The impact of Trade Liberalization on Performance of Indonesian Cocoa Economy

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Abstract

This study aims to analyze impact of trade liberalization in the form of the abolition of trade restrictions on the performance of Indonesian cocoa economy. The study was conducted based on the analysis of time series data for 23 years (1990-2012). Framework econometric model prepared by classifying economic system of Indonesian cocoa into three blocks, namely: block of production, block of supply and demand, and block of trades. Each block consists of several structural similarities and identities. The next step was to model formulation, re-specification the model and evaluate the results of the alleged parameters, model validation and simulation.

The analysis showed that the cocoa trade liberalization would be increase the acreage of cocoa, productivity, production, price of cocoa Indonesia, export price of cocoa and quantity of cocoa exports. This policies had no impact on domestic demand due to rising prices of Indonesian cocoa. Production policy (raising acreage of cocoa) would be increase the production and the productivity of cocoa. As a result, export and export price of cocoa would be increase. Economic policies (lowering interest rates and price of urea fertilizer), would be increase the acreage of cocoa and cocoa production but its productivity was decrease.

Keywords: liberalization, trade, economic performance, cocoa, palm coconut

1. Introduction

Cocoa is one of plantation commodities which have an important role in supporting the economic development of Indonesia. In 2012, plantation commodities have generated revenues of US $ 1.053 billion, or a source of foreign exchange of US $ 668 million. In addition, cocoa is also a source of income and employment for farmers. In Indonesia, the cocoa plantation area was recorded at 1732.641 ha, or approximately 94.55% was dominated by smallholder agriculture. Farmers who were directly involved in cocoa plantations amounted about 1,626,816 households. Cocoa also contributed to the establishment of regional centers of agribusiness and agro-industry growth of cocoa (Departemen Pertanian, 2013). Production of cocoa beans in this country at 2011 amounted to 712,231 tons (Direktorat Jenderal Perkebunan, 2012). In 2012, domestic production of cocoa beans increased to 740,513 tons (Direktorat Jenderal Perkebunan, 2013).

Cocoa is important Indonesian exports, because this commodity was able put Indonesia as the world's third largest exporter after Ivory Coast and Ghana (Neilson, 2008). Indonesian cocoa exports reached amounted to 387.80 thousand tons with a value of US $ 1.053.4 million in 2012. The world's annual cocoa demand is estimated to reach 6.7 million tons per year, and this demand will be met only about 2.5 million tons. This means that the unfullfil global demand was 4.2 million tons, making it a huge opportunity for Indonesia to increase cocoa production (Anonymous, 2011). Efforts to increase cocoa production of Indonesia has a strategic significance because of the need of cocoa in the domestic market also remain unaddressed.

On the other hand, one of the fundamental changes occurring in the international market caused by the liberalization of trade on agricultural products. Free trade has a major impact on Indonesia's agricultural sector, both at the micro level (farm) as well as at the macro level (national and policies). At the micro-level, trade liberalization is associated with efficiency, productivity and scale. Therefore, the government policy is very necessary, especially for protecting agricultural producers. In fact, governments in developing countries were relatively less to protect agricultural producers.

The question in this study was how the performance of Indonesian cocoa economy if trade liberalization entirely implemented and what the appropriate alternative agricultural policy?

2. Trade Liberalization

International trade was defined as the exchange of goods and services that occur beyond the boundaries between countries (Lipsey, 1997). International trade according to David Ricardo, if a country can produce some cheaper goods or services,

then the country will produce goods or services rather than purchasing or importing them from other countries, vice versa. Without international trade (autarky), the market price of one product in one country will be different from other countries. Under international trade, there was only one price (Salvatore, 1994).

Trade between countries will be occur because of there are different prices in the different countries (Krugman and Obstfield, 1991). The price difference will be determine a country's decision to sell or buy some goods from other countries. If a country has a comparative advantage, then the domestic price is higher than the world price and the country will become an exporter of goods, vice versa. If a country does not have a comparative advantage, then the domestic price is higher than the world price and the country will be an importer of goods (Mankiw, 2009).

The fact shows that almost all countries have implemented trade liberalization. In agriculture, multilateral cooperation embodied by the WTO by Agreement on Agriculture (AoA) aims to create a system of agricultural trade that was fair and market-oriented. Consequently, the countries involved should reduce domestic subsidies, export subsidies and improving market access through the rules creation and strong discipline and effective (Departemen Pertanian, 2004).

Theoretically, the system of free trade between countries can provide the maximum benefit. But in reality, many market distortion would be occurs because of government intervention. Government intervention in the form of import tariffs, export taxes, restrictions on the value or volume of imports, subsidies and other trade policies, basically aimed at protecting the local manufacturers or maintain the availability of domestic supply.

According to Tan (1987), practice of international trade between two countries have always hurt the poor, but Jhingan (2012) states that trade policy was important in the economic development of a country. Thus, trade policy was expected to reduce the amount of trading losses incurred. Trade policies which is applied in the importing country will be different to the policy in the exporting country. According to Anindita and Reed (2008), trade policies in importing countries were usually in the form of import tariffs or import tax and import quotas. On the other hand, trade policy in the exporting country was generally in the form of export subsidies, export taxes and price discrimination. Export subsidies are often applied to agricultural commodities in developed countries like the United States. Export tax was applied to exporters or government-owned marketing agencies that pay producers a price lower than world market price. The price discrimination is done if the exporting country that aims to act as a monopolist maximizes profit (surplus).

3. The Impact of Cocoa Export Tax Elimination

The impact of elimination of export taxes was explained by using Figure 1. Assuming there are only two countries, namely the state A (Indonesia) as cocoa exporting country and country B (or a combination of other countries, ROW) as cocoa importing countries.

Indonesia exported cocoa in the form of cocoa beans, because the domestic price (Pa) this commodity is lower than the world price (Pw) as in Figure 1 (d). Indonesian cocoa exports amounted to excess supply on the price Pw. Assuming trade restrictions (such as export tax) cocoa is Pw-Pa, the elimination of restrictions in the context of cocoa trade liberalization would lead to Pw = Pa (world prices are transmitted directly to the domestic market). In the short term, the increase in domestic prices consumers will respond by reducing demand for cocoa. Manufacturers could not immediately respond to price increases by increasing production because they need a lot of time to process fresh cocoa into cocoa beans or cocoa processed. If consumers want to decrease their consumption by switching to substitutes cocoa, the cocoa producers will respond by decreasing production that was shown by shifting the supply curve to the left, so that the new equilibrium price is Pw. (Elimination restriction policy is a non-price factor that will be shifting the supply curve).

Witzke et al (2011) suggested that changes in agricultural producer prices which drive to a larger extent allocation decisions at farm level and farm income. Liberalization will transmitted directly world price into domestic prices. The assumptions used in this regard, Indonesia is a price taker in the world cocoa trade. Furthermore, according to Drajat (2011) world price by exporters transmitted to the domestic market.

4. Methodology

This study used secondary data, time series data for 23 years (1990-2012). Data were collected and processed from several sources, both published regularly in the country and the world as well as from the results of previous studies that are relevant.

The economic system of Indonesian cocoa was divided into three blocks, namely: production block, block supply and demand, and block trades. Each block consists of several structural similarities and identities. Production block consists of two structural equation was acreage and productivity of cocoa, and one identity equation. The last equation was the sum of the production of smallholdings, private estates and government estates.

Demand and supply block consists of two structural equations were demand equations of cocoa, and Indonesian cocoa price,

and an identity equation is demand of cocoa. The demand was domestic production plus imports and minus exports.

Trading block consists of two structural equation were the equation of Indonesian cocoa exports, cocoa imports and cocoa export price.

Exports of cocoa were determined by the price of cocoa exports, the production of cocoa, demand for cocoa, exchange rate, and cocoa trade restrictions. Cocoa export price was determined by the world cocoa imports, world cocoa prices, exchange rate, trade restrictions cocoa and cocoa export price in the previous year (lag).

Relevance between research variables as a framework econometric model of economic performance of Indonesian cocoa were presented in Figure 2. Next, formulated models, re-specification model and evaluate the results of parameters, model validation and simulation.

5. Results and Discussions

Based on pre-defined performance indicators and evaluation criteria compromise between economics, statistics and econometrics of the models that had been developed, the impact of trade liberalization on the economic performance of Indonesian cocoa described below.

5.1 Block of Production

a) Response Acreage of the Cocoa (LAKI)

Indonesian cocoa acreage (LAKI) simultaneously influenced by the price of cocoa Indonesia (HKI), the price of palm coconut Indonesia (HKSI), interest rates (i) and cocoa acreage in the previous year (LAKI1) (Table 1). The variable interest rate (i) provide a very real effect on the area of cocoa Indonesia (LAKI), meaning that the interest rate (i) is one important factor for the survival of cocoa plantations. The lower interest rates were expected to be utilized by the cocoa farmers to take loan in the bank. This was consistent with research by Dalmi (2006) that the high rate of interest was one of the constraints experienced by the cocoa farmers to obtain bank credit. Plantation Development Strategic Plan 2010-2014 also suggested that one of the limitations of the farmers for their business development were capital.

Response of Indonesian cocoa acreage (LAKI) in the short term and long term were inelastic. It is shown by the elasticity of both short-term and long-term that smaller than one. The interest rate (i) was also inelastic in the short and long term that were equal to -0.2056 and -0.7305. This shows that both short-term and long-term if there is an increase in interest rates of 1% will be responded by a decrease in the area of cocoa (LAKI) of 0.2056% in the short term and amounted to 0.7305% in the long term.

b) Response of Cocoa Productivity (YKI)

Indonesian cocoa productivity was influenced by the ratio of Indonesian price of cocoa at a price of urea (SHKIP) and produtivitas cocoa previous year (YKI1) (Table 2). In the short term, the response of Indonesian cocoa productivity (YKI) is not elastic as a result of changes in the ratio of Indonesian cocoa prices and the price of urea (SHKIP) that is equal to 0.2964. If the ratio of Indonesian cocoa prices and fertilizer prices rose 1%, the productivity of Indonesian cocoa (YKI) just increased 0.2964%.

Response of Indonesian cocoa productivity (YKI) in the long term was elastic as a result of changes in the ratio of Indonesian cocoa prices and fertilizer prices (SHKIP) of 1.3383. This means that if the ratio of Indonesian cocoa prices and fertilizer prices (SHKIP) increased about 1%, the productivity of Indonesian cocoa would be increased by 1.3383%.

5.2. Block of Cocoa Demand

a) Demand of Indonesian Cocoa (DKI)

Indonesian cocoa demand (DKI) was influenced by price of cocoa Indonesia (HKI), population of Indonesia (POP) and Indonesian cocoa demand for one year earlier (DKI1). The increase in the population will increase demand for cocoa Indonesia because of the increasing consumption of products based on cocoa (chocolate). This is consistent with the statement Mankiw (2000) that one of the components of public expenditure was the consumption of non-durable goods. According to ICCO (2012), the level of cocoa consumption per capita showed improvement, although still very low, amounted to 0066 kg in 2006 to 0096 kg in 2011.

Indonesian cocoa demand to changes in the population of Indonesia was elastic in both the short and long term, respectively 5.5995 and 8.6528. If there is an increase of 1%, the population in the short term demand for cocoa Indonesia will be increased by 5995% and in the long term will be increased by 8.6528%.

b) Price of Indonesian Cocoa (HKI)

The price of cocoa Indonesia (DKI) is significantly influenced by the world price of cocoa (HKW), and the price of

Indonesian cocoa at 1 year before (DKI1) (Table 4). This is consistent with the assumption that Indonesia is a price taker or price of the recipient in the context of world cocoa trade. According Drajat (2011), cocoa is an international commodity where the international prices were transmitted directly to the domestic market so that the development of domestic prices in line with international price developments.

In the short term and long term, world cocoa price elasticity (HKW) to the price of cocoa Indonesia (HKI) was elastic in the amount of 1.1545 and 1.9119. That is, if the world price of cocoa rose 1%, then the price of cocoa Indonesia (HKI) will be increased by 1.1545% to 1.9119% short term and in the long term.

5.3 Block of Trade

a) Export of Indonesian Cocoa (EKIN)

Indonesian cocoa exports (Ekin) were significantly influenced by Indonesian cocoa demand (DKI) and cocoa production of Indonesia (QKI). Cocoa exports were not affected significantly by the price of Indonesian cocoa exports (Heki), exchange rate (ERI) and trade restrictions (RESTIKI) (Table 5).

The increase in cocoa production (QKI) accompanied by the decline in Indonesian cocoa demand (DKI) would be increase exports of Indonesian cocoa (EKIN). Indonesian cocoa export price (HEKI) and trade restrictions Indonesia (RESTIKI) has a coefficient direction according to economic criteria but the rising price of Indonesian cocoa exports did not impact significantly on the Indonesian cocoa exports. Because of cocoa is an international commodity price, thus the movements were depend on world prices as proposed Drajat (2005).

Indonesian cocoa demand response (DKI) for Indonesian cocoa exports (EKIN) is inelastic in the short term that is equal to -0.4736. This means that if demand for cocoa Indonesia (DKI) rose 1%, the Indonesian cocoa exports (EKIN) decreased by 0.4736%. Indonesian cocoa production response (QKI) against Indonesian cocoa exports (EKIN) was elastic in the short term that is equal to 1.9016. That is, if there is an increase in cocoa production of Indonesia (QKI) by 1%, then in the short term will result in the increase of Indonesian cocoa exports amounted to 1.9016%.

b) Import of Indonesian Cocoa (IKIN)

Indonesian cocoa imports (IKIN) were significantly affected by the exchange rate (ERI) and imports of cocoa Indonesia one year earlier (IKIN1). This suggests that increasing or strengthening of exchange rate significant would be affected on cocoa imports Indonesia (HKI). Increasing the exchange rate will increase the ability of Indonesian cocoa imports, as domestic cocoa price movement is strongly influenced by the world price of cocoa. Indonesian cocoa imports required for blending materials (mixture) cocoa because of its excellence is not easy to melt.

Response of Indonesian cocoa imports to the exchange rate was inelastic in the short term was 0.2711. It means if the exchange rate increase by 1%, then in the short term there will be an increase in imports of Indonesian cocoa price of 0.2711%. Furthermore, in the long term, the response of Indonesian cocoa imports to the exchange rate was elastic that is equal to 1.4383 (Table 6).

c) Price of Indonesian Cocoa Export (HEKI)

Indonesian cocoa export price (HEKI) was significantly influenced by the world price of cocoa (HKW), trade restrictions Indonesia (RESTIKI) as well as the exchange rate against the dollar (ERI) (Table 7). This is because the position of Indonesia in the world cocoa trade was a price taker.

Elasticity in the short term and long term world cocoa prices to the price of Indonesian cocoa exports was elastic in the amount of 1.6175 and 1.6971. It is means that if the world price of cocoa rose 1%, the price of Indonesian cocoa exports (HEKI) will be increased by 1.6175% in the short term and amounted to 1.6971% in the long term. The elasticity of trade restrictions toward the exchange rate was not elastic, both short-term and long-term.

5.4 Impact Analysis of Trade Liberalization Policy on Performance of Indonesian Cocoa Economy

Changes in performance of Indonesian cocoa economy as a result of implementation of trade liberalization are analyzed through several policies that were elimination of cocoa trade restrictions (SIM 1), an increase total area of cocoa at 5% (SIM 2), an increase cocoa productivity by 11% (SIM 3), a decline rate interest at 6% per year (SIM 4), and a decrease in the price of urea by 10% (SIM 5). The impact of these policies were summarized in Table 8.

Trade liberalization policies (the elimination of cocoa trade restrictions)

The impact of trade liberalization on economic performance of Indonesian cocoa can be analyzed using the approach Nominal Rate of Protection (NRP). According Flatter (2014), NRP is an indicator of difference between domestic prices with international prices. The simulation results the impact of trade liberalization (the elimination restrictions) on economic

performance of cocoa presented in Table 8 (SIM 1).

The simulation results showed that if trade restrictions be removed, it would affect the growing area of cocoa, and cocoa production of Indonesia QKI) and productivity of cocoa (YKI). The increase in cocoa production would increase exports of Indonesian cocoa (EKIN). On the demand side, the rising price of cocoa Indonesia had an impact on the decline in demand for Indonesian cocoa.

Results of this research differs from the research by Maswadi (2011) which found that the government's fiscal policies have spurred an increase in domestic production, but productivity decreases due to cocoa farmers no longer pay attention to the quality of the garden. They also did not try to suppress pests and diseases and do not pay attention to the quality of the fruit is harvested.

The results study by Pudjiastuti et al. (2013) on commodity sugarcane (sugar) found that sugar trade liberalization did not have an impact on domestic output of sugarcane (sugar). The linkage between sectors (sugarcane plantation and sugar industry) will determine the effect of elimination sugar import tariff to the amount of domestic sugar production. Eventually, this was determine quantity of import or export.

Production policy: increasing the acreage of cocoa at 5%, and the productivity at 11%.

The simulation results raise the acreage of cocoa by 5% (SIM 2 in Table 8) shows that the policy of increasing the area cocoa would increase Indonesian cocoa production by 9.98%, cocoa exports at 8.51%, and cocoa exports price at 2.27%. The reason was, cocoa is Indonesia's main export commodity. On the demand side, the rising price of cocoa would be impact on reducing domestic demand for cocoa.

Policies to raise productivity of cocoa by 11% (SIM 3 in Table 8) resulted in an increase cocoa production of Indonesia (QKI) to 10.81% and exports of cocoa Indonesia (EKIN) at 15.39%. Therefore cocoa was Indonesia's main export commodities, an increase in cocoa production would be increase volume of Indonesian cocoa exports (EKIN).

On the demand side, rising cocoa productivity would increase the price of cocoa Indonesia (HKI) at 1.48%, but demand for Indonesian cocoa would decrease at 0.22%. Contributing factor was the low level of Indonesian cocoa consumption and cocoa is more agricultural commodities exported.

Economic policy: decrease interest rate of 6% per year and the price of urea by 10%

The interest rate is one of the economic variables that are often used as guidelines by the economic actors including businesses cocoa. The simulation results (SIM 4 in Table 8) showed that decrease in the interest rate of 6% per year would increase the area of cocoa Indonesia (LAKI) to 15.75%. This corresponds to Direktorat Jenderal Perkebunan report (2010) that one of the limitations of cocoa farmers in terms of business development were capital.

An increase in area of cocoa will increase cocoa production of Indonesia (QKI) at 16:55%. Increasing cocoa production of Indonesia (QKI) will further impact on the increase of Indonesian cocoa exports (EKIN) by 22.77%. As one of Indonesia's main export commodities, the increase in cocoa production will increase the volume of Indonesian cocoa exports (EKIN). The reason was, cocoa is one of export commodities that is contribute to foreign exchange (Amoro and Shen, 2013).

Input prices will affect the ability of farmers to buy and fullfil their input requirements. If this input can not be met in accordance with the fertility rate will drop so that the plant will reduce production. Therefore, removal of subsidies on fertilizers should be reexamined. Policy of decline the price of urea by 10%, had   increased acreage of cocoa and cocoa production but have not been able to increase productivity of cocoa (SIM 5 in Table 8).

6. Conclusions

Indonesian cocoa plantations performance was determined by a variety of variables that are grouped in blocks of production (acreage of cocoa and productivity), block of supply and demand (demand and cocoa price) as well as block trade (exports of cocoa, cocoa import and export prices of Indonesian cocoa).

Trade liberalization on cocoa resulted in increased acreage, production and productivity of cocoa that had an impact on the increase of Indonesian cocoa exports. This policy also had an impact on increasing the price of Indonesian cocoa and decreasing the cocoa demand.

Production policies (raising the acreage of cocoa and its productivity by 11%) were able to increase production and productivity of cocoa. As a result, exports of cocoa, price of Indonesian cocoa exports and domestic prices would be increase, but domestic demand would be decline.

Economic policy (decrease interest rate of 6% per year and price of urea at 10%), would increase acreage of cocoa, cocoa production and export of Indonesian cocoa, but cocoa productivity can't be increased.

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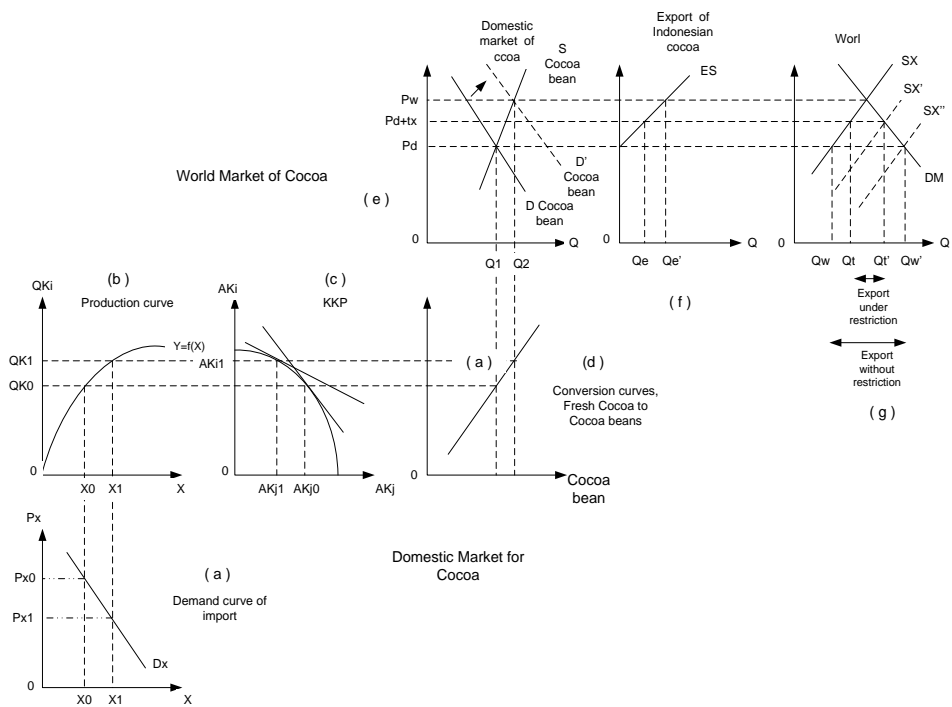
Figure 1. Impact of Trade Liberalization Cocoa
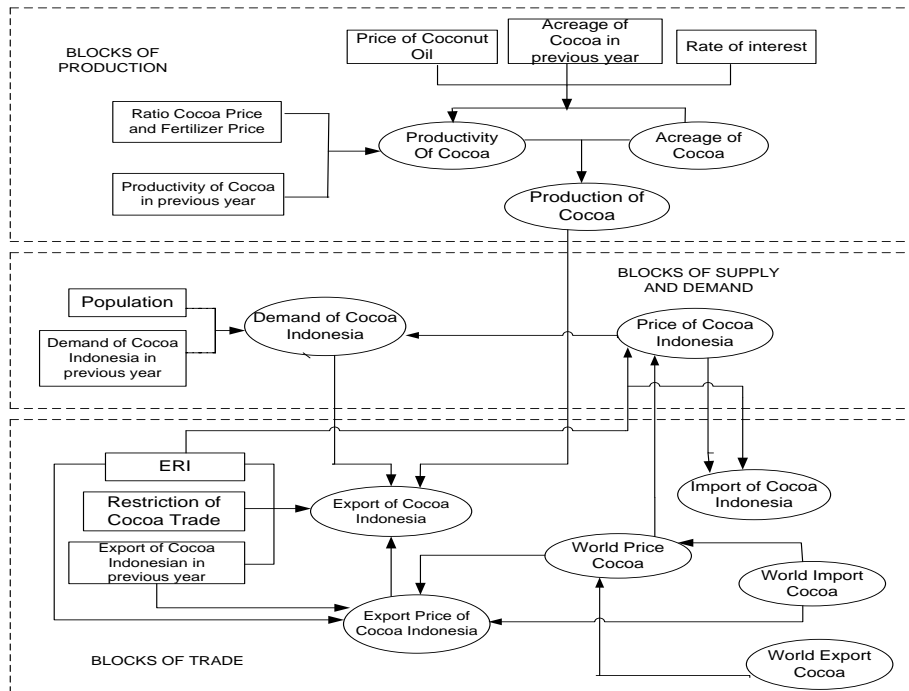
Source: Tweeten (1992), modified

Figure 2. The Framework Model for the Economic Performance of Indonesian Cocoa

Table 1. Response Analysis Acreage of Indonesian Cocoa (LAKI)

Variable	Parameter	Pr > (t)	ESR	ELR
Intercept	239721.1	0.0839		
Price of Indonesian Cocoa (HKI)	0.002103	0.8084	0.0313	0.2815
Price of Indonesian Palm Coconut (HKSI)	-0.01008	0.6875	-0.0668	-0.2373
Interest Rate (i)	-6581.57	0.1490	-0.2056	-0.7305
Acreage of cocoa in previous year (LAKI1)	0.888778	0.0005		
F Value = 85.78 Pr > F: <0001 R^2 = 0.9527 D − W = 2.0940				

Source: analysis results, 2015

ESR= short run elasticity

ELR= long run elasticity

Table 2. Response Analysis Productivity of Indonesian Cocoa (YKI)

Variable	Parameter	Pr > (t)	ESR	ELR
Ratio between price of Indonesian Cocoa and urea fertilizer price (SHKIP)	0.025292	0.0026	0.2964	1.3383
Productivity of cocoa in previous year (YKI1)	0.778567	<00001		
F Value = 719.56 Pr > F: <0001 R^2 = 0.9862 D − W = 2.4850				

Table. 3. Response Analysis Demand of Indonesian Cocoa (DKI)

Variable	Parameter	Pr > (t)	ESR	ELR
Intercept	-883539	0.1538		
Price of Indonesian Cocoa (HKI)	-0.00208	0.7963	-0.1010	-0.1561
Population of Indonesia (POP)	0.004804	0.1467	5.5995	8.6528
Demand of Indonesian Cocoa in previous year (DKI1)	0.352877	0.1291		
F Value = 19.93 Pr > F: <0001 R^2 = 0.7686 D − W = 1.9898				

Table 4. Response Analysis Price of Indonesian Cocoa (HKI)

Variable	Parameter	Pr > (t)	ESR	ELR
Intercept	-31384.3	0.9545		
World Cocoa Price (HKW)	0.471872	<0001	1.1545	1.9119
Exchange rate of IDR and US$ (ERI)	-56.6822	0.6409	-0.0434	-0.0719
Price of Indonesian Cocoa in Previous Year (HKI1)	0.396189	<00001		
F Value = 268.65 Pr > F: <0001 R^2 = 0.9782 D − W = 2.6495				

Table 5. Response Analysis Export of Indonesian Cocoa (EKIN)

Variable	Parameter	Pr > (t)	ESR	ELR
Price of Indonesian Cocoa Export (HEKI)	0.000221	0.6610	0.0074	-
Demand of Indonesian Cocoa (DKI)	-0.9425	<0001	-0.4736	-
Production of Indonesian Cocoa (QKI)	1.032675	<0001	0.9016	-
Exchange rate of IDR and US$ (ERI)	-0.42627	0.7361	-0.0079	-
Trade Restriction of Indonesia (RESTIKI)	-0.94.2740	0.6737	-0.0018	-
F Value = 8640.77 Pr > F: <0001 R^2 = 0.9996 D − W = 1.5729				

Table 6. Response Analysis Import of Indonesian Cocoa (IKIN)

Variable	Parameter	Pr > (t)	ESR	ELR
Intercept	-822.176	0.8142		
Price of Indonesian Cocoa (HKI)	0.000053	0.9070	0.0186	0.0987
Exchange rate of IDR and US$ (ERI)	1.007640	0.1724	0.2711	1.4383
Import of Indonesian Cocoa in Previous Year (IKIN1)	0.811489	<00001		
F Value = 63.23 Pr > F: <0001 R^2 = 0.9113 D − W = 2.6887				

Tabel. 7. Response Analysis Export of Indonesian Cocoa (HEKI)

Variable	Parameter	Pr > (t)	ESR	ELR
Intercept	1135714	0.4999		
World Price of Cocoa (HKW)	0.913950	<0001	1.6175	1.6971
World Import of Cocoa (IKW)	0.535249	0.5771	0.1104	0.1158
Restriction of Indonesia (RESTIKI)	-144766	<0001	-0.0884	-0.0884
Exchange rate of IDR and US$ (ERI)	-216.895	0.1020	-0.1202	-0.1261
Price of Indonesian Cocoa Export in Previous Year (HEKI1)	0.046895	0.5651		
F Value = 375.63 Pr > F: <0001 R^2 = 0.9915 D − W = 2.4862				

Table 8. Impact of Trade Liberalization Policy, Production Policy and Economic

Towards Economic Performance of Indonesian Cocoa

No	Variable	Base Value	Change (%)				
			SIM 1	SIM 2	SIM 3	SIM 4	SIM 5
1.	Acreage of Indonesian Cocoa (LAKI)	611513	0.05	4.81	0.05	15.75	0.05
2.	Productivity of Indonesia Cocoa (YKI)	0.8864	0.45	-0.46	9.5	-0.46	-0.46
3.	Production of Indonesian Cocoa (QKI)	537017	1.00	9.98	10.81	16.55	1.00
4.	Demand of Indonesia Cocoa (DKI)	184805	-0.21	-0.22	-0.22	-0.22	-0.21
5.	Price of Indonesian Cocoa (HKI)	9142953	1.41	1.44	1.48	1.52	1.41
6.	Export of Indonesian Cocoa (EKIN)	378416	2.07	8.51	15.39	22.77	1.86
7.	Import of Indonesian Cocoa (IKIN)	26203.8	0.01	0.01	0.01	0.01	0.01
8.	Price of Indonesian Cocoa Export (HEKI)	12645118	9.02	2.27	2.32	2.39	2.23

SIM 1 = Simulation of elimination trade restriction to cocoa (RESTIKI = 0%)

SIM 2 = Simulation of increasing acreage plantation of cocoa (LAKI = 5%)

SIM 3 = Simulation of increasing productivity plantation of cocoa (YKI = 11%)

SIM 4 = Simulation of decreasing rate of interest became 6% per year (i = 6%)

SIM 5 = Simulation of decreasing price of urea 10% (PPU = 10%)