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Analysis of Crude Oil Price Determinants on Indonesia's Export Volume for the Period 1992 -2022

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ABSTRACT : This study was motivated by curiosity about the impact of world oil prices on the economy in Indonesia. The study was conducted in Indonesia and used secondary data from relevant agencies. The analytical technique used is multiple linear regression with time series data from 1992 to 2022. The results show simultaneous production variables, worldwide oil prices, growth, and exchange rates. have the same effect on export volumes. However, part of the production variable has a positive and significant impact, the world oil price variable has a positive but insignificant effect, the economic growth variable has a positive and significant impact, the exchange rate variable has a negative impact and insignificant to the volume of Indonesia's crude oil exports.

Keywords : Production, Price, Economic Growth And Exchange Rate

INTRODUCTION

Crude oil resources are one of the natural resources that are very helpful in turning the gears of a country's economy. In 2021, the total value of oil and gas exports from Indonesia is 22.38 billion USD (BPS, 2021). The state of domestic petroleum determines greatly to the volume of crude oil exports, if domestic oil prices are low, oil production tends to be used to increase exports. Not all countries have these oil resources (Chen et al., 2022; Lechthaler & Leinert, 2019; Shang & Hamori, 2021). Thus, there is exchange between countries or at the international level (Setryari, 2017). In a country with excess oil resources, it will export through international trade and import if it does not have these resources. However, if only one country has an absolute advantage, international trade will also harm other countries. This theory was advanced by Adam Smith (Tampubolon, 2020).

International trade plays an important role for Indonesia, which can stimulate the growth of domestic production so that the country can produce exports in a sustainable way. Here is an overview of Indonesia's oil and gas exports from 2016 to 2022:

Table.1 Oil and Gas Export in 2016-2022

Year	Sum
2016	13.105,5
2017	15.744,4
2018	17.171,7
2019	11.789,3
2020	8.251,1
2021	12.247,4
2022	24.560,0

Source (BPS, 2022)

From the table above, it can be seen that Indonesia's oil and gas exports were the highest in 2018, amounting to 17,171.7 million USD. But 2019 started to decline. This is because the Covid 19 pandemic has begun to hit countries around the world including Indonesia. And in Indonesia at the height of 2020 brought the entire economy to a standstill. Oil and gas exports are also affected by the Covid 19 epidemic (Adeleye et al., 2022; Drebee & Razak, 2022; Olamide et al., 2022). This can be seen in the reduction of oil and gas production in 2020 by a total of $8,251.1 million or a decrease of 4.94% compared to the crude oil output of the year. 2019 is 11,789.3 million US dollars. As a result, production affects the export supply of a commodity, so that commodity can be included in one of the factors that can affect export volumes(Patrick, 2019; Setiyawan, 2022; Singhal et al., 2019).In addition, prices can also affect export volumes, where the higher the price, the greater the supply of the product supplied. An exchange rate or exchange rate can be used as a factor in determining the profit or loss of a currency in international trade. Similarly, economic growth has a relationship with exports. Based on the background of Indonesia's crude oil export potential, the author is interested in examining the factors affecting the volume of crude oil exports in Indonesia.

Export

Exporting is the legal movement of an item from one country to another and usually requires the cooperation of customs in both the country of origin and the country of destination (Tampubolon, 2020). In theory, Adam Smith explained in his book The Wealth of Nations the theory of absolute superiority, according to which a country is said to have an absolute advantage if it can produce goods with Lower cost than other countries. Overproduction is the root cause of the existence of exporting countries (Mahrani & Efendi, 2022). But the theory of absolute advantage cannot provide a reason why a country without an absolute advantage might export. This is called the theory of comparative advantage proposed by David Ricardo. In this case, trade between countries becomes essential (Mahrani & Efendi, 2022). According to Samuelson and Nordhaus, the factors affecting the volume of exports depend on foreign income and output, and the exchange rate. and relative prices among countries abroad. If production abroad increases, the value of currencies of other countries decreases, the volume of exports will tend to increase and vice versa (Hassan, 2022; Nguyen, 2022; Ur Rahiman & Kodikal, 2019). An export-related study titled "Factors affecting Indonesia's coffee commodity exports to Australia in the period 1989-2016 concluded that at the same time, coffee prices, world, world, exchange rate and per capita income affect export volumes while changes in per capita income and world prices have a positive effect while world coffee prices and exchange rates have negative effects.

Furthermore, a study titled "Factors Influencing Export Intensity of Chinese Manufacturing Firms concluded that FDI, gender, innovation, technological development, and research affect Export levels of manufacturing firms in China, The study concludes that variables (exchange rates), global crude oil production and prices affect the volume of crude oil simultaneously and significantly export (Baek & Choi, 2021; Baek & Kim, 2020; Baek & Young, 2021).

Production

Production is the end result of an economic process that uses inputs to produce an output (Sukirno, 2019). The production will then be used to meet the daily needs of human life (Ghazouani, 2021). Consistent with research showing that export production quantity affects the ups and downs of exports, the increase in export volume is inseparable from the increase in production quantity (Santoso et al., 2022). The study titled Effects of production, international prices and exchange rates on export volumes concluded that together they affect export volumes. Similarly, a study titled The Effect of Gross Production, International Prices and Exchange Rates on Indonesian Paper Exports indicates that changing production volumes have a significant positive effect on exports. Indonesian paper exports, while prices and exchange rates have a negative and negligible impact on Indonesia's paper exports. The larger the foreign market share, the greater the demand for exports, but if there is no export demand, the output will decrease, which can cause economic instability.

Price

Price is the amount of money spent on a certain product to obtain benefits from that product (Kotler & Amstrong, 2018). In a transaction, the price is determined by the seller or the manufacturer expressed in currency. There are three things about pricing, namely: determine sales, profits and determine product image (Kotler & Amstrong, 2018). Similarly, the international price relative to the export quantity is that if the price of a material on the world market is higher than the domestic price, the larger the quantity of that material exported. The Effect of Of Price Behaviour on Indonesia CPO Export Quantity shows that export prices have a negative effect on the quantity of exports, (Budi et al., 2021). In addition, a study titled Analysis of the Impacts of Exchange Rates, Economic Growth and Export Prices on Indonesia's Tuna Exports for the period 2002-2014 indicates that export prices have a and partly to tuna exports while economic growth and exchange rate did not affect tuna exports.

Economic Growth

The economic growth of a country can be seen from the size of GDP. However, economic growth does not always increase export output (Barguellil, 2021; Jayathilaka et al., 2023). Economic growth can increase exports as more companies have capital to invest to increase long-term economic productivity, which can increase exports. However, during a recession, many companies are reluctant to invest and export growth slows. In theory, economic growth can affect exports because inflationary pressures lead to high interest rates. This can lead to a decrease in exports. The factors that determine the increase in exports are the demand of other countries, that is, export demand depends on the economic growth rate of other countries. Moreover, competitiveness means that if we can increase competitiveness and productivity, it will be more competitive. And the third is the exchange rate, a decrease in the exchange rate can lead to an increase in exports because the decrease in prices depends on the elasticity of export demand. The results conclude that increased economic growth will lead to increased exports. This study is consistent with research showing that economic growth expressed in GDP, exchange rate and FDI has a positive impact on non-oil and gas exports in Indonesia and also is the result of a study done in Pakistan with the conclusion that economic growth leads to increased exports (Farhana et al., 2017) .

Exchange rate

An exchange rate is the price of one country's currency relative to another country's currency (Fitri et al., 2022). Exchange rate is a very important economic indicator in exchange rate movements. The existence of differences in a country's currency, both exports and imports, will cause a difference in the exchange rate. Exchange rate movements are very important for the Indonesian economy, maintaining the stability of the rupiah exchange rate is very important for Bank Indonesia. The study titled "Analysis of Value Exchange Impacts on Indonesia's Major Exports" concluded that there is a positive and significant impact on rubber exports. For this reason, the government should try to increase exports so as not to run a deficit. This is consistent with the results of the study concluding that exchange rate and price had a positive and significant impact on Indonesia's exports (Kurniasari & Monica, 2019). In addition, there are also other research opinions that indicate that the rupiah exchange rate has a negative and negligible impact on Indonesia's crude oil exports. The results of the study titled "Impact of exchange rate on exports in the case of Pakistan" suggest that exchange rate has a negative but negligible impact on exports in Pakistan. Therefore, a stronger exchange rate will lead to less exports, since domestic prices are more expensive.

METHOD

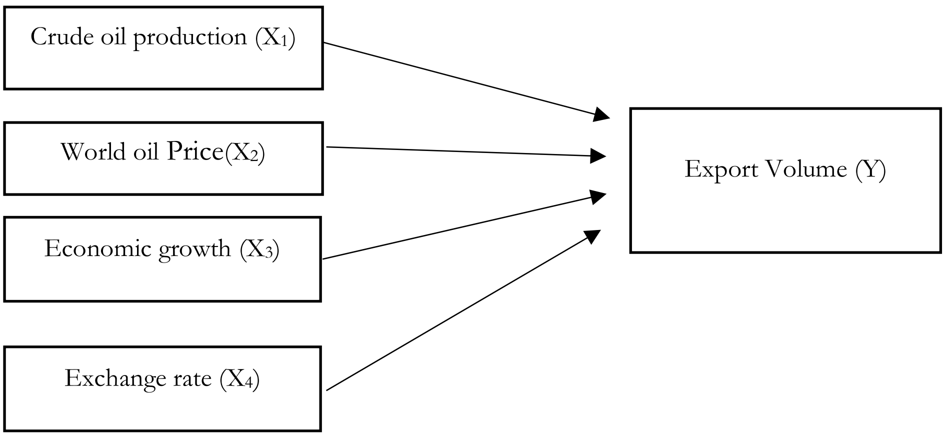
Researchers using the correlation method to analyze research data on the correlation between variables are used to find out the effect that occurs between the variables used in this study (Sugiyono, 2021). In addition, 30 Indonesian provinces were sampled in this study. With reasonable sampling technique in sampling. Four components are used, such as a dependent variable and four independent variables. Export volume is the dependent variable (Y) and the independent variable includes crude oil production (X 1), price (X 2), economic growth (X 3) and rupee exchange rate (X 4) .

Some of the means used in data recovery include:

1. Document as a report for BPS Central from 1991 to 2021.
2. Theories and methods are drawn from the literature review.

Thematic studies are described as follows:

Figure 1.Research scheme



The obtained results are collected, processed and analyzed by regression method.

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta 3 X_3 + \beta 4 X_4 + e$$

Where:

Y : Export Volume
X_1 : Cruide Oil Production
X_2 : Price
X_3 : Economic growth
X_4 : Exchange rate
β : Constants
ε_1 : *Error*

RESULT AND DISCUSSION

This study passed the classical hypothesis test and had no problems in the classical hypothesis test. This means that the variables of production, exchange rate and economic growth together affect export volumes by 85.2%. The remainder was influenced by other factors outside of this study. Here is the result of adjusted R2:

Table 1.R^2

Model Summary[b]					
Type	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.934[a]	.872	.852	118.106	1.305

a. Predictors: (Constant),Oil production,prices,economic growth, exchange rates
b. Dependent variable: Indonesia's crude oil export volume
Source: Data processed (2023)

The table above shows that the variable related to export output is simultaneously explained by the independent variables (output, world oil price, growth and exchange rate) with the rate of 85.2%, the rest is The influence of other factors was not included in this study. model.

While in the statistic test k F obtained the value sig (0.000) < α = 0.05, where the value of sig is less than the significance level of 0.05, that is, accept H1 and it can be concluded that the dependent variable of export output (Y) is also affected by the independent variable of production (X 1), world oil prices (X 2), economic growth (X 3) and value exchange (X4) significantly.

In addition, the partial test with t-test helps to know the degree of influence of each variable. Here are the results of the t-tests:

Table 2.Test t
Coefficients[a]

Type		**Unstandardized Coefficients**		**Standardized Coefficients**	**t**	**Sig.**
		B	Std. Error	Beta		
1	(Constant)	5.689	2.305		2.468	.020
	Crude oil production	.094	.040	.470	2.344	.027
	World oil prices	.042	.122	.071	.340	.737
	Economic Growth	.390	.157	.575	2.476	.020
	Rupiah exchange rate	-.144	.127	-.296	-1.134	.267

a.Dependent Variable: Volume of crude oil exports

Source: Data processed (2023)

From the table above we can write the equation :

$$Y= 5.689 +0.94\ X_1 + 0.42\ X_2+0.390X_3 - 0.144\ X_4+ e$$

The recorded constant is 5,689, which means the export volume variable if the variables of production, world oil price, economic growth, and exchange rate are held constant.

Based on the results of the partial test calculation, we get:

1. The production variable (X1) with the export volume (Y) obtained the calculated production variable t value of 2,344 with the significance level of 0.27 < 0 > 1.703, so it can be explained that the production variable has an impact positively on crude oil exports.
2. The change in world oil price (X2) according to export volume gives a significant value of 0.737 greater than 0.05. This shows that volatile world oil prices have a positive but insignificant effect on variable export volumes.
3. The economic growth variable (X3) with export output has a significant value of 0.020 less than 0.05. It can be concluded that economic growth has a positive and significant impact on export volumes.
4. The variable exchange rate (X4) with export volume can be obtained with a calculated t-value of -1.134 with a significance value of 0.267 greater than 0.05. This shows that a part of the exchange rate variable has no significant impact on export volumes.

The Effect of Production Variables, World Oil Price, Economic Growth and Exchange Rate Together on Export Volume

The production concept is that export products must be competitive in the world market(Taufiq & Natasah, 2019). While world oil prices, economic growth and exchange rates are factors that can affect exports. The world oil price is used as a standard in conducting international trade transactions The exchange rate is the basis for determining export prices.

The results of Uji Together (F-Test) show that the sig value of 0.000 dimana is less than 0.05 hence 0.000 < 0.05. This value shows that the variables of production (X 1), oil price (X 2), economic growth (X 3) and exchange rate (X4) all have an impact on the volume of oil exported (Y). . The result of the deterministic test (R 2) is 0.852 or 85.2% where exports affected by production, world oil prices, economic growth and exchange rates are 85.2%. . The remaining 24.8% are affected by other factors not mentioned in this study.

The results of this hypothesis support the researchers to conclude that the variables of the world crude oil exchange rate, production and price have a concurrent and significant influence on export volume (Anak Agung Bagus Gowinda) , Anak Agung Ketut Ayuningsasi, 2021).

Partial Effect of Production Variables on Export Volume

According to the t-test performed, the production variable is 0.094 with a significance level of 0.027. This result shows that production variables have a positive and significant impact on crude oil exports. English. These results support a study titled The Effects of Gross Production, International Prices and Exchange Rates on Indonesian Paper Exports indicating that a change in production quantity has a significant positive effect including Indonesia's paper exports, while international prices and exchange rates have a negative and negligible impact on Indonesian paper exports. Due to positive and significant results, it is possible that large crude oil production will increase export crude oil production and vice versa. Strong foreign demand for crude oil triggers an increase in production activity to meet foreign market demand. Production can also increase exports if the products produced by each company can improve the quality and quality set by the state for the purpose of Indonesia's oil exports. This is consistent with research showing that the quantity of export production will affect the rise and fall of exports, the increase in the quantity of exports cannot be separated from the increase in the quantity produced (Santoso et al., 2022).

Effect of Variable Crude Oil Prices Partially on Export Volume

Price increases are likely to influence purchasing decisions. If the price of crude oil is higher than the domestic price, a country tends to become an exporter. Producers will choose to sell oil abroad, on the contrary, if the world oil price is low, countries will tend to sell domestically. From the results of the t-test, it can be seen that the coefficient of the crude oil price (X2) is positive s 0.042 with a significance level of 0.737. The results show that the price variable has a positive effect but does not partially affect the export volume. The results of the study are consistent with the study titled Crude oil production, export prices and exchange rates, do they interact? Evidence from Nigeria (2006-2014) concludes that export prices have a positive but negligible effect on the quantity of exports (Budi et al., 2021).increase, supply will increase.The exchange rate of the producer's currency to the US dollar, has no significant effect.

Partial Economic Growth on Export Volume

From the results of the t-test, the value of the economic growth variable (X3) obtained is 0.390 with the significance level of 0.020 less than 0.05. The results show that the economic growth variable has a positive and significant impact on the volume of crude oil exports of Indonesia. The amount of economic growth of 1% will increase exports by 0.390. High economic growth marked by the use of factors of production to close the productivity gap encourages domestic industrial capacity to develop upstream industries downstream strengthening linkages between industries domestic industry to encourage local value chain improvement. Agreements and institutions such as improving the level of export base in Indonesia and international cooperation agreements such as expanding the market and increasing the types of export products in this case Indonesia should start Exporting oil already converted because the price is higher than the price of crude oil. The results of this study support the study titled "Reflecting the hypothesis of "Export-based growth" or "Export-based growth" about the Turkish economy in the period 1999-2021. concluded that economic growth will lead to increased exports.

Partial Exchange Rate Effect on Export Volume

From the results of the t-test, we know that the t-value of the exchange rate variable (X4) is -0.144 with a significance level of 0.267. The results show that exchange rate variables have a negative and insignificant impact on the volume of Indonesian crude oil exports. These results support the theory that exchange rate is one of the factors affecting export volume. This result also corroborates the results of a study titled "Impact of Exchange Rate on Exports in the Case of Pakistan" which found that exchange rate has a negative and negligible effect on exports in Pakistan. Therefore, a stronger exchange rate will lead to less exports. This happens because domestic prices are more expensive. A negative result indicates an inverse relationship between price and export volume, where if the rupee's exchange rate strengthens, the export volume decreases, and if the rupee's exchange rate strengthens, weakened, export volume increased due to cheap crude oil price of importers. This shows how important the exchange rate policy is to trigger an increase in crude oil exports from Indonesia. The exchange rate of the rupee against the US dollar plays an important role in international trade because it is possible to compare the prices of all goods and services produced in different countries.

CONCLUSION

The test results show that the value of 0.000 is less than 0.05, which means that the variables of output, world oil price, growth and exchange rate all affect Indonesia's crude oil exports simultaneously. In addition, the results of the determination test (R 2) were obtained in 85.2%. It is explained that the change in export volume affected by production, price, economic growth and exchange rate is 85.2%. The remainder was influenced by factors outside of this study. While a part of the production variable (X1) produces a value of 0.094 with a significance level of 0.027. less than 0.05. This result shows that the production variable has a positive and significant impact on the volume of crude oil exports of Indonesia. The value coefficient of the world oil price (X2) is 0.024 with a significance level of 0.737. This result shows that the world oil price has a positive but insignificant impact on Indonesia's crude oil exports. The value coefficient of the economic growth variable (X3) is 0.390 with the significance level of 0.020 less than 0.05 ie the growth variable. Same with the coefficient of variation of the exchange rate (X4) of -0.144 with a signature level of 0.267, meaning that the exchange rate in terms of value has a negative and negligible impact on crude oil exports from Indonesia.

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