The Role of Export in Boosting Indonesia's GDP during Crisis: Macroeconomic Conditions

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Abstract

Research examining the determinants of export activities affecting economic growth during the pandemic is gaining global interest, particularly in Indonesia, which recently reduced its fuel subsidy as a unique case in this field. Hence, this study examines the role of export and macroeconomic conditions, including fuel price, exchange rate, and interest rate, in boosting Indonesia's GDP during the crisis. We examine this relationship by conducting a structural equation model and path analysis on secondary data from 1995-2022. The result shows that both partially and simultaneously, fuel prices, exchange rates, and interest rates significantly affect exports. On the other hand, an increase in export activity improves Indonesian GDP. Thus, simultaneous control of fuel prices, exchange rate, interest rate, and export value can improve Indonesian GDP growth even during the crisis. Based on this result, this article proposes suggestions to the government for a stable fuel price, exchange rate, interest rate, and government policy to promote future economic growth.

Keywords:
economic growth; fuel price; exchange rate; export; gross domestic product

How to Cite:

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INTRODUCTION

For the last thirty years, Indonesia has been striving to improve development cooperation through various means available. This effort is implemented by improving the national status and identity through international events and global countries incorporated in the G20 (Dal & Dipama, 2019). Furthermore, encouraging non-fossil fuel export has affected the Gross Domestic Product (GDP) expansion through fuel price and currency exchange rate stabilization (Douvan, 2019) through fuel subsidy elimination, which leads to rising raw material cost, auxiliary material cost, and cost of capital (Chandrarin et al., 2022; Heriqbaldi et al., 2022). This condition encourages the Bank of Indonesia to exercise stringent control on foreign currency exchange rates and interest rates to maintain the stability of imported fuel prices (Mukhlis et al., 2020). The growth of non-oil and gas exports, affected by the current unstable fuel price, exchange rate, and interest rate, resulted in GDP growth of minus 3.46 percent during the 2020 crisis.

Table 1. Fuel Prices, Exchange Rates, and Export 2012-2022

Year	Fuel Price (IDR)	Growth (%)	Exch. Rate (IDR)	Growth (%)	Export (M)	Growth (%)	GDP (M)	Growth (%)
2012	4,500		9,400		153,043.10		8,319,127.94	
2013	6,500	44.44	11,977	27.41	149,918.80	(2.04)	9,192,837.78	10.50
2014	8,500	30.77	12,440	-	145,961.10	(2.64)	10,688,792.04	16.27
2015	7,600	(10.59)	13,795	10.89	131,791.80	(9.71)	11,673,530.08	9.21
2016	6,450	(15.13)	13,436	(2.60)	132,080.90	0.22	12,546,336.00	7.48
2017	6,450	-	13,548	0.83	153,084.00	15.90	12,700,306.00	1.23
2018	7,000	8.53	14,481	6.89	162,841.00	6.37	14,991,200.00	18.04
2019	7,650	9.29	13,900	(4.01)	155,893.80	(4.27)	15,992,460.00	6.68
2020	6,450	(15.69)	14,037	0.99	181,304.49	16.30	15,439,815.00	(3.46)
2021	7,800	20.93	14,269	1.65	219,362.10	20.99	16,996,538.91	10.08
2022	10,000	28.21	15,731	10.25	379,176.00	72.85	18,099,867.94	6.49

Source: Bank of Indonesia (2022)

The rise in fuel prices affects other sectors because fuel has become the driving force of economic activities and is a crucial input in production. Currently, fossil fuels (oil) become the primary inputs, particularly for generating electricity, fueling production machinery, and transporting products to the market. A rise in fuel price will increase the overall production cost, leading to a higher selling price of a product in the market (Balta-Ozkan & Watson, 2017). Other than fuel price increases, a country's currency exchange and interest rates also affected exports (Spahiu & Durguti, 2023).

Indonesian GDP has both positive and negative traits. Regarding positive traits, Indonesian GDP depends on the domestic economy, which is only slightly affected by international conditions. On a negative note, the Indonesian GDP tends to record a decrease in the contribution of the trade surplus. This condition leads to a trade balance

deficit due to the massive number of imported products that are detrimental to local products today.

Global investors have found new confidence in Indonesia's economic condition; thus, foreign investment remains under government monitoring to measure the investment entering Indonesia (McLeod & Rosdaniah, 2018). However, fuel price contributes to the global inflation rate, leading to a higher production cost and production material price. Following this situation exported products from Indonesia will be less competitive in the international market, resulting in a decrease in exports (Baek, 2021). Indonesia needs help managing the rise of fuel prices due to its high dependency on imported oil fuel, which significantly burdens the national budget. Moreover, the country has to provide fuel subsidies to support its citizens' livelihood, thus resulting in a budget deficit (Badli et al., 2020).

On the other hand, the US dollar exchange rate on global currency directly affects the import value of raw materials, semi-finished goods, and capital, thus increasing production costs and reducing supply (Mandigma, 2019). Because of this, Indonesian products become less competitive, which leads to reduced export prices and value (Ajija et al., 2021). This chain of events contributed to Indonesia's decreased non-oil and gas export growth. It affects Indonesian economic growth, reflected in stagnant GDP growth that can hamper the overall economic expansion.

Additionally, the COVID-19 pandemic and the Russian-Ukraine war have had a significant effect, creating a food and energy crisis, further aggravating price rises, and hampering non-oil and gas exports (Cui & Maghyereh, 2023). Cui & Maghyereh (2023) argued that international trade activities in Indonesia were also affected by the COVID-19 pandemic (Jiying et al., 2020). Meanwhile, the Russian-Ukraine war that started in March 2022 has shifted global economic growth downward. According to the World Bank prediction, the global economic growth in 2021 was recorded at 5.7 percent and was corrected to 2.9 percent in 2022. This crisis leads to weak investment, a situation during the global pandemic faced by all business sectors (Mishra et al., 2020). An increase in the exchange rate will also increase production costs, making national export product prices less competitive than other countries' product prices (Burstein & Gopinath, 2014). The exchange rate also affects Indonesian export activities. A Low currency exchange rate will affect raw material, semi-finished goods, and capital goods import value, which are essential for the Indonesian economy (Gohar et al., 2023; Sarkodie & Owusu, 2021).

Interest rate has also been found to affect export performance indirectly. Spahiu and Durguti (2023) found a relationship between interest rate, export performance, and country GDP. The high-interest rate will also affect production and capital costs, affecting the business's ability to pursue export markets. International trade become a significant part of the global economy. This trade consists of cross-border trade activities, sales of goods to foreign countries (export), and purchase of goods from other countries (import), which are necessary for developing countries (Zheng & Walsh, 2019), including Indonesia. Indonesia has implemented global trade to boost non-oil and gas exports,

which has a huge opportunity to increase the national GDP, especially in the digital era (Gregory et al., 2019).

Export and import growth become an integral part of the activity that supports economic development through GDP growth (Hakim, 2012). Indonesian oil export shows a decrease, encouraging the government to focus on non-oil and gas exports. Restricting palm oil export (non-gas) will increase palm oil farmers and improve community welfare (Mancheri et al., 2019; Shahbaz et al., 2019). Export trade was supported by a sufficient supply chain and international goods shipping efficiency (Khan et al., 2019). The non-oil and gas export includes other mining commodities, processing industries, and agriculture products.

Raw material transportation uses oil-fueled freight, and fuel price increases will significantly affect Indonesian exports. Therefore, effective and efficient energy usage is necessary to develop global business (Osano, 2019). Development program to maintain fuel supply does not hinder export activities in Indonesia (Abdikeev et al., 2019) because of the implementation of effective and efficient means of transportation following the need for the shortest transportation route to save freight costs. This strategy will attract investors to increase their export trade (Paudel et al., 2020).

The oil fuel supply also significantly affects production and community consumption. The government determines oil fuel supply through the Ministry of Energy and Mineral Resources of Indonesia (ESDM) by considering State finances. The government set a policy to manage the fluctuating oil fuel price by reducing fuel subsidies and allocating the funds to other sectors, such as health and education. The national economic growth needs to be improved by increasing oil fuel scarcity and cost (Aucott & Hall, 2014). In the short term, oil price volatility can positively impact Indonesian economic development. The national GDP is highly dependent on the lagging value; thus, it is difficult to predict future economic growth (Hussain, 2020).

The applied exchange rate conversion and provision of the need for raw material import affect the currency exchange rate. The exchange rate refers to the conversion ratio of a currency to another currency from other countries based on the value of the currency. In rupiah, the amount of local currency needed to obtain one unit of foreign currency is enormous. As a developing country and a member of the ASEAN free trade area, Indonesia takes advantage of the available trading facilities to promote higher export levels in this region, which is free from trade restrictions (Iacoviello & Navarro, 2019). The exchange rate is the agreed price between two countries during international trade. The rupiah becomes the preferred means of payment for export and import trade transactions due to its high stability and is used by all countries in cross-country goods transactions. There is a need for a policy to set the rupiah exchange rate as a tool to drive economic growth and to isolate the national economy from global economic turmoil. The fluctuating exchange rate will affect all company transactions, either export-related or import-related.

Aside from the rupiah exchange rate, the need for GDP calculation can be done using three approaches. These approaches are Production-based, Income-based,

and Consumption-based (Badan Pusat Statistik, 2010). GDP calculation based on consumption or expenditure is calculated from the total output value resulting from household consumption instead of profit-based expenditure, added to government investment and net export value (Iacoviello & Navarro, 2019). The effect of fuel prices on GDP growth can be the decision-making tool for parliament members (Abdelsalam, 2020). A similar case happened to the US economy because of the Katrina and Rita hurricanes in 2005, resulting in natural gas prices reaching the highest point. Natural gas is an important energy source for the US economy, and the price rise has created a significant economic slowdown, particularly in the manufacturing sector that consumes natural gas. This analysis stretched to the macroeconomic sector, where the real GDP growth substantially increased crude oil (Kliesen, 2006). GDP has become an essential indicator in measuring economic conditions and development in a country. GDP can be calculated by the constant or specific price of the added value produced by all business units or as the total value of economic units for goods and service production (Badan Pusat Statistik, 2022).

Previous research states that export positively affects GDP (Spahiu & Durguti, 2023). However, in the short term, export has a negative and non-significant effect on economic growth. To solve this condition, one of the efforts to increase economic growth is by increasing finished goods export trade. Thus, the current study examines the effect of macroeconomic conditions, including fuel price, exchange rate, interest rate, and exports, on Indonesia's GDP during the crisis.

This research contributes to the academic discussion by examining the relationship and effect (both partial and simultaneous) of fuel price, exchange rate, and interest rate on export trade value, which then affects the Indonesian GDP growth during the crisis, to stimulate future economic growth. It is essential to discuss the role of fuel prices and other macroeconomic conditions in this paper, considering that removing fuel subsidies could have an extensive effect on economic activities.

METHOD

The current study analyzed the effect of fuel price, exchange rate, and interest rate on non-oil and gas exports and its impact on Indonesia's GDP during the crisis. The statistical analysis was conducted on secondary data collected from 1995 to 2022 from Bank Indonesia and Central Bureau of Statistics (BPS) and related ministries with 28 observations, as summarized in Table 2. The collected data were analyzed using path analysis on Eviews 10 software to assess its correlation and relationships.

Fuel price was measured from the price of Premium and Pertalite (subsidized fuel in Indonesia), as reported by the Ministry of Energy and Mineral Resources (ESDM). The exchange rate was measured according to IDR to USD middle exchange rate at the end of the observation year, as reported on Bank Indonesia's website. The variable interest rate was measured from the retail interest rate reported on Bank Indonesia's website. Indonesia's non-oil and gas export value was assessed from BPS and is reported

in thousands of USD. The dependent variable of this study, GDP, is reported in trillion of IDR as reported on BPS' website.

Table 2. Collected Data

Year	Fuel Price	Exchange Rate	Interest Rate	Export	GDP
1995	700.00	2,308.000	18.85	37,290.00	389,932.88
1996	700.00	2,383.000	19.22	38,092.90	420,947.42
1997	700.00	4,650.000	21.82	41,821.00	439,751.52
1998	1,200.00	8,025.000	32.15	40,975.00	381,756.57
1999	1,150.00	7,100.000	27.66	38,873.20	390,200.90
2000	1,150.00	9,595.000	18.46	47,757.40	1,432,916.73
2001	1,450.00	10,400.00	18.55	43,684.60	1,683,805.41
2002	1,550.00	8,940.000	18.95	45,046.10	1,861,687.51
2003	1,550.00	8,465.000	16.94	47,406.90	2,054,570.67
2004	1,550.00	9,290.000	14.12	55,939.20	2,340,092.45
2005	4,500.00	9,830.000	14.5	66,428.36	2,825,104.31
2006	4,500.00	9,020.000	15.98	79,589.04	3,397,400.52
2007	4,500.00	9,419.000	13.86	92,012.40	4,018,202.97
2008	6,000.00	10,950.00	13.6	107,894.23	5,031,436.82
2009	4,500.00	9,400.000	14.5	94,491.70	5,697,977.97
2010	4,500.00	8,991.000	13.25	129,739.50	6,535,537.24
2011	4,500.00	9,068.000	12.4	162,019.50	7,514,516.00
2012	4,500.00	9,400.000	11.7	153,043.10	8,319,127.94
2013	6,500.00	11,977.00	11.86	149,918.80	9,192,837.78
2014	8,500.00	12,440.000	11.86	145,961.10	10,688,792.04
2015	7,600.00	13,795.000	10.75	131,791.80	11,673,530.08
2016	6,450.00	13,436.000	10.5	132,080.90	12,546,336.00
2017	6,450.00	13,548.000	10.25	153,084.00	12,700,306.00
2018	7,000.00	14,481.000	9.95	162,841.00	14,991,200.00
2019	7,650.00	13,900.0000	9.95	155,893.80	15,996,538.91
2020	6,450.00	14,037.0000	8.25	181,304.49	15,439,815.00
2021	7,800.00	14,269.005	8.25	219,362.10	16,996,538.91
2022	10,000.00	15,731.000	8.3	379,176.00	18,099,867.94

Sources: Bank of Indonesia (2022)

This study examined the relationship between independent and dependent variables, as represented in Figure 1.

$Y1 = a + b1X1 + \varepsilon$ ………………………………(1)

$Y2 = a + b2 X2 + \varepsilon$ ……………………………...(2)

$Y3 = a + b3 X3 + \varepsilon$ ……………………………...(3)

$Z = a + b4 Y + \varepsilon$ ……………………………..(4)

Notes:

Y   = Non-oil and gas export is an intervening variable

X1 = Fuel Price

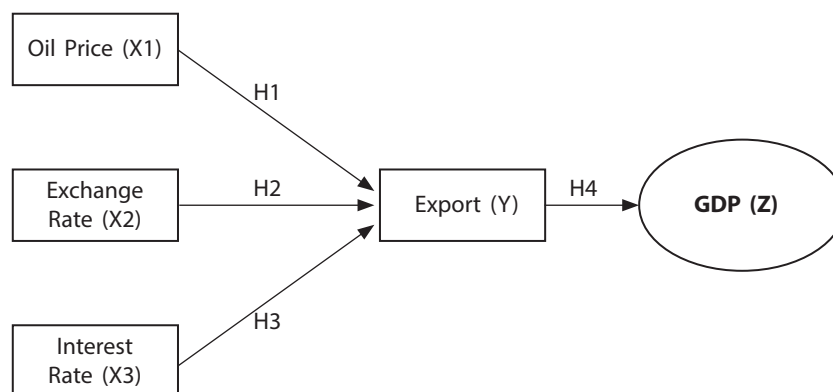X2 = Exchange Rate

X3 = Interest Rate

Z   = Gross Domestic Products (GDP)

ε   = Standard error

The collected data were analyzed through several statistical analyses, starting from the descriptive analysis of the variables, classical assumption test, correlation, and structural equation modeling using path analysis on EViews 10 software. Descriptive analysis of variables aims to examine the group's characteristics and differences (Hair, Black, Babin, & Anderson, 2018). The following test was the classical assumption test consisting of normality, heteroskedasticity, multicollinearity, and autocorrelation, followed by correlation analysis and hypothesis testing.

Path analysis was selected to expand the regression model by examining the correlation matrix and model with arrows signifying the direction of relationships. Path analysis is a statistical approach using bivariate correlation to estimate the variables' relationship in the SEM model (Hair Jr. et al., 2018). Path analysis helps analyze relationships with intervening variables because this approach provides an acceptable way to assess relationships in a complex model (Hair et al., 2018).

Figure 1. Research Framework

RESULTS AND DISCUSSION

The first analysis conducted in this study is the descriptive analysis of variables consisting of fuel price, exchange rate, interest rate, non-oil and gas export, and Indonesia's GDP, the classical assumption test, correlation, and the SEM analysis showing that fuel price, exchange rate, and interest rate significantly affect Indonesia's non-oil and gas export, which in turn affect Indonesia's GDP in 1995-2022.

Figure 2. Fuel Price Development 1995-2022
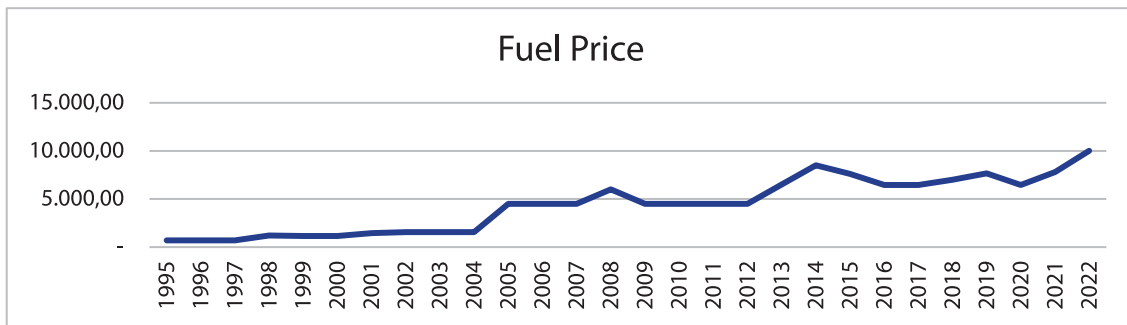
Source: Ministry of Energy and Mineral Resources (2022).

The descriptive analysis revealed that fuel prices in Indonesia fluctuate following the government's decision to reduce the subsidy provided to Indonesians. This decision was taken after the government concluded that the provided subsidy needed to be more effective and reach the intended economic classes. The government found that the subsidy was mostly used by medium to high-income families instead of the poor households, especially the Premium and Pertalite products. Figure 2 summarizes the fluctuation of fuel prices after removing government subsidies after global fuel prices' increasing and declining trend. Significant changes are observable in 2013 (44% increase), 2016 (16% decline), 2022 (28.21% increase). This fluctuation significantly impacts non-oil and gas exports because it affects raw and auxiliary materials and capital goods, including machinery and transportation prices.

Figure 3. Rupiah Exchange Rate 1995-2022 (Bank Indonesia 2022)
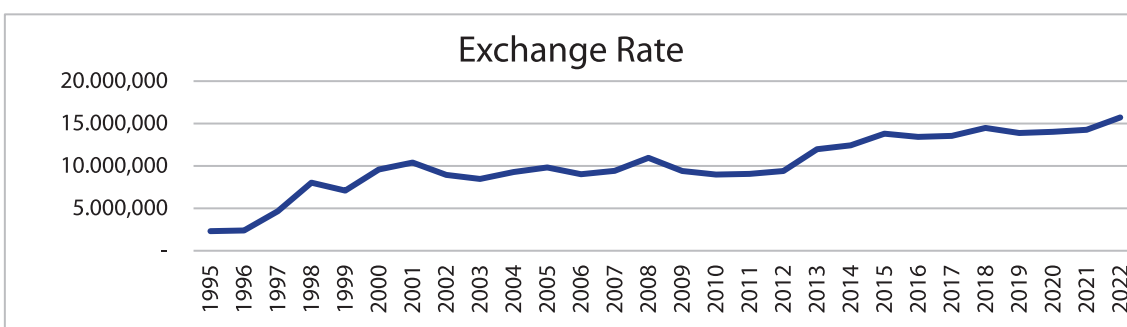
The descriptive analysis pointed out that Bank Indonesia's exchange rate monitoring policy based on a free-floating system with strict supervision is appropriate for Indonesia. The Rupiah exchange rate experienced significant changes during 2000-2001 following the 1998 crisis, changing the IDR exchange rate to USD from IDR 1,995 to IDR 2,308 (350.6% increase) and the highest exchange rate of IDR 10,400 (2001) after the crisis. The great 2008 recession caused by US mortgage failure caused another fluctuation and drop in the IDR exchange rate that continued until the Russia-Ukraine war in 2022. IDR recorded the lowest exchange rate in 2022, with IDR 15,731 per USD (a 10.24% drop from 2021). This depreciation significantly affects imported goods that

support Indonesia's exports because the country's industry depends on raw materials and machine tools imported from other countries, which is highly sensitive toward the USD exchange rate (see Figure 5).

Figure 4. Interest Rate
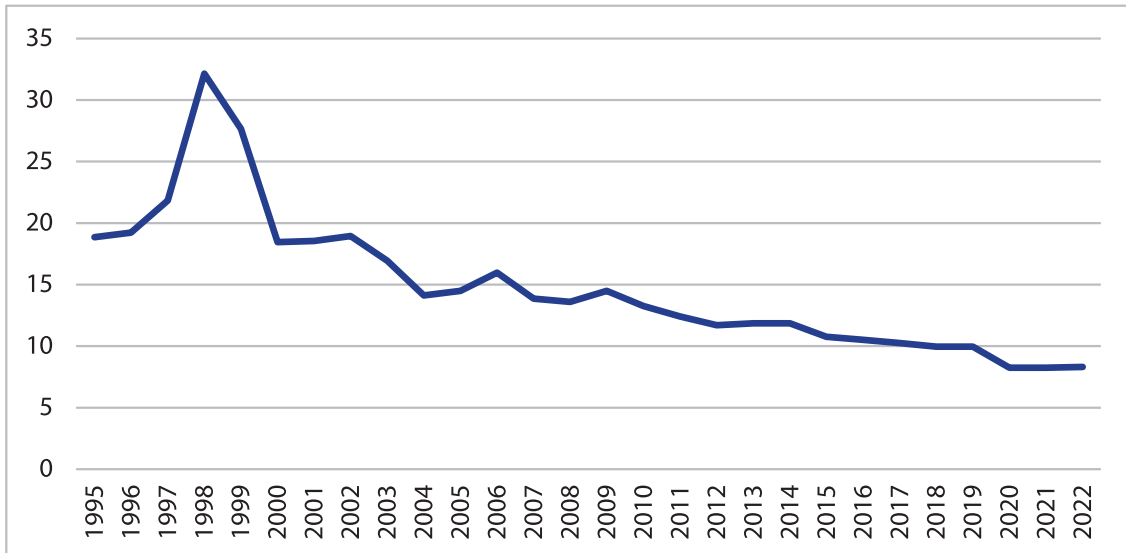
The interest rate is the following variable affecting Indonesia's non-oil and gas exports. The descriptive analysis summarized in Figure 4 showed that the interest rate was steadily dropping after the 1998 crisis, in which it reached its highest score in Indonesia's history. The declining interest rate negatively affects Indonesia's non-oil and gas export, which shows steady increases when the interest rate continues to drop.

**Figure 5. Development of Non-Gas and Oil Export 1995-2022**
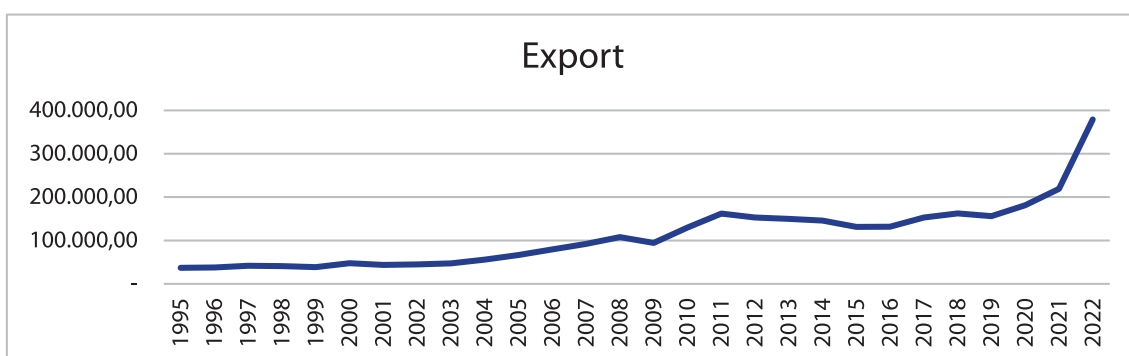
Source: Ministry of Trade of the Republic of Indonesia (2022)

The descriptive analysis of Indonesia's exports exhibited satisfactory growth despite the stagnation at IDR 45,000 trillion from 1995-2004, which slowly increased after the Regional Free Trade Agreement was enacted in 2008. This growth was also affected by the great 2008 recession by 12.44% (from IDR 107,894 to IDR 94.491 trillion).

Fortunately, the government's policy to deregulate permits and global promotion through the Ministry of Trade brought gratifying results with the increasing non-oil and gas exports amid the COVID-19 pandemic and the Russia-Ukraine war. The estimated export value 2022 was IDR 379.176 trillion, 72.80% of 2021 exports (IDR 219.362 trillion). Indonesia's export was boosted by palm oil export to the Netherlands and other countries, leaving domestic demand in jeopardy during the first and second quarter of 2022. The increasing non-oil and gas export is an exciting development that could support Indonesia's GDP growth (see Figure 6).

Figure 6. Indonesia's GDP 1995-2022
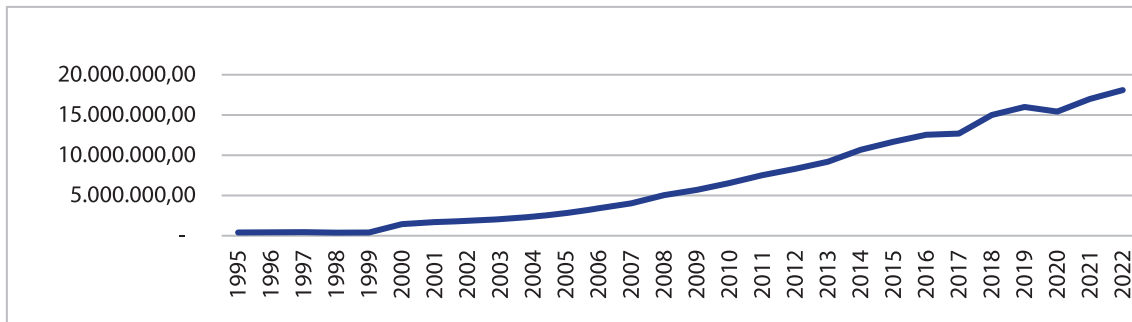
Source: Bank of Indonesia (2022)

Descriptive analysis was also conducted on the variable's natural logarithm (Ln) score following Berg et al. (2012) argument that financial and economic data must be processed into Ln before being statistically analyzed to generate relevant research findings. Table 3 summarizes the descriptive statistics of the Ln score for the variables.

The fuel price had its minimum score of IDR 6,551 per liter in 1995 and the highest price of IDR 9,210 per liter in 2022. The mean score for fuel price is IDR 8,099, with a standard deviation of 0.871. The lowest IDR exchange rate to USD was 7.744%, and the highest was 9.663%, with an average exchange rate of 9.145%. The minimum interest rate score was recorded in 2020 and 2021 at 8.25% and the highest in 1998 at 31.15%. The mean interest rate score during the observation period is 14.8725%, showing a declining trend over the years. The minimum score of non-oil and gas export value was 10.520%, with a maximum score of 12.846% and an average rate of 11.424%. The analysis showed that fuel price, exchange rate, and interest rate fluctuation during the observation period affected Indonesia's non-oil and gas exports by 11.424% more than fuel price (8.099%) and exchange rate (9.145%). The GDP growth for 28 years showed a minimum return of 16.711%, with an average of 15.159%. Thus, GDP growth (M 15.159%) is higher than the independent variables (X1, X2, X3) with 11.424%.

Table 3. Statistics Descriptive

	Ln Fuel Price	LN Exchange Rate	LN Interest Rate	LN Export	LN_GDP
Mean	8.099471	9.144848	2.638306	11.42446	15.15917
Median	8.411833	9.159741	2.619538	11.52259	15.49342
Maximum	9.210340	9.663389	3.470412	12.84576	16.71142
Minimum	6.551080	7.744137	2.110213	10.52648	12.85254
Std.Dev.	0.871745	0.471180	0.347793	0.650877	1.307781
Skewness	-0.580385	-1.824143	0.462564	0.071453	-0.617544
Kurtosis	1.820779	6.129542	2.770398	1.934235	2.108486
Jarque-Bera	3.194274	26.95470	1.060010	1.348990	2.706945
Probability	0.202475	0.000001	0.588602	0.509414	0.258342
Sum	226.7852	256.0558	73.87256	319.8849	424.4567
SumSq.Dev.	20.51838	5.994298	3.265920	11.43829	46.17786
Observations	28	28	28	28	28

To ensure the predictive ability of multivariate analysis, an analysis model needs to meet the classical assumptions (Hair et al., 2018). The classical assumptions in the current study were assessed using the BLUE (Best Linear Unbiased Estimator) test that showed normal distribution of data (Kolmogorov Smirnov. $0.200 > 0.05$), free of heteroskedasticity (Glejser test > 0.05), multicollinearity (R score > P partial: $0.854 > 0.838 > - 0.158$), and autocorrelation (Run Test $0.178 >$ p-value 0.05). Therefore, the research model met the classical assumption test, and further analysis can be conducted for the model. The first analysis conducted on the variables is the correlation and regression analysis to check the relationship between the variables.

Table 4. Simple Regression X1 to Y

Variable	Coefficient	Std. Error	T-Statistic	Prob.
C	5.846720	0.460783	12.68866	0.0000
LN_Fuel_Price	0.688655	0.056575	12.17234	0.0000
R-squared	0.850717	Mean dependent var		11.42446
Adjusted R-squared	0.844975	S.D. dependent var		0.650877
S.E. of regression	0.256271	Akaike info criterion		0.183585
Sum squared resid	1.707543	Schwarz criterion		0.278742
Log-likelihood	-0.570190	Hannan-Quinn criteria.		0.212676
F-statistic	148.1658	Durbin-Watson stat		0.708468
Prob(F-statistic)	0.000000			

Table 4 summarizes the simple regression analysis between fuel price and non-oil and gas export. The correlation between the two variables was 0.922, indicating a solid relationship between fuel price and Indonesia's non-oil and gas exports. The t-test for the hypothesis returned t-statistics of $12.172 >$ t-table 2.060. This result further strengthens

fuel price's positive effect on Indonesia's non-oil and gas exports from 1995-2022. The fluctuation in fuel prices explains an 85.07% variation (R-square 0.8507) in Indonesia's non-oil and gas exports, indicating that a 1% change in fuel price will increase non-oil gas exports by 85.07%. In contrast, the remaining variation is affected by variables outside the model, ceteris paribus (see Table 5).

Table 5. Simple Regression X2 to Y

Variable	Coefficient	Std. Error	T-Statistic	Prob.
C	2.388957	1.733585	1.378044	0.1799
LN_Exchange rate	0.988043	0.189327	5.218701	0.0000
R-squared	0.511598	Mean dependent var		11.42446
Adjusted R-squared	0.492813	S.D. dependent var		0.650877
S.E. of regression	0.463535	Akaike info criterion		1.368880
Sum squared resid	5.586484	Schwarz criterion		1.464037
Log-likelihood	-17.16432	Hannan-Quinn criteria.		1.397970
F-statistic	27.23484	Durbin-Watson stat		0.249223
Prob(F-statistic)	0.000019			

A strong relationship between exchange rate and non-oil and gas export was also observed based on the correlation result of R 0.715. The R square of 0.5116 hinted that the increase of 1% in the exchange rate will contribute to an increase of 51.16% in Indonesia's non-oil and gas export under the ceteris paribus assumption and stable variables outside of the model (see Table 5). Indonesia imports raw, semi-finished, auxiliary, and capital materials to support its non-oil and gas exports. Thus, the IDR exchange rate's strength is significant in supporting the country's exports, as summarized in Table 5.

Table 6. Simple Regression X3 to Y

Variable	Coefficient	Std. Error	T-Statistic	Prob.
C	15.91364	0.406512	39.14680	0.0000
LN_Interest Rate	-1.701537	0.152806	-11.13530	0.0000
R-squared	0.826661	Mean dependent var		11.42446
Adjusted R-squared	0.819994	S.D. dependent var		0.650877
S.E. of regression	0.276148	Akaike info criterion		0.332991
Sum squared resid	1.982703	Schwarz criterion		0.428148
Log-likelihood	-2.661874	Hannan-Quinn criteria.		0.362082
F-statistic	123.9950	Durbin-Watson stat		0.809817
Prob(F-statistic)	0.000000			

Another positive relationship between interest rate and Indonesia's exports is observed, supported by the correlation analysis of R 0.715. This finding is supported by the t-statistic of 39.14680 > t-table 2.060, indicating a positive and significant effect of interest rates on Indonesia's non-oil and gas exports. The R-square of 0.8266 also

shows that 82.66% of the variation in Indonesia's export is explained by interest rate, meaning that a 1% increase in interest rate will contribute to an 82.66% decline in Indonesia's non-oil and gas export.

Table 7. Multiple Regression X1, X2, X3 to Y

Variable	Coefficient	Std. Error	T-Statistic	Prob.
C	10.66133	1.435704	7.425859	0.0000
LN_Fuel Price	0.435641	0.119053	3.659228	0.0012
LN_Exchange_rate	-0.064305	0.150690	-0.426735	0.6734
LN_Interest rate	-0.825256	0.228194	-3.616458	0.0014
R-squared	0.905800	Mean dependent var		11.42446
Adjusted R-squared	0.894025	S.D. dependent var		0.650877
S.E. of regression	0.211885	Akaike info criterion		-0.133980
Sum squared resid	1.077489	Schwarz criterion		0.056335
Log-likelihood	5.875716	Hannan-Quinn criteria.		-0.075799
F-statistic	76.92552	Durbin-Watson stat		0.636786
Prob(F-statistic)	0.000000			

The following analysis of the simultaneous relationship between fuel price, exchange rate, and interest rate with Indonesia's non-oil and gas export shows a positive relationship with F-statistics of 76.925 > F-table 3., indicating that simultaneously the independent variables affect Indonesia's export. The three variables explain 90.5% of the variation in Indonesia's exports, while other variables are constant.

Table 8. Simple Regression of Y to Z

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-6.238985	1.632061	-3.822764	0.0007
LN_Export	1.873012	0.142634	13.13162	0.0000
R-squared	0.868978	Mean dependent var		15.15917
Adjusted R-squared	0.863938	S.D. dependent var		1.307781
S.E. of regression	0.482395	Akaike info criterion		1.448642
Sum squared resid	6.050328	Schwarz criterion		1.543800
Log likelihood	-18.28099	Hannan-Quinn criter.		1.477733
F-statistic	172.4395	Durbin-Watson stat		0.475968

The correlation analysis between the intervening and dependent variables returned a solid result of R 0.932. This result is further supported by the t-statistics of 13.1318 > t-table 2.060. The analysis points out the positive and significant effect of Indonesia's non-oil and gas exports and GDP from 1995-2022. The result of the R-square analysis also supports a strong relationship with the R-square of 0.8689, showing that Indonesia's non-oil and gas export significantly contributes to Indonesia's GDP with high market potential abroad. The 1% increase in Indonesia's non-oil and gas exports will contribute

to an 86.89% increase in the national GDP, assuming that other variables remain constant.

SEM testing with path analysis was conducted to examine the simultaneous relationship among the research variables and found that simultaneously, fuel price, exchange rate, interest rate, and non-oil and gas export have a strong effect on Indonesia's GDP with R= 0.977, F-statistic of 251.8768. Partially, fuel price and exchange rate have a positive and significant effect on Indonesia's GDP with t-statistics of 3.223485 and 3.982859 > t-table 2.060. Interest rates negatively affect Indonesia's GDP.

Table 9. Multiple Regression X1, X2, X3, Y to Z

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	10.22212	2.604696	3.924495	0.0007
LN_Fuel Price	0.478550	0.148457	3.223485	0.0038
LN_Exchange Rate	0.601881	0.151118	3.982859	0.0006
LN_Interest Rate	-1.89616	0.283369	-6.691487	0.0000
LN_Export	0.048982	0.203932	0.240189	0.8123
R-squared	0.977681	Mean dependent var		15.15917
Adjusted R-squared	0.973799	S.D. dependent var		1.307781
S.E. of regression	0.211686	Akaike info criterion		-0.106996
Sum squared resid	1.030648	Schwarz criterion		0.130897
Log likelihood	6.497951	Hannan-Quinn criter.		-0.034270
F-statistic	251.8768	Durbin-Watson stat		0.975231

Figure 7. Path Analysis
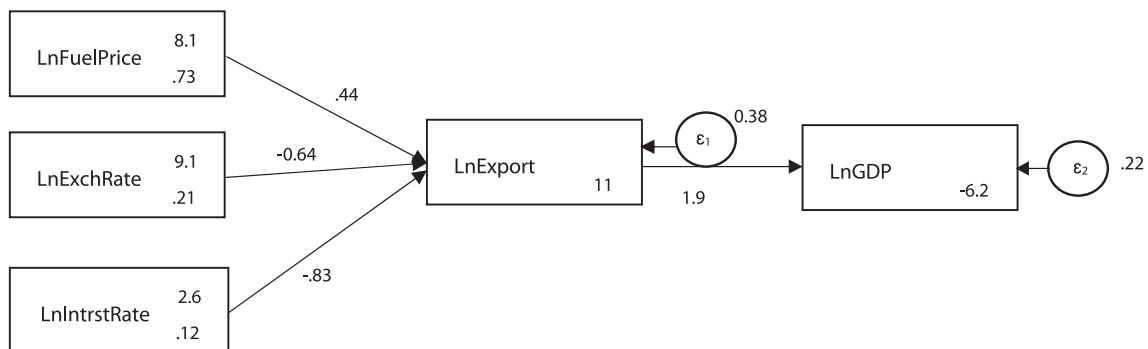
The first model showed a solid relationship between fuel price and non-oil and gas export (R 0.922) and an 85.07% contribution to non-oil and gas export value variability. This finding indicates that Indonesia's non-oil and gas export is growing despite the increasing production, transportation, and raw material costs. This success is inseparable from the government's role through the Ministry of Transportation, which implements the deregulation of tariffs, siding with the businesses, and is highly expected to contribute to this growing export trend. However, this finding contradicts Kpodar et al. (2022) study that increasing fuel prices negatively affects export growth. High fuel and food

prices have also adversely impacted economic growth, inflation, and international trade (Hojjat, 2012). In Indonesia, increased fuel price has resulted in dropped commodities export with the depreciation of IDR predicted to contribute to the increasing export of certain commodities in the past (Sato & Damayanti, 2015).

The analysis of the second model revealed a partially solid relationship between the IDR exchange rate and USD on Indonesia's non-oil and gas exports. The analysis revealed a strong correlation (R 0.715) and the ability to explain 51.16% of changes in Indonesia's non-oil and gas exports, noting that the IDR exchange rate has a positive effect. This finding is slightly weaker than the fuel price effect on Indonesia's exports. This finding aligns with Thorbecke & Sengonul (2023), who found a significant effect of exchange rate on export and import in Turkey, and Sundari et al. (2023), who found IDR exchange rate effect on chili export in Indonesia. In Chile, the exchange rate has also been found to predict the return of oil exports (Pincheira-Brown et al., 2022), while in Indonesia, the depreciation of the IDR exchange rate stimulated export in 2015 (Yusuf & Sumner, 2015). It also aligns with Todorova (2022), who states that high exchange rates boost imports while discouraging exports.

The third model examined the relationship between interest rate and Indonesia's non-oil and gas exports, finding a strong correlation (R 0.715) and a negative effect that explains 82.66% of the variation in Indonesia's exports. This result shows the damaging effect of the high-interest rate on the nation's exports. This finding supports Spahiu and Durguti (2023) on the negative impact of interest rates on exports. Das and Biswas (2021) also found the crucial role of interest rates in affecting export and import practices between India and the US, supporting Bhide et al. (2010) that unstable foreign exchange and high interest rates hurt international trade and India's economic growth.

The fourth model analyzed the simultaneous effect of fuel price, exchange rate, and interest rate on Indonesia's non-oil and gas exports. The analysis showed that the three variables explain 90.5% of the differences in Indonesia's non-oil and gas exports. In this model, the exchange rate and interest rate negatively impact Indonesia's exports, indicating that a weak IDR exchange rate against USD and a high interest rate will hurt the national export. These results explain how the IDR exchange rate that reached IDR 15,000 per USD hurt Indonesia's non-oil and gas exports. A high exchange rate equals high production costs due to imported raw materials and capital goods. This finding aligns with Spahiu & Durguti (2023), who found a damaging impact of high-interest rates on export, as well as Thorbecke & Sengonul (2023) and Sundari et al. (2023), who found a significant effect of exchange rate on export. However, despite the negative impact of both variables, Bank Indonesia implemented its supervisory role in the IDR exchange rate well, resulting in Indonesia's growing export post-Covid-19 pandemic and the ongoing Russia-Ukraine war. However, the finding on the positive effect of fuel price on Indonesia's non-oil and gas export contradict the existing literature, which found the negative impact of high fuel price on export performance (Kpodar et al., 2022), which is interesting to examine further considering Indonesia has recently removed the fuel subsidy for two products analyzed in the current study.

The finding in the fifth model on non-oil and gas export's role in supporting Indonesia's GDP growth found a substantial effect (R 0.932), higher than other variables' correlation in the current study and 86.89% contribution to the GDP growth. This finding aligns with the previous study on the relationship between exports and a country's GDP (Spahiu & Durguti, 2023). Another study also found that fuel price affected by the global crude oil price is directly proportional to GDP growth in developing countries (Abdelsalam, 2020), while growth promoted by fuel price affects GDP growth positively (Kliesen, 2006). Exports, particularly oil products, contributed significantly to Kuwait's GDP (Al-Zuhair & Al-Bazali, 2022), accounting for almost half of the variation in Oman's GDP (Al Jabri et al., 2022).

The last model examined the simultaneous effect of fuel price, exchange rate, interest rate, and export on a country's GDP and found simultaneous and significant effects of the variables. The combination of fuel price, exchange rate, interest rate, and export contributed to 97.7% of changes in Indonesia's GDP. The strong correlation among the variables shows that good supervision to achieve stable fuel prices, exchange rates, and interest rates to support international trade activities in non-oil and gas export will increase Indonesia's GDP with a 92.90% contribution. This contribution is significantly higher than focusing on boosting export alone, which only contributes 86.89% growth in GDP, supporting Spahiu and Durguti (2023), who found a significant relationship between export, interest rate, and GDP.

CONCLUSION

This study provides new information on the macroeconomic conditions affecting Indonesia's export and economic expansion amid global financial difficulties. The analysis found simultaneous effects of fuel price, exchange rate, interest rate, and non-oil and gas exports supporting Indonesia's GDP growth. Thus, this study examines the importance of fuel cost, exchange rate, and interest cost for the export-oriented industry. The finding emphasizes the need for a careful government initiative to support the business. Secondly, this study also underlies the importance of the exporting sector in boosting the economy by highlighting the importance of non-oil and gas exports on GDP growth.

Indonesia maintained and strengthened its position as an essential player in the global economy by ensuring stable fuel prices, exchange rates, interest rates, and government policies. This study's findings offer in-depth suggestions for businesses and politicians who want to develop export-oriented industries to support Indonesia's economic growth.

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