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UNITED STATES - CHINA TRADE WAR ISSUE: IMPACT ON INFLATION AND INDONESIA'S EXPORT PERFORMANCE

Romauli Nainggolan*, Benedecta Nadya Evangelie

School of Business and Management, Ciputra University
Boulevard, Made, Sambikerep, Surabaya, East Java, 60219, Indonesia

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Abstract:

Background: The import tariffs imposed by the United States (U.S) on 10 countries have received mixed responses. Indonesia is subject to an import tariff of 32%—the highest in the history of international trade. Due to this condition, several countries have entered negotiations to request a reduction in import tariffs. Such negotiations are crucial because high import tariffs may weaken the economic growth of exporting countries and reduce their export value to the U.S.
Purpose: To examine the impact of domestic macroeconomic factors and U.S. import tariff fluctuations on the long-term value of Indonesia's fish exports.
Design/methodology/approach: Autoregressive Distributed Lag (ARDL) analysis technique is applied in this explanatory quantitative research to test long-term relationships among variables. The data used are monthly time series data covering the period 2015–2024.
Findings/Result: Short-term and long-term ARDL equations show that inflation and import tariffs significantly affect Indonesia's fish export performance to the United States. In addition, a long-term complementary correlation was found between exports to China and exports to the U.S. For every 1% increase in fish exports to China, fish exports to the U.S. increase by about 0.41% within the following 21 months. This indicates the existence of common external demand, value chain integration, or global commodity conditions that influence both markets. This study provides important implications for fiscal and international trade policies. Fiscal authorities need to design strategies to maintain exchange rate and inflation stability.
Conclusion: Indonesia's domestic inflation, U.S.-imposed import tariffs, and Indonesia's fish exports to China significantly influence the performance of Indonesia's fish exports to the United States.
Originality/value (State of the art): The object of study is the marine sector. Research on fish exports that compares two export destinations under conditions of high trade war tension is rare. In general, most studies only examine exports to a single destination country.

Keywords: import tariff, United States, exchange rate, fish exports, Indonesia

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* Corresponding author:
Email: romauli.nainggolan@ciputra.ac.id

INTRODUCTION

The trade war between the United States and China has directly affected Indonesia's exports. Specifically, the trade war, which began in July 2018 with the imposition of tariff hikes on imported Chinese goods by the U.S., aimed to reduce trade flows between these two economic superpowers (Jong, 2022). In the context of the U.S.–China trade war, the imposition of tariffs by both parties has disrupted global supply chains and triggered a decline in international trade volumes overall, even affecting global economic growth (Napang, 2022) (Villia et al. 2023). Consequently, these tariffs have increased trade costs, suppressed trade flows between the U.S. and China, and led to higher production costs and market uncertainty for businesses worldwide (Yang et al. 2025). This paper explores the complex mechanisms through which the U.S.–China trade war affects the Indonesian economy, particularly focusing on inflation and the export performance of its fisheries sector, a vital component of its national economy (Napang, 2022).

The fisheries sector is one of the backbones of Indonesia's economy, with fishery exports contributing significantly to state revenue and job creation (Oktavilia et al. 2019). A country's economic growth is strongly influenced by its export performance, including fishery exports, which serve as a key driver for increasing foreign exchange reserves (Villia et al. 2023). This phenomenon is increasingly relevant, given that export value plays a crucial role in economic growth (Nisa, 2025). However, Indonesia's export performance particularly in the fisheries sector is highly vulnerable to various complex external and domestic factors. Key factors influencing fish export performance include international trade policies; particularly import tariffs from destination countries such as the United States, global inflation fluctuations that affect production costs and selling prices, and exchange rate movements that impact product competitiveness in international markets (Widiyanto et al. 2024). These factors interact in complex ways, creating both challenges and opportunities for Indonesian fish exporters in maintaining and expanding their global market share. The U.S. market's demand for sustainable fishery products is also a key consideration, as eco-label standards and responsible fishing practices have become essential criteria for importers (Wiranthi, 2021).

In both the short and long term, the trade war has been proven to significantly affect inflation, export volume, import tariffs, and exchange rates (Retnasih & Syahda, 2025), thereby slowing down economic growth (Aba, 2021). A 1% increase in U.S. tariffs on Chinese exports can reduce China's exports to the U.S. by up to 1.6 times (Doifode & Narayanan, 2020). U.S. import tariffs on Chinese goods have a negative impact on Indonesia's exports, while Chinese tariffs on U.S. goods causes a slight increase in demand for Indonesian exports (Purwono et al. 2022) though still reducing overall export value (Aba, 2021). This dynamic indicates that Indonesia's trade performance is indirectly affected by global trade tensions, particularly due to its strong linkage with both the U.S. and Chinese markets. Fluctuations in tariff policies and exchange rates can alter Indonesia's export competitiveness, especially in primary and manufacturing sectors. Consequently, the trade war underscores the importance of diversifying export destinations and strengthening domestic economic resilience through value-added production.

Previous studies have largely focused on analyzing the competitiveness of Indonesian fishery products in the global market such as studies of (Suryana & Amalia, 2021) (Destiningsih et al. 2020). Other research has also analyzed the impact of the trade war on exports (Villia et al. 2023) and studied the potential of blue economy in boosting the marine and fisheries sector (Khoiriyah, 2024). However, comprehensive research that focus on key macroeconomic and external trade variables which specifically integrates the analysis of U.S. import tariffs, inflation, exchange rates, and exports to China on Indonesia's fish exports remains limited. This gap is crucial because Indonesia's fish export performance is mostly shaped by macroeconomic dynamics as well as global trade policy. Therefore, this study seeks to fill this gap by examining in depth how these four macroeconomic variables and trade policies simultaneously affect the long-term value of Indonesia's fish exports, which would provide more insights for trade and fisheries policy formulation.

This research is expected to make a significant contribution to formulating more effective trade and economic strategies for both the Indonesian government and fishery businesses. Specifically, the study will explore the implications of U.S. import tariffs on the price of Indonesian fish products, analyze how global inflationary pressures affect production cost structures and export competitiveness, and assess the impact

of Rupiah–U.S. dollar exchange rate fluctuations on exporters' profitability. The study will also take into account the dynamics of fish exports to China as an alternative or complementary market, and how changes in demand from these two major markets influence Indonesia's fishery export diversification and resilience strategies. Overall export performance is influenced by a range of internal and external factors, including inter-country trade dynamics and global economic uncertainty (Villia et al. 2023). In this context, understanding these interconnected variables will help policymakers design adaptive strategies to stabilize export income and maintain industry growth. Ultimately, the study aims to provide an empirical foundation for strengthening Indonesia's position within the global seafood supply chain. From a theoretical perspective, this study contributes by integrating trade policy variables, macroeconomic indicators, and market diversification through a single analytical framework to better explain export performance dynamics. Meanwhile, from a policy perspective, the findings offer evidence-based foundation for export diversification, exchange rate management, and strategic trade negotiations with the hopes of enhancing Indonesia's long-term competitiveness in the global market.

High tariff policies imposed by the U.S. on exporting countries are a protectionist instrument that negatively affects production and income in exporting countries while restricting U.S. exports to those markets (Park, 2021), negatively affect Indonesia's exports through U.S. tariffs on China, yet they also lead to increased demand resulting from China's tariffs on U.S. goods (Purwono et al. 2022). Such policies not only suppress bilateral trade performance but also generate spillover effects on other partner countries such as Indonesia. Recent studies (Jayadi & Firmansyah, 2021) show that the trade war has driven shifts in global demand patterns, with some importing countries diverting their sources to Indonesia, including fishery commodities. This creates short-term export opportunities but remains characterized by fluctuating fish prices and uncertainty in long-term contracts.

Exchange rate depreciation can, on the one hand, stimulate exports. However, exchange rate instability poses obstacles for long-term trade contracts and undermines investor confidence. Economic models such as ECM, VECM, and GARCH have been used in various studies to measure the short- and long-term impacts of exchange rates on Fed interest rates, trade tariffs, and Indonesia's export performance (Marshanda & Wulandari, 2024). This study adds that exchange rate pressures arising from trade war and global monetary policies have compelled Bank Indonesia to balance policies between price stability and export growth, particularly in sectors sensitive to exchange rates such as fisheries. A study analyzing the impact of Rupiah exchange rate volatility on Indonesia's exports to six OIC countries found significant negative effects both in the short and long term, suggesting that exporters tend to avoid risks, therefore stable exchange rate policies are recommended (Handoyo et al. 2022). The recommendations of aforementioned research emphasized the importance of exchange rate stabilization policies and the use of hedging instruments by Indonesian fish exporters to maintain stable export revenues amid global trade uncertainty.

The aim of this study is to analyze the long-term impact of inflation, exchange rates, U.S. import tariffs, and exports to China on the performance of Indonesia's fish exports, as well as the implications for domestic macroeconomics. The findings of this study can serve as recommendations for sustainable blue economy strategies for Indonesia's marine economy and as policy suggestions for international trade (Evans et al. 2023).

METHODS

This study uses secondary sourced monthly data collected from 2015-2024. These data were obtained from credible secondary sources, ranging from Bank Indonesia, Badan Pusat Statistik Indonesia, and the Ministry of Trade of the Republic of Indonesia. The focus on analysis in this study is Indonesia's fish exports to China and the United States. The selected time frame captures the dynamic effects of global trade tensions and exchange rate fluctuations that have influenced export performance. By utilizing consistent and verified secondary data, the study ensures reliability in trend analysis and supports the robustness of long-term econometric estimations.

The data obtained were a result from compiling statistical publications from credible databases from authoritative sources: Bank Indonesia, Badan Pusat Statistik Indonesia, and the Ministry of Trade of the Republic of Indonesia. These statistical publications are further examined to ensure its validity, reliability, and suitability for this study. The variables that are

studied are as the following: export values (USD), exchange rate (USD/ IDR), inflation (CPI), economic growth (percent), and import tariff rate (percent). Each variable was selected based on its theoretical relevance to trade performance and its measurable impact on macroeconomic stability. The inclusion of both monetary and real-sector indicators allows for a more comprehensive assessment of the factors influencing Indonesia's fish export dynamics.

This research is an explanatory quantitative study aimed to examine the influence among variables, both directly and indirectly. The analytical technique employed is the Autoregressive Distributed Lag (ARDL) model for time series data with mixed integration orders of I(0) and I(1). This method allows for the simultaneous analysis of both short-term and long-term relationships. It is well-suited for testing the effects of exchange rates and inflation on exports in the context of developing countries. H1: Domestic inflation has a significant effect on the export performance of Indonesian fish to the United States market. H2: Fluctuations in import tariffs set by the United States have a significant effect on the value of Indonesian fish exports in the long run. H3: There is a significant complementary correlation between Indonesian fish exports to China and export performance to the United States in the long run.

Ahmad and Zhao (2021) emphasized the advantages of ARDL in analyzing long-term relationships between economic growth, exchange rates, and trade balance in Asia. Meanwhile, demonstrated that ARDL can accurately identify the effects of trade liberalization on export growth in both the short and long term (Ullah et al. 2020). The steps in this technique include the Bounds Testing approach (Pesaran et al. 2001), estimation of the error correction model (ECM) derived from ARDL, and long-term cointegration testing. The use of ARDL in this study enables the researcher to capture the dynamic long-term relationships among variables. This approach has been applied in various international trade studies (Nguyen et al. 2022), making it relevant for analyzing the impact of trade war on exchange rates, inflation, and the fish exports volume in Indonesia. The A

$$Y_t = \alpha_0 + \sum_{i=1}^{p} \beta_i Y_{t-i} + \sum_{j=0}^{q_1} \gamma_{1j} X1_{t-j} + \sum_{k=0}^{q_2} \gamma_{2k} X2_{t-k} + \sum_{l=0}^{q_3} \gamma_{3l} X3_{t-l} + \sum_{m=0}^{q_4} \gamma_{4m} X4_{t-m} + \sum_{n=0}^{q_5} \gamma_{5n} X5_{t-n} + \varepsilon_t$$

Where: Yt (volume of fish exports to the United States); X1, X2, X3, X4, X5 (variables ER (exchange rate)); INF (inflation); EG (economic growth); EXP_China (fish exports to China); Import Tariff; p (lag length of the fish export volume variable); q1,q2,q3,q4,q5 (lag lengths of each independent variable); α0 (intercept); βi,γij (regression coefficient); ε (error term). Definitions, measurement units, and data sources of variables used in the study (2015-2024) in Table 1.

RESULTS

The analysis will be divided in three parts. First, the development over the last 10 years of inflation, exchange rates, economic growth, fish export values to China, fish export values to the U.S., and trade tariffs. Second, the description of the research variables. Third, the statistical test results using the Autoregressive Distributed Lag (ARDL) analysis technique. This analytical structure is designed to capture both short-term and long-term relationships among the variables, ensuring a more comprehensive interpretation of dynamic interactions. The ARDL approach is particularly suitable for this study because it can handle variables with different levels of stationarity and provide robust estimates even with limited sample sizes.

Table 1. Definitions, measurement units, and data sources of variables used in the study (2015-2024)

Variable	Definition	Unit	Source	Period 2015-2024
ER	Exchange rate between the US Dollar (USD) and the Indonesian Rupiah (IDR)	USD/ IDR	Bank Indonesia (2025)	Monthly
INF	Inflation measured from CPI (Consume Price Index)	%	Bank Indonesia (2025)	Monthly
EG	Economic growth rate	%	BPS (2025)	Monthly
EXP_AS	Fish exports to U.S.	USD	BPS (2025)	Monthly
EXP_China	Fish exports to China	USD	Bank Indonesia (2025)	Monthly
Import Tariff	Import tariff rate as an indicator of Tariff Tension Index	%	-	Monthly

Based on Figure 1, during 2015–2019 there was an upward trend in the first two years (2015–2016). Afterwards, inflation tended to remain stable until 2019. A decline occurred in 2020–2021 due to the COVID-19 pandemic. Following this, a temporary upward trend appeared in 2022–2023, before returning to normal in 2024. This pattern reflects the typical inflationary response to global supply chain disruptions and post-pandemic recovery pressures. The stabilization in 2024 indicates the effectiveness of monetary policies implemented by Bank Indonesia in maintaining price stability amid fluctuating global economic conditions.

Figure 2 shows that exchange rate tended to follow a long-term upward trend from 2015 to 2025. In early 2020, when the COVID-19 pandemic occurred, exchange rate experienced a very significant increase, reaching 4.2. After the pandemic subsided, the exchange rate continued to rise slowly but consistently. Several external factors may have contributed to this annual increase, such as global interest rates, commodity prices, and geopolitical uncertainty. This persistent depreciation of the Rupiah reflects Indonesia's vulnerability to global financial market volatility and capital flow reversals. Nevertheless, the gradual pace of adjustment suggests that domestic monetary policy and foreign exchange interventions were relatively effective in mitigating excessive fluctuations.

Based on Figure 3, the value of fish exports to the U.S. shows a long-term upward trend from 2015 to 2025. The highest increase occurred in 2021–2022, in the post-pandemic period. Afterward, there was a gradual decline, though the level remained higher compared to the beginning of the period. This surge was likely driven by rising U.S. demand for seafood products as global supply chains normalized and consumer spending rebounded. The subsequent moderation indicates market adjustment and increased competition from other exporting countries, highlighting the need for Indonesia to strengthen product quality and trade partnerships to sustain export growth.

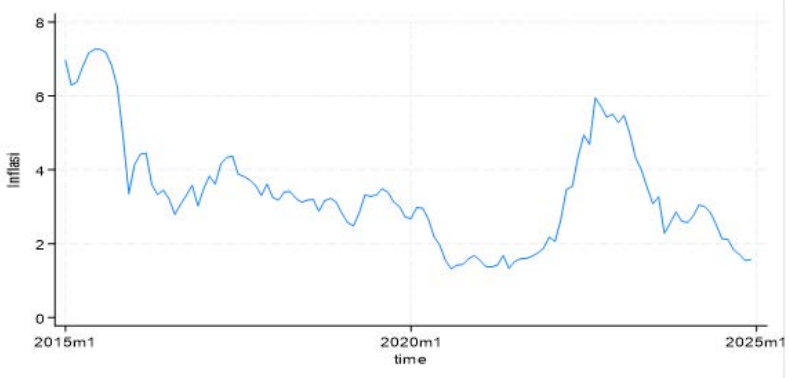

Figure 1. Indonesia's Monthly Inflation Rate (2015-2024): Showing the Impact of the COVID-19 Pandemic on Price Stability

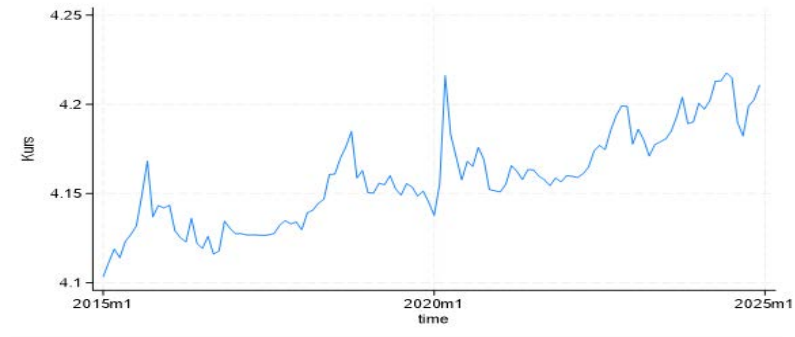

Figure 2. USD/IDR Exchange Rate Trend (2015-2024): Indicating the Rupiah Depreciation and Post-Pandemic Recovery

Based on Figure 4, the value of fish exports to China shows a steady and sustainable long-term upward trend from 2015 to 2025. Unlike exports to the U.S., which spiked after the pandemic and then declined, exports to China were more consistent and continuous. This indicates that the Chinese market is more strategic and has the potential to become the main absorber of Indonesian fishery products in the long run. The stability of export growth to China reflects strong trade relations, supported by regional cooperation frameworks such as RCEP and ASEAN-China Free Trade Agreement. Furthermore, China's growing middle-class consumption and demand for high-quality seafood present long-term opportunities for Indonesia to enhance value-added fishery exports.

Based on Figure 5, the U.S. import tariff graph shows that from 2015–2018 the rate remained relatively constant at around 1.5%. However, there was a very significant increase in 2019–2020, reaching as high as 14%. Afterwards, it declined and stabilized until 2023, before rising sharply again to 20% in 2024. This surge aligns with the escalation of the U.S.–China trade war, which prompted widespread policy spillovers across global supply chains. The heightened tariff environment indirectly affected Indonesia's export competitiveness, as trade diversion and market uncertainty disrupted demand patterns in key export destinations.

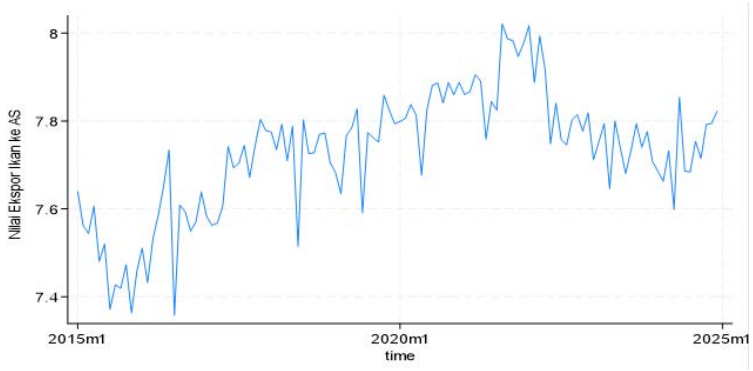

Figure 3. Indonesia's Fish Export Value to the U.S. (2015-2024): Post-Pandemic Surge and Stabilization Trends

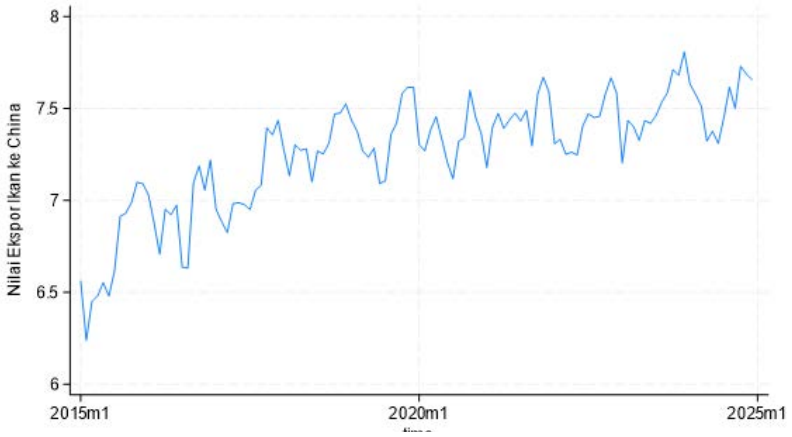

Figure 4. Indonesia's Fish Export Value to China (2015-2024): Sustained Growth Reflecting Market Stability and Strategic Potential

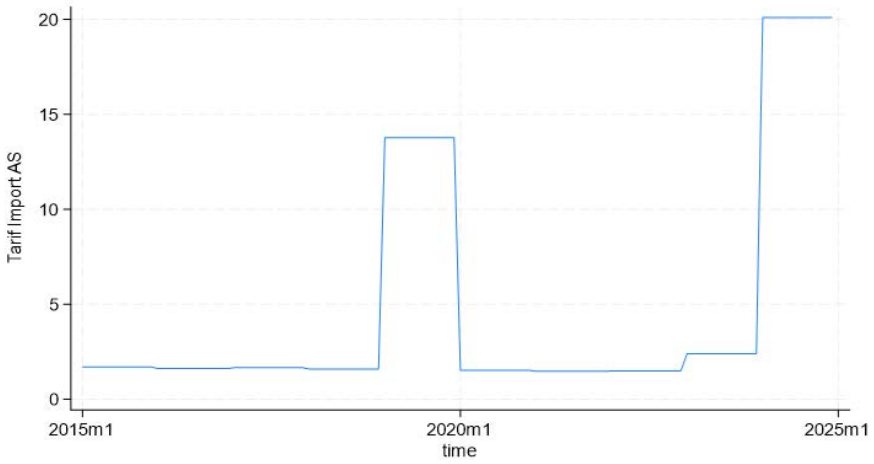

Figure 5. U.S. Import Tariff Trends on Indonesian Fish Products (2015-2024): Tariff Escalations during Trade War Phases

Descriptive statistics show the mean, standard deviation, minimum, and maximum values of the six variables. These indicators provide an overview of data distribution and variability, allowing researchers to understand the stability and fluctuation tendencies of each variable over time. The mean values illustrate the central tendency of Indonesia's macroeconomic and trade performance, while the standard deviation highlights the degree of volatility, particularly in exchange rates and export values. Furthermore, identifying the minimum and maximum points helps to capture extreme conditions such as economic shocks or policy shifts that may have significantly influenced export performance.

Table 2 shows the statistical description of each variable used. Inflation has an average of 3.37, with a maximum value of 7.26 in June–July 2015 and a minimum of 1.32 in August 2020, indicating a relatively low inflation rate with moderate fluctuations. The exchange rate averages at Rp14,431.31 with a standard deviation of 900.14, where the highest value reached is Rp16,503.10 in June 2024 and the lowest is Rp12,688.00 in January 2015, reflecting considerable exchange rate volatility. Indonesia's export value to the United States averages at 56,212,406.30, ranging between 22,786,278.46 and 105,004,644.24, while exports to China are more volatile with an average of 22,475,659.32, a maximum of 64,316,816.22 in December 2023, and a minimum of 1,729,037.00 in February 2015. Indonesia's economic growth during the observation period shows an average of 4.08 with considerable variation (standard deviation of 2.54), reaching a peak growth of 7.07 in the second quarter of 2021 but also experiencing a contraction of –5.32 in the second quarter of 2020 during the pandemic. Meanwhile, U.S. import tariffs have an average of 4.73 with a standard deviation of 6.30, with the highest value of 20.10 in 2024 and the lowest value of 1.47 in 2021. Overall, these data highlight significant dynamics in the observed macroeconomic and trade variables, including inflation, exchange rates, exports, economic growth, and import tariff policies.

Stationarity Testing

Table 3 shows the results of the ADF test for the variables used in this study. Based on Table 3, it can be seen that the variables exhibit different levels of stationarity. The export values to the United States and to China are stationary at the level stage, as indicated by the ADF test p-values being smaller than the 5% significance level. Meanwhile, the other variables are not stationary at the level stage. Therefore, stationarity testing must be carried out at the next stage until stationarity is achieved. Based on the results of the stationarity test at the first difference level, all variables are found to be stationary, which allows the analysis to proceed to the next stage.

Table 2. Descriptive statistics of key macroeconomic and trade variables (inflation, exchange rate, export values, growth, and tariffs)

Variable	Means	Standard deviation	Maximum	Minimum
INF (%)	3.3740	1.48118	7.26	1.32
ER (IDR/USD)	14431.3068	900.14256	16503.10	12688
EXP_AS	56212406.304	17401557.33898	105004644.24	22786278.46
EXP_China	22475659.318	12729177.00498	64316816.22	1729037
EG (%)	4.0763	2.53867	7.07	-5.32
US Import tariffs (%)	4.7310	6.29732	20.10	1.47

Table 3. Augmented Dicky-Fuller (ADF) Stationarity Test Results for Time Series Variables (2015-2024)

Variable	Level I(0)		First Difference I(1)	
	Statistic	p-value	Statistic	p-value
Export Value to U.S.	-3.381	0.0022	-	-
Export Value to China	-2.983	0.0366	-	-
Inflation (INF)	-2.242	0.1915	-9.016	0.000
Exchange Rate (ER)	-2.292	0.1745	-12.093	0.000
Economic Growth (EG)	-2.666	0.0801	-10.822	0.000
U.S. Import Tariffs	-1.256	0.6492	-10.867	0.000

Optimal Lag Determination

Based on Table 4, the smallest values of AIC, HQIC, SBIC, and FPE are found at lag (1) and (2). Therefore, these two lags will be used for the next stage. This result indicates that the model achieves optimal efficiency and predictive accuracy at shorter lag intervals, suggesting that current and one-period lagged variables already capture most of the dynamic interactions among the data. The relatively consistent results across multiple selection criteria also strengthen the robustness of the lag determination. Consequently, using lag (1) and (2) helps to minimize estimation bias while preserving model parsimony in the subsequent ARDL analysis**.**

Short-Run ARDL Analysis Results

Short-run ARDL equation is formulated based on table 5:

$$EXPAS_t = 1.4386 + 0.3238EXPAS_{t-1} + 0.3730EXPAS_{t-2} + 0.1253EXPChina_t + 0.0458Inf_t - 0.4508ER_t + 1.3429ER_{t-1} - 2.8206ER_{t-21} + 0.0069EG_t - 0.0137EG_{t-1} - 0.0078USImportTariffs_t + \varepsilon_t$$

Explanation of the ARDL Equation:

1. Positive constant value means that when all independent variables are zero, Indonesia's fish exports to the United States still tend to increase by 1.4386 units. This indicates the presence of other factors outside the model that also drive exports. The lagged U.S. export values {t-1} = 0.3238 and {t-2} = 0.3730 show positive and significant coefficients, indicating inertia (path dependence), where past exports directly influence current exports. In other words, if exports increased in the previous period, current exports also tend to rise.
2. The export-to-China coefficient of 0.1253 indicates a positive relationship, showing evidence of market diversification. An increase in exports to China also boosts exports to the U.S., likely due to productivity effects or rising national production capacity.
3. Inflation coefficient of 0.0458 is positive, though relatively small. This may suggest that in the short run, domestic inflation does not severely hinder exports, as producers can still pass on costs to foreign consumers.
4. Exchange rate coefficient ER_{t-1} is 1.3429, meaning that in the next period, a depreciation of the domestic currency increases exports, since Indonesian products become cheaper. This result aligns with the Marshall–Lerner condition, which states that a weaker domestic currency enhances

export competitiveness when the elasticity of demand for exports and imports exceeds one. Furthermore, currency depreciation can stimulate foreign demand by improving Indonesia's price advantage in international markets, particularly for tradable goods like fishery products.

5. The coefficient ER_{t-2} of -2.8206 reflects the longer-term reversal effect, where excessive exchange rate fluctuations create instability, harming exports. This finding supports the J-Curve Effect theory (Bahmani-Oskooee & Mitra, 2009). In the longer term, persistent volatility erodes exporters' confidence and raises transaction costs, leading to reduced trade volumes despite initial benefits from depreciation. Moreover, this indicates that stable exchange rate management is crucial for sustaining export performance and avoiding uncertainty in long-term trade contracts.
6. Economic growth coefficient of 0.0069 shows that current economic growth encourages exports (though modestly). However, GR_{t-1} of -0.0137 suggests that past economic growth slightly suppresses exports, possibly because higher domestic consumption absorbs part of production.
7. The U.S. import tariff coefficient of -0.0078 reveals a negative relationship consistent with international trade theory; the higher the U.S. import tariff, the lower Indonesia's fish exports. Although the impact is small, it is significant in the short run, consistent with international trade literature (Kurniawan & Luthfi, 2023)

In conclusion, Indonesian exports to the U.S. are strongly influenced by exchange rates and U.S. import tariffs in the short run, while domestic inflation and economic growth are relatively weaker factors. Lag effects are crucial, supporting the existence of short-run dynamics, including the J-Curve effect of exchange rates. Diversification into the Chinese market helps stabilize exports, providing a substitute market when the U.S. imposes tariff pressures.

Table 4. Selection of Optimal Lag Lengths Based on AIC, HQIC, SBIC, and FPE Criteria

Indicator	Lag		
	1	2	3
AIC		-0.825253*	-0.717198
HQIC	-0.277656*	-0.077648	0.375457
SBIC	0.311336*	1.0162	1.97415
FPE	2×10^{-8}	$1 \times 10^{-8*}$	2×10^{-8}

Table 5. Short-Run ARDL Estimation Results: The Effect of Inflation, Exchange Rate, Economic Growth, and Tariffs on Indonesia's Fish Exports to the U.S.

Variable	Coefficient	Std. Error	t-Stat	Prob.	Notes
EXP_AS (-1)	0.3238	0.0767	4.220	0.000	Significant
EXP_AS (-2)	0.373	0.0733	5.090	0.000	Significant
EXP_China	0.1253	0.0291	4.300	0.000	Significant
INF	0.0458	0.0178	2,580	0.011	Significant
ER	-0.4508	0.6273	-0.720	0.474	Not Significant
ER (-1)	1.3429	0.6598	2.040	0.044	Significant
ER (-2)	-2.8206	0.6871	-4.110	0.000	Significant
EG	0.0069	0.0058	1.200	0.231	Not Significant
EG (-1)	-0.0137	0.0057	-2.390	0.018	Significant
U.S. Import Tariffs	-0.0078	0.0029	-2.670	0.009	Significant
Constant	1.4386	0.3926	3.660	0.000	Significant

F-Statistic = 38.16
Prob. = 0.000
R^2 = 0.7810
R^2 Adj = 0.7605
Log likelihood = 152.53512
RMSE = 0.0698

Bounds Testing (Pesaran et al. 2001) that the results of the bounds test confirm the existence of a long-term equilibrium relationship among the variables, as the F-statistic exceeds the upper critical bound at a 5% significance level. This implies that the selected variables exports to the U.S., exports to China, inflation, exchange rate, and tariffs move together over time despite short-term fluctuations. Hence, the presence of cointegration justifies the use of the ARDL model to capture both short-run adjustments and long-run dynamics influencing Indonesia's fish export performance.

Table 6 presents the results of the cointegration test, showing the calculated F-statistic and critical F-values at various significance levels. The critical F-values consist of the upper bound and the lower bound. The results indicate that the calculated F-statistic (4.433) is greater than the critical values at the lower bound I(0) and upper bound I(1) which are 2.3 and 3.4 respectively. This finding confirms the presence of cointegration, meaning that there is a long-run relationship among the variables.

Long-Run ARDL Analysis

After analyzing the short-run ARDL model, the study proceeds to the long-run ARDL analysis, as presented in Table 7. This stage aims to identify the equilibrium relationship between Indonesia's fish exports to the United States and its key macroeconomic determinants over time. The long-run ARDL estimation captures the persistent impact of variables that may not be immediately visible in short-term dynamics but are crucial for structural policy formulation. The findings from this model provide deeper insights into how trade patterns, inflation, and tariff policies jointly influence the sustainability and competitiveness of Indonesia's export performance in the global market.

Long-run ARDL equation is formulated based on Table 7, as follows:

$$EXP\_AS_t = 0.78357 + 0.41317EXP\_China_t + 0.15109Inf_t - 6.3609ER_t - 0.0223EG_t - 0.025868US\ Import\ Tariffs_t + \varepsilon_t$$

A detailed explanation of the long-run ARDL model equation is as follows:

1. The constant of 0.78357 indicates that, assuming all explanatory variables are equal to zero, the expected value of exports to the United States will increase by 0.78357. This baseline value reflects long-term competitiveness of Indonesia's fish industry even without external influences. It also implies that structural factors such as production efficiency, existing trade agreements, and established market reputation contribute significantly to sustaining export performance over time.

Table 6. Bounds test for cointegration: assessing long-term relationship among variables

F-Statistic = 4.433		
Significance	I(0) Bound (Lower Bound)	I(1) Bound (Upper Bound)
10%	2.300	3.444
5%	2.695	3.933
1%	3.563	4.983

Table 7. Long-Run ARDL estimation results: the long-term influence of inflation, exchange rate, and tariffs on indonesia's fish export performance

Variable	Coefficient	Std. Error	t-Stat	Prob.	Notes
EXP_Cina	0.41317	0.07813	5.29	0.000	Significant
Inflation (INF)	0.15109	0.05903	2.56	0,010	Significant
Exchange Rate (ER)	-6.36090	4.33570	-1.47	0.142	Not Significant
Economic Growth (EG)	-0.02230	0.02754	-0.81	0.418	Not Significant
U.S. Import Tariff	-0.02586	0.01065	-2.43	0.015	Significant
Constant	0.78357	0.22824	3.43	0.001	Significant

2. The coefficient of fish exports to China is 0.41317, showing a complementary long-run correlation between exports to China and exports to the United States. A 1% increase in fish exports to China raises exports to the U.S. by approximately 0.41%. This suggests the presence of common external demand, value chain integration, or global commodity conditions influencing both markets. This interdependence underscores the importance of maintaining product quality and compliance with international standards to sustain competitiveness across markets.
3. The coefficient of inflation is 0.15109. Domestic inflation, measured using the Consumer Price Index (CPI), reflects that inflation is linked to strong domestic/external demand supporting fish exports to the United States. However, it is not the main long-run driver of exports. However, it is not the main long-run driver of exports. Moderate inflation can signal healthy economic activity that indirectly boosts export-oriented production. Nevertheless, persistent high inflation could erode cost competitiveness, suggesting the need for stable macroeconomic management to ensure export resilience in the long term.
4. The coefficient of U.S. import tariffs imposed on Indonesia is −0.025868, meaning that every 1% increase in U.S. import tariffs reduces the value of fish exports to the U.S. by 0.025% in the long run. Although the magnitude is relatively small per tariff unit, this is consistent with the theory that higher import tariffs reduce export volumes due to destination market barriers. Policy implication: market diversification and trade diplomacy could mitigate the sensitivity of exports to partner tariff policies.

In conclusion, the long-run ARDL equation shows that fish exports to China and inflation have a positive and significant impact on Indonesian fish exports to the U.S (Figure 7). This means that rising exports to China and higher inflation increase U.S. export values. Meanwhile, exchange rate and economic growth do not significantly affect exports to the U.S. U.S. import tariffs, however, have a negative and significant long-run effect. This means that higher import tariffs reduce the value of exports to the U.S. over time.

Based on Figure 8, the Plot of Actual vs Predicted VAR vs Predicted ARDL, it can be seen that the ARDL fitted values more closely follow the actual data. Predictions using the VAR model also reflect the data pattern but appear more rigid compared to ARDL. This indicates that the ARDL model is more capable and better at capturing export dynamics than the VAR model, as ARDL accounts for both short-term and long-term effects of exogenous variables.

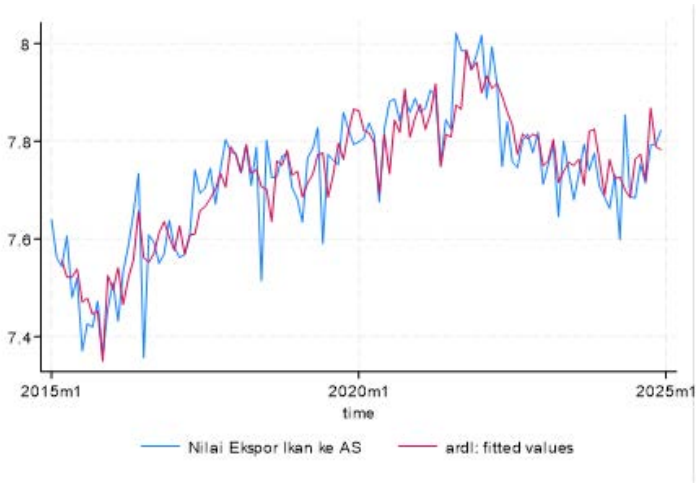

Figure 7. Comparison between actual and predicted values using ARDL model: model accuracy in forecasting fish E

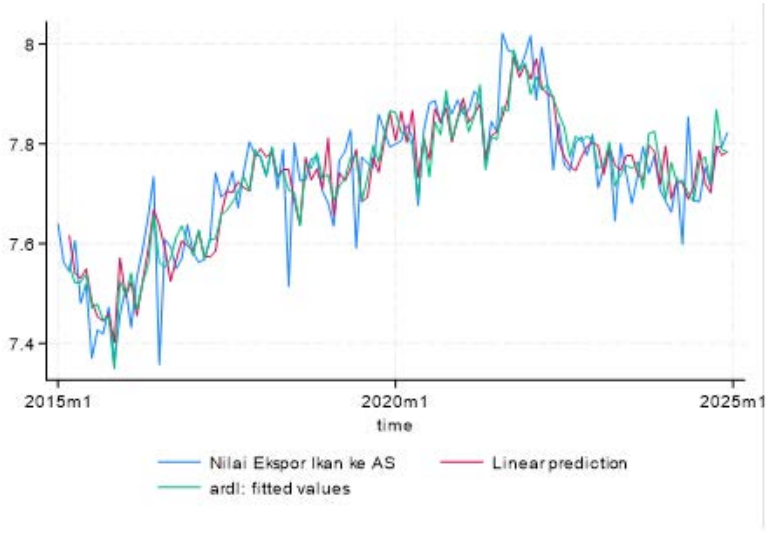

Figure 8. Comparative Accuracy between VAR and ARDL Models in Predicting Indonesia's Fish Export Values

The effect of domestic inflation on fish exports to the U.S.

Inflation has a small positive effect of 0.0458 on Indonesia's fish export performance in the short run (Leonard, 2018). Similar studies also indicate a weak short-term relationship between inflation and exports (Çakmaklı, 2025). In the long run, the positive effect becomes stronger (0.15109), suggesting that higher inflation increasingly supports fish export performance to the U.S. and also affects Indonesia's food export performance (Maulana & Indrawati, 2022). In other words, while inflation can reduce export competitiveness, the effect remains small (Mankiw & Reis, 2002). This phenomenon may occur because moderate inflation often coincides with higher production activity and rising export prices, which increase nominal export values. Moreover, controlled inflation within a stable macroeconomic environment can signal strong domestic demand and economic resilience, indirectly strengthening exporter confidence. This suggests that inflation influences exports through wider macroeconomic channels rather than simply just through cost-competitiveness effects.

The effect of U.S. import tariffs on fish exports to the U.S.

U.S. import tariffs have a negative impact on Indonesia's fish export performance. This is consistent with international trade theory: the higher the U.S. import tariff, the lower Indonesia's fish exports (Kurniawan & Luthfi, 2023). In the short run, tariff shocks are more volatile. Both in the short and long run, import tariffs negatively affect fish exports to the U.S.(Aceh Nurjasari et al. 2023) (Villia et al. 2023). However, the short-run impact is weaker than the long-run impact. This suggests that exporters initially respond by adjusting prices or redirecting shipments, but over time, sustained tariff barriers reduce competitiveness and market share. This shows that tariff effects operate not only through price mechanisms but also through long-term structural adjustments in trade relationships and market access. Therefore, policy responses such as trade diversification and bilateral negotiations are crucial to mitigate long-term adverse effects.

The effect of fish exports to China on fish exports to the U.S.

The coefficient for fish exports to China (0.1253) shows a positive relationship, indicating market diversification. Increased exports to China also drive exports to the U.S., possibly due to higher productivity or expanded national production capacity. From a policy perspective, diversifying exports to China is strategic to mitigate the negative effects of U.S. tariffs (Nguyen et al. 2022; Arintoko et al. 2024). This suggests that exports to different markets can actually strengthen each other instead of competing with one another.

Managerial Implication

The study points out the urgent need for a coordinated trade strategies with the purpose of stabilizing Indonesia's fish exports even in the midst of current U.S. import tariffs that are relatively high. From this study, it is recommended that export managers should enhance strategic cooperation with China as complementary relationship would be resulted with the United States. In addition to this, diplomatic efforts to modify tariff agreements with the United States should be done by trade authorities. These strategies and efforts would be advantageous in improving overall cost efficiency and export resillience.

Policies that strengthen market access to China or reduce barriers in the value chain have the potential to indirectly increase exports to the U.S. This occurs because enhanced trade connectivity with China can improve production efficiency, logistics networks, and supply chain integration that also benefit exports to other major markets. Moreover, China often serves as an intermediary hub for global trade, so stronger bilateral cooperation with China may lead to greater exposure, demand, and market spillover effects toward the U.S. export destination.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

In conclusion, this study concludes that in the short and long run, inflation does have a direct positive effect on Indonesia's fish export to the United States. This means that domestic inflation at a moderate level reflects healthy demand conditions instead of hindering export competitiveness. This finding aligns with a number of international empirical studies on developing economics, although it is not aligned traditional trade theory that associates inflation to competitiveness loss. On the other hand, United States import tariffs shows a direct negative effect on Indonesia's fish export volume in both short and long-run. However, it shows that the long-run effect is stronger compared to the short-run. This is important because this indicates that ongoing tariff pressures is able to make the products' positioning in the global market to be less competitive resulting a decrease in Indonesia's export value. This result is consistent with international evidence which highlights the long-term effects of restrictive trade policies.

Last but not least, the increasing fish exports to China shows how it positively influences exports to the United States which suggests a better export resilience which helps in maintaining performance regardless of United States tariff challenges. This aligns with global evidence that diversified export destinations would in fact reduce vulnerability to external trade disruptions. Based on theoretical foundations, this study develops previous trade frameworks by jointly incorporating both domestic macroeconomic conditions and external trade policy variables, providing a more comprehensive understanding of export performance dynamics.

Recommendations

The exchange rate used in this study should be clearly defined, whether it refers to the nominal exchange rate or the real exchange rate. This clarification is important as it will help avoid confusion in interpreting the results. In addition, conducting additional sensitivity analysis and impulse response evaluations are recommended to better understand how the variables affect export performance over time. Limitation: using average inflation and exchange rates may obscure important sectoral variations. Studies such as Al Farid & Anward (2024) showed that exchange rate volatility significantly affects long-term exports (jiep.ulm.ac.id).

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