



PENGARUH VOLATILITAS HARGA COCOA DUNIA TERHADAP EKSPOR COCOA INDONESIA

Effect of World Cocoa Price Volatility On Indonesian Cocoa Export

Agung Prasetyo¹, Mahananto^{1*}

¹Agribusiness Study Program, Faculty of Agriculture, Tunas Pembangunan University
Jln. Balekambang lor no. 1, Surakarta 57139

* Corresponden Author : agungpras17@gmail.com

ABSTRACT

Cocoa was one of the commodities, which are crucial to the economy of Indonesia. Cocoa serve as a source of income, driving the development of the region, a provider of employment and agro-industry and foreign exchange earnings, The purpose of this study to analyze the influence of the world cocoa price volatility against Indonesian cocoa exports. This study used ordinary least squares (OLS) to analyze the data. The time interval used was 2013-2017 with monthly data. The results showed that independent variables such as world cocoa prices, consumption and world stocks of cocoa have a significant effect on the Indonesian cocoa exports. World cocoa prices were down led to a decline of Indonesian cocoa exports. Besides that, Government policy states the imposition of export duty on exported goods to guarantee the supply of raw materials for cocoa in the country, OLS also indicates that cocoa production, exchange rate, and world cocoa consumption did not affect the export cocoa of Indonesia.

Keywords: Volatility, world cocoa prices, OLS, Export

followed by Singapore, China, India, Germany, and Netherland.

INTRODUCTION

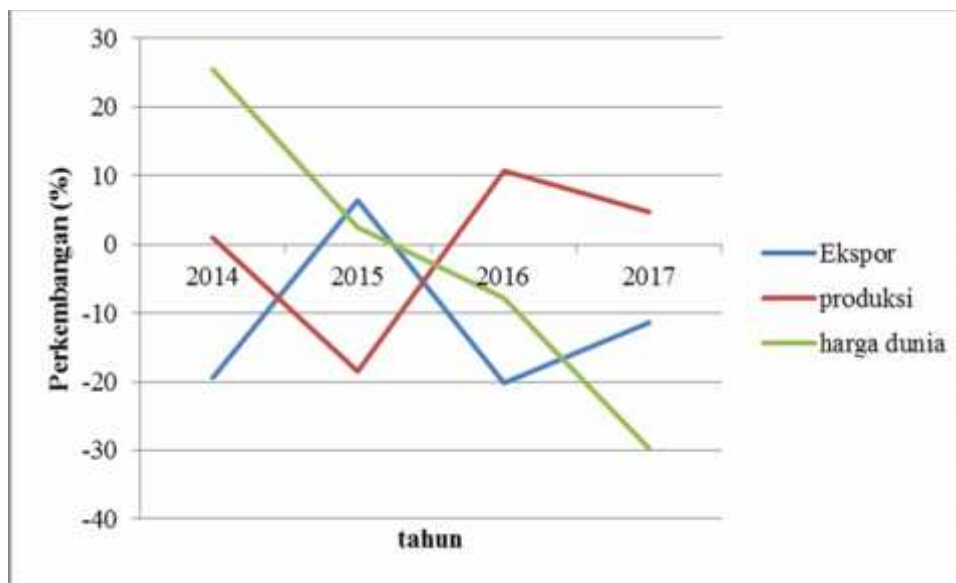
Chocolate today was one of the most popular foods in the world. Processed chocolate sweet taste and brown ties with aspects of human feelings make chocolate favored various circles at various age levels. Even so popular, most consumers are not aware that they consume processed chocolate comes from cocoa beans that taste bitter. 82.25% of the total world production of cocoa beans or equivalent to 3,830,432 tons in 2016 resulting from the five countries such as Ivory Coast, Ghana, Indonesia, Nigeria and Cameroon (FAO, 2019). Aside from being a producer, the five countries were also the main exporter of cocoa in the world with the countries of the European Union into a major importer. For Indonesia, the main goal was Malaysia's cocoa exports and the United States,

Cocoa's role in the national economy, Indonesia is an important position, especially as a provider of employment, sources of income, driving regional development and agro-industry and foreign exchange earnings (Hasibuan, 2012). As a producer of foreign exchange, cocoa certainly generates some revenue from the export of cocoa to the major importing countries. The development of Indonesian cocoa exports from the years 2013 - 2017 the average fell by 11.15% per year. Indonesian cocoa exports in 2013 amounted to 414 092 tonnes and then decreased to 250 971 tonnes by the end of 2017 (Un Comtrade, 2019). Factors that could theoretically affect the export of commodities which are production, consumption, and prices. Production would theoretically affect the number of cocoa exports, but the number of Indonesian cocoa production in 2013



amounted to 720,862 tonnes and fell to 688,345 tonnes in 2017 or a decrease of 0.49% per year. Indonesian cocoa consumption per capita reached 96 grams per person per year (ICCO, 2014). Prices that were influential in the world's cocoa exports are price and producer price level. Cocoa prices at the global level down from 2,438 USD per ton in 2013 to 2,029 USD per ton in 2017, down 2.41% per

year (World Bank, 2019). Cocoa producer level prices in 2014 amounted to USD 21,087 per kilograms and only increase slightly once to the 21,157 per kilograms at the end of the year 2018 (FAO, 2019). Here was a picture that explains the development of exports, production and world prices of cocoa beans from 2014 to 2017.



Source: FAO, 2019

Figure 1. Export Development, Production and World Prices for Cocoa (%)

Export development, production, and world prices as shown in figure 1 showed that world prices will affect the number of cocoa exports due to the price level of Indonesian cocoa producers has tended to remain. This study aims to determine how the effects of volatility of world prices of cocoa beans to the number of Indonesian cocoa exports. The research on cocoa beans had previously been performed by Ari, et al. (2014) and Rizki, et al. (2017). Ari, et al. (2014) discuss the impact of the export duty on the country market power in the United States, while Rizki, et al. (2017) studied the comparative analysis of Indonesian cocoa, Ivory Coast and Ghana.

METHOD

This study focuses on the export of Indonesian cocoa to world markets. This study used secondary data. Secondary data used was data time series with the period January 2013-December 2017. Secondary data were taken in this study is the volume of cocoa exports, world cocoa prices, Indonesian consumption of cocoa, the exchange rate (IDR against USD), the production of cocoa, world cocoa stocks, world cocoa consumption, Indonesian and American consumer price index. Exports of cocoa were analyzed in this study is devoted to the volume of exports by HS (harmonized system) code 1906 1801.



Secondary data were obtained from the agencies government (BPS RI), the Republic of Indonesia trade ministry (Kemendag RI), the agriculture department of Indonesia (Ministry of Agriculture RI), USDA (United States Department of Agriculture) The World Bank (WB), Un Comtrade (United Nations Commodity Trade Statistics Database), Indonesian Bank (BI), research journals, and related references.

World cocoa price volatility effect on Indonesian cocoa exports can be analyzed by OLS (Ordinary Least Squares). OLS has the lowest variance among other linear estimators; in this case, OLS was called the best linear Unbiased Estimator (BLUE) (Gujarati DN, Porter D, 2008), OLS will be able to explain the impact of price volatility and other independent variables on Indonesian cocoa exports. The basic shape of the equation in this study was defined as in equation (1).

$$EXPCCO_t = f(PCCOW, ECR, PROD, CCCOW, CCCOI, SCCOW) \quad (1)$$

Or can be written in the following form:

$$EXPCCO_t = \beta PCCOW^{a_1} ECR^{a_2} PROD^{a_3} CCCOW^{a_4} CCCOI^{a_5} SCCOW^{a_6} e_u \quad (2)$$

Alternatively, it can be written into the following logarithm:

$$\begin{aligned} \text{LogEXPCCO}_t &= a_0 + a_1 \text{LogPCCOW} + \\ &+ a_2 \text{LogECR} + a_3 \text{LogPROD} + \\ &+ a_4 \text{LogCCCOW} + a_5 \text{LogCCCOI} + A_6 \\ &+ \text{logSCCOW} + U \end{aligned} \quad (3)$$

Note: $a_0 = \log \beta$

Annotation:

EXPCCO_t : Indonesian cocoa export volume in month t (tons)

PCCOW : World cocoa price in month t normalized by the US CPI (USD / kg)

ECR : The exchange rate (IDR against USD) in month t (IDR / USD)

PROD : Indonesian cocoa production in month t (tons)

CCCOW : World cocoa consumption in month t (tons)

CCCOI : Cocoa consumption of Indonesia in month t (tons), the cocoa consumption of Indonesia was a reduction of between Indonesian cocoa production and export volume of Indonesian cocoa and stocks,

SCCOW : World cacao stocks in month t (tons)

a_0 : constants,

A_{1-6} : The regression coefficient, and

U : error.

Regression models were tested using statistical tests (coefficient of determination, F-test and t-test) and classical assumption (normality (using Jarque-Berra test), multicollinearity (tested using variance inflation factor), Autocorrelation (tested using LM test) and heteroskedasticity (tested using the White test)).

Elasticity was the ratio of the proportional change of a variable to another variable change (Salvatore, 2009). The elasticity of exports was the level of sensitivity of a good quantity exported to changes in prices of export goods. The elasticity coefficient was a positive number indicates the level of sensitivity of Indonesian cocoa exports to the price of cocoa from Indonesia. Indonesian cocoa exports elasticity coefficient can be calculated as follows for the supply elasticity formula as in equation (4):

$$Es = \frac{\Delta Q}{\Delta P} \times \frac{P}{Q}$$

Note:

Es : Export elasticity

Q : Quantity exported (tons)

P : Price of goods (IDR / tonne)

Q : Changes in supply quantity (tons)



P : Changes in the price of goods (IDR / tons)

The value of export elasticity more than one indicates that cocoa exports are elastic and indicate inelastic if the value was less than one. The unitary elasticity was obtained when the export elasticity is one.

Estimation Result

The method used to analyze the effect of the volatility of price on Indonesian cocoa exports was ordinary least squares (OLS). Table 1 describes the model of estimation results to Determine the effect of world cocoa price volatility on Indonesian cocoa exports.

RESULT AND DISCUSIION

Table 1. Estimation Result

variable	coefficient	Std. Error	t-Statistic	Prob.
LogSCCOW	-0.552421 *	0.320993	-2.897665	0.0019
LogCCCOI	-0.253799 *	0.042652	-3.897764	0.0000
LogCCCOV	-1.682786ns	0.975842	-0.519876	0.1652
LogPROD	0.288303ns	0.388460	0.876541	0.5642
LogECR	-0.712524ns	0.546329	-1.265531	0.1987
LogPCCOW	1.363321 *	0.218976	4.515972	0.0000
C	25.52078	5.564732	3.718267	0.0003
R-squared				0.659877
Adjusted R-squared				0.638631
F-statistic				19.87679
Prob (F-statistic)				0.000000
Durbin-Watson stat				1.798765
Number of observation				60

Source: Analysis of Secondary Data, 2019.

Description: * estate at 95% confidence level, ns not significant

Table 1 showed that the adjusted R-squared value was 0.638. it indicated resources that the export volume of cocoa Indonesia can be explained by 62.3 percent by the world cocoa price, IDR exchange rate against US Dollar, Indonesian cocoa production, world cocoa consumption, cocoa consumption of Indonesia and world cocoa stocks while the remaining 37.7 percent was explained by other factors outside the models. The negative sign on the coefficient of free variables of cocoa consumption of Indonesia and world cocoa stocks showed that if the cocoa consumption of Indonesia and world cocoa stocks rose by a few percents, it will affect the percentage decrease of the export volume of Indonesian cocoa.

F Test

F test used to examine the influence of the dependent variable simultaneously on independent variables. Based on table 1, the dependent variable of world cocoa price, IDR exchange rate, cacao production, world cocoa consumption, cacao consumption of Indonesia and world cocoa stocks together have a real effect on Indonesian cacao exports (probability (F-statistics) was 0:00 smaller than (0:05)).

t-test

t-test used to know the effect of a dependent variable on the independent



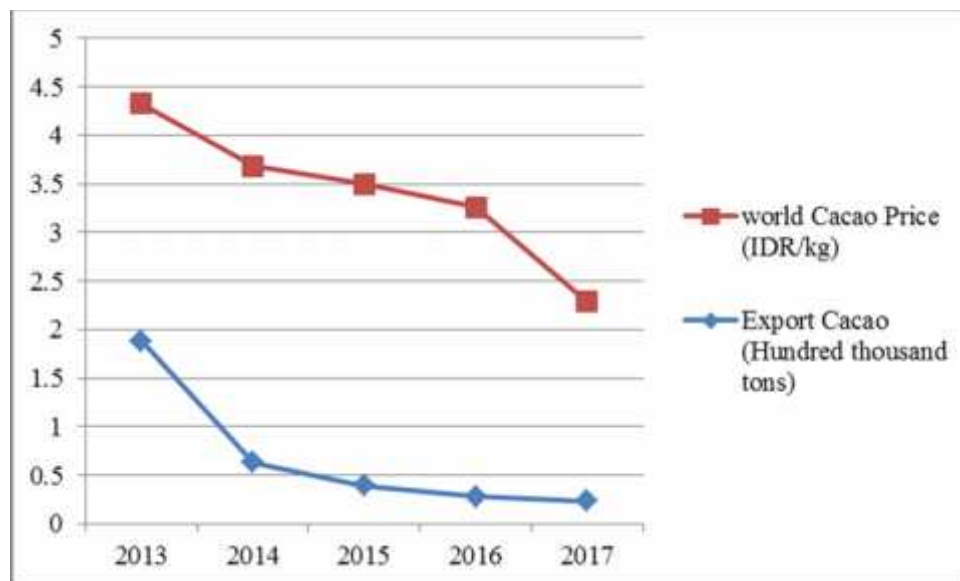
variable partially. Based on table 1, it was found that the variable of the world cocoa price has a positive effect on Indonesian cocoa exports. Cocoa consumption of Indonesia and world cocoa stocks had a negative and real effect on Indonesian cocoa exports. IDR exchange rate, cocoa production, world cocoa consumption have no effect on Indonesian cocoa exports.

Effect of Volatility World price on Indonesian Cocoa Export

The world cocoa price variable (LogPCCOW) Affects Indonesian cocoa exports (probability was 0.000 smaller than 5 percent) and has a positive correlation. The coefficient value 1.363 declares that every increase of the world cocoa price by 1 percent will raise the export volume of Indonesian cocoa 1.363 percent, ceteris paribus. This finding was in accordance with the hypothesis of a basic international trading theory that if an export price of a commodity increase, then the producer also increasing the quantity

of the export commodity. The results of this analysis were also in conformity with the research by Djoni et al. (2013) that indicated that commodity prices negatively affected the export volume of the commodity. Figure 2 shows that if the world cocoa price decreases then it will Decreasing export cocoa.

Generally, World cocoa prices are higher than domestic prices. The higher price will stimulate producers to export cocoa to the world market. In 2014, the producer price of cocoa in Indonesia was 1983 USD / ton and the export price was 3062 USD / ton and then the world cocoa price down to 2293 USD / ton in 2018. The handicap between the world price and the domestic price has driven producers to export more. The situation today, cocoa has been accepted by all consumers in every country, there were no policies against cocoa to enter the importers country.



Source: analysis secondary data, 2019

Fig.2. World cocoa price and Indonesian cocoa Export



Prices have positive effect on boosting cocoa export volume due to the demand of cocoa is rising every day and producer export assume that the higher the price they will get more profit from trading. Because producer price remains unchanged. Indonesia also has a deal with the importer country that fixed and involves a certain volume of cocoa demands. The effect of price changes on a number of goods offered by producers or requested by consumers can be seen through the effect of elasticity. The elasticity of Indonesia's cocoa exports is the level of sensitivity of changes in the amount of Indonesian cocoa exported to the change of cocoa export prices in Indonesia. The elasticity of cocoa exports (in 2013-2017) was elastic (value of elasticity is 9.15). Changes to world cocoa prices in Indonesia are not well responded by producers and exporters of cocoa by increasing the export volume of cocoa. This can be explained in various reasons, first, in terms of production and availability, there still need time to produce cocoa into quality export and in 2015 cocoa export was down until 66.3%, second, in terms of marketing cocoa that there are standard quality that Indonesian exporter and must follow state government export tax to cocoa. Also Indonesian government continues to encourage the entry of new investment in the processed cocoa industry so they will reduce the export of cocoa in the future.

Effect of cocoa consumption of Indonesia on Indonesian cocoa export

The variable of cocoa consumption of Indonesia (LogCCOI) has an effect on Indonesian cocoa export (probability is 0.000 smaller than 5 percent) and has a negative correlation. The coefficient value of 0.253 indicates that the increase is of cocoa consumption of Indonesia by 1 percent will reduce the export volume of Indonesian cocoa 0.253 percent, ceteris paribus (Hariyadi, Huda, Ali, & Wandik,

2019). This finding was in accordance with the export supply theory which states that the export offer was the result of production reduction with consumption and stocks at a certain time. Indonesia has a high per capita cocoa consumption, reaches 96 grams per person per year encouraging Indonesia to process cocoa domestically in expectation to provide better-added value. Also, the Government provides some policies that have been prepared to support the realization of investments of processed cocoa industry include the provision of tax allowances, as well as exemption from import duties on machine imports. To guarantee the supply of raw materials for cocoa in domestic, the government has issued Government Regulation No. 55/2008 concerning the imposition of export duty on exported goods.

Effect of World Cocoa Stocks on Indonesian Cocoa Export.

World cocoa stocks (LogSCCOW) variable affect Indonesian cocoa exports (probability is 0.0019 percent smaller than 5) and have a negative correlation. The coefficient value (0.552) indicates that the increases of world cocoa stocks by 1 percent will reduce the export volume of Indonesian cocoa by 0.552 percent, ceteris paribus. The increase in world cocoa stocks will reduce the price of cocoa globally. A fall in prices will cause producers and exporters to be reluctant to export if the price difference between domestic prices and world cocoa prices did not provide benefits to producers and exporters. The global decline in world cocoa prices also will shift consumers' desire to consume cocoa.

Effect of Exchange Rate on Indonesian Cocoa Export

IDR exchange rate against the US dollar can affect the price of the exported goods. If the IDR exchange rate against



the US Dollar increases (IDR is weakened), the Indonesian exports will increase, because of the weakening of the IDR against the US dollar makes the price of goods and services in Indonesia assessed cheaper by the producer then they will export the product. On the contrary, if the IDR exchange rate against the US Dollar decreases (IDR is strengthened), the Indonesian exports will decrease. Because the strengthening of the IDR against the US dollar makes the price of goods and services in Indonesia assessed more expensive by the producer then they will sell their product domestically (Algifari, 2016).

The value of the t-test in table 1 showed that the IDR exchange rate has no effect on Indonesian cocoa exports. Reviews these findings address theoretically different things. Changes in the IDR exchange rate can not be a stimulus to change the price of cocoa. The presence of cocoa export barriers such as product certification and the application of export duty taxes makes the exchange rate did not affect Indonesian cocoa exports. Exchange rate policy was not followed by a policy that can suppress the direct-passthrough impact of exchange rate on inflation. Depreciation of the IDR will result in higher raw material costs. Increased raw material costs will increase cocoa production costs. The increase in cocoa production costs makes the exchange rate will not be a stimulus for producers and exporters to increase cocoa exports if the cocoa sales price was maintained at the same level. Exchange rates can only be followed by the exporter with the release of cocoa stocks of Indonesia.

Effect of Cocoa Production on Indonesian Cocoa Export

Based on table 1, cocoa production has no effect on Indonesian cocoa exports. It can be explained that in the processing of cocoa from trees there was uncertainty

due to climate influences, pest and disease and technical management of the plantation itself. During 2013-2017, there are climate and weather uncertainties in Indonesia. Indonesia had a long drought due to the El Nino storm. The El Nino phenomenon causes rainfall in most parts of Indonesia to decrease, the decreasing rainfall in an area was dependent on the intensity of El Nino. The long drought has caused drought in most of Indonesia's cocoa plantations and decreased the potential for production. Also, El Nino resulted in a tightening of production due to plant stress that can increase prices. Another factor that resulted in cocoa production has no effect on Indonesian cocoa exports was the government wants the cocoa not to be exported as raw material. The government state policies that have been prepared to support the processed cocoa industry. To guarantee the supply of raw materials for cocoa in the domestic area, the government has issued Government Regulation No. 55/2008 concerning the imposition of export duty on exported goods.

Effect of World Consumption of Cocoa on Indonesian Cocoa Export

The value of the t-test in table 1 found that the variable of world consumption of cocoa did not affect the export of Indonesian cocoa. The consumption of world cocoas that increases every year should be a boost for Indonesian producers and exporters to increase cocoa exports, but the competition among the exporter countries also increasing. The government regulation that limiting the export of raw materials makes high demands from world consumption did not respond well by the producer.

CONCLUSION



The major findings of this research showed that the world cocoa price, cocoa consumption of Indonesia and world cocoa stocks have a significant effect on Indonesian cocoa exports. Generally, cocoa world prices are higher than domestic prices. In view of this condition, producers seek the handicap between the world cocoa price and the domestic price. The Decrease in world cocoa prices makes export decrease as well. Another factor that makes exports decreasing there are government policies that support the realization of investments of the processed cocoa industry and state the imposition of export duty on exported goods to guarantee the supply of raw materials for cocoa in the country. OLS also found that cocoa production, exchange rate, and world cocoa consumption did not affect Indonesian cocoa exports. Various Efforts are needed to encourage Indonesian cocoa exports. Indonesia must increase cocoa quality by processed into various products. The government has taken good decisions that support the downstream of cocoa products. Promotion and publicity of this policy are needed to invite investment in the Indonesian cocoa industry.

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APPENDIX

Table 1. Classic Assumption Test Regression Model

Classic Assumption Test	Methods	information
normality	Jarque-Bera	Based on secondary analysis of data, Jarque-Bera value of 0.578746 with probability value (0.867652) is greater than (5%), it means that the distribution of data is normally distributed.
Multicollinearity	Variance Inflation Factor	The value of VIF centered between each independent variable is in the range of 1.34325 - 5.23451 and below 10, so it can be concluded that multicollinearity not found in the models
autocorrelation	LM test	Obtain * R-squared value of 4.67550 with Chi-square probability of 0.1076 greater than 0:05 (5%), then concluded in the equation model there is no autocorrelation.
heteroscedasticity	White Test	Obtain value of squared residuals (ui ²) with chi-squared probability of 0.1731 is greater than 0:05 (5%), it is concluded that the models is free from heteroskesdaticity

Source: Analysis of Secondary Data, 2019.