



Analysis Of Indonesian Economic Dynamics On The Balance Of Trade, Exchange Rate, And Foreign Investment: A Vector Errors Correction Model (Vecm)

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ABSTRACT

This study aims to analyze the effect of the Balance of Trade (BOT), Exchange Rate, and Foreign Direct Investment (FDI) on Indonesia's economic growth during the period 1993–2023. The research applies a descriptive quantitative approach using annual time-series secondary data. The analytical method employed is the Vector Error Correction Model (VECM), preceded by stationarity tests, optimal lag selection, and cointegration tests to ensure the validity of the model. In addition, Granger Causality, Impulse Response Function (IRF), and Forecast Error Variance Decomposition (FEVD) analyses are conducted to examine both short-run and long-run dynamics among variables. The results indicate that in the short run, the Balance of Trade, Exchange Rate, and Foreign Direct Investment do not have a statistically significant effect on Indonesia's economic growth. However, in the long run, the Exchange Rate and Foreign Direct Investment show positive and significant effects on economic growth, while the Balance of Trade remains insignificant. The Granger causality test reveals a one-way relationship, where economic growth influences the Balance of Trade, and Foreign Direct Investment influences economic growth. Overall, the findings suggest that exchange rate stability and sustained foreign investment inflows are key determinants of Indonesia's long-term economic growth. Meanwhile, improvements in the structure and competitiveness of international trade are still necessary to strengthen the role of the external sector in supporting sustainable economic development.

INTRODUCTION

A country's economic growth is generally demonstrated through a gradual increase in production capacity, measured by the Gross Domestic Product (GDP) indicator. Economic growth

is always related to the total value of goods and services produced over a given period, demonstrating a country's economic capacity to produce larger, higher-quality products. A country's economic growth is inextricably linked to the availability and management of its natural and human resources. Furthermore, investment as capital for economic growth is crucial for driving innovation and technology (Puspandari, 2022). Indonesia's Gross Domestic Product (GDP) growth from 1993 to 2023 indicates a fluctuating economic dynamic. At the beginning of the period, GDP was around \$160 billion, but dropped drastically to around \$95 billion in 1998 due to the monetary crisis. After that, GDP showed a consistent upward trend, reaching around \$900 billion in 2011 and stagnating slightly until 2015. Although it fell in 2020 to around \$1,058 billion, GDP rebounded sharply and reached a peak of around \$1,368 billion in 2023. Global conditions resulting from the economic crisis and the pandemic caused Indonesia's economic growth to decline, but it stabilized in the long term (Central Bureau of Statistics, 2023).

Foreign Direct Investment (FDI) is a crucial element that contributes positively to Indonesia's economic dynamics, particularly through increased investment flows, expanded employment opportunities, and technology transfer. Indonesia actively opens opportunities for foreign investors through various policies that support market conditions that encourage investment growth. In recent years, the manufacturing, mining, and infrastructure sectors have been the three main sectors that have attracted the most FDI. FDI contributes significantly to Indonesia's economic growth dynamics by increasing productivity and national income (Wibowo and Cahyadin, 2020). Various studies on Foreign Direct Investment (FDI) have been conducted by several previous researchers. Research by Hendrati (2019) "Analysis of Surabaya City Export Expansion Policy". In her research, she stated that a country's economic growth occurs due to the main factor, namely FDI, because the presence of FDI has the potential to increase export volume, both at the national and regional levels.

Foreign investment has a significant role in supporting export performance, considering that exports are the main driver of economic growth. 6 Foreign Direct Investment (FDI) in Indonesia, from 1993 - 2023 experienced various dynamics along with changes in global economic conditions and domestic policies. At the beginning of the period, FDI was still relatively low, namely around 2.1 billion USD in 1993, and had fallen drastically to -4.7 billion USD in 2000 due to the monetary crisis. Afterward, FDI began to show an upward trend, reaching around USD 15.3 billion in 2010 and soaring to USD 25.4 billion in 2013. FDI declined sharply again to USD 4.3 billion in 2016, but recovered and stabilized at around USD 20-25 billion during the 2018-2022 period. This phenomenon illustrates that fluctuations in foreign investment flows to Indonesia are closely related to changes in global economic conditions and domestic stability.

The dynamics of the Indonesian economy can be influenced by movements in the rupiah exchange rate against foreign currencies. Rupiah exchange rate instability also affects the competitiveness of export and import activities, where rupiah depreciation can encourage exports but make imports more expensive. Bank Indonesia's monetary policy, such as setting interest rates, plays a crucial role in maintaining the exchange rate. Furthermore, exchange rate movements are influenced by external factors such as uncertain global conditions and foreign capital flows (Khan & Ksatria, 2020). Palm oil, coal, and coffee are three of Indonesia's main producers. Meanwhile, imports are carried out to provide goods and services that cannot be provided through domestic production, including machinery, raw materials, and consumer products. Trade policies and nine supporting regulations are crucial to increasing the competitiveness of Indonesian products in the global market. Therefore, the government continues to strive to optimize export potential and manage the trade balance (Central Statistics Agency, 2020).

The Balance of Trade reached its highest surplus of around USD 55,760. million in 2022, after experiencing the deepest deficit of around -8,567 million in 2019. The significant increase from 2021 to 2022 is expected to be influenced by the surge in prices of key export commodities such as coal and palm oil. This indicates that Indonesia's trade balance performance is highly

sensitive to changes in global economic conditions and commodity price volatility in the international market. Based on research by Husnul Holifah (2022), the results obtained indicate that Foreign Direct Investment (FDI) does not have a significant impact on foreign exchange reserves in the short term, but shows an influence in the long term. However, the import variable is proven to have a significant effect in the short and long term. However, this study has a broader scope, including international trade and foreign investment as variables.

This study not only examines the impact of trade but also considers how foreign investment and the dynamics of international trade as a whole contribute to Indonesia's economic condition. This study, entitled "Analysis of Indonesian Economic Dynamics on the Balance of Trade, Exchange Rate, and Foreign Investment," aims to examine the influence of the balance of trade, exchange rate, and foreign investment on Indonesia's economic dynamics. The differences in previous research findings (Intan Sari Arfiani, 2020) require further research to examine the relationship between export and import volumes, which significantly impact economic growth. However, the rupiah exchange rate variable does not show a significant positive effect on economic growth. This research tends to focus on a single aspect, such as the influence of exports or imports separately, without considering how exchange rate fluctuations can affect both variables. The findings indicate that the Balance of Trade (BOT) does not have a significant effect on Indonesia's economic growth, both in the short run and the long run. In the long-run estimation, the t-statistic value of 0.33196 is smaller than the t-table value of 1.97993, indicating that BOT does not significantly contribute to Gross Domestic Product (GDP). This result is reinforced by the Granger Causality test, which shows that BOT does not cause GDP (probability 0.7696). Conversely, GDP affects BOT with a probability value of 0.0071, indicating a one-way causal relationship from economic growth to the trade balance. This suggests that changes in national output influence external trade performance, rather than the trade balance being a primary driver of economic growth.

These findings are consistent with Thirafi (2020), who concluded that Indonesia's trade balance dynamics are more influenced by domestic conditions and global commodity prices than by its role as a growth engine. Similarly, Cristanto and Bowo (2021), using a VECM approach, found that trade balance determinants do not always directly stimulate economic growth. Therefore, the hypothesis stating that BOT positively affects GDP is not supported in this study. This outcome implies the need for structural export reforms, diversification toward higher value-added products, and stronger international trade competitiveness so that the trade balance can contribute more effectively to long-term economic growth.

LITERATURE REVIEW

International trade, exchange rates, and foreign investment are important components in understanding Indonesia's economic dynamics. International trade reflects the exchange of goods and services between Indonesia and other countries, while the balance of trade represents the difference between the value of exports and imports. Exchange rate movements influence the relative prices of domestic and foreign goods, thereby affecting export competitiveness, import costs, and trade performance. Meanwhile, foreign investment contributes to capital formation, technology transfer, employment opportunities, and economic productivity. These variables are interconnected because changes in exchange rates can influence trade flows and investment decisions, while trade performance and foreign capital movements can also affect currency demand and supply. Therefore, examining the relationships among the balance of trade, exchange rates, and foreign investment is essential for understanding Indonesia's economic adjustment processes.

The Vector Error Correction Model (VECM) provides a suitable econometric framework for analyzing both the short-run dynamics and long-run equilibrium relationships among economic variables that are non-stationary but cointegrated. Based on cointegration theory, economic

variables may experience temporary deviations from their long-run equilibrium while gradually adjusting toward equilibrium over time. The VECM captures these adjustments through an error correction term, which indicates how changes in the variables respond to previous disequilibrium. In the context of Indonesia, this approach can be used to investigate the dynamic interactions among the balance of trade, exchange rates, and foreign investment, including the speed at which short-run imbalances are corrected. The application of VECM requires appropriate preliminary tests, particularly unit root and cointegration tests, to establish whether the model is suitable for the data. Through this framework, the study can provide empirical insights into Indonesia's economic relationships and support a better understanding of the factors associated with external trade performance and investment dynamics.

METHODS

Research Approach

This study applies a descriptive quantitative approach to examine the relationship between the balance of trade, exchange rate, foreign direct investment (FDI), and economic growth in Indonesia. The quantitative method is used because the research relies on numerical data processed through statistical and econometric techniques. The descriptive aspect aims to systematically explain the characteristics and development of each variable during the observation period. By combining these approaches, the study is able to provide both statistical evidence and an analytical explanation of how macroeconomic variables influence economic growth.

Research Location and Period

The research was conducted at Universitas Pembangunan Nasional Veteran Jawa Timur as the academic institution supporting this study. The analysis uses secondary time-series data covering the period 1993–2023, allowing the research to capture long-term economic dynamics, including periods of economic crisis, recovery, and structural transformation in Indonesia. The selected time frame is considered sufficient to observe both short-run fluctuations and long-run equilibrium relationships among variables.

Operational Definition and Measurement of Variabels

Independent Variabels

The independent variables in this study consist of the Balance of Trade (BOT), Exchange Rate, and Foreign Direct Investment (FDI). The Balance of Trade is defined as the difference between Indonesia's export and import values of goods and services, measured in US dollars. A surplus indicates exports exceed imports, while a deficit indicates the opposite. The Exchange Rate refers to the nominal value of the Indonesian Rupiah against the US dollar, reflecting currency stability and external competitiveness. Foreign Direct Investment (FDI) represents foreign capital inflows invested directly into productive sectors in Indonesia, measured in US dollars.

Dependent Variabel

The dependent variable in this study is Economic Growth, measured by the annual growth rate of Gross Domestic Product (GDP) in percentage terms. Economic growth reflects the increase in the production of goods and services within an economy over a certain period. It serves as a key macroeconomic indicator to assess a country's economic performance and development progress.

Population and Sample

The population of this research includes all annual macroeconomic data related to Indonesia's balance of trade, exchange rate, FDI, and economic growth. The sample consists of time-series data from 1993 to 2023, selected based on data availability and consistency. The use of annual data ensures comparability and reliability in econometric estimation while capturing structural economic changes over time.

Type of Data

This study uses secondary data, meaning the data were previously collected and published by authorized institutions. Secondary data are considered appropriate because macroeconomic variables are officially recorded and regularly updated by national and international agencies. The data were obtained from official government institutions and international statistical databases that provide reliable and publicly accessible macroeconomic information. These sources ensure the accuracy, consistency, and credibility of the dataset used in the analysis.

The data collection technique applied in this research is the documentation method, which involves collecting, reviewing, and recording statistical data from official publications, reports, and online databases. The collected data were then organized and processed using econometric software to conduct further analysis.

Vector Error Correction Model (VECM)

This study employs the Vector Error Correction Model (VECM) to analyze both short-run and long-run relationships among the variables. VECM is appropriate when time-series data are non-stationary at level but become stationary after first differencing and exhibit cointegration. The model allows the researcher to examine how short-term deviations from long-term equilibrium are corrected over time.

RESULTS

Table 1. Long-run estimation results VECM

Variabel	Coefisien	T Statistic	T Table	Prob.	Discription
Gross Domestic Product	-0.082784	-1.81212	1.97993	0,082	Not Significant
Exchange Rate	25.91846	3.43478	1.97993	0,002	Significant
Foreign Direct Investment	11.63056	6.11540	1.97993	0,000	Significant

Table 2. Short-run estimation result VECM

Variabel	Koefisien	T Statistic	T Table	Prob.	Discription
Gross Domestic Product	-0.242607	-1.33336	1.97993	0,100	Not Significant
Baance of Trade	-0.372771	-1.66161	1.97993	0,060	Not Significant
Exchange Rate	-0.233296	-0.96279	1.97993	0,194	Not Significant
Foreign Direct Investment	0.215869	0.86496	1.97993	0,158	Not Significant

In the long-run estimation, the balance of trade (BOT) variable does not have a significant effect on economic growth (GDP), as the t-statistic value of 1.000000 is lower than the t-table value of 1.97993. Therefore, the trade balance does not influence economic growth in the long term. The exchange rate (Kurs) variable significantly affects economic growth (GDP) because the t-statistic value of 3.43478 exceeds the t-table value of 1.97993. Thus, the exchange rate influences long-term economic growth. Similarly, foreign direct investment (FDI) has a significant effect on economic growth (GDP), as indicated by the t-statistic value of 6.11540, which is greater than the t-table value of 1.97993. This finding suggests that foreign direct investment positively correlates with economic growth in the long run.

DISCUSSION

The Effect of Balance of Trade on Indonesia's Economic Growth

The findings indicate that the Balance of Trade (BOT) does not have a significant effect on Indonesia's economic growth, both in the short run and the long run. In the long-run estimation, the t-statistic value of 0.33196 is smaller than the t-table value of 1.97993, indicating that BOT does not significantly contribute to Gross Domestic Product (GDP). This result is reinforced by the Granger Causality test, which shows that BOT does not cause GDP (probability 0.7696). Conversely, GDP affects BOT with a probability value of 0.0071, indicating a one-way causal relationship from economic growth to the trade balance. This suggests that changes in national output influence external trade performance, rather than the trade balance being a primary driver of economic growth.

These findings are consistent with Thirafi (2020), who concluded that Indonesia's trade balance dynamics are more influenced by domestic conditions and global commodity prices than by its role as a growth engine. Similarly, Cristanto and Bowo (2021), using a VECM approach, found that trade balance determinants do not always directly stimulate economic growth. Therefore, the hypothesis stating that BOT positively affects GDP is not supported in this study. This outcome implies the need for structural export reforms, diversification toward higher value-added products, and stronger international trade competitiveness so that the trade balance can contribute more effectively to long-term economic growth.

The Effect of Exchange Rate on Indonesia's Economic Growth

The research results show that the exchange rate has a positive and significant effect on Indonesia's economic growth in the long run. This is indicated by a t-statistic value of 3.43478, which is greater than the t-table value of 1.97993, along with a positive coefficient of 25.91846. This finding suggests that, in the long term, depreciation of the Rupiah tends to support GDP growth, particularly by improving export competitiveness. However, in the short run, the exchange rate does not significantly affect economic growth, as reflected by a t-statistic value of -1.97063, which is lower than the t-table value. Furthermore, the Granger Causality test confirms the absence of short-term causal relationships between the two variables (probability 0.6980).

These findings align with Omar and Nugroho (2023), who applied a VECM model and concluded that exchange rates significantly influence economic growth in the long run but require time to transmit effects to the real sector. In addition, Wicesa et al. (2021) emphasized that exchange rate stability plays an essential role in maintaining trade balance stability and controlling inflation. Thus, the hypothesis that the exchange rate affects economic growth is supported in the long term but not in the short term. This indicates that exchange rate stabilization policies remain crucial in promoting sustainable economic development.

The Effect of Foreign Direct Investment on Indonesia's Economic Growth

The study indicates that Foreign Direct Investment (FDI) has a positive and significant impact on Indonesia's economic growth in the long run. The t-statistic value of 6.11540, which is

much higher than the t-table value of 1.97993, along with a positive coefficient of 11.63056, demonstrates that increased FDI inflows contribute to higher GDP levels. However, in the short run, FDI does not have a statistically significant effect on economic growth, as shown by a t-statistic value of -1.45381, although the direction of the relationship is negative.

The Granger Causality test supports the long-run finding, showing that FDI causes GDP with a probability value of 0.0096. This implies that foreign investment requires time before generating measurable effects on domestic economic activity. These results are consistent with Hendrati et al. (2021), who found that foreign direct investment and gross fixed capital formation positively contribute to national income per capita in Indonesia. FDI plays an important role as a catalyst for technology transfer, job creation, capital accumulation, and productivity improvement. Therefore, the third hypothesis is supported in the long run but not in the short run. Stable investment policies and a conducive business climate are essential to maximize the contribution of foreign investment to sustainable economic growth. In addition, the insignificant short-run effect of FDI suggests that investment inflows do not immediately translate into higher output. This is because foreign capital often requires an adjustment period for project planning, infrastructure development, regulatory compliance, and integration into domestic production networks. The benefits of FDI—such as technology transfer, managerial expertise, productivity enhancement, and employment creation—tend to materialize gradually. Therefore, while short-term fluctuations in FDI may not directly influence GDP growth, sustained and stable inflows contribute significantly to long-term economic expansion.

Overall, the empirical findings of this study emphasize that among the three variables examined, exchange rate stability and foreign direct investment play more decisive roles in supporting Indonesia's long-term economic growth compared to the balance of trade. This implies that macroeconomic policies should prioritize maintaining exchange rate stability, strengthening investment-friendly regulations, improving institutional quality, and ensuring legal certainty for investors. At the same time, although the trade balance was found to be insignificant, improving export structure and increasing the competitiveness of domestic industries remain important to enhance external sector resilience. A well-coordinated combination of monetary, fiscal, and investment policies is therefore essential to achieve sustainable and inclusive economic growth in Indonesia.

CONCLUSION

This study examines the relationship between the Balance of Trade (BOT), Exchange Rate, and Foreign Direct Investment (FDI) on Indonesia's economic growth using the Vector Error Correction Model (VECM) approach. The empirical results indicate that each independent variable produces different responses to Gross Domestic Product (GDP) in both the short run and the long run.

In the short run, the estimation results show that the Balance of Trade, Exchange Rate, and Foreign Direct Investment do not have a statistically significant effect on Indonesia's economic growth. This is reflected in the t-statistic values of all three variables, which are smaller than the critical t-table value. These findings suggest that short-term shocks in international trade, exchange rate fluctuations, and foreign capital inflows have not yet generated a substantial impact on national output. The economy requires time to adjust to external changes before these variables can meaningfully influence GDP. In the long run, however, the Exchange Rate and Foreign Direct Investment show positive and significant effects on economic growth, while the Balance of Trade remains insignificant. The Exchange Rate variable has a t-statistic of 3.43478 with a positive coefficient, indicating that currency depreciation may stimulate growth through improved export competitiveness. Meanwhile, Foreign Direct Investment records a t-statistic of 6.11540 with a positive coefficient, demonstrating that foreign capital inflows are a crucial

component in supporting national economic development. In contrast, the Balance of Trade shows a low and insignificant t-statistic and no causal relationship with GDP.

Overall, this study confirms that in Indonesia's long-term development strategy, policies that support exchange rate stability and encourage foreign direct investment should become primary priorities. Although improvements in the trade balance remain important, they have not yet become the main driver of economic growth. Therefore, an integrated combination of monetary stability and pro-investment policies is essential to achieve sustainable economic growth.

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