Analysis of Factors Affecting the Volume Of Sugar Imports in Indonesia in 2017-2019

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ABSTRACT: The objective of this study is to analyze the result of data of sugar production and gross domestic product (GDP) to volume of import of sugar in Indonesia. This study used quantitative research method. The data used in this study is secondary data. Sample was determined using random sampling method. The data processing technique used multiple linear regression method with the use of eviews version 12 application. Result of this study identified that production amount not affecting significantly to volume of import of sugar in Indonesia, it was shown with probability value $0.010 > 0.05$, Gross Domestic Product (GDP) has significant influence to volume of import of sugar in Indonesia identified with probability value $0.00 < 0.005$.

Keywords: Production, Gross Domestic Product (GDP), Volume of Import of Sugar in Indonesia

INTRODUCTION

Sugar is one of the food commodities that has many uses, namely as a sweetener whether used for food or beverages (Kemenprin Indonesia). Indonesia is a country that has a very suitable climate for the cultivation of sugarcane plants and one of the highest exporting and importing countries of sugar in the world.

Based on data from the Central Statistics Agency, sugar imports from 2017-2019 tend to fluctuate. In 2019 Indonesia experienced a decline due to a decrease in acreage. In 2018 sugar production amounted to 2.17 million tons, a decrease of 19.25 thousand tons (0.88 percent) compared to 2017. Conversely, in 2019 sugar production increased to 2.23 million tons or an increase of 55.33 thousand tons (2.55 percent) compared to 2018 (Statitik, 2019).

Indonesia was originally the number two sugar exporting country in the world but with the development of the times, the condition changed to become the largest sugar importing country in the world. Sugar consists of 3 types, namely white crystal sugar, refined crystal sugar, raw crystal sugar. White crystal sugar and refined crystal sugar are types of sugar produced by Indonesia. Indonesia pursues sugar import policies such as white crystal sugar, refined crystal sugar and raw crystal sugar (Indonesian Sugar Council, 1999).

The national sugar industry is a labor-intensive industry, especially with the increasing flow of trade liberalization. One of the efforts to deal with the threat of imported sugar is to examine the domestic sugar industry, especially sugar factories that use the carbonatation process. Recently, a large number of sugar mills (PG) in Java have faced difficulties in providing sugarcane raw materials, as seen from the decline in Milling Days and the increase in Stop Milling Hours caused by raw material shortages. The condition of old sugar mills and the difficulty of cutting and transporting have affected the yield and quality of sugarcane, so that sugar production costs are more expensive (Sawit, 2004). Sugar is one of the agricultural commodities that Indonesia has designated as a special commodity in the World Trade Organization (WTO) negotiating forum, along with rice, corn and soybeans. With key considerations to strengthen food security and quality of life in rural areas, Indonesia seeks to increase domestic production, including planning a sugar self-sufficiency target, which until now has not been achieved. Such conditions, in addition to being caused by not optimal factors that support domestic sugar production (on farm and of farm), national sugar consumption is also still high (Arifin, 2008).

The development of national consumption of white sugar increases every year, the increase in national white sugar consumption is not followed by high national white sugar production capabilities either. Based on data from the Indonesian Sugar Association (AGI) and the Indonesian Sugar Experts Association published by the Central Statistics Agency (BPS).
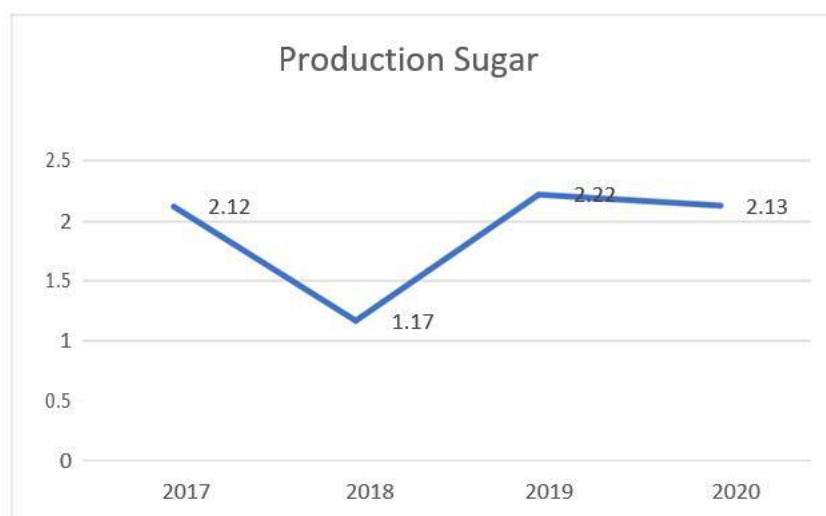

Figure 1
Sugar Production Data 2017 – 2020
Source: BPS

Based on the picture above, since 2017 granulated sugar production in Indonesia has experienced a fluctuating trend, recorded in 2017 sugar production of 2.12 million tons that amount fell 4.48% to 1.17 million tons in 2018. A year later, in 2019, granulated sugar production increased 89% to 2.22 million tons, then granulated sugar production fell again in 2020. The decline that occurred in 2020 has not been able to meet the needs of domestic consumption. It was recorded that the national direct consumption of sugar for 2020 was 2.66 million tons. The decline in granulated sugar production occurred again in 2020 so that it could not meet the needs of domestic sugar

consumption. It was noted that the direct consumption of national sugar for 2020 was 2.66 million tons, meaning that Indonesia's granulated sugar balance experienced a deficit of around 500 thousand tons (Statitik, 2019). High consumption of granulated sugar is not accompanied by increased production, this causes Indonesia to have to import sugar.
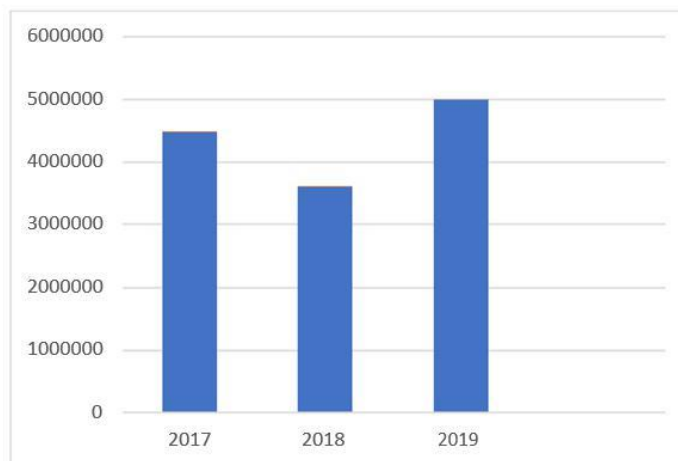

Figure 2
Sugar Import Data for 2017-2019
Source: BPS 2019

Based on the picture above, it can be seen that the number of sugar imports increased in 2019 by 38.6%. There has been an increase in sugar imports due to increasing public demand for basic necessities that cannot be fully fulfilled bydomestic production. Granulated sugar is the main commodity for the people of Indonesia and even for people in the world. The production of granulated sugar in the country is increasingly unable to meet the needs of the community itself, so the shortage must be covered by imported sugar which continues to increase from year to year where in 2017 Indonesia has become the second largest sugar importer in the world after Russia.

There are many factors that cause Indonesia to become a sugar importing country, one of the main causes is because the sugar industry is unable to fully meet the increasing demand and demand for community sugar and high domestic selling prices (Herawati, 2021). According to BPS data, Indonesia imports the largest sugar in Thailand and India. This is due to the increase in people's per capita income every year.

The results of previous research stated that consumption, prices, production, and import duties have a major influence on sugar imports in Indonesia (Herawati Rusdi) while according to (Sri Endang Rahayu) Production, Consumption, Exchange Rate, Sugar Price, and Per Capita Income together have a major influence on the formation of the value of sugar imports in Indonesia. Individually, exchange rate variables have a negative and insignificant effect on sugar imports in Indonesia, sugar production and prices have a negative and significant effect while consumption and per capita income have a positive and significant effect on sugar imports in Indonesia.

The results showed that GDP, Import Value, and Exchange Rate affect Indonesia's sugar import volume, while sugar production partially has a positive influence on Indonesia's sugar import volume, but the intention is not significant (Setiawan, 2018).

Literature

1. Business Administration

Hadayaningrat (2013), Business administration is the activities / processes / businesses carried out in the business field in an effort to achieve the goal of seeking profit. While Siagian (2010) suggests that business administration is the entire activity starting from the production of goods or services until the arrival of these goods and services in the hands of consumers.

Supriyanto (2016) argues that commercial administration or what is now becoming popular as business administration, is part of the social sciences that study the process of cooperation between two or more people in an effort to achieve a goal which is a science that focuses on human behavior. As a science, administration has objects, subjects, and methods. The object of administrative science is people with their behavior, the subject studied is the form or part and mechanism of cooperation, while the method is a way or thought developed to achieve the goals of the cooperation.

The main duty of any administrative officer is to manage the necessary paperwork and personnel tasks to ensure that the day-to-day business runs smoothly. This kind of work that requires professionalism in running it is usually rather high and usually has leadership responsibilities next to their desk. Most companies and government agencies hire these kinds of people to help ensure that internal operations and business functions can run smoothly the way they should. In almost every context, the job of an administrative officer involves four main functions: communication, coordination, day-to-day administrative tasks, and long-term planning. In general, the definition of business administration is all interconnected activities in a company with the aim of achieving profits that have been targeted by the company. Some expert opinions regarding the understanding of business administration, according to Poerwanto (2006) that, business administration is the entire cooperation in producing goods or cooperation in producing goods or services needed and desired by customers to the delivery of these goods or services to customers by obtaining and providing benefits in a balanced, responsible and sustainable manner.

a.Import export

Export can be interpreted as shipping and selling goods from within the country to abroad, export is an economic activity selling domestic products to markets abroad, the advantage of exporting is that it can expand the market, increase the country's foreign exchange, expand employment. Import is the purchase and entry of goods from outside the country. (Farina, 2017)

Export and import of a country occurs because of the benefits obtained due to foreign trade transactions, trade can also increase a country's consumption capacity and help various efforts to develop and increase the role of sectors that have comparative advantages due to efficiency in production factors. (Wulandari, 2019)

1)Import Sugar

a) Definition of Import

Import is the activity of entering goods from one country (abroad) into the customs area of another country. This means involving two States. In this case, it can be represented by the interests of two companies between the two different countries and of course also different rules and regulations. One country acts as an exporter (supplier) and the other acts as a recipient / importer country (Susilo, 2013).

Import can be interpreted as buying goods from abroad in accordance with government provisions which are paid for using foreign exchange. In the implementation of imports, there are various intermediaries, seller representatives, agents, culakan buyers, sellers and distributors who are in charge of delivering merchandise to the domestic market (Astuti &; Sri, 2013).

The formula used to see the development of sugar imports is as follows:

G sugar import = $\underline{\text{sugar import year n}-\text{sugar import year n}-1}$ x 100%

Sugar imports year N−1

Or

G mg = mg (t)− $\underline{\text{mg (t}-1)}$ x 100%

mg (t−1)

Where:

G mg = development of sugar imports

Mgt= Sugar imports for the year the development is calculated

Mg(t-1)= previous year's sugar imports

2) Sugar Production

a) Definition of production

The term Production is often used in terms of making something. In particular, production is the activity of creating or adding to a good or service. In broader and more fundamental terms, production can be interpreted as follows: the conversion of materials from sources into results desired by consumers. That result can be either goods or services. In a simple sense, production means producing goods or services. According to economics, the definition of production is the activity of producing goods or services or activities to add value to the use or benefits of a good. Production is the provision of goods and services with due regard to the values of justice and policies or benefits (mashlahah) for society. In his view, as long as the producer has acted fairly and brought policies to the community, he has acted Islamically (Siddiqi, 2008).

According to (Sugiarto, 2002), suggests that production is: "Production is an activity that converts input into output. The activity in the economy is usually expressed in terms of product functions, The product function shows the maximum amount of output that can be produced from the use of a certain number of inputs using certain technologies".

Production theory can be divided into two parts, namely the first, short-term production theory where if a producer uses production factors that are only variable inputs (variable input) and fixed (fixed input). Second, long-run production theory when all inputs used are variable inputs and there are no fixed inputs, so it can be estimated that there are two types of production factors, namely labor and capital (Tentoea, 2013)

$Q = f (X1, X2, X3)$

Where:

Q = Output

$X1...... Xn$ = A variety of different inputs that each or together take part in producing output Q.

b) Factors of production

Production factors can be grouped into four groups, namely:

(1) Nature (soil)

With all its potential as an item that can never be separated from the discussion of production. Land being the most important factor in this regard, the emphasis on the use of dead lands shows the attention of the Prophet SAW in the use of resources for the prosperity of the people. Islam is committed to implementing justice in matters of land.

(2) Workforce

Because the quality and quantity of production is largely determined by labor. This is human capital for a company and also an asset for the success of the company. The success of a production lies in the performance of the human resources in it, including the performance of the workforce. In general, among economists there are those who state that labor is the only producer and the base of productivity of all factors such as: land, good managerial capital will not be able to produce a good / service without labor.

(3) Capital

Capital in terms of ownership can be divided into two, namely, own capital and borrowed capital, capital which is an inheritance can be considered, as own capital or loans because it is added from outside but does not cause certain obligations from those who receive it. Own capital and borrowed capital do not differ in the production process , due to each menu.

(4) Production management / people running it

To get good production quality requires good management as well. Some factors of production among all factors will not produce a good profit (profit) when there is no good management, because land, labor, capital and so on will not be able to stand by itself.

3) Gross Domestic Product

a) Definition of GDP (Gross Domestic Product)

Gross domestic product (GDP) is the total production (output) produced by the government. GDP is the value of goods and services produced within a country in a certain period. Gross domestic product is a concept in the calculation of national income (Sadono, 2015)

According to (Sukirno, 2013) in his book macroeconomics introductory theory, Gross Domestic Product (GDP) can be interpreted as the value of goods and services produced within the country in a given year.

Gross Domestic Product (GDP) is the value of goods and services in a country produced by factors of production belonging to foreign citizens and countries (Sukirno, 2013).

Planning economic development in a country requires a variety of economic indicators. Gross domestic product (GDP) is one of the measuring instrument indicators to determine the economic condition of a country and is needed in macroeconomics. Economic growth is indicated by an increase in GDP on the basis of constant prices, while GDP on the basis of prevailing prices is used to look at the structure of the economy. In addition, GDP also measures two things at the same time, namely the total income of everyone in the economy and the total expenditure of the country to buy goods and services resulting from the economy. (Saragih, 2021).

b. Types of GDP

(1) Nominal gross domestic product is the monetary value of a country's production in a given period (a year or a quarter), measured by prevailing prices. This gross domestic product is an indicator of the size of a country's economy. In conclusion, nominal gross domestic product is preferable to compare data with other variables that are also not adjusted for inflation. An example of nominal gross domestic product is debt. Debt is always expressed as a nominal number, so the debt ratio is always based on nominal gross domestic product.

(2) Real gross domestic product (or GDP on a constant price basis) is the market value of all goods and services produced in the economy. Its growth is the change in total production, so economists use it as an indicator of economic growth. This gross domestic product corrects the nominal gross domestic product figure by including the effect of prices. Because it uses constant prices, changes in real GDP from year to year also reflect a change in production volume. As production increases, gross domestic product will also increase. Conversely, gross domestic product will decline when production also decreases   .

Relationships Between Variables

1. Variable Relationship of Sugar Production, Gross Domestic Product with Sugar Imports in Indonesia

Based on the results of research, the higher the production, the less imports will be, and vice versa. Imports are affected by domestic production that cannot meet market demand (Baohi song et al., 2009). Research conducted by Syarifah and Iqdan (2007: 101) concluded the relationship between import variables and production variables ishnegative. While the variable relationship between GDP and imports has a positive relationship, the results of research by Asima Rotinua (2012) concluded that the higher imports must be supported by GDP because GDP is one of the sources of import financing.

2. The Variable Relationship of Sugar Production with Sugar Imports in Indonesia

Based on the results of the study, it is known that national sugar production does not have a significant effect on sugar imports in Indonesia. This explains that the increase or decrease in the amount of national sugar production does not significantly affect the volume of sugar imports in Indonesia.

According to (Sugiarto, 2002), suggests that production is: "Production is an activity that converts input into output. The activity in the economy is usually expressed in terms of product functions, The product function shows the maximum amount of output that can be produced from the use of a certain number of inputs using certain technologies".

The results of this study are in line with research conducted by Aushaf et al. (2020) and Rusdi et al. (2021) which showed that sugar production did not have a significant effect on sugar imports. Because sugar imports are carried out because domestic sugar production cannot meet the needs of the community.

3. Variable Relationship of GDP with Sugar Imports in Indonesia

Based on the results of GDP (Gross Domestic Product) research has a positive effect on Indonesia's sugar imports. That is, if Indonesia's GDP (Gross Domestic Product) increases, sugar imports in Indonesia increase.

Gross domestic product (GDP) is the total production (output) produced by the government. GDP is the value of goods and services produced within a country in a certain period. Gross domestic product is a concept in the calculation of national income (Sadono, 2015)

The results of this study are in line with research conducted by Mohhammad et al. (2011) and Chen (2009) through their research stated that GDP with imports has a positive relationship where higher national income will increase imports of consumer goods in Indonesia

METHOD

The research method used by researchers is a type of quantitative research using library research methods. The primary data source comes from BPS. While secondary data are based on literature that supports this study.

In this study, researchers used Library Research data collection techniques, namely research conducted by studying, researching, and reviewing several literature books, journals, magazines, websites and previous studies related to the problem being researched and then reprocessed by agencies related to this research are BPS (Central Statistics Agency) Indonesia to obtain data from 2017-2019 .

Table 1

	2017	2018	2019
Import sugar	4.470.000	3.600.000	4.991.020
Sugar production	12.100	21.000	24.500

Source: BPS 2019

RESULT AND DISCUSSION

A. Overview
1. Center for Production and Development of Sugar Production

Sugarcane plants are cultivated in almost all provinces in Indonesia, usually sugarcane plantation businesses are divided into three, namely community plantations (PR), State Large Plantations (PBN) and Private Plantations (PBS).

According to CDMI research, the area of sugarcane harvesting in Indonesia in the last 3 years (2016-2021) seems to fluctuate but tends to increase. If in 2016 the area of sugarcane harvest in Indonesia was recorded at 445 thousand hectares, in 2020 it became 458 thousand hectares and in 2021 it is predicted to cover an area of 490 thousand hectares (CDMI).

Three provinces that have sugarcane land area are East Java, Lampung and Central Java, while other provinces have sugarcane land that is not too large. The trend of sugarcane production in the last six years (2016-2021) seems to fluctuate. In 2016 Indonesia's sugarcane production reached 2.2 million tons, in 2020 it reached 2.4 million tons and the prediction for 2021 reached 2.5 million tons (CDMI).

Indonesia's high sugarcane production still cannot keep up with the large demand for sugar in Indonesia. Indonesia is the world's largest importer of sugar with an average import of 6 million tons per year.

2.Sugar Trade in Indonesia

Sugar trade in Indonesia will be discussed through the import and export side of sugar in Indonesia. Export development in the agricultural sector is carried out as one of the efforts to evaluate the performance and achievement of development in the agricultural sector quantitatively in increasing its contribution to state revenue. The agricultural sector in this case includes the subsector of plantation crops, especially sugar.

The sugar export trade in Indonesia had experienced a heyday in the 1930s where Indonesia became the largest sugar exporting country in the world. The establishment of sugar factories on

a large scale and implementing the forced sugarcane planting system carried out by the Dutch on the island of Java became one of the biggest factors for the Indonesian state to enter the largest sugar exporting country in the world. After its heyday, the sugar industry in Indonesia experienced ups and downs related to changes in policies implemented by the government at that time (Dermawan, 1930).

Along with the times, the land to grow sugarcane was replaced with a row of residential buildings, industries in other fields, as well as for land to grow other commodities which caused Indonesia to no longer be a sugar exporting country.

Indonesia became the largest sugar importing country in Indonesia in 2017-2019. Total sugar imported reached 4.45 million tons. So the data released by the Central Statistics Agency (BPS).

In 2019, sugar imports will not be stopped. The government will open the import tap of Refined Crystal Sugar (GKR) in 2019 as much as 2.8 million tons. The allocation of sugar imports decreased by 28.5 percent from GKR imports in 2018, which was 2.8 million.

3.Sugar Factory in Indonesia

The existence of sugar factories in Indonesia, especially on the island of Java, certainly greatly affects the Indonesian economy, plus sugar is the basic need of the Indonesian people, this is because in its history it was inseparable from the cultuurstelsel policy implemented by the Dutch East Indies Colonial Government. Financial difficulties due to the Java War (1825-1830) made the Dutch East Indies Colonial Government impose a cultuurstelsel or cultivation system to fill their coffers. Governor-General Johannes Vam Den Bosch required villages in Java to set aside 20 percent of their land to be planted with export crops such as sugarcane, tea, and coffee.

Sugarcane is mainly grown in a number of residencies, such as Surabaya, Pasuruan, and Besuki. This is certainly very important in building the civilization of a region such as East Java Province, Central Java Province, and West Java Province. Gula factories not only build welfare in the economic sense, but reach all aspects of life, people, society, nation, and state.

Maximum sugar production until now has not been able to achieve the sugar self-sufficiency target due to a decrease in the quality of harvest and ration, weak productivity, high cost of GKP production which makes sugar prices less competitive, policy conflicts between ministries/institutions, refined imports seeping into the consumer market, milling stop hours are still around 6 percent, planting time and harvest time are not right, The magnitude of government intervention, the shift from paddy fields with good waters to dry land or moor.

National sugar self-sufficiency should be achieved, considering that Indonesia has so many sugar factories that have been improved and increasingly modern. But the fundamental problem now and in the future is the difficulty of Indonesian sugar mills to earn profit margins, and some are already losing money due to high operational costs, inefficiencies at the on-farm and off-farm levels and low levels of productivity. Moreover, the price of imported sugar turned out to be cheaper and more attractive after it was on the market and conditions like this made sugar factories at a crossroads, namely on the one hand the cost of production was constantly increasing and the threat to obtain sugarcane as a source of raw material was increasingly difficult, but on the other hand the price of sugar could not be formed at a level that promised adequate margins due to the

calculation of consumer purchasing power and the magnitude of government intervention when sugar prices rose in the market. TheIndonesian cane sugar industry, which is unable to keep up with the rapidly increasing demand for Refined Crystal Sugar (GKR), especially for the food, beverage and pharmaceutical industries, has encouraged the government to open investment opportunities for the construction of refined sugar factories using imported raw sugar raw materials. This opportunity was glimpsed by the private sector by building several refined sugar factories in Indonesia, especially on the island of Java.

According to information received by CDMI, PTPN X has prepared an investment of Rp. 1 trillion to build a modern sugar factory in Madura with a capacity of 5,000-7,000 tons of sugarcane per day. An investment of Rp. 1.6 trillion has also been prepared by 3 SOEs namely PTPN III, PTPN XII and PTPN XI to build a very modern sugar factory with a capacity of 7,000 tons of sugarcane per day in Banyuwangi, East Java under the name GLENMORE sugar factory. The same steps were also taken by PT. Rajawali Nusantara Indonesia (RNI) has prepared an investment of Rp. 1.5 trillion to build a modern sugar factory with a capacity of 6,000 tons of sugarcane per day in Gempol (CDMI).

B. Research Results

1.Descriptive Analysis

Descriptive analysis is a statistical analysis method whose purpose is to provide a description or description of the research subject based on variable data obtained from certain subject groups. Descriptive analysis can be displayed in the form of frequency distribution tables, histogram tables, mean values, standard deviation values and others. The benefit of using descriptive analysis is to obtain a complete picture of the data either in verbal or numerical form related to the data we examine.

2.Classical Assumption Test

The classical assumption test is used to determine the feasibility of a regression model used, so that it can satisfy all the classical assumptions that have been set. There are four types of classical assumptions used in this study, namely normality test, multicollinearity test, heterokedastistas test, and autocorrelation test. The following is an explanation of the four classical assumption tests:

a.Normality Test

The normality test is used to test whether in a regression model, the free variable and the bound variable are normally distributed or not. A good regression model is one that has normally distributed data. Data is said to be normally distributed if the probability is greater than 0.05 (Sarwono, 2016: 163).

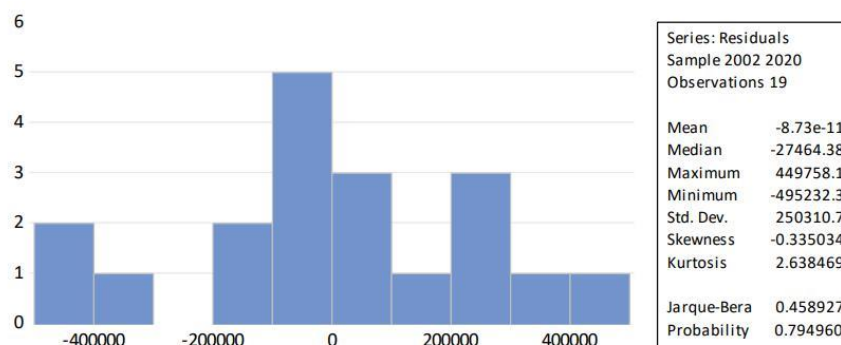|	
Series: Residuals	
Sample 2002 2020	
Observations 19	
Mean	-8.73e-11
Median	-27464.38
Maximum	449758.1
Minimum	-495232.3
Std. Dev.	250310.7
Skewness	-0.335034
Kurtosis	2.638469
Jarque-Bera	0.458927
Probability	0.794960

Figure 3

Based on the figure above, it shows that the probability value of 0.79 is greater than 0.05 so that the data is normally distributed.

b. Multicollinearity Test

The multicollinearity test is used to test whether in the regression model there is a correlation of free variables or not. A good regression model is one that does not occur multicollinearity. The method used is to detect the occurrence of muiltikolenieritas by looking at the value of variance inflation factor (VIF). The regression model is said to not occur multicollenierity if the VIF value is less than 10 (Gunawan, 2019: 140)

Variance Inflation Factors
Date: 07/20/22   Time: 19:09
Sample: 2002 2021
Included observations: 19

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	5.76E+14	70.10216	NA
X1	116.4571	73.69347	1.051478
X2	0.387394	4.138813	1.051478

Table 2

Based on the table above, it shows that the VIF value is less than 10 so that the regression model does not occur multicollenierity

c. Heteroscedastistasis Test

The heterropedstistal test is used to test whether in the regression model there is an inequality of variance of the residuals of one observation with another observation. A good regression model is one in which heteroscedasticity does not occur. The method used to detect the occurrence of heteroscedastitas is the breusch-pagan-goldfrey test. The regression model is said not to occur

heteroscedastistas if the obs*R-squared has a probability value greater than 0.05 (Sarwono, 2016: 162).

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Heteroskedasticity Test: Breusch-Pagan-Godfrey
Null hypothesis: Homoskedasticity

F-statistic          2.907980   Prob. F(2,16)            0.0837
Obs*R-squared        5.065248   Prob. Chi-Square(2)      0.0795
Scaled explained SS  4.614581   Prob. Chi-Square(2)      0.0995


Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 07/20/22   Time: 19:22
Sample: 2002 2020
Included observations: 19
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Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.78E+14	3.78E+14	0.471792	0.6434
X1	-1.05E+08	1.70E+08	-0.618435	0.5450
X2	23619094	9800259.	2.410048	0.0283

R-squared	0.266592	Mean dependent var	1.32E+14
Adjusted R-squared	0.174916	S.D. dependent var	2.17E+14
S.E. of regression	1.97E+14	Akaike info criterion	68.80836
Sum squared resid	6.20E+29	Schwarz criterion	68.95748
Log likelihood	-650.6794	Hannan-Quinn criter.	68.83359
F-statistic	2.907980	Durbin-Watson stat	1.812515
Prob(F-statistic)	0.083708		

Table 3

Based on the table above, it shows that obs*R-squared has a prob.chi-square value of 0.079 greater than 0.05 so that the regression model does not occur heteroscedasticity.

d. Autocorrelation Test

The autocorrelation test is used to test whether in the regression model there is a correlation between the fault of the intruder in period t and the fault of the intruder in the previous period. A good regression model is one in which autocorrelation does not occur. The regression model is said to have no autocorrelation if the obs*R-squared has a probability value greater than 0.05 (Sarwono, 2016: 163).

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Breusch-Godfrey Serial Correlation LM Test:
Null hypothesis: No serial correlation at up to 2 lags

F-statistic      0.409777 Prob. F(2,14)         0.6715
Obs*R-squared    1.050741 Prob. Chi-Square(2)   0.5913
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Table 4

Based on the table above, it shows that obs*R-squared has a prob.chi-square value of 0.59 greater than 0.05 so that the regression model does not autocorrelate.

C.Test Hypothesis

1.Multiple Linear Regression Analysis

Dependent Variable: Y
Method: Least Squares
Date: 07/21/22 Time: 23:23
Sample: 2002 2020
Included observations: 19

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	28087667	24009295	1.169866	0.2592
X1	-18.79349	10.79153	-1.741504	0.1008
X2	3.444528	0.622410	5.534178	0.0000

R-squared	0.658908	Mean dependent var	13408929
Adjusted R-squared	0.616271	S.D. dependent var	20178015
S.E. of regression	12499438	Akaike info criterion	35.66420
Sum squared resid	2.50E+15	Schwarz criterion	35.81333
Log likelihood	-335.8099	Hannan-Quinn criter.	35.68944
F-statistic	15.45408	Durbin-Watson stat	2.299174
Prob(F-statistic)	0.000183		

Table 5

Based on the results of the table above, a multiple linear equation is obtained as follows:

Y= 2808-18.793X1+3.444X2+e. From this equation, the explanation of multiple linear regression is as follows:

The value of constanta (a) is 2808 or positive then the relationshipn variables are unidirectional, if variable X increases then variable Y increases. The value of the variable coefficient X1 (amount of production) -18.79 is negative then if the variable X1 (amount of production) increases then the varible Y (sugar imports) decreases.

The value of the variable coefficient X2 (GDP) 3.444 is positive, so if the variable X2 (GDP) increases, the variable Y (sugar imports) increases.

2.T Test

a. If Tcalculate < Ttable or -Tcalculate > -Ttable or a significant value > 0.05 then H0 is accepted, meaning that the independent variable has no significant effect on the tricate variable.
b. If Tcalculate ≥ Ttable or -Tcalculate ≤ -Ttable or a significant value ≤ 0.05 then H0 is rejected, meaning that the free variable has a significant effect on the dependent varible.

Result: Sugar production prob value (X1) = 0.10

GDP prob value (X2)=0.00

It can be concluded that the value of prob x1 0.10>0.05 then H0 is accepted, meaning that the variable sugar production does not have a significant effect on the volume of sugar imports. Conversely, the prob value X2 0.00≤0.05 then H0 is rejected, meaning that the GDP variable is significant to the volume of sugar imports.

3.F Test

a. If Fcalculate < Ftable or a significant value > 0.05 then H0 is accepted, meaning that all independent variables simultaneously have no effect on the dependent variable.
b. If Fcalculate ≥ Ftable or a significant value < 0.05 then H0 is rejected, meaning that all independent variables simultaneously affect the dependent variable.

It can be concluded that the value of Fcalculate ≥ Ftable or a significant value of < 0.05 then H0 is rejected, meaning that the variable of sugar production, gross domestic product (GDP) simultaneously affects the volume of sugar imports in Indonesia.

Discussion

1.The effect of sugar production on the volume of sugar imports

Based on the results of data processing, the production variable has a prob value of 0.10 > 0.05, which means that H0 received by the free variable of sugar production does not have a significant effect on the volume of sugar imports. It can be interpreted that in the short term every increase in sugar production, the volume of sugar imports in Indonesia decreases.

The results of this study are in line with previous research conducted by Aushaf (2020) showing that in the long run, sugar production variables have a negative and insignificant effect on sugar imports in Indonesia. This is because the high level of sugar consumption that cannot be met by domestic sugar production causes Indonesia to experience a shortage of sugar stocks, so the government will continue to import sugar from several countries to meet the shortage.

2.Effect of Gross Domestic Product (GDP) on sugar import volume

Based on the results of data processing, it is known that the variable Gross Domestic Product (GDP) has a probability value of 0.00 < 0.05, then H0 is rejected, which means that the variable Gross Domestic Product (GDP) has a significant effect on the volume of sugar imports in Indonesia.

The results of this study are in line with research conducted by Mohhammad et al. (2011) and Chen (2009) through their research stated that GDP with imports has a positive relationship where higher national income will increase imports of consumer goods in Indonesia

CONCLUSION

Based on the results of research conducted on the analysis of factors affecting the volume of sugar imports in Indonesia using multiple linear regression analysis, the following conclusions were obtained:

1. Factors that affect the volume of sugar imports in Indonesia are sugar production and Gross Domestic Product (GDP).
2. The factor that negatively and significantly affects the volume of sugar imports is the variable sugar production. Then for factors that have a positive and significant influence on the volume of sugar imports in Indonesia is the variable Gross Domestic Product (GDP)

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