Effect of Production, Price, and Rupiah Exchange Rate on the Export Value of Cocoa Beans (HS 1801) in Indonesia

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Abstract

Among Indonesia's many plantation exports, cocoa beans play a starring role. In general, the trends in the export value of cocoa beans is inseparable from external changes including prices, production, and exchange rates. The purpose of this study is to determine the effect of the independent variables cocoa bean price (X1), rupiah exchange rate (X2), and cocoa bean production (X3) on the dependent variable Indonesian cocoa bean export value (Y). This research uses a quantitative approach in the form of a time series. the data used is secondary data sourced from the Badan Pusat Statistik, Bank Indonesia, and the International Cocoa Organization starting from 2008 to 2022. The data analysis method is multiple linear regression (ordinary Least Square). Based on the results of the analysis obtained information that the price of cocoa beans has a significant impact on the export value of cocoa beans, the rupiah exchange rate has no affect the export value of cocoa beans, and cocoa bean production has a significant impact on the export value of Indonesian cocoa beans.

Keywords: Production, Price, Exchange Rate, Export, Cocoa Beans

Introduction

Economic growth is believed to be able to develop rapidly accompanied by the expansion of international trade (Gnangnon, 2018). In a country's economy, international trade activities play an important role. So as to seize the various opportunities and opportunities that exist, international trade must continue to be pursued. The influence of globalization has an impact on the development of international trade so that it is in the spotlight of all countries including Indonesia. Various strategies are carried out so that the development of international trade can continue to increase. To sell their products, producers need a wider market share. Therefore, bilateral, regional, and multilateral cooperation is needed. (Siagian, 2019).

Based on data from the Badan Pusat Statistik (BPS), Beyond its delicious nature, cocoa plays a crucial role in Indonesia's economic growth. As a major plantation product, it provides jobs, boosts incomes for farmers, and generates valuable foreign exchange, all of which contribute significantly to the national GDP.. In addition, cocoa contributes to local economic growth and agro-industry. About 900,000 farming households found employment and income in cocoa farming in 2002, mainly in Eastern Indonesia (KTI). With a potential value of US$ 701 million, cocoa could make the third largest contribution to the plantation subsector after rubber and oil palm. (Syarif, 2018).

Table 1 Data on Export Value, International Price, Cocoa Bean Production, and Exchange Rate 2008-2022

Year	Export Value USD/ton	International PriceUSD/Kg	Cocoa Bean Production	Exchange Rate
2008	1269022	2.51	803.594	9.330
2009	1459297	2.99	809.583	9.088
2010	1643773	3.13	837.918	9.246
2011	1345430	2.74	712.231	9.221
2012	1053615	2.22	740.513	9.500
2013	1151481	2.3	720.862	11.000
2014	1244530	2.89	728.414	12.250
2015	1307771	3.13	593.331	13.300
2016	1239621	2.89	658.399	13.500
2017	1120252	2.03	590.683	13.500
2018	1245800	2.29	767.280	14.500
2019	1198735	2.34	734.797	14.000
2020	1244209	2.37	720.661	14.400
2021	1206781	2.4	706.636	14.300
2022	1262081	2.36	732.256	15.655

Source: BPS, International Cocoa Organization, Bank Indonesia (processed)

Despite being surpassed by Ivory Coast (42.60%) and Ghana (15.80%), Indonesia remains a major player in the global cocoa market, securing the third spot with a 14.40% share of production. Table 1.1 shows that Côte d'Ivoire has the highest cocoa production at 2,200,000 million tonnes, followed by Ghana at 800,000 tonnes, and Indonesia in third place with a production of 739,000 tonnes, with Nigeria and Cameroon in fourth and fifth place respectively. Among the top three cocoa bean producers in the world, Indonesia has great potential to become a major exporter of cocoa.

Based on data from the Indonesian Central Bureau of Statistics, Indonesia's cocoa bean exports fluctuated between 2008-2022. In 2008, Indonesia's cocoa export value was 1.26 billion USD. In 2009 the value of Indonesian cocoa exports increased to 1.45 billion USD. Then the value of cocoa exports the following year increased until it touched the highest figure for the last 15 years, namely 1.64 billion USD. Then in 2011, the value of cocoa exports

decreased with a value of 1.34 billion USD until in 2012 it decreased again with the lowest value of 1.05 billion USD. Then in 2013 - 2015, it increased to 1.30 billion USD. In 2016 - 2017 it decreased again with a value of 1.12 billion USD. Back up in 2018 with a value of 1.24 billion USD. The export value continues to fluctuate until 2022 the value of Indonesian cocoa exports is at 1.26 billion USD.

Indonesia's cocoa export value fluctuates depending on several factors, one of which is production. (Paramartha & Setyari, 2020). Judging from data from the Central Bureau of Statistics, the development of Indonesian cocoa production from 2008 - 2022 continues to fluctuate, in 2008 cocoa production was recorded at 803,594 tonnes. then experienced an increase in 2009 of 809,583 tonnes. In the last 15 years, the largest production of Indonesian cocoa was recorded in 2010 at 837,918 tonnes. In the following years, cocoa production continued to fluctuate until 2017 when it decreased to the lowest production figure of 590,683 tonnes. From the data, it is known that the development of cocoa production has fluctuated until the last in 2022 was recorded at 732,256 tonnes.

Cocoa bean prices over the 15 years from 2008 to 2022 have seen fluctuating movements. From 2008 to 2010 the price of cocoa beans increased from the base year price of 2.51 USD per kilogram to 3.13 USD per kilogram in 2010. Then the price fluctuated and decreased until 2022 when it reached 2.36 USD per kilogram.

In the economy, the exchange rate is one of the important prices because it is determined by the balance of demand and supply that occurs in the market. According to data from the table the level of exchange rates in Indonesia in 2008-2022 experienced fluctuating movements. In 2008 the exchange rate was Rp. 10,950. Until 2015 the exchange rate weakened by Rp. 13,548. Then the exchange rate strengthened in 2016, which amounted to Rp. 9,299. The following year until 2022 the exchange rate continued to weaken to Rp. 15,731. According to (Silaban, 2022) Due to the widening current account deficit and the Fed's aggressive interest rate hikes, which resulted in foreign capital outflows and lower confidence in the rupiah, the exchange rate continued to fluctuate. From the above explanation, the purpose of this study is to determine the effect of cocoa bean price, rupiah exchange rate, and cocoa bean production on the export value of Indonesian cocoa beans.

Literature Review

Price

Price is a common thing in buying and selling activities. Price is an important factor in trading activities. Because price serves as a benchmark in trading activities. The product of a product or service can be assigned a financial value using the term price. Price in economics can also refer to a variable, the selling or buying value of an object, or both (Sukirno, 2019). According to classical economics, all goods and services have flexible prices that are easily influenced by the attraction of supply and demand either up or down. The main cause of price changes is due to market imbalances. Based on the elasticity of demand, price changes can affect the demand for commodities. Demand elasticity is a measure or statistic that describes

how changes in prices or other variables affect changes in demand for a particular good or service. This measurement is a benchmark to determine how much the quantity of a good changes when the price changes, this is an assumption of ceteris paribus assumptions (Sugiarto, 2010).

Exchange Rate

According to the theory behind the law of supply and demand, the price of a foreign exchange, such as the US dollar, will increase above its nominal value if demand exceeds supply or remains the same while supply decreases. When demand is high while supply is low, or when demand falls while supply remains constant, the price of foreign exchange will be lower than the nominal price or prevailing rate. Exchange rates occur in a market mechanism when an equilibrium point is reached, or when supply and demand are equal.

According to (Ekananda & Sallama, 2015) there are 3 (three) exchange rate systems used by a country, namely:

1. Free exchange rate system (Floating)

   Within a system of unrestricted foreign exchange markets, the exchange rate emerges spontaneously from the aggregate forces of supply and demand. This approach to exchange rate determination, characterized by an absence of official intervention, stands in contrast to fixed or managed exchange rate regimes, where the government actively seeks to influence the value of its currency.

2. Fixed exchange rate system

   Under a fixed exchange rate system, the government or central bank assumes the responsibility of actively managing the domestic currency's value. This entails establishing a predetermined par value against another currency or a basket of currencies and employing market interventions, such as foreign exchange purchases or sales, to maintain the exchange rate within a narrow band around the designated level.

3. Controlled exchange rate system

   Under this system, the allocation of foreign exchange reserves lies entirely within the purview of the government or central bank. They possess absolute discretion in directing the usage of these vital resources, effectively acting as gatekeepers for the nation's access to foreign currency.

Export Demand

According to the theory presented (Soekartawi, 2016), five factors affect the growth of a country's exports, including the exchange rate, tariff and nontariff policies, export-import quotas, and policies aimed at increasing non-oil and gas exports.

Aggregate demand is the real value of the level of expenditure to be made in the economy at various general price levels where what is meant by general prices are prices set in the free market. Where what is meant by the level of expenditure is divided into five

components, namely household consumption, private and government investment, government consumption expenditure, exports and imports (Sukirno, 2019)

One of the components of aggregate demand in an open economy is exports. Exports are very important because they can increase the country's foreign exchange reserves as well as state revenues, especially for developing countries to catch up with developed countries. Export is a trade activity in which domestic goods and services are sold or sent to other countries to gain more profit (Sukirno, 2019). Thus it can be concluded that export demand is a country's desire for goods and services that are still categorized as insufficiently fulfilled against countries that have abundant goods and services which then the country sells goods and services to countries in need.

Research Method

This study uses a quantitative approach in the form of a time series. The data analysis method used is multiple linear regression (ordinary least square) which is done through the EVIEWS 10 application. The data used is secondary data sourced from the Central Bureau of Statistics, Bank Indonesia, and the International Cocoa Organization starting from 2008 to 2022.

Information, descriptions, and theoretical foundations for this study came from various related institutions, as well as from related literature research, such as journals, articles, and reports. Data sources were obtained from agencies related to this research, namely Badan Pusat Statistik (BPS), Bank Indonesia, and the International Cocoa Organization (ICCO) website.

The data collection method in this study uses documentation techniques, which are carried out by studying existing archives in agency publications, after which the data required in this study are collected. then, data analysis tools through the coefficient of determination or R-Square test, simultaneous test, normality test, multicollinearity test, heteroscedasticity test, t-test (partial test), normality test, and autocorrelation test.

Result

a. normality test

Table 2 Normality Test Results

Jarque-Bera	Probability
0.168667	0.919124

Source: Eviews 10

Before carrying out statistical analysis for hypothesis testing, a regression equation model must fulfill all the requirements of the classical assumption test, one of which is through the normality test. The basis for making decisions on the normality test is if the Sig value is

obtained. (2-tailed) > 0.05, it can be concluded that the research data is normally distributed. Referring to the test results of Table 4.5 above, which obtained a probability value of 0.919124> 0.05, it can be concluded that it passes the Normality Test.

b. Multicollinearity Test

Table 3 Multicollinearity Test Results

Variable	Centered VIF
C	NA
Price	1.150645
ER	1.475489
Production	1.315309

In an equation model, it is important to conduct a multicollinearity test because it is necessary to ascertain whether or not there is an intercorrelation or collinearity problem between independent variables. Referring to Table 4.6 above, it appears that all independent variables obtained VIF values < 10 and Tolerance values > 0.01. Thus it can be concluded that in the multiple regression model in this study, there is no multicollinearity problem.

c. Heteroscedasticity Test

Table 4 Heteroscedasticity Test Results

Prob. Chi-Square (3)	Obs R-Squared
0.4666	2.548451

The heteroscedasticity test is carried out to determine whether there are symptoms of heteroscedasticity in a regression equation model or not (Wooldridge, 2016). In the table of heteroscedasticity test results, it can be concluded that there are no symptoms of heteroscedasticity because all independent variables have a significance value> 0.05.

d. Autocorrelation Test

Table 5 Autocorrelation Test Results

Durbin-Watson stat	F-Statistic
1.974358	0.002789

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The autocorrelation test is used to detect whether, in a regression model, there are symptoms of correlation between members of observations that have been sorted by space or time. Referring to the results in the table above, it appears that the Durbin-Watson value is 1.974. In this study, the value of dU = 1.7501 and dL = 0.8140 is obtained from the number of samples (N) = 15 and the number of independent variables (k) = 3. Then the result is (dU) 1.7501 ≤ (DW) 1.9743 ≤ (4-dU) 2.2499. The result of this linear regression is that the autocorrelation coefficient is equal to zero, meaning there is no autocorrelation.

e. Multiple linear regression analysis

Table 6 Multiple Linear Regression Equations

Variable	Coefficient
C	-200157.0
X1	288143.6
X2	5947.043
X3	901.5464

The following is the regression equation in this study:

$$Y = (-200157.0) + (288143.6)X_1 + (5947.043)X_2 + (901.5464)X_3 + e$$

Based on the above equation, each coefficient has its own meaning so it needs to be explained through the following explanation:

α = a constant value of -200157.0 indicates that if the International Cocoa Price (X1), Exchange Rate (X2), and Cocoa Bean Production (X3) are constant, the value of cocoa bean exports will decrease by -200157.0

$\beta 1$ = regression coefficient value 288143.6 indicates that the International Price of Cocoa (X1) has a positive effect. This means that if the international price of cocoa increases by one US$/ton, the export value of cocoa beans will increase by 288143.6.

$\beta 2$ = regression coefficient value of 5947.043 indicates that the exchange rate (X2) has a positive effect. That is, if the exchange rate increases by one US$, the export value of cocoa beans will increase by 5947.043.

$\beta 3$ = regression coefficient value 901.5464 indicates that cocoa bean production (X3) has a positive effect. This means that if the exchange rate increases by one Ton, the export value of cocoa beans will increase by 901.5464.

f. Coefficient of Determination (R2)

Table 7 Test Results of the Coefficient of Determination

R-Squared	Adj R-Squared
0.746279	0.677082

Referring to the table above, it can be seen that the R2 value is 0.746 or 74.6%. This proves that all independent variables in this study have a strong relationship with the dependent variable of 74.6%. And the remaining 25.4% is interpreted by independent variables not mentioned in the study.

g. F Test (Simultaneous)

Table 8 F Test Results (Simultaneous)

F-Statistic	Probability
10.78489	0.001324

Referring to the test results above, the resulting F value is 10.78489 with a sig level. 0,001. The F table value with a significance level of 0.05, namely df $1 = 3$ (Number of X Variables), df 2 (n-k-1) or (15-3-1) $= 11$, then the F table value is 3.59. The result of the calculated F value exceeding the F table ($9.113 > 3.59$) means that there is a rejection of H0 and acceptance of H1. So it is concluded that the International Cocoa Price, Exchange Rate, and Cocoa Bean Production affect the Export Value of Cocoa Beans simultaneously.

h. T-test (Partial)

Table 9 T Test Results (Partial)

Variabel	t-tabel	t-hitung	Probabilitas
Y (Ekspor)			
X1 (Cocoa International Price)	1.78229	4.46805	0.0009
X2 (Exchange Rate)	1.78229	0.542210	0.5985
X3 (Cocoa Bean Production)	1.78229	2.572588	0.0259

1. On the variable International Price of Cocoa (X1) on the Export Value, the resulting t-count> t table is 4.468065> 1.78229 so it can be seen that the t-count value is greater than the t-table. and can be seen from the probability value which is 0.0009 <0.05. It can be concluded that the International Price of Cocoa partially affects the Export Value of Cocoa Beans.

2. In the Exchange Rate (X2) variable on Export Value, the resulting t-count value < t table is 0.542210 < 1.78229 so it is known that the t-count value is smaller than the t-table. Judging from the probability value which shows that it is greater than 0.05, namely the sig value. 0,5985 > 0,05. It can be concluded that partially the Exchange Rate does not affect the Export Value of Cocoa Beans.
3. In the Cocoa Bean Production Variable (X3) on Export Value, it is known that the result of t-count> t table 2.572588> 1.78229 so it is known that the t-count value is greater than the t-table value. Judging from the probability value, namely 0.0268 <0.05, which means smaller than 0.05, it can be concluded that partially Cocoa Bean Production positively affects the Export Value of Cocoa Beans.

Discussion

Based on the results of the study, international cocoa bean prices were found to have a positive and significant effect on the increase in cocoa bean export value. Therefore, it can be concluded that an increase in international prices causes the export value of cocoa beans to increase. This finding indicates that the international price of cocoa beans is the main factor influencing the increase in Indonesia's cocoa bean exports. This research is by (Utami, Nurlaila &Armayani, 2023) Based on the results of tests conducted using the multiple linear regression method, the international cocoa price variable has a positive and partially significant effect on Indonesian cocoa bean exports.

Based on the research results, the US$-IDR exchange rate was found to have a positive and insignificant effect on the increase in the export value of cocoa beans during the period 2008-2022. This finding proves that an increase in the exchange rate of Rp 1/US$ can be followed by an increasing trend in export value. Conversely, if there is a weakening of the exchange rate, the export value of cocoa beans also tends to decrease. However, this is by the law of demand, where when the currency of the exporting country depreciates, the price of the commodity in the exporting country will become cheap in the currency of the importing country, so the demand for cocoa beans will increase. This is supported by research (Puspita, 2015) which states that the Rupiah exchange rate against the US Dollar has an insignificant positive relationship with cocoa exports.

Based on the results of the research conducted, cocoa bean production was found to have a positive and significant effect on increasing the export value of cocoa beans. Where the export value is very influential on cocoa bean production. If cocoa bean production increases, the export value of cocoa beans will increase. This research is supported by research conducted by (Izzah & Damayanti, 2023)Stating that the export value of cocoa beans affects cocoa bean production because if the interest in cocoa bean exports increases, cocoa bean production will also increase.

Conclusion

International prices were found to have a positive and significant effect on the export value of Indonesian cocoa beans. Thus, it can be concluded that in the context of increasing Indonesian cocoa bean exports, the international price of cocoa beans has a positive effect on export value. Then, the high demand for cocoa beans is likely to affect the increase in the export value of Indonesian cocoa beans.

The exchange rate has no significant effect on the export value of cocoa beans. This can happen because different export destination countries have different sensitivities to changes in exchange rates. Countries that have a strong cocoa processing industry, such as Europe and the United States, have lower sensitivity to exchange rate changes. This is because the cocoa-producing industries in these countries are able to absorb cocoa beans at higher prices, even if the exchange rate weakens.

Cocoa bean production individually has a positive and significant effect on the export value of Indonesian cocoa beans, because if there is a lot of interest in cocoa bean exports, cocoa bean production will also increase.

Suggestion

Based on the results of the study, cocoa bean production had declined because many cocoa plants were damaged and lacked maintenance. This has led to reduced domestic cocoa availability. If cocoa productivity continues to decline for a long time, it will have an impact on export performance. In addition, exchange rate fluctuations will also affect export supply. The government is expected to adjust its policies to fluctuations in international cocoa bean prices, increasing export volumes when international prices are down. If international prices rise, it can increase exports when Indonesian cocoa bean prices are cheap due to depreciation.

These efforts need to be carried out sustainably and responsibly by various parties, including governments, companies, and non-governmental organizations. By working together, we can ensure that the cocoa industry can develop sustainably and responsibly, without compromising the environment and workers' rights.

This research aspires to become a foundational resource, actively guiding future scholars in propelling investigations into cocoa bean exports. This can be done by considering other variables beyond the existing variables. Thus, the research results obtained will be better.

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