

## FACTORS ANALYSIS AFFECTING INDONESIAN COFFEE EXPORTS 2000-2020

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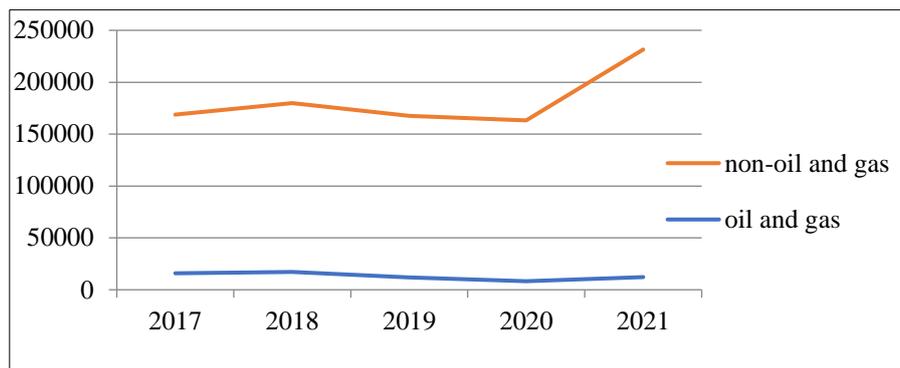
### *Abstract*

*Indonesia engages in a variety of export activities, one of which is the export of coffee commodities, with the goal of boosting the country's overall revenue. Coffee is one of Indonesia's primary exports, making it one of the world's leading exporting nations. The purpose of this study is to determine the factors that influence the export of coffee commodities from Indonesia during the period of 2000-2020. An error correction model is utilized in the process of carrying out the analysis approach. The finding revealed that both in the short term and the long term, the price of coffee on the global market has an effect on Indonesia's coffee exports. The exchange rate for the rupiah has no effect on Indonesia's coffee exports in the short term, but it does have an effect on those exports in the long term. There is neither a short-term nor a long-term impact brought about by the quantity of coffee that is produced in Indonesia.*

**Keywords:** Exchange Rate, Export, Production, World Coffee Prices

### 1. INTRODUCTION

The economic growth of nations that implement an open economy system can increase. Indonesia's economic system is characterized by its openness (Ningsih et al., 2021). International trade is one of the most important aspects of an open economic system. Export and import activities comprise the categories of international trade (Diphayana, 2018). Export is the activity of selling goods from one country to another. While the definition of import is the activity of buying or importing goods from other countries into a country (Adrian Sutedi, 2014). Only by exporting finished or ready-to-use goods, semi-finished or semi-processed goods, and unprocessed or commonly referred to as raw goods does Indonesia's income increase through international trade. The export activities of Indonesia can be divided into two categories: exports of oil and gas products and exports of non-oil and gas products. The graph below depicts the value of Indonesia's oil and gas and non-oil and gas exports over the past five years.



Source: BPS (2022), processed

**Figure 1. Oil and Gas and Non-Oil Exports**

Based on figure 1, exports of goods other than oil and gas are more prevalent than exports of oil and gas. Indonesia's exports of goods other than oil and natural gas tend to increase annually. In 2021, the value of non-oil and gas exports will amount to 219.249.000.000 USD.

These non-oil and gas products can be divided into industrial, agricultural, and mining subsectors. The agricultural subsector is an important contributor to Indonesia's economic expansion. Coffee is among the most important agricultural commodities. The coffee export commodity contributes a substantial amount of foreign currency to non-oil and gas exports (Utami, 2017). As a result, Indonesia has become one of the countries with the largest number of coffee exports in the world.

**Table 1. The World's Largest Coffee Exporting Countries**

Country name	Total exports (per 60 bags)
Brazil	40,698,000
Vietnamese	27,400,000
Colombia	13,672,000
Honduras	6,765,000
Indonesia	6,334,000
India	6,028,000

Source: ICO, (2020)

In 2020, Indonesia will be the fifth largest coffee exporting nation in the world, according to the International Coffee Organization (ICO). Brazil is the world's leading exporter of coffee, with total exports of 40.698.000 metric tons in 2012. The second position is Vietnam with exports of 27.400.000, the third position is Colombia with total exports of 13.672.000, then followed by Honduras in the fourth position with total exports of 6.765.000, the fifth position is Indonesia with total exports of 6.334.000, and the sixth position is occupied by India with a total export of 6.028.000.

Export activities are the main target in the marketing of Indonesian coffee products. In marketing, Indonesia has exported coffee commodities to other countries. Many countries that become the destination of Indonesian coffee exports are located in the Americas, Europe, and Asia.

**Table 2. Coffee Export Volume**

<b>Year</b>	<b>Export (tons)</b>
2016	1.000.620.1
2017	1.175.393.1
2018	806.878.6
2019	872.355.4
2020	809.158.9

Source: BPS Indonesia

The export volume of Indonesian coffee from 2016 to 2020 is presented in Table 2. Using table 2 as the basis, The volume of Indonesian coffee exports fluctuated between 2016 and 2020. Indonesia's coffee exports declined between 2018 and 2020. The decrease and increase in the volume of coffee exports can be affected by a variety of factors, including the price of coffee on a global scale, the quantity of coffee produced, and the exchange rate.

The formulation of the research problem is that Indonesia experienced a decline in total coffee exports during the period 2016-2020, with research questions pertaining to the influence of world coffee prices, Indonesian coffee production, and the exchange rate or exchange rate of the rupiah against the US dollar over the short and long term.

## **2. LITERATURE REVIEW**

Various previous studies that examined the factors that affect Indonesian coffee exports abroad have been carried out. As according to Purba (2011), that all independent variables in the regression model which include world and domestic coffee prices, exchange rates, American coffee consumption and per capita income affect Indonesian coffee exports.

Furthermore, Elisha (2015) also conducted research which resulted that in the short term coffee production had an effect on Indonesian coffee exports, while world coffee prices and exchange rates had no effect. In the long run, coffee production and exchange rates have a significant effect, but world coffee prices have no effect.

Research conducted by Hidayah (2017) shows that the variables Competitor Price, Domestic Price, and Gross Domestic Product have a significant impact on Indonesian coffee exports. While the exchange rate variable has no effect and is insignificant in relation to Indonesian coffee exports, it does have an impact.

Benedict (2017) and Putri et al. (2018) states that the total coffee production in Indonesia has a significant influence on coffee exports. However different results are mentioned in Mardhiah et al. (2020) where coffee production has no effect on Indonesia's coffee exports.

Meanwhile, Ulfa & Andriyani (2019) in their research states that indonesia's export of non-oil and gas commodities is significantly and positively affected by the exchange rate variable.

Pribadi & Sudiana (2020) as well as Sitanini et al. (2020) stated that if the world coffee price had an effect on Indonesia's coffee commodity exports. However, there are differences in research results between the two, namely: Personal & Sudiana (2020) states that the exchange rate has an influence on the export of coffee

commodities, while Sitanini et al. (2020) said the exchange rate had no effect on export commodities.

### **3. RESEARCH METHODS**

This research is quantitative research. The data used in this study are secondary data with time series sourced from BPS (Central Statistics Agency) Indonesia, World Bank, ICO (International Coffee Organization), Ministry of Agriculture, internet sites, and related books.

The variables used in this study consist of the dependent variable, namely the total production of Indonesian coffee and the independent variables which include world coffee prices, exchange rates, and Indonesian coffee production.

Multiple linear regression with an error-correction model approach is utilized as the data analysis method in this study. Using the software application Eviews 10, the error correction model strategy aims to analyze the relationship between the variables utilized in this study.

The regression equation model for this study is as follows:

$$\text{LogEX}_t = \beta_0 + \beta_1 \text{LogWCP}_t + \beta_2 \text{LogER}_t + \beta_3 \text{LogICP}_t + e_t$$

When formulated into an ECM, the equation changes to the following:

$$\text{DLogEX}_t = \beta_0 + \beta_1 \text{DlogWCP}_t + \beta_2 \text{DLogER}_t + \beta_3 \text{DLogICP}_t + \beta_4 \text{ECT} + e_t$$

Information:

EX	: Indonesian Export Volume
WCP	: World Coffee Prices
Exchange Rate	: Rupiah Exchange Rate against USD
ICP	: Indonesian Coffee Production
$\beta_0$	: Constant
$\beta_1, \beta_2, \beta_3, \beta_4$	: Regression coefficient
ECT	: Error Correction Term
e	: Error
t	: Time series

## **4. RESULTS AND DISCUSSION**

### **4.1 Analysis Results**

#### **4.1.1. Stationerity Test**

To see the stationarity of the data, a unit root test was carried out with the Augmented Dickey-Fuller test. The following table shows the results of the ADF test to check the stationarity of the data.

**Table 3. Stationarity Test Results**

Variable	Probability	Conclusion
Log_EX	0.6177	Not Stationary
Log_WCP	0.5779	Not Stationary
Log_ER	0.8175	Not Stationary
Log_ICP	0.1372	Not Stationary

Source: Eviews 10, data processed

Table 3. above shows that at the level the variables used are not stationary, so it is necessary to test at the level above, namely the first difference level.

**Table 4. Stationarity Test Results on the first difference**

Variable	Probability	Conclusion
Log_EX	0.0003	Stationary
Log_WCP	0.0024	Stationary
Log_ER	0.0026	Stationary
Log_ICP	0.0028	Stationary

Source: Eviews 10, data processed

Table 4. shows that all variables are stationary in the first differentiation, so the research is feasible to continue.

#### **4.1.2. Cointegration Test (Long-Term Estimation)**

The long-term estimation of this research model can be described in the following table.

**Table 5. Long-Term Estimation Results**

Variable	Coefficient	t-Stats	Probability
C	-3.647482	-1.290627	0.2141
LOG_WCP	1.235370	12.77128	0.0000
LOG_ER	0.742248	3.389552	0.0035
LOG_ICP	0.684685	1.301552	0.2104

Source: Eviews 10, processed

Based on the table above, the equation for the long-term estimation results is as follows:

$$\text{LogEX}_t = -3.647482 + 1.235370\text{LogWCP}_t + 0.742248\text{LogER}_t + 0.684685\text{LogICP}_t + e_t$$

From table 5, the findings of the cointegration test regression equation can be defined as follows: the coefficient constant is -3.647482, which indicates that if all independent variables are zero on the long term, then Indonesia's coffee exports will decrease by -3.647482. The coefficient of the world coffee price variable is 1.235370, which indicates that a 1% increase in world coffee prices will raise the value of coffee exports by 1.235370 in the long run, assuming all other variables remain constant. The exchange rate variable has a coefficient of 0.742248, which indicates that a 1% increase in coffee production will raise the value of coffee exports by 0.742248 in the long run,

assuming that all other variables remain constant. Moreover, the variable coefficient of coffee consumption is 0.684685, which indicates that for every 1% increase in coffee consumption, the value of Indonesian coffee exports abroad will increase by 0.684685, assuming that all other variables remain constant.

**4.1.3. Test Error Correction Term**

The residual value from the cointegration test results is then tested with the ADF test which aims to see whether the residual value is stationary or not at the level level. This residual value is then called the error correction term. The following are the results of the ECT test at the level level:

**Table 6. ECT Test Results**

	<b>t-statistics</b>	<b>Probability</b>
Augmented Dickey-Fuller test statistics	-4.813218	0.0012

Source: Eviews 10, processed

The probability value is 0.0012 according to the findings of the residual value test. This value is below the 5% significance value, indicating that the ECT is stable at the current level. In this study, cointegration can therefore be concluded between the dependent and independent variables.

**4.1.4. ECM Test (Short-Term Estimate)**

The ECM test is carried out after obtaining the results of the residual series. This test is used to see the short-term estimation results. Here are the results of the ECM test.

**Table 7. ECM Test Results**

<b>Variable</b>	<b>Coefficient</b>	<b>t-statistics</b>	<b>Probability</b>
C	0.003295	0.195600	0.8475
D(LOG_WCP)	0.891278	4.816712	0.0002
D(LOG_ER)	0.865530	2.121161	0.0510
D(LOG_ICP)	0.675965	0.931945	0.3661
ECT (-1)	-1.133814	-4.511742	0.0004
R-squared	0.734680		
Adjusted R-squared	0.663928		
F-statistics	10.38388		
Probability (F-statistic)	0.000310		

Source: Eviews 10, processed

Based on the table above, the equation for the estimation results of the short-term model is as follows:

$$D\text{LogEX}_t = 0.003295 + 0.891278\text{LogWCP}_t + 0.865530\text{LogER}_t + 0.675965\text{LogICP}_t - 1.133814 \text{ECT}(-1) + e_t$$

According to the findings of the short-term estimation test conducted using the ECM method, the following conclusion can be drawn: The value of the constant coefficient is 0.003295 In the short term, the export of copies will increase by 0.003295

if the values of the independent variables remain constant. The coefficient of the world coffee price variable is 0.891278, indicating that a 1% increase in world coffee prices will increase the value of coffee exports by 0.891278 over the short term, assuming the variable has a constant value. The coefficient value of the exchange rate variable is 0.865530, so a 1% increase in the exchange rate has a short-term effect on the value of Indonesian coffee exports of 0.865530, assuming all other variables remain constant. The variable coefficient of Indonesian coffee production is 0.675965, which means that a 1% increase in coffee production will increase the value of coffee exports by 0.675965 over the short term, assuming that all other variables remain constant. The value of the ECT coefficient is -1.133814, indicating that the speed of error correction to correct the behavior of each variable over the short term is -1.13 percent. According to the above equation, the value of the ECT cointegration coefficient written as ECT (-1) is negative at -1.133814, and the probability of 0.0004 is statistically significant at 5% alpha. This ECM model is therefore considered valid.

#### **4.1.5. Statistic Test**

##### **1) Coefficient of Determination Test**

Adjusted R-Squared in the short-term predicted results is 0.663928, which indicates that independent variables such as world coffee costs, exchange rates, and Indonesian coffee production influence Indonesian coffee exports by 66.39 percent, while the remaining 33.61 percent is influenced by variables outside the model.

##### **2) T test**

The probability of the global coffee price fluctuating is 0.0002 < 5% based on short-term estimation results. In the long run, the probability is 0.0000 < 5%. This indicates that the global coffee price variable has a substantial impact on both the short- and long-term.

The exchange rate variable probability is 0.0510 > 5%. The probability of the long-term exchange rate occurring is 0.0035 < 5% over the short term. This indicates that the exchange rate variable has no effect over the short term, but a significant effect over the long term.

The likelihood of Indonesian coffee production variable is 0.3661 > 5%. While the probability of long-term variation in Indonesian coffee production is 0.2104 > 5%, the likelihood of long-term variation in Indonesian coffee production is greater than 5%. This indicates that the Indonesian coffee production variable has no short- or long-term significance.

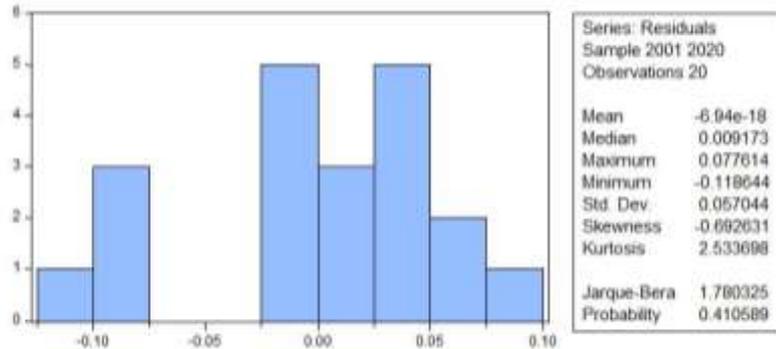
##### **3) F test**

The probability F-statistic in the short-term estimate is 0.000310 < 5%. This means that the independent variables which include world coffee prices, exchange rates, and Indonesian coffee production have a simultaneous effect on Indonesian coffee exports abroad.

#### 4.1.6. Classic Assumption Test

##### 1) Normality Test

The Jarque-Bera test (JB test) is used to determine whether or not the data are normally distributed during the normality test.



Source: Eviews 10, processed

**Figure 2. Normality Test Results**

According to the results of the Jarque-Bera test, the ECM model's probability value is 0.410589, which is bigger than 5% alpha, so it can be stated that the ECM model is normally spread.

##### 2) Multicollinearity Test

The purpose of the multicollinearity test is to determine if there is an intercorrelation between the independent variables. The test for multicollinearity yielded the following results.

**Table 8. Multicollinearity Test Results**

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	0.000284	1.377248	NA
D(WCP)	0.034239	1.334814	1.306196
D(ER)	0.166501	1.351675	1.295124
D(ICP)	0.526100	1.573733	1.451822
ECT(-1)	0.063153	1.125592	1.116429

Source: Eviews 10, processed

Based on the results of the multicollinearity test, all independent variables in the regression equation have a correlation coefficient value below 10, which means that this ECM model does not have multicollinearity problems.

##### 3) Autocorrelation Test

The LM Test can be utilized to test autocorrelation. If the probability value of Obs\*R-squared is greater than 0.05, then there is no autocorrelation issue. The autocorrelation test yielded the following results.

**Table 9. Autocorrelation Test Results**

F-statistics	0.159186	Probability F	0.8545
Obs*R-Squared	0.478093	Chi-Square Probability	0.7874

Source : Eviews 10, processed

For the autocorrelation test above, the probability value of Obs\* R-Squared is  $0.7874 > 0,05$ , which means that this ECM model has no autocorrelation problem.

#### 4) Heteroscedasticity Test

A good regression model has homoscedasticity or has no heteroscedasticity issues. The test outcomes are provided below.

**Table 10. Heteroscedasticity Test Results**

F-statistics	1.035192	Probability F	0.4214
Obs*R-squared	4.326649	Chi-Square Probability	0.3636

Source: Eviews 10, processed

Based on the results above, it can be seen that the value of the Obs\*R-Squared probability is 0.3636 which is greater than 5% alpha. In conclusion, this ECM model does not have heteroscedasticity problems.

#### 5) Linearity Test

**Table 11. Linearity Test Results**

	<b>Probability</b>
t-statistics	0.8853
F-statistics	0.8853
Likelihood Ratio	0.8607

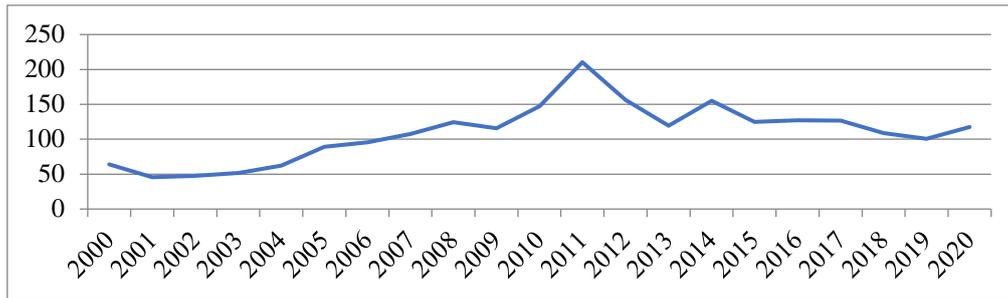
Source: Eviews 10, processed

From the results of the linearity test above, it can be seen that the F-statistic probability is equal to 0.8853 where the value is greater than 5% alpha, which means that the ECM model in this study has no linearity problem.

## 4.2. Discussion

### 4.2.1. The Effect of World Coffee Prices on Indonesian Coffee Exports

From the estimation results, it can be concluded that world coffee prices have a significant effect in the short and long term on Indonesian coffee exports. This happens because price is an indicator of interest in a country to buy goods. If the price of goods in one country is cheap, then other countries will increase their demand for export goods. Conversely, if there is an increase in the price of goods, other countries will reduce their export demand with the assumption of *ceteris paribus*.



Source: International Coffee Organization

**Figure 3. World Coffee Prices 2000-2020**

It can be seen in Figure 3. that world coffee prices in the period 2000 to 2020 continue to fluctuate. Based on data from the ICO or International Coffee Organization and data from the Indonesian Central Statistics Agency, in 2019 the world coffee price reached 100.52 USD with a total Indonesian coffee export of 872,355,4 thousand USD. Meanwhile, in 2020 the world coffee price reached USD 117.57 with a total export of Indonesian coffee of 809,158.9 thousand USD. The demand for an item is influenced by the price of the commodity itself. The same result was discovered by Benedict (2017) who said that the international price of coffee significantly affected the volume of Indonesian coffee exports. Likewise, Putri et al., (2018) said the same result that the world coffee price variable had a significant influence in the short and long term on the value of Indonesian coffee exports.

#### **4.2.3. The Effect of Exchange Rates on Indonesian Coffee Exports**

According to the results of the estimation, the exchange rate variable has no immediate effect on the volume of Indonesian coffee exports. Benedict (2017) and Hidayah (2017) concurred that the exchange rate variable had no substantial impact on Indonesia's coffee exports. Long-term estimation results, however, indicate that the exchange rate variable has a significant impact. According to Elisha (2015) research, the exchange rate has no effect in the short term, but a positive significant effect in the long term.

#### **4.2.4. The Effect of Indonesian Coffee Production on Indonesian Coffee Exports**

Coffee production in Indonesia has no effect on Indonesia's coffee exports in the short term. This is partly due to the lack of maximum coffee production in Indonesia. Therefore, Indonesia must always maintain the quality and quality of coffee commodities so that Indonesian coffee is able to continue to compete with coffees from other countries. Same result was revealed by Mardhiah et al., (2020) and Sitanini et al., (2020) who said that coffee production had no effect on coffee exports in the short term. For long-term estimates of Indonesian coffee production variables also have no effect on Indonesia's coffee exports. This finding is the same as the research conducted by Putri et al., (2018).

## 5. CONCLUSION

Based on the results of the preceding discussion, it can be concluded that international or world coffee prices have an effect on Indonesia's coffee exports in both the short and long term, the exchange rate has no effect on Indonesian coffee exports in the short term, but a significant positive effect in the long term, and Indonesia's coffee production has no effect on Indonesia's coffee exports to other countries in either the short or long term. Therefore, the government should pay greater attention to Indonesian coffee farmers by providing them with incentives to increase the quantity and quality of their coffee production. Thus, Indonesian consumers of coffee will not switch to coffee from other countries. The provision of incentives can take the form of research and development, the construction of research sites for coffee farming, training, investment, and the promotion of coffee exports to other countries.

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