in consumption, of course, total production will increase so that production costs will also increase and affect the price of goods. In the theory of demand determination, demand is directly proportional to price, that is, if demand rises, relative prices will rise, otherwise if demand falls, relative prices will fall (Febianti, 2014). So that an increase in demand will increase the level of consumption and will ultimately affect the price of a good.

Effect of Nickel Production on Nickel Prices

Indonesia is the country with the largest nickel supply in the world with the largest share in the world, which is 21 million metric tons. In addition, Indonesia is known as the world's largest nickel producer. In fact, in 2020 it is estimated that Indonesia contributed around 30 percent of world nickel production or equivalent to 760 thousand tons with total reserves reaching 174 million tons. Indonesia is also in the first position as the world's nickel producer and even has a considerable difference with the second rank, the Philippines.

Based on the short-term and long-term estimation results, it shows that nickel production in Indonesia has no effect on nickel prices. This is not in accordance with the hypothesis raised by the researcher, where nickel production will affect nickel prices. The results of this analysis differ from research from (Shan-Qin, 2015) whose research concluded that in the short term, nickel stocks adjust nickel prices and in the long term changes in nickel stocks are driven by changes in nickel prices. An increase in nickel stocks should be an indication of a weakening market because stocks exceed nickel demand, so normally prices and inventory levels move in opposite directions. When nickel prices are low, producers will store their production and sell when prices are high.

The Indonesian nickel ore export ban policy, which began to be planned since 2014, resulted in very high export realization because producers sold their nickel production before the export ban took effect. The high number of nickel exports has led to an abundance of raw material stocks so that nickel prices have decreased. Indonesia also experienced a slowdown in nickel production with an estimated 10.9% in 2020. Compared to 2019, Indonesia's nickel output reached 853 thousand metric tons of nickel in 2019. Indonesia's nickel production shrank by around 760 thousand metric tons in 2020.

Effect of Stainless Steel Production on Nickel Prices

Based on the short-term estimation results, it shows that stainless steel production has no effect on nickel prices. This is due to the covid-19 outbreak which has disrupted the stainless steel production supply chain and has had a negative impact on production and distribution activities in the steel industry, which in turn has hampered the growth of the global stainless steel market. Meanwhile, the long-term estimation results show that stainless steel production has a negative effect on nickel prices, which means that if there is an increase in stainless steel production by one thousand metric tons, the price of nickel will decrease by US $ 3.502680.

These estimation results are in line with research from (Shan-Qin, 2015) which concluded that there is a long-term interactive relationship between demand factors (e.g. stainless steel production) and nickel prices but the short-term relationship is unclear. However, the hypothesis raised by the researcher that stainless steel production has a positive effect on prices does not match the estimation results which show a negative relationship with prices. This is due to other components contained in stainless steel, namely Iron, Chrome, Carbon, Nickel, Molybdenum and a small amount of other metals that have a greater influence on stainless steel production. Supposedly if stainless steel production increases, it will cause nickel consumption to increase, which in turn will increase nickel prices.

Most of the nickel production is absorbed by stainless steel and based on data from the Ministry of Energy and Mineral Resources (2020), nickel is converted into several products including 70% for stainless steel, 8% for steel, 5% for batteries, 8% for Ni-base and Cu-base alloys, 8% as plating and 1% for others.

Effect of Exchange Rate on Nickel Price

Based on the short-term estimation results show that the exchange rate has a negative effect on the price of nickel, which means that if there is an increase in the US dollar exchange rate of Rp 1/US$, the price of nickel will decrease by US$ 2.308185. These estimation results are in accordance with the opinion of Windarti (2004), changes in the exchange rate will be responded negatively by the price level, meaning that a depreciation of the rupiah exchange rate will increase prices, both import prices, wholesale prices, and consumer prices.

The short-term estimation results showing that the US dollar exchange rate has a negative effect on nickel prices are indicated due to the weakening or depreciation of the rupiah exchange rate against the US dollar which can increase Indonesian nickel exports to export destination countries. Exporters can take advantage of rupiah depreciation to increase their exports. The cheaper product prices in the international market make the demand for Indonesian nickel exports increase.

While the long-term estimation results show that nickel prices have no effect on nickel prices. These estimation results are not in accordance with the supply theory described by Rahardja and Manurung (2006) where the exchange rate is strongly influenced by changes in the value of currencies between two countries. In this theory it is stated that if the exchange rate of the rupiah against the dollar increases, which is characterized by the strengthening of the dollar against the rupiah, it will cause the price of goods to decrease.

IV. CONCLUSION

Based on the results of data analysis conducted in this study, it can be concluded that in the short term, partially nickel consumption, nickel production and stainless steel production have no effect on nickel prices in Indonesia. While partially the exchange rate variable affects the price of nickel in Indonesia. In the long-term equation analysis, partially nickel consumption has a positive effect on nickel prices in Indonesia and stainless steel production has a negative effect on nickel prices in Indonesia, while nickel production and exchange rates have no effect on nickel prices in Indonesia

REFERENCES

[1]. Apostolikas. A., E. Frogoudakis & J. Bakallbashi. (2009). Nickel, World Productionand Demand. 3rd Balkan Mining Congress, BALKANMINE.

[2]. Aprisal& Abadi. A. M. (2019). Fuzzy Sistem: Estimasi Harga Nikel Dunia. Jurnal Matematika Ilmiah STKIP Muhammadiyah Kuningan, 5(1), 48-58

[3]. Arief, R., Suhandi& Putra, C. (2011). "Penelitian bahan galian lain dan mineral ikutan pada wilayah pertambangan di Kabupaten Minahasa Utara Provinsi Sulawesi Utara," in Prosiding Hasil Kegiatan Pusat Sumber Daya Geologi Tahun 2011. Bandung: Pusat SumberDaya Geologi, pp. 1–18.

[4]. Barus, E. B., & Sugiyanto, F. X. (2020). Analisis Keterkaitan Money Multiplier dan Velocity of Money pada Uang Elektronik dan Kartal di Indonesia Tahun 2009. Q1- 2018. Q4. Diponegoro Journal of Economics, 9(3), 50-59.

[5]. Febianti, Y. N. (2014). Permintaan dalam Ekonomi Mikro. Edunomic, 2(1): 15-24.

[6]. Fitrian, E. B., Massinai, M. A & Maria. (2014). Identifikasi Sebaran Nikel Laterit dan Volume Bijih Nikel Daerah Anoa Menggunakan Korelasi Data Bor. Makassar: Universitas Hasanuddin.

[7]. Garinas, W. (2020). Dampak pandemi covid-19 terhadap komoditas minerallogam di Indonesia dan mitigasinyadi kegiatan penambangan. Jurnal Sains dan Teknologi Mitigasi Bencana, 15(2): 123-130.

[8]. Haryadi. (2017). Analisis Neraca SumberDaya Pasir Besi Bijih Nikel Indonesia. Jurnal Teknologi Mineral dan Batubara, 13(2): 153-169.

[9]. Izzaty & Suhartono. (2019). Kebijakan Percepatan Larangan Ekspor Ore Nikel dan Upaya Hilirisasi Nikel. Info Singkat: Bidang Ekonomi Dan Kebijakan Publik, 11(23),19-24.

[10]. Jumari, Setiadi, D., Purwanto, Y. & Guhardja, E. (2013) "Pengelolaan sumberdaya alam dan lingkungan dalam pandangan masyarakat Samin," in Prosiding Seminar Nasional Pengelolaan Sumberdaya dan Lingkungan 2013. Semarang: Program Studi Magister dan Doktor Ilmu Lingkungan Universitas Diponogoro, pp. 64–70.

[11]. Kambono, H., &Marpaung, E. I. (2020). Pengaruh Investasi Asing dan Investasi Dalam Negeri Terhadap Perekonomian Indonesia. Jurnal Akuntansi Maranatha, 12(1), 137-145.

[12]. Nur, E. M. 2012. Konsumsi dan Inflasi Indonesia. Jurnal Kajian Ekonomi, 1(1): 55-77.

[13]. Pertiwi, H. D. (2011). Dampak Keberadaan Perusahaan Pertambangan Batubara Tehadap Aspek Ekologi, Sosial dan Ekonomi Masyarakat di Era Otonomi Daerah di Kelurahan Sempoja Utara Kecamatan Samarinda Utara Kota Samarinda. Bogor: Institute Pertanian Bogor.

[14]. Pines, L. (2021). Nickel in 2021: Learn About This In-Demand Industrial Commodity. Commodity: https://commodity.com/precious-metals/nickel/.

[15]. Rahardja, P &Manurung, M. (2008). Teori Ekonomi Makro SuatuPengantar. Jakarta: Lembaga PenerbitFakultas Ekonomi Universitas Indonesia.

[16]. Sainsbury, P. (2018). Nickel prices: The top 10 most important drivers. Material Risk: https://materials-risk.com/nickel-prices-the-top-10-most-important-drivers/.

[17]. Setyarini, A. (2020). AnalisisPengaruh CAR, NPL, NIM, BOPO, LDR TerhadapROA (Studi Pada Bank Pembangunan Daerah di Indonesia Periode 2015-2018). Research Fair Unisri, 4(1).

[18]. Shan-Qin. N., H. Song-Yi., W. Hong-Hai., Y. Wen-Jia., C. Qi-Shen., & L. Ting. 2015. Analysis on the main influencing factors and future trend of nickel price. Resource Science, 37(5), 961-968.

[19]. Shao, B., Li, M., Zhao &Bian, G. (2019). Nickel Price Forecast Based on the LSTM Neural Network Optimized by the Improved PSO Algorithm. Mathematical Problems in Engineering. https://doi.org/10.1155/2019/1934796

[20]. Statista. (2021). Global consumption of nickel from 2010 to 2020.Statista: https://www.statista.com/statistics/273635/consumption-of-nickel-since-2007/

[21]. Statista. (2021). Global stainless steel melt shop production from 2005 to 2020. Statista: https://www.statista.com/statistics/223028/world-stainless-steel-production/

[22]. Statista. (2021). Indonesia's nickel mine production 2010-2020. Statista: https://www.statista.com/statistics/260757/indonesian-mine-production-of-nickel-since-2006/.

[23]. Statista. (2021). Reserves of nickel worldwide as of 2020, by country. Statista: https://www.statista.com/statistics/273634/nickel-reserves-worldwide-by-country/.

[24]. Tyas, A. A.W. P., &Ikhsani, K. T. W. (2015). SumberDayaAlam dan SumberDayaManusiauntuk Pembangunan Ekonomi Indonesia. Forum Ilmiah, 12 (1), 1-15.

[25]. Widarjono, A. (2017). EkonometrikaPengantar dan AplikasinyaDisertaiPanduan Eviews. 4th penyunt. Yogyakarta: UPP STIM YKPN.

[26]. World Atlas. (2021). Top 10 NickelConsumingCountries. World Atlas: https://www.worldatlas.com/articles/top-10-nickel-consuming-counties.html.

[27]. Zarreta, B &Yovita, L. (2019). Harga Saham, Nilai Tukar Mata Uang Dan Tingkat Suku Bunga AcuanDalam Model Autoregressive Distributed Lag (ARDL).JurnalPenelitian Ekonomi dan Bisnis, 4 (1), 9-22.