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IMPACT ANALYSIS OF MACROECONOMIC FACTORS TO INDONESIA'S EXPORT PERFORMANCE

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ABSTRACT

Research Originality — This study provides an empirical analysis of the influence of macroeconomic factors on Indonesian exports in the short and long term. Unlike previous studies that tend to focus on one main variable, this study integrates several macroeconomic factors, namely foreign direct investment (FDI), exchange rate, inflation, interest rate, and gross domestic product (GDP), to evaluate their collective impact on Indonesia's export performance. By applying the Vector Error Correction Model (VECM), this study provides new insights into the dynamics of Indonesian exports from a macroeconomic perspective.

Research Objectives — This study aims to analyze the influence of macroeconomic factors on Indonesian exports during the period 2007–2022. Specifically, this study examines the impact of FDI on export volume and value, the effect of exchange rate fluctuations on the competitiveness of export products, the correlation between inflation rate and export structure, the impact of interest rates on investment and exports, and the contribution of GDP to exports.

Research Methods — This study uses a quantitative approach with the VECM model to analyze secondary time series data published quarterly during the period 2007–2022. Data were obtained from the Statistic Indonesia (BPS), the Ministry of Investment (BKPM), and Central Bank of Indonesia (BI). The analysis was conducted using E-Views 10 software to identify the short-term and long-term relationships between macroeconomic variables and Indonesian exports.

Empirical Results — The results of the study indicate that FDI has an indirect positive impact on exports through changes in production structure and technology transfer. The exchange rate has a positive impact in the long term, but a negative impact on exports in the short term. Inflation has a positive effect on exports in the long term, but is not significant in the short term. Interest rates have a negative impact in both the short and long term, while GDP has a negative impact on exports in the long term, but a positive impact in the short term.

Implications — The findings in this study have important policy implications for stakeholders in the economic sector. The proposed recommendations include providing incentives for foreign investment to increase export competitiveness, stable exchange rate management to reduce the impact of volatility, effective inflation control so as not to disrupt export competitiveness, interest rate policies that support the export sector, and economic growth policies that are oriented towards export market expansion.

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INTRODUCTION

Considering the development over the past few years, some of which have experienced even greater increases. The increase is due to the expansion of the number of companies involved in international trade while existing companies have the desire to reduce their dependence on one particular national economy (Brooke & Buckley, 1988). Over time, export-focused policies have continued to evolve in Indonesia. In the early 1980s, during the downturn in world oil prices, the Indonesian government specifically focused its attention on export diversification, shifting the focus away from dependence on oil and gas exports. Concrete action was taken in 1983, where the government allocated greater resources and attention to the development of manufacturing exports. From 1983 to 1995, more than 24 economic reform programs were designed by the government to increase investment, reduce trade barriers, improve efficiency, and

strengthen the foundation of the export economy (Bustaman et al., 2022). This increase reflects efforts to create an economic structure that is resilient to global market fluctuations.

Indonesia faced an economic crisis in 2008 due to the Subprime Mortgage crisis in the US triggered by the bankruptcy of Lehman Brothers, causing the rupiah to weaken and the capital market to decline. This crisis occurred 10 years after the 1998 monetary crisis. In 2019, an economic crisis occurred again due to the Covid-19 pandemic (Dahari et al., 2023). Although the crisis caused a decline in its export value, after the economic shock in 2020, Indonesia's exports increased significantly (Figure 1). Exports are important in an open economy because they can increase the country's foreign exchange and support economic growth. Exports provide opportunities to strengthen the country's economic stability (Hodijah &

APPLICATIONS FOR PRACTICE
• The results of the study show that FDI does not significantly affect exports. The exchange rate and inflation have a positive impact in the long term, while interest rates have a negative impact. GDP drives short-term exports but weakens the long term.
• To increase the value of exports, policies such as FDI incentives, exchange rate management, inflation control, interest rates that support exporters, and technology training and production efficiency are needed to increase export competitiveness.

Angelina, 2021). The Indonesian government tries to increase exports through a policy of down streaming the natural resource industry and trade agreements between business actors (Rasbin, 2022). However, challenges such as exchange rate fluctuations, inflation, and interest rates still affect export competitiveness. Based on the Balance of Payments Theory, exports are influenced by various factors such as FDI, exchange rates, inflation, interest rates, and GDP (Bird, 1998).
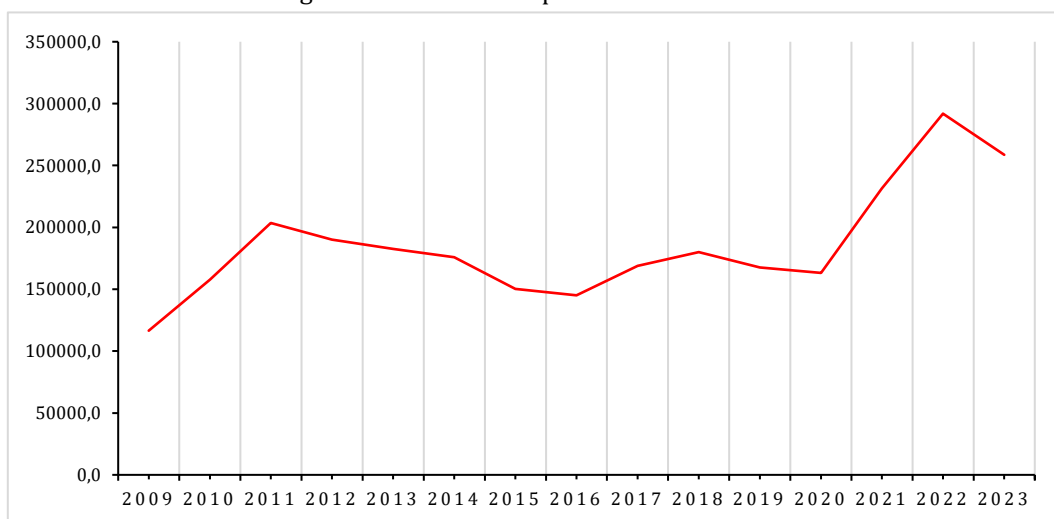
FDI contributes to increased production and export competitiveness through technology transfer and international market access. Although FDI in Indonesia increased from USD 31,093 million (2021) to USD 50,267 million (2023) (Badan Pusat Statistik, 2024e), the export value fluctuated during the same period (Figure 1). This shows that the relationship between FDI and exports is not always linear and can be global market conditions (Widjajanto et al., 2020). The exchange rate also affects export competitiveness. The fluctuation of the Rupiah exchange rate against the US Dollar from IDR 14,269 (2021) to IDR 15,731 (2022) and IDR 15,416 (2023) is in line with export fluctuations (Badan Pusat Statistik, 2024d). This relationship shows the dependence of exports on exchange rate stability (Yani et al., 2023). Inflation can also have an impact on production costs and export competitiveness. During 2021–2023, inflation in Indonesia fluctuated, from 1.87% to 5.51%, then dropped to 2.61% (Badan Pusat Statistik, 2024c). Although there are indications of a directional relationship between inflation and exports, this dynamic needs to be further analyzed to understand the deeper impact of inflation on exports (Hutabarat et al., 2023).

Interest rates also affect exports through financing and investment costs. An increase in interest rates from 3.50% (2021) to 6.00% (2023) is not always directly proportional to export value (Badan Pusat Statistik, 2024b), indicating an interaction with other factors, such as competitiveness and exchange rates (Ningsih et al., 2024). Then, GDP reflects the capacity of the economy and domestic consumption that can support exports. Although Indonesia's GDP grew significantly from IDR 16,977 trillion (2021) to IDR 20,892

Figure 1 Indonesia's Export Value 2007-2022

Source: Badan Pusat Statistik (2024d)

trillion (2023) (Badan Pusat Statistik, 2024a), the export value continued to fluctuate, indicating an indirect relationship that needs further research (Rezandy & Yasin, 2021). The influence of these factors on Indonesia's export performance shows a complex and dynamic relationship. Although several factors such as FDI, exchange rates, inflation, interest rates, and GDP have the potential to affect exports, the impact is not always linear. Export fluctuations reflect the complexity of the relationship between variables influenced by global conditions and product competitiveness. Therefore, a deeper analysis is needed to understand the interaction of these macroeconomic factors on Indonesia's exports.

Research on Indonesia's export performance has shown that various macroeconomic factors, such as FDI, exchange rates, inflation, interest rates, and GDP affect export dynamics. However, field data reveal mixed and inconsistent results. For example, the relationship between FDI and exports is not always linear, while inflation can have both positive and negative impacts on export performance. In addition, export fluctuations amid significant GDP growth indicate the presence of other factors, such as the investment sector or global market conditions, that have not been fully studied. Based on these problems, this study aimed to conduct an in-depth analysis of the contribution of macroeconomic factors to Indonesia's export performance, focusing on the complex and dynamic interactions between variables. This study expectedly makes contributions in the form of a more comprehensive understanding of the interaction of macroeconomic factors on export performance while identifying the main determinants that have an influence. The implication of this study is to provide recommendations that can support the formulation of more effective economic policies to improve the competitiveness of Indonesia's exports in the international market.

LITERATURE REVIEW
Foreign Direct Investment (FDI)
Increased investment drives economic growth by increasing production capacity. With increased investment, production capacity increases, which, in turn, fuels overall economic growth. Rapid growth can open up opportunities to expand the production of goods and services that can be exported to international markets. This creates a positive relationship between investment, growth, and exports. Initially, investment starts a cycle that accelerates growth and increases production efficiency, thereby enhancing export competitiveness. Business confidence growth can also spur additional investment, strengthening a country's export capacity (McCombie & Thirlwall, 1994). The theory shows a unidirectional relationship between FDI and exports, which is also supported by findings of Mekuriaw (2021) for Ethiopia from 1991 to 2016, Rehman & Ding (2020, p. 5) for China from 1990 to 2017, Nweke et al. (2020) for Ethiopia from 1987 to 2020, and Harkat et al. (2022) for Morocco from 1990 to 2020. Meanwhile, the findings of Sumiyati (2020), Banzouzi et al. (2022), and Sharma & Bhatt (2023), also show that FDI has a negative and significant effect on exports. Musti & Mallum (2020) findings state that FDI has no significant effect on exports.

Exchange Rate
Exchange rates have an important role in influencing a country's exports and imports. With the current account deficit, exports tend to be lower than imports, therefore there is excess demand for foreign currency. The market response to this deficit is exchange rate depreciation, where the domestic exchange rate becomes lower against foreign currencies. Exchange rate depreciation directly impacts domestic exchange prices, making exports cheaper for foreign buyers. These lower prices can increase the competitiveness of exports, which can increase demand for exported goods and services (Thirlwall, 1986). The theory shows a consistent relationship between exchange rates and exports. The statement and theory are consistent with Elias et al. (2023) findings for Ethiopia from 1987 to 2020, Anggraeni & Prakoso (2022) for Indonesia from 2017 to 2021, Basia et al. (2023) for Indonesia from 2009 to 2019, and Pratiwi & Firmansyah (2022) for West Java, Indonesia from 2016 to 2019. Meanwhile, Harkat et al. (2022), Sudarusman et al. (2021), and Omotayo et al. (2022) showed the opposite, where exchange rates had a negative and significant effect on exports. Nweke et al. (2020) argued that currency exchange rates had no significant effect on exports.

Inflation Rate
Keynes emphasized that inflation can be a tool to ease difficulties in the transfer of payments (Kyle, 1976). The impact of inflation on exports is that inflation can trigger an increase in domestic prices which in turn can reduce the competitiveness of domestic products in the international market. Higher domestic prices than trading partners can reduce the attractiveness of export products, leading to a decrease in export volumes. Inflation can also increase production costs including labour and raw material costs, which can harm the competitiveness of domestic products. Increased production costs can negatively affect exports by making domestic products more expensive in the global market (Gomes, 1990). This statement is supported by indicating an inverse relationship between inflation and exports. This is reinforced by the findings of Olugbenga et al. (2022) for Nigeria from 1980 to 2018 and the findings of Sumiyati (2020) for Indonesia from 2010 to 2019. Meanwhile, Harkat et al. (2022), Basia (2023), Dalango (2020) and Anggraeni & Prakoso

(2022), stated that inflation had a positive and significant effect on exports. The findings of Mekuriaw (2021) and Islam et al. (2019) showed that inflation had no significant effect on exports.

Interest Rates

In an open economy model, interest rates influence exports through two main mechanisms. First, the increase in domestic prices can lead to an increase in interest rates, which, in turn, reduces investment, consumption, and aggregate demand, thus negatively affecting exports. Second, the increase in the price of domestic goods can reduce the competitiveness of products in international markets, leading to a decrease in export volumes. However, to ensure that a decrease in interest rates can directly increase exports, an additional assumption is needed that domestic and foreign goods are substitutes (Kyle, 1976). This indicates that interest rates have an inverse effect on export value. This statement is also supported by findings of Nweke et al. (2020) for Nigeria from 1986 to 2018, Pratiwi & Firmansyah (2022) for West Java, Indonesia from 2016 to 2019, Olugbenga et al. (2022) for Nigeria from 1980 to 2018, Basılgan et al. (2019) for Turkey from 2005 to 2018, and Omotayo et al. (2022) for Nigeria from 1995 to 2020. Meanwhile, Sudarusman et al. (2021) stated that interest rates had a positive and significant effect on exports. Findings of Anggraeni & Prakoso (2022) and Islam et al. (2019) stated that interest rates had no significant effect on exports.

Gross Domestic Product (GDP)

The Balance of Payments Theory also explains that exports are influenced by a country's economic growth. High economic growth tends to increase a country's purchasing power and production. If economic growth increases, then domestic demand for goods and services can also increase. This condition can encourage increased production and exports because companies will try to meet higher domestic demand. Conversely, if economic growth slows, domestic demand can also fall, resulting in a decrease in exports due to the lack of domestic demand for exported goods and services (Blejer & Škreb, 2016). The theory shows that GDP has a unidirectional effect on exports. This statement is also supported by findings of Dalango (2020) for Ethiopia from 1981 to 2010, Sumiyati (2020) for Indonesia from 2010 to 2019, Bereket (2020) for Ethiopia from 1981 to 2010, Nweke et al. (2020) for Nigeria from 1981 to 2018, and Mekuriaw (2021) for Ethiopia from 1991 to 2016. Meanwhile, Elias et al. (2023) stated that GDP had a negative and significant effect on exports. However, findings of Harkat et al. (2022), and Asmare & Haiyun (2019) showed that GDP variable had no significant effect on exports variable.

METHODS

Approach and Data Sources

This study is quantitative research using secondary time series data. Quantitative research is a research or analysis approach that uses quantitative data, i.e., data that can be measured and calculated numerically. This method involves collecting, analyzing, and interpreting data in the form of numbers or statistics to investigate relationships, patterns, or trends in a phenomenon (Creswell, 2014). Time series data refers to a set of data consisting of observations of a variable or several variables at successive points in time (Eatwell et al., 1990). The data of this current research were quarterly data on exports, FDI, exchange rates, inflation, interest rates, and GDP from 2007 to 2022. The export and GDP data were obtained from the Statistics Indonesia, the FDI data were obtained from the Ministry of Investment, and the exchange rate, inflation, and interest rate data were obtained from Central Bank of Indonesia (BI) as data sources that represent the sample in this study. The data were then processed and analyzed using Eviews 10 software.

Data Analysis Techniques

The data processing method used in this study is the Vector Error Correction Model (VECM), which was chosen to analyze the long-term and short-term impacts. VECM was selected due to the presence of cointegration in the data, indicating a long-term equilibrium relationship between the variables analyzed. The use of VECM allows researchers to not only understand the long-term effects of independent variables on dependent variables but also explore the short-term dynamics that may arise. This approach is relevant to explain how the variables in this study interact in the long term while paying attention to the campus that occurs in the short term. Thus, this method is considered ideal for achieving the research objectives, namely to provide a deeper understanding of complex causal relationships. This additional explanation provides a stronger methodological foundation and supports a more comprehensive interpretation of the research results. The following is the testing flow in VECM.

Stationarity Test

Stationarity test is a statistical method used to test whether a time series is stationary. Stationarity refers to the nature of a variable that does not change significantly in descriptive statistics, such as mean or variance. The current study used the Augmented Dickey-Fuller Test and the Philips-Perron Test. Stationarity

tests are important in the analysis of time series data because many methods of analysis and model estimation depend on the assumption of stationarity (Box-Steffensmeier et al., 2014).

Lag Order

The best lag selection in the VAR (Vector Autoregression) model is done using information criteria. Information criteria is used to balance the enhancement of model fit with model simplicity. Information criteria such as Akaike Information Criterion (AIC) or Bayesian Information Criterion (BIC) can be used. These criteria include a measure of model fit and a measure of parsimony in one equation, allowing the determination of the optimal lag order (Kilian & Lütkepohl, 2017).

VAR Stability Test

Stability tests are used to ensure that the parameters in a VAR model remain consistent over time or to identify possible structural changes. Stable time series tend to fluctuate around a constant mean without any significant change, whereas time series of unstable VAR processes may show clear trends or seasonal fluctuations. Although the stability assumption rules out some series that may be of practical interest, an understanding of stability is important in the context of a time series analysis (Lütkepohl, 2005).

Cointegration Test

Cointegration test is a statistical method used to test whether there is a cointegration relationship between two or more time series. A cointegration relationship indicates that the variables have a long-run relationship, even though they may fluctuate in the short run. This study used the Johansen method. This method utilizes maximum likelihood estimation and is based on the VAR model. The Johansen method has the advantage of estimating the entire system of equations simultaneously (Box-Steffensmeier et al., 2014).

VEC Model

The VEC (Vector Error Correction) model is an approach in econometric analysis used to analyze the long-run relationship between co-integrated variables. The basic assumption of VECM is that there is a cointegrating relationship between the variables, and changes from the long-run equilibrium will be adjusted through an error correction mechanism. Thus, the VEC Model allows the analysis of short-run dynamics and restoration of long-run equilibrium in a system of co-integrated variables (Kilian & Lütkepohl, 2017).

Causality Test

The Granger causality test is a statistical method used to test whether one variable can "Granger-cause" another variable based on historical information. In a Granger causality test, if variable X Granger-causes variable Y, it means that historical information from X can be helpful in forecasting Y. This test does not imply a direct causal relationship or true causality, but only indicates that changes in X can provide useful information for forecasting changes in Y based on historical data (Hamilton, 1994).

Impulse Response Function

An impulse response function is a function that describes the response of a variable to a one-time impulse in another variable, with all other variables held constant. This function measures the change in a response variable to a small change or impulse in another variable. It can be used to analyze the long-term and short-term impact of changes in the system's variables (Hamilton, 1994).

Variance Decomposition

Variance decomposition refers to analyzing the proportion of the variance of a variable that can be explained by that variable and by other variables in the system. Variance decomposition provides insight into the extent to which fluctuations in a variable are influenced by fluctuations in other variables in the system. The result of variance decomposition gives an idea of how much each variable in the system contributes to the fluctuation of a particular variable at a particular time level (Lütkepohl, 2005).

RESULT AND DISCUSSION

Findings

Before proceeding to further analysis stages, a stationarity test is needed to ensure that the data used meets the assumptions in the econometric model. This test aims to identify whether the data is stationary, both at the level and at the first difference, in order to avoid the possibility of pseudo-relationships in the analysis.

Table 1 shows the results of the stationarity analysis at 1%, 5%, and 10% significance levels. The findings from the ADF and PP tests showed that the probability values of the six variables were greater than alpha, so H0 was accepted. This finding indicated that EX, FDI, ER, INF, IR, and GDP were not stationary at the level. Furthermore, the stationarity test results at the first difference level showed that the six variables had a p-value less than alpha. Therefore, it can be concluded that the six variables were stationary at the

first difference level. This means that all variables met the stationarity criteria after differencing, so they could be used for further analysis in the economic model.

The optimal lag test results in Table 2 show that lag 1 was the most optimal lag, indicated by the majority of star symbols (*) contained in lag 1. In addition, based on the Akaike Information Criterion (AIC) method, lag 1 was also the most optimal lag to continue testing.
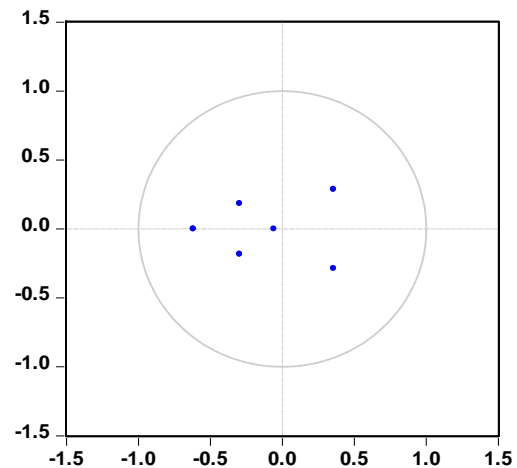
The findings in Figure 2 showed that the VAR model was stable. This is because all modulus values (absolute values) in the output were less than 1. In addition, the findings are also reinforced by all blue dots (inverse roots) inside the circle (unit circle). Thus, the findings from the impulse response function as well as the variance decomposition were valid.

The test results in Table 3 showed that all the probability values obtained were smaller than alpha (0.05) in both trace and max-eigen statistic, thus indicating the existence of long-run cointegration among the analyzed variables. Thus, the appropriate model to continue testing was the VECM.

The VECM results in Table 4 showed that FDI in the previous period had an insignificant negative

Figure 2 VAR Stability Test

Root	Modulus
-0.618222	0.618222
0.355502 - 0.287711i	0.457340
0.355502 + 0.287711i	0.457340
-0.296312 - 0.182634i	0.348075
-0.296312 + 0.182634i	0.348075
-0.058253	0.058253

Source: Data Processed by Author

effect in the long term and an insignificant positive effect on exports in the short term. Then, the exchange rate in the previous period had a significant positive effect (at the 1% significance level) in the long term and a significant negative effect (at the 1% significance level) on exports in the short term. Furthermore, inflation in the previous period had a significant positive effect (at the 5% significance level) in the long term and an insignificant positive effect on exports in the short term. Meanwhile, the interest rate in the previous period had a significant negative effect (at 1% significance level) in the long run and a significant negative effect (at 10% significance level) on exports in the short run. Meanwhile, GDP in the previous period had a significant negative effect (at 1% significance level) in the long run and a significant positive effect (at 1% significance level) on exports in the short run.

The findings of the Granger causality test presented in Table 5 showed that there was a one-way relationship between FDI and exports, where exports affected FDI. The findings also showed a one-way relationship between exchange rates and exports where exports affected exchange rates. Then regarding the relationship between inflation and exports, there was a one-way relationship where inflation affected

Table 1 Unit Root Test

Variable	Augmented Dickey-Fuller (ADF)		Phillips-Perron (PP)	
	Level	First Difference	Level	First Difference
EX	0,5344	0.0186**	0.8288	0.0000***
FDI	0,9395	0.0000***	0.8748	0.0000***
ER	0,8469	0.0000***	0.8609	0.0000***
INF	0.3437	0.0000***	0.1314	0.0000***
IR	0,1881	0.0007***	0.2593	0.0011***
GDP	0,9235	0.0000***	0.9970	0.0000***

*Note: *** significant at 1% (0.01), ** significant at 5% (0.05), * significant at 10% (0.10)*

Source: Data Processed by Author

Table 2 Optimal Lag Selection

Lag	LR	FPE	AIC	SC	HQ
0	NA	9.71e+33	95.28587	95.49349*	95.36724*
1	84.35765*	6.67e+33*	94.90401*	96.35740	95.47361
2	35.95305	1.06e+34	95.33532	98.03447	96.39314

Note: * indicates lag order by the criteria
Source: Data Processed by Author

Table 3 Johansen Cointegration Test

Hypothesized No. of CE(s)	Trace Statistic			Max-Eigen Statistic		
	Trace Statistic	0.05 Critical Value	Prob.	Max-Eigen Statistic	0.05 Critical Value	Prob.
None *	195.9555	103.8473	0.0000	54.68323	40.95680	0.0008
At most 1 *	141.2723	76.97277	0.0000	44.74206	34.80587	0.0024
At most 2 *	96.53023	54.07904	0.0000	34.64290	28.58808	0.0074
At most 3 *	61.88733	35.19275	0.0000	24.16638	22.29962	0.0271
At most 4 *	37.72094	20.26184	0.0001	20.30228	15.89210	0.0095
At most 5 *	17.41867	9.164546	0.0012	17.41867	9.164546	0.0012

Source: Data Processed by Author

Table 4 VECM Test

Variable	Long Run		Short Run	
	Coefficient	T-Table	Coefficient	T-Table
FDI (-1)	-0.000612	-0.54210	8.266052	0.17099
ER (-1)	6.135006	4.90021***	-2.168041	-2.70882***
INF (-1)	1781.355	2.17092**	232.6713	0.59712
IR (-1)	-4793.517	-2.99394***	-1855.880	-1.68033*
GDP (-1)	-0.018017	-4.20147***	0.014849	2.99258***

*Note: *** significant at 1% (2.66329), ** significant at 5% (2.00172), * significant at 10% (1.67155)*

Source: Data Processed by Author

Table 5 Granger Causality Test

Independent Variable	Dependent Variable					
	EX	FDI	ER	INF	IR	GDP
EX	-	12.2000 (0.0009)***	3.22657 (0.0775)*	1.12971 (0.2921)	11.0795 (0.0015)*	1.54058 (0.2194)
FDI	0.18878 (0.6655)	-	1.70958 (0.1960)	1.21902 (0.2740)	1.26522 (0.2651)	0.35373 (0.5542)
ER	0.02201 (0.8826)	7.60790 (0.0077)***	-	1.39122 (0.2429)	1.85074 (0.1788)	2.23581 (0.1401)
INF	9.33698 (0.0033)***	0.33893 (0.5626)	5.97697 (0.0174)	-	11.4674 (0.0013)***	0.37216 (0.5441)
IR	12.6659 (0.0007)***	4.80649 (0.0322)**	0.18289 (0.6704)	0.13275 (0.7169)	-	2.47828 (0.1207)
GDP	1.06611 (0.3060)	11.3253 (0.0013)***	8.36038 (0.0053)***	1.42810 (0.2368)	0.12861 (0.7211)	-

*Note: *** significant at 1% (0.01), ** significant at 5% (0.05), * significant at 10% (0.10)*

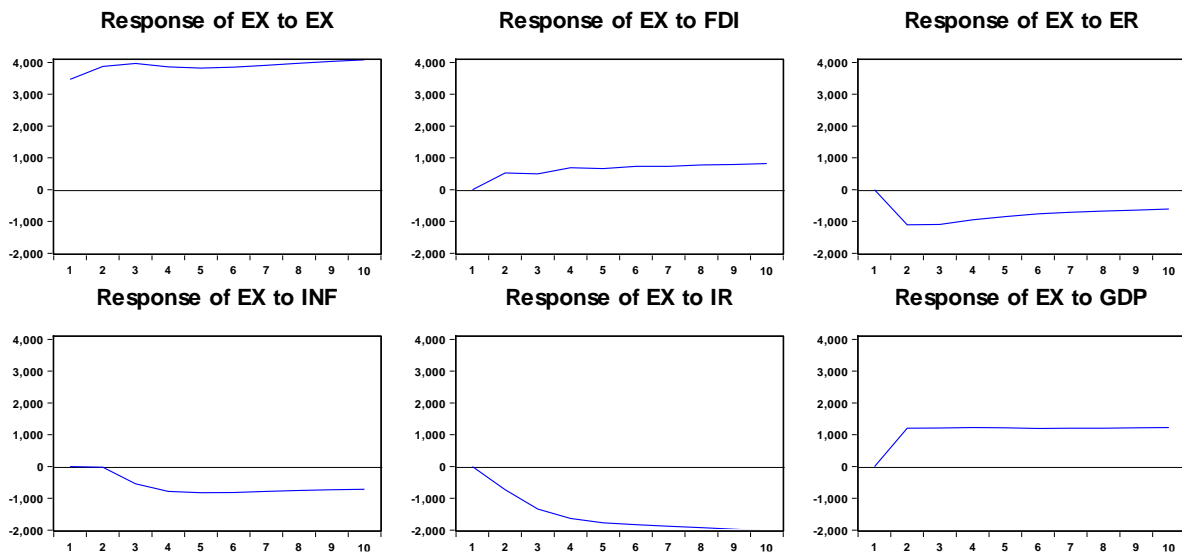Source: Data Processed by Author

exports. Furthermore, interest rates and exports had a mutually influential relationship, where interest rates affected exports and exports affected interest rates. Meanwhile, GDP and exports had no relationship.

The findings in Figure 3 showed the response of exports to shocks that occur in exports, FDI, exchange rates, inflation, interest rates, and GDP. The response of exports to shocks in exports alone by 1 standard deviation in the first period showed a response of 3471.687. The response then showed a decrease in the second period. In subsequent periods, the response was stable with little fluctuation. The response of exports to FDI stocks showed a significant increase in the second period. The response then showed an increasing trend in the following periods. Then, the response of exports to exchange rate shocks showed a significant decrease in the second period. The response was then stable until the third period and increased in the following periods. Furthermore, the export response to inflation shocks showed a relatively stable response until the second period. The response then decreased until the fourth period but increased in the following periods. Meanwhile, the response of exports to shocks in interest rates showed a significant decline until the fourth period. The response was then in steady decline in the following periods. The response of exports to GDP shocks showed a significant increase in the second period, then it was stable in subsequent periods.

The findings of the variance decomposition analysis presented in Table 6 showed the contribution of each variable to the variation of exports. The exchange rate and GDP contributed most significantly, with a contribution of 4% in the second period (in the short term). Meanwhile, FDI, inflation, and interest rate variables only made a small contribution to the variation of exports, i.e., 0.9%, 0.002%, and 1%, respectively. Meanwhile, in the tenth period (in the long run), interest rates showed the most significant contribution

Figure 3 Impulse Response Function

Source: Data Processed by Author

with a contribution of 12%, followed by exports with a contribution of 6%. Meanwhile, FDI, exchange rate, and inflation only had an effect of 2%, 3%, and 2%, respectively.

Discussion

Effect of FDI on Exports

The research findings showed that FDI had no significant effect on exports, both in the long term and in the short term. This findings are supported by Musti & Mallum (2020) for the long term, and Harkat et al. (2022) for the short term. However, FDI is known to change the structure of economic production, improve the efficiency of resource utilization, and expand certain sectors, which can ultimately increase the economy's ability to export (Fu, 2004). This shows that the effect of FDI on exports is indirect. Using the VECM model, this study specifically explored the long-term and short-term effects of FDI on exports. In the long term, the results of this study indicated that economic policies need to focus on increasing technology transfer facilitated by FDI, given that export-led growth strategies often accompany foreign direct investment. This technology transfer can help countries develop industries for goods with high income elasticity and technologies that are too advanced to rely solely on domestic markets (Soukiazis & Cerqueira, 2012). Meanwhile, in the short term, these findings provide a signal that Indonesia's economic policy strategy should be directed at optimizing the use of resources and technical expertise brought by foreign investors to increase the efficiency and competitiveness of products produced by sectors receiving foreign investment.

Effect of Exchange Rate on Export

The research showed that the exchange rate had a significant positive effect in the long run and a significant negative effect in the short run on exports. These results are supported by Harkat et al. (2022), Anggraeni & Prakoso (2022), Basia et al. (2023), and Dalango (2020) for the long run. Meanwhile, for the short run, these results are consistent with findings of Sudarusman et al. (2021), Omotayo et al. (2022), and Harkat et al. (2022). A low exchange rate makes commodities that depend on unskilled labor or natural

Table 6 Variance Decomposition

Period	EX	FDI	ER	INF	IR	GDP
1	100.0000	0.000000	0.000000	0.000000	0.000000	0.000000
2	88.59141	0.900922	4.032950	0.001571	1.748206	4.724938
3	83.46997	1.022489	4.725932	0.578692	4.526306	5.676615
4	79.77714	1.393241	4.582587	1.257653	6.899230	6.090149
5	77.42926	1.547978	4.314452	1.695400	8.708269	6.304639
6	75.92428	1.732712	4.015930	1.962143	9.989303	6.375636
7	74.94078	1.847418	3.742665	2.091748	10.96649	6.410906
8	74.23679	1.966879	3.497415	2.153854	11.72664	6.418423
9	73.71134	2.059225	3.278380	2.173618	12.36112	6.416308
10	73.29174	2.149901	3.081576	2.172321	12.89923	6.405232

Source: Data Processed by Author

resources more competitive for export. In this case, the exchange rate affects a country's competitiveness and comparative advantage in international trade (Baldwin, 1966). In the long term, exchange rate appreciation can have a negative impact on the export sector because products become less competitive in the international market (Seringhaus & Rosson, 1991). Therefore, economic policy needs to focus on stabilizing the exchange rate through monetary and fiscal instruments to maintain export competitiveness. A strategy of diversifying economic sectors is also important to reduce dependence on certain exports. Meanwhile, in the short run, sharp exchange rate fluctuations can be suppressed by temporary incentives for affected exporters or the use of foreign exchange reserves.

Effect of Inflation on Exports

Inflation had a significant positive effect in the long term and did not have a significant negative effect in the short term on exports. These findings are supported by Anggraeni & Prakoso (2022), Harkat et al. (2022), Basia et al. (2023), and Dalango (2020) for the long term. Meanwhile, for the short term, these findings are in accordance with research results of Anggraeni & Prakoso (2022), Olugbenga et al. (2022), Harkat et al. (2022), Mekuriaw (2021), and Islam et al. (2019). Inflation affects exports through several mechanisms, including increased production costs due to rising prices of inputs such as labor and raw materials, which can encourage exporters to raise their export prices, thereby affecting profit margins (Branch, 1994). In the long run, moderate inflation can be an indicator of economic growth and increased competitiveness, but excessive inflation can increase production costs and reduce the competitiveness of a country's export products (Petermann, 2013). Therefore, long-term economic policy should focus on controlling inflation by stabilizing the prices of raw materials and production inputs to increase production efficiency. In the short term, insignificant inflation effects provide the government with greater flexibility in designing monetary and fiscal policies.

Effect of Interest Rates on Exports

The research findings showed that interest rates had a significant negative effect on exports both in the long term and in the short term. These findings are supported by Pratiwi & Firmansyah (2022), Basılgan et al. (2019), and Omotayo et al. (2022). In addition, the results are also strengthened by Olugbenga et al. (2022) and Nweke et al. (2020) for the long term, and Sudarusman et al. (2021), Anggraeni & Prakoso (2022), and Islam et al. (2019) for the short term. In the long term, these results emphasized the need for an interest rate policy that supports the sustainable development of the export sector. One step that can be taken is to establish a preferential interest rate policy for exporters, which includes low-interest export credit and loans in competitive domestic currency. This aims to improve the competitiveness of export products in the international market, while reducing the financing costs borne by exporters (Chan et al., 1999). In the short term, interest rate adjustments can support exporters, especially during global economic instability. For example, loans with preferential interest rates can offset foreign export subsidies and maintain competitiveness (Salcic, 2014). Therefore, this policy is necessary to be able to increase the stability and competitiveness of the country's exports in the international market.

Effect of GDP on Exports

The findings showed that GDP had a significant negative effect in the long run and a significant positive effect in the short run on exports. These findings are supported by Elias et al. (2023) for the long run, as well as Dalango (2020), Sumiyati (2020), and Bereket (2020) for the short run. In the long run, the negative relationship between GDP and exports suggests that significant domestic economic growth may reduce the focus on international markets. This may occur because increased domestic demand causes producers to focus more on the domestic market, thereby reducing the competitive advantage of export products. To address this challenge, policies that encourage export product diversification and incentives for firms to remain competitive in international markets are essential (Khan et al., 2009). In the short term, the positive relationship between GDP and exports reflects that economic growth can increase production capacity and encourage exports. This indicates the need for policies that support production capacity and infrastructure that can take advantage of the momentum of economic growth. Policies such as providing tax incentives to exporting companies, sending import duties on primary inputs, and investing in logistics infrastructure can help improve the competitiveness of export products (Mejía, 2011).

CONCLUSIONS

Based on the findings regarding the effect of FDI, exchange rate, inflation, interest rate, and GDP on exports, several conclusions can be drawn. First, FDI does not have a significant and direct effect on exports in the long or short term but can have a positive impact indirectly through changes in the structure of economic production and technology transfer. Second, exchange rates have a positive long-term and negative short-term effect on exports, playing an important role in a country's competitiveness in the international market. Third, inflation has a positive effect in the long-term and no significant negative effect

in the short-term on exports. Fourth, interest rates have a negative effect both in the long-term and in the short-term on exports, so export promotion measures need to pay attention to interest rate policies that support exporters. Fifth, GDP has a negative effect in the long-term and positive effect in the short-term on exports, suggesting that strong economic growth can support exports in the short-term.

There are some recommendations based on the findings of this study. First, policies should support the improvement of export competitiveness through incentives for FDI, prudent exchange rate management, inflation control, interest rate policies that support exporters, and economic growth stimulus. In addition, there needs to be an effort to utilize the technology brought by FDI, improve production efficiency, and develop industries for goods with high income elasticity.

The limitation of this study is that the influence of these variables can be influenced by other factors that are not included in this study. In addition, the economy and policies in a country may change over time, so the results of the study may not always be universally applicable. Variability in data as well as research methodology may affect the validity of the findings. Therefore, further research considering additional factors and deeper analysis may provide a more comprehensive understanding of the relationship between FDI, exchange rates, inflation, interest rates, GDP and exports.

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