THE INTERPLAY OF RUPIAH EXCHANGE RATE AND INTERNATIONAL CPO PRICES IN DRIVING VALUE OF INDONESIA'S CPO EXPORT GROWTH (2013-2023)

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ABSTRACT

This study aims to analyze the relationship between the Rupiah exchange rate against the United States Dollar (USD) and international Crude Palm Oil (CPO) prices on the development of the value of Indonesia's CPO export during the 2013-2023 period. The study employs secondary annual data obtained from Bank Indonesia, the Central Statistics Agency (BPS), FAOSTAT, and World bank. A quantitative descriptive analysis with the Pearson Correlation approach was used to measure the direction and strength of relationship among variables. The result indicate that the Rupiah exchange rate has a positive relationship with the value of Indonesia's CPO export, with a correlation coefficient of 0.588 (moderate relationship) and a significance value of 0.057, suggesting an economically relevant association though statistically insignificant at the 5% level. Meanwhile, international CPO prices exhibit a strong positive relationship with the value of Indonesia's CPO export, with correlation coefficient of 0.701 and a significance value of 0.016. these findings confirm that fluctuations in international CPO prices have a more dominant influence on export performance than exchange rate fluctuations, as international prices directly determine the value of export transactions. Overall, the study concludes that the value of Indonesia's CPO exports is largely influenced by global market dynamics and the stability of domestic macroeconomic conditions.

INTRODUCTION

Indonesia has long been recognized as the world's leading producer and exporter of crude palm oil (CPO). The palm oil industry plays a vital role in the national economy, contributing significantly to foreign exchange

earnings, job creation, and rural development. As one of the most strategic commodities in the agribusiness sector, palm oil also supports millions of smallholder farmers and serves as an essential source of revenue for both the private sector and the government. Over the past decade, however, Indonesia's CPO export performance has experienced notable fluctuations. These changes are largely influenced by movements in the international market, shifts in global demand, and variations in macroeconomic indicators such as exchange rates and global commodity prices.

In global trade, exchange rate dynamics and international prices are among the most influential factor affecting a country's export performance. The exchange rate determines the relative price of goods between countries. When the rupiah depreciates against the US dollar, Indonesian exports become cheaper for foreign buyers, potentially increasing export demand. Conversely, an appreciation of the rupiah can make exports less competitive and reduce export volumes. At the same time, the international price of CPO, generally expressed in US dollars per metric ton, reflects global supply and demand conditions. Price fluctuations in the global market— driven by production trends, substitute vegetable oils, or policy change— can directly affect the value of Indonesia's CPO export.

Between 2013 and 2023, Indonesia's CPO export value and volume have shown an uneven pattern. The decline in global CPO prices in 2015 and 2018, for example, coincided with the depreciation of the rupiah, while the commodity boom of 2021-2022 marked one of the highest export performances in the decade. Such variations highlight the complex interplay between exchange rates, global prices, and export dynamics. Understanding these relationships is essential for policymakers, industry stakeholders, and researchers in identifying how external shocks translate into changes in export performance.

Previous studies have examined the factors influencing Indonesia's agricultural exports, including palm oil. Research by Putra & Widanta (2022) found that an increase in the exchange rate against the Rupiah encourages export growth, as the appreciation of foreign currencies enhances the purchasing power of importing countries. Similarly, Nabila et al. (2025) emphasized the role of global price movements in determining export competitiveness. However, many of these studies used data only up to 2015 or focused on broader agricultural product rather than specifically on CPO. Moreover, few studies have analyzed both the trend of export growth and the direct relationship between exchange rate and international CPO price.

Building upon these findings, this study aims to examine the relationship between the rupiah exchange rate and international CPO prices in relation to Indonesia's CPO export development during 2013-2023.

Specifically, it intends to (1) describe the trend of these three variables over the last decade, and (2) examine the degree of correlation between exchange rate movements, global CPO prices, and export performance. By combining descriptive trends analysis and Pearson correlations, this research offers a concise yet insightful understanding of the linkages among key macroeconomics factors influencing Indonesia's palm oil export sector.

Theoretically, the relationship between exchange rates and exports can be explained through the elasticity approach in international trade theory. A depreciation of the domestic currency is expected to increase export competitiveness, assuming that the price elasticity of demand for exports is sufficiently high. In contrast, when the local currency appreciates, export volumes may decline as prices in foreign currency terms become less competitive. On the other hand, the international price of CPO, which reflect global market supply and demand, influences export revenue directly. When international price rise, export earnings increase, although the effect on export volume depends on domestic production capacity and policy responses such as export levies or restrictions.

The analysis of this relationship holds broad relevance within the context of Indonesia's national economy. Palm oil is one of Indonesia's leading export commodities, playing a vital role in generating foreign exchange earnings annually. Fluctuations in CPO export performance can influence national income, the trade balance, and the welfare of communities in major production areas. Amid growing global concerns over sustainability, trade barriers, and biodiesel policies, understanding the key economic factors that drive export performance has become increasingly important. Therefore, examining how exchange rate movements and changes in international CPO prices affect Indonesia's palm oil exports offers deeper conceptual understanding and practical insights for policy formulation and industry development.

This study differs from previous works in three important ways. First it focuses on the most recent decade (2013-2023), a period that includes major global events such as the oil price collapse in 2015, trade disruptions during the COVID-19 pandemic in 2020, and the commodity boom following global recovery in 2021-2022. Second, this study applies a simple yet effective analytical approach to examine the relationship between key macroeconomic variables, allowing for a clear and accessible understanding of their dynamics without relying on complex econometric models. Third, by emphasizing the Indonesian context, it provides updated empirical evidence that can support national export policy formulation and strategic decision-making in the palm oil sector.

This research contributes to the growing body of literature on agricultural trade by providing an update and context-specific analysis of

how exchange rate fluctuations and international price dynamics influence Indonesia's CPO exports. The findings are expected to enhance the understanding of Indonesia's export behavior under changing global economic conditions and offer relevant insights for policymakers and industry practitioner.

RESEARCH METHODS

Method of Collecting Data

This study draws on secondary data using annual time series covering the period 2013-2023. The data were obtained from several credible international and national sources, including the Bank Indonesia, the Central Statistics Agency (Badan Pusat Statistik/BPS), FAOSTAT, and World bank. The dataset comprises Indonesia's crude palm oil (CPO) exports measured both in value (US dollars) and in volume (tons), world palm oil exports in value and volume, the annual average international price of CPO (US dollars per metric ton), and the Indonesian rupiah to US dollar exchange rate.

Data Analysis Method

This study adopts a descriptive quantitative approach aimed at analyzing the relationship between the Indonesian rupiah exchange rate and international CPO prices on the development of Indonesia's CPO export during the period 2013-2023. The data analysis method employed is the Pearson correlation analysis, which is used to examine the degree and direction of association among variables.

The analytical framework of this study involves the collection and quantitative interpretation of secondary data to explain the relationship between the rupiah exchange rate and international CPO prices as the independent variables, and Indonesia's CPO export performance as the dependent variable. The interpretation of the correlation coefficient follows the classification used by Jabnabillah and Margina (2022), where the strength of the relationship is categorized based on the strength of the Pearson correlation coefficient.

Table 1.   Levels of Relationship Strength in Pearson Correlation

Coefficient Interval	Strength of Relationship
0,00-0,199	Very weak
0,20-0,399	Weak
0,40-0,599	Moderate
0,60-0,799	Strong
0,80-1,000	Very strong

RESULTS AND DISCUSSION
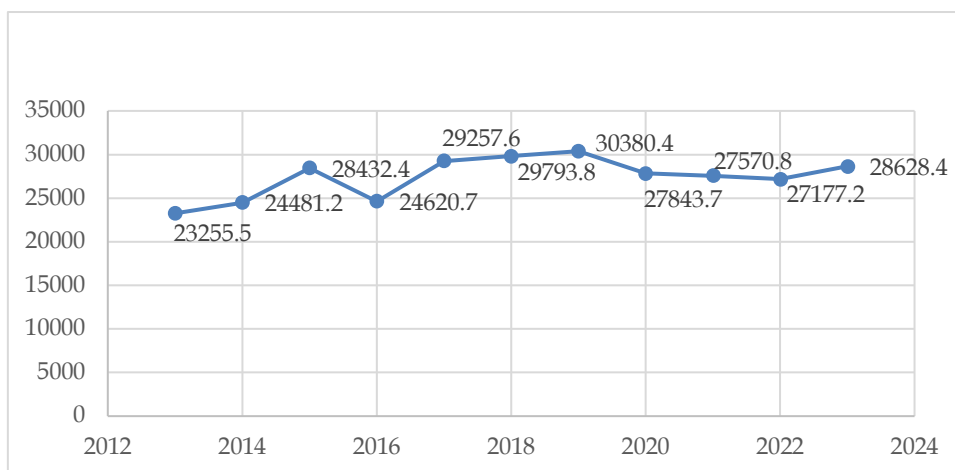
Trends in Indonesia's CPO Export

Figure 1
Volume of Indonesia's CPO Export

Based on Figure 1, the volume of Indonesia's CPO export during the period 2013-2023 exhibited considerable fluctuations. In 2013, the export volume was recorded at 23,255.5 tons, gradually increasing to 28,432.4 tons in 2015. Although it slightly declined to 24,620.7 tons in 2016, exports then grew considerably, reaching their highest level in 2020 at 30,380.4 tons, the highest level observed over the past decade.

The increase in export volume during 2017-2020 period was largely driven by rising demand from major importing countries such as India, China, and the European Union, as well as relatively favorable international price conditions (Anzani et al., 2023). Moreover, the government's policy to promote downstream processing and the implementation of the biodiesel mandate (B20 to B30) strengthened the competitiveness of the national palm oil industry by ensuring a stable supply of raw materials for domestic processing (Hudori, 2025).

However, export volume tended to decline after 2020. In 2021, export decreased to 27,843.7 tons, reaching their lowest level in 2022 at 27,177.2 tons. This decline was closely associated with the temporary export ban on CPO and its derivatives in 2022. The temporary export ban policy on CPO was implemented as a government response to the sharp increase in domestic palm oil prices, which affected the availability and stability of cooking oil prices in Indonesia. This policy is regulated under the Regulation of the Minister of Trade of the Republic of Indonesia No. 22 of 2022 concerning the *Temporary Export Ban on Crude Palm Oil (CPO), Refined Bleached and Deodorized (RBD) Palm Oil, Refined Bleached and Deodorized (RBD) Palm Olein,* and *Used Cooking Oil.* The main objective of this regulation was to maintain domestic supply stability and reduce

the soaring price of cooking oil caused by global supply chain disruptions. Consequently, the policy directly reduced Indonesia's CPO export volume to international markets during its implementation period. (Sjofian et al., 2025). In 2023, export volumes began to recover, reaching 28,628.4 tons, following the lifting of the export ban and the gradual stabilization of global market. Overall, despite fluctuations driven by market dynamics and policy interventions, Indonesia's CPO export trend over the past decade has remained relatively high, reaffirming the country's position as the world's leading palm oil exporter.

The development of Indonesia's CPO export volume can indirectly provide an overview of trade dynamics from the quantitative perspective. However, changes in export volume do not always move in line parallel with export value, as the latter is more strongly influenced by broader economic factors such as international prices, exchange rates, and global demand conditions. Over the 2013-2023 period, Indonesia's CPO export value exhibited sharp fluctuations, reflecting the combined influence of domestic policies and external economic developments.
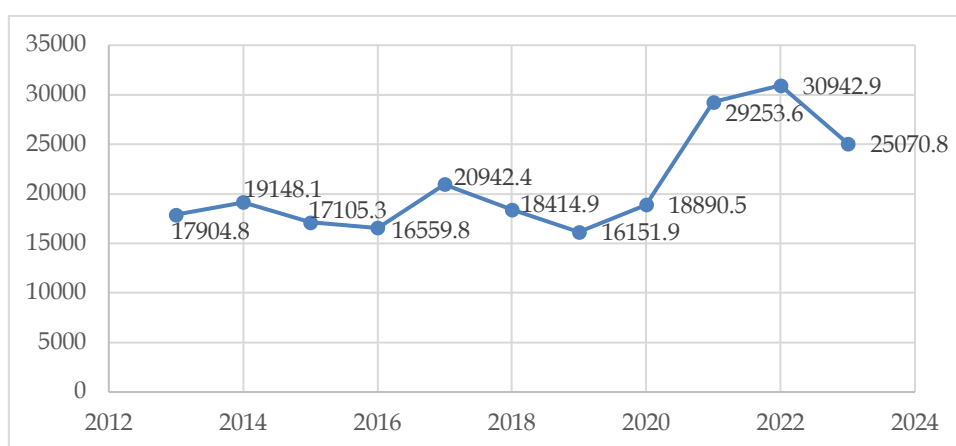

Figure 2
Value of Indonesia's CPO Export (000 US$)

Based on Figure 2., in 2013, Indonesia's CPO export value stood at US$17,904.8 million and raising to US$19,148.1 million in 2014. The increase reflected relatively stable of vegetable oil prices and growing demand from key importing countries such as India, China, and the European Union. During 2015-2016, export value declined to around US$16,559.8 million, largely driven by the collapse in global crude oil prices, which exerted downward pressure on CPO prices. The decline in global commodity prices led to lower export revenues even though export volumes remained relatively stable. In principle, export and import activities are influenced by the price within international markets. Aprilia (2012) as cited in Anzani et al. (2023) states that from the producer's perspective, an increase in international market prices will lead to higher export supply and export.

Conversely, when international prices decline, both export volume and value tend to decrease. From the demand side, however, lower international prices stimulate greater demand in the global market. Hence, it is often observed that when international prices and export values decline, export volumes may still increase. This phenomenon occurred in Indonesia CPO export performance in 2015. Although international CPO prices dropped by 20.78% and export value fell by 10.66% compared to 2014, Indonesia's CPO export volume increased by 14.42% during the same period.

A recovery occurred in 2017, when rising demand from India and China, supported by improving economic growth, pushed export value up to US$20,942.4 million. This rebound was also reinforced by the government's efforts to promote palm oil downstreaming and the implementation of the B20 biodiesel mandate, which enhanced domestic absorption and stabilized produces prices. However, the positive trend was constrained in 2018-2019, when export value fell again to around US$18,414.9 million, primarily due to the European Union's trade restrictions on palm oil-based products related to sustainability and deforestation issues. These developments highlight that Indonesia's CPO export performance is shaped not only by economic variables but also by the political economy of global trade and environmental policy.

A more significant downturn occurred in 2020, as the COVID-19 pandemic disrupted global supply chains and weakened demand for vegetable oils worldwide. Indonesia's CPO export value dropped sharply to US$16,151.9 million, reflecting the pandemic's adverse effects on international trade. However, the situation reversed dramatically in 2021-2022, when export value surged to a decade high of US$30,942.9 million. This sharp increase was driven by a spike in international CPO process due to tight global supply (partly caused by adverse weather conditions in other producing countries such as Malaysia and Thailand), rising biodiesel demand, and Indonesia's B20-B30 biofuel policy, which maintained price stability in the domestic market while supporting export performance.

Despite reaching its peak, export value declined again in 2023, to US$25,070.8 million. This fall reflected the impact of lower global CPO prices, reduced demand growth from major importing countries, and the continuing effects of Indonesia's temporary export ban in 2022, which disrupted trade flows and undermined market confidence. Overall, the fluctuations in Indonesia's CPO export value over the past decade underscores its high sensitivity to global economic factors, including commodity price cycles, international demand, exchange rate movements, and trade policy shifts both domestically and internationally. These dynamics reaffirm that Indonesia's export performance is not merely a function of production capacity but also depends on macroeconomic stability, global energy trends, and the evolving sustainability discourse in international markets.

The Realtionship between Rupiah Exchange Rate on Indonesia's CPO Export Value

The exchange rate holds a crucial position in shaping international trade and the global economy. An increase in the exchange rate is referred to as an appreciation, while a decrease is referred to as a depreciation. Exchange rates are inherently dynamic, as their values fluctuate over time. According to Sugiharti et al. (2020) the exchange rate serves as an important indicator in determining potential gains or losses from export activities, as its fluctuations directly affect the export earnings received in international trade transactions.
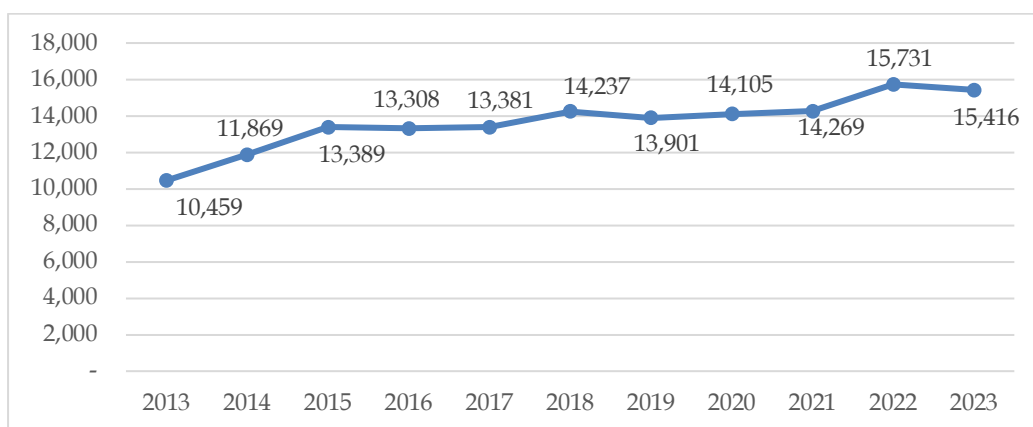

Figure 3
Trends in Rupiah-US Dollar Exchange Rate

Figure 3 illustrates the trend of the Rupiah exchange rate against the United States Dollar (USD) during 2013-2023 period. In general, the Rupiah experienced a depreciation trend, weakening from IDR10,459/USD in 2013 to IDR15,416/USD in 2023, with notable fluctuations in certain years such as 2015 and 2022. The period from 2013 to 2015 was marked by a significant depreciation of the Rupiah, followed by a relatively stable phase between 2016 and 2021, within the range of IDR13,000-14,000/USD. A sharp depreciation occurred again in 2022 amid global uncertainty following the Covid-19 pandemic and the increase in interest rates by the United States Federal Reserve (The Fed), before slightly strengthening in 2023.

From macroeconomic perspective, this trend reflects the influence of various external factor such as global monetary policy, international commodity price, and the current account deficit, alongside domestic factors including Bank Indonesia's interventions, inflation levels, and the structure of foreign trade. According to Hadi (2020) dan Sari et al. (2021) fluctuations in the Rupiah exchange rate against USD represent one of the fundamental indicators influencing the export performance of Indonesia's major commodities, including CPO as most export transactions are conducted in USD denominations.

From the perspective of international economic theory, particularly the *elasticity approach to the balance of payments,* a depreciation of the Rupiah is expected to stimulate exports since the prices of exported goods become relatively cheaper for foreign buyers (Mankiw, 2018; Krugman & Obstfeld, 2022). In context of Indonesia's CPO exports, which represent one of the country's main export commodities, this phenomenon has two major implications: (1) the depreciation of the Rupiah against the USD makes Indonesia's CPO prices more competitive compared to those of Malaysia, thereby strengthening Indonesia's position as the world's leading CPO exporter, and (2) the export revenues received in USD are worth more when converted into Rupiah, thus potentially increasing the country's foreign exchange earnings.

Based on the exchange rate tend, which indicates a tendency of Rupiah depreciation over the past decade, the subsequent analysis examines the statistical relationship between the Rupiah exchange rate and the value of Indonesia's CPO exports using the Pearson correlation test. The results of the correlation analysis presented in Table 2.

Table 2.   Pearson Correlation between the Rupiah Exchange Rate and the Value of Indonesia's CPO Exports

Variable	Exchange Rate IDR-USD	Value of Indonesia's CPO Export
Exchange rate IDR-USD	1	**0.588**
Value of Indonesia's CPO Export	0.588	1

Note:

N = 11 (period 2013-2023)

Based on Table 2., the correlation between the Rupiah exchange rate against USD and the value of Indonesia's CPO export is 0.588. this indicates a positive relationship of moderate strength between the depreciation of the Rupiah and the increase in Indonesia's CPO export value. Although the result is not statistically significant at the 5% confidence level ($p < 0.05$), the p-value that approaches the threshold of significance ($p = 0.057$) suggests that the relationship remains economically meaningful. Gujarati & Porter (2013) who argue that correlations with near significant p-values may still indicate a functional association, particularly in studies with small sample size ($N < 30$).

The positive correlation of moderate strength between the Rupiah exchange rate against the USD and the value of Indonesia's CPO export is consistent with findings from previous studies. Hamzah (2020) and Pratiwi et al. (2021) revealed that a depreciation of the Rupiah is positively correlated with an increase in value of CPO export, particularly in the long term. Exporters receive higher revenues in Rupiah even when international CPO prices remain constant in USD terms. This statement is further supported by Salwanisa (2025) who explained that Rupiah depreciation can enhance the nominal value of CPO

exports through the foreign exchange conversion mechanism. During the 2013-2023 period, when the Rupiah weakened from approximately IDR13.000 to IDR15.000-IDR16.000 per USD, export revenues in Rupiah increased by about 20%-25%. Thus, the effect of the exchange rate on export value is asymmetric—positive during stable periods but tends to weaken or even turn negative when exchange rate fluctuations become extreme.

The Realtionship between Internationa CPO Prices on Indonesia's CPO Exports

The international price of CPO represents a complex interaction among global market forces, world energy policies, and investor expectations. As one of the most widely traded vegetable oils in the world, CPO prices are determined conditions of production and consumption, speculative mechanisms in commodity exchanges, trade policies, and environmental issues (UNCTAD, 2022; FAO, 2023; Ghazali & Silalahi, 2021). In the context of global economy, CPO exhibits a highly elastic price behavior in response to changes in world demand. Any fluctuation in international prices can have a direct impact on the economies of producing countries, including Indonesia, as more than 70% of the nation's palm oil production is allocated for export. Thus, the international price of CPO serves as a key indicator determining the direction of export value, foreign exchange earnings, and the stability of the plantation sector in major producing countries.

Based on Figure 4., the development of international CPO prices during 2013-2023 period shows considerable volatility. In 2013, the international price of CPO stood at around US$870.73 per ton, followed by a downward trend that reached its lowest point in 2019 at US$601.37 per ton. A significant increase began in 2020, peaking in 2022 at US$1,275.99 per ton, before declining again to US$886.45 per ton in 2023. These price fluctuations influenced by factors such as global demand, renewable energy policies, weather variations, and substitution effects from other vegetable oils such as soybean, coconut, and canola oil. According to the United Nations Conference on Trade and Development (2022) and FAO (2023), the surge in international CPO prices in 2021-2022 was driven by rising demand for vegetable oils as alternative energy sources (biodiesel demand) and supply disruptions caused by the pandemic and geopolitical conflicts.
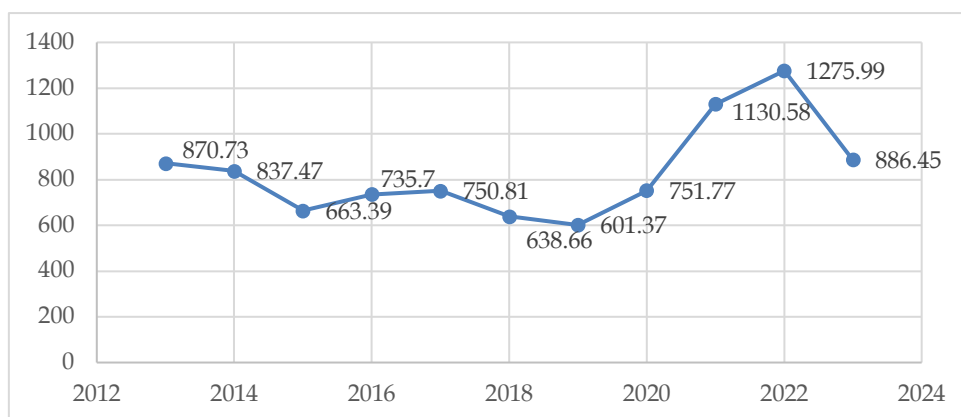
Figure 4
Trends in International CPO Prices

In theory, an increase in international CPO prices leads to a rise in Indonesia's CPO export value, as the selling price per ton in USD increases while export volume remains relatively constant. This phenomenon, known as the price-driven export effect,the surge in international CPO prices during 2021-2022 resulted in a significant jump in Indonesia's CPO export value. According to Badan Pusat Statistika (2023), the value of CPO exports recorded an increase of 57% compared to the various year, even though export volume increased by only 5%-7%. Conversely, when international CPO prices declined during 2014-2019 period, Indonesia's export value also decreased, despite relatively stable export volumes. Based on the trend indicating fluctuations in international CPO prices over the past decade, the subsequent analysis examines the statistical relationship between international CPO prices and value of Indonesia's CPO export using the Pearson correlation test. The results of the correlation analysis presented in Table 3.

Table 3.   Pearson Correlation between the international CPO Prices and the Value of Indonesia's CPO Exports

Variable	International CPO Prices	Value of Indonesia's CPO Export
International CPO Prices	1	**0.701***
Value of Indonesia's CPO Export	**0.701***	1

Note:
(*) Correlation is significant at the 0.05 level (2-tailed)
N = 11 (period 2013-2023)

Based on Table 2, the correlation between international CPO prices and value of Indonesia's CPO export is 0.701, indicating a positive and strong relationship between the two variables. This implies that an increase in international CPO prices is significantly associated with a rise in value of

Indonesia's CPO export. This finding is consistent Hamzah (2020) who reported a positive correlation of 0.68 between international CPO prices and CPO export value at 0.05 significance level. Furthermore, Pratiwi et al. (2021) revealed that international CPO prices contribute the most to variations in Indonesia's CPO export performance compared to exchange rates and domestic production variables. Similarly, Rahmadani (2020) emphasized that international CPO prices are the most dominant variable, showing the highest regression coefficient among other macroeconomic factors such as exchange rate, inflation, and global GDP.

Hadi (2020) revealed that changes in international CPO prices serve as the main determinant of export value, with a positive elasticity of more than 0.8—meaning that every 10% increase in international prices leads to approximately an 8% rise in export value. Similarly Salwanisa (2025) confirmed that fluctuations in international CPO prices exert a stronger influence on export performance that the Rupiah/USD exchange rate, as international prices directly determine export transaction values in USD terms. These findings indicate that international prices are a key factor in shaping Indonesia's palm oil export performance. The increase in international CPO prices not only raises export values nominally but also enhances investor interest..

CONCLUSIONS AND POLICY IMPLICATIONS

Conclusions

Based on the data analysis for the 2013-2023 period, it can be concluded that both the Rupiah exchange rate against US Dollar (USD) and international CPO prices have a positive relationship with value of Indonesia's CPO export. The Rupiah exchange rate shows a positive correlation of moderate strength (r = 0.588), indicating that Rupiah depreciation tends to increase CPO export revenues in Rupiah terms, although the effect is not always statistically significant. Meanwhile, international CPO prices display a strong significant positive correlation (r = 0.701), suggesting that rising international prices directly boost value of Indonesia's CPO export.

Suggestion

Therefore, exchange rate stability and international price management strategies are crucial in maintaining Indonesia's CPO export performance. The government is recommended to strengthen hedging policies, expand downstream palm oil product diversification, and sustain a conducive trade environment to mitigate the adverse effects of exchange rate and international commodity price fluctuations on national exports.

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