

Analysis of Factors Affecting Indonesian Cocoa Exports to the Netherlands

Aulia Agusdi*, Cut Zakia Rizki, Sofyan Syahnur, and Fakhruddin

Department of Development Economics, Universitas Syiah Kuala, Banda Aceh, Indonesia

Corresponding Email: auliaagusdi99@gmail.com

Abstract

Understanding the short- and long-run determinants of cocoa exports can help inform Indonesia's agricultural trade policies. This study aims to analyze the factors that influence Indonesian cocoa exports to the Netherlands from 1991 to 2020. This study used secondary data for 30 years and used the Autoregressive Distributed Lag (ARDL) analysis method. The results indicate that in the short run, the exchange rate has a significant negative effect on Indonesian cocoa exports to the Netherlands, while the Netherlands' GDP per capita has a negative but insignificant effect. Additionally, both domestic cocoa production and international cocoa prices show positive yet insignificant effects. Meanwhile, the long-run estimation reveals that domestic cocoa production exhibits a significant negative impact on exports, whereas the exchange rate and the Netherlands' GDP per capita have positive but insignificant effects, and international cocoa prices have a negative but insignificant effect. These findings highlight the distinct short-run role of the exchange rate and the long-run relationship between domestic production and bilateral export performance. They also indicate that higher national cocoa output is not necessarily accompanied by higher exports to the Netherlands, suggesting that production expansion alone may be insufficient to strengthen exports to this market.

Keywords: *Indonesian Cocoa Export to the Netherlands, Exchange Rate, Netherlands' GDP per Capita, Indonesian Cocoa Production, International Cocoa Price, and ARDL Model*

JEL Classification: *F13, F17, Q17, and Q18*



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Introduction

International trade is an activity between two or more countries to fulfill the needs of the parties conducting trade. It is a platform for the broad exchange of services and goods; it also has a role in increasing welfare (Krugman et al., 2012). Trade liberalization would expand each country's production and export of resource-intensive products (Brander & Taylor, 1997). As part of international trade, exports and imports are inseparable parts of relationships and partnerships between nations (Krugman et al., 2012). Globalization has encouraged each country to be more open. In addition,

*Corresponding Author: Aulia Agusdi, Department of Development Economics, Universitas Syiah Kuala, Jl. Teuku Nyak Arief No.441, Kopelma Darussalam, Syiah Kuala, Kota Banda Aceh, Indonesia, auliaagusdi99@gmail.com

exports and imports also create a multiplier effect; when many investors open businesses in Indonesia, they will create jobs and reduce unemployment.

Regarding exports, Indonesia is one of the global main exporters of agricultural products, especially cocoa beans (Badan Pusat Statistik, 2021). The agricultural product has a significant position in Indonesian economic activity; its contribution to the Gross Domestic Product (GDP) is fairly large, approximately 13.7 percent in 2020, or second only to the Manufacturing sector of 19.88 percent. It is also one of the important export commodities of Indonesia for foreign exchange reserves other than gas and oil. Indonesia is the third-largest manufacturer and exporter of the world's cocoa, following Ghana and Ivory Coast (Badan Pusat Statistik, 2021).

Indonesian cocoa exports reach five continents such as Asia, Europe, Africa, America, and Australia. By 2019, the top five Indonesian cocoa importer countries were Malaysia, the US, India, China, and the Netherlands. The Netherlands is a key country and Indonesia's main cocoa export destination to Europe (Badan Pusat Statistik, 2021).

UN Comtrade data presented through the World Bank's World Integrated Trade Solution show the Netherlands' cocoa-bean imports of approximately 681,307 metric tons in 2020 (UN Comtrade, 2022). Meanwhile, Jukema et al. (2021) describe how imported beans enter Dutch processing facilities or are resold to other countries. Consequently, Indonesian exports to the Netherlands can provide access to a wider European production network, and Dutch household income alone may be an incomplete indicator of the demand facing Indonesian suppliers.

According to the Netherlands' Center for Promotion of Imports from Developing Countries (2021), the Netherlands is a significant cocoa trading hub in Europe, as the world's biggest importer of cocoa beans and the second biggest cocoa processor. The Netherlands serves as an important cocoa bean re-exporter and exporter of semi-finished cocoa products to other European countries. The cocoa grinding industry of the Netherlands is the second biggest in the world, following Ivory Coast. The Dutch cocoa grinding industry processed around 600,000 metric tons of cocoa beans in 2020 and 2021. It houses multinational corporations such as Cargill, Olam, Dutch Cocoa, and Daarnhouwer. These corporations have a significant role in both cocoa imports and cocoa derivatives manufacturing. As Indonesia's important trading partner in Europe, the Netherlands also has the largest port, the Port of Rotterdam. From 1962 to 2004, it was the busiest port in the world, currently followed by Singapore and Shanghai. Many products and commodities exported to European countries such as Germany, Switzerland, and several other countries transit through the Port of Rotterdam.

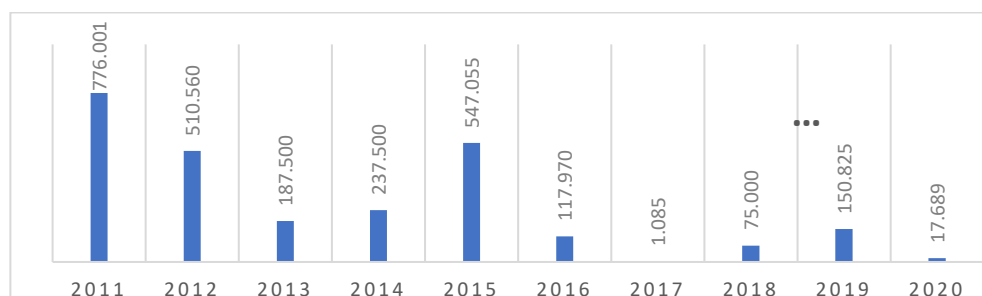


Figure 1. Indonesian Cocoa Exports to the Netherlands (kg)

Source: UN Comtrade, 2022

Based on the data from the United Nations Comtrade (2022), total cocoa exports in the last 10 years have fluctuated up and down. In 2011, the total export volume reached 776,001 kg, while in 2013 it decreased to a total value of 187,500 kg. In 2015, it increased again with a total volume of 547,055 kg. In 2017, it experienced a sharp decline in the last 10 years, with a total value reaching 1,085 kg. And in 2020 Indonesia's cocoa exports to the Netherlands with a total value of 17,689 kg.

However, Indonesian cocoa exports to the European Union market, especially to the Netherlands, have experienced many non-tariff barriers related to the harmonization of regulatory and quality standards by the EU. Non-tariff barriers for Indonesian cocoa to the EU market need to be viewed positively as an effort to further enhance competitiveness. Efforts to improve standards and quality start from upstream to downstream (Anggoro & Widyastutik, 2016).

As one form of support from the Indonesian government in encouraging the export of products to Europe, the Indonesian government has carried out several steps and policies, such as those performed by the Indonesian Ministry of Agriculture through the Indonesian diplomatic forum - the EU Comprehensive Economic Partnership Agreement (IEU - CEPA) in 2016 by conducting diplomatic cooperation and trade efforts to reduce cocoa tariffs in Europe while increasing Indonesian processed cocoa consumption in the region.

The contribution of this study is therefore its destination-specific scope, its joint consideration of Indonesian supply and Dutch income, and its separation of contemporaneous associations from longer-run estimates over 1991–2020. This focus complements the destination comparisons and aggregate export models reviewed above by examining adjustment within one bilateral relationship. The objective is to estimate how the exchange rate, the Netherlands' GDP per capita, Indonesian cocoa production, and international cocoa price are associated with Indonesian cocoa exports to the Netherlands, and to assess the limits of the resulting policy interpretation

Literature Review

International Trade and Comparative Advantage

International trade is a transaction of buying and selling across countries, involving two parties and crossing national borders. These parties do not have to be from different countries or various nationalities. International trade transactions, better known as exports and imports, are essentially simple transactions that do nothing more than buy and sell goods between entrepreneurs who reside or are domiciled in different countries. However, in the exchange of services and goods across the sea and land, complex problems often arise between entrepreneurs who have different languages, cultures, customs, and ways. International trade mainly concentrates on real transactions in the global economy. These transactions involve the physical movement of goods or the desire for tangible economic resources (Krugman et al., 2012).

Comparative advantage is an economy's ability to manufacture a particular service or goods at a lower opportunity cost than its trading partners. Comparative advantage is used to understand why countries, corporations, or individuals can benefit from trade. Meanwhile, absolute advantage is the ability of an individual, corporation, region, or country to manufacture a bigger quantity of services or goods with an equal inputs quantity per unit of time or to manufacture an equal quantity of a good or service per unit of time using a lesser inputs quantity than the competitors. The greater

efficiency that one nation may have over another in the production of a commodity (Salvatore, 2012).

Within this framework, Indonesian production represents potential export supply, the Netherlands' GDP per capita represents one component of destination demand, and the exchange rate and international price represent price-related conditions. Observed exports arise where these conditions interact with domestic utilization and trade costs. The empirical equation is a reduced-form relationship: its coefficients summarize conditional associations and cannot identify separate structural supply and demand effects without additional identifying restrictions.

Exchange Rate

An exchange rate is the value of one country's currency in terms of another country's currency. Exchange rates have a role in making decisions because they allow us to understand various countries' prices in comparable terms (Krugman et al., 2012). The exchange rate of a country's currency consists of the nominal exchange rate and the real exchange rate. The nominal exchange rate is the relative price of the currencies of two countries. Meanwhile, the real exchange rate is the relative price of goods between two countries. The real exchange rate informs us of the rate at which we can trade one country's goods for other goods. The real exchange rate is also called the terms of trade (Mankiw, 2010).

When the exchange rate is expressed as rupiah per US dollar, a higher value indicates rupiah depreciation. Holding other conditions constant, depreciation can make Indonesian output cheaper in foreign-currency terms and encourage exports. The response may be weaker when production relies on imported inputs, or exporters cannot quickly change output and sales commitments. Abeyasinghe and Yeok (1998) show why imported-input costs can complicate the usual prediction linking appreciation to weaker exports. The baseline competitiveness hypothesis is therefore a positive export response to depreciation, subject to adjustment costs and supply constraints.

Destination Income and Industrial Demand

Higher income in an importing country can raise expenditure on food products and thereby increase demand for cocoa-related inputs. Dutch GDP per capita is used as a broad income indicator rather than a direct measure of industrial cocoa demand. Because Dutch imports also support processing and onward exports, income per person may fail to capture changes in grinding capacity, inventories, or demand elsewhere in Europe (Jukema et al., 2021). A positive income association is plausible, but a statistically insignificant coefficient would not establish that Dutch demand conditions are irrelevant.

Domestic Production and International Prices

An increase in Indonesian cocoa production expands the quantity potentially available for export. The expected production coefficient is positive when domestic utilization, quality, and destination shares remain unchanged. A bilateral relationship can differ from this prediction if additional output is absorbed by domestic processors or exported

to other markets. These allocation mechanisms are possible explanations, not effects directly identified by aggregate production data.

International cocoa prices create competing incentives. Higher prices can encourage exporters to supply foreign markets, while simultaneously raising costs for importers and processors. They can also reflect global supply shortages that reduce available export quantities. The expected sign is therefore ambiguous in a reduced-form bilateral equation. Wardhany and Adzim (2018) report positive production and exchange-rate coefficients and a negative international-price coefficient for aggregate Indonesian cocoa-bean exports. Their results provide a benchmark, but differences in destination coverage and model specification prevent a direct transfer of those estimates to the Netherlands.

Evidence on Market Access and Adjustment

Market access can modify the relationship between production and trade. The European-destination evidence in Anggoro and Widyastutik (2016) suggests that income, exchange rates, and trade restrictions deserve joint consideration. Mukhlis et al. (2021) find long-run links between European and Indonesian cocoa markets, with adjustment differing across crisis periods. Their outcome concerns market interactions rather than this study's bilateral export measure. Taken together, these studies motivate a dynamic specification and careful assessment of stability rather than an assumption that a single relationship remains unchanged throughout the sample.

Methods

In this study, the data used are secondary data (time series) obtained from various reports and collections as well as other forms of publication, such as data from Badan Pusat Statistik (BPS), World Trade Organization, World Bank, IMF, and other credible sources.

The method used in this research is the Autoregressive Distributed Lag (ARDL) to examine the factors that affect the volume of Indonesian cocoa exports to the Netherlands during the period 1991-2020. This method is used to test the effect of the Exchange Rate, the Netherlands' Gross Domestic Product Per Capita, Indonesian Cocoa Production, and International Cocoa Prices on Indonesian cocoa exports to the Netherlands. The data processing application in this study uses the Eviews 10 software.

There are some advantages to choosing the ARDL model in a study. First, this model does not attach much importance to the level of data stationary, as long as the data is already stationary at the maximum on the first difference. Second, the ARDL model serves research with a limited number of observations. Third, the ARDL model can estimate short-run and long-run influence (Gujarati, 2003). The following equations are used in this study when performing Autoregressive Distributed Lag (ARDL), namely:

$$\begin{aligned} \Delta Y_t = & \beta_0 + \sum_{i=1}^k \beta_1 \Delta Y_{t-i} + \sum_{i=1}^k \beta_2 \Delta X_{1t-i} + \sum_{i=1}^k \beta_3 \Delta X_{2t-i} + \\ & \sum_{i=1}^k \beta_4 \Delta X_{3t-i} + \sum_{i=1}^k \beta_5 \Delta X_{2t-i} + \theta_1 Y_{t-i} + \theta_2 X_{1t-i} + \\ & \theta_3 X_{2t-i} + \theta_4 X_{3t-i} + \theta_5 X_{3t-i} + \varepsilon_t \end{aligned} \quad (1)$$

So, the ARDL model for this research can be arranged as:

$$\Delta X_t = \beta_0 + \sum_{i=1}^k \beta_1 \Delta LX_{4t-i} + \sum_{i=1}^k \beta_4 \Delta E_{1t-i} + \sum_{i=1}^k \beta_3 \Delta LY_{2t-i} + \sum_{i=1}^k \beta_4 \Delta Q_{4t-i} + \sum_{i=1}^k \beta_5 \Delta PF_{4t-i} + \theta_1 X_{4t-i} + \theta_2 E_{4t-i} + \theta_3 Y_{3t-i} + \theta_4 Q_{4t-i} + \theta_5 PF_{4t-i} + \varepsilon_t \quad (2)$$

where: X_{t-i} = Indonesian Cocoa Export to the Netherlands (kg), E_{t-i} = lag of Exchange Rate (USD/IDR), Y_{t-i} = lag of Netherlands' GDP Per Capita (USD), Q_{t-i} = lag of Indonesian Cocoa Production (metric ton), Pf_{t-i} = lag of International Cocoa Price (USD/metric ton).

$$\Delta X_t = \beta_0 + \theta_1 X_{4t-i} + \theta_2 E_{4t-i} + \theta_3 Y_{3t-i} + \theta_4 Q_{4t-i} + \theta_5 PF_{4t-i} + \varepsilon_t \quad (3)$$

while the short-run effect is:

$$\Delta X_t = \beta_0 + \sum_{i=1}^k \beta_1 \Delta X_{4t-i} + \sum_{i=1}^k \beta_2 \Delta E_{4t-i} + \sum_{i=1}^k \beta_3 \Delta Y_{3t-i} + \sum_{i=1}^k \beta_4 \Delta Q_{4t-i} + \sum_{i=1}^k \beta_4 \Delta PF_{4t-i} + \delta ECT_{t-i} + \varepsilon_t \quad (4)$$

description, δ is the coefficient of the error correction term (ECT); it indicates the speed of adjustment from short-run to long-run balance. The ECT value should be negative and significant in the model to be valid.

Estimation and Diagnostic Procedures

Augmented Dickey–Fuller tests assess the integration properties of the series using the unit-root framework of Dickey and Fuller (1979). Statistical significance is evaluated at 5 percent unless otherwise stated. Lag selection uses the Akaike information criterion. The selected ARDL specification is followed by bounds testing under Case 2, a restricted constant with no trend. Residual normality, serial correlation, and parameter stability are then examined. The CUSUM and CUSUM of squares procedures assess stability rather than establishing cointegration (Brown et al., 1975).

The number of usable observations and parameters is important for interpretation. A maximum lag of four leaves 26 observations, while the selected levels equation contains 21 estimated coefficients, including the intercept. This leaves only five residual degrees of freedom. Asymptotic bounds results therefore require caution. Finite-sample and bootstrap approaches provide relevant alternatives for assessing inference (McNown et al., 2018; Narayan, 2005).

Result and Discussion

Data Stationarity Test (Unit Root Test)

This study uses a unit root test to determine the level of stationarity. This test is carried out at the beginning of the research process, which aims to determine whether the data is stationary or not. The researcher uses the Augmented Dickey-Fuller (ADF) method with the following test criteria: if the p-value $< \alpha$, then the data used is stationary, while

if the $p\text{-value} > \alpha$, then the data used is not stationary. The following are the results of the stationarity test of the data in this study.

Table 1. Data Stationarity Test Result

Variable	Level			First Difference		
	T-Stat	p-value	Conclusion	T-Stat	p-value	Conclusion
X	-3.622383	0.0115	Stationary	-8.087131	0.0000	Stationary
E	-1.113700	0.6966	Non-Stationary	-6.369674	0.0000	Stationary
Y	-1.173743	0.6718	Non-Stationary	-4.503272	0.0014	Stationary
Q	-2.010969	0.2807	Non-Stationary	-7.629976	0.0000	Stationary
Pf	-1.482761	0.5279	Non-Stationary	-4.802520	0.0007	Stationary

Source: Processed data, 2022

The conclusion from the results of data processing using a significance level of $= 0.05$, which can be seen from Table 1, is that at the variable level, the variable Indonesian cocoa export to the Netherlands is stationary, and the other is non-stationary. While 1st difference, all the variables are stationary. Based on the results of this data processing, it can be concluded that the stationary variable is at the 1st difference level.

Optimum Lag Test and ARDL Estimation Result

In research using the ARDL model, lags are needed to estimate optimally.

Table 2. ARDL Estimation Result

Variable	Coefficient	Std. error	t-Statistic	Prob.
X (-1)	-0.550230	0.199263	-2.761327	0.0398
E	-1638.794	350.3144	-4.678067	0.0054
E (-1)	285.4039	362.0830	0.788228	0.4663
E (-2)	-14.73862	412.7190	-0.035711	0.9729
E (-3)	-985.1754	326.2923	-3.019303	0.0294
E (-4)	2405.823	345.3113	6.967113	0.0009
Y	-393.9815	235.4611	-1.673234	0.1551
Y (-1)	-311.9396	356.1354	-0.875901	0.4212
Y (-2)	-48.69955	295.1258	-0.165013	0.8754
Y (-3)	505.3906	310.5629	1.627337	0.1646
Y (-4)	521.8212	255.8981	2.039176	0.0970
Q	18.05623	9.905115	1.822919	0.1279
Q (-1)	-11.67591	8.633030	-1.352470	0.2342
Q (-2)	-20.24199	8.794203	-2.301743	0.0696
Q (-3)	-7.421150	10.51237	-0.705945	0.5117
PF	2142.806	2328.808	0.920130	0.3997
PF (-1)	-1061.977	4766.079	-0.222820	0.8325
PF (-2)	-4665.950	4716.232	-0.989339	0.3679
PF (-3)	-3354.012	3015.001	-1.112441	0.3166
PF (-4)	-2011.953	2257.257	-0.891327	0.4136
C	29160930	3262288	8.938797	0.0003

Source: Processed data, 2022

Based on the results, there is a selection of ARDL models, namely (1,4,4,3,4). The model explains that Indonesian cocoa exports to the Netherlands are at lag 1, the Exchange rate is at lag 4, the Netherlands' gross domestic product per capita is at lag 4, Indonesian Cocoa Production is at lag 3, and the international cocoa price is at lag 4.

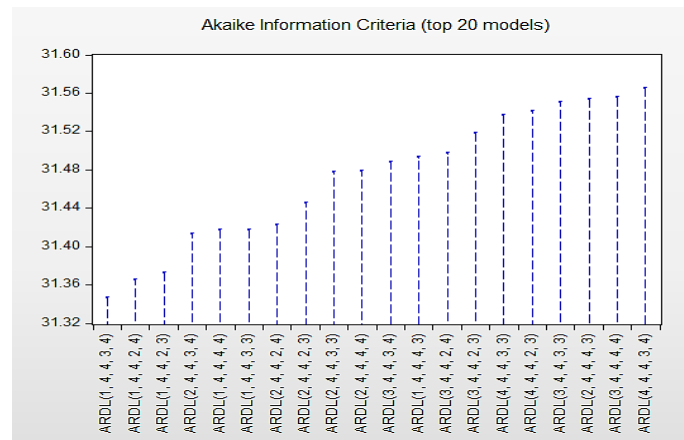


Figure 2. Optimum Lag Test Result

Source: Processed data, 2022

The following are the results of data processing based on the top 20 models from the Akaike Information Criteria (AIC). From the results, it can be concluded that the suitable model in the ARDL processing method in this study is ARDL (1,4,4,3,4) because it has the lowest AIC among the candidate models.

Cointegration Test

Table 3. Cointegration Test Result

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
Asymptotic: n=1000				
F-Statistic	26.77020	10%	2.2	3.09
k	4	5%	2.56	3.49
		2.5%	2.88	3.87
		1%	3.29	4.37

Source: Processed data, 2022

The cointegration test serves to test whether the data being tested has a tendency in the long run or not. Based on the data processing, it is found that the results of the F-Statistic are $26.77020 > I(1)$ with a significance level of 1%, 2.5%, 5%, and 10%. So, it can be concluded that there is cointegration between the variables of Indonesian Cocoa Export to the Netherlands, Exchange rate, the Netherlands' Gross Domestic Product Per Capita, Indonesian Cocoa Production, and International Cocoa Price in the long run.

Short-Run and Long-Run of the ARDL Model

Here are the results of data processing from short-run and long-run testing:

Table 4. Short-Run Test Result

Variable	Coefficient	Std. error	t-Statistic	Prob.
X (-1)	-0.550230	0.199263	-2.761327	0.0398
E	-1638.794	350.3144	-4.678067	0.0054
E (-1)	285.4039	362.0830	0.788228	0.4663
E (-2)	-14.73862	412.7190	-0.035711	0.9729
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PF (-3)	-3354.012	3015.001	-1.112441	0.3166
PF (-4)	-2011.953	2257.257	-0.891327	0.4136
C	29160930	3262288	8.938797	0.0003

Source: Processed data, 2022

Table 5. Long-Run Test Result

Levels Equation				
Case 2: Restricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
E	33.87820	308.9373	0.109660	0.9169
Y	175.8392	163.3722	1.076311	0.3310
Q	-13.72882	5.188004	-2.646262	0.0456
PF	-5774.038	2887.843	-1.999429	0.1020
C	18810712	2236490	8.410818	0.0004

EC= X – (33.8782*E + 175.8392*Y -13.7288*Q -5774.0378*PF + 18810711.7333)

Source: Processed data, 2022

Stability Test

The structural model stability test can be divided into two types, namely, CUSUM (Cumulative Sum of Recursive Residuals) and CUSUMQ (Cumulative Sum of Squares of Recursive Residuals). Here are the results of the CUSUM test with Indonesian cocoa exports to the Netherlands as the dependent variable.

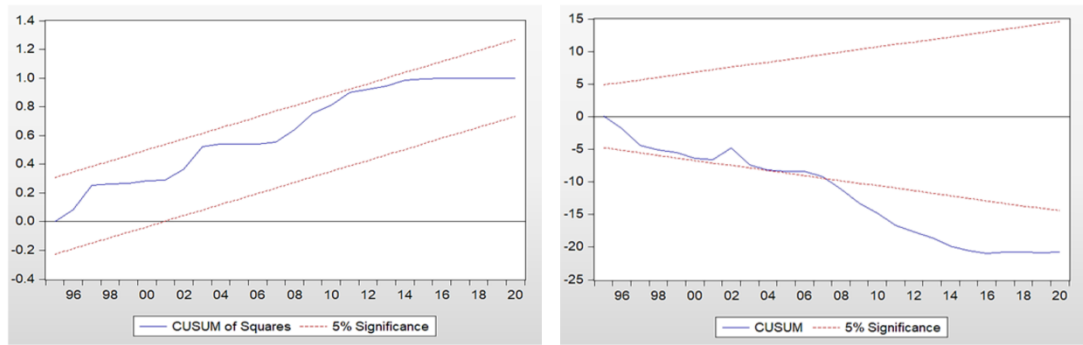


Figure 3. CUSUM of Squares Test and CUSUM Test Result

Source: Processed data, 2022

In Figure 3, the CUSUM of Squares test chart is within the 5 percent significance level; it asserts the long-run relationship in the research variables and the stability of the ECT coefficient value. Meanwhile, the CUSUM chart exceeds the line plot, so the model shows that instability in the coefficient occurs in the years 2007 to 2020.

Classical Assumption Test

The normality test is a test carried out to test the data distribution of a group or variables to see if the data distribution is normally distributed or not. Based on the above data processing obtained, the probability of the normality test using the Jarque-Bera method is 0.417778, as shown in Figure 4. This probability value is greater than the α value of 0.05. Thus, it can be concluded that the residual models of ARDL (1,4,4,3,4) are normally distributed.

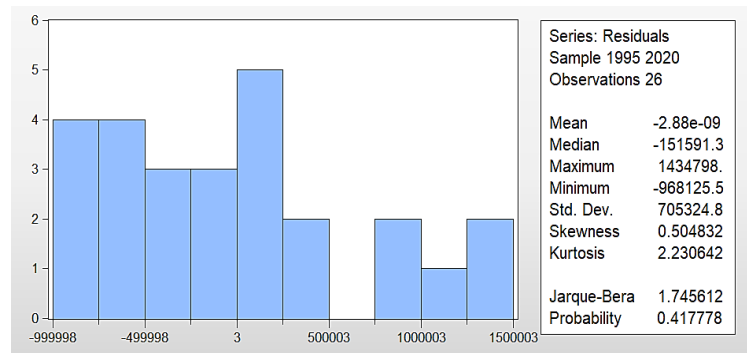


Figure 4. Normality test

Source: Processed data, 2022

Table 6. Autocorrelation Test Result

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	4.714753	Prob. F(2,3)	0.1186
Obs*R-squared	19.72461	Prob. Chi-Square(2)	0.0001

Source: Processed data, 2022

The autocorrelation test serves to test whether there is a relationship between variables from one period to another. To find out whether there is autocorrelation or not, the researcher used the Breusch-Godfrey Serial Correlation LM Test method.

The autocorrelation test using the LM test method presented in Table 6 indicates an F-statistic probability of 0.1186. This probability value is 0.1186 more than 0.05 it can be concluded that there is no serial correlation in residual ARDL (1,4,4,3,4).

Relationship of Exchange Rate to Indonesian Cocoa Export to the Netherlands

Based on data processing in the short-run model test, it is known that the exchange rate coefficient is -1638.794 and has a probability of 0.0054 (less than 0.05). In the short-run exchange rate has a negative and significant role in explaining Indonesian cocoa export to the Netherlands. In the short run, the possibility of changes and fluctuations in the USD/IDR exchange rate has an impact on Indonesian Cocoa Exports to the Netherlands. The result of the short-run model is in line with the research conducted by Fajar et al. (2017) found that the exchange rate has an influence on Indonesian export because the exchange rate depreciates, which means that the price of domestic cocoa is cheaper than the international price, so that the competitiveness increases so it will increase the export volume of cocoa beans.

Meanwhile, for testing the long-run model, it is known that the exchange rate coefficient is 33.87820 and has a probability of 0.9169 (more than 0.05). In the long-run exchange rate has a positive and insignificant role in explaining Indonesian cocoa export to the Netherlands. The results of the long-run model are in line with research conducted by Gururaj et al. (2016), who stated that the variable of the exchange rate has an insignificant influence related to the value of exports. In addition, a study by (Mukhlis et al., 2021) found that the long-term balance between the European and Indonesian cocoa markets, implying a reciprocal influence. The US dollar continues to influence Indonesian cocoa prices, while the cocoa market is not dependent on fluctuations in world oil prices.

Relationship of the Netherlands Gross Domestic Product Per Capita to Indonesian Cocoa Export to the Netherlands

Based on data processing in the short-run model test, it is known that the Netherlands GDP per capita coefficient is -393.9815 and a probability of 0.1551 (more than 0.05). In the short run, the Netherlands GDP per capita has a negative and insignificant role in explaining Indonesian cocoa exports to the Netherlands. The results of the short-run model are in line with the research by Lisdiani et al. (2021) stated GDP variable had no significant influence on Indonesian export.

Meanwhile, for testing the long-run model, it is known that the Netherlands GDP per capita coefficient is 175.8392 and has a probability of 0.3310 (more than 0.05). In the long run, the Netherlands GDP per capita has a positive and insignificant role in explaining Indonesian cocoa exports to the Netherlands. The results of the long-run model are different from research conducted by Siburian (2012); in the long run, GDP had a negative relationship with Indonesian exports.

Relationship of Indonesian Cocoa Production on Indonesian Cocoa Export to the Netherlands

Based on data processing in the short-run model test, it is known that the Indonesian cocoa production coefficient is 18.05623 and a probability of 0.1279 (more than 0.05). In the short run, Indonesian cocoa production has a positive and insignificant role in

explaining Indonesian cocoa exports to the Netherlands. The results of the short-run model are in line with the research by Wardhany & Adzim (2018) stated production has a positive impact on the export volume of Indonesian cocoa beans.

Meanwhile, for testing the long-run model, it is known that the Indonesian cocoa production coefficient is -13.72882 and has a probability of 0.0456 (less than 0.05). In the long run, Indonesian cocoa production has a negative and significant role in explaining Indonesian cocoa exports to the Netherlands. The results of the long-term model are in line with research conducted by Wardhany & Adzim (2018) concluded that the production has significant impact on the export volume of Indonesian cocoa beans.

Relationship of International Cocoa Price on Indonesia Cocoa Export to the Netherlands

Based on data processing in the short-run model test, it is known that the international cocoa price coefficient is 2142.806 and has a probability of 0.3997 (more than 0.05). In the short-run International cocoa price has a positive and insignificant role in explaining Indonesian Cocoa Export to the Netherlands. The results of the short-run model are in line with research conducted by Chairul (2014), who stated that international cocoa bean prices did not have any significant influence on export volume.

Meanwhile, for testing the long-run model, it is known that the International cocoa price coefficient is -5774.038 and has a probability of 0.1020 (more than 0.05). In the long-run International cocoa price has a negative and insignificant role in explaining Indonesian Cocoa Export to the Netherlands. The results of the long-run model are in line with research conducted by Chairul (2014), which stated that international cocoa beans price did not have any significant influence on export volume.

Conclusion

From the results of research and testing that has been carried out, it is found the conclusions as follows. In the short run, the exchange rate was negatively and significantly associated with exports. The Netherlands' GDP per capita also showed a negative relationship, although it was not statistically significant. Indonesian cocoa production and international cocoa prices showed positive but statistically insignificant relationships with exports.

In the long run, Indonesian cocoa production was negatively and significantly associated with exports to the Netherlands. The exchange rate and the Netherlands' GDP per capita showed positive but statistically insignificant relationships, while international cocoa prices showed a negative but statistically insignificant relationship. The analysis suggests closer attention to marketable quality, destination access, currency-risk management, and the allocation of cocoa across processing and export uses.

Policy Recommendation

The findings of this study suggest several policy priorities to support Indonesian cocoa exports to the Netherlands, particularly in relation to exchange rate stability and

domestic cocoa production. Complementary measures are also proposed to improve product quality, strengthen coordination among stakeholders, and facilitate access to international markets. *First*, Bank Indonesia needs to maintain stability of the rupiah exchange rate against the US dollar carefully because it is one of the variables that can affect Indonesian cocoa exports to the Netherlands.

Second, the government needs to pay special attention to the quality of domestic cocoa production because it is one of the variables that can affect Indonesian cocoa exports to the Netherlands, and it should provide education to farmers on producing excellent-quality domestic cocoa so they have the opportunity to compete in the international market.

Third, the Ministry of Agriculture and local extension services could support pest management, post-harvest handling, fermentation where required by buyers, and collective quality control. These measures address the marketability of production. Their effectiveness should be assessed through quality outcomes, rejected consignments, and producer returns, rather than through output growth alone.

Finally, the government needs to encourage more economic diplomacy, both bilaterally and multilaterally, through comprehensive economic partnership agreements to eliminate import tariffs in destination countries so Indonesian cocoa can be more competitive in the international market.

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