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RSST001 - FACTORS AFFECTING RUBBER PRICES IN MALAYSIA

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ABSTRACT

Rubber prices in Malaysia fluctuate significantly due to a range of factors. This research investigates how both external market conditions and environmental variables influence these price changes. In particular, this study examines the impact of rubber exports, crude oil prices, exchange rates, temperature, and rubber planted area. Excel and Minitab were used to analysed secondary data collected from 1990 to 2022 using time series regression. The results indicate that crude oil prices and rubber exports significantly affect rubber prices, while temperature, exchange rates, and rubber planted area exhibit weaker impacts. These findings provide valuable insights into stabilizing rubber prices and enhancing economic resilience within Malaysia's rubber industry.

Keywords – Rubber prices, crude oil, exchange rates, rubber exports, rubber planted area, temperature

INTRODUCTION

Natural rubber has become one of Malaysia's flagship commodities since its first tree plantation in the early 1900s, approximately after two decades many smallholder-owned plantations were established. Natural rubber or called as *Hevea Brasiliensis* scientifically has played a significant role in our economy across various sectors. Due to the COVID-19 pandemic, its role in the economy has become more prominent, especially in high-demand items such as gloves. The Department of Statistics Malaysia (2021) reported that, in October 2021, Malaysia earned around RM63.2 billion from exporting natural rubber and rubber products. This marks a 70.7% rise compared to 2020.

Issues with volatility and instability of rubber prices have been well-known problems that arise in the rubber market globally affecting farmers, manufacturers, and policymakers. Recently, Malaysian government added an increment for the Rubber Production Incentive (IPG) activation pricing level to RM3 per kilogram which was announced in Budget 2024 (Malaysia Ministry of Finance, 2024). According to Pareed *et al.* (2017), the income of the rubber tappers was influenced by the rubber price volatility in the long run, which caused difficulties in planning their economic activities. It is also hard to achieve a suitable price every year. In order to stabilize the market and ensure a good economy, it is essential to understand the factors influencing rubber prices. Therefore, this research will examine the determinant of rubber prices in Malaysia which can be categorised into external and internal influences.

This research is pivotal as it aims to investigate various factors affecting the rubber price in Malaysia, a country where natural rubber acts as the main commodity in the economy. It is also able to provide an understanding of rubber price volatility in the rubber market by identifying factors such as export, exchange rate, crude oil price, rubber planted area and temperature. For example, by understanding the relationship between crude oil price and rubber price can help both the producers and manufacturers of the rubber market to forecast the company's future loss and profit. Thus, the commodity price volatility and agriculture economic are able to enhance broader academic and practical discussions. This study fills a gap in existing literature specifically regarding the effects of external factors and environmental factors and understand how these factors interplay with the rubber price.

OBJECTIVE

The objectives of this research are to investigate the determinants that significantly affect the rubber prices.

METHODOLOGY

In this study, the secondary data collected on an annual basis from 1990 to 2022 were utilized. As previously stated, rubber price will be used as the dependent variable whereas rubber export, exchange rate, crude oil, rubber planted area and temperature acted as the independent variables.

Augmented Dickey-Fuller test

First thing that need to be considered when constructing a time series regression, is to check the stationarity of the data. Hence, the data is said to be stationary if the mean, variance and autocorrelation structure remains constant over period of time. Augmented Dickey-Fuller (ADF) test is one of the most commonly used approach used to check the model stationarity.

Multicollinearity test

Multicollinearity is a problem that occurs when two or more independent variables are highly correlated with each other. Multicollinearity existence can lead to unreliable and unstable coefficient estimates. Variance Inflation Factor (VIF) can be used to detect the presence of multicollinearity. VIF value range from 1 to 5 indicates low correlation while VIF value between 5 and 10 indicates moderate correlation. If the VIF value greater than 10, the independent variables are highly correlated.

Multiple linear regression

Time series regression was used in this research to accomplish the primary objective which is to identify whether rubber price volatility was more tolerant towards global factors or environmental factors. Exchange rate and crude oil price are the global factor whilst rubber planted area and temperature are the environmental factor. The regression model can be constructed as below:

$$RP_t = \beta_0 + \beta_1 EXP + \beta_2 EXR + \beta_3 CP + \beta_4 ACRE + \beta_5 TEMPT + \varepsilon_t$$

where RP , EXP , EXR , CP , $ACRE$ and $TEMP$ representing rubber price, rubber export worldwide (Billion Dollars), exchange rate (MYR/Dollar), crude oil price, rubber planted area, and mean annual temperature. The estimated coefficients are denoted as β_i , where $i = 0, 1, 2, \dots, 5$ and ε_t is the error term.

RESULTS AND DISCUSSION

Augmented Dickey-Fuller test

The results demonstrate that all variables achieve stationarity after first differencing, as their test statistics are lower than the critical value at the 5% significance level, and the corresponding p-values are below 0.05. Hence, the rejection of the null hypothesis across all variables ensures that the data meets the requirements for time series analysis.

Multicollinearity test

The VIF value for each independent variables and variables such as rubber planted area (VIF = 6.78) and average annual Brent crude oil price (VIF = 5.81) have relatively higher VIF values, suggesting moderate multicollinearity, which may slightly inflate the standard errors of these coefficients. Currency exchange rate (VIF = 3.01) and annual mean temperature (VIF = 2.34), exhibit lower VIF values, indicating weaker multicollinearity. These results suggest that while multicollinearity exists, it is manageable and should not critically affect the interpretation of individual variable contributions.

Time series regression

$$RP_t = -12.5 + 24.62 EXP - 32.3EXR + 3.43CP - 369ACRE + 33TEMP + \varepsilon_t$$

Table 1: Estimated coefficient

Variables	Coefficient	t-stat	p-value
Constant	-12.5	-0.44	0.665
Rubber export	24.62	2.56	0.017
Exchange Rate (MYR/USD)	-32.3	-0.37	0.716
Crude oil price	3.43	2.04	0.052
Rubber planted area	-369	-0.65	0.521
Temperature	33	0.26	0.793

Based on the result generated from Minitab, it's shown that only crude oil price and rubber export were significant where the respective p-values were less than 10% significance level, (0.017) and (0.052). It could be interpreted that, for every 1 USD increase in the average annual Brent crude oil price, SMR20 prices increase by approximately 3.43 sen/kg, assuming all other factors remain constant. As for rubber export, for each 1 billion USD increase in rubber export value, SMR20 prices rise by approximately 24.62 sen/kg, holding other factors constant.

As for currency exchange rate, regression analysis indicates that the currency exchange rate (MYR/USD) has a coefficient of -32.3. It could be interpreted as for every 1 USD increase in the exchange rate (MYR/USD), SMR20 prices decrease by approximately 32.3 sen/kg, assuming all other factors remain constant. However, the p-value of 0.716 suggests that this relationship is statistically insignificant.

CONCLUSION

In conclusion, this study provides a significant insight into the factors influencing rubber prices in Malaysia, a key commodity in the nation's economy. The findings indicate that external factors, particularly currency exchange rate, crude oil prices and rubber exports, play pivotal roles in determining rubber prices, while environmental variables such as temperature and rubber planted area demonstrate weaker, less consistent impacts. This research contributes to broader academic and policy discussions, providing a foundation for future studies to refine and expand on the complex interrelations affecting agricultural commodity prices.