Factors Influencing Indonesia's Cashew Export Volume

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ABSTRACT

Cashews contribute significantly to the Indonesian economy because it is one of the exporting countries. However, volume of exports tends to fluctuate, so it is necessary to identify the influencing factors. This study aims to analyze volume of Indonesian cashew exports and its determinants. Time series data for 8 variables during 1985–2016 were analyzed descriptively by multiple regression models. The results again show fluctuations in export volume and value over 1985–2016 period. Lowest export volume occurred in 1989, but its value was in 1985. Highest export volume and value occurred in 2015. National cashew export volume depends on the domestic cashew price, exchange rate and income per capita. Peanuts and coffee have a complementary relationship with cashews, while sugar has a substitution relationship with this commodity. Cashews are an inferior goods.

Keywords: Price, Volume, Domestic, Export, Cashews

INTRODUCTION

Cashew (Anacardium) is one of the leading commodities of plantation crops that are prioritized by government in future economic and agricultural development. Cashews contribute significantly to Indonesian economy, as a source of foreign exchange, income for farmers, raw materials for food industry, and job creation (Kurniawan, 2016)000 tons per year. East Java province contributed about 11% of the national cashew production. Jember is famous as a center for cashew producer in the Eastern region of East Java province and has great potential in the development of agribusiness/agroindustry cashew nuts. However, they found some of problems that hamper the success of cashew farming. The purpose of this study is to formulate a strategy and analyze the development prospects for of cashew Jember Regency. The analysis technique used were Internal Factor Evaluation (IFE. Development of cashew in production centers, both

for rehabilitation of existing plants and extensification in newly planted land, is still constrained by inability of farmers to provide superior seeds and production facilities (Kementan, 2015).

Cashew production in Indonesia in 2015–2019 grew 2.20% per year. In 2015, production was recorded at 116,424 tons and in 2019 it increased to 126,724 tons. On the other hand, planted area decreased 1.69% per year. Total area was recorded at 551,512 Ha, then in 2019 it decreased to 515,161 Ha. The data shows that productivity has increased during this time. High production surplus caused export volume during 2015–2019 increase by 1.39% per year. In 2015, export volume was close to 61 thousand tons, and then in 2019 it became 65 thousand tons.

As one of the largest cashew exporters in the world apart from Vietnam, India, Brazil and East Africa, Indonesia has a comparative advantage for type of cashew, but does not yet have a competitive

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advantage for the peeled cashew type. Indonesia is a cashew exporting country because it has a positive Trade Specialization Index (Zahir & Sanawiri, 2018). The largest export destinations are Vietnam and India. In 2015, total exports of logged cashews were recorded at 84 thousand tons and in peeled cashews were 18.3 thousand tons. Vietnam imports from Indonesia in these form at 71% and 54%, respectively. Exports to India reached 28% and 15%. Other importing countries for Indonesian cashew are America, several European Union countries, Middle East, Asia, Australia and Africa (Wawansyah, 2017).

Fluctuating volume of cashew exports can be influenced by various factors. Dionita & Utama (2015) reported that production and planted area had a significant effect on exports in 1996–2013, while the weather and exchange rates had no significant effect. Production has the most dominant influence. Production that fluctuates is caused by various factors (Indrawanto *et al*., 2003; Wongnaa, 2013), including discrepancy in crop and land management patterns, and climate (high rainfall). High production opens up great opportunities for export.

It is different from existing theory, and could be one of a reasons why Indonesia does not have a competitive advantage in this commodity. Indonesia should learn from the experiences of other countries such as India, Mozambique and Nigeria in order to get greater trade benefits.

Conceptually, exports are carried out when there is excess production (supply> demand). Exports of various commodities will have a positive effect on the trade balance. On the other hand, imports of traded commodities will have a negative effect (Pudjiastuti *et al*., 2013; Pudjiastuti, 2014; Pudjiastuti & Kembauw, 2018). Another fact, since 2010, cashew production has continued to decline, but exports are still carried out in large numbers, so that domestic demand is not fulfilled (Kemendag, 2014). Another fact, since

2010, cashew production has continued to decline, but exports are still carried out in large numbers so that domestic demand is not fulfilled.

India as the largest cashew exporting country has succeeded in increasing domestic production by introducing superior varieties, in order to have competitiveness in the domestic and world markets (Kumar *et al*., 2015). However, Padmanaban et al. (2014) found that India's cashew exports fluctuated due to export demand from destination countries, especially the United States. Mozambique experience, which limits cashew exports, has made this country fail to transform its economy (Balchin *et al*., 2019). Meanwhile, Indonesian cashew is classified as a growing and export-oriented industry (Indrawanto, 2004), but does not yet have a comparative advantage based on the RCA index (Fauziyah *et al*., 2017). However, Guledgudda *et al*. (2014), argued that in the world market, Indonesia was considered a major competitor for India, apart from Vietnam, Brazil and Tanzania. In Nigeria, Oluyole *et al*. (2017) and Alidou et al. (2017) stated that cashew has a competitive advantage and plays an important role.

Previous studies have reported that production, exchange rates and prices have an effect on cashew exports. In this study, the prices of peanuts, sugar and coffee are added as variables that are thought to determine volume of cashew exports as well as show the relationship between these commodities, because (1) peanuts are a local product that can be used as a cashew substitute in the processed food industry (Kemendag, 2016), (2) sugar and coffee are assumed to be substitutes related to the use of agricultural land for plantation some crops (cashew, sugar cane and coffee), which are traded commodities. In addition, income per capita was chosen because it would show cashew as an inferior or superior type of good. The study aims to analyze development of Indonesian cashew exports in 1985–2016 and its determining factors, i.e. domestic cashew

prices, peanut prices, sugar prices, coffee prices, exchange rates, and income per capita.

METHODOLOGY

Variables selected included cashew export volume, cashew export price, domestic cashew price, domestic peanut price, domestic sugar price, domestic coffee price, exchange rate and income per capita. Data used were time series during 1985–2016. Data sources are Central Statistics Agency (BPS), United State Department of Agriculture (USDA), Food Agriculture Organization Statistics (FAOSTAT), Directorate General of Plantation, Ministry of Industry and Trade of Indonesia.

To evaluate development of Indonesian cashew exports in 1985–2016, descriptive analysis was used accompanied by relevant diagrams. To analyze determinants of Indonesia's cashew export volume, multiple linear regression models were used. The model is mathematically expressed as:

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + e$$

Where **Y** is export volume of cashew, X_1 is price of export cashew, X_2 is price of domestic cashew, X_3 is price of domestic peanut, X_4 is price of domestic sugar, X_5 is price of domestic coffee, X_6 is exchange rate, X_7 is income per capita, b_1, b_2, ….b_7 is regression coefficient, **e** is standard error, **a** is constant.

Data were analyzed using Ordinary Least Square (OLS). Before being analyzed, stationary tests of time series data were first performed. Stationarity is important in econometrics model for time coherent data. If data is not stationary, then it is reconsidered for its validity and stability, because regression results will cause spurious. It means that regression has high R^2, but none of independent variables are significant. Classic assumption tests were also carried out.

Goodness of fit model was checked based on the determination coefficient (R^2). The model is considered good or suitable if R^2 approaches 1. F test is used to find out whether export cashew price, domestic cashew price, domestic peanut price, domestic sugar price, domestic coffee price, exchange rate and income per capita simultaneously influence and significantly to export volume of Indonesian cashew. The statistical hypothesis is:

Ho: b_i= 0 (i = 1,2, …,7), meaning export cashew price, domestic cashew price, domestic peanut price, domestic sugar price, domestic coffee price, exchange rate and income per capita simultaneously does not significant effect to export volume of cashew in Indonesia.

*Ha : b_i≠*0 (i = 1,2, …,7), meaning export cashew price, domestic cashew price, domestic peanut price, domestic sugar price, domestic coffee price, exchange rate and income per capita simultaneously had significant effect to export volume of cashew in Indonesia.

To see partial effect of export cashew price, domestic cashew price, domestic peanut price, domestic sugar price, domestic coffee price, exchange rate and income per capita on the export volume of cashew, *t* test was conducted.

RESULTS AND DISCUSSION
Growth of Volume and Value of Cashew Export in Indonesia

Vietnam and India are big importing countries of Indonesia's cashew. The countries then processed and exported it to Europe, so that Indonesia's direct cashew exports to Europe were recorded in a small. It is a reason that Indonesia does not yet have a comparative and competitive advantage as stated by Fauziyah et al., (2017) even though Indonesia is included as exporting country (Indrawanto, 2004; Wawansyah, 2017; Zahir & Sanawiri, 2018). Competitive advantage must be achieved so that Indonesia can take greater benefits in the world market because Guledgudda et al., (2014) states that Indonesia is a major competitor for the main exporting country. If it's achieved, cashew will play an

important role in the Indonesian economy, such as in Nigeria (Oluyole et al., 2017 and Alidou et al., 2017).

Volume and value of Indonesia's cashew exports fluctuated during 1985–2016 (Figure 1), with highest export being achieved in 2015. Padmanaban et al. (2014) stated that India experienced fluctuating exports due to demand of destination countries. It may also be experienced by Indonesia, but it is not considered in this study because the data are difficult to access. In addition, cashew production and exports sometimes have unidirectional relationships, as stated by Kemendag (2014), Indonesia begin increased its exports in 2010, even though production fell. It is not accordance with prevailing theory that domestic production is used to meet domestic demand, and then export demand. Main factors being considered are depreciation of IDR' exchange rate and increasing demand from other countries.

Increasing demand for cashew imports by European countries has prompted Indonesian government to increase domestic production. It's a great opportunity to increase yields, either through intensification and/or extensification. Policies that implemented

in 2014 Kemendag (2016), were cashew tree revitalization in production centers: Southeast Sulawesi (100 Ha); West Nusa Tenggara (100 Ha); East Nusa Tenggara (500 Ha); Yogyakarta (100 Ha) and Bali (100 Ha). Other policies include cashew tree extension plots in: South Sulawesi (150 Ha); East Java (160 Ha); East Nusa Tenggara (400 Ha); West Nusa Tenggara (200 Ha) and North Maluku (200 Ha).

This policy was able to increase high cashew exports in 2015 (104,647 tons or US$ 184,395,000), which increased sharply than 2014 (22,037 tons or US$ 52,699,000). Exports declined again in 2016 (30,726 tons or US$ 78,682,000), although volume and value of exports in 2016 was still higher than 2014. It is an indicator that revitalization has not implemented effectively or it has not sustainable, ceteris paribus. If the revitalization being continues, there is a possibility that Indonesia will not only have a comparative advantage, but also a competitive advantage.

Determinants of Indonesian Cashew Nut Export

Time series data for all variables must be tested for stationarity. Unit difference root
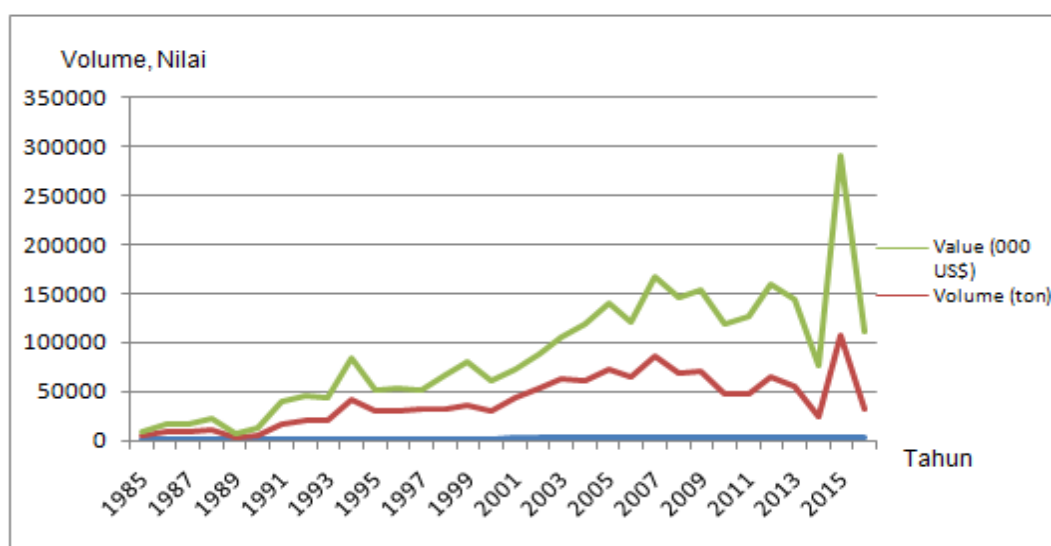
Source: Faostat and USDA 2018, processed

Figure 1
Growth of Indonesian Cashew Nut Exports 1985-2016

test results indicate that all variables were eligible to be used (Table 1). Initially, the Augmented Dickey Fuller (ADF) in the unit root test showed that price of export cashew, domestic peanut prices, domestic sugar prices, domestic coffee prices, and income per capita contain unit root problems and have no-stationary conditions. Therefore, a degree of integration test was carried out, so that all of variables were stationary.

The results of classic assumption test showed that: 1) data have normal distribution (sig. Kolmogorov-Smirnov = 0.999>0.05), 2) there was no multicollinearity (the variables have VIF <10), 3) there was no autokorelasi (asymp. Sig. 2-tailed =0.508 >0.05).

Factors that determine volume of cashew exports are approached with regression model with one dependent variable: volume of cashew exports and seven factors that are thought to influence it (simultaneously and partially). Regression model was appropriate (goodness of fit model) because adjusted R^2 obtained was 0.789. It means that export cashew prices, domestic cashew prices, domestic peanut prices, domestic sugar prices, domestic coffee prices, exchange rates, and income per capita are able to explain value variation of Indonesia's cashew exports volume by 78.9% (Table 2).

Effect of the Factors Simultaneously (*F* Test)
Results of the F test (see Table 2) show that simultaneously, export price of cashew, domestic cashew prices, domestic peanut prices, domestic sugar prices, domestic coffee prices, exchange rates, and income per capita influence export volume of cashew (sig. = 0.00). Therefore, to determine which variables influence volume of Indonesian cashew exports, a partial test (t test) is used.

Effect of the Factors Partially (*t* Test)
Factors affecting Indonesia's cashew exports can be identified based on the t test (see Table 3). The test results showed that export price of cashew, exchange rates and income per capita were significant determinants of export volume. Meanwhile, domestic cashew prices, domestic peanut prices, domestic sugar prices, and domestic coffee prices were not the determining factors.

Price of Export Cashew
Regression coefficient of –5,594 shows a negative relationship between price and volume of cashew exports. If export price decreases by IDR 1,000 / ton, export volume will increase by 5,594 tons. This variable greatly determines volume of Indonesia's cashew exports because

Table 1
Results of First Difference Test and Multicolinearity

Variables	Augmented Dickey-Fuller statistic	Prob.	Justification	VIF
Price of export cashew (X_1)	-2.985966	0.0419	Stationer	1.958
Price of domestic cashew (X_2)	-5.517788	0.0000	Stationer	9.456
Price of domestic peanut (X_3)	-3.829116	0.0085	Stationer	8.681
Price of domestic sugar (X_4)	-2.996456	0.0410	Stationer	5.481
Price of domestic coffee (X_5)	-2.986094	0.0420	Stationer	2.546
Exchange rate (X_6)	-5.368890	0.0000	Stationer	7.295
Income per capita (X_7)	-2.973416	0.0488	Stationer	7.388
Export volume of cashew (Y)	-11.48146	0.0000	Stationer	1.958

Source: Analysis Results, 2020

Table 2
Results Analysis of Variance

Aspect	Sum of Square	df	Average of Square	F	Sig.
Regression	17212613135.359	7	2458944733.623	17.556	.000
Residual	3361491268.609	24	140062136.192		
Total	20574104403.969	31			

Source: Analysis Results, 2020

Table 3
Determinants of Indonesian Cashew Volume Export

Variable	Regression Coefficient	Standard Error	Prob.	Justification
Constant	11719.029	10105.732	0.258	
Price of export cashew (000 IDR/ton) (X_1)	-5.594	1.197	0.000	Highly significant
Price of domestic cashew (000 IDR/kg) (X_2)	272.299	192.431	0.170	Not significant
Price of domestic peanut (IDR/kg) (X_3)	0.669	1.336	0.621	Not significant
Price of domestic sugar (IDR/kg) (X_4)	-8.156	5.663	0.163	Not significant
Price of domestic coffee (IDR/kg) (X_5)	0.528	4.414	0.906	Not significant
Exchange rate (X_6)	7.760	1.522	0.000	Highly significant
Income per capita (IDR/year/person) (X_7)	0.004	0.002	0.037	Significant

Source: FAO and USDA 2020, processed

of sig. = .000 is less than α = 0.01. It is according to demand theory that if price of a commodity rises, the demand will decrease.

Price of Domestic Cashew
Regression coefficient of 272,299 shows a positive relationship between domestic cashew prices and volume of cashew exports. If domestic cashew price increases by IDR 1,000/kg, then export volume of cashew will increase by 272,299 tons. The variable does not determine volume of cashew exports because of sig. = 0.170 is greater than α = 0.05. These results also illustrate that exported quantity and domestic cashews has a substitution relationship, which according to the theory that domestic production is the sum of exported production and domestic consumption.

Price of Domestic Peanut
Regression coefficient of 0.669 shows a positive relationship between domestic peanut prices and volume of exported cashews. If price of domestic peanuts increases by IDR 1/kg, export volume of cashew will increase by 0.669 tons. But, this variable does not determine volume of Indonesia's cashew exports because of sig. = 0.621 is greater than α = 0.05. It reveals that domestic peanuts and cashews have a complementary relationship. It means that if cashew exports increase, domestic demand will fall. On the other hand, rising domestic peanut prices will cause quantity demand of peanuts to decrease.

Price of Domestic Sugar
Regression coefficient -8,156 shows a negative relationship between domestic sugar prices and volume of exported

cashews. If domestic sugar price increases by IDR 1/kg, export volume of cashew will decrease by 8,156 tons. This variable does not determine volume of Indonesia's cashew exports because of sig. = 0.163 is greater than α = 0.05. It illustrates that there is a substitution relationship between sugar and domestic cashew. In accordance with the existing concept, rising exports will cause domestic sales to fall. On the other hand, if price of sugar falls, quantity demand of sugar will increase, vice versa.

Price of Domestic Coffee
Regression coefficient of 0.528 shows a positive relationship between domestic coffee price and volume of exported cashews. If domestic coffee price increases by IDR 1/kg, then export volume of cashew will increase by 0.528 tons. This variable does not determine volume of Indonesia's cashew exports because of sig. = 0.906 is greater than α = 0.05. An explanation of this analysis is like price of domestic peanuts. There are no research results that can be linked to point 3–5.

Exchange Rate
Regression coefficient of 7,760 shows a positive relationship between exchange rate and volume of cashew exports. If exchange rate increases by one unit of IDR/US$, export volume of cashew will increase by 7,760 tons. This variable highly determines volume of Indonesia's cashew exports because of sig. = 0.000 is smaller than α = 0.01. Exchange rate is an important component in international trade and is the driving force behind decline in the volume of traded commodity exports. However, Dionita & Utama (2015) reported that this variable had no significant effect on volume of cashew exports in 1996–2013. Huge increase export volume in 2015 is a source of differences between the studies.

Income per Capita
Regression coefficient of 0.004 shows a positive relationship between income per capita and volume of cashew exports. If income per capita increases by IDR 1/year, the export volume of cashew will increase

by 0.004 tons. This variable determines volume of Indonesia's cashew exports due to sig. = 0.037 is smaller than α = 0.05. It means that if export volume increases, domestic volume will decrease. Negative relationship between income and domestic cashews shows that Indonesian cashews are an inferior good.

Relationship between export price of cashew and its volume, following the prevailing demand law, is negative, and has a significant effect, ceteris paribus. According to Kilama (2010), higher domestic prices for raw cashew and falling world prices, have resulted in reduced or even stopped production in Vietnam and Tanzania. Muna & Farid (2016), argue that during the 2003–2014 period, Indonesia ranked fourth as a cashew exporter to Canada, with a market share of 2.3%. Commodities with HS code 080132 include top commodities which are missing opportunities on the Canadian market, and are in the first place. In 2010/2011, Indonesia's market share was 6% (ITC, 2011). A larger share of the world market that is lost will cause domestic cashew production to fall and the domestic price to rise. It is a reason why domestic cashew price does not have a significant effect on export volume. India's cashew exports have also decreased, even though its acreage and domestic productivity have increased (Nayak & Paled, 2018). Even though ITPC (2015), states that cashew has the top position in nuts and seeds products in the global market in 2014-2021.

It is possible that domestic cashew prices do not have a direct effect on export volume, but through the exchange rate. This variable has a highly significant and positive effect on export volume, encouraging exports to increase if the rupiah currency weakens.

Income per capita has a significant and positive effect on the volume of cashew exports, indicating that the higher purchasing power of people, the higher export volume. It means that demand of domestic cashew decreases with increasing income, with assumption that

exports are carried out when domestic needs are met. It also shows that cashew in Indonesia is an inferior good.

Domestic peanut prices, domestic sugar prices, and domestic coffee prices did not have a significant effect on the export volume of cashew, indicating that these commodities referred to had no relationship with cashew.

Based on the results, it can be said that Indonesia's cashew export opportunities are still relatively large. In order to have a competitive advantage and get greater benefits from this trade, government can implement policies carried out in 2014, because it has been proven to increase exports very substantially through increased production (Kemendag, 2016). Most important thing is to maintain sustainability of this policy implementation. High ability to increase production will be able to create products with good quality, cheaper and available when needed (competitive advantage). It hope will be easier to achieve because the world cashew market has recognized Indonesia as a competitor.

CONCLUSION

This study aims to analyze Indonesia's cashew exports and its determinants using time series data from 1985–2016. Descriptive and quantitative analysis with multiple regression models are used to achieve the goal. Volume of Indonesia's cashew exports in the 1985–2016 period was found to fluctuate. The lowest export volume occurred in 1989 and the highest was in 2015. Meanwhile, the lowest export value occurred in 1985 and the highest was in 2015. There is a government policy that encourages a spike in export volume and value in 2015, but the sustainability is not maintained so that it drops drastically in 2016. Export price of cashew, exchange rate and income per capita are factors that influence export volume of Indonesian cashew. Cashew is an inferior good in Indonesia based on the relationship between income and sales volume of this commodity in the domestic market.

Meanwhile, looking at the relationship between cashews and peanuts, sugar, and coffee, there are neutrality relationships with coffee and peanuts, as well as a substitution relationship with sugar. The limitations of this study are rationality regarding selection of other commodities that are thought to have an effect on volume of cashew exports and difficulty of obtaining domestic production data which has a major effect on export volume. It could be an opportunity for similar research. Due to highly potential of Indonesian cashew in the international market, with a policy of revitalization and area expansion that can increase production, it is necessary to have an in-depth study of various existing policies. Government policy should also consider export cashew prices, exchange rates and per capita income which are the influencing factors.

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