The Effect of The Russia-Ukraine War And Economic Determinants on Indonesian Oil Imports

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Abstract: The war in Ukraine has caused Europe's natural gas prices to almost double and made world oil prices soar and supply was unstable. Indonesia has been an oil importing country since 2004, so fluctuations in oil supply and prices will greatly impact conditions in Indonesia. This research is to determine the effect of the Ukraine-Russia war on Indonesian oil imports by using a linear regression analysis of the ECM (Error Correction Model) to see long-term and short-term relationships with data from 2010 Q1 to 2022 Q4. This study found that the influence of economic determinants on Indonesia's oil imports was not the same in the long and short term

Keywords: Oil Import, Inflation, Money Supply, Exchange Rate

1. Introduction

Russia's invasion of Ukraine was the largest military action in Europe since 1945. It also signaled a high-risk economic war that could divide the world economy in a new century of economic conflict [1].

Russia supplies 10-25% of the world's oil, gaseous petrol and coal products to different nations, particularly in Europe, making the region more vulnerable due to the war in Ukraine. An increase in oil prices is inevitable due to concerns of supply disruption. On the other hand, it is not easy for other major oil producers such as Saudi Arabia and the United Arab Emirates to replace oil supplies from Russia, either economically or politically.

The dependence of many countries on petroleum is increasing as a result of rapid modernization (in Indonesia it has occurred since Pelita I). The world crisis of the 1970s was the result of the oil crisis. It is not surprising that many countries in the world are fighting over petroleum because it is the main source of energy for the entire planet and plays an important role in the development of modern industry and economy [2]

The data shows an upward trend in oil prices from year to year. Basic supply and demand factors will determine the level of oil prices in the market. The imbalance between supply and demand caused by the rise in oil consumption, along with OPEC's inflated price actions, is causing problems. The rapid growth rate of the world's population and industrialization are the determining factors of the imbalance. As a result, the world's oil energy supplies will be depleted and the consumption of oil as the main energy source will increase. It is estimated that by 2030 the world will still be dependent on petroleum energy sources because the shift to renewable energy sources is still not enough to meet the demand.

Both internal variables, such as government policies, and foreign influences affect the Indonesian economy inseparably. One element that affects the Indonesian economy is rising oil

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prices. Due to Indonesia's net oil imports since the third month of 2004, changes in oil prices have a significant influence on the country's economy and cause an increase in inflation[3].

The main source of energy in Indonesia today is petroleum, so there is currently a scarcity due to limited resources and due to supply-side disruptions because of geopolitical effects from oil-producing countries. Therefore, it is time for Indonesia to develop the potential of existing and unexploited resources and not only rely on imports of petroleum to cover the large consumption demand. The budget set by the government, which should be used as capital to drive the national economy, will undoubtedly be disrupted by foreign exchange provided for imports. Thus, it can be said that oil imports significantly affect economic development.

2. Literature Review

2.1 Economic Growth

Economic growth is defined by Kuznets as economic growth that takes place over time and enables a country to provide a wider range of material commodities to its citizens [4]. The ability to grow is consistent with technological, institutional and ideological progress.

Real Gross Domestic Product or real per capita income continues to grow as a result of increased productivity per capita. This is the process of economic growth [5]. Economic growth can be summarized as aggregate national income or output increase over a period of time, usually expressed in annual terms or economic growth is an increase in the physical production capacity of goods and services over a certain time.

2.2 World Oil Price

The oil and gas business is subject to cyclical fluctuations in oil prices. The method used to determine Indonesia's crude oil price (also known as the "Indonesian Crude Price" or "ICP") is a weighted average value of data from reliable sources that track global oil transactions, such as Platts, RIM, and APPI [3][6]. Platts is a supplier of information services covering gas, electricity, petrochemicals, coal, nuclear power, and other energy sources beyond oil. RIM Intelligence is an impartial organization that tracks oil price information in the Middle East and Asia Pacific markets.

The Asian Oil Price Index (APPI) is a price index based on a panel data system, i.e. the pricing of oil by industry participants (oil traders, refineries, oil companies, etc). It is published by SeaPac Service, headquartered in Hong Kong, and is considered a common pricing mechanism for the East Asia region. The ratio of Platts and RIM in the APPI calculation is 50:50 since 2007.

West Texas Middle of the road (WTI) is a level or mix of raw petroleum [7]; the term is additionally used to allude to the spot cost, prospects cost, or surveyed value for such oil [8].

2.3 Exchange Rate

Every country in the world uses foreign exchange as its official currency. For examples are the US dollar for the United States, the Yen for Japan, and the Pound Sterling for the United Kingdom. The foreign exchange market supply and demand for foreign money. The money of another country is valued in the local currency and is known as the foreign exchange rate. Comparing or setting the price of two currencies is what foreign exchange rates do [9], [10]The comparison of the value or price of two currencies will follow the exchange between two separate currencies. The exchange rate is the name given to this comparison of value.

2.4 Inflation

A widespread and sustained rise in commodity prices is known as inflation [11][12]. According to this definition, widespread and continuous price increases must also be present for a situation to be considered inflationary. Inflation is not always caused by a temporary and periodic increase in commodity prices. When there is more money in circulation than goods available for purchase, inflation results, and the prices of those commodities tend to increase or become more expensive. Deflation, which is characterized by a broad decline in prices, is the opposite of inflation.

The difference between international and domestic inflation is added to the percentage change in the real exchange rate to arrive at the percentage change in the nominal exchange rate [13]. Since the real value of the rupiah is greater than the foreign currency, the demand for it increases sharply when the inflation rate in other countries is higher than in Indonesia.

Greater income inequality is the result of high inflation [12]. While some individuals are able to increase their actual income as a consequence, the majority see their real income decline. As a result of declining purchasing power due to lower real incomes as a result of rising prices of goods in the country, state revenues will decline.

2.5 Money Supply M2

Cash supply is an essential macroeconomic component that impacts financial development in an economy by guaranteeing powerful running of monetary exercises in both public and confidential areas through liquidity accessibility. Through cash supply, the confidential areas can get credits to carry on organizations at a cost being alluded to as loan fee. Cash supply is a financial strategy device that is profoundly fundamental in helping monetary development of a country [14].

There are various estimations of cash supply. Every one of them are broadly utilized and the specific arrangements rely upon the country. M0 and M1, likewise called thin cash, regularly remember coins and notes for flow and other cash reciprocals that are effectively convertible into cash. M2 incorporates M1 in addition to shortterm time stores in banks and 24-hour currency market reserves [15][16]. The narrow money supply (narrow money = M1) and broad money supply (broad money = M2) are the most commonly used measures to examine the effect of money on the economy. card money, demand deposits, and quasi money all form the monetary system's liabilities to the domestic private sector [17]. Thus, M2 equals M1 plus quasi money.

2.6 Oil And Gas Exports

Selling products and services outside the country is known as exporting. Increased exports not only result in higher foreign exchange earnings, but also increased domestic production capacity and real domestic production capacity, both of which have an influence on employment growth [11]. Exports are products and services provided to other countries in exchange for commodities or cash.

Whenever there is overproduction of a product, the country that exports the commodity can benefit. Since these domestic goods will have a lower price when production is easy and plentiful, the government will be seen as being able to regulate the price of export products that occur in the country. Success in expanding exports also shows an increase in competitiveness and is an indicator of the rise of positive dynamics in the entrepreneurship of a [18].

2.7 Oil Imports

A process of buying goods from other countries officially into their own country. This stage is like entering goods or commodities from other countries to one's own country. Import of goods in large quantities requires the intervention of the customs managers in each country concerned. Imported products are goods that are not capable of being produced or have been can be produced, but not enough to meet the needs of the people[3][19].

The imports of a country determined by the high competitiveness of the country other sales protection is implemented by the country by collecting exchange rates or foreign exchange [9][10]. The main determinant of imports is the income income of a country's society, the higher the higher the income of the people, the more imports are made.

For oil bringing in nations, the last option cost increment prompts a disintegration of the exchange balance and resulting deterioration of the public money [20]

2.8 RUSSIA-UKRAINE War

The main source of energy in Indonesia is currently petroleum, so there is currently a scarcity due to limited resources and due to supply-side disruptions due to geopolitical effects from oil-producing countries.

From year to year, oil prices tend to rise. Basic supply and demand factors will determine the level of oil prices in the market. The imbalance between supply and demand caused by the rise in oil consumption, along with OPEC's price-gouging actions, poses a problem. This causes fluctuations in oil prices to be considered a measure of the world economy, and is a hot topic at economic and political forums around the world especially the disruption from Russia-Ukraine War.

3. Hypotheses submission

The conceptual framework of this research is presented in Fig.1 below with the relationship among the variables : Import Oil, Gross Domestic Product, Exchange Rate, Inflation, Money Supply M2, World Oil Price, Oil and and Gas Export and dummy variable is Russia-Ukraine War.

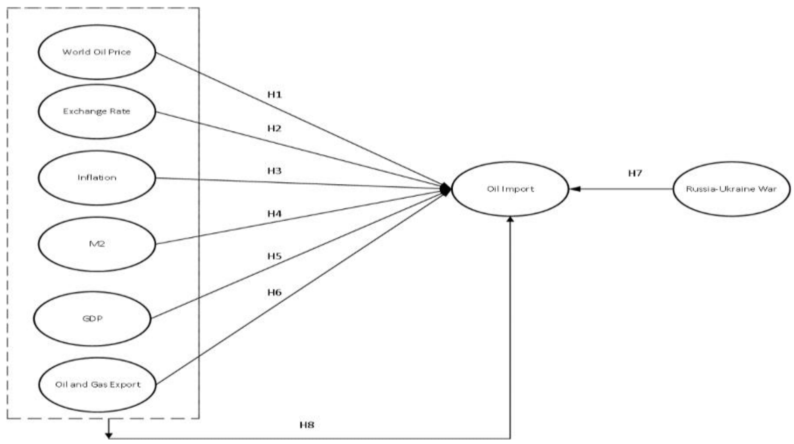

Fig. 1. Conceptual Model of the research.

Based on the subject matter supported by relevant theories and previous research, the hypothesis or temporary answer of this study is as follows :

H1: World Oil Price has significant influence on Indonesian Oil Import.
H2: Exchange Rate has significant influence on Indonesian Oil Import.
H3: Inflation has significant influence on Indonesian Oil Import
H4: Money Supply has significant influence on Indonesian Oil Import
H5: Gross Domestic Product has significant influence on Indonesian Oil Import
H6: Oil and Gas Export has significant influence on Indonesian Oil Import.
H7: Russia-Ukraine War has significant influence on Indonesian Oil Import.
H8: World Oil Price, Exchange Rate, Inflation, Money Supply, Gross domestic Product, Oil, Gas Export and Russia- Ukraine War has significant influence on Indonesian Oil Import

4. Method

The data used in this research is quantitative data and utilizes literature study on the effect of the Ukraine-Russia war and economic determinants on Indonesia's oil imports. Secondary time series data for the quarters 2010Q1-2022Q4 based on BPS data for gross domestic product expenditure, oil imports, oil and gas exports. Money supply (M2), exchange rates, inflation are taken based on data from Bank Indonesia (BI), as well as world oil prices based on Western Texas Intermediate (WTI) data.

The technique utilized in this review is the Mistake Remedy Model (ECM) approach, since the model can test whether the experimental model is predictable with monetary hypothesis and the arrangement of time series factors is non-fixed and deceptive relapse [21]. Spurious regressions are regressions that do not reveal the truth, with significant regression results from unrelated data and to determine the direct and long-run impact of each independent variable on the dependent variable. Sargan, Engle, and Granger claim that the Error Correction Model (ECM) is a method for balancing long-run and short-run fluctuations and can explain the relationship between past and present dependent and independent variables.

Stationary test, degree of integration test, and cointegration test are three tests that must be performed to determine the linear regression model using the Error Correction Model (ECM) technique. These assumptions must be met before the model can be determined.

The regression equation that will be tested in this study is as proposed by Nyangarika, Mikhaylov and Richter (2019) on the relationship between fiscal structure and macroeconomic indicators.

$$\text{Log(Import)} = \propto + \beta_1 \text{ Log (GDP)} + \beta_2 \text{ Log (inflation)} + \beta_3 \text{ Log (Rate)} + \beta_4 \text{ Log (M2)} + \beta_5 \text{ Log (Eksport)} + \beta_6 \text{ Log (Price)} + \beta_7 \text{ (War)} + \epsilon_1$$

Which :
Log (Import) = Indonesian Oil Import
Log(GDP) = Gross Domestic Product
Log (Inflation) = Inflation
Log (Rate)= Exchange Rate
Log (M2) = Money Supply M2
Log (Eksport) = Oil and Gas Export
Log (Price) = World Oil Price
War = dummy Russia-Ukraine War

5. Result

At Table 1 shows that seven variables are stationary at the first differencing level, significantly at the 5 percent level. Therefore, it can be said that all the data used in this study are integrated at first differencing.

Table 1. Augmented Dickey Fuller result at 1stDifference.

Variable	ADF	P	Description
Log Import	-8.136479	0.0000	Stationer
Log Price	-6.533873	0.0000	Stationer
Log Inflation	-5.469506	0.0000	Stationer
Log Rate	-4.921793	0.0002	Stationer
Log M2	-6.101698	0.0000	Stationer
Log GDP	-7.606117	0.0000	Stationer
Log Eksport	-6.818105	0.0000	Stationer

Long-Term Analysis

Regression equation is formulated as follows:

Log(Import) = -8.461584 + 0.434035* Log (GDP) +0.172677* Log (Rate)+ 0.125253* Log (inflation) + 0.106623* Log (M2) + 0.622890* Log (Price) – 0.084587*War

Table 2 shows that the independent variables of price, inflation, oil and gas exports have a significant effect on the dependent variable of Indonesian oil imports.

Table 2. Long-Term Analysis Coefficient

Variable	Coefficient	P-Value
Log Price	0.622890	0.0001
Log Inflation	0.125253	0.0365
Log Rate	0.172677	0.6278
Log M2	0.106623	0.7500
Log GDP	0.436800	0.2774
Log Eksport	0.554582	0.0000
War	-0.084587	0.2833
Constanta	-8.486349	0.0001
R-Squared	0.945595	
Adjusted R-squared	0.936939	
F-statistic	109.2489	
DW stat	2.275271	

The result of this study (Table 2) is find that in the long run an increase of 1% world oil price will cause an increase of 0.62% Indonesia Oil Import. An increase of 1% of Inflation will cause an increase of 0.125% Indonesia Oil Import. An increase of 1% of Exchange Rate will cause an increase of 0.17% Indonesia Oil Import. An increase of 1% of Money Supply will cause an increase of 0.106% Indonesia Oil Import. An increase of 1% of Gross Domestic Product will cause an increase of 0.43% Indonesia Oil Import. An increasing of 1% of Oil and Gas Export will cause an increase of 0.55% Indonesia Oil Import. And Russia-Ukraine war will negative impact on Indonesian Oil Import.

Short-term Analysis

Regression equation is formulated as follows:

D(Log(Import)) = 0.006146 – 0.005382*D(Log(GDP)) + 0.677549*D(Log (Rate)) + 0.232943*D(Log (Inflation)) – 0.075367*D(Log (M2)) + 0.670994*D(Log (Price)) + 0.460338*D(Log (Eksport))– 0.045626*War –1.243194*RESID (-1)

. **Table 3.** Short-Term Analysis Coefficient

Variable	Coefficient	P-Value
D(Log Price)	0.670994	0.0000
D(Log Inflation)	0.232943	0.0040
D(Log Rate)	0.677549	0.1992
D(Log M2)	0.075367	0.9365
D(Log GDP)	-0.005382	0.9916
D(Log Eksport)	0.554582	0.0000
War	-0.045626	0.3927
Resid(-1)	-1.243194	0.0000
Constanta	0.006146	0.8391
R-Squared	0.869755	
Adjusted R-squared	0.844946	
F-statistic	35.05852	
DW stat	1.872920	

The result of this study (Table 3) is find that in the short run the impact of Gross Domestic Product is different direction while the other variables is same. The ECM model is certainly inseparable from the ECT (Error Correction Term), the ECT coefficient of -1.243194 indicates that the previous period's disequilibrium is corrected in the current period by 1.24%. ECT shows how fast the equilibrium reached back into long-run equilibrium. which shows the long-run and short-run adjustments to return to equilibrium position has a slow convergence rate because the coefficient is negative. The value of the error correction of 1.24 indicates that the adjustment to the GDP equilibrium condition is 0.8 years or 10 months.

6. Discussion

From the above description that has been explained previously, the following result can be drawn as:

1. In the long run, the GDP level has a positive and not significant effect on oil imports. But in the short term the level of GDP has a negative and not significant effect. This means that the high GDP will reflect the growth of Import Oil in the long run, due to the demand from people's needs for energy supply so as to maintain fiscal and monetary stability so that the impact of the war has a worse effect on Indonesia's economic growth.
2. In the long and short run the inflation rate will have a positive and significant effect on Import Oil. It needs to be further investigated the relationship of oil and gas imports caused by greater population growth with energy needs.
3. In the long and short run, the exchange rate has a positive and not significant effect on Import Oil. This is also due to the high demand for domestic oil and the amount of Indonesian oil and gas exports which results in additional foreign exchange, but at the same time must import energy.

4. In the long and short run , money supply M2 has positive and not significant effect on Import Oil. It can be mean the policy of Government is impacting of oil import especially on the local price subsidies by government.
5. In the long and short run, world oil prices will have a positive and significant effect on Imports Oil. This can also be explained by the amount of Indonesian oil and gas exports, as well as fluctuating prices on the market, and exchange rates that tend to be unstable, and also the demand for oil in the market because no alternatif energy yet.
6. In the long and short run, oil and gas exports will have a positive and significant effect on oil imports. This can also be explained by the number of national needs that are increasingly high, so that the export of oil abroad does not mean that domestic needs have been met first.
7. In the long and short run, the effect of the Russia-Ukraine war will negatively affect oil imports. In the long run it will reduce oil imports greater than in the short term so that the government must more quickly help the settlement of the Russia-Ukraine war so as not to adversely affect the economy and the supply of Indonesia's needs and national energy needs or develop alternative energy.

7. Conclusion and suggestion

The result of this research found that the influence of Gross Domestic Product on Indonesia's oil imports was not the same in the long and short term, while the other have economic determinant have have the same direction and the significant level.

In the short term there are other variables that increase of influencing Indonesia's oil imports. The increase in oil prices in the international market increase the inflation and also cause interest rates to rise. The Indonesian government needs to develop alternative energy such as CPO for biodiesel or solar energy and others so as to reduce oil consumption by converting energy from fossil to non-fossil. this is because Indonesia is an oil importing country so that fluctuations in world oil prices will have an impact on the country's economic performance.

The effect of oil and gas exports against Indonesia's oil imports, the government need to further maintain the development of natural resources and seek new oil and gas reserves, maintaining the age of oil and gas reserves is to increase exploration activities, the government is expected to manage raw materials into finished goods in order to increase selling prices on the international market.

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