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THE RELATION BETWEEN EXPORT VOLUME, PRODUCTION AND PRICE OF "Cassia Vera" IN WEST SUMATERA

(Hubungan antara Volume Ekspor, Produksi dan Harga Kayu Manis (Cassia vera) di Sumatera Barat)

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ABSTRAK

Penelitian ini dilaksanakan di Fakultas Pertanian RUG GENT Belgia tahun 1993 dengan cara mengumpulkan data sekunder dari Departemen Pertanian dan Departemen Perdagangan Propinsi Sumatera Barat. Data kemudian dianalisis dengan menggunakan model Cobb-Douglass.

Hasil penelitian menunjukkan bahwa volume ekspor kulit manis dipengaruhi oleh produksi dan harga. Adanya hubungan yang positif antara volume ekspor dan produksi artinya semakin tinggi produksi kulit manis semakin tinggi pula volume ekspor. Tetapi sebaliknya terdapat hubungan negatif antara volume ekspor dengan harga, artinya menaiknya volume ekspor akan menurunkan harga ekspor kulit manis.

INTRODUCTION

Back ground of the story

'Cassia Vera' is the given name for the bark of stem and branches of the tree *Cinnamomum burmanii* BL. After it has been processed. In daily use, the name 'Cassia Vera' is used for all aspect related to the plant.

In Indonesia, 'Cassia Vera' is an export commodity. It has an important role in obtaining foreign exchange for the country and also in providing work and a source of revenue for the farmers.

Indonesia is the main 'Cassia Vera' exporting country in the world. It supplies almost 90% of 'Cassia Vera' available on the world markets. In 1990, three quarters of Indonesia's export of this product went to the United States (74,0%). The Netherlands imported 7.6% and Germany 5,8% of Indonesia's 'Cassia Vera' export. The United States, the Netherlands, Germany, Japan, Belgium, the United Kingdom, Canada and Sweden continuously import 'Cassia Vera' from Indonesia. Other country import also, but on a less regular basis.

The main 'Cassia Vera' producing provinces in Indonesia are West Sumatra (Tanah Datar, Agam, Solok, Pesisir Selatan), Jambi (Kerinci), and North Sumatra (Tapanuli Selatan). They produce almost 95% of the total Indonesian production (Ketaren, 1985), whereas 90% the potential export of 'Cassia Vera' comes from West Sumatra in Indonesia.

The export value from West Sumatra during 1986 – 1990, as shown in Table 1, is almost constant. In 1990 the foreign exchange gained by this 'Cassia Vera' export from West Sumatra are US$ 26.4 million or 76.8% from the total value of agricultural production.

Table 1 indicates also the export volume 'Cassia Vera' of West Sumatra. The export volume shows fluctuation. This indicates that there is not yet an ensured production. 'Cassia Vera' is produced by smallholders. The production will depend on the activity of farm management, that is carried out by people in West Sumatra. Therefore, it is difficult to expect a stable increasing production. Despite this, 'Cassia Vera' exports from this province are important in the view of income of foreign exchange and they have a strategic chance to expand.

Table 1. Realized export of 'Cassia Vera' by West Sumatra 1986 - 1990

Year	Volume (kg)	Value (US$)
1986	18,403,045	24,579,864
1987	13,131,842	25,183,306
1988	12,623,045	24,123,176
1989	9,804,926	25,994,450
1990	14,790,733	26,374,798

Source: Department of Commerce in West Sumatra

Objectives

With regard to the above given background, the objectives of this study are looking at the relation between export volume, production, and price.

Methodology

This research will be done in a descriptive way. All material for this study are secondary data. The data were compiled from Department of Agricultural and Department of Commerce in Indonesia and the library of the Agricultural Faculty of RUG RUG in Gent.

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Analysis of Data

The functional from of the model in linear. For that purpose the analysis of variance of the multiple regression and double logarithmic function are performed. The reason to used two models, is because we want to see a linear relationship with two repressors, namely production and price of export 'Cassia Vera' with the volume of export of 'Cassia Vera', where parameters resulting from the multiple regression are compared with these of double log function.

Multiple Regression

In general, this relationship can be written as :

$$Y = b0 + b1X1 + b2X2 + \mu$$

Where : Y = Volume export 'Cassia Vera'
X1 = Production of 'Cassia Vera'
X2 = Price export of 'Cassia Vera'
μ = Error
b0, b1, b2 = Regression coefficients

Double Logarithmic Function

The double logarithmic function is a simple exponential equation, which general form is :

$$Y = Ax^b Z^c \qquad \text{(Nelson, 1980)}$$

Where : Y = Volume export 'Cassia Vera'
X = Production of 'Cassia Vera'
Z = Price export of 'Cassia Vera'
A,b,c = Regression coefficients

Statistic tests are conducted to proof if the model is accepted or not. There are two steps which will be performed in this study : an overall test of the model (F test) and a test of individual estimates (T test).

RESULT AND DISCUSSION

Based on research result calculated by using computer (see data Table 2), we found multiple regression equation :

Table 2. Development of export volume, production and price of 'Cassia Vera' in West Sumatra.

Year	Volume (ton)	Production (ton)	Price (US $/ton)
1977	5,140	1,627	0.85
1978	8,475	2,550	0.67
1979	11,868	2,739	0.65
1980	12,623	3,089	0.83
1981	11,955	7,414	1.08
1982	14,220	7,219	1.15
1983	16,213	12,500	1.24
1984	15,078	13,250	1.20
1985	15,643	13,375	1.09
1896	18,403	14,925	1.34
1987	13,312	13,567	1.92
1988	12,623	12,354	1.91
1989	9,804	9,616	2.65
1990	14,791	10,525	1.78
1991	17,979	10,997	1.62

Source : Department of Commerce Province West Sumatra, 1991.

$$Y = 9847,789 + 0.7393\ X1 - 2509.31\ X2$$
$$(0.1593) \quad (1333.3526)$$

The number in parenthesis below the regression coefficient are the standard errors of the regression coefficients.

The coefficient b1 = 0.7393 indicates that, on the average, the amount of the export volume will increase by 0.7393 units for each 1 ton increase in production while price (US $/ton) X2, is held constant. The price coefficient b2 = -2509.31, shown that the amount of the export volume will decline by 2509.31 units for each $ 1 increase in price of export while production X1, is held constant.

The coefficient of determination (R^2) = 0.6519 can be summarized by saying that 65.19% of the total deviation has been explained by the regression or in other words 65.19% of variation of the volume export of 'Cassia Vera' can be explained by the variables in the model simultaneously.

The square correlation coefficient ($r12^2$) is 0.3317, so $R^2 > r12^2$ and there is no danger for multicollinearity.

The table value of t for one tail test with n-k = 12 degrees of freedom at the 5% level significance is 1.78. The t observed value of 4.64 is the critical region and leads to the rejection of H_0. And the observed value of -1.88 is in the critical region and leads to the rejection of H_0. And the observed value of -1.88 is in the critical region and less to the rejection of volume of export and the production but negative relationship with the price of export. In the other words, the production and the price of export 'Cassia Vera' appear to have a significant effect on the volume of export of 'Cassia Vera'. Whereas the F ratio of 11.24 is

larger than the F table of 3.89 at the 5% level of significance. So, we can conclude to reject H_0, which means that the variation of production and price of export of 'Cassia Vera' as individual or as whole appear to have a significant effect on the variation of export volume of 'Cassia Vera'.

The double log function can be written as:

$$Y = 2.0973 + 0.5285\ X1 - 0.4522\ X2$$
$$(0.0943) \quad (0.1715)$$

The numbers in parenthesis below the regression coefficient are the standard errors of the regression coefficient.

The coefficient b1 = 0.5285 indicates that on the average, the amount of the volume of export will increase by 0.5% units for each 1% increase in production while price of export X2, is held constant.

The coefficient b2 = -0.4522, shows that amount of the volume export will decline by 0.4% unit for each 1% increase in price of export while production X1, is held constant.

Whereas the coefficient of determination (R^2) = 0.7521 can be summarized by saying that 75.21% of the total deviation has been explained by the regression line or in other words 75.21% of variation of the volume of export of 'Cassia Vera' can be explained by the variables in the model simultaneously.

The square correlation coefficient ($r12^2$) is 0.5474 so that $r^2 > r12^2$ and there is no danger for multicollinierity.

The table value of t for one tail test with n-k = 12 degrees of freedom at the 5% level of significance is 1.78. The t observed value of 5.60 is in the critical region and the t observed value of –2.64 also and both leads to the rejection of H_0. We conclude that there is a positive relationship between the volume of export and the production but a negative relationship with the price of export. In other words, the production and price of export appear to have a significant effect on the volume of export of 'Cassia Vera'. Meanwhile F ratio is 18.20 and greater than the F table of 3.89 at the level 5% level of significance. So that we can reject H_0. It means that the variation of production and price of export 'Cassia Vera' as individual or as whole appear to have a significant effect on the variation of export volume of 'Cassia Vera'.

Based on the coefficient of determination (R^2), the double log function is better than the multiple regression, due to the highest value of R^2 for the double log function. The coefficient of determination (R^2) is 0.7521, its mean 75% of the volume of export of 'Cassia Vera' is affected by production and price of export and 25% affected by other variables.

The t test indicates that exporting 'Cassia Vera' the exporter will be affected significantly by the changes in production and price of export 'Cassia Vera'. If production increases export volume will increase and a decrease of the price of export will increase the export volume. On the contrary, if production decreases export volume will decrease and increase of the price of export causes a decrease of the export volume.

The own price elasticity is –0.4522, which means that a one percent decrease of the 'Cassia Vera' price will increase the export 0.45%, other factors held constant. From the magnitude of the elasticity can be derived that the export demand for 'Cassia Vera' with respect to the price is inelastic.

The elasticity of export volume with respect to the 'Cassia Vera' production appear to be positive and statistically significant. The magnitude of the elasticity coefficient is 0.52285. This indicates that, a one percent increase in the 'Cassia Vera' production will cause an increase of 0.53% of 'Cassia Vera' export volume, with other factors held constant. From the magnitude of elasticity can be derived that export volume for 'Cassia Vera' with respect to the production is inelastic.

CONCLUSIONS

Based on the explaination that is presented in previous chapters, it can be conclude that:

West Sumatra is a main production area for 'Cassia Vera', where 90% of the potential export of 'Cassia Vera' comes from this province in Indonesia.

Based of analysis, its was found that the export volume of 'Cassia Vera' is affected by production and price. There is a positive relationship between export volume and production, which means the higher production of 'Cassia Vera' the higher the export volume of 'Cassia Vera'. But there is a negative relationship between export volume and price of 'Cassia Vera' which implies that a decreased price will cause an increase of the export volume. The export demand for 'Cassia Vera' with respect to the price and production is inelastic.

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