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ANALYSIS OF DETERMINANTS THAT INFLUENCE THE VOLUME OF INDONESIAN SEAWEED EXPORTS TO MAIN DESTINATION COUNTRIES IN 2012 – 2022

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Abstract

Seaweed is one of Indonesia's top marine and fishery commodities, with a significant amount of untapped potential. Despite the fact that seaweed is currently a highly valuable commodity, this potential has not been fully realized.The state of Indonesia's seaweed exports is prone to fluctuations, so it's critical to monitor these issues in order to identify the factors that drive increases and decreases in the amount of seaweed exported from Indonesia to destination nations. The purpose of this study is to examine the factors that simultaneously affect the amount of Indonesian seaweed exported to the major destination nations in 2012–2022, including population size, GDP per capita, inflation, and currency rates.

Keywords: *Population, GDP per capita, Inflation, and Exchange Rates*

INTRODUCTION

As a maritime nation, Indonesia has the potential to produce 3000 trillion worth of marine and fisheries resources annually, of which only 225 trillion, or 7.5%, have been used. These resources are primarily composed of superior commodities like grouper, tuna, shrimp, skipjack, and seaweed (Ministry of Maritime Affairs and Fisheries, 2021). Seaweed is one of the excellent marine and fisheries commodities that Indonesia possesses. It has a considerable amount of potential, supported by a sea area of 5.8 million km2, and a total area of 1,110,900 hectares for seaweed production (Indonesian Institute of Sciences, 2009).

Due to its significant use in a variety of everyday items, seaweed is today valued highly as a commodity in several nations, including Indonesia (Ministry of Trade, 2015). Based on the estimated yearly growth in worldwide seaweed demand of 5–10%, the seaweed commodity has a sizable market opportunity (Ministry of Maritime Affairs and Fisheries, 2021). There is undoubtedly a market for exports to other countries, particularly as Indonesia possesses a wide variety of seaweed varieties that are not commonly seen outside, leading to the import of seaweed by many other nations.

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Seaweed, often known as seaweed, is a type of marine plant that belongs to the group of benthic macroalgae, which primarily inhabits the ocean floor. Algae from the thallophyta division are found in the sea and are referred to as seaweed. A class of plants known as thallophyta, or talus plants, includes moss and other plants without true stems, roots, or leaves. Seaweeds such as gracilaria, gelidium, eucheuma, hypnea, sargasum, and tubrinaria are frequently found in Indonesian waters. The color categorization of seaweed grown in Indonesia is based on the following: there are approximately 452 species of red seaweed (Rhodophyceae), 196 types of green seaweed (Chlorophyceae), 134 types of brown seaweed (Phaeophyceae), and 196 types of blonde seaweed (Chrysophyceae) (Suparmi, 2009).

Of the many varieties of seaweed that are known to exist, four kinds found in Indonesia are primarily traded as commodities for export: eucheuma cottoni, gracilaria, eucheuma spinossum, and andsargassum (Dwan & Choyce, 2014).Because it has high concentrations of yeast, gelatin, and alginate and can be used as a flavor softener, ice cream crystallization preventer, medicine, and raw material for the food industry, Indonesian seaweed is highly valued and in high demand by the industry (Ministry of Trade of the Republic of Indonesia, 2013). The majority of Indonesia's seaweed exports in 2020—71.59 percent—were of the Eucheuma cottonii variety, which is used as a raw ingredient to make raginan. Next, the seaweed type gracilaria is utilized in the production of jelly, with an amount of

There are several kinds of seaweed, and each has advantages of its own. For example, Eucheuma cottonii seaweed is used as a raw material and is extracted using different chemicals to make keraginan flour, which is then called keraginan. Gracilaria seaweed is used as an ingredient in this process. The grown spinossum seaweed used to make jelly is typically consumed raw, meaning it doesn't need to be industrialized. It can be eaten raw in salads or other processed seaweed-based meals. Moreover, sargassum seaweed is a type of seaweed that is utilized as an ingredient in an extraction procedure to make alginate since it includes algine.

The magnitude of the growing region supports the significant development potential of seaweed commodities. Indonesia possesses a vast expanse of potential land for aquaculture; however, it has not been utilized to its fullest extent; the average has only reached 2.7%. This area is divided into three categories: 278,920 ha for marine cultivation, 605,909 ha for pond cultivation, and 316,446 ha for freshwater cultivation. (Maritime Affairs and Investment Coordinating Ministry, 2020). Only over 50%, or 384,733 hectares, of the suggested land that can be used for growing Indonesian seaweed items has actually been employed (Indonesian Ministry of Trade, 2013).

According to Dahuri (2011), companies that cultivate seaweed have the potential to generate significant economic multiplier effects and absorb a huge amount of labor.Statistics showing that Indonesian seaweed is comparatively competitive in global trade lend credence to this (Indonesian Ministry of Trade, 2015).

A nation's economy can grow significantly as a result of its exports, as they can spur domestic industries to produce competent and high-quality goods and services that can compete on global markets. International trade may be very profitable for home business owners and provide a significant influx of foreign cash for the nation.

In order to realize one of the pillars of the global maritime axis, namely obtaining seafood sovereignty, the government currently seeks to prioritize the growth of Indonesia's maritime and fisheries sectors (Pudjiastuti, 2016b: 5). The aforementioned image shows that although total Indonesian seaweed exports decreased in 2019 and 2020, the volume of seaweed exports from Indonesia keeps rising.

This is due to the Covid-19 pandemic that affected both Indonesia and the rest of the world in that year. Despite a drop in seaweed exports, Indonesia was able to weather the pandemic, with the exception of some fluctuations in the volume of seaweed exports from 2012 to 2022. Indonesian seaweed exports to destination nations go through ups and downs on a yearly basis in practically all of the destination nations.

According to the amount of Indonesian seaweed sent to target countries between 2012 and 2022, the author of this study identified seven major destinations for Indonesian seaweed exports. This shows which nations buy the most Indonesian seaweed. While China is still the top destination for Indonesian seaweed exports each year due to its largest export volume, many other nations also buy seaweed from Indonesia because few other countries have the same kinds of seaweed that Indonesia does. The evolution of Indonesian seaweed export volumes is shown in the following statistics, which is based on the major export destination nations from 2018 to 2022.

China has consistently been the export leader, with Chile, South Korea, the Philippines, Japan, Denmark, and Vietnam following in order of importance. But a lot of other nations also import Indonesian seaweed since, depending on the kind, seaweed can be eaten raw or utilized as an ingredient in other goods (such carrageenan, gelatin, and alginate). With 249,280 tons imported in 2017, China is the world's largest importer of seaweed, with 61.35% of that total coming from Indonesia. China purchased over 150,000 tons (85.5%), or 127.2 million USD, of the 174,000 tons of seaweed and other algae that Indonesia sold to other nations in 2017 (Central Statistics Agency, 2018).

Only brown seaweed, such saccharina japonica, which makes up around 68% of the overall production, is currently grown in China. In the meantime, China's national production of red seaweed varieties like eucheuma cottoni is still relatively small, making up only 1% of global production (Ministry of Maritime Affairs and Fisheries, 2018). As a result, the Chinese government continues to buy seaweed from nations like Indonesia that cultivate it. Up till now, Euchema cottonii seaweed has been the most common kind of seaweed sent to China. Since China is the largest seafood market,

Indonesia's cooperation is essential for China to export many varieties of Indonesian seaweed, such as Eucheuma cottonii (Ministry of Trade, 2015).

According to Soerianto (2007), gracilaria is the most commonly exported seaweed from Chile. An ingredient used to make agar-agar is gracilaria. The largest exports of seaweed from Indonesia to Chile were 7,975.7 tons in 2015; exports declined in the years that followed, but they will rise in 2022. Naturally, there are a variety of reasons why Chilean imports of Indonesian seaweed vary.

Seaweeds such as euchema cottonii and seaweed gracilaria are the most commonly exported seaweeds to South Korea (Directorate General of Cultivated Fisheries KKP, 2018).South Korea has seen fluctuations in the amount of seaweed exported from Indonesia. 2015 saw the largest exports, totaling 10,915.2 tonnes; however, in 2016, shipments significantly decreased to just 3,853.8 tonnes (Central Statistics Agency, 2023). Still, it went up once more.

Every year, the amount of goods exported to the Philippines varies. With a 22.8% share in 2014, the Philippines ranks as the second-largest nation of origin for carrageenan imports. With a proportion of 7.6%, Denmark ranks third among the countries of origin for imports of carrageenan (BPS, 2015). As of 2005, the Philippines had produced 110,000 tons of Euchema cottonii, while Indonesia was still producing 80,000 tons (McHugh, 2006). This may be among the reasons for variations in shipments to the Philippines, as that nation also cultivates the same kind of seaweed.

Every year, the amount of seaweed sent from Indonesia to Japan varies. Indonesia is still sending more goods, particularly seaweed, to Japan. Additionally, this rise raises the competitiveness of Indonesian seaweed products abroad. Indonesia exports seaweed primarily to Japan as a final destination. The world's largest supplier of fish is Japan. Given Japan's limited natural resources, Indonesia can meet its domestic needs. In terms of total imports, Indonesia ranks as Japan's second-largest supplier of marine product imports.

Seaweed is particularly popular in Japan, where eating it and using it for other purposes has established a culture. The species Euchemeuma cottonii, which is found in seawater, is the one that is extensively grown in Indonesia. The majority of the outcomes are utilized as raw components by the pharmaceutical and cosmetic businesses. In addition, gracilaria sp. that developed in brackish water are also present. Japan is currently the primary market for Indonesian seaweed, purchasing it in its unprocessed state. Though seaweed is widely employed in the industrial sector for cosmetic and pharmacological purposes, Japanese people eat it at virtually every meal. However, not all of Japan's needs for seaweed are supplied domestically. Thus, in this instance, Indonesia, a nation that produces seaweed, is taking advantage of it to

Indonesian seaweed exports to Denmark have been erratic; in 2021, they were as low as 0.1, and in 2022, they were even lower. Of course, a variety of things are at play here. One of the most popular varieties of seaweed in Denmark is native to the

country and tastes much like fresh peas or beans. To be able to compete globally and keep up with demand from destination nations, Indonesia, however, consistently raises the caliber of the export items it manufactures.

Furthermore, Indonesian seaweed exports to Vietnam have fluctuated between a rather sharp increase and fall each year. Vietnam was the top destination for Indonesian seaweed exports in 2021, with the lowest export volumes occurring in 2013 and 2016, when they only reached 1,677.9 and 1,751.5 tons, respectively (Central Statistics Agency, 2023). Seaweed gracilaria and euchema cottonii are the most common seaweed exports to Vietnam. One of the reasons for the decline in Indonesian seaweed exports to Vietnam is that Vietnam produces sea grape grass, a type of seaweed with a higher economic value than the euchema cottonii and gracillaria types of seaweed that Indonesia possesses (Directorate General of Cultivated Fisheries KKP, 2018).

Population expansion may have a good or negative impact on exports since more productive individuals increase the workforce, which in turn increases production. Because consumption in each importing destination country will rise in tandem with population growth or increase in the destination country, population growth in each country can also influence that country to import more products.(Salvator, 1997). Population growth stimulates imports, therefore if the nation where Indonesia sells seaweed experiences a rise in population, that nation is anticipated to import more seaweed (Saskara and Aditya, 2013).

For the years 2018–2022, the population growth of the primary destination nations for Indonesian seaweed exports has increased in nearly every state. However, for the past few years, this nation has received less seaweed shipments from Indonesia. This indicates that Salvatore's theory and the previously explained journals of Saskara and Aditya differ from the actual events, which show that an export destination country's population growth should lead to an increase in imports of products.

The amount of Indonesian seaweed sent to the major destination nations is influenced by a number of factors besides population increase, including GDP (gross domestic product).According to Lipsey (1992), GDP is the total of all government, export, and import spending as well as consumer and investment spending.The money a nation receives from its economic endeavors is referred to as its national income (GDP) (Wiharani, 2021).

The GDP per capita development for China, Chile, South Korea, the Philippines, Japan, Denmark, and Vietnam from 2018 to 2021 was derived from secondary data provided by the World Bank.Although China's GDP per person has consistently increased, the amount of seaweed exported from Indonesia to China has fluctuated over time; in 2016, it was 139,950.3 tons, while the previous year it was 147,958.6 tons (Central Statistics Agency, 2022). This, of course, is contrary to the theory, which holds

that people's income would fluctuate in tandem with changes in the value of exports, whether they are increasing or decreasing (Risma, 2018).

Indonesian seaweed exports to destination nations will rise in tandem with an increase in GDP per capita. As in the case of China, Chile, South Korea, the Philippines, Japan, Denmark, and Vietnam, the same thing happened, defying theories and journals that show several years of increases in GDP per capita accompanied by a decline in seaweed export volume. Indonesia arrived there the same year.

Inflation is another element that can affect exports. The propensity for prices to rise generally and consistently is known as inflation (Mankiw, 2006: 145). Imported items become less expensive than those produced domestically due to inflation (Sukirno, 2012). This implies that an increase in inflation in the destination nation will lead to a rise in seaweed imports into that nation, hence increasing the amount of Indonesian seaweed sent to that nation.

The amount of Indonesian seaweed sent to the primary destination country was impacted by changes in the inflation rate in that nation. The percentage of inflation in the major destination nations for Indonesian seaweed exports rises and falls annually; in 2022, inflation will rise in all major destination countries at the same time. Vietnam saw a decline in export volume in 2022 as a result of rising prices. This also occurred in other nations at specific years, which contradicted Sukirno's previously stated theory.

The exchange rate is the next element that affects the amount of seaweed exported from Indonesia.One of the key elements influencing exports is the exchange rate (Sudirman, 2014).Exports will rise in response to a decline in the value of the rupiah because they will be more affordable in overseas markets (Sukirno, 2012: 408).

Annual fluctuations in the value of the currency are a recurring feature of the main destination country's currency exchange rate relative to the US dollar. An increase in the value of the currency at the primary export destination country's exchange rate will result in lower import product prices than before the appreciation, which will increase demand for imported goods (Firdaus, 2018). This implies that the primary destination country for Indonesian seaweed exports will import more seaweed if the currency rate of that country rises, or appreciates, increasing the amount of Indonesian seaweed exports to that country.

This study is driven by the previously mentioned research gap, wherein bbased onA mere 225 trillion, or approximately 7.5%, of Indonesia's vast marine and fishery resources—which include outstanding commodities like tuna, shrimp, skipjack, grouper, and seaweed—have been utilized out of a potential 3000 trillion year (KKP, 2022). Seaweed is one of Indonesia's top marine and fishery commodities, with a significant amount of untapped potential.

Due to its significant use in a variety of everyday items, seaweed is today valued highly as a commodity in many nations, including Indonesia. The seaweed commodity

has a considerable market potential, as determined by the 5–10% annual growth in global seaweed demand.

RESEARCH METHODOLOGY

The planning of study with the goal of conducting research so that there is logic in testing hypotheses and coming to conclusions is known as research design (Sugiyono, 2016). The scientific process of gathering data for certain uses and purposes is called a research method. This study employed a quantitative methodology. A quantitative approach is a type of research methodology that looks at a specific population or sample in order to test a theory. This study falls under the category of associative research, which is defined as research that tries to ascertain the impact or relationship of two or more factors (Sugiyono, 2016).

RESULTS AND DISCUSSION

Results of Analysis of Research

Selection of Panel Data Regression Models

Finding out if the model being used conforms to the Common Effect Model, Fixed Effect Model, and Random Effect Model is the aim of panel data regression analysis. To ensure that the model being used is suitable and good, the following Chow and Hausman test is required.

a. Test Chow

To determine if a model follows the Fixed Effect Model or the Common Effect Model, the Chow test is performed. Table 1 displays the test findings.

Table 1. Chow Test Results

Effect Test	*Statistics*	*df*	*Prob.*
Cross-section F	19.790780	(6.66)	0.0000
Chi-square cross-section	79.257641	6	0.0000

According to Ghazali and Ratmono (2013), the Chow test is used to determine which of the Fixed Effect Model (FEM) and the Common Effect Model (CEM) is a better method.Given that the output of the data processing is 0.0000 and less than 0.05, as can be observed from the findings above, the Fixed Effect Model (FEM) was employed. The Hausman Test was used because the selected model was the FEM.

b. Hausman test

To determine if the model being utilized adheres to the Fixed Effect Model (FEM) or the Random Effect Model (REM), the Hausman test is performed. Table 2 displays the test findings.

Table 2. Hausman Test Results

Test Summary	*Chi-Sq. Statistics*	*Chi-Sq. df*	*Prob.*
Random cross-section	68.584873	4	0.0000

A method called the Hausman test is intended to ascertain if the model being employed is a Random Effect Model (REM) or a Fixed Effect Model (FEM) (Ghazali and Ratmono, 2013: 289).The Fixed Effect Model (FEM) was employed as, as the data processing findings above demonstrate, the output is smaller than 0.05 and equal to 0.0000. The Lagrange Multiplier test was stopped because the selected model, the FEM, was finished. Therefore, the Fixed Effect Model (FEM) is the optimal model selected. Table 3 below displays the outcomes of choosing the optimal model.

Table 3. Selection of the Best Panel Data Regression Model

Test/Results	**Test Chow**	**Hausman test**
Results	Prob < 0.05 = 0.0000	Prob < 0.05 = 0.0000

It is evident from the above table that the Chow Fixed Effect Model (FEM) test is chosen in panel data regression testing when the chance of the F-statistic being smaller than the five percent real level (0.000 < 0.05) is smaller. Additionally, the Hausman Fixed Effect Model (FEM) test is selected since the F-statistic in the Hausman test is less than the actual five percent threshold (0.000 < 0.05). These findings indicated that since the Fixed Effect Model (FEM) had been selected, the Lagrange Multiplier test—which was used to evaluate the Common Effect Model (CEM) and Random Effect Model (REM)—did not need to be performed again.

Classic assumption test

The Fixed Effect Model (FEM) is the model that should be used in the panel data regression equation after it has been determined which one to use. Panel data testing eliminates the need for traditional assumption tests by enabling the investigation of more complicated behavior in the model (Gujarati, 2012). However, Linearity, Autocorrelation, Heteroscedasticity, Multicollinearity, and Normality tests are among the traditional assumption tests utilized in linear regression with the Ordinary Least Squared (OLS) approach, according to Basuki and Prawoto (2016). On the other hand, not all linear regression models using the OLS technique require the execution of all traditional assumption tests.

1. Since it is expected that a linear regression model exists, linearity tests are rarely performed on such models. Just to check how far the level of linearity goes, if you must.

2. In essence, the normalcy test is not a BLUE (Best Linear Unbias Estimator) condition, and there are differing views on whether it is necessary to meet this criteria.
3. Third, autocorrelation is limited to time series data. Any autocorrelation testing performed on data (cross section or panel) that is not a time series will be useless.
4. When more than one independent variable is used in a linear regression, multicollinearity analysis must be done. There cannot be multicollinearity if there is just one independent variable.
5. Typically, heteroscedasticity arises in cross section data, where panel data is closer to the characteristics of cross section data than time series.

From the foregoing explanation, it can be shown that just multicollinearity and heteroscedasticity are required for panel data regression; all other conventional assumption tests in the OLS method are not needed (Basuki and Prawoto, 2016).

A. Multicollinearity Test

When one or more independent variables may be described as a linear combination of other independent variables, this is known as multicollinearity. A high correlation between the independent variables is indicative of multicollinearity. You can examine the independent variables' correlation matrix to test the multicollinearity issue. Multicollinearity is present if the correlation coefficient is greater than 0.90 (Gujarati, 2012). Table 4 below displays the multicollinearity test results.

Table 4. Multicollinearity Test Results

	X1	X2	X3	X4
X1	1,000000	-0.313077	-0.079216	-0.160537
X2	-0.313077	1,000000	-0.376499	-0.404759
X3	-0.079216	-0.376499	1,000000	0.259818
X4	-0.160537	-0.404759	0.259818	1,000000

Table 4 shows that there isn't a correlation coefficient greater than 0.90. There isn't a single independent variable in the multicollinearity test results table above whose value is more than 0.90. This indicates that multicollinearity issues were not present in this study.

B. Heteroscedasticity Test

The purpose of the heteroscedasticity test is to determine whether the residuals of one observation differ in variance from those of another observation in a regression model. It is referred to as homoscedasticity if the variance in the residual from one observation to the next is constant, and heteroscedasticity if it differs. When the sig value is less than 0.05, heteroscedasticity is present. Conversely, a sig value of less than 0.05 indicates the absence of heteroscedasticity.

The White test was used in the study to assess heteroscedasticity. Based on the findings of the heteroscedasticity test conducted in this study, it was discovered that the chi square probability value was higher than the actual five percent level (0.0835 > 0.05), indicating that the estimation model does not contain symptoms of heteroscedasticity.

Hypothesis testing

The statistical test (F test), partial test (t test), and coefficient of determination test (R2) are the three hypothesis tests used in this study. The findings are as follows.

a) F Test (Simultaneous Test)

To determine if the regression model being used can accurately predict how independent variables will collectively affect the dependent variable, the F test is employed (Ghozali and Imam, 2016: 94). In order to ascertain whether the independent factors (population size, GDP per capita, inflation, and exchange rate) had an impact on the amount of Indonesian seaweed exported to the primary destination countries in 2012–2022, the F-statistical test was employed in this study. Table 5 below displays the findings of the F test used in this study.

Table 5. F Test Results (Simultaneous Test)

F Test Results (Simultaneous Test)	
R-square	0.988024
Adjusted R-square	0.986209
F-statistic	544.4826
Prob (F-statistic)	0.000000

Table 5 shows that the F-count is 544.4826 > Ftable 2.91 and that the F-statistic probability value is smaller than the real level of five percent (0.000000 < 0.05). These findings support the rejection of H0 and acceptance of H1, which indicates that the number of variables population (X1), GDP per capita (X2), inflation (X3), and exchange rate (X4) all together (simultaneously) influence the volume of Indonesian seaweed exports to the main destination countries in 2012–2022 (Y).

b) t test (partial test)

In essence, the purpose of the t test is to determine the degree to which each independent variable affects the dependent variable. In order to ascertain whether the coefficient of each independent variable—population size, GDP per capita, inflation, and exchange rate—partially (individually) had a significant impact on the dependent variable—the volume of Indonesian seaweed exported to the primary destination countries in 2012–2022—the t test (partial test) was employed in this study. Table 6 below displays the t test results for this investigation.

Table 6. T Test Results (Partial Test)

Variables	*Coefficient*	*Std. Error*	*t-Statistics*	*Prob*	**Information**
C	-193504.6	24489.85	-7.901418	0.0000	-
X1	0.000866	9.90E-05	8.746950	0.0000	Significant positive
X2	0.227548	0.280904	0.810055	0.4208	Positive is not significant
X3	-507.6517	421.0145	-1.205782	0.2322	Negatives are not significant
X4	-2.379543	2.108580	-1.128505	0.2632	Negatives are not significant

Based on Table 6, it can be seen that the regression equation obtained is as follows:

$Y = -193504.6 + 0.000866X1 + 0.227548X2 – 507.6517X3 – 2.379543X4 + e…(4.1)$

The population variable is the independent variable that has a partially significant effect on the dependent variable above, whereas GDP per capita has a positive but not significant effect, according to the significance value per variable based on the t probability value (p-value). The variables with probability values of 0.0000 < 0.05 for population size, 0.4208 > 0.05 for GDP per capita, 0.2322 > 0.05 for inflation, and 0.2632 > 0.05 for exchange rate are all present.

These findings indicate that, from 2012 to 2022, the population variable had a somewhat significant impact on the amount of seaweed exported from Indonesia to the major destination nations. In the meantime, there was no partially significant impact of the GDP per capita, inflation, and exchange rate factors on the volume of Indonesian seaweed exports to the main destination countries in 2012-2022. Meanwhile, the GDP per capita, inflation and exchange rate variables did not have a partially significant effect on the volume of Indonesian seaweed exports to the main destination countries in 2012-2022 because the t probability value (p-value) was higher than the five percent significance level.

c) Coefficient of Determination (R2)

In essence, the coefficient of determination (R2) expresses the extent to which changes in the dependent variable can be explained by the model. where the value of the coefficient of determination ($0 \leq R2 \leq 1$) falls between zero and one. A low R2 value indicates a restricted capacity of the independent variables to account for variations in the dependent variables. When the independent variables yield nearly all of the information required to forecast changes in the dependent variable, the value is close to unity. The test findings to determine the size of the Adjusted R-square value in this study are listed below.

Table 7. Coefficient of Determination Test Results (R2)

Coefficient of Determination Test Results (R2)	
R-square	0.988024
Adjusted R-square	0.986209
F-statistic	544.4826
Prob (F-statistic)	0.000000

The R-square value, as indicated by the above table, is 0.988024. This figure demonstrates that the population size, GDP per capita, inflation, and exchange rate taken together can account for 98.80% of the dependent variable, which is the amount of Indonesian seaweed exported to the major destination nations between 2012 and 2022.

Discussion of Research Results

The influence of the population of importing countries (X1) on the volume of Indonesian seaweed exports to export destination countries (Y)

With a probability value of 0.0000 < 0.05 and a tcount value of 8.746950 > ttable 1.6955 for the variable population size of the importing country, it can be concluded that H0 is rejected and H1 is accepted, indicating that the importing country's population (X1) has a significant and positive impact on volume. Exports of seaweed from Indonesia to its top destinations between 2012 and 2022 (Y). Assuming all other variables remain constant, the regression coefficient for the variable population of the importing country (X1) is 0.000866. This indicates that for every additional person in the importing country, the volume of Indonesian seaweed exports to the main destination countries between 2012 and 2022 will increase by 0.000866.

The findings of this study are corroborated by earlier research by Maulana and Kartiasih (2017), who found a significant and positive correlation between population and the amount of goods eaten. Amadeo and Maria's research from 2023, on the other hand, indicates that population has a positive and statistically significant impact on high technology exports, both in terms of employment and absolute terms.This implies that the nation where Indonesia exports seaweed will import more seaweed if population growth in that nation rises.

Naturally, this supports the research's premise, which states that the number of Indonesian seaweed exports to the primary target nations is positively and significantly impacted by those countries' populations. Therefore, it may be concluded that the populace is capable of describing the destination country's purchasing power with regard to imports of seaweed commodities. The amount of seaweed to be shipped will grow if the export destination country has a high population. This is due to the fact that the amount of seaweed exported from Indonesia is significantly

influenced by population size. This indicates that the amount of seaweed is significantly influenced by the population growth in export destination countries.

The influence of GDP per capita of importing countries (X2) on the volume of Indonesian seaweed exports to export destination countries (Y)

With a probability value of 0.4208 > 0.05 and a t value of 0.810055 < t table 1.6955 for the variable GDP per capita of the importing country, it can be concluded that H0 is rejected and H1 is accepted. This means that while the importing country's GDP per capita (X2) has a positive effect, it does not significantly affect the amount of Indonesian seaweed exports to the main destination countries in 2012–2022 (Y). Given that all other variables remain constant, an increase of 1 US dollar in the importing country's GDP per capita will result in a 0.227548 increase in the volume of Indonesian seaweed exports to the primary destination countries in the world. This is because the regression coefficient for the GDP per capita variable in the importing country (X2) is 0.227548.

The findings of earlier research by Nugraheni et al. (2021) indicating that North Sulawesi exports are not significantly impacted by the GDP per capita of export destination nations partially confirm this.The findings of these data tests contradict the study's hypothesis, which states that there is a slight but positive correlation between the GDP per capita of the destination nation and the volume of Indonesian seaweed exports to the main destination countries.

The purchasing power of the destination nation for imported seaweed commodities might be shown by a rise in the average income of the populace. The amount of seaweed to be exported will rise if the export target country has a high GDP per capita, although this will not have a major impact. This indicates that although there would be a slight increase in the volume of Indonesian seaweed exports to the export target country, the increase will not be substantial due to the average income of the population in that country. Furthermore, the data results are positive and not statistically significant, meaning that export destination countries will continue to acquire seaweed from Indonesia regardless of GDP per capita.

The effect of inflation in importing countries (X3) on the volume of Indonesian seaweed exports to export destination countries (Y)

The probability value of the importing country inflation variable is 0.2322 > 0.05, while the tcount value is -1.205782 < ttable 1.6955. Thus, it may be said that importing country inflation (X3) has a negative but not statistically significant impact on volume, with H0 being rejected and H1 accepted. Exports of seaweed from Indonesia to its top destinations between 2012 and 2022 (Y). Although the negative effect of inflation in importing countries does not have a significant effect on other variables, the regression coefficient for the inflation variable in the importing country (X3) is -507.6517, which indicates that, assuming other variables remain constant, a 1 percent

increase in inflation in the importing country will not necessarily reduce the volume of Indonesian seaweed exports to the main destination countries in 2012–2022.

This clearly contradicts the research's hypothesis, which is based on Sukirno's (2012) idea that inflation drives down the cost of imported goods relative to those made domestically. Nonetheless, the present study aligns with the findings of Nugraheni et al's (2021) research, which indicates that North Sulawesi exports are not significantly impacted by inflation in the country of destination. According to research from Apristiana, Ardha (2021), the number of Indonesian seaweed exports is unaffected by inflation in ten of the nations where seaweed exports are shipped.

This suggests that higher inflation in the export destination country raises the cost of goods, even though Sukirno's (2012) theory states that inflation lowers the cost of imported goods relative to those produced domestically, but only if inflation is not accompanied by higher income. Furthermore, it will be in vain since consumers will choose to spend their money on less expensive and more essential necessities. Because local prices are rising, Indonesian seaweed exports will not expand in volume if domestic consumption does not increase. Based on the data processing results, it can be inferred that inflation has a negative but not statistically significant effect; that is, an increase in inflation in export destination nations

The influence of the importing country's exchange rate (X4) on the volume of Indonesian seaweed exports to export destination countries (Y)

With a probability value of 0.2632 > 0.05 and a tcount value of -1.128505 < ttable 1.6955, the importing country's exchange rate variable is associated with a negative but not statistically significant impact on the volume of Indonesian seaweed exports to the main destination countries in 2012–2022 (Y). As a result, H0 is rejected and H1 is accepted. With other variables held constant, an increase of 1 US dollar in the importing country's exchange rate will not necessarily result in a decrease of 0.019468 in the volume of Indonesian seaweed exports to the primary destination countries between 2012 and 2022, according to the regression coefficient for the importing country exchange rate variable (X4), which is -2.379543.

This is undoubtedly at odds with the study's hypothesis, which is supported by research by Marbun (2015) and indicates that exports are significantly boosted by exchange rates. However, according to research by Bruno and Shin (2015), export volume is negatively impacted by the dollar exchange rate. The average decline in exports is a 2% drop when the US dollar appreciates by 1%. According to research by Octavira and Jayadi (2023), Indonesia's non-oil and gas exports from 2012 to 2019 are unaffected by inflation.

The amount of Indonesian seaweed sent to the primary destination country is negatively impacted by the exchange rate of the destination country, albeit not significantly. Thus, it can be concluded that a decline in the value of the currency will

lead to a fall in the volume of Indonesian seaweed exports because of a decline in demand brought on by a decline in the exchange rate, although this will not have a major impact.Based on the data processing results, it can be concluded that the exchange rate has a negative but not statistically significant effect. This means that a rise in the exchange rate in the country of export destination may cause a decline in the amount of seaweed exported to that country, but the decline that

CONCLUSION

The following conclusions might be made in response to the problem formulation based on the findings of the analysis that was presented in the previous chapter.

1) The volume of Indonesian seaweed exports to the primary destination nations in 2012–2022 is simultaneously influenced by population size, GDP per capita, inflation, and currency rates.
2) From 2012 to 2022, the number of Indonesian seaweed exports to the major destination nations is significantly and positively impacted by population size. GDP per capita has a slight but beneficial impact on the amount of seaweed exported from Indonesia to the major destination nations between 2012 and 2022. There is a slight but not substantial impact of inflation and exchange rates on the amount of Indonesian seaweed sent to the major destination countries in 2012-2022.

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