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The Impact of Exchange Rate Changes on Indonesian Exports

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Abstract

This study delves into how Exchange Rates and Gross Domestic Product (GDP) have shaped Indonesian exports over the past 17 years, from 2006 to 2022. On the whole, Indonesian exports have generally shown a positive trajectory during this period, although there have been occasional drops in specific years. The main countries that receive Indonesian exports are China, the United States, Japan, India, and Malaysia, and the primary export goods include coffee, animal and vegetable fats and oils, Crude Palm Oil (CPO), and coal. When we look at long-term model analyses, it becomes evident that exchange rates play a significant role in negatively affecting Indonesian exports. This means that, over an extended period, an increase in the value of the Indonesian currency can lead to a reduction in export volumes. Furthermore, GDP also exerts a notable negative influence on Indonesian exports, suggesting that the overall economic growth of the country can impact export levels. In the context of short-term model estimations, it is apparent that fluctuations in currency exchange rates have a substantial negative impact on Indonesian exports in the immediate term, assuming all other factors remain constant. The results of these estimations also indicate that GDP has a considerable negative effect on Indonesian export performance in the short run.

Keywords: Indonesian Exports, Exchange Rates, Gross Domestic Product

INTRODUCTION

The abundance of natural resources can significantly enhance a nation's prosperity and wealth. A country is often considered affluent or economically well-off when it possesses ample resources that can be effectively utilized to fulfill its domestic requirements. However, some countries face limitations in terms of their natural resource endowments. In a 2018 study conducted by Wild, it was observed that due to these constraints, a country may struggle to meet all the needs of its population in terms of goods and services.

In light of this, it becomes essential for a country to identify and develop specific economically advantageous commodities that can be produced and exported to generate foreign exchange, thus contributing to the nation's economic well-being. The foreign exchange earned through such exports can then be used to import key commodities that may not be readily available domestically.

Since the abandonment of the Bretton Woods system in 1973, the international currency exchange rate system has operated on a Floating System. Under this system, currency exchange rates can fluctuate, and these fluctuations are closely tied to a country's economic conditions. Changes in exchange rates can have a significant impact on the prices of exported goods, which in turn can influence the competitiveness of a country's exports. For example, if the currency of an exporting nation depreciates, the prices of its goods become more attractive and affordable in the importing country.

Exports encompass the total worth of goods or services sold by one nation to another during a specified timeframe, including items like products, services, and insurance. Net exports, on the other hand, represent the total exports minus total imports and hold significant sway over a nation's income, potentially stimulating economic growth. When export values surpass those of imports, it can bolster a country's income. Conversely, if exports lag behind imports, it can diminish a nation's income.

Over the past 22 years of available data, Indonesia's Exchange Rate and Total Exports transactions experienced a sharp depreciation in 2009. Both Exchange Rate and Total Exports saw substantial declines, with Exchange Rate dropping by 14.16% and Total Exports decreasing by 14.97%. This drastic depreciation was triggered by the global financial crisis, which led to reduced demand in international markets compared to the preceding year, 2008, or the subsequent year, 2010.

In 2009, nearly all of Indonesia's export transactions saw declines, both in terms of contributions from Oil and Gas (Migas) and Non-Oil and Gas (Non-Migas) exports, spanning from the first quarter to the fourth quarter of that year. The most significant drop occurred in the early second quarter, specifically in April 2009, with Non-Oil and Gas commodities experiencing a decrease of $3321.1 million, notably in the category of Ores, Slag, and Ash.

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Changes in exchange rates can exert influence on the prices of goods, subsequently affecting the competitiveness of a country's exports. Multiple studies examining the impact of Exchange Rates on a country's Total Exports have yielded varying conclusions. Research by Tas (2003), Sekantsi (2007), and Ratana demonstrated negative results, while A. Kasman and S. Kasman's (2005) research yielded positive outcomes. Additionally, some studies, such as those by Handroyiannis (2005) and Alam (2010), found no significant impact. Given these divergent research findings, it's evident that further investigation is necessary to comprehensively understand the effects of exchange rate fluctuations on total exports.

The effects of exchange rates can lead to different consequences on commodity prices, particularly on the aggregate export level, which represents the combined impact of various sectors' commodities. This study focuses on Coal, Crude Palm Oil (CPO), and Iron/Steel, chosen because they are the primary contributors to non-oil and gas exports. Oil and gas (Migas) are not included in this research due to their limited quantity, as Indonesia meets its domestic needs through production and imports.

Exchange rate fluctuations can significantly influence the relative prices of a product, resulting in either price increases or decreases. Consequently, exchange rates are frequently utilized as a tool to enhance a country's competitiveness by encouraging exports. Changes in export patterns can also enhance a nation's trade balance. Thus, a comprehensive understanding of how exchange rates impact a country's trade balance and production is of paramount importance for economic policymakers. Based on the summary provided, this research aims to achieve two main objectives: (1) analyze the trends in Indonesia's export development, and (2) reassess the relationship between exchange rates and exports using data from Indonesia.

Literature Review

The term "currency exchange rate" encompasses two fundamental concepts: the nominal exchange rate and the real exchange rate. The nominal exchange rate represents the price comparison between the currencies of two countries. For instance, if 1 US$ dollar is equivalent to Rp 15.781 (as of the end of 2022 according to the BI exchange rate) in the foreign exchange market. On the other hand, the real exchange rate focuses on the price comparison of goods between two countries. It essentially measures how much people in an economy can trade goods from one country for goods from another.

To calculate the relationship between the real exchange rates of two different countries' currencies, you multiply the nominal exchange rate by the price comparisons in both countries. This relationship delineates the real exchange rate concerning the nominal exchange rate and can be represented using the following formula:

$$= REER - ER \times (FP/DP),$$

- REER : Real Effective Exchange Rate
- ER : Exchange Rate
- FP : Foreign Price
- DP : Domestic Price

Based on the provided explanation, we can deduce that international trade competitiveness hinges on two primary factors: Exchange Rate (ER) and the price comparison between two countries. If the Real Effective Exchange Rate (REER) strengthens (appreciates), assuming price comparisons remain steady, it will positively impact the trade balance equilibrium. This is because a higher REER signifies that domestic goods in Indonesia become relatively more affordable compared to foreign goods. In simpler terms, with the same amount of foreign currency, you can buy more Indonesian Rupiah, which boosts the attractiveness of domestic products in international markets.

However, if we assume that currency exchange rates remain stable, the competitiveness of a country will largely depend on the efforts made within the country itself or by its monetary authorities to manage the price level using various tools available to them. The REER within a nation has consequences for its overall economic situation, particularly in terms of net exports or the trade balance. According to Mankiw (2003), this impact can be elucidated through the relationship between the real exchange rate and net exports or the trade balance.

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$$= NX - NX(e, Y, Y^*)$$

- NX = Ekspor Netto
- e = Nominal Exchange rate
- Y = GDP
- Y* = Combine GDP Of Countries

According to this theory, when measuring the exchange rate indirectly, there tends to be a negative relationship between the real exchange rate and net exports. However, if we measure the exchange rate directly (e.g., Rupiah per US$), we can explain this concept using the Investment Saving curve. The Investment Saving curve is a graphical representation illustrating the connection between interest rates and income levels in the market for goods and services. The IS curve showcases combinations of interest rates and income levels that signify equilibrium in the supply and demand for goods and services. Essentially, it illustrates how changes in the real economy or the goods market correspond to shifts in the positively sloped Investment Saving curve.

In this context, a higher real exchange rate implies depreciation or a decrease in the Rupiah's value. When the Rupiah weakens, domestic goods become relatively more affordable compared to foreign goods. Consequently, this boosts export competitiveness, leading to increased exports and reduced imports. Conversely, if the Rupiah strengthens, domestic goods become relatively pricier compared to foreign goods, potentially reducing export competitiveness and increasing imports.

When the Rupiah's exchange rate is low when directly measured (e.g., Rupiah per US$), it signifies that domestic goods are relatively more costly compared to those of trading partners' countries. This typically leads to decreased export competitiveness and a potential increase in imports, which can negatively affect the trade balance as domestic residents purchase fewer imported goods. Conversely, when the Rupiah's exchange rate is high in direct measurement, domestic goods become relatively more expensive compared to foreign goods. This can encourage domestic residents to buy more imported goods while potentially discouraging foreign residents from purchasing domestic goods. Thus, the interplay between the real exchange rate and the trade balance has significant implications for a country's competitiveness, exports, and imports. A low exchange rate can suppress the trade balance by boosting imports and reducing export competitiveness, while a high exchange rate can stimulate exports but may also lead to increased imports.

The Floating Exchange Rate System Applied in a Small Open Economy.

Countries participate in international trade due to two primary factors that bring about trade benefits for each country in a small economy operating under a floating exchange rate system. First, international trade occurs because there exist disparities in characteristics among these countries, much like the diversity seen among individuals. Within this framework, there is the potential for each country to exploit these differences by implementing regulations that enable each party to specialize in what they excel at.

Secondly, another objective of international trade is to attain economies of scale during the production process. In simpler terms, if each country focuses its production efforts on a specific set of products, they have the opportunity to enhance production efficiency by operating on a larger scale. According to Krugman (2004), this approach is more efficient than attempting to produce a wide range of products simultaneously.

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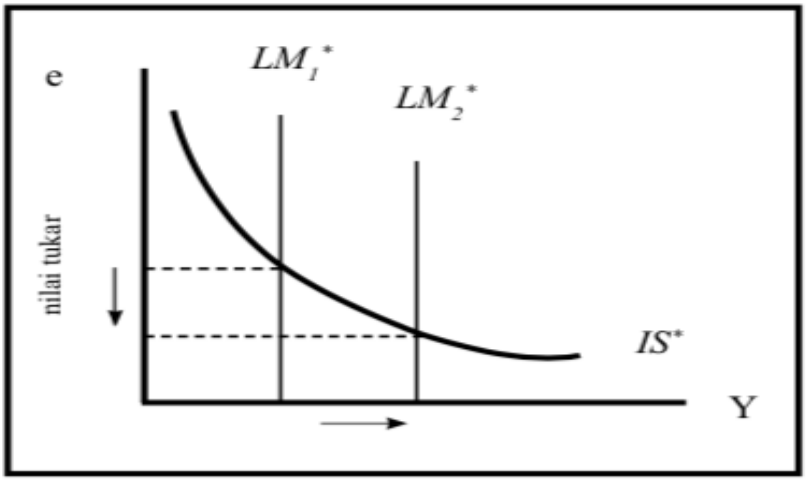

Source: Mankiw (2003)

Graph 1. Monetary Expansion (Floating Exchange Rate System)

The adoption of a floating exchange rate system in an open economy results in a flexible exchange rate that reacts to changes in economic conditions. In this scenario, if a country's Central Bank increases the money supply while keeping prices stable, it triggers a shift in the real equilibrium, leading to an increase. This shift is represented by the movement of the Liquidity Money (LM) curve to the right. The LM curve visualizes the intersection between interest rates and income levels, signifying the balance between money supply and demand. It also represents the equilibrium in the money market. The figure below illustrates the impact of an increased money supply. As per Mankiw (2003), this results in a temporary increase in output and a decrease in the exchange rate.

In a small open economy, international interest rates determine domestic interest rates. If the money supply grows, domestic interest rates decrease. In this situation, investors may redirect their investments to foreign markets seeking higher returns. This leads to capital outflows and an increase in the domestic currency supply in the foreign exchange market, potentially causing the exchange rate to depreciate. A weaker currency makes domestic goods more affordable than foreign goods, potentially stimulating exports. It's essential to note that in a small open economy, monetary policy via exchange rate adjustments significantly impacts output and economic income.

Within a floating exchange rate system, currency value fluctuations, whether depreciation or appreciation, influence export and import activities. When currency depreciation occurs, meaning the domestic currency's value decreases relative to foreign currency, it generally has a positive effect on export volume. As per Sukirno (2004), stronger foreign currency often correlates with increased export volumes.

The effects of exchange rate fluctuations on exports have captured the attention of various economists and prompted further research. For instance, research by Susilo (2001) revealed that exchange rate fluctuations significantly impact non-oil and gas real exports in the short term. Additional research by Huchet-Bourdon and Korinek (2012) produced similar conclusions, with their analysis focused on the influence of exchange rates on trade between Chile and New Zealand. Their findings indicate that changes in exchange rates affect the trade balance in small open economies (Huchet-Bourdon and Korinek, 2012).

METHOD

Select and describe the methodology you have summarized in the previous section. It can be the same as in a previous related work, a modified one you considered more appropriate or a mix of the methods you have analysed in the literature review section.

This study relies on secondary data in the form of a time series dataset. The analytical approach used is time series analysis employing the Error Correction Model (ECM) approach. Data processing is conducted using Eviews 10.0 software. Working with time series data presents various challenges, including the potential for autocorrelation, which can introduce non-stationarity. Therefore, before delving into more comprehensive analysis, it is crucial to assess the stationarity of the data, often done through Unit Root Tests. As a reference, Gujarati (2013) provides the formulation for testing stationarity

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using Unit Root Tests, particularly the Augmented Dickey-Fuller (ADF) Test model, as outlined below:

$$\Delta Y_t = \beta_1 + \beta_2 t + \delta Y_{t-1} + a_i \sum_{i=1}^{m} \Delta Y_{t-1} + u_t$$

Cointegration testing becomes a vital tool for addressing the challenges posed by non-stationary time series data. The core principle behind the cointegration approach is that it recognizes the presence of disequilibrium, a common phenomenon in economic behavior. This concept signifies that what economic agents desire doesn't always align with the actual unfolding of events. The disparity between the intentions of economic agents and the realized outcomes highlights the need for adjustments to steer the situation from short-term imbalances towards long-term stability. To rectify this disequilibrium, a method that facilitates integration adjustments is essential. This is where the Error Correction Model (ECM) comes into play, which is rooted in the Engle-Granger Error Correction concept, employing a specific formula as used in this study. Essentially, this model operates on the understanding that states of disequilibrium can be gradually corrected towards equilibrium conditions through the interplay of relevant variables. This approach equips the model with the ability to interpret the dynamics between economic agents' intentions and actual developments and provide insights into how adjustments can guide the economic system towards long-term equilibrium.

The primary objective of this research is to investigate the impact of exchange rate fluctuations on Indonesia's exports, following an approach previously employed by Huchet-Bourdon and Korinek in 2012. However, in conducting this study, some modifications have been made to the methodology used by Huchet-Bourdon and Korinek. One notable modification is the adoption of an Error Correction Model that is better suited to the context of this study. Additionally, adjustments have been applied to relevant equations, eliminating less pertinent variables to focus more sharply on the research objectives. While prior research conducted by Mariliyne and Jane in 2012 analyzed the export equation between two countries and their exchange rates, namely Chile and New Zealand, our research concentrates on assessing the influence of the exchange rate on the total export value of Indonesia within the context of a single country, namely Indonesia. Based on the description provided, the modeling approach employed is as follows:

$$\Delta lnX = c_0 + c_2 \Delta \ln Y_{it} + c_3 \Delta \ln ER_{it} + c_3 ECT_{it} + \mu_{it}$$

X_i = Indonesian Exports,
Y_{it} = Gross Domestic Product
ER_{it} = Exchange Rates,
ECT_{it} = *Error Correction Term*
μ_{it} = *error*.

RESEARCH RESULTS AND DISCUSSION

Indonesia's Export Development

Based on the provided chart, Indonesia's export performance over the past 17 years, from 2006 to 2022, has been predominantly driven by the non-oil and gas sector, serving as the primary revenue source for the country. The non-oil and gas sector exhibited a robust average growth rate of 8.77%, in stark contrast to the oil and gas sector, which posted a considerably lower growth rate of 1.57%. The most notable surge occurred in 2021 compared to the preceding year, 2020, with a remarkable growth rate of 41.58%, equivalent to an impressive increase of US$ 64,421 million.

This exceptional growth can be attributed to several factors, including the global economic recovery following the aftermath of the COVID-19 pandemic and the ramifications of the Russia-Ukraine conflict. These events led to a surge in commodity prices, notably coal and Crude Palm Oil (CPO), both of which constitute Indonesia's primary export commodities.

Simultaneously, the oil and gas sector experienced its highest growth in the same year, contributing a substantial 48.43% to the country's overall revenue, translating to a notable increase of US$ 3,996.3 million. This increase was primarily

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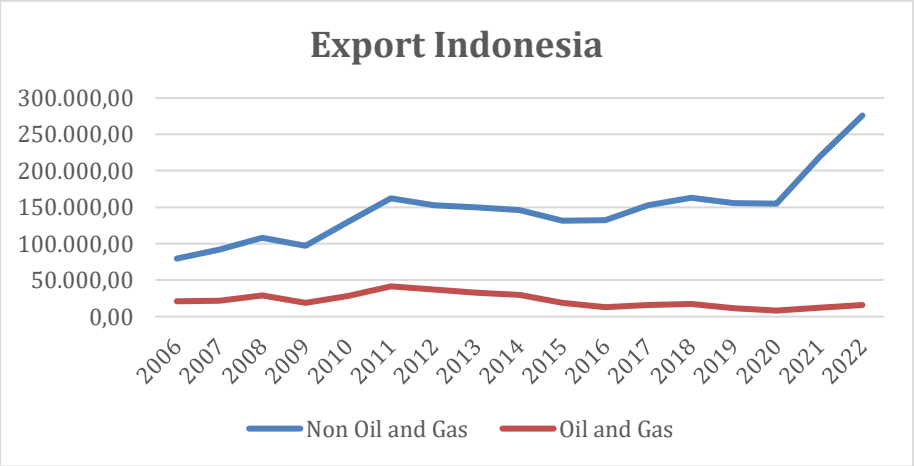
driven by the upward trajectory of global crude oil prices, with the average global oil price escalating from US$ 70.86 per barrel to US$ 100.93 per barrel in 2022, representing a significant increase of 42.4%.



Source : BPS (2022), Data Processed

Graph2. Indonesia's Export Growth

The growth observed in Indonesia's exports, as depicted in the provided graph, highlights that in 2022, the country placed significant emphasis on its primary destination markets. China stood out prominently in the first position, with a substantial export value of US$ 65,924.1 million, constituting 22.23% of the total. China holds a crucial position as one of Indonesia's major trading partners. Indonesian exports to China encompass a wide array of goods, spanning agricultural products, minerals, jewelry, electronics, textiles, and, notably, Crude Palm Oil (CPO) products. Following closely is the United States, securing the second position with an export value of US$ 28,202.0 million, accounting for 9.65% of the total. Indonesia's exports to the United States encompass diverse products, including clothing, footwear, furniture, electronics, agricultural products, and, notably, CPO, which plays a pivotal role in the trade between the two nations. Japan occupies the third position, with an export value of US$ 24,845.4 million, representing 8.50% of the total. Japan serves as a significant trading partner for Indonesia, particularly in sectors such as automotive, electronics, and manufacturing. Additionally, Indonesia exports fisheries, textiles, and agricultural products to Japan.

India follows in the fourth position, with an export value of US$ 23,378.8 million, accounting for 8.00%. Indonesia's exports to India encompass a diverse range of products, including palm oil, coal, agricultural goods like coffee and coconut, and various consumer items. The trade relationship between Indonesia and India has evolved over time.Malaysia rounds out the top five destinations with an export value of US$ 15,452.4 million, constituting 5.29% of the total. Indonesia's exports to Malaysia comprise agricultural products, palm oil, wood products, and other consumer goods. Malaysia also holds significance as a regional trading partner for Indonesia. Other countries collectively accounted for US$ 148,076.4 million, making up 50.71% of the total exports.

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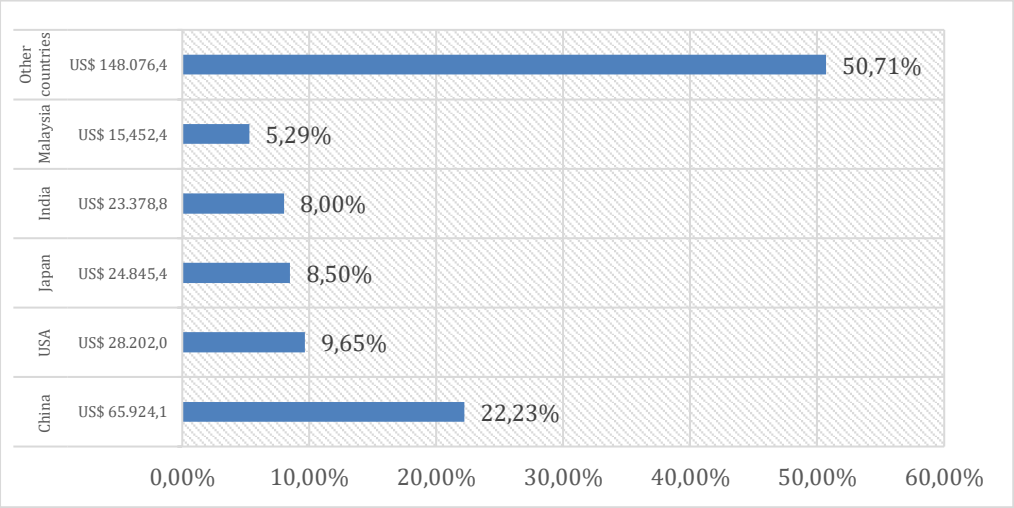

Source : BPS (2022), Data Processed

Graph 3. Indonesia's Export Destination Countries

Based on the data provided in the table for the past five years, the most substantial contribution to the Non-Oil and Gas sector comes from the HS (Harmonized System) 2-digit code HS 15, representing Animal/Vegetable Fats and Oils, with a share of 11.13%. This is primarily attributed to Indonesia's prominent role as one of the world's major palm oil producers. The global demand for palm oil has been consistently increasing due to its widespread utilization in the food industry, consumer products, and biodiesel production. Over the past five years, this sector has witnessed a notable growth trend of 18.74%, driven by heightened production and the growing global appetite for palm oil and its derivatives. Following closely is HS 72, encompassing Iron and Steel, contributing 10.7% to the sector. Iron and steel are essential materials in the construction and manufacturing industries. The substantial growth trend of 52.05% in the past five years can be attributed to increased production in Indonesia's iron and steel industry, which aligns with strong economic growth in some countries and significant infrastructure projects, driving robust demand for iron and steel. HS 85, covering Electrical Machinery/Equipment, represents 6.14% of the sector's contribution. Technological advancements and investments in manufacturing and technology industries across various countries have spurred demand for electrical machinery and equipment. Over the last five years, this sector has witnessed a growth trend of 13.43%, reflecting increased production and the export of technology products from Indonesia. The most remarkable market demand trend is observed in HS 75, focused on Nickel, with a staggering growth trend of 56.69% in nickel exports. This surge can be primarily attributed to the continuously increasing demand for nickel in diverse applications, including battery production, the automotive industry, and green technology. Indonesia's position as one of the world's leading nickel producers has enabled it to capitalize on meeting the escalating global demand. (Ministry of Trade, 2022).

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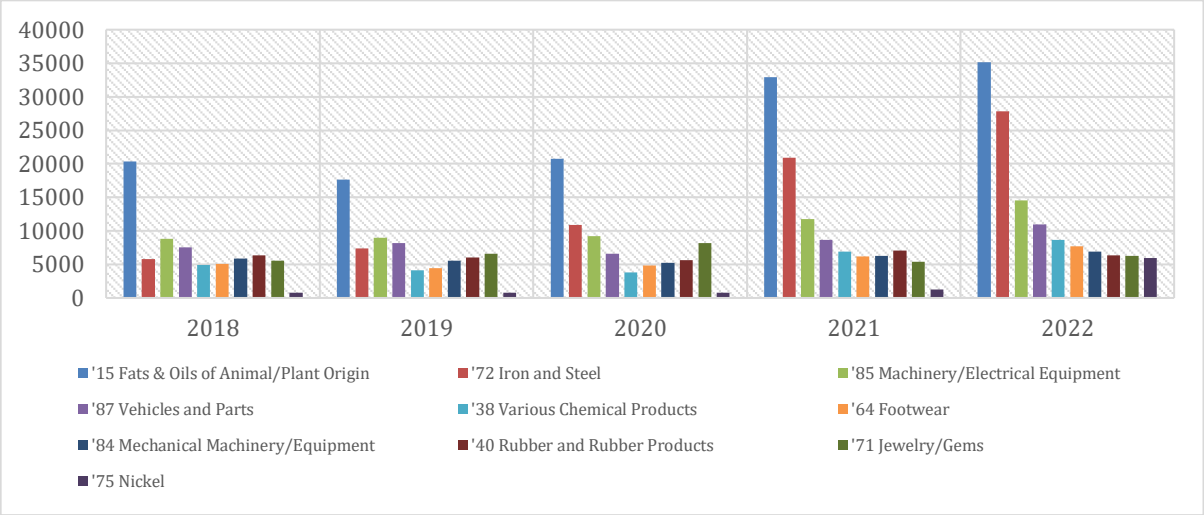

Source : BPS (2022), Data Processed

Graph 4. Indonesia's Export Contribution by Sector

Quantitative Testing

As previously elucidated, the stationarity test serves the purpose of evaluating whether the analyzed data exhibit stable and stationary characteristics. When dealing with data that lack these characteristics (non-stationary), the outcomes of various empirical analyses may become unreliable. The results obtained from regression analyses, if misinterpreted, could lead to erroneous conclusions that deviate from actual reality. Hence, the inaugural step in empirical analysis within this research entails subjecting the various economic data to stationarity testing. Stationarity testing was systematically executed on all variables encompassed within the research model, employing the Augmented Dickey-Fuller (ADF) method, with the requisite calculations being carried out utilizing Eviews software.

Table 1. Results of Unit Root Test

Variabel	Level		1st' Difference		2nd' Difference	
	ADF	P-Value	ADF	P-Value	ADF	P-Value
Exports	-0,220415	0,9174	-2,363593	0,1670	-4,747305	0,0031
Exchange Rates	-0,240037	0,9144	-5,075297	0,0013	-	-
GDP	-1,988330	0,2880	-4,680059	0,0027	-	-

Source: Data Processed (Eviews 10)

Table 2. Group Unit Root (Export, Exhange Rate, GDP)
Intermediate' ADF test results D (UNTITLED,2)

Series	Prob.	Lag	Max Lag	Obs
D (EXPORT, 2)	0,0031	1	2	13
D (GDP, 2)	0,0001	0	2	14
D (EXHANGE RATE, 2)	0,0004	1	2	13

Source: Data Processed (Eviews 10)

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Based on the outcomes derived from the Unit Root Test results presented above, it can be inferred that none of the variables incorporated into the model have attained stationarity at a 5% significance level. In the context of the Augmented Dickey Fuller (ADF) test, which involves second-order differenced data for the Indonesian Export variable, and first-order differenced data for the Exchange Rate and GDP variables, the following conclusions can be drawn: The Indonesian Export variable exhibits a lower P-Value (Probability) at a 5% significance level when subjected to second-order differenced data, whereas the Exchange Rate and GDP variables display lower P-Values (Probabilities) at a 5% significance level when examined with first-order differenced data.

Cointegration Testing and Long-Term Model Estimation

Cointegration testing is a technique utilized in the examination of dynamic models to determine if there exists a long-term relationship among multiple variables. In cointegration testing, the Engle-Granger method is commonly applied. The primary objective is to derive the long-term equations inherent in the research model under scrutiny, and the methodology employed here is the Johansen Cointegration. Based on the findings presented in the table below, it is observed that the critical value surpasses the trace statistic, indicating the absence of cointegration among the three variables. This implies that these variables do not establish a stable long-term relationship amongst themselves. In simpler terms, alterations in one variable will not consistently lead to changes in the other variables over the long term. This could signify that the variables are unrelated in the long run, or if there is a connection, it is ephemeral and lacks consistency.

Table 3. Johansen Cointegration Test Results

Sample (adjusted): 2008 2022
Included observations: 15 after adjustments
Trend assumption: Linear deterministic trend
Series: EKSPOR NILAI_TUKAR PDB
Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None	0.520284	20.49159	29.79707	0.3901
At most 1	0.445210	9.473188	15.49471	0.3234
At most 2	0.041494	0.635692	3.841466	0.4253

Trace test indicates no cointegration at the 0.05 level

Source: Data Processed (Eviews 10)

The concept of cointegration entails that when one or more variables with fluctuating trends are amalgamated within a system, the outcome of this linear amalgamation will yield a variable with a steady or stationary trend. Consequently, this process enables the derivation of a set of long-term equations characterized by their enduring consistency.

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Table 4. Long-Run Model Estimation Results

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(EKSPOR)
Method: Least Squares
Date: 09/07/23 Time: 12:55
Sample (adjusted): 2007 2022
Included observations: 16 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EKSPOR(-1)	-0.050178	0.227652	-0.220415	0.8287
C	20051.27	37545.80	0.534048	0.6017

R-squared	0.003458	Mean dependent var	11944.11
Adjusted R-squared	-0.067723	S.D. dependent var	29180.72
S.E. of regression	30152.64	Akaike info criterion	23.58240
Sum squared resid	1.27E+10	Schwarz criterion	23.67897
Log likelihood	-186.6592	Hannan-Quinn criter.	23.58735
F-statistic	0.048583	Durbin-Watson stat	1.293649
Prob(F-statistic)	0.828729		

Source: Data Processed (Eviews 10)

The Long-Run Equation for the Indonesian Export Model is as follows :

$$Log\ (\ Export\ ) = 2{,}0051 + 2{,}0684 \times Log\ (\ GDP\ ) - 3{,}4578\ Log\ (\ ER\ ) \ldots\ldots\ldots\ldots\ldots\ (1)$$

The interpretation of the long-term equation presented above reveals that the exchange rate exerts a noteworthy negative influence on Indonesia's exports, with an elasticity coefficient of 3.4578. This signifies that, all else being equal, a 1% increase in the exchange rate will result in a 3.4578% reduction in Indonesia's exports over the long run. In essence, the exchange rate's fluctuations will lead to a decrease in Indonesia's export volume in the long term. This outcome aligns with research conducted by Carmen Nicolea in 2011 concerning Romania's exports, which employed the Vector Auto Regression (VAR) method and likewise identified a significant adverse impact of the exchange rate on exports. Similarly, a study conducted by Omojimete Akpokodje in 2010 on Nigeria's exports from 1986 to 2007 concluded that the exchange rate had a substantial negative effect on Nigeria's export performance. Additionally, Ekananda's research in 2004 found that currency depreciation resulted in more competitive export prices, consequently boosting export demand.

The explanation accompanying the graph below illustrates a prominent negative relationship, indicating an inverse direction, between the Exchange Rate and Exports.

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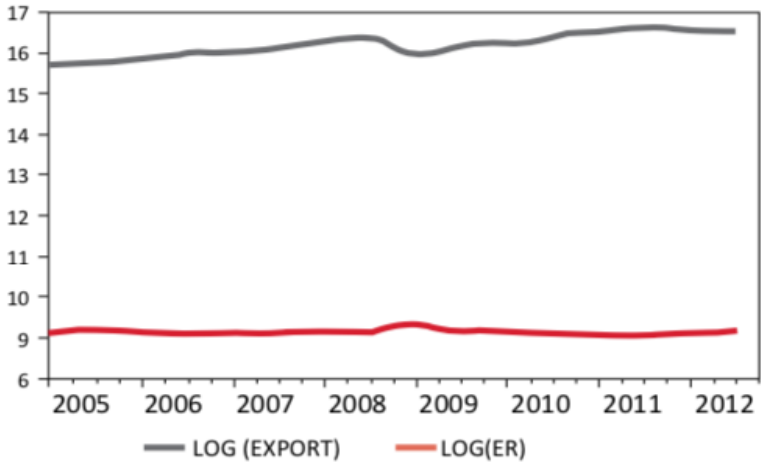
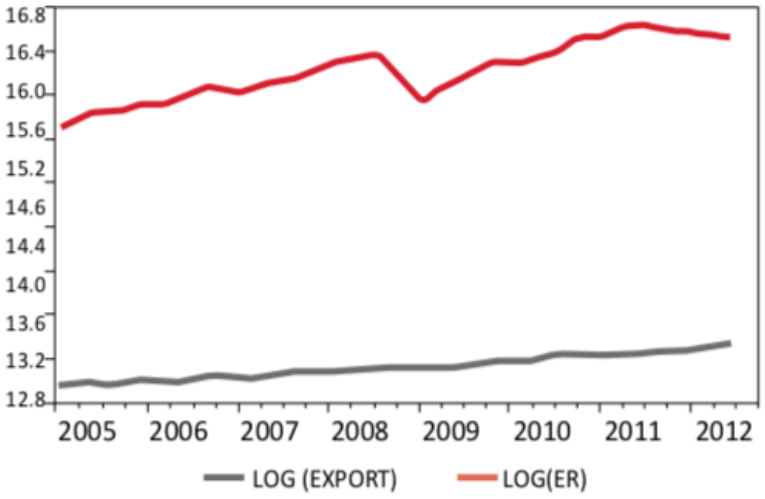


Source: Bank Indonesia (2012), Processed

Graph 5. Exchange Rate and Indonesian Exports (2005 to 2012)



Source: Bank Indonesia (2012), Processed

Graph 6. GDP and Indonesian Exports (2005 to 2012)

Upon acquiring the regression outcomes for the long-term export equation as elucidated earlier, the subsequent phase involves the generation of residuals derived from that equation. These residuals serve a crucial purpose in assessing whether corrections to exports can be attributed to disparities in the exchange rate and Gross Domestic Product (GDP). The residual findings derived from the export equation will be incorporated into the short-term equation as the Error Correction Term (ECT).

The ensuing table presents the short-term equation founded on the estimation outcomes of the Error Correction Model (ECM).

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Table 5. Estimation Error Correction Model Export Indonesia

Method: Least Squares
Date: 09/07/23 Time: 14:59
Sample (adjusted): 2007 2022
Included observations: 16 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	18444.35	9534.928	1.934398	0.0751
D(NILAI_TUKAR)	7.868075	12.40709	0.634160	0.5370
D(PDB)	-0.009422	0.012451	-0.756708	0.4627

R-squared	0.102230	Mean dependent var	11944.11
Adjusted R-squared	-0.035888	S.D. dependent var	29180.72
S.E. of regression	29699.72	Akaike info criterion	23.60302
Sum squared resid	1.15E+10	Schwarz criterion	23.74788
Log likelihood	-185.8242	Hannan-Quinn criter.	23.61044
F-statistic	0.740165	Durbin-Watson stat	0.939886
Prob(F-statistic)	0.496103		

Source: Secondary Data (Processed in Eviews)

The table presented above demonstrates that the Error Correction Model yields a significant negative coefficient for the estimated value of Indonesian exports. This outcome implies that, in the short term, it exerts a substantial impact on Indonesian exports within the scope of this study. However, with an R-Squared (R2) value of 0.1 (10%), it can be deduced that the independent variables incorporated into the model are not particularly robust, as approximately 90% of the variability in the independent variables remains unaccounted for outside the model.

The explanation elucidated by the available data suggests that Indonesian exports in the short term can be described by the following equation

Δ [Log (Export)] = 1.844435 – 7.868075 x Δ [Log (ER)] – 0.009422 x Δ [Log (GDP)] – 0.035888 x ECT
……. (2)

The estimation results presented above indicate that in the short-term period, changes in the exchange rate have a significant negative impact on Indonesian exports, assuming all other factors remain constant (ceteris paribus). Additionally, the estimation results also show that Gross Domestic Product (GDP) also has a significant negative impact on Indonesia's export performance.

After obtaining the short-term equation and applying the Error Correction Model (ECM) method, the result is the coefficient of the Error Correction Term (ECT). This coefficient is used to measure the response in each period to deviations from the equilibrium value. According to Widarjono (2007), the absolute value of the ECT imbalance correction coefficient indicates how quickly the difference between exports and its equilibrium value will be adjusted. With an ECT coefficient of 0.035888, it can be interpreted that a difference between exports and its equilibrium value of 0.035888 will be adjusted within 1 year.

CONCLUSIONS

The discussion of the data provided above yields three key conclusions. Over the span of 17 years, ranging from 2006 to 2022, Indonesian exports have exhibited an overall positive trajectory, notwithstanding occasional declines in specific years, including 2009 (US$ -22,510.4 million), 2013 (US$ -13,476.3 million), 2013 (US$ -7,468.5 million), 2014 (US$ -6,571.8 million), 2015 (US$ -25,613.7 million), 2019 (US$ -12,329.7 million), and 2020 (US$ -4,491.1 million). This positive export trend is primarily driven by key trade partners such as China, the United States, Japan, India, and Malaysia, with significant export commodities encompassing coffee, animal and vegetable fats and oils, crude palm oil (CPO), and coal. The Long-term Model Estimation reveals that the exchange rate exerts a significant negative influence on Indonesian

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exports. In essence, this suggests that in the long run, the exchange rate will lead to a reduction in Indonesia's exports. Likewise, Gross Domestic Product (GDP) also exerts a notable negative impact on Indonesian exports. The Short-term Model Estimation indicates that fluctuations in the exchange rate have a substantial adverse effect on Indonesian exports, assuming that all other factors remain constant (ceteris paribus). The estimation results also demonstrate that Gross Domestic Product (GDP) wields a significant negative influence on Indonesia's export performance.

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