

UDC 332

## THE EFFECT OF PRODUCTION, INTERNATIONAL RICE PRICES, AND FOREIGN EXCHANGE RESERVES ON THE VOLUME OF INDONESIAN RICE IMPORTS IN 2008-2020

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### ABSTRACT

Rice is the main commodity as one of the staple foods in Indonesia, because most of the Indonesian population consumes rice. Domestic rice production is not able to meet the food needs of all Indonesian people, so the government imports rice and for the reason of maintaining rice reserves in Indonesia. This study aims to analyze the effect of production, international rice prices and foreign exchange reserves have a simultaneous and partial effect on the volume of Indonesian rice imports. The data analysis technique used is multiple linear regression. The results of this study found that the variables of production, international rice prices, and foreign exchange reserves had no simultaneous significant effect on the volume of Indonesian rice imports. Meanwhile, foreign exchange reserves partially have a positive and significant effect on the volume of Indonesian rice imports, while international rice production and prices partially have a negative and significant effect on the Indonesian rice import volume.

### KEY WORDS

Rice imports, production, prices, and foreign exchange reserves.

The agricultural sector in Indonesia has an important role to meet the food needs of the community. Strategically, the agricultural sector can create national food security. Food demand from the community can be measured by the amount of rice produced (Permatasari, 2020). Rice is the main commodity as one of the staple foods in Indonesia, because most of the Indonesian population consumes rice. Food has become a primary human need that must be met before fulfilling other life needs such as clothing, housing and education. This proves that rice is an important commodity for the government to pay attention to in terms of supply availability (Hikmah et al, 2020). According to FAO (2015), Indonesia is the third largest rice producing country in the world with 75.6 million tons. Indonesia's rice production is only behind China at 741 million tons and India at 153 million tons (Kurnia & Iskandar, 2020). However, domestic rice production is not able to meet people's food needs, so the government implements a policy to import rice.

The government carries out an import policy aimed at filling domestic consumption needs when domestic production is unable to cover market demand. In the national economy, rice is the largest contributor in the food crop sub-sector. The demand for rice can be equated with the demand for corn, but the amount is slightly higher (Imamudin, 2008). According to Edward (2013), the population of Indonesia who consumes 139.5 kg of rice per year is greater than the world's consumption of 60 kg of rice per year. The large demand for rice consumption in Indonesia must be balanced with domestic rice production so that it can meet consumption needs. The government seeks to achieve self-sufficiency in rice production and domestic rice price stability can reduce international rice price fluctuations (Wiseman et al, 2021).

Indonesian rice imports come from various countries such as Vietnam, Thailand, the United States, Pakistan, India, China, Taiwan, Singapore, Myanmar and other countries. However, only a few countries are exporters of Indonesian rice, such as Vietnam, Thailand, the United States, and Pakistan. Thailand and Vietnam are not countries with the most rice production in the world but both countries are able to export large amounts of rice because rice is not the main food in both countries (Widarjono, 2018). The combination of an increase

in rice demand and a decrease in rice production will result in an imbalance. The widening gap between demand and supply of Indonesian rice is mainly due to slowing growth in rice production. This is very relevant considering the decline in rice production in 2018-2019. Rice imports are still very limited, and almost does not allow Indonesia to meet domestic needs through foreign production. (Octania, 2021)

Price is an important factor in considering a product or service to be purchased, the cheaper the price and followed by good quality, the consumers will tend to choose the product for consumption. Domestic rice prices can affect the amount of imports to maintain a balance in local rice so that rice prices will not soar. The rice stock in Bulog comes from local procurement, inter-regional and foreign imports. When the price of rice falls, the National Logistics Agency will buy rice and store it for distribution when the price rises through traders appointed by the National Logistics Agency or market operations (Sembiring, et al. 2018).

In addition, another factor affecting rice imports is Indonesia's foreign exchange reserves. According to Sultan (2011), international trade is highly dependent on a country's foreign exchange reserves as a source of costs. Foreign exchange reserves are a determinant for developing countries as import demand. Foreign exchange reserves for a certain period can increase or decrease rice imports in the next period. Seeing the large volume of Indonesian rice imports and also Indonesia's status as an agricultural country so that it can produce rice which is a staple food requirement for the Indonesian people, it is important to conduct research related to factors that are thought to affect the volume of Indonesian rice imports.

## **LITERATURE REVIEW**

### **International Trade Theory**

International trade is trade carried out by residents of a country with residents of other countries on the basis of a mutual agreement (Setiawan and Lestari, 2011). There are several theories in international trade such as: first, the theory of mercantilism which states that a country is involved in playing a positive role in the economy and directly intervenes in the course of an economy (Hafizah, 2005). Second, absolute advantage by Adam Smith which states that countries will benefit from international trade because they specialize in production and exporting goods that have absolute advantages and importing goods that do not have absolute advantages (Marbun. 2015). Third, the theory of comparative advantage by David Ricardo which states that countries can export commodities that have a comparative advantage in labor costs and import commodities that have a comparative advantage (Learner & Levinshon, 1994). Fourth, modern international trade theory by Hecksher Ohlin which states that the cause of differences in productivity is due to the number or proportion of production factors owned (endowment factors) by each country so that this theory is said to be The Proportional Factor Theory.

This research is in line with Hecksher Ohlin's theory because countries that have relatively large or cheap production factors in producing them will specialize in production and then export their goods. On the other hand, each country will import certain goods if the country has factors of production that are relatively scarce or expensive to produce them. In this case, Indonesia exports rice from rice-producing countries but does not consume rice as the main food ingredient.

### **Import Concept**

Imports can be interpreted as buying goods from abroad in accordance with government regulations which are paid for using foreign currencies. In the implementation of imports, there are various intermediaries, seller representatives, agents, sellers and distributors who are tasked with delivering merchandise to the domestic market (Purnawati & Fatmawati, 2013). In the import policy, there are import tariff policies and subsidies. Import tariffs are taxes or excise imposed on a commodity traded across territorial borders. Meanwhile, subsidies are government policies to provide protection or assistance to domestic industries in the form of tax breaks, tax refunds, credit facilities and price subsidies.

### **Production Concept**

According to Sugiarto (2007) production is an activity that converts inputs into outputs. There are 3 aspects of the production process, namely the quantity of goods or services produced, the form of goods or services created, and the temporal and spatial distribution of the goods or services produced. If a country's production is low, the country's imports will also be higher. Developing countries tend to import to meet their needs because the expertise of human resources is still low, causing the inability to produce goods to meet the needs of life. According to Yulianti (2012), a country imports due to the failure to fulfill domestic needs, both in terms of quality and quantity. The number of imports that continue to increase does not mean that it can meet the domestic demand for rice. This is because the population of Indonesia increases every year so that the increase in the number of imports of rice is intended to balance the increase in the number of people who consume rice.

### **Price Concept**

According to Buchari Alma (2013) price is the value of an item expressed in money. When domestic prices rise, the demand for imports will increase due to the substitution effect. If the price of domestic products increases, consumers will replace domestic products with imported products that are cheaper. Meanwhile, if the price of imported products increases, the demand for imports will decrease. When the price of imported products rises, the demand for imported products will decrease due to the substitution effect and income effect (Yuniarti, 2010).

### **Foreign Exchange Reserve Concept**

Foreign exchange reserves are defined as a number of foreign currencies that are reserved by the central bank or government of a country for development financing purposes, financing to foreign parties, and used for currency exchange rate stabilization (Benny, 2013). International trade activities are highly dependent on the condition of foreign exchange reserves, meaning that foreign exchange reserves are a source of financing used for national development. A country's foreign exchange reserves are used in various ways, one of which is as a means of payment for imports. Other uses of foreign exchange reserves are to pay off government foreign debt, maintain monetary financial stability, and become state savings (Mustafa et al, 2021).

## **METHODS OF RESEARCH**

### **Relationship Between Variables**

In some developing countries, such as Indonesia, agricultural output is smaller than the population, so the ability to produce goods is much lower than people's needs. Therefore, a trade is needed to fill this need. In the research of Yoga & Saskara (2013) concluded that the amount of production has a negative and significant effect on the volume of imports. This is in accordance with the results of research conducted by Edward (2013), that rice production in the period 2001-2010 did not affect the volume of rice imports in Indonesia.

The price of goods is determined by demand and supply. The law of demand states that if the price of a good increases, (and other things are held constant), buyers tend to buy less of that good, and vice versa. Yoga & Saskara's (2013) research also state that the total price partially has a negative and significant effect on import volume.

Foreign exchange reserves can be used to pay government obligations or conduct international trade, foreign exchange reserves are expressed in billions of USD. An increase in foreign exchange reserves will increase imports for goods that cannot be fulfilled by a country. The effect of fluctuations in foreign exchange reserves on rice imports has a positive relationship (Paipan & Abrar, 2020). The results of research conducted by Zaeroni & Rustariyuni (2016) state that foreign exchange reserves have a positive and significant effect on Indonesian rice imports. Imports of a country can be carried out if foreign exchange reserves are sufficient for subsequent imports for a period of at least three months, foreign exchange reserves are used as the basis for financing rice imports.

Hypothesis:

- H1: Production, international rice prices, and foreign exchange reserves simultaneously have a significant effect on the volume of Indonesian rice imports in 2008-2020;
- H2: International rice production and prices have a negative and significant impact on the volume of Indonesian rice imports in 2008-2020;
- H3: Foreign exchange reserves have a positive and significant impact on the volume of Indonesian rice imports in 2008-2020

This study was conducted to determine the effect of production, international rice prices and foreign exchange reserves on the volume of Indonesian rice imports in 2008-2020. Import volume (Y) is the amount of Indonesian rice imports measured in tons. Production (X1) is Indonesia's rice production measured in tons in 2008-2020. The international rice price (X2) is the value of the international rice price measured in US Dollars/ton for 2008-2020. Foreign exchange reserves (X3) is the level of Indonesia's foreign exchange reserves measured in US Dollars in 2008-2020. The research data uses secondary data obtained through the Central Statistics Agency, Bank Indonesia and other sources related to related variables. Because it uses time series data in quarterly form from the period 2008-2020, the number of observations in this study is 39 observations. The research data were then analyzed using multiple linear regression analysis techniques. The stages in the test are doing the classical assumption test as a regression test requirement, simultaneous test (f test) and the coefficient of determination test, and partial test. The multiple linear regression equation used is:

$$Y = \alpha + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \mu$$

Where: Y = Rice Import Volume; X1 = Production; X2 = Price; X3 = Foreign Exchange Reserves; A = Constant;  $\mu$  = Error.

## RESULTS AND DISCUSSION

The trend of rice imports in Indonesia fluctuates every year. One of them is also influenced by the increase in the number of Indonesian population each year causing a higher increase in rice imports from outside the country (Ariska, 2021). The trend in rice imports is quite high due to achieving sufficient rice reserves to cover production shortages caused by crop failures, long dry seasons, and natural disasters. The aspect that is thought to cause Indonesia to still import rice from abroad is the decline in rice production so that domestic rice prices also increase. The increase in the price of local rice will increase the demand for imported rice. When the price of domestic goods increases, consumers will replace them with similar imported products at cheaper and affordable prices.

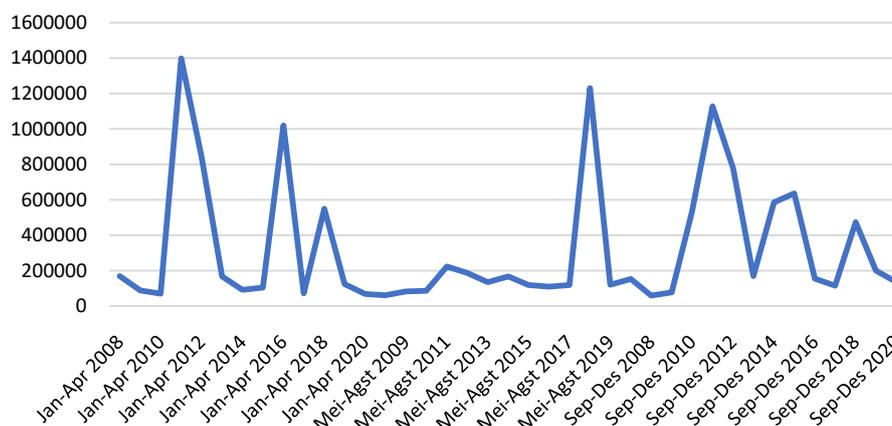


Figure 1 – Indonesian Rice Imports In 2008-2020 (Source: Central Bureau of Statistics, 2021)



Figure 2 – Indonesian Rice Production In 2008-2020 Source: Central Bureau of Statistics, 2021

The data shows that the dominant rice production decreased in the third quarter. According to the Director of Statistics for Food Crops, Horticulture and Plantations, BPS, based on the pattern and annual harvest season nationally, rice production tends to be low every year in October-December. The pattern of rice production is always the same every year and will start to decline from September to December because at the beginning of the rainy season many farmers are just starting to cultivate the land to plant rice. The rice harvest season in Indonesia is around March-May, while the famine season is around January-February. In addition, there are lands with crop failure or different rice harvest ages depending on the variety and region which causes it to be harvested forward or backward from the age of rice in general (Sariagri, 2021).

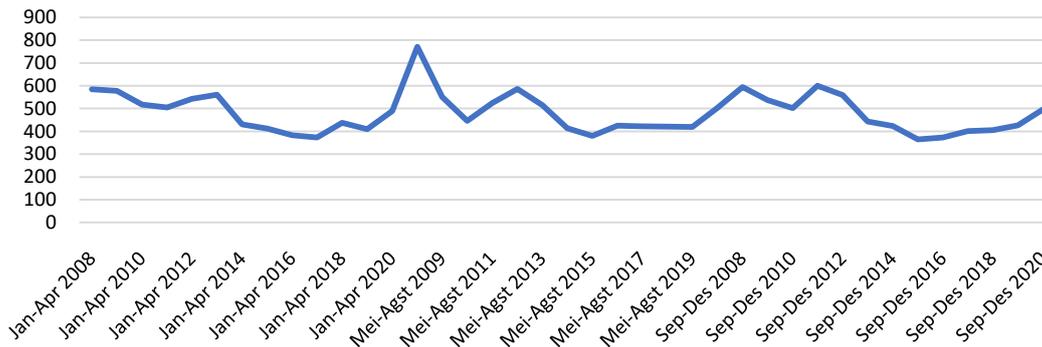


Figure 3 – International Rice Prices 2008-2020 Source: Central Bureau of Statistics, 2021

The soaring price of rice in May 2008 was described by the World Bank as a world food crisis caused by changes in export restriction policies by rice-exporting countries along with the efforts of rice-importing countries to ensure the availability of rice at any price. This leads to hoarding and price speculation. The dwindling international rice market also makes prices very vulnerable to unwise trade policies. According to Rachman and Dermoredjo (2004) the price of rice in the international market tends to be unstable due to the small surplus that is traded and is concentrated in several countries. The movement of international rice prices is due to intense competition among producing countries, which drives prices to a sloping equilibrium level. In addition, increasing production and productivity in producing countries also contributes to the volume of rice traded.

Indonesia's foreign exchange reserves tend to fluctuate every year. The global economic crisis that occurred in 2008 which began with the United States economic crisis spread to all countries including Indonesia. The decline in foreign exchange reserves in 2013 can be seen from two sides, namely from the external side where there is a slowdown in the euro area economy which will reduce demand and commodity prices. From an internal perspective, the government's reluctance to suppress fuel subsidies has hampered

infrastructure development so that logistics costs have swelled (Uli, 2016). Along with the improvement in the world economy, Indonesia's economy will also improve in 2016-2020 as indicated by an increase in Indonesia's foreign exchange reserves, which means there is a trade surplus.

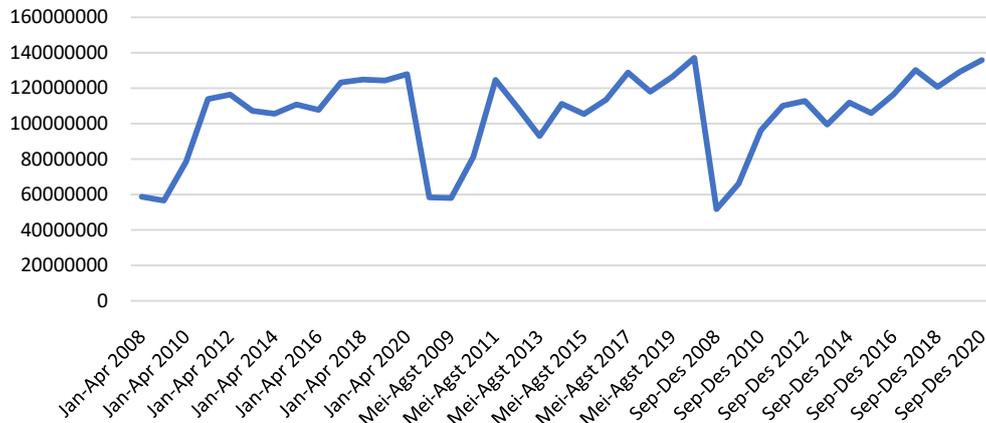


Figure 4 – Foreign Exchange Reserves For 2008-2020 Source: Central Bureau of Statistics, 2021

**Classic Assumption Test**

The normality test is carried out to test whether a regression model has a normal or abnormal distribution (Ghozali, 2016). The test results obtained that the value of Asymp. Sig. of 0.083 is greater than 0.05, it can be concluded that the data is normally distributed.

Multicollinearity testing aims to determine whether the regression model found a correlation between independent variables or independent variables. Based on the test results, it is known that the tolerance test value for each variable is greater than 10 percent or 0.10 and the VIF value is less than 10. This indicates that there is no multicollinearity in this study.

The autocorrelation test used in this study is the Durbin-Watson Test (DW-Test). The test results show that the DW value is 1.464. Based on the test criteria, the results obtained that there is no autocorrelation in the research model because the DW value is between -2 and +2 or  $-2 < 1.856 < +2$

The heteroscedasticity test aims to test whether in a regression model there is discomfort variance from the residuals in one observation to another. The test was carried out using the Spearman Rank test. The test results obtained a significance value or sig. (2-tailed) of each independent variable is greater than 0.05 so it can be said that there is no heteroscedasticity problem.

Table 1 – Results of Multiple Linear Regression Analysis

Model	Unstandardized Coefficients		Standardized	t	Sig.
	B	Std. Error	Coefficients Beta		
(Constant)	-22.437	19.379		-1.158	0.255
Production	-0.019	0.333	-0.009	-0.056	0.955
Price	0.870	1.071	0.157	0.812	0.422
Foreign Exchange Reserves	1.604	0.689	0.460	2.330	0.026
R Square	0,153				
Adjusted R Square	0,081				
F count	2,111				
Significance of F	0,117				

Source: Research Data, 2021.

Based on the results of multiple linear regression analysis, it can be explained that the production variable (X1) has a coefficient value of -0.019 with a significance value of 0.955, which means that production partially has no significant effect on the volume of Indonesian

rice imports in 2008-2020. This indicates that if production increases or decreases, it cannot affect the volume of Indonesian rice imports with the assumption that other variables are constant. Price variable (X2) has a coefficient value of 0.870 with a significance value of 0.422, which means that the price does not partially have a significant effect on the volume of Indonesian rice imports in 2008-2020. This indicates that if the price increases or decreases, it cannot affect the volume of Indonesian rice imports with the assumption that other variables are constant. The Foreign Exchange Reserves variable (X3) has a coefficient value of 1.604 with a significance value of 0.026 which means that foreign exchange reserves partially have a positive and significant effect on the volume of Indonesian rice imports in 2008-2020. This indicates that if foreign exchange reserves increase, the volume of Indonesian rice imports will also increase assuming other variables are constant.

The hypothesis states that production, international rice prices, and foreign exchange reserves simultaneously have a significant effect on the volume of Indonesian rice imports in 2008-2020. The results of statistical tests show that rice production, international rice prices, and foreign exchange reserves have a significant value of 0.117 which is greater than 0.05 so that the hypothesis is rejected. This is evidenced from the results of the coefficient of determination R Square which is only 0.153 or 15.3% which indicates the low ability of the independent variables in influencing the dependent variable. While the remaining 84.7% is influenced by other variables that are not included in the research model. In line with research conducted by Rukmana (2020), and Barus (2015) that simultaneously the independent variables have no effect on the dependent variable.

#### **The Effect of Production (X1) on Indonesian Rice Import Volume (Y)**

The hypothesis states that production has a negative and significant effect on the volume of Indonesian rice imports in 2008-2020. The results of statistical tests show that production partially has no significant effect on the volume of Indonesian rice imports in 2008-2020, so the hypothesis can be rejected. However, this result is supported by research by Armaini (2016) which concludes that the variable rice production has a negative but not significant effect on rice imports in Indonesia, meaning that the government imports rice every year not because of the lack of food (rice) in the country. This is indicated by the level of domestic rice production which is relatively increasing every year. The government's reason for importing rice is for food reserves. From the achievement of Indonesia's rice production, it is not impossible for Indonesia to become a rice exporter country. However, the high population growth followed by the large consumption of rice causes the demand for rice to increase so that it still cannot be realized because the increase in the amount of rice production is intended to offset the increase in the number of people who consume rice (Setyawati, 2019).

Zaeroni (2016) in his research stated that in the period 2000-2014 rice production had no effect, this was because even though rice production increased, if the existing domestic rice reserves were not sufficient for the minimum rice reserve requirement, the government carried out rice import activities. A similar study conducted by Setyawati (2019) found that rice production during the period 1999-2017 had no significant effect on rice imports in Indonesia. Imports may still be carried out with the aim of meeting people's needs for rice and in anticipating problems of food shortages, price fluctuations, emergencies due to disasters and food insecurity as well as fulfilling the ASEAN Emergency Rice Reserve agreement (Bulog, 2017). Food reserves, especially rice, are very important for Indonesia's food security, therefore the government should pay attention to the state of agricultural facilities and infrastructure for the smooth running of Indonesia's rice needs (Nizar, 2019).

#### **The Effect of Price (X2) on Indonesian Rice Import Volume (Y)**

The hypothesis states that prices have a negative and significant effect on the volume of Indonesian rice imports in 2008-2020. The results of statistical tests show that prices partially have no significant effect on the volume of Indonesian rice imports in 2008-2020, so the hypothesis is rejected. This result is inconsistent with the law of demand which states that if the price of a good increases, (and other things are held constant), buyers tend to buy

less of that good. This result is contrary to the opinion of Tambunan, (2003: 204) which states that another factor that can cause an increase in rice imports is if there is an increase in rice prices through the effect of world prices which causes local rice demand to decline, coupled with the dry season that occurs in several regions. This is because rice is a commodity that cannot be replaced for the basic needs of people in Indonesia (Fadil, 2018).

This is in line with Puspitasari's research (2019) that the rice price variable partially has no effect on rice imports in Indonesia in 2008-2017. Whatever the price level will not affect the amount of rice imports because rice is a staple commodity and the community is trying to meet the need for rice, when the price rice price changes up or down does not affect the amount of rice imports in Indonesia. Another opinion from the Regulation of the Minister of Trade of the Republic of Indonesia No.19/MDAG/PER/3/2014 explains that rice imports are for certain purposes such as health, consumption in particular or for certain segments, as well as to fulfill the need for raw materials which cannot be fully filled from within the country. Therefore, even though international rice prices have increased, the government will continue to import rice (Prinadi, 2016).

### **The Effect of Foreign Exchange Reserves (X<sub>2</sub>) on Indonesian Rice Import Volume (Y)**

The hypothesis states that foreign exchange reserves have a positive and significant impact on the volume of Indonesian rice imports in 2008-2020. The results of statistical tests show that foreign exchange reserves partially have a positive and significant effect on the volume of Indonesian rice imports in 2008-2020, so the hypothesis can be accepted. In line with Zaeroni's research (2016) that the variable of foreign exchange reserves partially has a positive and significant effect on rice imports in Indonesia in 2000-2014. According to Kariyasa (2008), foreign exchange reserves are stocks of foreign currency owned by the state which can be used at any time for international transactions or payments. Imports of a country are usually declared safe if the foreign exchange reserves are sufficient for imports for a period of at least three months, the foreign exchange reserves will be used as the basis for financing the import of rice.

Similar results were found by Naufal (2019) that foreign exchange reserves had a positive and significant effect on rice imports in Indonesia in 2007-2017. This is because the increasing foreign exchange reserves will cause the government to be able to import rice freely as needed because the government has the ability to import rice from abroad. The Indonesian government pays for transactions for imports of goods from abroad using foreign exchange reserves. One of the imports that the government continues to carry out is rice imports. Apart from domestic production that is unable to meet market demand, rice imports are also carried out because Indonesia's foreign exchange reserves are able to finance the rice import activities. According to Tambunan (in Aulia, 2016), foreign exchange reserves are a number of foreign exchange funds used by the central bank for financing purposes and the country's foreign obligations, which include import payments and other payments to foreign parties.

## **IMPLICATION OF RESEARCH RESULTS**

Theoretically, this research can contribute to knowledge and support theories and obtain new research results. International trade theory states that each country will import certain goods if that country has factors of production that are relatively scarce or expensive to produce them. In this case, the import of rice, which is a source of food for the Indonesian people. The results of the analysis found that production and prices did not have a significant effect, while foreign exchange reserves had a significant effect on the volume of Indonesian rice imports. This is because rice imports are carried out depending on emergency rice reserves, so even if production and prices increase, if rice reserves are not sufficient, the government will still import rice.

Practically this research implies that production has no effect on Indonesia's rice imports, this can be caused by rice reserves from domestic production have not yet reached emergency rice reserves. The government must pay attention to the production factors that

need to be improved in its implementation. The government should procure facilities and infrastructure to support the quantity and quality of rice production, such as infrastructure, procurement of irrigation, strengthening agricultural institutions, and facilitating access to capital for farmers. Prices have no effect on Indonesian rice imports, which is because the increase in rice prices is influenced by supply and demand, where the increasing demand for rice consumption is not followed by rice supply, it has an impact on the scarcity of rice commodities, this is what causes rice prices to rise. Therefore, to reduce the price of rice, the government's policy is to increase the supply of rice by importing rice.

## **CONCLUSION**

Based on the discussion in the previous chapter, the conclusions of this study are as follows: Production, international rice prices, and foreign exchange reserves have no simultaneous significant effect on the volume of Indonesian rice imports in 2008-2020. This is supported by the low value of  $r$  square of 15.3%, while the remaining 84.7% is influenced by other variables not included in the research model. The production variable partially has no significant effect on the volume of Indonesian rice imports in 2008-2020. This indicates that if production increases or decreases, it cannot affect the volume of Indonesian rice imports, assuming other variables are constant. The price variable partially has no significant effect on the volume of Indonesian rice imports in 2008-2020. This indicates that if the price increases or decreases, it cannot affect the volume of Indonesian rice imports, assuming other variables are constant. The foreign exchange reserve variable partially has a positive and significant effect on the volume of Indonesian rice imports in 2008-2020. This indicates that if foreign exchange reserves increase, the volume of Indonesian rice imports will also increase, assuming other variables are constant.

The government is expected to pay attention to production factors that need to be improved in their implementation, and should procure facilities and infrastructure such as infrastructure, procurement of irrigation, strengthen agricultural institutions, facilitate access to capital for farmers and labor factors that need to be stimulated to be more productive so that domestic production increase. In addition, it can provide special incentives for farmers and entrepreneurs in the field of agriculture to accelerate business development in agriculture such as; supervision of the procurement of fertilizers and seeds, procurement of information on technology, efforts to overcome and prevent natural disasters for agriculture. In relation to international rice prices, coordination of rice policies needs to be developed to facilitate the emergence of an international rice market that is healthier, and less constrained. The development of more effective policy instruments in the public offering of rice purchases and price stabilization will also help to eliminate the problem. In addition, the development of measures to increase agricultural productivity and reduce rice import tariffs will also help make the domestic rice market function more efficiently. Based on the test results, it is known that the effect of production, price, and foreign exchange reserves variables is only 15.3%, so it is recommended for further researchers to add other variables that can affect the volume of Indonesian rice imports such as exchange rates, GDP, and levels of rice consumption.

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