

DYNAMIC EFFECTS OF EXCHANGE RATE, TRADE BALANCE, AND FINANCIAL DEVELOPMENT ON EXPORTS IN INDONESIA: AN ARDL APPROACH

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Abstract: This study examines the effects of exchange rate, trade balance, and financial development on exports in Indonesia. The data for this study were extracted from the World Bank's World Development Indicators from 1980 to 2023. The data consists of annual time series data for Indonesia. This study employs the ARDL bounds testing approach for cointegration to estimate the short- and long-run effect of exchange rate, trade balance, and financial development on exports in Indonesia. Empirical findings confirm that exchange rate, trade balance, and financial development have a substantial impact on exports in Indonesia in both the long and short term. In line with these findings, this study recommends that government policies should focus on encouraging stable exchange rate volatility and financial development in the long term to increase export revenues. Efforts to encourage long-term financial openness are also needed, including in the form of encouraging increased foreign investment.

Keywords: *exchange rate, trade balance, financial development, export, ARDL*

1. Introduction

Globalization has strengthened economic ties between countries, making international trade a key driver of economic growth. Indonesia, as an open economy, is inextricably linked to global dynamics that influence export and import performance. This makes it impossible for Indonesia to separate its activities from international trade. International trade is defined as the export and import of goods and services between interdependent countries within the context of the global economy (Wiryanti, 2017). International trade creates mutually beneficial relationships among the countries involved. This benefit is reflected in the availability of goods and services that are relatively inexpensive compared to those produced domestically, or, more accurately, the availability of goods and services that cannot yet be produced domestically.

International trade activities are recorded in a trade balance. According to (Yusuf & Rangkuty, 2019) trade balance is a record containing the value of goods exported and imported from a country. Several conditions can be observed in the trade balance. First, a surplus occurs when the value of exports exceeds the value of imports. Second, a deficit occurs when the value of imports exceeds the value of exports. Third, an equal condition occurs when the value of exports equals the value of imports (Gede Udiyana & Setiyarti, 2017). The trade balance plays a crucial role in a country's economy. This is because the trade balance describes the state of a country's economy. A country's economy is considered positive when the trade balance is in surplus. However, if the trade balance is consistently in deficit, this needs to be addressed as it can indicate poor economic conditions, particularly in terms of export performance.

International trade requires a mutually agreed-upon currency for use in trade transactions, namely the US dollar (United States). The use of the US dollar in transactions causes the rupiah exchange rate against the dollar to fluctuate over time. This can create the

risk of exchange rate fluctuations due to the uncertainty of the exchange rate itself. Changes in the exchange rate directly impact the price trends of goods and services in that country. Furthermore, a currency's exchange rate is also determined by the relationship between supply and demand for that currency (Siregar & Rozaini, 2023). Trade flows may be influenced by exchange rate policies designed to restrict imports to maintain export competitiveness and reduce the current account deficit. The impact of exchange rate policies on the economy can be seen from two aspects: demand and supply. When demand for a currency increases while supply remains constant or decreases, the currency's exchange rate appreciates. When supply of a currency increases while demand remains constant or decreases, the currency's exchange rate weakens (depression).

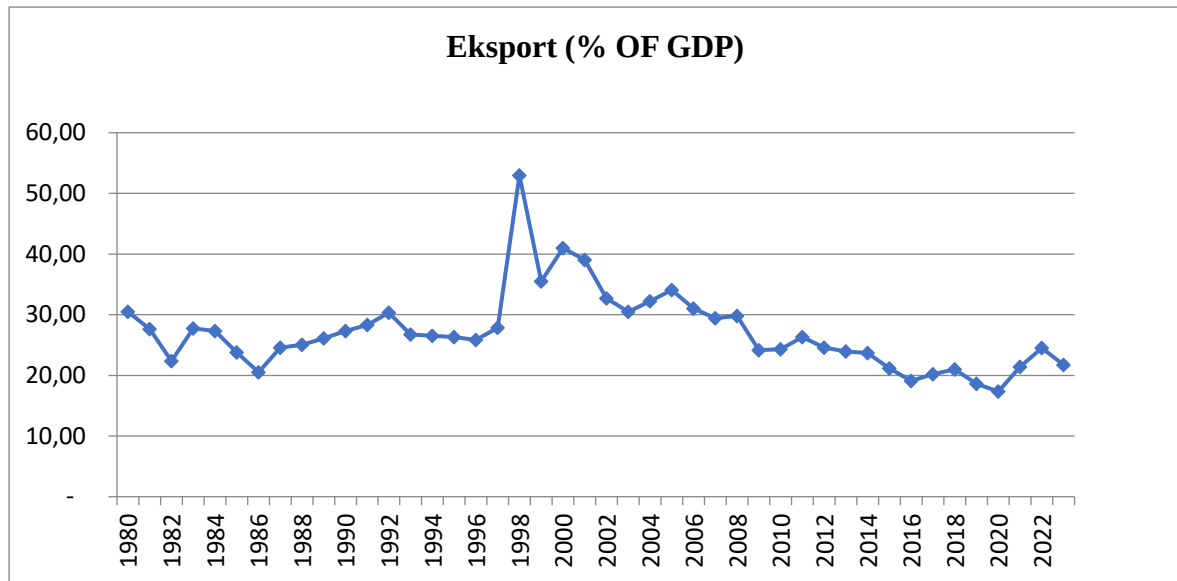
Export activities will improve with assistance from the financial sector. The financial sector can accelerate trade by providing borrowers with various high-quality, low-risk financial instruments (Irzam & Udayana, 2020). Therefore, when the financial sector develops well, it can encourage public trade activities. Therefore, the World Bank recommends the importance of policies to encourage financial sector development. Financial development, referred to as the development of the financial sector, aims to increase the liquidity of financial institutions, the amount of savings, capital accumulation, and encourage entrepreneurship, which can boost economic growth. One of the variables used is domestic credit for the private sector. Domestic credit is considered a measure of financial sector activity in providing credit assistance to the private sector (Orimogunje, 2019).

2. Literature Review

2.1 Export

According to (Manihuruk et al., 2024) export is an activity involving the sale of output abroad, using a payment system, quality standards, quantity, and other sales conditions agreed upon by both parties, namely the exporter and importer. Exports are carried out with the aim of increasing sales and profits, as well as contributing to increasing the country's foreign exchange. Generally, export is a trade process or activity involving removing commodities from within the country and sending them to other countries. Large-scale exports of goods generally require customs duties in both the sending and receiving countries. Exporting goods and services has an impact on increasing national income; if there is an increase in net exports, it is positive (Siregar & Rozaini, 2023).

Export is a crucial activity in international trade, involving the sale of goods or services abroad based on an agreement between the seller and the buyer. The primary purpose of exports is to expand markets for a country's products, increase revenue and profits, and contribute to the country's foreign exchange earnings. The export process generally follows rules and procedures such as quality standards, payment systems, and customs duties. Macroeconomically, increased exports can boost national income growth, especially if net exports are positive.

Figure 1 Export Development 1980-2023 (% of GDP)

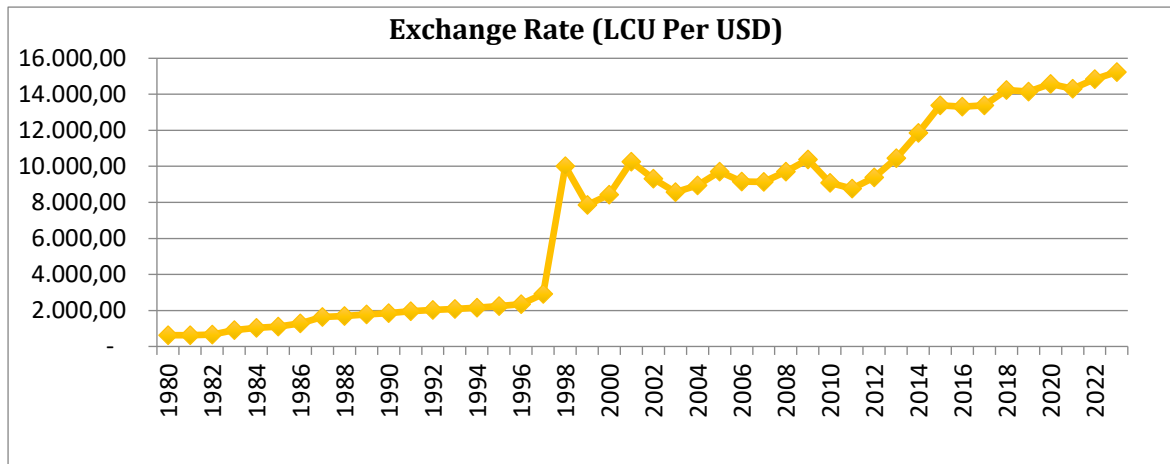
Source: World Bank (2024)

Figure 1 shows the development of Indonesian exports from 1980 to 2023, which fluctuates annually due to various internal and external factors, including international demand, changes in commodity prices, production costs, and the exchange rate. The highest exports occurred in 1998 at 52.97%, due to the weakening of the rupiah against the US dollar, which made Indonesian products cheaper in the international market and encouraged exports. The lowest exports occurred in 2020 at 17.33%, due to the Covid-19 pandemic, which can hamper international trade.

2.2 Exchange Rate

The exchange rate is the price of a country's currency relative to another country's currency, making it an important determinant of exports (G. Mankiw, 2001). Because the exchange rate involves two currencies, the equilibrium point is determined by the supply and demand sides of both currencies. The foreign exchange market is where a country's currency can be exchanged or traded for another country's currency according to the prevailing exchange rate in the money market. The exchange rate is crucial in international trade because it is the benchmark for the rupiah that must be spent to purchase one foreign currency. Exchange rates are generally divided into two: the nominal exchange rate, which is the relative price of the currencies of two countries, and the real exchange rate, which is the relative price of goods between two countries.

Several theories underlying exchange rates include the Purchasing Power Parity Theory, which essentially states that one currency should be able to purchase the same quantity of goods and services in any country (N. G. Mankiw, 2021). Purchasing Power Parity Theory states that international trade always responds quickly to international price differences.

Figure 2 Exchange Rate Development (LCU per US\$, period average) 1980-2023

Source: World Bank (2024)

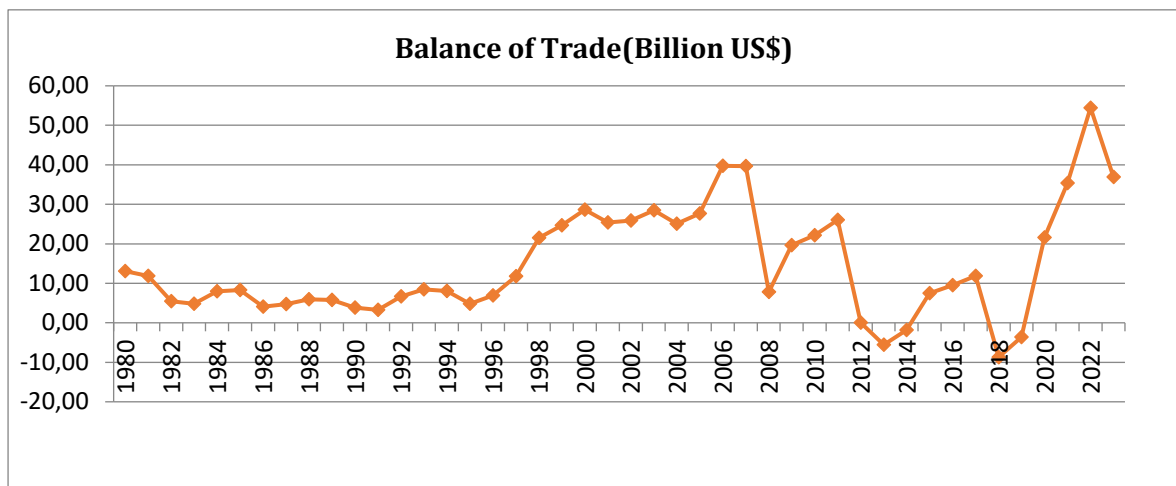
Figure 2 shows that the exchange rate movement during the 1980-2023 period continued to fluctuate annually and tended to weaken. Observation shows that the exchange rate has been experiencing depression since 1980, with the highest depression in 1998, at Rp 10,013.62, due to the monetary crisis that occurred that year. Furthermore, in 1999, the rupiah exchange rate strengthened again to Rp 7,855.15 and fluctuated again the following year, reaching Rp 15,236.88 in 2023.

2.3 Balance of Trade

The trade balance, or export-import balance, is the difference between a country's exports and imports over a given period, measured using the prevailing currency (Rahayu, 2021). If exports exceed imports, a positive trade balance (surplus) results; if exports are less than imports, a negative trade balance (deficit) results.

The balance of trade (BOT) is a component of the balance of payments (BOP), a statistical report that systematically records a country's economic transactions with other countries over a specific period (Sugiyono, 2020). Recording the balance of trade aims to provide information on exchanges between various exchanges and the country's international standing. This information can assist the government in making policies in the trade, monetary, and fiscal sectors (Apridar, 2009). Therefore, a surplus or deficit in the balance of trade will influence the government's decision-making process to bring the balance of trade into equilibrium.

Factors influencing the trade balance include the exchange rate, which is the comparison of one country's currency price against another. The exchange rate is one factor influencing Indonesia's trade balance. If the currency depreciates, exports will increase, ultimately creating a trade surplus. Conversely, if the currency appreciates, imports will increase, resulting in a trade deficit. The final factor influencing the trade balance is an economic crisis, an event or condition that causes a decline in a country's economy. When an economic crisis occurs, the economic competitiveness of Indonesia's export destination countries declines. Consequently, demand for exported goods decreases, creating a trade deficit. Berdasarkan data yang diperoleh dari Badan Pusat Statistik, didapat data perkembangan neraca perdagangan Indonesia periode tahun 1980 sampai 2023 sebagai berikut:

Figure 3 Development of Indonesia's Trade Balance 1980-2023 (Billion US\$)

Source: Central Statistics Agency (2024)

The graph above, sourced from the Central Statistics Agency (BPS), shows the development of the trade balance from 1980 to 2023. The graph shows that the highest trade deficit occurred in 2018, amounting to -8.70 billion US dollars, while the highest surplus occurred in 2022, amounting to 54.45 billion US dollars.

2.4 Domestic Credit

Domestic credit is a crucial component of a country's financial system, reflecting the amount of loans provided by financial institutions (such as banks) to the private sector, government, and other sectors. Domestic credit plays a crucial role in driving economic growth, investment, and consumption.

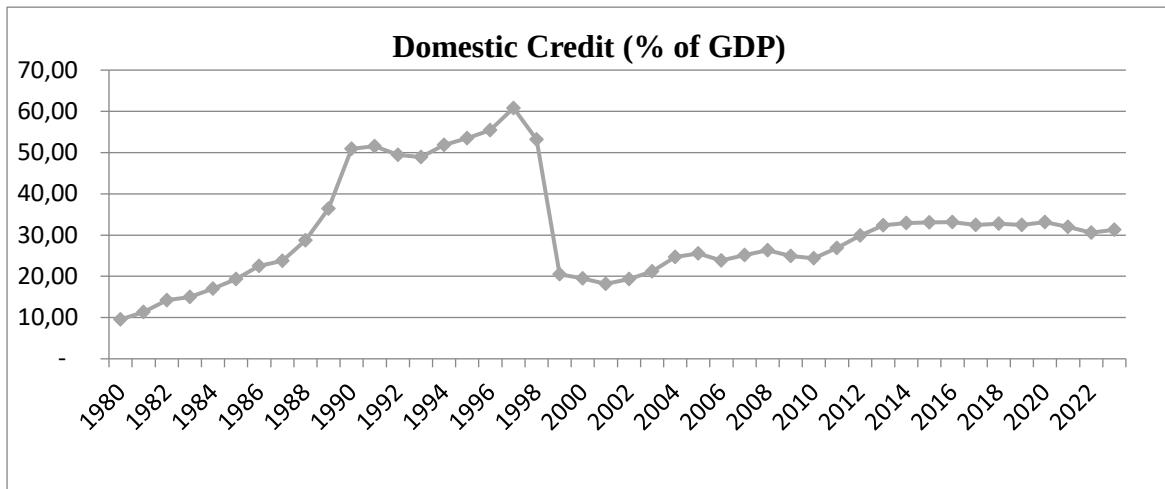
To achieve better exports, the role of the private sector is essential. This role can be realized through the mobilization of funds through banking. Therefore, efforts to increase the efficiency and effectiveness of these financial institutions in mobilizing and distributing funds need to be encouraged. A bank is a financial institution that functions as a financial intermediary between parties with excess funds (surplus units) and parties with a lack of funds (deficit units) (Fahrika, 2018). Through banks, these excess funds can be distributed to parties in need, providing benefits to both parties. Banks accept deposits from the public (Third Party Funds) and then redistribute them in the form of credit.

Financing in conventional banks is also known as credit. According to Banking Law Number 10 of 1998, credit is the provision of money or equivalent debt, based on a loan agreement or contract between the bank and another party, requiring the borrower to repay the debt after a certain period of time with interest. Meanwhile, domestic credit for the private sector is a source of finance in the form of loans and non-equity securities provided to the private sector by financial institutions such as banks and other financial companies. Domestic credit for the private sector is obtained by dividing the percentage of loan yield by the size of GDP.

There are three objectives of providing credit facilities: seeking profit, helping customers, and assisting the government. The first is seeking profit, which aims to obtain interest from the loan. The second is helping customers who need funds, whether for investment or working capital. These funds will be used to develop and expand customers' businesses. Finally, helping the government means that more credit is disbursed, meaning increased development in various sectors. Furthermore, credit serves the function of

stimulating both parties, aiming to meet the needs of both business and daily life. The following is a domestic credit report from 1980-2023, sourced from the World Bank:

Figure 4 Domestic Credit (% of GDP)



Source: Central Statistics Agency (2024)

Figure 4 above shows the domestic credit level from 1980 to 2023. The highest domestic credit was in 1997, at 60.82%. This was due to one of the factors contributing to the monetary crisis that occurred that year. High domestic credit, especially that provided to the private sector, created imbalances in the economy and increased credit risk.

3. Method

This study employs quantitative research, utilizing secondary data as its source. Secondary data was obtained through official and trusted institutions that have collected and uploaded data over a specific period of time via the internet. These institutions are the Central Statistics Agency (BPS) and the World Bank. The data collected is a 44-year time series from 1980 to 2023. This research is also supported by a review of literature and theories related to the research topic. The aim is to compare this study with previous research. The variables used in this study are the exchange rate, trade balance, and domestic credit as independent variables, and exports as the dependent variable.

The analytical method used in this study is multiple regression with the Autoregressive Distributed Lag Model (ARDL). The ARDL method is a combination of the Autoregressive (AR) and Distributed Lag (DL) models. AR is a model that uses one or more past data from the dependent variable, and DL is a model that involves current and past data from the independent variable. Thus, it can see the influence of the dependent variable from the past on the current value of the dependent variable. Therefore, the ARDL method assumes that a variable is influenced by itself but at a previous time. Before estimating the ARDL model, several diagnostic tests are necessary to ensure that the estimated ARDL model avoids violating basic econometric assumptions.

4. Finding and Discussion

1. Stationary Test

Before estimating the ARDL model, the first step is to test for stationarity. Data stationarity testing is performed to ensure that the data is stationary at the level or first difference level and does not contain a unit root, thus preventing spurious

regression. Stationarity testing is performed using the Augmented Dickey-Fuller (ADF) unit root test or the Phillips-Perron (PP) test. Test results are considered free of unit roots if the probability value is less than an alpha value of 0.05.

Table 1 Stationary Test

Variabel	Level		First Difference	
	ADF	PP	ADF	PP
Eksport	0.0519	0.0570	0.0000	0.0000
Exchange Rate	0.8707	0.9092	0.0000	0.0000
Balance of Trade	0.1819	0.1583	0.0000	0.0000
Domestic Credit	0.1258	0.2210	0.0006	0.0007

Source: Data Processing Results Using Eviews 10, 2025

After testing the four research variables, it was found that exports, the exchange rate, the trade balance, and domestic credit were non-stationary at the level level because their probability values were >0.05 . Therefore, testing was conducted at the first difference level. At the first difference level, all variables were found to be stationary. Therefore, the ARDL model can be used because all variables are stationary at the first difference.

2. ARDL Cointegration

This test is conducted to ensure that the ARDL model is suitable for use. When the dependent and independent variables in this study are stationary and there is no initial cointegration, the ARDL model is suitable for use.

Table 2 Bound Test Cointegration

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
Asymptotic : n=1000				
F-statistic k	17.67468 3	10%	2.37	3.2
		5%	2.79	3.67
		2.5%	3.15	4.08
		1%	3.65	4.66
Finite Sample: n=40				
Actual Sample Size	40	10%	2.592	3.454
		5%	3.1	4.088
		1%	4.31	5.544

Source: Data Processing Results Using Eviews 10, 2025

Based on the results of the cointegration test using the Bound Test approach, the F-statistic value is 17.67468. This value is greater than the upper bound value at 5% alpha, which is 3.67. Therefore, it can be concluded that the exchange rate, trade balance, and domestic credit variables have a long-term relationship with the export variable.

3. Long-Term Test Results

Long-term tests using the ARDL model revealed a positive and significant effect of the exchange rate on exports. This suggests that the exchange rate plays a significant role in determining a country's export performance. Changes in the exchange rate, particularly domestic currency depreciation, impact the price competitiveness of exported goods in the international market. When the exchange rate depreciates (weakens), domestic goods become more affordable for foreign consumers, thus driving increased export demand. Conversely, an appreciation (strengthening) in the exchange rate can lead to higher prices and reduce export competitiveness.

The trade balance variable also has a positive and highly significant effect on exports, indicating that changes in the trade balance can significantly impact a country's export performance. When the trade balance improves (a larger surplus), this generally reflects a higher value of exports than imports. This situation can strengthen the competitiveness of domestic products in international markets and encourage increased export activity. This significant effect indicates that changes in the trade balance are not accidental but have a measurable impact on exports.

The domestic credit variable has a positive but insignificant effect on exports in the long run. This indicates that while increased domestic credit has the potential to boost export activity, its impact is not yet strong or consistent enough to be empirically proven over the long term. It is possible that domestic credit allocation has not been fully directed to sectors that directly support exports, or that other factors are hampering the transmission of credit to increased export performance.

Table 3 Autoregressive Distributed Lag Test

Levels Equation Case 2: Restricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(X1)	0.136046	0.065279	2.084071	0.0455
D(X2)	13.59309	5.072458	2.679784	0.0117
D(X3)	0.124257	0.101695	1.221855	0.2310
C	-83.25265	43.16528	-1.928695	0.0630
EC = D(Y) - (0.1360*D(X1) + 13.5931*D(X2) + 0.1243*D(X3) -83.2526)				

Source: Source: Data Processing Results Using Eviews 10, 2025

4. Short Term Test Results

Based on the results of the short-term Autoregressive Distributed Lag test, the variable $D(Y(-1))$, which represents the error correction term (ECT) component, has a coefficient of -1.1568 and is significant. Based on the ARDL model estimation results, the export variable at the previous lag shows a significant influence on the current export value. This indicates that Indonesia's export performance in the previous period plays a significant role in determining export performance in the current period. This finding reflects the persistence or sustainability of export activities, where past export success tends to be maintained in the future. Economically, this can

be caused by the continuity of international trade contracts, production consistency, and previously established distribution and market networks. Therefore, the government and business actors need to maintain export stability over time so that this positive trend can continue.

Specifically, in the short term, the variable $D(X1(-1))$ has a positive effect on the dependent variable with a coefficient of 0.1574 and is close to significant at the 5% level ($p\text{-value} = 0.0554$), which indicates that the increase in the exchange rate in the previous period tends to increase exports, although the effect is not yet statistically strong enough. The variable $D(X2(-1))$ shows a positive and significant effect on the dependent variable (coefficient = 15.7251; $p\text{-value} = 0.0085$). This indicates that changes in the trade balance in the previous period also affect export performance in the current period. The increase in the trade balance surplus in the past contributed to an increase in the volume or value of exports directly, which reflects the lag effect of improvements in the international trade sector on national exports.

In contrast, the variable $D(X3(-1))$ does not significantly influence the dependent variable ($p\text{-value} = 0.2222$). This indicates that changes in the amount of credit disbursed in the short term have not had a significant impact on Indonesia's export performance. This lack of influence may be due to the indirect nature of the credit transmission channel to the production of export goods, or because most of the credit is absorbed by sectors not directly related to exports. Therefore, more time and effective management are needed so that credit distribution can make a significant contribution to increasing exports.

Overall, the model shows a strong short-term relationship and a correction mechanism for long-term imbalances, as indicated by the significance of the error correction term variable.

Table 4 Autoregressive Distributed Lag Test

Conditional Error Correction Regression				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-96.31031	50.39995	-1.910921	0.0653
$D(Y(-1))^*$	-1.156844	0.133274	-8.680214	0.0000
$D(X1(-1))$	0.157383	0.079049	1.990954	0.0554
$D(X2(-1))$	15.72508	5.592606	2.811763	0.0085
$D(X3(-1))$	0.143746	0.115399	1.245642	0.2222
$D(X1, 2)$	0.311095	0.033959	9.160812	0.0000
$D(X2, 2)$	4.019048	3.861539	1.040789	0.3060
$D(X3, 2)$	-0.084333	0.128954	-0.653973	0.5180
$D(X3(-1), 2)$	-0.165134	0.070125	-2.354853	0.0250

* $p\text{-value}$ incompatible with t-Bounds distribution.

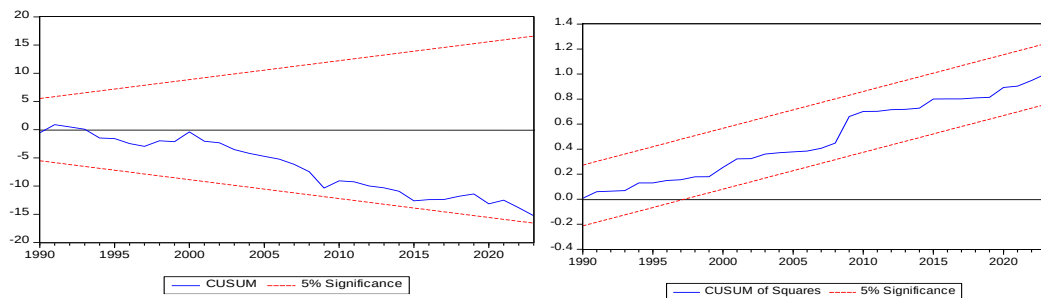
Source: Source: Data Processing Results Using Eviews 10, 2025

5. CUSUM DAN CUSUMQ

The suitability of the ARDL model can be assessed through a stability test. The stability test is conducted using the cumulative sum of recursive models (CUSUM) and cumulative sum of squares of recursive models (CUSUMQ). The stability test aims to detect model stability in both the short and long term. This test is conducted

to ensure whether the ARDL model estimate is stable. The ARDL model can be used if the CUSUM line is within the 5% significance limit.

Figure 5 CUSUM and CUSUMQ



5. Conclusion and Recommendation

Conclusion

1. The rupiah exchange rate against the US dollar has been shown to have a significant impact on exports in the long term. These results indicate that exchange rate fluctuations, particularly rupiah depreciation, can increase the price competitiveness of Indonesian export products in the international market.
2. The trade balance variable has a significant impact on exports, both in the short and long term. A trade balance surplus tends to increase export volume because it reflects increased demand for domestic products from abroad.
3. The domestic credit variable shows different results compared to the previous two variables. Domestic credit does not significantly impact exports in the long term. This result indicates that credit distribution in the Indonesian financial sector has not been fully directed to support export activities, but is still predominantly used for consumption or non-productive sectors. Although there is a slight impact in the short term at certain lags, the overall contribution of domestic credit to exports remains limited and unstable. This may be due to limited access to financing for export businesses, particularly small and medium enterprises.

Recommendation

1. The government and monetary authorities such as Bank Indonesia are expected to continue to maintain the stability of the rupiah exchange rate by carrying out appropriate interventions in the foreign exchange market, especially in the face of global uncertainty.
2. To improve export performance, the government needs to strengthen its trade balance through various strategies. These strategies could include diversifying export products, increasing product added value through the development of the processing industry, and expanding export markets to non-traditional countries.
3. The research results show that the contribution of domestic credit to exports is still suboptimal. Therefore, banks and financial institutions are expected to increase the proportion of credit distributed to productive sectors with high export potential.

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