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Analysis of Factors Affecting International Trade Stability Conditions in Indonesia with Vector Autoregression Approach

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Abstract:

International trade greatly affects the economies of the countries involved. The value of exports and imports for Indonesia, which is one of the largest emerging economies in Southeast Asia, is crucial for measuring trade performance. Meanwhile, the use of interest rates as an instrument of monetary policy has an impact on economic stability, both in the short and long term. These three indicators show the condition of Indonesia's economy and its position in global trade. The Vector Autoregressive (VAR) method is used in this study to model the relationship between export values, imports, interest rate, GDP, inflation, and exchange rate. The data reaches stationarity at the second differencing; the lowest AIC value determines the best lag at lag 2. The results show that lagged variables, GDP, and exchange rates strongly influence the relationship between exports, import, and interest rates in the short run. Good statistical criteria support this model, which shows a high level of explanation (R-squared > 0.9), and emphasizes how important it is to understand the relationship between variables for appropriate policies. One-way relationships between imports and exports (p-value 0.0389) and interest rates to exports (p-value 0.0170) were found through Granger causality analysis. There is no reciprocal relationship. The contribution of exports to the variation of interest rates reached 28.80% in the 10th period, while imports dominated the variation of exports by 37.24%. This finding shows how important it is to improve the export sector to help manage imports and monetary stability. From this study is recommended to focus on developing policies, such as those related to foreign direct investment or fiscal policy, to achieve a more comprehensive understanding and effective management of the International Trade Stability system.

Keywords — **International Trade, Vector Autoregression (VAR), Economic Modeling, Time Series, Regression.**

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I. INTRODUCTION

International trade plays a very important role in the economies of the countries involved. Classical economists have recognized that international trade can make a significant contribution to a country's economic progress because it serves as a catalyst to accelerate economic growth and improve people's quality of life [1]. In the context of Indonesia, exports and imports play an important role in supporting the national economy. As one of the largest emerging economies in Southeast Asia, Indonesia has extensive international trade relations, and the value of exports and imports is often used as a key indicator of trade performance. Meanwhile, interest rates as one of the monetary policy instruments also affect economic stability, both in the short and long term. The combination of these

three indicators reflects the health of the Indonesian economy and gives an idea of the country's position in global trade [2].

The rapid development of the international economy encourages increased trade flows of goods, money and capital between countries, where international trade has an important role in economic growth through benefits such as increased income, foreign exchange reserves, capital transfers, expansion of employment, and improved product quality due to global competition [3]. For Indonesia, balanced trade flows, with exports greater than imports, support its position as a competitive exporter [4]. However, dependence on imports to fulfill domestic needs, especially raw materials and capital goods, makes import stability very important to maintain the smooth running of industrial activities [5]. On the other hand, an increase in the value of exports contributes to the country's income, creates jobs, and reflects the competitiveness of products in the global market [3]. In this case, interest rates act as a monetary policy instrument to control inflation, maintain exchange rate stability, and encourage investment to support sustainable economic growth. Therefore, an understanding of imports, exports, and interest rates is crucial in formulating stable and competitive economic policies.

Appropriate monetary policy and international trade stability can promote inclusive and sustainable economic growth and strengthen international relations. The Sustainable Development Goals (SDGs), particularly SDG 8 (Decent Work and Economic Growth) and SDG 17 (Partnership for Purpose), are strongly influenced by the value of imports, exports, and interest rates. High exports increase the competitiveness of domestic products, support economic growth, and contribute to job creation in line with SDG goals 1 and 10. Stable interest rates encourage investment, strengthen industrial sectors, and promote inclusive economic growth. Taken together, these three factors play a role in creating economic stability that supports the achievement of the SDGs, especially sustainable and inclusive growth.

To analyze the factors that influence the international trade situation in Indonesia, an analytical technique is needed that is able to identify the relationship between variables. Regression analysis is one of the methods that can be used to measure the effect of independent variables on the dependent variable [6]. One of the developments is the Vector Autoregression (VAR) model, which was introduced by Christopher Sims in 1980 based on Granger's (1969) causality theory, which states that historical data of variable X can be used to predict variable Y if X affects Y. The main advantage of VAR is that there is no need to determine which variables are endogenous and exogenous because all variables are treated as endogenous variables [7]. In addition, VAR allows analyzing the impact of random disturbances on the variables in the system as well as predicting the relationship between variables in the time series. With a reduced approach that avoids structural modeling, VAR estimation using the Ordinary Least Square (OLS) method becomes relatively simple and allows separate modeling for each endogenous variable, thus making it an effective tool in economic analysis.

Research by Sihotang and Gulo [8] using a multiple linear regression approach found that gross domestic product (GDP) and inflation rate have a positive and significant influence on the value of imports in Indonesia. Meanwhile, the exchange rate (KURS) has a negative but significant effect on the value of imports in Indonesia. Research by Risma, et al. [3] using the Autoregressive Distributes Lag Models (ARDL) approach has the result that GDP has a positive and significant effect on the value of exports, while KURS has a negative and significant effect on the value of exports in Indonesia. Research by Akbar [9] using a multiple linear regression approach provides results that inflation has a negative and significant relationship to the value of exports in Indonesia. Then, research from Raharja [10] using a multiple linear regression approach states that partially the inflation rate is a variable that significantly affects the interest rate on commercial bank deposits in Indonesia.

Based on research from previous researchers, this study will analyze the factors that affect the stability of international trade in Indonesia using the Vector Autoregression (VAR) approach. Along

with this description, there are not many researchers who discuss the effect of GDP, Inflation, and KURS on international trade conditions, which can be seen from the value of exports, imports, and interest rates using Vector Autoregression (VAR) model analysis. The VAR model can capture the dynamic relationship between these variables. Therefore, researchers are interested in modeling international trade stability conditions using the VAR method to analyze the reciprocal relationship between the three variables that are thought to affect the bank's stock price.

II. RESEARCH METHODOLOGY

This study examines the impact of Gross Domestic Product (GDP), inflation, and exchange rate (KURS) on international trade stability conditions in Indonesia using a quantitative approach. This research uses statistical data analysis to test the hypothesis that has been set. The secondary data used is sourced from the Central Bureau of Statistics (BPS) and the Ministry of Trade (MoT) consisting of quarterly time series from 2015 to 2023, covering 34 districts/cities in Indonesia. The variables used in this study are outlined in Table 1.

TABLE I

RESEARCH OF VARIABLES

Variable	Variable Description	Unit
Y_1	Export	Ratio
Y_2	Import	Ratio
Y_3	Interest Rate	Percent
X_1	Gross Domestic Product (GDP)	Ratio
X_2	Inflation	Ratio
X_3	Exchange Rate (KURS)	Ratio

The data analysis method used in this study is Vector Autoregression (VAR). VAR is commonly used to forecast interrelated time series systems and to analyze the dynamic impact of random disturbances on variable systems. The following p-order VAR model (VAR(p)) is as follows.

$$\boldsymbol{y}_t = \boldsymbol{\mu} + \boldsymbol{A}_1\boldsymbol{y}_{t-1} + \boldsymbol{A}_2\boldsymbol{y}_{t-2} + \cdots + \boldsymbol{A}_p\boldsymbol{y}_{t-p} + \boldsymbol{B}\boldsymbol{x}_t + \boldsymbol{\epsilon}_t$$

with,

$\boldsymbol{y}_t = (y_{1t}, y_{2t}, \dots, y_{qt})'$ is $q \times 1$ vector of endogenous variables.

$\boldsymbol{\mu}$ is vector $q \times 1$ of constants.

$\boldsymbol{x}_t = (x_{1t}, x_{2t}, \dots, x_{dt})'$ is $d \times 1$ vector of exogenous.

$\boldsymbol{A_1}, \boldsymbol{A_2}, \dots, \boldsymbol{A_p}$ is each $q \times q$ matrix from the coefficient of the lag ever estimated.

$\boldsymbol{B}$ is matrix of the coefficient of exogen variable that estimated.

$\boldsymbol{\epsilon}_t = (\epsilon_{1t}, \epsilon_{2t}, \dots, \epsilon_{qt})$ is $q \times 1$ white noise error vector with the assumption that.

$E(\boldsymbol{\epsilon}_t) = \mathbf{0}$, $E(\boldsymbol{\epsilon}_t\boldsymbol{\epsilon}_t') = \Sigma_\epsilon$, and $E(\boldsymbol{\epsilon}_t\boldsymbol{\epsilon}_s') = \mathbf{0}$ for $t \neq s$.

The parameter estimation of the (VAR(p)) model is performed using the Ordinary Least Squares (OLS) method, represented as follows:

$$\tilde{\boldsymbol{y}} = (\mathbf{Z}' \otimes \mathbf{I}_q)\boldsymbol{\gamma} + \tilde{\boldsymbol{\epsilon}}$$

where,

$\tilde{\boldsymbol{y}} = \text{vec}(\mathbf{Y})$

$\boldsymbol{\gamma} = \text{vec}(\mathbf{C})$

$\tilde{\boldsymbol{\epsilon}} = \text{vec}(\mathbf{E})$

Here, $\mathbf{Y} = (\boldsymbol{y}_1, \boldsymbol{y}_2, \dots, \boldsymbol{y}_T)$ and $\mathbf{E} = (\boldsymbol{\epsilon}_1, \boldsymbol{\epsilon}_2, \dots, \boldsymbol{\epsilon}_T)$ are $q \times T$ matrices representing the endogenous variables and errors, respectively, while $\mathbf{C} = (\boldsymbol{\mu}, \boldsymbol{A}_1, \boldsymbol{A}_2, \dots, \boldsymbol{A}_p, \boldsymbol{B})$.

The OLS estimator $\hat{\boldsymbol{\gamma}}$ is expressed as:

$$\hat{\boldsymbol{\gamma}} = \left[(\mathbf{Z}\mathbf{Z}')^{-1}\mathbf{Z} \otimes \mathbf{I}_q\right]\tilde{\boldsymbol{y}}$$

The properties of the OLS estimator $\hat{\boldsymbol{\gamma}}$ are as follows:

$$E(\hat{\boldsymbol{\gamma}}) = \boldsymbol{\gamma} \text{ and } cov(\hat{\boldsymbol{\gamma}}) = (\mathbf{Z}\mathbf{Z}')^{-1} \otimes \Sigma_\epsilon$$

To model International Trade Stability and examine the factors influencing it, the following data analysis procedures must be implemented.

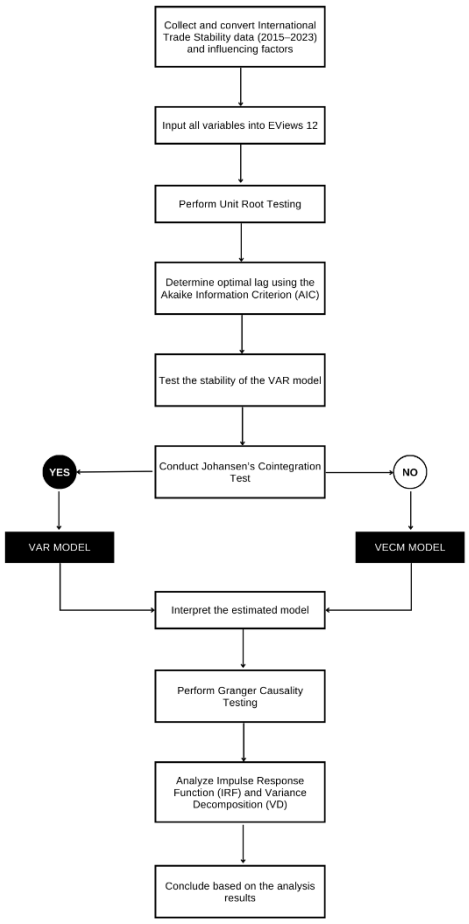

Fig. 1 Flowchart Diagram

III. RESULTS AND DISCUSSION

A. Unit Root Test

Additionally, a data stationarity test will be conducted using the Augmented Dickey-Fuller (ADF) method, with the results presented in Table 3. The purpose of the ADF test is to assess whether the data utilized in the study are stationary. The data are deemed stationary if the p-value obtained is less than the significance level of 0.05.

TABLE II

UNIT ROOT TEST

	Variable	ADF Statistic Value	P-Value
Real Data	GDP	0.13	0.963
	Inflation	-5.79	0.000
	Exchange Rate	-1.5	0.520
	Export	-0.52	0.876
	Import	-0.91	0.774
	Interest Rate	-2.66	0.091
First Differencing	GDP	-7.69	0.000
	Inflation	-9.82	0.000
	Exchange Rate	-5.70	0.000
	Export	-4.36	0.002
	Import	-4.73	0.001
	Interest Rate	-2.66	0.093
	Variable	**ADF Statistic Value**	**P-Value**
Second Differencing	GDP	-9.68	0.000
	Inflation	-6.36	0.000
	Exchange Rate	-6.77	0.000
	Export	-6.30	0.000
	Import	-6.34	0.000
	Interest Rate	-5.33	0.001

Referring to Table 2, it is evident that the research variables have p-values exceeding 0.05, necessitating a differencing process. After performing the second differencing, the p-values for all variables fall below 0.05, indicating that the data achieve stationarity at the second differencing. Consequently, the analysis can progress to the model identification stage.

B. Optimal Lag Test

To determine the appropriate model, it is necessary to test for the optimal lag. The selection of the optimal lag is based on the AIC value, with the lag corresponding to the lowest AIC value being chosen. The results of the optimal lag test are shown in Table 3 below.

TABLE III

OPTIMAL LAG TEST

Lag	LogL	LR	FPE	AIC	SC
0	-621.55	NA	7.94e+12	38.21	38.62
1	-543.18	128.24*	1.20e+11	34.01	34.82*
2	-532.14	16.06	1.09e+11*	33.88*	35.11
3	-525.95	7.876	1.38e+11	34.05	35.69

As shown in Table 3, the optimal lag is determined to be lag 2, as it exhibits the lowest AIC value. Consequently, the model to be utilized for further testing will be based on lag 2.

C. Stability Test

To verify the stability of the estimated model, a stability test is performed, with the results displayed in Table 4. This test is conducted to assess whether

the model satisfies the stability criteria, which is a critical requirement for ensuring the accuracy and reliability of long-term model predictions.

TABLE IV

STABILITY TEST

Root	Modulus
0.887631	0.887631
0.755790 - 0.288677i	0.809045
0.755790 + 0.288677i	0.809045
0.228349 - 0.457803i	0.511592
0.228349 + 0.457803i	0.511592
-0.088744	0.088744

The results presented in Table 4 indicate that the model has achieved a stable state and has successfully passed the stability test. This is demonstrated by the modulus values being less than one, confirming that the model fulfills the stability criteria required for further analysis.

D. Cointegration Test

The Johansen Cointegration Test, utilizing the trace statistic, is performed to assess the presence of cointegration among the variables. Cointegration is identified when the trace statistic exceeds the critical value at a significance level of $\alpha = 0.05$.

TABLE V

COINTEGRATION TEST

Hypothesized No. of CE(s)	Eigen value	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.493265	29.31905	29.79707	0.0567
At most 1	0.150451	6.886726	15.49471	0.5909
At most 2	0.044613	1.506084	3.841465	0.2197

Referring to the cointegration test results presented in Table 5, the probability values for the "None," "At most 1," and "At most 2" rows are greater than the significance level of α=0.05. This outcome indicates the absence of cointegration among the variables. Therefore, the analysis proceeds using the VAR method.

E. VAR Model

The detailed results of the VAR analysis are shown in Table 6 below. This table outlines the estimated coefficients and their statistical significance, enabling a thorough interpretation of both the long-term and short-term dynamics among the variables being analyzed. These results are essential for understanding the relationships and adjustments toward equilibrium as modeled by the VAR approach.

TABLE VI

VAR MODEL

Error Correction:	D(GDP)	D(INFLATION)
EXPORT(-1)	0.863744 (0.30284) [2.85214]	0.172340 (0.26920) [0.64020]
EXPORT(-2)	0.132574 (0.30450) [0.43539]	-0.022179 (0.27067) [-0.08194]
IMPORT(-1)	-0.078417 (0.27545) [-0.28469]	0.654164 (0.24485) [2.67172]
IMPORT(-2)	-0.305352 (0.30898) [-0.98824]	-0.370743 (0.27466) [-1.34982]
INTERESTRATE(-1)	-769.8956 (663.958) [-1.15956]	556.3926 (590.200) [0.94272]
INTERESTRATE(-2)	421.2614 (654.292) [0.64384]	-709.9908 (581.608) [-1.22074]
INFLATION	1327.112 (1571.16) [0.84467]	2509.783 (1396.62) [1.79704]
KURS	-0.426025 (0.34664) [-1.22902]	-0.561067 (0.30813) [-1.82088]
GDP	0.005001 (0.00199) [2.51529]	0.006109 (0.00177) [3.45674]
R-squared	0.949554	0.919960
F-statistic	58.82203	35.91812
Akaike AIC	17.12513	16.88962
Schwarz SC	17.52917	17.29366

Therefore, based on the data provided in Table 6, the following equation is formulated.

$$\begin{aligned} EXPORT \;=\; & 0.864 * EXPORT(-1) + 0.133 \\ & * EXPORT(-2) - 0.078 \\ & * IMPORT(-1) - 0.306 \\ & * IMPORT(-2) - 769.896 \\ & * INTEREST\ RATE(-1) \\ & + 421.261 \\ & * INTEREST\ RATE(-2) \\ & + 1327.112 * INFLATION \\ & - 0.426 * KURS + 0.005 * GDP \end{aligned}$$

$$IMPORT = 0.172 * EXPORT(-1) - 0.022 * EXPORT(-2) + 0.654 * IMPORT(-1) - 0.371 * IMPORT(-2) + 556.393 * INTEREST\ RATE(-1) - 709.991 * INTEREST\ RATE(-2) + 2509.783 * INFLATION - 0.561 * KURS + 0.006 * GDP$$

$$INTEREST\ RATE = 3.827e-05 * EXPORT(-1) - 3.561e-05 * EXPORT(-2) + 4.189e-05 * IMPORT(-1) + 6.443e-05 * IMPORT(-2) + 1.243 * INTEREST\ RATE(-1) - 0.381 * INTEREST\ RATE(-2) - 0.237 * INFLATION + 0.0002 * KURS - 1.569e-06 * GDP$$

The Vector Autoregressive (VAR) model analysis highlights the short-run interdependence between exports, imports, and interest rates. In the export equation, export(-1) has a significant positive effect on current exports, with a t-statistic of 2.85, indicating that past export values strongly influence current export performance. In addition, GDP shows a significant positive impact on exports, with a t-statistic of 2.51. In the import equation, import(-1) is the most significant predictor, with a t-statistic of 2.67, indicating its strong influence on current imports. GDP also significantly affects imports, as evidenced by the t-statistic of 3.46.

For the interest rate equation, interest rate (-2) has a significant negative effect on current interest rate, with a t-statistic of -2.30. The exchange rate and GDP also show significant contributions to the dynamics of interest rates, with t-statistics of 2.65 and -3.12, respectively. The VAR model shows high explanatory power, with R-squared values of 0.95 for exports, 0.92 for imports, and 0.95 for interest rates, indicating that the included variables explain most of the variation in each dependent variable. The adjusted R-squared values remain robust, while the F-statistics and good Akaike Information Criterion (AIC) and Schwarz Criterion (SC) values support the reliability of the model.

Overall, the VAR analysis emphasizes the Important role of lagged values, GDP, and exchange rate dynamics in explaining the short-run interactions between exports, imports, and interest rates. This reinforces the Importance of understanding the linkages in the system for informed decision-making and policy analysis.

F. Granger Causality Test

The Granger Causality test is conducted to investigate the causal relationships between variables. Short-term causality is identified when the p-value is below the 0.05 significance level. The results of the Granger causality test are shown in Table 7 below.

TABLE VII

GRANGER CAUSALITY TEST

Null Hypothesis:	Obs	F-Statistic	Prob.
IMPORT does not Granger Cause EXPORT	34	0.89356	0.4202
EXPORT does not Granger Cause IMPORT		3.63843	0.0389
INTEREST RATE does not Granger Cause EXPORT	34	4.70541	0.0170
EXPORT does not Granger Cause INTEREST RATE		1.21013	0.3128
INTEREST RATE does not Granger Cause IMPORT	34	2.63975	0.0885
IMPORT does not Granger Cause INTEREST RATE		1.76002	0.1899

The Granger causality test results show that there is no reciprocal relationship between imports and exports, as well as between exports and interest rates, indicated by p-values greater than 0.05. In contrast, there is a one-way relationship between exports and imports, with a p-value of 0.0389, suggesting that exports can predict imports in the short term, while imports cannot predict exports. Similarly, interest rates Granger cause exports (p-value 0.0170), but exports do not Granger cause interest rates (p-value 0.3128).

G. Impulse Response Function

Additionally, an Impulse Response Function (IRF) analysis will be conducted to examine the dynamic responses between variables. This IRF approach offers a more detailed understanding of how a disturbance or shock to one variable affects another

over time. The IRF test graph is presented in Fig. 2 below.

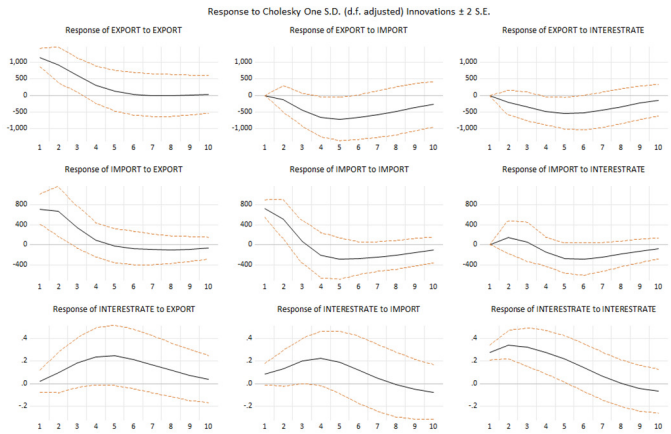

Fig. 2 Impulse Response Function

Impulse Response Function (IRF) analysis shows the dynamic interaction between export, import, and interest rate in a Vector Autoregressive (VAR) model. A positive shock to each variable initially increases its own value, followed by a gradual decline. Shocks from other variables generally have a significant but temporary impact: export reacts negatively to shocks to import and the interest rate, while import reacts positively to export and negatively to the interest rate. The interest rate shows a modest increase after the export and import shocks and a persistent but decreasing response to its own shocks. Confidence intervals indicate the reliability of these responses, with wider intervals indicating greater uncertainty.

H. Variance Decomposition

Table 8,9,10 displays the Variance Decomposition values for the Inflation variable over multiple forecast periods. This table demonstrates how the variance of forecast errors for the response variables changes over time. The decomposition offers a clearer understanding of the evolving relationships between export,import, and interest rate throughout the forecast period.

TABLE VIII

VARIANCE DECOMPOSITIONS OF EXPORT VARIABLE

Variance Decomposition of EXPORT:				
Period	**S,E,**	**EXPORT**	**IMPORT**	**INTEREST RATE**
1	1133.045	100.0000	0.000000	0.000000
2	1472.827	97.28357	0.666258	2.050175
3	1683.714	87.21108	7.090337	5.698580
4	1892.257	71.74447	17.36341	10.89213
5	2096.358	58.82899	25.55981	15.61120
6	2260.233	50.63358	30.62108	18.74534
7	2373.213	45.92741	33.65355	20.41904
8	2442.812	43.34846	35.50538	21.14616
9	2481.491	42.00853	36.61671	21.37476
10	2501.017	41.37235	37.24154	21.38611

The Variance Decomposition of export indicates the proportion of variation in export that is explained by shocks to itself, import, and the interest rate over time. Initially, in Period 1, export explains 100% of the variation on its own, with no influence from import or the interest rate. In Period 2, export still dominate, explaining 97.28%, while import contribute 0.67% and the interest rate 2.05%. As time goes by, the influence of export declines, with its contribution falling to 41.37% in Period 10, along with the increasing role of import (37.24%) and the interest rate (21.39%). This indicates that, in the long run, import become the most significant factor in influencing the variation of export, followed by the interest rate.

TABLE IX

VARIANCE DECOMPOSITIONS OF IMPORT VARIABLE

Variance Decomposition of IMPORT:				
Period	**S,E,**	**EXPORT**	**IMPORT**	**INTEREST RATE**
1	1007.178	49.02835	50.97165	0.000000
2	1322.563	53.85935	44.81276	1.327886
3	1370.113	56.58651	41.98905	1.424444
4	1395.209	55.03684	42.63720	2.325957
5	1446.358	51.23647	43.38148	5.382050
6	1498.589	47.92801	43.58846	8.483529
7	1538.275	45.80513	43.72232	10.47255
8	1564.167	44.64727	43.88106	11.47168
9	1578.388	44.11782	44.00649	11.87569
10	1584.358	43.93291	44.07879	11.98830

The Variance Decomposition of import shows how variations in import are explained by shocks to export, import itself, and the interest rate over time. In Period 1, import explains 50.97% of its own variation, while export explains 49.03%, and the interest rate has no influence. Over time, the influence of import decreases slightly, stabilizing at 44.08% in Period 10, while export consistently contribute around 43.93%. The influence of the

interest rate grows gradually, reaching 11.99% in Period 10. This shows that export and import remain the dominant factors influencing the variation of import, with the interest rate playing a smaller but increasing role in the long run.

TABLE X

VARIANCE DECOMPOSITIONS OF INTEREST RATE VARIABLE

Variance Decomposition of INTEREST RATE:				
Period	**S,E,**	**EXPORT**	**IMPORT**	**INTEREST RATE**
1	0.286784	0.415793	8.358013	91.22619
2	0.475847	4.221236	10.92979	84.84897
3	0.633947	10.50235	15.99011	73.50753
4	0.764381	16.85978	19.37087	63.76935
5	0.851922	21.79914	20.40214	57.79871
6	0.897723	25.30734	20.16697	54.52569
7	0.916708	27.57431	19.63391	52.79178
8	0.924235	28.73912	19.32539	51.93549
9	0.929604	29.03179	19.41026	51.55795
10	0.936114	28.79543	19.82129	51.38327

The Variance Decomposition of the interest rate shows the proportion of its variation explained by shocks to exports, imports, and the interest rate itself over time. In Period 1, interest rate explains 91.23% of its own variation, with small contributions from imports (8.36%) and exports (0.42%). Over time, the influence of interest rate declines significantly, stabilizing at 51.38% in Period 10. The influence of exports continues to increase, reaching 28.80%, while the contribution of imports increases initially and stabilizes at around 19.82% in Period 10. This indicates that in the long run, exports become the most influential external factor on interest rate, followed by imports, as the explanatory power of interest rate decreases.

IV. CONCLUSIONS

This study analyzes the short-term relationship between exports, imports, and interest rates using the Vector Autoregression (VAR) method. The data reached stationarity at the second differencing, with the optimal lag determined at lag 2 based on the lowest AIC value. The resulting model is stable, with an R-squared of 0.95 for exports, 0.92 for imports, and 0.95 for interest rates, indicating the model's ability to explain most of the variation. Granger Causality analysis showed a one-way relationship between exports and imports (p-value 0.0389) and interest rates to exports (p-value 0.0170), but no reciprocal relationship was found. Variance Decomposition reveals that the contribution of exports to the variation of interest rates increased to 28.80% in the 10th period, while imports became the dominant factor in the variation of exports, reaching 37.24%. This result highlights the Importance of strengthening the export sector to support import management as well as considering the impact of trade on monetary stability. Future research should consider including external variables such as foreign direct investment and fiscal policy to gain a more comprehensive understanding of the relationships within the International Trade Stability system. In addition, it is important to examine government policies that can be implemented to stabilize or boost international trade.

REFERENCES

[1] A. Safitri, "Pengaruh Produk Domestik Bruto, Inflasi, Kurs dan Cadangan Devisa Terhadap Impor Barang Konsumsi di Indonesia," 2020.

[2] R. R. Laksono, "Analisis Faktor-Faktor Yang Mempengaruhi Suku Bunga Pinjaman Bank Umum Di Indonesia Melalui Pendekatan Kointegrasi Dan Error Correction Model (Ecm)," *Seminar Nasional Akuntansi dan Bisnis (SNAB)*, pp. 1–15, 2017.

[3] O. R. Risma, T. Zulham, and T. C. Dawood, "Pengaruh Suku Bunga, Produk Domestik Bruto Dan Nilai Tukar Terhadap Ekspor Di Indonesia," *Jurnal Perspektif Ekonomi Darussalam*, vol. 4, no. 2, pp. 300–317, 2018, doi: 10.24815/jped.v4i2.13027.

[4] R. Mutia, "Analisis Pengaruh KURS, PDB dan Tingkat Inflasi terhadap Ekspor Indonesia ke Negara ASEAN (Studi pada Negara Malaysia, Singapura, Filipina, dan Thailand)," 2015.

[5] S. Muryani and D. M. Hutajulu, "Analisis Pengaruh Inflasi, Produk Domestik Bruto, Dan Kurs Bagi Impor Indonesia," *Jurnal Ilmiah Ekonomi Bisnis*, vol. 28, no. 2, pp. 210–224, 2023, doi: 10.35760/eb.2023.v28i2.7290.

[6] Z. Iba and A. Wardhana, *Analisis Regresi dan Analisis Jalur untuk Riset Bisnis Menggunakan SPSS 29.0 & SMART-PLS 4.0*, vol. 19, no. 5. 2024.

[7] Gujarati, *Basic econometrics, Fourth Edition*. New York: The MacGraw-Hill, 2004.

[8] J. Sihotang and Y. O. Gulo, "Analisis Pengaruh Produk Domestik Bruto, Tingkat Inflasi, Dan Nilai Tukar Rupiah Atas Us Dollar Terhadap Impor Indonesia Periode," *Visi Sosial Humaniora*, vol. 01, no. 01, pp. 31–43, 2020, doi: https://doi.org/10.51622/vsh.v1i1.31.

[9] A. M. Akbar, "Analisis Pengaruh Inflasi, KURS dan Produk Domestik Bruto (PDB)Terhadap Nilai Ekspor Indonesia Periode 2009-2013," Universitas Islam Sultan Agung, 2014.

[10] S. Raharja, "Analisis Faktor-Faktor yang Mempengaruhi Tingkat Suku Bunga Deposito Bank Umum Di Indonesia Tahun 2007-2010," Universitas Diponegoro, 2011.

