

THE DETERMINANTS OF NATURAL RUBBER EXPORT IN MALAYSIA

Nurul Idayu Bt. Mohd. Laili¹, Aw Yang Huey^{2*} and Kursimah Bt. Harun³

¹ Self-employed, Parit Raja, 86400 Batu Pahat, Johor, Malaysia.

² Lecturer, Department of Economics, Faculty of Business and Management, Universiti Teknologi MARA Seri Iskandar Campus, Seri Iskandar, 32610 Perak, Malaysia.

³ Lecturer, Department of Economics, Faculty of Business and Management, University Teknologi MARA Seri Iskandar Campus, Seri Iskandar, 32610 Perak, Malaysia.

*Corresponding author, E-mail: awyan804@perak.uitm.edu.my.

Abstract

This study examined the factors that influence natural rubber export in Malaysia. It uses production of natural rubber, domestic consumption of natural rubber, exchange rate and interest rate as independent variables and export quantity of natural rubber as a dependent variable. Secondary data used in this research covered a period of 30 years ranging from 1985 to 2015. The Augmented Dickey-Fuller (ADF) test was used to test for stationary of the data. The ADF test showed that all the variables are stationary in first difference except interest rate which is stationary at level. Ordinary Least Squares (OLS) technique was employed in analyzing the relevant data. The OLS findings revealed that production of natural rubber has a positive significance effect on export of natural rubber while domestic consumption and interest rate have negative significance effect on export of natural rubber. Meanwhile, the impact of exchange rate is statistically insignificant on the export of natural rubber in Malaysia between 1985 and 2015. This study has proposed a few suggestions that can increase Malaysia's natural rubber export.

Keywords: natural rubber export, exchange rate, interest rate

Introduction

Natural rubber is one of the key sectors of the Malaysian economy and has been planted in Malaysia for more than three decades. The Malaysian government set up the Malaysia Rubber Board (MRB) on 1st January 1988 to oversee the development of the rubber industry. The main task of MRB is to assist in the development and modernization of the Malaysian rubber industry. This includes cultivation of the rubber tree, the extraction and processing of latex, the manufacturing and marketing of the rubber products. Rubber did contribute to the country's export earnings especially in 1960 whereby it accounted for up to 55% of Malaysia's export earnings. In 1978, rubber accounted for up to 21% of Malaysia's export earnings. From 2000 to 2013, Malaysia is

still one of the top producers of natural rubber in the world after Thailand and Indonesia. Data from MRB showed that Malaysia's export earnings increased from RM2571 million in 2000 to RM7026 million in 2013. Therefore natural rubber is considered as one of the important agricultural commodities in Malaysia. However, the production of this export crop has suffered a reduction in recent years due to several factors such as land shortage and inconsistent production pattern. Previous rubber land was not only used for oil palm plantation, but the land is used for building residential houses including its infrastructures such as hospitals, schools and also has been converted into industrial estates. As a consequence, the total output of rubber in Malaysia has declined significantly. On the other hand, the demand for natural rubber has increased due to development of the automobile industry and other factors. This research will examine four independent variables namely production of natural rubber, domestic consumption of natural rubber, exchange rate and interest rate to analyze how these variables influence the export of natural rubber in Malaysia.

Literature Review

OLS regression from a study on factors influencing rubber export in Nigeria using time series data from 1970 to 2005 and semi-log data by Abolagba et al. (2010) indicated that there is a positive significant association between production of natural rubber and export of rubber. However there was a significant negative relationship between domestic consumption of rubber and rubber export in Nigeria. As for interest rate, the researchers discovered that there is a significant positive relationship between interest rate and rubber export. Findings from Amoro and Shen (2012) using OLS regression concurred with Abolagba's results. The secondary data from 1970 to 2005 found out that rubber export in Cote D'Ivoire has a significant influence and a positive relationship with domestic rubber production. The result also showed that domestic consumption of rubber and rubber export has a negative relationship. The same goes to exchange rate. It was significant in influencing rubber export but has negative relationship. This implies that the devaluation of domestic currencies led to increase in rubber export. As for interest rate, they also discovered a significant positive relationship between interest rate and quantity export of rubber.

Similarly, Boansi (2014) investigated the determinants of Ghana's rubber export performance by using annual time series data from 1986 to 2011. Boansi also run the stationary, normality and serial correlation tests for the residual series. The results from the OLS regression also revealed that rubber export was influenced significantly and positively related to natural rubber production. Meanwhile, the study revealed that there is a negative relationship between domestic consumption of rubber and quantity

export of rubber, indicating that when the domestic consumption is higher the quantity of export will decrease. On the other hand, Kannan (2013) who examined the relationship between production and export of natural rubber found out that natural rubber production is not significant in determining the export quantity of natural rubber in India. He uses secondary data from 1991 to 2010 and OLS technique in analyzing the relevant data. The same goes to Saeid Mousavi, D.S. Leelavathi (2013) who investigated the causal relationships between quantity of agricultural export and real exchange rate in India by using time series data for the period between 1980 and 2010. They also found that there is no significant relationship between quantity of agricultural export and real exchange rate.

Objectives

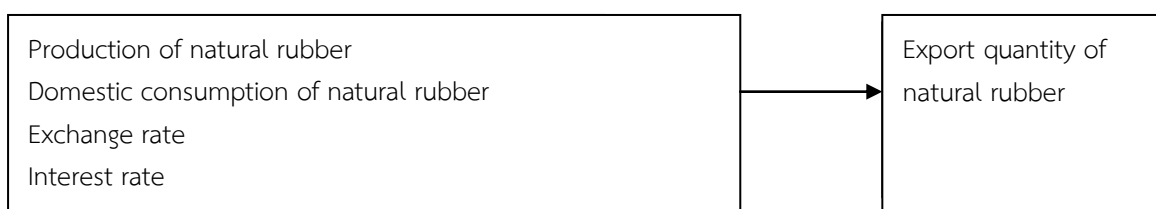
The general objective of this study is to investigate the determinants of natural rubber export in Malaysia from 1985 to 2015. The specific objectives of this study are to determine the relationships between the independent variables (production of natural rubber, domestic consumption of natural rubber, exchange rate and interest rate) and the dependent variable (export quantity of natural rubber in Malaysia).

Conceptual framework

Figure 1 shows the conceptual framework of the study.

Independent variables

Dependent variable



For this study, secondary data on export quantity, production of natural rubber, domestic consumption, exchange rate and interest rate were collected for 30 years from 1985 to 2015. The researchers employed OLS to determine variables affecting the export of natural rubber in Malaysia. To avoid the spurious regression, the ADF test was conducted to test for stationary of the data. The ADF test shows that all the variables are stationary in first difference except interest rate which is stationary at level. Table 1 below shows the results for a unit root test of all variables in this study which comprises of quantity export of natural rubber (X), production of natural rubber (TP), domestic consumption of natural rubber (DC), exchange rate (ER) and the interest rate (IR).

Table 1: Unit Root Test

Variables	Level	1 st . Difference
Log (X)	<-2.665581> (0.2568)	<-6.100918> (0.0001)****
TP	<-1.623037> (0.7587)	<-4.349914> (0.0094)****
DC	<-1.164469> (0.8993)	<-5.209074> (0.0016)****
Log (ER)	<-1.775346> (0.6905)	<-5.674167> (0.0004)****
Log (IR)	<-5.217587> (0.0011)****	-

Note: t-statistics in <> and p-value in (). All the **** denotes the rejection of the null hypothesis of non-stationary at 5% significance level.

Normality test was conducted by referring to the Jarque-Bera value. From this research, the Jarque-Bera value is at 1.563878 which is less than 5.99, thus proving that the residuals are normally distributed. The value of probability is 0.457518 which is more than 0.05 and it is not significant at any level. The diagnostic test was conducted in order to find the stability of the model in this study. The Variance Inflation Factor (VIF) was used for multicollinearity and Lagrange Multiplier (LM) test for autocorrelation. The VIF values for all the independent variables are smaller than 5. This indicates no severe multicollinearity problem exists in the regression. To detect the autocorrelation problem, the Breusch-Godfrey Serial Correlation LM test was conducted and the chi-square probability was examined at 0.15 and it shows a higher probability than 0.05 at lag 2. This means that there is no severe autocorrelation problem.

Results

OLS technique was employed in analyzing the relevant data. Table 2 below shows the multiple regression analysis.

Table 2: Multiple Regression Analysis

Variable	Coefficient	Std. Error	t-statistic	Prob.
TP	2.45E-07	7.94E-08	3.086436	0.0049
DC	-1.14E-06	2.30E-07	-4.965892	0.0000
LOG (ER)	0.171157	0.147968	1.156721	0.2583
LOG (IR)	-0.097798	0.016006	-6.110163	0.0000
C	13.79573	0.189017	72.98658	0.0000

The OLS regression line is:

$$\text{Log } X = 13.79573 + 0.000000245\text{TP} - 0.00000114\text{DC} + \text{Log } 0.171157 \text{ER} - \text{Log } 0.097798\text{IR}$$

The regression result shows value of the R^2 at 0.845694.

It indicates that the model is good enough and the independent variables are able to explain the dependent variable precisely. In other words, 84.56% of the dependent variable in the model can be explained by the independent variables. Meanwhile the remaining 15.44% of the dependent variable in the model can be explained by other variables such as average domestic market price and world population. From the regression line it shows that an increase of production will increase the quantity export of natural rubber. The production has a significant relationship with the export quantity since the probability is 0.0049 which is less than 0.05. This finding is consistent with the study conducted by Abolagba et al. (2010) that stated the production of natural rubber has a positive and significant relationship with export quantity of natural rubber in Nigeria. Amoro and Shen (2012) and David Boansi (2014) in their studies regarding export quantity of natural rubber also showed the same results. The coefficient of the domestic consumption shows a negative relationship with export quantity of natural rubber. The negative value means that an increase of domestic consumption will lead to decrease in quantity export. Domestic consumption is also a significant variable as the p value is less than 0.05 which is 0.0000. This result is in line with Boansi (2014) who stated that domestic consumption is significant and had negative relationship with quantity export of natural rubber in Ghana. However, there is a positive relationship between exchange rate and quantity export but the exchange rate has an insignificant relationship with quantity export of natural rubber. This is due to the probability is 0.2583 which is larger than p-value 0.05. Thus, an increase in exchange rate will not lead to any increase in quantity export of natural rubber. This finding is consistent with the study conducted by Saeid Mousavi and D.S. Leelavathi (2013) in India. The coefficient of interest rate shows a negative relationship with the quantity export of rubber. An increase in interest rate will lead to decrease in quantity export of natural rubber. The interest rate has a significant relationship with the quantity export of natural rubber at 0.05 significance level since the probability is 0.0000 which is less than 0.05. This finding shows that if interest rate increases, the cost of production will increase and the supply will decrease.

Conclusions and Discussion

The results in this study have shown that all three independent variables (TP, DC, IR) have been found to be significant and may have affected the export quantity of natural rubber in Malaysia. The researchers would like to offer several recommendations to increase the production of natural rubber in Malaysia such as conservation and

rehabilitation programs for rubber should be carried out. Felling of rubber trees for other developments should be controlled. R & D in the production of natural rubber should be intensified to produce quality seeds and to improve output efficiency. Accelerating downstream activities should be encouraged such as production of tyres, footwear, landing net and road-building that use rubber. This will enhance value addition to natural rubber. Malaysia also has the ability to produce high-value engineering rubber products used specially in the field of vibration and earthquake engineering. In addition, the glove manufacturing and automotive industries will continue to be major pushing factors behind the growth of rubber industry.

Although supply of natural rubber experience uncertainties due to its price volatility, we are optimistic that with the rise of the global green economy, there would be more opportunities to venture into downstream and investment in higher value added manufactures, through restructurizing R & D and more innovation.

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