Available online at http://journals.ums.ac.id, Permalink/DOI: 10.23917/jep.v26i1.10790

Jurnal Ekonomi Pembangunan: Kajian Masalah Ekonomi dan Pembangunan, 26 (1), 2025, 21-44

Macroeconomic Shifts in Indonesia: Analyzing the Impact of The United States (US) – China Trade War

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Received: September 2024 | Revised: November 2024 | Accepted: May 2025

Abstract

The trade war between the United States and China has created global trade tensions that have had a significant impact on the economies of various countries, including Indonesia. This study analyzes the effects of the trade war, represented by the Trade Tension Index and Import Tariff variables, on Indonesia's macro economy during the 2018–2023 period using monthly data. The macroeconomic variables analyzed include inflation, exports, imports, exchange rates, and industrial production indices. The VECM method is used to evaluate the short-term and long-term effects of the trade war on these variables. The results show that the trade war have a significant effect, both in the short and long term, on inflation, exports, imports, and exchange rates. However, the effect on the industrial production index is not significant. These findings indicate that the trade war not only affects Indonesia's price stability and international trade but also has implications for exchange rate volatility, which can complicate the management of monetary and trade policies. The results of this study emphasize the importance of strengthening the resilience of the trade sector and developing adaptive industrial policies to mitigate the negative impacts of trade wars while maximizing opportunities from international trade dynamics.

Keywords: Trade War, Inflation, Export, Import, Exchange Rate, Industrial Production Index
JEL Classification: E01, E31, F1, F41, F51

How to Cite: Retnasih N. R., Syahda P. E. (2025). Macroeconomic Shifts in Indonesia: Analyzing the Impact of The United States (US) – China Trade War, *Jurnal Ekonomi Pembangunan: Kajian Masalah Ekonomi dan Pembangunan, 26*(1), 21-44. doi:https://doi.org/10.23917/jep.v26i1.10790

1. INTRODUCTION

The world's largest challenge is the trade war between the United States (US) and China, which involves two of the greatest economies in the world (Shi et al., 2021). Citing unfair trade practices and intellectual property theft, the US put tariffs on Chinese goods in 2018, sparking the start of the trade war. China responded by imposing its own tariffs on US exports, which led to a reciprocal increase in trade barriers and restrictions. The impact of

the US-China trade war on China's import and export structure has been extensive and remains tense to this day (Khalil & Strobel, 2024).

The escalation of trade tensions is indicated by the trade tension index indicator (Shafique & Bhutta, 2024). This situation not only affects the main countries involved but also significantly affects countries integrated into the global supply chain, including Indonesia. Developing countries have a significant dependence on global trade and face various macroeconomic pressures arising from the dynamics of this trade conflict, where trade contributes more than 40% of Gross Domestic Product (GDP) (Kurniawan & Rizal Luthfi, 2023). According to Maria (2022) another negative impact of the trade war is that Indonesia will become a target market for both countries, and this could affect the penetration of domestic products.

On the other hand, global trade patterns have changed significantly due to the increase in import taxes during the trade war, which has a direct impact on developing countries such as Indonesia. Two possibilities arise from this disruption, namely, Indonesian products, including textiles and agricultural products, can reach new markets as a result of the decline in US imports from China. However, strong competition from ASEAN countries that often have advantages in terms of better trade infrastructure and affordable prices is also a challenge. Also, Indonesia's excessive dependence on imports has caused supply chain disruptions, increased production costs, and limited industrial output, all of which have a negative impact on the country's GDP growth (Purwono et al., 2022). In addition, to take advantage of market opportunities and reduce dependence on imported inputs, policies to encourage industrial innovation and improve trade efficiency are essential. Indonesia should encourage import substitution, which will ultimately strengthen domestic sectors and reduce trade imbalances (Kurniawan & Rizal Luthfi, 2023).

Another thing due to global trade tensions also has a significant impact on the rupiah exchange rate against the US dollar. Investors' growing concerns about the stability of the global economy primarily trigger this trend. Investors often move their portfolios to safer assets, such as the US dollar (Molnar dan Viktor, 2023). In times of intensifying trade disputes, which put further pressure on currencies of emerging markets such as Indonesia. Import prices rise as a result of the rupiah devaluation, which can lead to domestic inflation. For example, the rupiah fell more than 6% during the height of the US-China trade war in 2018, reflecting broader market concerns and macroeconomic headwinds in Indonesia (World Bank, 2023). From the investment dynamics, the flow of foreign direct investment (FDI) to Indonesia is greatly influenced by changes in international trade flows. To reduce the impact of high tariffs caused by the trade war between the United States and China, multinational companies are moving their production bases more often. Indonesia has the opportunity to attract investment in conditions like this, especially in industries that focus on manufacturing and exports (Susetyo, 2022). However, this challenge also depends heavily on Indonesia's competitiveness compared to other ASEAN countries, such as Vietnam and Malaysia, which have a more friendly investment environment.

The trade war has also caused significant fluctuations in Indonesia's trade balance. Uncertainty in US-China trade relations has led to a decline in demand for Indonesia's key

export commodities, such as coal and palm oil, which are vital to the economy (Ningsih & Harningtias, 2023). For example, during the peak of trade tensions in 2019, Indonesia saw its coal exports decline due to reduced global demand, with China's tariffs on US imports jumping from 8% to 21% between 2018 and 2023, while US levies on Chinese products jumped from an average of 3% to more than 20% (World Bank, 2023). So that worsens the trade deficit. Without a corresponding reduction in imports, this decline in exports risks widening the trade deficit, which can disrupt the stability of the national economy (Maria, 2022).

In light of the previously described background, this study aims to analyze in depth the impact of the US-China trade war on Indonesia's macroeconomic indicators. Using the Vector Autoregression (VAR) and Vector Error Correction Model (VECM) approaches, this study will evaluate the dynamic relationship between trade war variables (import tariffs and trade tension index) and Indonesia's macroeconomic variables (inflation, exports, imports, exchange rates, and industrial production index). Most current studies tend to focus on the impact of the US-China trade war on the global economy or developed countries such as the US, China, and the European Union. While only a few studies examine how the trade war has affected developing countries such as Indonesia, especially considering the complex macroeconomic dynamics. Most studies that focus on Indonesia generally discuss the broader impact on trade or investment without exploring the causal relationship between the trade war and key economic indicators.

In addition, previous studies often use static or descriptive models, which limit their capacity to capture dynamic interactions and long-run impacts. These studies rarely use the trade tension index as a measure of the severity of trade conflicts. In addition, dynamic frameworks such as Vector VAR or VECM, which can show causal relationships between these variables, have not been widely used. The novelty of this study lies in the integration of trade war indicators such as import tariffs and trade tension index with an in-depth analysis of their impacts on key macroeconomic variables in Indonesia. By using the VAR or VECM approach, this study not only examines the short-run relationship but also identifies the long-run equilibrium between these variables. This approach allows for a broader test of causality, dynamic responses to shocks, and a more detailed understanding of how each variable contributes to explaining Indonesia's macroeconomic fluctuations.

This study also provides a new perspective by looking at how the impact of the trade war can create opportunities and challenges for Indonesia, especially in restructuring the global supply chain. Thus, this study not only fills the gap in the existing literature but also makes an important contribution to supporting data-based policy decisions amidst the ever-evolving dynamics of the global economy.

2. RESEARCH METHODS

This study uses a quantitative approach to analyze the impact of the trade war between the US and China on Indonesia's macroeconomic indicators. The analysis tool used is VAR or VECM which is able to identify the dynamic relationship between research variables in the short and long term. According to Adrian & Rofiuddin (2023) This model is in the form of time series data that is able to capture economic changes and does not distinguish between

endogenous and exogenous variables. This is because all variables are considered endogenous variables. This analysis was chosen because the trade war and its impact on the Indonesian economy are mutually influential, so methods that can capture the reciprocal relationship between variables are very relevant.

The data used in this study is monthly time series data from January 2018 to December 2023. Data sources include official publications from the World Bank, Bank Indonesia, the Central Statistics Agency (BPS), and other international reports. The variables used in this study are grouped into two parts. First, the US-China Trade War Proxy includes Import Tariffs, namely the average tariff rate imposed by the US on Chinese products and vice versa. And also, the Trade Tension Index which is an indicator of the intensity of trade conflicts measured based on the frequency and scale of protectionist policies from both countries. Meanwhile, the Indonesian Macroeconomic Proxy includes the Industrial Production Index, namely the rate of change in production capacity in the industry that has been adjusted for prices as the main indicator of economic growth. Exchange Rate, namely the rupiah exchange rate against the US dollar. Exports, namely the total value of Indonesia's exports, especially to the US and China. Imports, namely the total value of Indonesia's imports, including capital goods and raw materials. And inflation, namely as an indicator of price stability. The general VAR model is formulated as follows (Aminarta & Kurniawan, 2021).

$$Y_t = A_0 + A_1 Y_{t-1} + \cdots + A_p Y_{t-p} + \varepsilon_t \quad (1)$$

Where Y_t is a vector of size (n.1) containing n variables according to the number contained in the VAR model. A_0 is an intercept vector of size (n.1), A_i s a coefficient matrix of size (nn) for the value of i = 1,2,3,4……p, while ε_t is an error vector of size (n.1).

The analysis stage is divided into several stages. First, a descriptive statistical test to explain the distribution of data on each research variable. Second is the stationarity test. Before the VAR/VECM model is estimated, according to Li & Gan (2019) All variables will be tested for stationarity using a unit root test such as the Augmented Dickey-Fuller (ADF) test. This is important to ensure that the data does not have a non-stationary trend that can cause biased estimation results. Third, the determination of optimal lag. According to Mashilal et al. (2024) Determining the optimal number of lags is done using information criteria such as the Akaike Information Criterion (AIC), Schwarz Criterion (SC), or HQ (Hannan-Quin Information Criterion). Optimal lag is important to ensure that the model accurately captures the dynamic relationship between variables. Fourth, Cointegration Test. According to Prieto & Lee (2019) if all variables are stationary at the same level and there is a cointegration relationship, then the VECM model will be used to capture the long-term relationship between variables, taking into account corrections to short-term imbalances. If there is no cointegration, then the VAR model is used to analyze the short-term dynamic relationship between variables. Fifth, Impulse Response (IRF) Test. According to Cristanto & Bowo (2021) IRF measures how shocks at one point in time affect endogenous variable innovations both at that time and later. To be more precise, IRF attempts to isolate shocks, meaning that a particular shock or shocks can have an impact on a variable. IRF is used to

analyze the dynamic response of Indonesia's macroeconomic indicators to shocks in trade war variables, such as sudden changes in import tariffs or increases in the trade tension index. And sixth, the variance decomposition (VD) test. Variance decomposition is used to measure the contribution of each independent variable to the variability of the dependent variable over a certain period of time (Hapsari et al., 2020).

The results of this VAR/VECM analysis are expected to provide a comprehensive picture of how import tariffs and the intensity of the trade war affect Indonesia's macroeconomic indicators. In addition, this study will identify significant long-term and short-term relationships, as well as provide policy recommendations to maintain Indonesia's economic stability amid global uncertainty due to the US-China trade war.

3. RESULTS AND DISCUSSIONS

3.1 Results

Before conducting VAR or VECM testing, a descriptive statistical test is first carried out, which is presented in the following table.

Table 1. Descriptive statistical test results

	Trade Tension Index	Import Tariff	Inflation	Export	Import	Exchange Rate	Industrial Production Index
Mean	20.92916	132.1250	2.952361	9.766276	9.664417	9.586921	127.9446
Median	21.11116	128.2000	2.970000	9.695323	9.682858	9.576059	114.2050
Maximum	21.97587	148.5000	5.950000	10.23741	10.00562	9.703022	167.9500
Minimum	16.55934	118.2000	1.320000	9.254609	9.040575	9.503980	103.0400
Std. Dev.	0.921535	8.292127	1.190240	0.244376	0.206954	0.038963	26.99714
Observations	72	72	72	72	72	72	72

Source: Author (2024)

The results of the descriptive statistical test show that the economic variables used, namely the trade tension index, import tariffs, inflation, exports, imports, exchange rates, and trade indexes, tend to have relatively small values. This can be seen from the average value of each variable, which is close to its minimum value, while the data variance also tends to be larger seen from the average value with the standard deviation of each variable; the difference is quite large.

Furthermore, a stationarity test was carried out using the ADF test with the following results:

Table 2. Stationarity Test Results

Variable	t-statistic	Prob.	Level	t-statistic	Prob.	First difference
Trade Tension Index	-5.955945	0.0000	Stationary	-10.18073	0.0001	Stationary
Import Tariff	-1.205961	0.6676	Not Stationary	-4.358742	0.0008	Stationary
Inflation	-2.629962	0.0920	Not Stationary	-3.008040	0.0392	Stationary
Export	-1.081760	0.7187	Not Stationary	-13.28631	0.0001	Stationary

Table 2. (continued)

Variable	t-statistic	Prob.	Level	t-statistic	Prob.	First difference
Import	-1.084180	0.7177	Not Stationary	-11.16708	0.0001	Stationary
Exchange Rate	-3.301430	0.0185	Stationary	-9.269933	0.0000	Stationary
Industrial Production Index	-1.478965	0.5385	Not Stationary	-8.391442	0.0000	Stationary

Source: Author (2024)

Based on the results of the stationarity test, it can be shown that at the level level, there are only two stationary variables, namely the Trade Tension Index and Exchange Rate. In contrast, the other variables experience unit root problems. So that further testing is carried out on the first difference, and the results show that all variables are free from unit root problems. This can be seen from the probability value smaller than 5 percent or 0.05, in other words, all variables are stationary on the first difference. The test can be continued to the next stage, namely determining the optimal lag which can be seen in the table below.

Table 3. Optimum Lag Test Results

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-410.7189	NA	0.000614	12.46922	12.69956	12.56037
1	**-72.66744**	**595.3742**	**1.11e-07***	**3.840819**	**5.683547***	**4.569991***
2	-37.39869	54.74553	1.75e-07	4.250707	7.705822	5.617905
3	17.21553	73.36238	1.67e-07	4.083119	9.150621	6.088342
4	77.08711	67.91403*	1.55e-07	3.758594	10.43848	6.401843
5	127.7809	46.91068	2.33e-07	3.708033*	12.00031	6.989307

Source: Author (2024)

Based on the results of the optimum lag test, it can be concluded that all research data from each variable is optimal at the first lag. This can be seen from the (*) sign which is most often found at lag 1 by looking at the FPE, SC, and HQ values, so that the next test will be carried out using lag 1.

Table 4. Model stability test results

Root	Modulus
0.955199 - 0.085700i	0.959035
0.955199 + 0.085700i	0.959035
0.935111	0.935111
0.596215	0.596215
0.293641	0.293641
-0.071510	0.071510
0.045796	0.045796

Source: Author (2024)

The results of the model stability test show that the data has met the stability criteria based on the modulus value. All modulus values of the characteristic roots are below 1,

indicating that the VAR model used has passed the stability test. This indicates that the model is able to provide reliable and consistent estimates without experiencing instability problems in the estimation process. Thus, this model is suitable for further analysis.

Table 5. Cointegration Test Results

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.524173	155.4162	125.6154	0.0002
At most 1 *	0.375445	103.4272	95.75366	0.0133
At most 2 *	0.317930	70.47705	69.81889	0.0443
At most 3	0.285396	43.69348	47.85613	0.1166
At most 4	0.132769	20.17157	29.79707	0.4113
At most 5	0.107787	10.20009	15.49471	0.2657
At most 6	0.031169	2.216564	3.841465	0.1365

Source: Author (2024)

Based on the results of the Johansen cointegration test, it was obtained that the probability values in the v-statistic panel test and the rho-statistic panel test were predominantly smaller than the 5 percent significance level (0.05). This finding indicates the presence of three significant cointegrations, so it can be concluded that there is a long-term relationship between the variables used in the study. In addition, the results of this test also confirm that the most appropriate model for further analysis is VECM, which is able to capture the dynamics of short-term and long-term relationships between variables.

Table 6. VECM Test Results

Error Correction	Inflation	Export	Import	Exchange Rate	Industrial Production Index
CointEq1	0.012407	0.004776	0.009384	-0.000173	0.044913
	(0.00452)	(0.00098)	(0.00131)	(0.00036)	(0.10840)
	[2.74304]	[4.85318]	[7.17294]	[-0.47967]	[0.41432]
Trade Tension Index	-0.008729	0.020477	0.013155	0.001450	-0.332611
	(0.04000)	(0.00870)	(0.01157)	(0.00319)	(0.95877)
	[-0.21819]	[2.35263]	[1.13690]	[0.45418]	[-0.34691]
Import Tariff	0.001564	0.014710	-0.010831	0.003389	0.057876
	(0.03869)	(0.00842)	(0.01119)	(0.00309)	(0.92723)
	[0.04042]	[1.74758]	[-0.96792]	[1.09785]	[0.06242]

Source: Author (2024)

CointEq1 in the VECM test refers to the error correction term component that represents the long-term relationship between the variables in the model. This component comes from the results of the cointegration test, which shows the existence of a long-term relationship between the variables analyzed. The results show that in the long term, the Trade Tension Index and Import Tariff have a significant effect on Inflation, Exports, Imports, and Exchange Rates. This can be seen from the probability value (in brackets) below

5 percent significance. While the Industrial Production Index does not provide a long-term effect.

In the short term, the Trade Tension index has a significant negative effect on inflation, where every 1-point increase in the trade tension index will reduce inflation by 0.008 points. And has a significant positive effect on exports, imports, and exchange rates where a 1-point increase in the trade tension index will increase exports by 0.02, imports by 0.01, and exchange rates by 0.001. While its relationship with the industrial production index is not significant. Furthermore, the results of the VECM test in the short term on the Import Tariff show that this variable has a significant negative effect on imports where a 1-point increase will reduce imports by 0.01 and has a significant positive effect on inflation, exports, and exchange rates where a 1 point increase in import tariffs can increase inflation by 0.001, exports by 0.01, and exchange rates by 0.003. Import tariffs also do not have a significant effect in the short term on the industrial production index.

Next, IRF and VD tests are conducted to deepen the results of the VECM test that has been conducted. The IRF test is used to see how much influence a change in one standard deviation of a variable has on the variable itself and other variables. The results can be seen in the figure below.

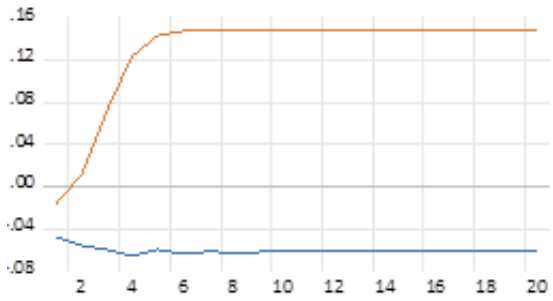

Figure 1. IRF Test Results on Inflation Variables
(Source: Author, 2024)

First, the IRF test on the inflation variable. The results show that inflation responds negatively to the Trade Tension Index shock for 20 periods. Initially, the negative impact was quite significant, which was -0.047685 in the first period, and continued to decline to reach -0.065605 in the fourth period. After that, the response tended to be stable and approached a constant value of around -0.062130 from the 10th to the 20th period. Meanwhile, the response to the import tariff shock was that in the initial period, the impact was negative (-0.016450 in the first period) but immediately changed to positive starting in the second period (0.011353). This positive response continued to increase until it reached a peak of around 0.149 in the seventh period. After that, the response began to stabilize at a constant positive value of around 0.147986 from the 14th to the 20th period.

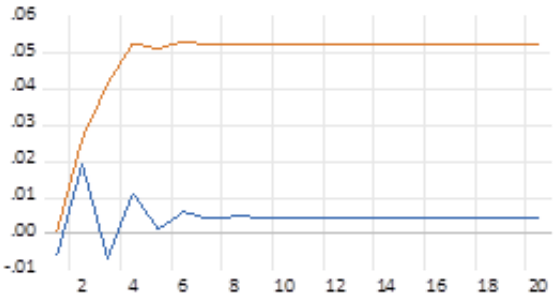

Figure 2. IRF Test Results on Export Variables
(Source: Author, 2024)

Second, the IRF test on the export variable. In the early period, exports responded negatively to the Trade Tension Index shock, indicated by a value of -0.005954 in the first period. However, this response immediately changed to positive in the second period (0.019312), followed by small fluctuations between positive and negative values until the sixth period. Starting from the seventh period, the export response to the shock stabilized around a positive value of 0.004692 until the end of the 20th period. On the other hand, the export response to the Import Tariff shock was consistently positive from the beginning. Its initial value of 0.000729 in the first period increased sharply to reach 0.052575 in the fourth period. After that, the response tended to stabilize around a positive value of 0.052253 from the 10th period to the 20th period.

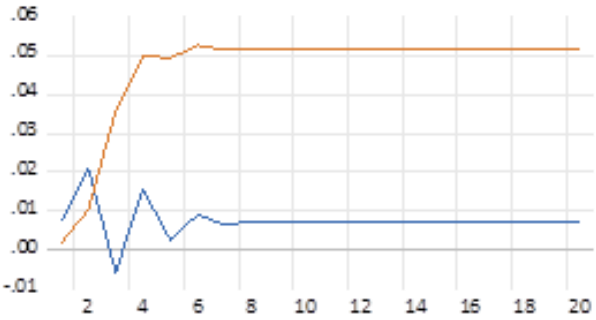

Figure 3. IRF Test Results on Import Variables
(Source: Author, 2024)

Third, IRF test on Import variable. The shock on the Trade Tension index responded positively with a value of 0.007367 in the first period. The response increased to reach a peak in the second period with a value of 0.021100 but turned negative in the third period (-0.005611). After the third period, the response returned to positive with small fluctuations and reached stability around 0.007265 from the 16th period to the 20th period. Furthermore, the import response to import tariff shocks was positive from the beginning. In the first period, the response value of 0.001865 continued to increase and reached a temporary peak

in the sixth period (0.052571). After that, the response stabilized around a positive value of 0.051503 from the 10th period to the end of the 20th period.

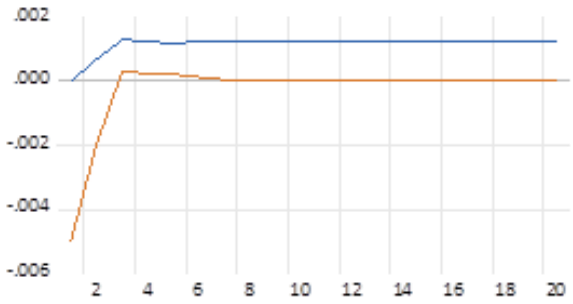

Figure 4. IRF Test Results on Exchange Rate Variables
(Source: Author, 2024)

Fourth, the IRF test on the Exchange Rate variable. In the first period, the exchange rate response to the Trade Tension Index shock was almost insignificant (0.00000771). However, the response increased sharply in the second period (0.000685) and continued to rise until it reached a peak in the third period (0.001299). After that, the response decreased slightly but remained positive and stable at around 0.001237 from the ninth period to the 20th period, reflecting the stability of the exchange rate in the face of shocks. Meanwhile, the exchange rate response to import tariff shocks was initially negative in the first period (-0.004994). However, the response moved in a positive direction in the third period (0.000290) and continued to stabilize in small values until it reached an almost constant level of around 0.0000425 from the eighth period to the 20th period, reflecting the impact of import tariff shocks on the exchange rate that faded over time.

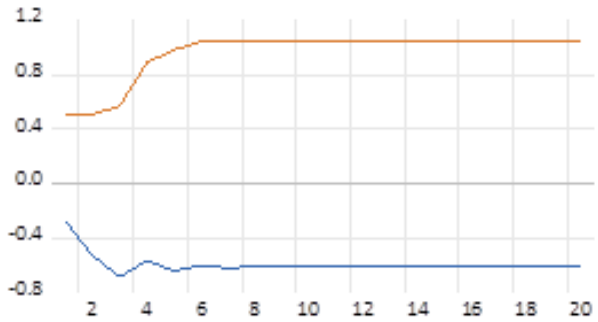

Figure 5. IRF Test Results on Industial Production Index Variables
(Source: Author, 2024)

And fifth, the IRF Test on the Industrial Production Index variable. The result is that the Industrial Production Index responded negatively to the Trade Tension Index shock since the first period (-0.281246), with a sharper decline in the second period (-0.532879) and third period (-0.688103). Although the response began to show improvement in the fourth period

(-0.569750), the value remained negative. Furthermore, the response stabilized around -0.616957 from the ninth period to the 20th period, reflecting a significant negative impact of the shock in the long run. On the other hand, the Industrial Production Index responded positively to the Import Tariff shock, with a fairly large value in the first period (0.502613). The response continued to increase, reaching its peak in the sixth period (1.042672). After that, the response stabilized around 1.046821 from the eighth period to the 20th period, indicating that the shock had a significant and stable positive impact in the long run.

After conducting the IRF test above, the final stage is to conduct a VD test to see the contribution of each variable in forming the value of the macroeconomic variable which can be seen in the image below.

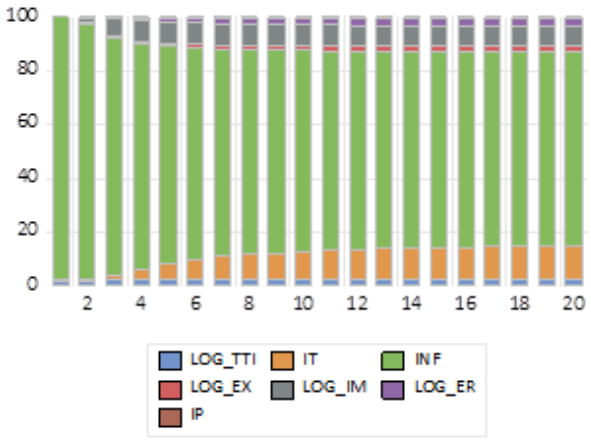

Figure 6. VD Test Results on Inflation Variables
(Source: Author, 2024)

The results of the VD test show the contribution of variables in influencing inflation over 20 periods. In the first period, inflation was almost entirely dominated by the contribution of the inflation variable itself of 97.76%, while the contribution of the Trade Tension Index, Import Tariff (IT), and other variables was very small, with the Trade Tension Index only contributing 2.00% and the Import Tariff 0.24%. Over time, the contribution of other variables to inflation began to increase. Import Tariffs showed a significant increase, from only 0.24% in the first period to 12.47% in the 20th period, reflecting the increasing impact of changes in import tariffs on inflation. Meanwhile, the contribution of the Trade Tension Index to inflation was relatively small but stable, increasing slowly from 2.00% in the first period to 2.52% in the 20th period. The contribution of other variables, such as Exports, Imports, Exchange Rates, and the Industrial Production Index, also increased gradually. Import has a significant contribution, reaching around 7.59% in the 20th period, while Export, Exchange Rate, and Industrial Production Index each contributed around 1.96%, 2.86%, and 0.52% in the same period. Although the contribution of inflation to itself has gradually decreased, from 97.76% in the first period to 72.07% in the 20th period, it

remains a dominant factor. This shows that inflation has a strong propagation effect, although external variables such as Import Tariff and Import have an increasingly significant influence in the long run.

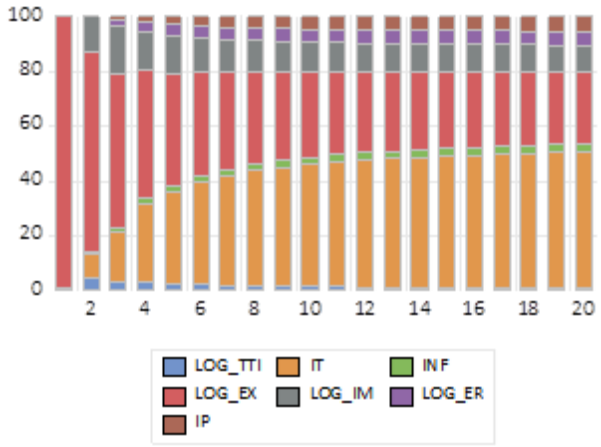

Figure 7. VD Test Results on Export Variables
(Source: Author, 2024)

Next, the results of the VD test on the Export variable. In the first period, exports were dominantly influenced by their contribution of 99.32%, the contribution of other variables such as the Trade Tension Index, Import Tariff, and other variables was almost insignificant. Over time, the contribution of other variables began to increase significantly. Import Tariff became the most dominant factor after the initial period, with its contribution increasing from only 0.01% in the first period to 49.75% in the 20th. This shows that changes in import tariffs have a major impact on export dynamics in the long run. The contribution of the Inflation variable also showed a gradual increase, although it remained relatively small, from 0.01% in the first period to 2.91% in the 20th period.

Meanwhile, the contribution of the Trade Tension Index variable decreased from 0.66% in the first period to 0.94% in the 20th period, reflecting the decreasing influence of trade tensions on exports in the long run. Other variables such as Import), Exchange Rate, and Industrial Production Index also provided contributions that increased gradually. Import contributed 9.65% in the 20th period, indicating a significant relationship between import and export. Exchange Rate and Industrial Production Index contributed 5.09% and 5.29% respectively in the 20th period, indicating the influence of foreign exchange rate and industrial output on export performance. Overall, although the contribution of exports to itself decreased from 99.32% in the first period to 26.36% in the 20th period, external variables such as import tariffs, imports, and exchange rates became the main factors affecting exports in the long run.

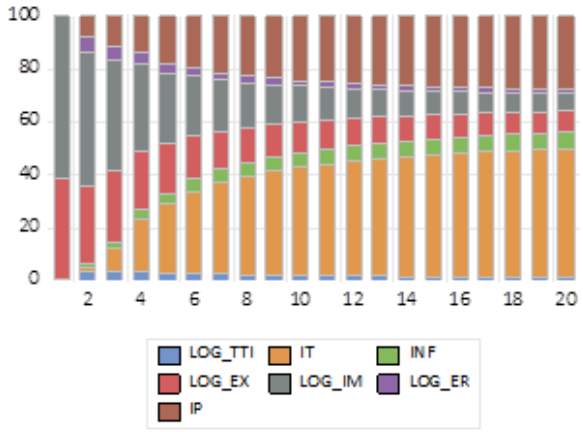

Figure 8. VD Test Results on Import Variables
(Source: Author, 2024)

Meanwhile, the results of the VD test on the import variable show a change in the contribution of variables in influencing the import value over 20 periods. In the first period, imports were predominantly influenced by their contribution of 60.84%, followed by the contribution of exports of 38.33%. Other variables such as the Trade Tension Index, Import Tariff, and Inflation had very little influence in the early period, at 0.57%, 0.03%, and 0.22%, respectively. Over time, the contribution of import tariffs has increased significantly, becoming the most dominant factor influencing imports after the early period. Its contribution increased from 0.03% in the first period to 48.20% in the 20th, indicating that tariff policy plays a major role in controlling the import value in the long run. The contribution of the export variable tends to decrease from 38.33% in the first period to 7.79% in the 20th period, indicating that the relationship between exports and imports becomes less significant over time.

On the other hand, the contribution of the Industrial Production Index continues to increase, from 0% in the first period to 27.73% in the 20th period, making it the second most significant variable after import tariffs. Other variables such as inflation show a small but consistent effect, increasing from 0.22% in the first period to 6.39% in the 20th. The Trade Tension Index and the exchange rate make relatively small contributions to imports in the long run, at 1.66% and 1.39% respectively in the 20th period. Overall, although the contribution of imports to itself decreases from 60.84% in the first period to 6.83% in the 20th period, external variables such as import tariffs, the industrial production index, and inflation are the main factors that affect the value of imports in the long run..

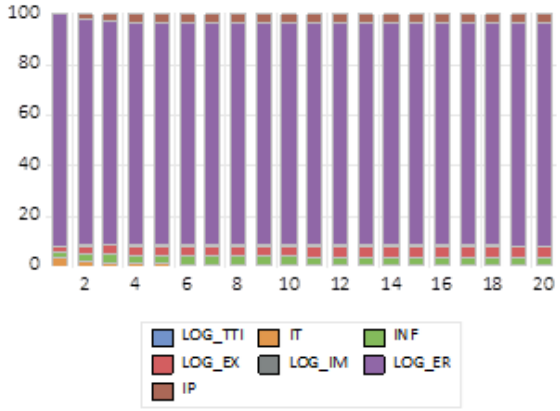

Figure 9. VD Test Results on Exchange Rate Variables
(Source: Author, 2024)

The results of the VD test on the Exchange Rate variable show that the largest contribution to exchange rate fluctuations comes from the variable itself. In the first period, the exchange rate made a dominant contribution of 92.19%. Although its contribution slowly decreased over time, it remained the main factor until the 20th period with a contribution of 87.75%. Other variables made relatively small contributions to the exchange rate. Inflation is the external variable with the second largest influence after the exchange rate itself, with a stable contribution of around 3.32%-3.33% from the initial period to the 20th period. This shows that the inflation rate has a consistent impact on exchange rate fluctuations. The contribution of the Industrial Production Index increased gradually from 0% in the first period to 3.80% in the 20th period. This indicates that the performance of the industrial sector has an increasingly significant influence on the exchange rate in the long term. Other variables, such as the Trade Tension Index, import tariffs, exports, and imports have very small contributions to the exchange rate over 20 periods. The contribution of import tariffs decreased from 3.45% in the first period to 0.27% in the 20th, while exports increased slightly from 2.08% in the first period to 4.03% in the 20th. The contribution from imports remained very small, ranging only between 0.02%-0.55% throughout the analysis period. Overall, these results suggest that the exchange rate is largely determined by its fluctuations, with relatively small influences from other external variables such as inflation, industrial production, exports, and imports.

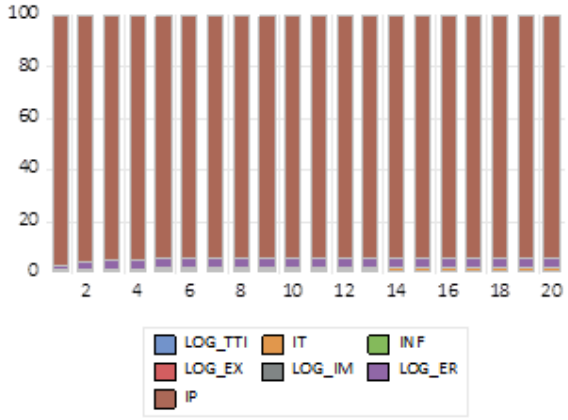

Figure 10. VD Test Results on Industrial Production Index Variables
(Source: Author, 2024)

Finally, the VD test on the Industrial Production Index variable. The test results show that the IP variable itself is the main contributor to the fluctuation of this index. In the first period, the IP contribution reached 96.96%, and although it decreased slightly over time, it still dominated until the 20th period with a contribution of 94.18%. This confirms that the IP variable is greatly influenced by its internal dynamics. Apart from that, the exchange rate variable has the second largest influence. Its contribution increased gradually from 1.92% in the first period to 3.33% in the 20th period, indicating that exchange rate fluctuations play an important, although relatively small, role in influencing the industrial production index in the long run. Other variables, such as import tariffs, contributed steadily from 0.39% in the first period to 1.38% in the 20th. This reflects the impact of import tariff policies on industrial activity over time. The contribution of the Trade Tension Index also increased, although small, from 0.12% in the first period to 0.53% in the 20th period. This indicates that international trade tensions have a very limited but still existent influence on industrial production fluctuations. Meanwhile, other variables such as inflation, exports, and imports have low contributions to IP. The contribution of inflation increases slowly from 0.002% in the first period to 0.41% in the 20th. Export and import variables each provide very small contributions, below 0.15%, throughout the analysis period. Overall, these results indicate that the industrial production index is largely determined by itself, while the influence of external variables such as exchange rates, import tariffs, and trade tensions is relatively small but increases gradually in the long run.

3.2 Discussions

3.2.1 Impact of Trade War on Inflation in Indonesia

Trade wars, particularly through increased import tariffs and international trade tensions, is capable of drive inflation in Indonesia. The Trade Tension Index, which reflects the level of trade tensions between major countries, is a key indicator that influences the price of goods. According to Rose (2020) slower growth is the most obvious and direct macroeconomic effect of trade disputes. US protectionism and the resulting trade policy

uncertainty have contributed significantly to the global downturn. The International Monetary Fund (IMF) lowered its forecast for GDP growth in October 2019 by 0.4% over the previous six months, raising the possibility of a recession or macroeconomic downturn. Meanwhile, higher import tariffs will directly increase the cost of imported goods, which in turn will increase the price of domestic goods. According to Fajgelbaum & Khandelwal (2022) Tariff policies can increase inflation through several mechanisms. Initially, tariffs affect importers or retailers more, especially for goods that could not be anticipated or stockpiled before the tariff was announced. For retail goods such as household goods and electronics, tariffs are often passed on to retailers, so consumer prices are not immediately affected. However, when stocks of goods that had been stockpiled before the tariff run out, retailers begin to raise prices to offset the additional costs of the tariff. Ultimately, the burden of the tariff is passed on to final consumers, so that prices of goods rise and contribute to inflation.

Febrio N. Kacaribu et al., (2019) explained that after the trade war, inflation in Indonesia faced various external pressures but still tended to be stable. However, the risk of inflation remains, especially from the possibility of increasing fuel prices if subsidies cannot be maintained in the long term. The increase in fuel prices will have a direct impact on transportation and distribution costs, which in turn can push up the prices of necessities. In addition, the significant depreciation of the Rupiah throughout 2018, reaching more than 12% against the US Dollar, has increased the price of imported goods, which has the potential to increase inflationary pressures in certain sectors such as pharmaceuticals and electronics that are highly dependent on raw material imports. In this case, Indonesia responded with a prudent monetary policy, such as adjusting the benchmark interest rate by Bank Indonesia to control inflation. Bank Indonesia (2022) the government will continue to optimize three monetary policy tools—interest rate policy, rupiah exchange rate stabilization, and bolstering foreign exchange reserves—in an effort to lessen the impact of the global turmoil on the monetary policy trilemma. By working closely with the government to limit inflationary pressures on price groups that are subject to government regulation and volatile food categories, interest rate policy aims to lower core inflation and bring it back to the original target.

Besides that, Ministry of Trade of the Republic of Indonesia (2023) formulated strategic steps to maintain macroeconomic stability and encourage national economic growth. First, improve policy coordination. Second, maintain Volatile Food (VF) Component inflation below the range of 3.0%–5.0%, especially on National Religious Holidays (HBKN). Third, improve regional cooperation and accelerate the implementation of the food barn program to improve domestic food security. Fourth, provide more easily accessible food data to help formulate inflation control policies. And fifth, improve communication synergy to help manage inflation expectations in the community. The results of this study are in line with Charbonneau (2019) trade wars represented through tariffs affect Canadian inflation. Global supply chains have a significant impact on domestic prices for small open economies. Policy changes that affect prices in one sector, such as the imposition of tariffs, will indirectly affect all sectors of the economy through wages and material inputs.

3.2.2 Impact of Trade War on Export in Indonesia

Trade wars have the potential to reduce demand for Indonesian exports, especially due to increased import tariffs and global market uncertainty. A high trade tension index reflects international market uncertainty that could reduce demand for Indonesian products. According to Rose, (2020) there are many more subtle and indirect consequences of trade tensions, some of which are long-lasting. The most obvious consequence of weakened trade is that reduced trade integration has a negative impact on welfare, productivity, and income. In addition, it is clear that trade wars weaken trade, especially for countries like Indonesia. On the other hand, higher import tariffs imposed by large countries, such as the United States and China, will limit market access for Indonesian products previously exported to these countries.

Since the trade war, Indonesia's exports have experienced a significant decline, according to Maghfiroh (2021) Indonesia's export value in 2018 was recorded at USD 180,012.67 but decreased to USD 167,496.99 million in 2019. This decrease reflects the impact of global trade tensions that have affected demand and prices for Indonesia's main commodities in the international market. These results are in accordance with research by Sulistiyowati & Pratama (2023) where the decline in global demand and increasing competition between countries caused a slowdown in Indonesia's export growth to only 6% in the third quarter of 2019. In addition, exports of key commodities such as palm oil fell by 17%, while exports of paper and cardboard to China fell by 45.69%. Indonesia's total export value also fell 28.9% in May 2020 compared to the previous year.

On the other hand, Laksmana (2024) added that the economic slowdown in China also raised concerns about the decline in demand for coal exports, which is one of Indonesia's largest exports to China. According to data from the Ministry of Energy and Mineral Resources of the Republic of Indonesia, until August 2018 coal exports to China reached 44.5 million tons or 31% of Indonesia's total coal exports, making the Chinese market the main determinant of the reference coal price. According to Maria (2022) after the trade war, the performance of export commodities, especially coal, experienced a significant decline of -5.78% in 2019. An equally important impact is that the excess supply of goods from China due to reduced US demand can flood the Indonesian market, which can create competition with local products. The same thing also applies to US goods that lose their market in China.

According to Laksmana (2024) the opportunity to open new markets, such as steel exports to the US, can be utilized by Indonesia. The high tariffs imposed by the US on Chinese steel open up opportunities for Indonesia to become an alternative supplier. However, Indonesia still faces challenges in attracting foreign investment and increasing product competitiveness compared to other ASEAN countries. So in this context, Indonesia needs to increase trade diplomacy to find new export markets and strengthen trade relations with non-traditional countries. Widayat et al., (2024) added that several alternatives that Indonesia can do are by implementing downstream policies on several commodities such as palm oil. Then carry out downstreaming of products that are also needed by Europe, especially Nickel. And conduct diplomacy with countries that produce the world's leading commodities, such as Malaysia, Thailand, Colombia, and also Ghana in the context of global

palm oil producers. In addition, Indonesia. The industrial sector is also evaluated to increase product competitiveness, with a focus on innovation and reducing dependence on export markets affected by the trade war. The decline in export volume can affect state revenues, reduce the contribution of the trade sector to GDP, and reduce employment in the export sector. Therefore, diversifying export markets and improving product quality are very important to maintain and increase the contribution of exports to the Indonesian economy.

3.2.3 Impact of Trade War on Import in Indonesia

A trade war that results in the imposition of high tariffs by large countries, such as the United States, on products from the countries involved will affect Indonesia's import structure. According to Sulistiyowati & Pratama (2023) the publication of a list of goods whose tariffs were increased by the US and China is an indication of a trade war between the two. Products from the aviation, information and communication technology, robotics, and machinery sectors are included in the 1,300 Chinese imports listed by the Office of the United States Trade Representative (USTR). In response, China imposed a 25% tariff on 106 US goods, grouped into 14 categories such as chemicals, automobiles, aircraft, and soybeans. Therefore, the tariff policies of the two countries involved in the trade war will have an impact on Indonesian imports. Higher import tariffs will cause the cost of importing goods to increase, which in turn leads to cost inflation and affects the competitiveness of domestic products. This condition shows that Indonesia imports many goods from countries involved in the trade war, especially industrial raw materials, capital goods, and high-tech products. Increasing import tariffs will lead to a decrease in imports, especially goods that cannot be produced domestically.

One of the impacts that occurred in Indonesia was on corn commodities. According to CNBC Indonesia (2025) as one of the countries with high corn needs, Indonesia faces the threat of price volatility that can disrupt the domestic supply chain. Imports will increase in 2024 to reach 1.5 million tons. This increase shows a high dependence on the global market. The impact of the trade war has worsened this situation, as tensions between the two major countries often trigger disruptions in global commodity trade, including corn. Tariff fluctuations and export restriction policies can exacerbate supply and price instability, forcing Indonesia to face a spike in import costs that could potentially weaken several sectors. In addition, according to Maria (2022) China's import market position in Indonesia for electrical and mechanical commodities has also increased rapidly, and this position has remained after the trade war. Exporting countries will seek other markets for their goods. One of the ASEAN members with the potential to tap the Chinese market is Indonesia, the nation with the largest population in the ASEAN area. The Indonesian government should focus more on this because, as seen by the data on Indonesia's export value in 2018 and 2019, which showed a deficit, Chinese goods would continue to enter the country if proactive measures are not taken.

To reduce the impact of increasing import tariffs, according to Wangke (2020) the government must implement protection for the people's economic interests to ensure the survival of small and medium enterprises in certain sectors. To prevent Indonesia from

importing, the government must establish regulations that limit the use of domestic products. Although imported goods may be much cheaper than local goods, Indonesian consumers should prefer domestic goods. Government policies that encourage domestic raw materials and investment in the manufacturing sector aim to reduce dependence on imports. Although import substitution policies can help reduce dependence on foreign goods, disruptions to the supply chain can occur, which can increase domestic production costs. Therefore, expanding domestic industrial capacity and strengthening the manufacturing sector must be carried out to minimize the negative impact of high import tariff policies.

3.2.4 Impact of Trade War on Exchange Rate in Indonesia

Economic equilibrium is greatly influenced by the exchange rate, a measure of a country's monetary strength, and its movements are directly reflected in the foreign exchange market. To regulate the movement of the rupiah, the position of monetary policy instruments is very important. To maintain economic stability and public expectations for the future, monetary institutions must continue to intervene in transmissions that affect currency exchange rates even when a country adopts a floating exchange rate regime. However, exchange rate fluctuations cannot be controlled, therefore their impacts need to be addressed (Pratiwik & Prajanti, 2023). Trade tensions caused by trade wars can cause uncertainty in international financial markets, which in turn affects the rupiah exchange rate. High trade tension index and import tariffs imposed by major countries can reduce investor sentiment towards emerging market countries such as Indonesia, causing large capital outflows and depreciation of the rupiah exchange rate against the US dollar.

Bank Indonesia (2022) reported the US-China trade war caused global financial market panic, foreign capital flight, and exchange rate depreciation pressure in developing countries, including Indonesia. According to Salim & Soelistyo (2024) until October 2023, the Rupiah exchange rate has fallen 54 points or 0.35 percent from its lowest position against the USD in 2022, around Rp15,731. Global sentiment pressure and capital outflows in the stock and bond markets which are expected to have a major impact have caused the Rupiah to continue to weaken against the US dollar. The weakening of the Rupiah has caused the price of imported raw materials, so costs have also increased. Depreciation also affects the industrial sector that relies on imported raw materials. Maghfiroh (2021) added that if the Rupiah exchange rate weakens, ideally this can encourage exports to be even greater because of the difference in prices abroad and domestically. However, Indonesian exports will find it difficult to increase export volume because they are influenced by internal domestic factors, namely the trend of the consumer price index which increases every year and will affect production costs. So this condition is equally detrimental from a trade perspective.

Exchange rate fluctuations caused by trade wars can worsen inflation and increase people's cost of living. Salim & Soelistyo (2024) the government must encourage export activities to strengthen the currency increase the country's foreign exchange reserves and maintain domestic price stability. Policies that ensure exchange rate stability are very important to reduce economic uncertainty and maintain the price stability of goods in the domestic market. Bank Indonesia is trying to stabilize the rupiah exchange rate by

intervening in the foreign exchange market and maintaining foreign exchange reserves. In addition, the Indonesian government is also trying to attract foreign investment to reduce dependence on volatile international capital flows. According to Aba (2021) for investors to remain interested in investing in Indonesia and reduce capital outflows, the policy of raising the benchmark interest rate seeks to make Indonesia's domestic financial assets more attractive. The exchange rate will eventually rise against the rupiah if investment flows continue.

3.2.5 Impact of Trade War on Industrial Production Index in Indonesia

Gross Domestic Product (GDP) is the main indicator in measuring economic growth in a country, but there are no monthly statistics that measure it. According to Manna et al. (2015) the Industrial Production Index is a statistical indicator that can measure the short-term growth in industrial production in a country. The growth rate based on the monthly Industrial Production Index is closely monitored and watched by planners and policymakers as well as by the business community at large. Furthermore, its growth rate is used in preparing provisional estimates of quarterly and annual GDP. In the context of this study, the Trade Tension Index and import tariffs can directly affect the industrial production index by affecting the production of goods that rely on imported raw materials and export markets. According to Pan (2023) trade friction between China and the United States directly affects production costs, thus affecting supply; meanwhile, policy changes will also lead to changes in market demand, and changes in the relationship between supply and demand will inevitably cause fluctuations in the overall economic environment of the market.

Although the research results show that the trade war as measured using the Trade Tension Index and import tariffs does not affect the Indonesian Industrial Production Index in either the short or long term, this can be explained by Indonesia's more diversified economic conditions. According to Bank Indonesia (2020) One of the strategies to accelerate Indonesia's economic transformation is by strengthening priority sectors. Most of Indonesia's industrial sectors, such as textiles, food, and beverages, although dependent on raw material imports, are mostly focused on the domestic market. In other words, many industries in Indonesia are not very dependent on exports or international markets, so the direct impact of a trade war or changes in import tariffs is relatively limited. In addition, the Indonesian government continues to strive to reduce dependence on imports through import substitution policies and encourage domestic production. These steps, including tax incentives and investment in the manufacturing sector, strengthen the resilience of domestic industries to continue growing despite global trade tensions.

The implications of these findings suggest that Indonesia's industrial sector is more resilient to shocks from external factors, including trade wars. According to Aba (2021) investment from American companies in Indonesia will increase GDP, create new jobs for Indonesians, expand the country's manufacturing sector, and advance Indonesian technology. Indonesia should increase the portion of export-based FDI which can reduce the current account deficit. Furthermore, because goods made by foreign companies have certain marketability in the global market, Indonesia's export volume can increase. Given its

abundant natural resources, Indonesia should be a desirable choice for investors looking to relocate their industrial base from China. Although international trade tensions and import tariffs may affect production costs in some sectors, the Indonesian industry has been able to survive and even adapt by increasing domestic production capacity and dampening external impacts. This also reflects the success of government policies in mitigating global impacts and strengthening the industrial sector through increased competitiveness. Thus, despite global trade tensions, Indonesia's industrial sector still shows quite good resilience and can maintain stability in the long term.

4. CONCLUSIONS

This study concludes that the trade war, represented by the Trade Tension Index and Import Tariff variables, has a significant impact on Indonesia's macroeconomy during the 2018–2023 period. In both the short and long term, the trade war has been shown to significantly affect inflation, exports, imports, and exchange rates. This impact reflects the high sensitivity of the Indonesian economy to the dynamics of international trade, especially through the channels of imported goods prices, changes in trade volume, and exchange rate fluctuations. However, the effect of the trade war on the industrial production index is not significant, indicating that Indonesia's manufacturing sector has not been fully integrated with the global supply chain affected by the trade war. This can be an opportunity as well as a challenge for the government in increasing the competitiveness of the domestic industry to be more resilient in facing global pressures.

Important implications that can be practically applied to deal with the impact of the trade war on the Indonesian economy. The government needs to focus on stabilizing inflation by managing the cost of importing basic necessities and diversifying import sources to reduce dependence on countries involved in the trade war. In addition, an export market diversification strategy needs to be carried out by expanding export destinations to non-traditional countries and increasing the competitiveness of export products through incentives, logistics efficiency, and technology adoption. Strengthening foreign exchange reserves and exchange rate stability are also priorities, which can be done through foreign exchange market intervention by Bank Indonesia and promoting the use of local currencies in international trade transactions (local currency settlement). On the other hand, the government needs to optimize adaptive import tariff policies, especially for industrial raw materials, while providing support for the development of domestic industries through investment incentives, deepening supply chains, and increasing innovation. These steps are expected to strengthen Indonesia's economic resilience to external shocks, mitigate the negative impacts of the trade war, and encourage sustainable economic growth.

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