The Influence of the Ukraine Russian War On Import Levels And Indonesia's Trade Balance Performance

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Abstract. This study aims to analyze how the influence of the war between Russia and Ukraine on Indonesia's trade balance. The war between Russia and Ukraine itself has started to heat up since 2013 and its peak broke out in February 2022. This research uses secondary data which uses data on Indonesia's trade balance, oil imports, wheat imports, and steel imports. This research has a vulnerable time from 2010 first quarter up to 2022 fourth quarter with data taken from the ministry of trade and TradeMap. The nature of the research used in this study is descriptive quantitative. The data analysis method used is the vector autoregression (VAR) method using the stationarity test, optimum lag test, VAR stability test, cointegration test, and Granger causality test.

Keywords: War; Russia; Ukraine; Indonesian Trade Balance; Import.

1. Introduction

In economic activities, a country will not be separated from trading activities with other countries. Trading activities with other countries are called international trade, international trade itself consists of various commodity trade goods, both natural resources that are still raw to manufactured goods. This international trade activity will not be separated from exports and imports.

Each country must strive for exports to be far greater than imports. This is intended to prevent state losses which can disrupt the economy and cause inflation if this happens continuously. Exports that are greater than imports will certainly provide benefits for the country and this is called a trade surplus, conversely if imports are greater than exports then it is called a trade deficit.

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In carrying out international trade activities, Indonesia certainly cooperates with various countries in the world, including Russia and Ukraine. Russia and Indonesia routinely import several types of commodities. These commodities are oil, wheat and steel. Indonesia imports from Russia in order to meet domestic needs and demands.

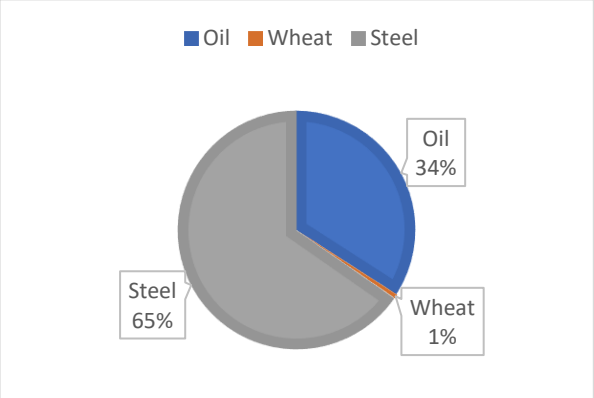

Fig 1. Percentage of Imports of Oil, Wheat and Steel from Russia, 2021
Source: TradeMap, 2021

Based on the picture above, it can be concluded that Indonesia mostly imports oil and steel from Russia. Steel imports contributed the most, namely 65% of Indonesia's total imports from Russia, followed by oil which contributed 34% of Indonesia's total imports from Russia, and finally wheat which only contributed 1% of Indonesia's total imports from Russia.
Based on data from(Harvards, 2020)stated that wheat contributed 61.62% of the total imports carried out by Indonesia and Ukraine in 2020. Indonesia imported wheat with Ukraine reaching $457,220,400 in 2020 and increasing to $919,426,000 in 2021(Trademap, 2021). Wheat itself is used in Indonesia as a basic ingredient of various foods such as bread, cakes, flour, cereals, oats and pasta. Apart from wheat, Indonesia also imported steel from Ukraine reaching $154,563,000 in 2020.
The outbreak of war conflict that occurred between Russia and Ukraine since February 2022 was caused by Ukraine's desire to become a member of NATO will certainly cause changes to Indonesia's trade balance, the conflict between Russia and Ukraine has a major impact on global supply chains, disrupting commodity flows, causing dramatic increases in raw material costs, product shortages, and causing world food shortages (Yulianingsih, 2022)[1]. This will have a direct impact on international trade activities between Indonesia Russia and Indonesia Ukraine so that it will disrupt Indonesia's trade balance.
The surge in commodity prices resulting from the Russia-Ukraine war significantly affected the economic sector. Moreover, the conflict led to a reshaping of global trade, with nations having ties to Russia and Ukraine holding considerable sway over their own national interests (Bakrie et al., 2022)[2]. An increase in the prices of oil, wheat, steel and gold can also cause a

[1] Yulianingsih, T. (2022). *Fakta 9 Mei, Hari di Balik Rumor Vladimir Putin Deklarasi Perang Rusia Ukraina*. Liputan6.

[2] Bakrie, C. R., Delanova, M. O., & Yani, Y. M. (2022). Perekonomian Negara Kawasan Asia Tenggara. *Jurnal Caraka Prabu*, *6*(1), 65–86.

domino effect to increase all commodities in Indonesia, thus creating high and faster inflation than normal. This will make the country or society experience various problems due to the increase in these various commodities.

Apart from a purely economic side, of course the case in Russia's war against Ukraine is included in economic politics. Politics without romanticism explains the motivation for public choice as a desire to challenge the theory of market failure characteristics that conforms to the theory of political failure. In discovering public choices, the model requires a fair degree of optimism about the democratic process that is not overly pessimistic (Winer & Shibata, 2013)[3]. Based on the explanations that have been described and data from various sources, it can be concluded that Russia's war against Ukraine had an impact on the global economy and also on the Indonesian economy. The impact of this war will affect the performance of the Indonesian economy, Indonesia's trade balance, and Indonesia's imports. Based on data from Indonesia's trade balance until August 2022, it was noted that Indonesia's trade balance towards oil and gas experienced a very large deficit and has already exceeded the 2021 deficit, the oil and gas deficit increased by 26%. Meanwhile, the non-oil and gas trade balance is still experiencing a very small increase or surplus from 2021.

2. Theoritical Review

2.1. The Theory of International Trade and Commodities. International trade is the activity of commodity or service transactions between countries, whether it is in the form of exports or imports. The purpose of international trade is to fulfill the needs of each country, as no country can meet all its requirements independently, but requires the assistance of trade cooperation with other countries. In international trade, due to each country's inability to fulfill its needs independently, there arises a demand and supply that occurs in each country. These demands and supplies form the basis of any transaction. While Commodities are the primary traded goods, whether they are raw materials or processed products that meet international trade standards for export. Commodities themselves are divided into agricultural commodities, industrial commodities, mining commodities, forestry commodities, marine commodities, timber commodities, and handicraft commodities. A flagship commodity is a commodity considered to be competitive with similar products from other countries or regions. The flagship commodity itself represents the efforts of a country and its people to provide benefits for both the nation and its society.

2.2. The Impact of War on the Global Economy. War is an international phenomenon involving two or more countries or hostile groups. National or interstate wars are greatly influenced by international politics. Wars are triggered by various factors such as economic issues, religion, feeling threatened, desire for dominance, and escalating political tensions. The presence of war in the world is inevitable due to human traits like possessiveness, aggressiveness, and a quest for dominance. While everyone agrees that war is terrible, it will continue to exist indefinitely. Presently, every nation competes to strengthen its military to defend itself from potential attacks

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[3] Winer, S. L., & Shibata, H. (2013). Political economy and public finance: a brief introduction. In S. Hirofumi (Ed.), *Political Economy and Public Finance*. Edward Elgar. https://doi.org/10.4337/9781843767527.00007

by other countries. The production of nuclear weapons is increasing, and there is continuous advancement in war weaponry. Based on the research conducted by (Ozili, 2022)[4] the five economic impacts of war are as follows: Disruption of Global Supply Chains, Increase in Oil and Gas Prices, Effects on the Global Banking System, Decline in Economic Output and Growth, Rise in Global Inflation and Cost of Living.

2.3. Trade Balance. Every country will undoubtedly engage in international trade transactions to fulfill its own national needs. These international trade transactions are known as exports and imports. Exporting is an activity where commodities or services are sold to other countries to gain profit, while importing is the act of purchasing commodities or services from other countries to meet domestic needs that cannot be fulfilled independently, thus requiring assistance from other countries to fulfill them.

2.4. Import. Import is an international trade activity carried out between two or more countries. This trade activity can involve commodities and services, where import refers to the act of acquiring or purchasing commodities and services from other countries. Unlike exports, imports do not add to a country's income or foreign exchange reserves. If imports exceed exports, it will result in a trade balance deficit.

3. Methods

Indonesia routinely carries out international trade activities with Russia and Ukraine, this trade activity focuses on oil, wheat, steel and gold prices. In trade theory it is also explained regarding absolute and comparative advantages, where Russia and Ukraine have advantages in their products. The war has increased the global price of oil, wheat, gold and steel as both countries are major exporters of global supplies. The conflict between Russia and Ukraine undeniably affected Indonesia's trade balance, particularly in regard to imports. Indonesia itself has increased the prices of commodities that are often traded with Russia and Ukraine. Price changes that occur will certainly cause changes to the trade balance.

[4] Ozili, P. K. (2022). Global Economic Consequence of Russian Invasion of Ukraine. *SSRN Electronic Journal*, *February 2022*. https://doi.org/10.2139/ssrn.4064770

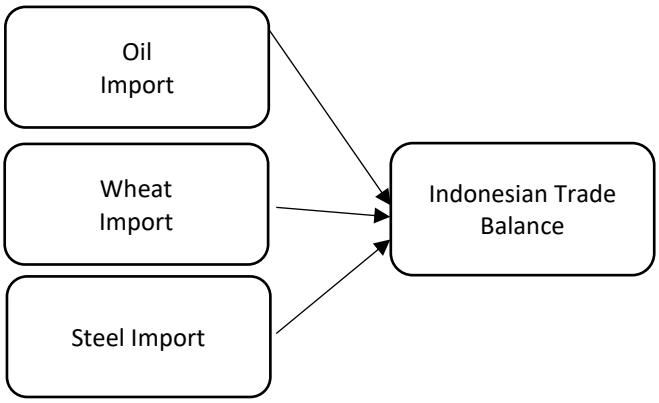

Fig 2. Framework of thinking

This type of research is descriptive quantitative, namely research that explains events or problems that occur and can be solved using existing data collected from various sources. This research has a descriptive nature which means that there are two types of approaches in conducting this research, the approaches are qualitative and quantitative approaches.

A qualitative research approach is characterized by its descriptive nature, focusing on in-depth analysis and interpretation of research. The theoretical framework serves as a guiding principle, ensuring the research remains aligned with real-world observations and phenomena in the field. Qualitative research studies from the perspective of participants with flexible and interactive strategies, qualitative research itself is aimed at understanding social phenomena that occur (Wekke et al., 2019)[5]. A quantitative approach is research that uses numbers to predict the condition of the population, or things in the future, quantitative research itself allows generalization of the results calculated using statistical analysis(Abd, 2021)[6].

This study uses secondary data published and obtained from various related agencies and uses the time series method. Explanations regarding data and data sources can be seen in Table 1.

[5] Wekke, I. S., Mappasere, S. A., & Suyuti, N. (2019). *Metode Penelitian Sosial* (1st ed.). Penerbit Gawe Buku.

[6] Abd, M. (2021). *Metodologi Penelitian Pendekatan Kuantitatif* (S. R. Wahyuningrum (ed.)). CV Jakad Media Publishing.

Table 1. Data and Data Sources.

No	Data	Data source	Unit	Symbol
1	Indonesian Trade Balance	Ministry of Trade	*Current*US$ (Million US$)	NPI
2	Indonesian Oil Imports	TradingEconomics	US$/Barrel	IM
3	Indonesian Wheat Imports	TradingEconomics	US$/Bushel	IG
4	Indonesian Steel Imports	TradingEconomics	US$/10 Tonnes	IB

The location of this study uses three countries, namely Russia, Ukraine, and Indonesia. These three countries have complete data related to international trade such as from TradingEconomics, Atlas of Economics, Trademap. This study uses the first quarter of 2010 - fourth quarter of 2022 as the time of research on the grounds that the Russia-Ukraine conflict has been going on since 1991, therefore the researcher uses a time span of 12 years for the research time.

In this study using the oil imports, wheat imports, steel imports on Indonesia's trade balance to produce the following equation:

$$NPI = \beta 0 + \beta 1\ IMt1 + \beta 2\ IGt2 + \beta 3\ IBt3 + \varepsilon$$

Where :
NPI = Indonesian Trade Balance
IM = Oil Imports (US$)
IG = Wheat imports (US$)
IB = Steel Imports (US$)
ε =*Error Term*
t = Time or Time Series

4. Results

4.1. Descriptive Statistical Analysis Results

Descriptive statistics is a method in statistical analysis that is used to describe and summarize the data that has been collected. This method can provide useful information about data properties such as data center, data variation, and data distribution. In this study, descriptive statistics are used to provide an explanation of the research variables, namely Indonesia's trade balance, oil imports, wheat imports, steel imports, gold prices.
The outcomes of the descriptive analysis are presented as variable data, encompassing the mean, median, maximum, minimum, and standard deviation. These statistical measures were computed utilizing Eviews 10 software. This descriptive analysis is a description of statistical data that was sampled and processed during the first quarter period 2010 to the fourth quarter of 2022.

The results of the descriptive analysis of this study are as follows:

Table 2. Descriptive Statistical Analysis

Variable	***Obs***	***Means***	***Std. dev.***	***Min***	***Max***
NPI	52	3245693.	4572531.	-2699981.	15715516
IM	52	6872743.	2537265.	2671525.	10729606
IG	52	20640.46	23616.71	2647,000	72948.00
IB	52	462251.3	85463.06	318007.0	596127.0

Based on Table 2. it can be concluded that:

a. Variable Indonesian Trade Balance (NPI)
   Indonesia's trade balance (NPI) as the dependent variable in this study has a mean value of 3,245,693. Meanwhile, the maximum value of Indonesia's trade balance is 15,715,516 occurred in the fourth quarter of 2022 which stated that Indonesia's trade balance had increased while the minimum value of Indonesia's trade balance was-2,699,981. occurred in 2018 fourth quarter, meaning that Indonesia's trade balance experienced a deficit in 2018 fourth quarter.

b. Oil Import Variable
   Import of Oil (IM) as the first independent variable in this study has a mean value of 6,872,743. Meanwhile, the maximum value of oil imports is10,729,606 occurred in the first quarter of 2014 which stated that oil imports were very high in that period. Meanwhile, the minimum value of oil imports is 2,671,525 occurred in the second quarter of 2020, meaning that oil imports tended to be small and decreased during that period.

c. Wheat Import Variable
   Wheat Imports (GI) as the second independent variable in this study has a mean value of 2,064,046. Meanwhile, the maximum import value of wheat is 7,294,800 occurred in 2011 in the first quarter which stated that wheat imports were very high in that period. Meanwhile, the minimum import value of wheat is 2,647,000 occurred in the first quarter of 2021, meaning that wheat imports tended to be small and decreased in that period.

d. Steel Import Variable
   Steel Imports (IB) as the third independent variable in this study has a mean value of 4,622,513 Meanwhile, the maximum value of steel imports is5,961,270 occurred in the second quarter of 2022 which stated that steel imports were very high in that period. Meanwhile, the minimum value of steel imports is 3,180,070 occurred in the fourth quarter of 2010, meaning that steel imports tended to be small and decreased in that period.

4.2. Stationarity Test

The stationarity test is conducted to ascertain whether the research data exhibits stationarity or not. When the data is stationary, it mitigates the risks of spurious or inconclusive regressions in the analysis. The stationarity test is useful for ensuring that the data used meets basic assumptions and that the model created can provide accurate and reliable results.

To find out whether the data used is stationary or not, there are several stationarity tests, in this study using the unit root test or unit root test. The unit root test or unit root test was carried out using the Augmented Dicky-Fuller (ADF) method. The test results in this study based on ADF at the levels are as follows:

Table 3. Stationarity Test at Level Level

Variable	ADF test scores	MacKinnon Critical Value 5%	Prob.	Information
NPI	-0.878	-2,921	0.7871	Not Stationary
IM	-2.145	-2,921	0.2284	Not Stationary
IG	-3,272	-2,925	0.0220	stationary
IB	-2,916	-2,926	0.0511	Not Stationary

Based on Table 3 above, the NPI variable has a prob value. 0.7871 > α 5% (0.05) it can be concluded that the NPI variable data is not stationary at the level level. The IM variable has a prob value. 0.2284 > α 5% (0.05) it can be concluded that IM variable data is not stationary at the level level. The IG variable has a prob value. 0.0220 < α 5% (0.05) it can be concluded that the GI variable data is stationary at the level level. The IB variable has a prob value. 0.0511 > α 5%a(0.05) so that the IB variable data is not stationary at the level. The HE variable has a prob value. 0.4090 > α 5% a (0.05) it can be concluded that the HE variable data is not stationary at the level level.

Based on the Augmented Dickey-Fuller (ADF) test with a MacKinnon critical value of 5%, four variables are not stationary at the level level and only one is stationary, so it is necessary to carry out a degree of integration test. The degree of integration test was carried out to find out at what level of differentiation all variables are stationary. The following are the results of the degree of integration test using the Augmented Dickey-Fuller (ADF) method on the 1st difference:

Table 4. Stationarity Test at the 1st difference level

Variable	ADF test scores	MacKinnon Critical Value 5%	Prob.	Information
NPI	-3,033	-2,921	0.0386	Stationary
IM	-2,621	-2,921	0.0955	Not Stationary
IG	-3,379	-2,925	0.0165	stationary
IB	-2,929	-2,926	0.0497	stationary

Based on Table 4, the NPI variable has a prob value. 0.0386 <α 5% (0.05) it can be concluded that the NPI variable data is stationary at the 1st difference/first degree of integration. The IM variable has a prob value. 0.0955 > α 5% (0.05) it can be concluded that IM variable data is not stationary at the 1st difference/first degree of integration. The IG variable has a prob value. 0.0165 < α 5% (0.05) it can be concluded that the IG variable data is stationary at the 1st difference/first degree of integration. The IB variable has a prob value. 0.0497 <α 5% (0.05) so

that the IB variable data is stationary at the 1st difference/first degree of integration. The HE variable has a prob value. 0.0379 <α 5% (0.05) so that the HE variable data is stationary at the 1st difference/first degree of integration.
Based on the Augmented Dickey-Fuller (ADF) test with a MacKinnon critical value of 5% one variable is not stationary at the 1st difference/first degree of integration level so it is necessary to test the second degree of integration 2nd difference/second degree of integration.

Table 5. Stationarity Test at the 2nd difference level

Variable	ADF test scores	MacKinnon Critical Value 5%	Prob.	Information
NPI	-8,793	-2,922	0.0000	Stationary
IM	-8,565	-2,922	0.0000	Stationary
IG	-2,974	-2,936	0.0460	Stationary
IB	-5,456	-2,926	0.0000	Stationary

Based on Table 5, the NPI variable has a prob value. 0.0000 < α 5% (0.05) it can be concluded that the NPI variable data is stationary at the 2nd difference/second degree of integration. The IM variable has a prob value. 0.0000 < α 5% (0.05) it can be concluded that IM variable data is stationary at the 2nd difference/second degree of integration. The IG variable has a prob value. 0.0460 <α 5% (0.05) it can be concluded that the IG variable data is stationary at the 2nd difference/second degree of integration. The IB variable has a prob value. 0.0000 <α 5% (0.05) so that the IB variable data is stationary at the 2nd difference/second degree of integration. The HE variable has a prob value. 0.0000 <α 5% (0.05) so that the HE variable data is stationary at the 2nd difference/second degree of integration.
Based on the degree of integration test using the Augmented Dickey-Fuller (ADF) method with a critical MacKinnon value of 5%, there are only two stationary variables at the level level and four stationary variables at the 1st difference but in the second difference or 2nd difference all variables are stationary.
Because the variable becomes stationary at the second difference but not stationary at the first difference, it shows that the variable has a higher degree of dependence on changes in its values. In the context of time series analysis, stationary means that the mean, variance and covariance of the variables do not change over time. If the variable is not stationary after taking the first difference, it means that there is a long-term trend or pattern in the data. The trend can be a constant increase or decrease over time. However, by taking the second difference, the trend can be eliminated so that the variable becomes stationary. When a variable becomes stationary after taking the second difference, it means that the changes in the variable occur at a more constant level.

4.3. Optimum Lag Test

Table 6. Optimum Lag Test Results

lag	LogL	LR	FPE	AIC	SC	HQ
0	-2830.303	NA	2.03e+44	113.3721	113.5251	113.4304

1	-2513.326	570.5577	1.20e+39	101.3331	102.0979	101.6243
2	-2464.347	80.32610*	3.25e+38*	100.0139*	101.3905*	100.5381*

The results of the lag length test in the VAR by entering AIC show that the optimal lag length is 2 because the smallest AIC is in lag 2, then using lag 2. Using the optimum lag test with lag 2 means we test whether including two dependent variable lags provides a significant increase in predictive power model compared to using only one lag or no lag at all. The estimation results using the VAR model will produce the variance decomposition function. Variance decomposition is a concept used in time series analysis to understand the relative contribution of various factors in explaining variations or fluctuations in a time variable. Usually,
With variance decomposition, it can be identified to what extent the variability of a time variable is influenced by internal and external factors, as well as direct and indirect relationships with other variables in the model. This information can assist in understanding the dynamics and interactions between the time variables involved and provide important insights in time series analysis. Another function that will be produced with the VAR model is the impulse response function. Impulse response is a concept used in time series analysis to understand how a variable responds to impulses or one-time shocks to other variables in a certain period of time.
*Impulse response*itself can be interpreted as a sudden change or spike in a variable, which in turn affects other variables in the model. In the context of VAR (Vector Autoregression) models or related models, the impulse response function is used to obtain information about how changes in one variable will affect changes in other variables over a certain period of time after the impulse occurs. With the impulse response function, we can analyze and understand the short and long term impact of impulses on other variables in the model. This information is useful in studying the interactions between variables in time series analysis, including the analysis of cause-and-effect relationships between these variables.

4.4. VAR Stability Test

Table 7. VAR Stability Test Results

roots	Modulus
0.970143	0.970143
0.919196 - 0.112753i	0.926086
0.919196 + 0.112753i	0.926086
0.754620 - 0.245955i	0.793691
0.754620 + 0.245955i	0.793691
0.591062 - 0.289204i	0.658022
0.591062 + 0.289204i	0.658022
0.457983	0.457983

The results of the VAR stability test are intended to see whether the data used in the study is stable or not. Stable data will be less than 1 and if unstable then greater than one. Based on the tests that have been tried, it was found that all modulus were below 1, which means that the data in this study were stable.
If the VAR stability test produces results that meet the stability assumptions, this indicates that the VAR model is reliable for analysis and prediction within the relevant timeframe.

The VAR stability test can also be seen using a pie chart which consists of scattered points. The point that is inside means that the point is stable, and if it is outside then it is unstable.

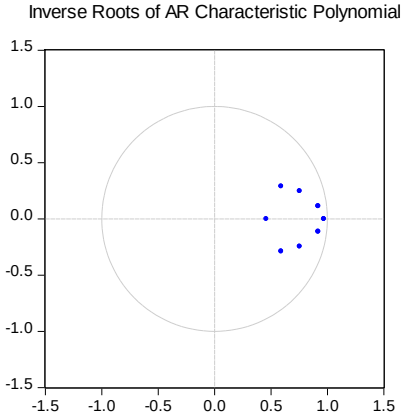

Fig 3. VAR Stability Test Results Diagram

Based on the picture above, all points are inside the circle which means the data in this study are stable. Testing the VAR stability test in the form of tables and pie charts, both are stable. Stability is a desirable trait in a VAR model because it indicates that the relationships between the variables in the model tend to be consistent and not affected by unrelated random changes. Because the data in this study is stable, this means that the data or model in this study has met the assumptions of stability in the time series analysis. The stability of the VAR model is important because it ensures that the parameter estimates in the model have a consistent and reliable interpretation. If the model is unstable, parameter estimates may be inconsistent or meaningless, and the resulting analysis and prediction results may be unreliable.

4.5. Cointegration Test

The cointegration test is a statistical procedure used in time series analysis to test whether there is a cointegration relationship between two or more time variables that have a similar long-term trend or pattern. Cointegration indicates a long-term causal relationship between the variables, even though they may not have a strong short-term causal relationship.

Table 8. Cointegration Test Results Lag

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistics	0.05 Critical Values	Prob.**
None *	0.999964	530.2826	47.85613	0.0001
At most 1 *	0.694134	79.58156	29.79707	0.0000
At most 2 *	0.390562	27.45876	15.49471	0.0005
At most 3 *	0.120890	5.669173	3.841466	0.0173

From the table provided, it is evident that the trace statistic exceeds the critical value at a 5% significance level. This leads to the rejection of the null hypothesis, indicating no cointegration, and acceptance of the alternative hypothesis, signifying the presence of cointegration. Based on the analysis above, it can be concluded that all cointegration tests are at a significance level of

5%. Thus, the results of the cointegration test indicate that among the movements of IM, IG, IB, and NPI have a relationship of stability/balance and similarity in the long term. This shows that there is a significant cointegration relationship between these variables. In the context of the cointegration test, if the variables have a stable cointegration relationship, meaning that there is a significant long-term causal relationship between these variables. This can happen if these variables have the same long-term trend or similar movement patterns in the relevant timeframes.

4.6. Granger Causality Test

The Granger Causality Test is a statistical method used in time series analysis to test whether one time series variable statistically causes a change in another time series variable. The concept of Granger Causality refers to the ability of IM, IG, IB variables to predict or explain variations in the NPI based on historical changes in all variables.

Table 9. Granger Causality Test

Null Hypothesis	Obs	F-Statistics	Prob
IM doesn't Granger Cause NPI	51	6.32067	0.0153
NPI doesn't Granger Cause IM		30.3292	1.E-06
IG doesn't Granger Cause NPI	51	6.24390	0.0159
NPI doesn't Granger Cause IG		4.36103	0.0421
IB doesn't Granger Cause NPI	51	0.79798	0.3762
NPI doesn't Granger Cause IB		4.30761	0.0433

Based on the obtained results, it is evident that variables with a probability value smaller than $\alpha = 0.05$ exhibit a causal relationship. Rejecting the null hypothesis (Ho) indicates that a variable indeed influences other variables. The Granger test results reveal the following reciprocal/causal relationships:

a. The oil import variable (IM) statistically significantly affects Indonesia's trade balance (NPI) because the prob value is smaller than 0.05, namely 0.01, thus rejecting the null hypothesis. The NPI variable is statistically significant and does not affect IM because the prob value is greater than 0.05, namely 1, so it accepts the null hypothesis. Thus, it is concluded that there is unidirectional causality between IM and NPI variables, namely only IM which has a statistically significant effect on NPI and not vice versa.
b. The wheat import variable (IG) statistically significantly influences Indonesia's trade balance (NPI) and vice versa, the Indonesian trade balance variable (NPI) statistically significantly influences the wheat imports variable (IG) as evidenced by the Prob value each being smaller than 0, 05, namely 0.01 and 0.04 (the results of both are rejecting the null hypothesis) so that it is concluded that there is causality between the two variables IG and NPI.
c. The steel import variable (IB) does not statistically significantly affect Indonesia's trade balance (NPI) because the prob value is greater than 0.05, namely 0.37, thus accepting the null hypothesis. However, the variable Indonesia's trade balance (NPI) statistically significantly influences the variable steel imports (IB) as evidenced by the prob value smaller than 0.05, namely 0.04, thus rejecting the null hypothesis. Thus, it

is concluded that there is unidirectional causality between the NPI variables that affect the IB variable.

Table 10. Test Vector Autoregression Estimates

	NPI	IM	IG	IB
NPI (-2)	-0.669787 (0.18066) [-3.70740]	0.062778 (0.09229) [0.68024]	-0.000234 (0.00049) [-0.47375]	0.004865 (0.00619) [0.78544]

Based on the vector autoregression estimates test, the tcount is 3.70740, this result is obtained from the NPI (-2), -2 is used from the optimum lag test results which are in lag 2. Meanwhile, the ttable is obtained at2.01289.Then we will compare tcount and ttable, where tcount (3.70740) > ttable (2.01289), it can be concluded that the coefficients estimated individually are statistically significant. This shows that there is sufficient evidence to support that the coefficient is significantly different from zero.

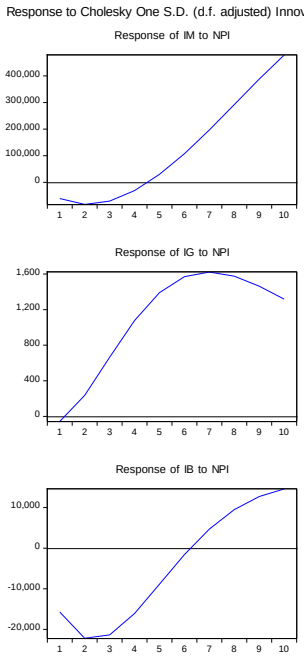

Fig 4. Impulse Response graph

Based on the picture above, it can be seen the response of each independent variable, namely oil imports, wheat imports, steel imports. The horizontal axis is the period of the next day before and when the "shock" occurred, while the vertical axis is the response value. Based on the results of the graph above, it can be concluded that each independent variable experiences a response to increasing prices which can have an impact on Indonesia's trade balance. In order to make the interpretation of the impulse response test easier, the impulse response test is continued

using a table which will explain the response of the independent variables to Indonesia's trade balance for each period.

Table 11. Table of Impulse Responses

period	NPI	IM	IG	IB
1	782093.5	0.000000	0.000000	0.000000
2	1207146.	-28611.13	155221.6	126688.1
3	1370060.	-59192.18	322107.4	353144.0
4	1364358.	-89361.37	430305.8	609854.2
5	1268980.	-125408.7	461374.9	841670.0
6	1141463.	-173098.5	426633.3	1020829.
7	1017586.	-234066.5	349352.4	1142064.
8	915087.2	-305780.3	253148.0	1213155.
9	838951.0	-383121.6	156115.6	1246751.
10	786536.7	-460239.6	69163.25	1255201.

Based on the impulse response test, it can be seen that the NPI response to the independent variables where when the NPI fluctuates it will affect other variables. This indicates that there is a continuous or long-term effect that affects these variables in response to changes in the independent variables used in the impulse response analysis and begins to decrease due to the conflict between Russia and Ukraine. In impulse response analysis, the independent variable or "shock" is changed in one unit and the impact of that change on the dependent variable is observed over time. Because the NPI variable shows significant fluctuations in the impulse response analysis, this shows that changes in the independent variables have a sustainable effect and affect the dependent variable in the long run.

Table 12. Variance Decomposition Table

period	SE	NPI	IM	IG	IB
1	782093.5	100,0000	0.000000	0.000000	0.000000
2	1452527.	98.05851	0.038799	1.141974	0.760717
3	2053987.	93.53073	0.102452	3.030364	3.336455
4	2577869.	87.38978	0.185207	4.710171	7.714842
5	3031950.	80.69121	0.304971	5.720580	13.28324
6	3427787.	74.22005	0.493613	6.024760	19.26157
7	3777083.	68.38563	0.790569	5.817464	25.00634
8	4090607.	63.30889	1.232810	5.342856	30.11544
9	4377494.	58.95571	1.842505	4.792685	34.40910
10	4644698.	55.23513	2.618475	4.279284	37.86711

In each fluctuating period, it can be seen that the response of each variable to the NPI varies for each period and fluctuates. The NPI variable shows significant fluctuations in the variance decomposition, this indicates that the variable plays an important role in explaining the variations or fluctuations in the system. The NPI variable actively contributes to the total variation in the system, and its fluctuations have a significant effect on the fluctuations of other variables in the system. and will produce a total of 100.

Table 13. ranger VAR Causality Test

Excluded	Chi-sq	df	Prob.
LOGIM	3.388179	2	0.1838
LOGIG	7.149565	2	0.0280
LOGIB	7.929434	2	0.0190
All	15.81795	6	0.0148

The probability of the Granger VAR Causality test obtained the results of 0.0148 <0.05. If the results of the Granger VAR Causality test show a p-value of less than 0.05, it can be concluded that the IM, IG, and IB variables are statistically significant in influencing both one-way and two-way changes to the NPI variable.

5. Discussion

Based on every data and result that already tested, it can be summarize that oil import, wheat import, and steel import that trade activities between Indonesia, Russia, and Ukraine have experienced a decline due to the ongoing war between Russia and Ukraine. This decrease in imports has consequently led to a rise in commodity prices, primarily affecting the supply of commodities such as oil, wheat, and steel. The impact of scarcity and increased commodity prices resulted in a decrease in Indonesia's imports and caused a decline in Indonesia's trade balance. The results of the impulse response also indicate that when there is a decrease in imports of oil, wheat, and steel during the Russia-Ukraine war, it will lead to a response in Indonesia's trade balance decreasing, even reaching a deficit

6. Conclusion

This research was conducted to analyze and describe the effect of oil imports, wheat imports, steel imports, gold prices and the Russian-Ukrainian war conflict on Indonesia's trade balance using data from the first quarter of 2010 to the fourth quarter of 2022. Based on the results of the Granger Causality test, one-way causality occurs. between oil imports and Indonesia's trade balance. The test results of the impulse response also show a decline in oil imports and Indonesia's trade balance during the war between Russia and Ukraine. This is because Russia is one of the world's oil exporters, causing supply chain disruptions and world oil prices. Based on the results of the Granger Causality test, there is a two-way causality between wheat imports and Indonesia's trade balance. The test results of the impulse response also showed a decline in wheat imports and Indonesia's trade balance during the war between Russia and Ukraine. This is because Russia and Ukraine are exporters of 21% of the world's wheat. The war that occurs will disrupt the production and export of Russian and Ukrainian grain commodities. Based on the results of the Granger Causality test, there is one-way causality between steel imports and Indonesia's trade balance. The test results of the impulse response also showed a decline in steel imports and Indonesia's trade balance during the war between Russia and Ukraine. This is because Russia is one of the world's largest steel exporters and a major supplier of palladium. Based on the results of research conducted on impulse response and variance decomposition, it shows that when there was a war between Russia and Ukraine it caused a decrease in oil imports,

wheat imports, steel imports, and an increase in gold prices which caused a decrease in Indonesia's trade balance. This means that the impact of the Russia-Ukraine war affected the performance of Indonesia's trade balance.

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