

## **“Analysis of Determinant Factors Influencing Cinnamon Export and Prices in Indonesia”**

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### **Abstract**

This research aims to study whether volume of Indonesia's cinnamon export to United State of America is affected by fluctuation of cinnamon prices, and whether the domestic and export cinnamon price is affected world cinnamon. The data collected covers the 1998 – 2010 period. This study uses Multiple Linear Regression by using simultaneously equation. Results of this research were volume of Indonesia's cinnamon exports to the United States is influenced by changing of the real price of cinnamon export, domestic cinnamon price is influenced by the real price at the cinnamon exporter in units of dollars, and the real cinnamon price domestic level last year, Indonesia's cinnamon export price is more responsive to fluctuation of cinnamon price in world markets, and world cinnamon price is responsive to fluctuation of world cinnamon import volume.

***Key words: cinnamon export, domestic cinnamon price, export cinnamon price and world cinnamon price***

### **1. Introduction**

World's growing supply and demand for cinnamon commodities tend to fluctuate from one year to another. In recent years, this tend has increased. The needs for cinnamon in the world in 1990 attained 20,496 tons, and increased 107,252 tons in 2007 (FAOSTAT, 2007). World's increasing supply and demand for cinnamon have affected cinnamon farm businesses in Indonesia. FAO (2009) recognises the importance of remunerative prices for producers, including cinnamon price, it points to many impediments that weaken the supply response.

Indonesia plays a significant role in the global cinnamon markets. The major trading partners for Indonesia's cinnamon products include Mexico, United States of America, Western Europe (including Britain, Germany, and Spain), and Australia. Indonesia has been the largest cinnamon bark supplier in the world, especially cinnamon or cinnamon burk (*Cinnamon burmannii*). Cinnamon bark is an important export commodity for certain regencies in West Sumatera and Jambi (Department of Trade of Republic of Indonesia, 2009). Indonesia's cinnamon export accounts for 66% cinnamon supply in the world. Among competitors of Indonesia's cinnamon bark export include China, Vietnam, Sri Lanka, India, and other countries. Indonesia has exported cinnamon products in the form of cinnamon bark and cinnamon powder.

The increased cinnamon production in Vietnam, Sri Lanka, and China, has been a concern for cinnamon farmers in Indonesia. One of the affected area is Kerinci, one of

the regencies in the shourthern part of Jambi Province on Sumatera (Wangsa, R, 2008). There has been excess supply of cinnamon in the International market because of three countries productions. United States tends to import the cinnamon products from Vietnam, Sri Lanka, and China, for the reason cinnamon prices, good relationships and some agreements between them. In terms of quality, Kerinci's cinnamon products were far more superior than those three countries, but the quality did not attract the United States to import Kerinci's cinnamon products more (Central Bureau of Statistics, 2008).

The growth of cinnamon export also been a concern for cinnamon farmers in Indonesia ( Table 1).

Table 1: Indonesia's Cinnamon Export, Year 2000 to 2008

| Year | Indonesia's<br>Cinnamon Export<br>(in Ton) | Growth (%) |
|------|--|------------|
| 2000 | 9265300                                    | -          |
| 2001 | 11505869                                   | 24.18      |
| 2002 | 19918183                                   | 73.11      |
| 2003 | 16491324                                   | (17.20)    |
| 2004 | 12702997                                   | (22.97)    |
| 2005 | 5317378                                    | (58.14)    |
| 2006 | 36708002                                   | 590.34     |
| 2007 | 24949284                                   | (32.03)    |
| 2008 | 27189854                                   | 8.98       |

Source: Central Bureau of Statistics, from several years of publishing

In figure 1 is indicated the growth of Indonesia's cinnamon export as follows



Figure 1. The growth of Indonesia's cinnamon export, Year 2000 – 2006

The lowest export volume of cinnamon bark occurred in 2005 in which this was only 5,317,378 tons, because in that year world's price of cinnamon increased and export of Indonesia's cinnamon higher than the Indonesia's rival, such Srilanka,

vietnam and China. The highest cinnamon export occurred in 2006 in which this reached 36,708,002 tons, because in that year, America and Europe needed many more Indonesia's cinnamon bark.

The low of cinnamon bark world price affected to cinnamon price at the level of exporters. That condition influenced decreasing the farmers cinnamon prices. Prices for exported cinnamon commodities with Free On Board (FOB) Price in Teluk Bayur Port, Padang, West Sumatera (U.S.\$/kg) in Desember 2010, for highest price and best cinnamon quality, e.g. Kerinci's Cinnamon A quality (Cassia-KA) is \$ 0.65 or 5,850.00 IDR per kg; These prices were lower than previous years, where the cinnamon which had best quality could reached 16,000.00 IDR per kg. The low of export cinnamon price affected decreasing cinnamon price at the domestic level which that price was 2,600 IDR to 5,000 IDR per kilogram for the best quality such as Kerinci's Cinnamon A quality (Cassia-KA). The low of cinnamon price affected economic stagnation at a local level. Cinnamon prices in Kerinci, for example, affected the low farmer's incomes and the market condition is not favourable.

Although the prices of cinnamon were low, but cinnamon products still contribute to Jambi Province's GDP, especially to value of plantation sector in Jambi Province. The value of exported plantation crops, particularly cinnamon increased from 2008 to 2009. In the third quarter of 2009, Jambi was able to export commodity crops (23,987.91 tons, at \$ 10,428,811). Such commodity crops included cinnamons, nut beans, arabica coffees, pecans, and coconuts. In 2008, the volume of commodity exports was only \$ 9,285,539 or 22,15.54 tons (Elviza, 2010). With a total cinnamon area of 103,280 hectares, cinnamon production in Jambi Province in 2009 reached 83,880.00 tons. Cinnamon crop productivity in that year was 0.65 ton per ha (Plantation Office of Jambi Province, 2009).

From an agribusiness perspective, processed cinnamon products are associated with value-added. This value-added relates to commodity input subsystem performance, production, processing, marketing, and supporting subsystems (Wangsa, R, 2008). To help cinnamon farmers from the falling prices and with the aim to increased the value added from cinnamon products, Kerinci Regency Government continues to support local farmers to process cinnamon made syrups in which the marketing shares of cinnamon syrups were targeted reaching the hyper market in Jambi Province and out of Jambi Province. As a improving cinnamon share, producer needed to enhance packaging, get production license, and improve distribution in order to attract potential buyers (Department of Trade and Industry Kerinci, 2008).

The recent research on cinnamon was conducted by Iskandar (2002). From the results of this research, it explained that the Export and Import of cinnamon are significantly influenced by the wage of plantation labor, interest rate, exchange rate, cinnamon prices in the exporter level and cinnamon prices in international markets. But in that research, researcher didn't study about value added of cinnamon syrup processing. In this research, the model which was used be singel equation (Ordinary Least Square).

To continue that research, it is needed a research focusing about cinnamon export and its value added, therefore, the present study focuses on Indonesia's cinnamon export and its value added, because of some reasons: 1) scarcity of studies about determinant of cinnamon export and determinant of value added of cinnamon syrup processing, 2) Indonesia is one of the largest cinnamon producers in the world, dan 3) to continue about cinnamon export reasearch which use simultaneous equation.

Drawing from the conditions as earlier described, the present study focuses specifically, the study aims to probe into:

- (i) Whether volume of Indonesia's cinnamon export to United State of America is affected by fluctuation of cinnamon prices, and
- (ii) Whether the domestic and export cinnamon price is affected world cinnamon price;

## 2. Review of Past Studies

### 2.1. Simultaneous Export Equation

There are many references on agricultural commodity international trade and supply response to prices. Important contributions include Nerlove (1979). Khrisna (1995a), Khrisna (1995c), Rosegrant, Kasyrno, and Perez (1998), Bardhan (2003) and Kanwar (2006), among others. In particular, Kanwar (2006) presents new evidence using a panel of Indian's states over the period 1967-2000. Kanwar (2006) concludes that prices matter but input availability matters more. On the other hand, Rosegrant et al (1998) analysed the effects of technology, prices, and investments on output growth for rice, corn, soybean, and cassava in Indonesia and reported large impacts of public investment in agricultural research, extension, and irrigation on long-run output growth, facilitated by fiscal savings from the elimination of fertilizer subsidy. Outside Asia, some studies show high agricultural output elasticity with respect to price as part of economic liberalisation. The present study seeks to re-examine the supply response to higher prices, drawing upon a panel database for 10 Asian countries. An important point of departure is that the yield response allows for both higher prices and costs (Imai, 2011).

Further, the research about determinant export had been done by Riedel (1988). The long-run demand and supply model estimated has the following log-linear structure:

$$X^d = \alpha_0 - \alpha_1 P^x + \alpha_2 P^w + \alpha_3 Y^w, \quad \alpha_i > 0$$

$$X^s = \beta_0 + \beta_1 P^x - \beta_2 P^m - \beta_3 W + \beta_4 T, \quad \beta_i > 0$$

where  $X$  represents the volume of export goods,  $P^x$  represents the prices of export goods of the country in question,  $P^w$  are competitors' prices in the country's export markets,  $Y^w$  is a scale variable which captures world demand conditions,  $P^m$  is the price of raw material inputs,  $W$  is an index of nominal wages in manufacturing, and  $T$  is a time trend in order to capture capacity growth and improvements in productivity.

The effect of agricultural price shocks on the general price level has been of concern (Fischer 1981; Van Duijn 1979). This issue was particularly acute in the early 1970s when food and oil prices were explosive. From this viewpoint, explaining relative agricultural price movements as a function of overall price movements or other macroeconomic factors may have cause and effect exactly reversed. Models in which exogenous macroeconomic developments are assumed to affect agriculture, with impacts from agriculture on the macroeconomy precluded, are called into question from this perspective. To pursue these issues, the effects on agricultural exports and relative prices of four macroeconomic variables, and possible reverse effects from the agricultural variables to the macroeconomy, are evaluated in this article. The macroeconomic variables included in the study are the money supply, the interest rate, the exchange rate, and the general price level. Though by no means an exhaustive set, these variables are central to the monetary-policy/financial-

market/tradebalance interactions that have been at issue in the policy debate about macroeconomic impacts on trade sectors.

Permani et.al. (2011) also provide a basis for evaluating the inflation/sectoral-prices issues that have been raised in particular with respect to agriculture. The recent study which presents thorough econometric estimates of import demand, export supply, Armington and cross elasticities using the Vector Error Correction Model (VECM) to deal with cointegration and simultaneity issues. A literature search suggests that existing studies not only report mixed results but also use methods, mostly the Ordinary Least Squares (OLS) model, which could not deal with cointegration and simultaneity issues.

The paper by Muscatelli et al. (1992) is a follow-up of Riedel's study. Using Riedel's data to allow for direct comparability, the Phillips and Hansen (1990) fully-modified OLS (FM-OLS) procedure is used to estimate the longrun elasticities of export demand and supply using cointegrating regressions, and a final error-correction representation is estimated by full information maximum likelihood. In sharp contrast to Riedel's findings, the longrun elasticities obtained by Muscatelli et al. (1992) indicate a low price elasticity and a high income elasticity of demand.

The export demand equation specification considered in the analysis is one that has been used extensively in the empirical literature (Uri and Jones, 1988). Further, the stability question is explored using a test posited by Brown et al. (1975). The results suggest that both the export demand for corn and the export demand for corn and export demand for soybeans destabilized over the sample period. When corrected for this instability, the estimated long run price elasticities do not allow for a definitive conclusion with regard to the question of whether the demand for exports of agricultural commodities is now elastic.

### **3. Data and Methodology**

#### **3.1. Data**

The data used are primary and secondary data (time series data). Primary data included cost of production and revenue in cinnamon farmers level. Secondary data are on the number of cinnamon area in Indonesia, cinnamon production in Indonesia, and cinnamon export data to United State of America. All of the secondary data were taken from **Central Bureau of Statistics (BPS)** and the institutions which associated with this research. The data collected covers the 1998 – 2010 period.

#### **3.2. Methodology**

This study uses Multiple Linear Regression by using simultaneously equation. The same approach has been applied by some previous studies. The model posited by Riedel (1988). The long-run demand and supply model estimated has the following a simultaneous equations system consisting of relationships for demand export and supply export relations with the prices. The model in this research used analyzes export response to prices changes, and vice versa, premised on simultaneous equations technique (Two-stage least square). The models in research using Structural Vector Auto-regressive (VAR), algebraically:

##### **3.2.1. Indonesia's Cinnamon Export**

Behavioral equations Indonesia's cinnamon export to each region's export destination are as following:

$$XCI_t = a_0 + a_1 PCX_t + a_2 PRCI + a_3 ECRI_t + a_4 GDP_j + a_5 T + a_6 EQ_t + a_7 XCI_{t-1} + ui \dots \dots \dots (1)$$

Expected signs of parameters are:  
 $a_2, a_3, a_4, a_7 > 0$ ;  $0 < a_5 < 1$ ;  $a_1 < 0$ ;

### 3.2.2. Price of Cinnamon in Domestic Level

$$PCD_t = c_0 + c_1 PCX_t + c_2 PCW_t + c_3 SCDN + c_4 PCD_{t-1} + c_5 PCD_{t-2} + c_6 T + c_7 EQ_t + ui \dots \dots \dots (2)$$

Expected signs of parameters are:  
 $c_1, c_4, c_5 > 0$ ;  $0 < c_6 < 1$ ; dan  $c_2, c_3 < 0$

### 3.2.3. Price of Cinnamon in Exporter Level

$$PCX_t = d_0 + d_1 XCI_t + d_2 ECRI + d_3 SCDN + d_4 PCX_{t-1} + d_5 PCX_{t-2} + d_6 T + d_7 EQ_t + ui \dots \dots \dots (3)$$

Expected signs of parameters are:  
 $d_2, d_4, d_5 > 0$ ;  $0 < d_6 < 1$ ; dan  $d_1, d_3 < 0$

### 3.2.4. Price of Cinnamon in World Level

$$PCW_t = e_0 + e_1 XCW_t + e_2 MCWI_t + e_3 GDPA + e_4 PCW_{t-1} + e_5 PCW_{t-2} + e_6 T + e_7 EQ_t + ui \dots \dots \dots (4)$$

Expected signs of parameters are:  
 $e_2, e_3, e_4, e_5 > 0$ ;  $0 < e_6 < 1$ ; dan  $e_1 < 0$

where:

|                  |   |
|------------------|---|
| $XCI_t$          | = volume of Indonesia's cinnamon export to USA (tons)                                     |
| $PC_{(i=1,2,3)}$ | = cinnamon prices (U.S. \$ / tons)<br>at the domestic, exporter and world level           |
| $PCI_{t-1}$      | = lag cinnamon prices at the domestic, exporter<br>and world level t-1 (US \$ / tons)     |
| $PCW_t$          | = cinnamon prices at the world level in time t (US \$ / tons)                             |
| $ECRI$           | = Indonesia's exchange rate to US \$ (IRD / US \$)  |
| $GDPA$           | = GDP of USA  |
| $GDPI$           | = Indonesia's GDP   |
| $SCDN$           | = Stock of cinnamon in domestic (tons)  |
| $PRCI$           | = production of cinnamon in Indonesia in year t (tons)                                    |
| $T$              | = time trend  |
| $EQ_t$           | = Dummy Variable (D = 0 ----- if no export quota<br>D = 1 ----- if there is export quota) |
| $ui$             | = error terms   |

## 4. Results

### 4.1. General Diversity Of Model Estimation

Based on the model estimation results show that the average of all the signs of the model parameters according to the theory of economic logic. Value of the coefficient of determination (r-squared) of each of the four equation model, as a whole is quite high, ranging from 0.80 to 0.92. Thus the diversity of each endogenous variable can be explained by the explanatory variables are incorporated into the model. The most important thing and become a major orientation in this study is the average mark of parameter estimation in the model according with expectations based on economic theory and logic.

Influence of the explanatory variables in each equation simultaneously significant to explain the diversity of the endogenous variables as indicated by the value of F statistics ranging from 40.80 to 120.42. Based on the t statistic, on a part variable there are some explanatory variables that do not significantly affect the endogenous variables.

### 4.2. Indonesia's Cinnamon Export

The results of analysis with multiple linear regression model to the amount of Indonesia's cinnamon export (XCIt) as the dependent variable and price of cinnamon in export level (PCXt), production of cinnamon in Indonesia (PRCI), exchange rates (ECRI), Gross National Product (GDP), time trend (T), and amount of Indonesia's cinnamon export last year (XCIt-1) as independent variables, the complete equation set as follows:

$$XCIt = 46488.422 + 0.658 PCX_t^* + 1.628 PRCI^{ns} + 2644.934 ECRI_t^{ns} + 0.804 GDPA^{ns} + 2.002 T^{ns} + 0.945 EQ^{ns} + 4575.006 XCIt_{t-1}^{ns}$$

Description:

\* = Significant

ns = non significant

From multiple linear regression analysis derived regression coefficient ( $R^2$ ) of 0.870. This indicated that the independent variables included in the model can explain the variation in the dependent variable amount of Indonesia's cinnamon export (XCIt) of 87 percent, while is explained by other variables not included in the model. F value = 200.658 at 95 percent confidence level greater than  $F_{0,05(6,17)} = 3.20$ . Statistical conclusion states that the test results are significant. Thus amount of Indonesia's cinnamon export (XCIt) as the dependent variable simultaneously influenced significantly by price of cinnamon in export level (PCXt), production of cinnamon in Indonesia (PRCI), exchange rates (ECRI), Gross National Product (GDP), time trend (T), and amount of Indonesia's cinnamon export last year (XCIt-1) as independent variables. The influence of each independent variable on the dependent variable partially described in the following:

The volume of Indonesia's cinnamon exports to the United States is influenced by changing of the real price of cinnamon export (PXC<sub>t</sub>). This shows that Indonesia's cinnamon exports to the United States is more determined by the indonesia's cinnamon exports price level. By Increasing the export cinnamon prices to the United States, it will cause increasing amount of cinnamon export significantly. Vice versa, if the export cinnamon price declined, exporters tended to decrease amount of cinnamon export. Changing the volume of Indonesia's cinnamon exports to the United States more elastic to currency exchange rate of rupiah (IDR) to the U.S. dollar, if it compared with the

other exogenous variables. By changing currency exchange rate of rupiah to the dollar, exporter will export the cinnamon in large numbers or less. If the value of the rupiah depreciated against the dollar, the exporters will respond by exporting large numbers of cinnamon, and vice versa.

#### 4.3. Domestic, Export and World Cinnamon Price

From Analysis with multiple linear regression model on cinnamon price in domestic level (PCDt), price of cinnamon in export level (PCXt), and price of cinnamon in the world level (PCWt), as a dependent variables, the complete equation is indicated as follows:

$$\begin{aligned}
 1. \text{PCD}_t &= 20245.388 + 0.504 \text{PCX}_t^* + 2.428 \text{PCW}_t^{\text{ns}} + 4039.944 \text{SCDN}^{\text{ns}} + \\
 &\quad 0.650 \text{PCD}_{t-1}^* + 4.604 \text{PCD}_{t-2}^{\text{ns}} + 0.876 \text{T}^{\text{ns}} + 2996.078 \text{EQ}_t^{\text{ns}} \\
 2. \text{PCX}_t &= 600986.299 + 20.988 \text{XCIt}^{\text{ns}} + 41.986 \text{ECRI}^{\text{ns}} + 83021.776 \text{SCDN}^{\text{ns}} \\
 &\quad + 0.546 \text{PCX}_{t-1}^{\text{ns}} + 2.094 \text{PCW}_t^* + 2.343 \text{T}^{\text{ns}} + 20.060 \text{EQ}_t^{\text{ns}} \\
 3. \text{PCW}_t &= 100224.006 + 4.5768 \text{XCW}_t^{\text{ns}} + 43.9880 \text{MCWIt}^* + 20.0082 \text{GDPA}^{\text{ns}} \\
 &\quad + 0.9090 \text{PCW}_{t-1}^{\text{ns}} + 0.8096 \text{PCW}_{t-2}^{\text{ns}} + 30.3044 \text{T}^{\text{ns}} \\
 &\quad + 0.004 \text{EQ}_t^{\text{ns}}
 \end{aligned}$$

where:

\* = Significant

ns = non significant

Estimation results shows the real domestic cinnamon price is influenced by the real price at the cinnamon exporter in units of dollars, and the real cinnamon price domestic level last year. This suggests that cinnamon price at the exporter level and at wholesaler level last year effect to pricing cinnamon in domestic this year. By changing Cinnamon price at the level of exporters and wholesalers in the last year will soon be responded by cinnamon domestic prices this year. Changing of Cinnamon price at the exporter level will immediately stimulate cinnamon wholesalers to raise their cinnamon price.

The real cinnamon price in the domestic market is not influenced by the supply of domestic cinnamon. This is because the domestic supply less when compared to overseas cinnamon captors. The real Indonesia's cinnamon export price is more responsive to fluctuation of cinnamon price in world markets, both in the short term, and in the long run, when compared to the fluctuation of total cinnamon export volume in Indonesia. This suggests that the export price of Indonesia's cinnamon follows the development of cinnamon price in world markets. Cinnamon real world price is responsive to fluctuation of world cinnamon import volume. This proves that the world cinnamon prices will be quickly affected by the up and down of the world cinnamon imports. World cinnamon price will rise if demand of imports cinnamon increase. Vice versa, if the demand for world cinnamon down, the price of cinnamon in the world level will also fall, too.

#### 5. Conclusions

Drawing of above descriptions, we can give some conclusions:

1. Volume of Indonesia's cinnamon exports to the United States is influenced by changing of the real price of cinnamon export,



2. Domestic cinnamon price is influenced by the real price at the cinnamon exporter in units of dollars, and the real cinnamon price domestic level last year,
3. Indonesia's cinnamon export price is more responsive to fluctuation of cinnamon price in world markets, and
4. World Cinnamon price is responsive to fluctuation of world cinnamon import volume.

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