Import Dynamics In Indonesia: The Effects Of Exports, Inflation, And Interest Rates

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Abstract

This study delves into the intricate dynamics of the Indonesian economy, focusing on the interplay between import variables and key economic indicators: exports, inflation, and interest rates. By employing the quantitative research methodology known as Autoregressive Distributed Lag (ARDL) analysis, we explore data from 1994 to 2023, generously provided by the World Bank. We found that inflation emerges as a critical factor influencing import patterns. When inflation rises, imports tend to decline. Put succinctly, higher inflation in the preceding period negatively impacts import volumes. However, it is essential to note that the effect of inflation on imports is moderately pronounced. The relationship between exports and imports is more straightforward. As exports increase, imports also tend to rise. This positive correlation underscores the interconnectedness of these two variables within the Indonesian context. When the nation's exports thrive, it naturally stimulates import activity. Interest rates play a pivotal role in shaping import behavior. When interest rates climb, imports tend to decrease. The inverse relationship suggests that higher borrowing costs discourage import activities. However, it is crucial to recognize that the impact of interest rates on imports is less substantial than other factors. Zooming out to the long run, an increase in exports corresponds with increased imports. However, the effect is modest. While this relationship exists, statistical evidence remains inconclusive regarding its significance. In other words, the impact of exports on imports is subtle, yet it persists over time. In summary, this study provides valuable insights for policymakers and researchers. It underscores the delicate balance between inflation, exports, and interest rates in shaping Indonesia's import landscape. While each factor contributes uniquely, their combined influence paints a nuanced picture of the nation's economic dynamics. Further research and policy considerations are warranted to optimize import strategies and foster sustainable economic growth.

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Introduction

Countries can take advantage of their comparative advantages and foster economic growth through international commerce. In the current globalized period, international economic interactions majorly influence any country's economic progress. Since no nation can meet its needs, all nations must engage in international trade (Ati & Asnawi, 2018). A nation's comparative advantage is capitalized upon and economic growth is encouraged through international trade. Countries with a comparative advantage in international trade might focus on manufacturing goods and services at a lower cost rather than importing goods and services that other nations produce more effectively. However, only some countries can fulfill all their needs. Each country has limited resources and production capacity. As a result, to fulfill its

domestic needs, each country must participate in international trade (Prahaski & Ibrahim, 2023).

International trade also helps countries' economies to diversify further and reduce dependence on specific areas. International commerce and globalization have been significant factors in the economic expansion of nations worldwide. Although challenges and barriers exist in international trade, they have encouraged economic cooperation and interdependence while providing new opportunities for countries to progress and develop. There is no denying that they contribute to economic growth and global progress (Soesanto et al., 2024).

Every country's economy depends heavily on international trade, which strives to improve living conditions for all its people. One of the ways that domestic and international economies can influence one another is through the trade of products and services between nations. The absence of regional boundaries to conduct global trade can allow other countries to take over their markets (Iswandari, 2018). Indonesia relies heavily on international trade because it has an open economy that allows it to enter the global market. International trade includes exchanging various products, such as goods and services made by a country to be sold abroad and goods and services imported from abroad to be imported into the country to fulfill domestic needs (Pambudi, 2011).

One of the rising economies in Southeast Asia, Indonesia's economy is influenced by many internal and foreign forces. Some critical factors that affect Indonesia's imports include exports, inflation, and interest rates (Basri & Hill, 2020). Exports are the sales of commodities or services to foreign countries that result in foreign exchange earnings. On the other hand, inflation is a steady, widespread rise in the cost of goods and services (Viphindrartin & Bawono, 2021). Lenders require interest rates from borrowers. If exports rise, the value of the home currency may appreciate relative to other currencies, thereby affecting imports. Inflation can also affect people's purchasing power, and interest rates can also affect investment and consumption, affecting imports. This paper will discuss how exports, inflation, and interest rates affect Indonesia's imports (Silaban, 2022). Using historical data and economic analysis, we will study the relationship between these factors. This study aims to enhance our comprehension of the workings of the Indonesian economy and how various elements impact imports.

Literature Reviews

According to research by Ginting (2017), exports and imports are two fundamental aspects of international trade that are vital to a nation's economy and significantly influence economic growth. These two components are crucial to determining the direction and speed of Indonesia's economic growth. Exports may increase production and the number of jobs, but economic growth may decline. This is evidenced by the fact that, at the 5% and 10% growth rates, respectively, imports and exports significantly impact Indonesia's economic growth. Furthermore, Hodijah and Angelina (2021) discovered that exports positively and statistically strongly impact Indonesia's economic growth; this means that higher export levels typically correspond with higher economic growth. Consequently, boosting exports is one strategy to support Indonesia's economic expansion since it can raise state revenue, generate employment, and support the expansion of regional industries.

Inflation has a significant short- and long-term impact on Indonesia's imports, according to research by Paramayuga (2016). Inflation is the steady increase in the price of goods and services. When the cost of products and services increases, people's purchasing power decreases, which may cause imports to increase as imported goods become cheaper than domestic goods. Inflation does not always have an essential impact on imports regarding GDP; it is the entire market value of all finished goods and services generated in a nation

over a given period. Inflation, however, has the potential to lower imports and impact people's purchasing power if it rises too high.

Sari and Rauf (2018) discovered a noteworthy correlation between imports and inflation. The relationship between inflation and imports is complex, and import prices are affected by it. If inflation is high, the currency exchange rate tends to weaken, causing imports to become more expensive. Conversely, imports may increase or decrease if imported goods become too expensive.

Research conducted by Kurniasari and Monica (2018) found that the amount of Indonesian imports is influenced by interest rates and Gross Domestic Product (GDP). Interest rates are fees that borrowers must pay to lenders in return for the use of money. High interest rates may lead to fewer imports due to the cost of borrowing needed to finance imports, while low interest rates may lead to more imports. Interest rates and GDP strongly influence the amount of imports made by Indonesia because an increase in GDP indicates economic growth, which can increase people's purchasing power and encourage imports. However, other factors such as export product quality, international demand, and trade barriers significantly influence export volume in Indonesia than interest rates, exchange rates, or GDP. However, these three factors have an effect simultaneously, suggesting that many factors, including interest and exchange rates, affect the amount of Indonesia's imports. Therefore, the quantity of imports into Indonesia can be significantly impacted by monetary and fiscal policies that influence interest rates, currency rates, and GDP. Policymakers should consider this when creating a trade and economic growth strategy.

Prior research indicates that interest rates, inflation, and exports have no appreciable effect on imports in Indonesia. Although these factors affect trade activity, their impact on imports appears modest (Ektiarnanti et al., 2023). Therefore, further research and analyses are needed to understand other variabilities that may contribute to changes in Indonesian imports. Factors such as government policies, political stability, and global economic conditions may also play an important role in Indonesia's import dynamics.

One element influencing imports is exports, which affect the price of products and services on the international market. If exports are successful, the price of goods and services will drop on the international market; on the other hand, if exports fail, the price of goods and services will rise, leading to more excellent import prices. In addition, inflation also affects imports in Indonesia. Inflation is a shift in the cost of goods and services, resulting in lower money values. Inversely, if inflation is low, goods and services will be lower, making imports less expensive. If inflation is high, goods and services will be higher, making imports more expensive; furthermore, interest rates also affect Indonesian imports. Interest rates indicate the likelihood that the price of goods or services will be bought with money. If interest rates are high, the price of goods and services will be higher, so imports will be more expensive; conversely, if interest rates are low, the price of goods and services will be lower, so imports will be cheaper.

Hipotesis

H0: Exports, inflation, and interest rates do not significantly influence imports in Indonesia.
H1: Exports, inflation, and interest rates significantly influence imports in Indonesia.

Research Methods

Data and Data Sources

This study will ascertain the relationships between Indonesia's import variables and exports, inflation, and interest rates. The World Bank provided statistics from 1994 to 2023, which was used.

Data Analysis Method

ARDL (Autoregressive et al.) analysis is a way to see how variables in an econometric model relate to each other in the long and short run. In research on the effect of exports, inflation, and interest rates on imports in Indonesia, the ARDL model can be used as follows: First, exports, inflation, and interest rates are considered independent variables, while imports are considered the dependent variable. Next, the relationship between the variables is examined using the ARDL model. In addition, to ascertain the short-term correlation between the variables, the ARDL model's error correction model (ECM) is employed. The ECM shows how quickly the system returns to equilibrium after a disturbance. Therefore, how Indonesian imports are affected by changes in exports, inflation, and interest rates in the long run and short run can be calculated using the ARDL model. It shows how these two economic variables influence each other and how changes in one variable can affect the other in the immediate and long term (Farichah, 2022).

Research Modelling

This study employs a quantitative research methodology; in actuality, it forecasts utilizing secondary data gathered over time from previous publications and blended with descriptive analysis. Quantitative research aims to test theories or hypotheses for or against them. Descriptive analysis is an example of quantitative research that aims to explain symptoms or problems now (Farichah, 2022).

Secondary data from time series with units of months used consist of imports, exports, inflation, and interest rates. Usually, secondary data is collected by an institution or agency and then distributed to the general public (Hanke & Reitsch, 1998). Because it can support new findings and complement some information from previous research, secondary data can expedite and facilitate the research process. Secondary data comes from publications published within a certain period by the World Bank regarding objects of observation in Indonesia.

Furthermore, the data will be processed using Eviews 10 with the Lag Distribution Autoregression method. This procedure aims to determine the short- and long-term effects of the i—amendment and dependent. The lag distribution autoregression technique is employed toriables. To ascertain whether there is a substantial link between the independent and dependent is employed. The effect can be evaluated using 5%. The initial phases in the ARDL model are the data stationarity test, cointegration test, and model estimation (Hardianti & Widarjono, 2017).

The Augmented Dicky Fuller (ADF) stationarity test is used to find the appropriate data regression model since the utilized data is non-stationary. Otherwise, this will result in a spurious regression result. The optimum lag can be determined at the next stage, which can then be used as a research source. It seeks to ascertain whether cointegration exists between the variables under study before performing the Autoregression Distribution Lag (ARDL) test on each variable examined using the bound and cointegration tests. The model estimation step includes estimating long-run and short-run elasticities using ARDL and ECM models. After the ARDL test is carried out, classical assumptions can be tested; using the resulting regression model as an excellent predictive tool is necessary. The model to be tested based on the econometric equation is as follows:

$IMt = \beta 0 + \beta 1EXt + \beta 2INFt + \beta 3IRTt + \beta 4EXCt + et$

Keterangan:

IM: Import

INF: Inflation

EX: Export

IRT: Interest Rate

e: Error term

Results And Discussion

Testing for stationarity of the data is a must before moving on to other variables. By doing this, we may determine whether the data is stationary or non-stationary and move on to the next test if the latter is the case.

Table 1. Stationarity Test

Variable	Unit Root	Statistic For The Adf	Probability	Description
Inflation	Level	-4.397124	0.0017	Stationary
Export	Level	-1.209183	0.6554	Not stationary
	First Diff	-4.791611	0.0007	Stationary
Import	Level	-0.022492	0.9470	Not stationary
	First Diff	-6.454755	0.0000	Stationary
Interest Rate	Level	-5.863639	0.0000	Stationary

Based on statistical tests, the inflation and interest rate variables turned out to be stationary at a level with a p-value less than 0.05. In the meantime, after the initial differentiation, the import and export variables become stationary but are not stationary on a level. This demonstrates a consistent pattern in the fluctuations of imports and exports, regardless of their magnitude. To sum up, every variable—whether at the level or after the initial differentiation—is stationary and appropriate for additional examination in econometric models.

Table 2. Cointegration Test

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.715624	57.30331	47.85613	0.0051
At most 1	0.330541	22.09446	29.79707	0.2933
At most 2	0.309316	10.85848	15.49471	0.2203
At most 3	0.017574	0.496442	3.841466	0.4811

The statistical test findings show that the model did not exhibit cointegration at any investigated levels. At the first level, even though the eigenvalue is 0.330541, the p-value (0.2933) is more significant than 0.05, and the statistical value of Trace 22.09446 is less than the critical value of 29.79707 at a significance level of 5%. This also holds for the second and third levels, where the p values are higher than 0.05, and the statistical values of Trace are lower than the crucial values at the 5% significance level. Consequently, at all investigated levels, the model does not exhibit cointegration.

After doing a stationarity test on the data, the next stage automatically sets the lag length to determine the optimal lag. Based on the provided coefficients, the lag optimum test findings are interpreted as follows:

Table 3. Optimum Lag Test

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
IMPORT(-3)	0.253126	0.223652	1.131783	0.2782
EXPORT(-4)	0.166016	0.066052	2.513398	0.0259
INFLATION	-0.364183	0.128917	-2.824933	0.0143
INTEREST_RATE(-2)	-0.260305	0.117392	-2.217406	0.0450
C	-6.569781	4.208706	-1.560998	0.1425

The analysis's findings support that Export (lag 4), Inflation, and Flowers (lag 2) significantly affect the imported variable. The import of the variable will grow by 0.166016 units for every unit increase in the export variable over the preceding four periods. In the meantime, the

import variables would drop by successively 0.364183 and 0.260305 units for every unit increase in the inflation and flower variables of the preceding two periods.
Nevertheless, the model's constant (C) or import (lag 3) does not significantly impact the imported variable. The p-value indicates that this coefficient is not statistically significant, even though increasing one unit on the imported variable of the preceding three periods would increase another variable by 0.253126 units, and the constant in the model would decrease import variables by 6.569781 units.
As a result, whereas the import variables and model constants have no discernible effect on imports, the export variables, inflation, and flowers all play significant roles. It matters for trade and economic policy.
The ARDL Bound Test is a cointegration technique developed by Pesaran, Shin, and Smith (2001) that may be used to look at long-term relationships between variables in time series data. If the F-statistic is less than I (0), there is no cointegration; if the F-statistic is between I (0) and I (1), there is no decision; and if the F-statistic is more significant than I (1), cointegration is required for the Bound Test cointegration test.

Table 4. Bound Test

Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	2.273242	10%	2.37	3.2
k	3	5%	2.79	3.67
		2.5%	3.15	4.08
		1%	3.65	4.66

The following is the interpretation of the bound test results based on the F-statistic value and critical value:
F-statistic: The value of 2.273242 indicates the F-statistic test result.
At 10%, the critical values are 2.37 to 3.2.
At 5%, the critical values are 2.79 to 3.67.
At 1%, the critical values are 3.15 to 4.08.
The model's F-statistic value (2.273242) indicates no cointegration between the variables since it is less than the crucial value at all significance levels.
The normality test is a statistical testing technique that assesses data distribution on a sample of variables or data groups to determine whether or not they follow a normal distribution. Regression models, intervening variables, and residual normal distribution can all be tested for normality using this method. A data normalcy test is a statistical approach that ascertains whether or not a given data collection is distributed normally. The primary prerequisite for conducting a normality test is that the data must exhibit a normal distribution. Normally distributed data follows a standard curve and exhibits a symmetrical distribution pattern.

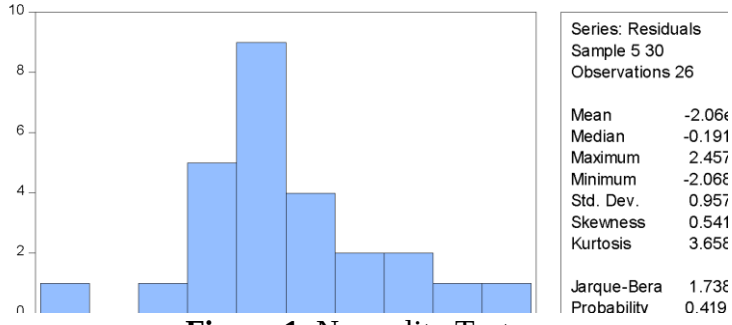

Figure 1. Normality Test

Based on the findings above, the Jarque Bera test's probability, or p-value, on the residuals is 0.419178, which is more significant than 0.05 and satisfies the condition for normalcy.
A statistical technique, the autocorrelation test, assesses whether confounders in period t and mistakes in period t-1 in a linear regression model correlate. As a result of connected observations made over time, autocorrelation develops.

Table 5. Autocorrelation Test

F-statistic	1.164610	Prob. F(2,11)	0.3477
Obs*R-squared	4.543380	Prob. Chi-Square(2)	0.1031

Considering the statistics presented before, the Breusch Godfrey LM Test report for autocorrelation analysis indicates no autocorrelation problem, with a p-value of 0.1031 larger than 0.05. The heteroscedasticity test is applied to determine if inequality exists in the residual differences between two data sets in the regression model. Homoscedasticity occurs when the difference in residuals from one observation to another does not change; conversely, heteroscedasticity occurs when the difference remains. In this study, the heteroscedasticity test can be performed graphically or non-graphically using the Breusch Pagan Godfrey test.

Table 6. Heteroscedasticity Test

F-statistic	0.219906	Prob. F(12,13)	0.9935
Obs*R-squared	4.387181	Prob. Chi-Square(12)	0.9754
Scaled explained SS	1.457725	Prob. Chi-Square(12)	0.9999

It is possible to infer that there is no heteroscedasticity issue in the data based on the findings of the heteroscedasticity study performed using the previously described Breusch Pagan Godfrey approach. A p-value larger than 0.05 indicates this. The homoscedasticity assumption is satisfied when the p-value is greater than 0.05, which shows that the error variability is independent of the independent variable values. As a result, the generated regression model is legitimate and suitable for use in additional research. After the examination of the variables under investigation. Short-term ARDL estimation can also be carried out to ascertain the short-term relationship between the independent and dependent variables.

Table 7. ARDL Model Estimation Short-term model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(Inflation (-1))	-0.520894	0.169300	-3.076756	0.0088
D(Inflation (-2))	-0.253126	0.136185	-1.858692	0.0859
D(Export)	0.968419	0.179529	5.394223	0.0001
D(Export(-1))	0.641286	0.165170	3.882590	0.0019
D(Export(-2))	-0.190215	0.122900	-1.547728	0.1457
D(Export(-3))	-0.166016	0.049346	-3.364316	0.0051
D(Interest_Rate)	-0.436284	0.124684	-3.499125	0.0039
D(Interest_Rate(-1))	0.260305	0.092369	2.818113	0.0145
CointEq(-1)*	0.474380	0.123045	3.855322	0.0020

First, the inflation variable with lag -1 has a coefficient of -0.520894. This shows that changes in inflation in the previous period harmed imports. In other words, when inflation increases, imports tend to decrease. Second, the export variable has a coefficient of 0.968419. This means that changes in exports contribute positively to imports. When exports increase, imports also tend to increase. Third, the interest rate variable has a coefficient of -0.436284. This shows that changes in interest rates harm imports. When interest rates increase, imports tend to decrease. Finally, the CointEq(-1) variable has a coefficient of 0.474380. If this coefficient is significant, there is a cointegration relationship between the variables in the

model. The long-term model estimation test can be conducted after the short-term ARDL estimation. This test aims to find the long-term link between the independent and dependent variables.

Table 8. ARDL Model Estimation Long-term model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Export	0.004124	0.357929	0.011522	0.9910
Inflation	0.767704	0.458545	1.674216	0.1180
Interest_Rate	0.795153	0.554296	1.434527	0.1750
C	13.84921	4.494917	3.081081	0.0088

The coefficient for "Export" is 0.004124. This indicates that a one-unit export increase is associated with a minimal import increase (approximately 0.004 units). The t-statistic (0.011522) suggests that this coefficient is not statistically significant (p-value > 0.05). The coefficient for "Inflation" is 0.767704. This means that a one-unit increase in inflation is associated with an increase in imports (approximately 0.768 units). The t-statistic (1.674216) indicates that this coefficient is not statistically significant at the 5% significance level (p-value > 0.05).

The coefficient for "Interest Rate" is 0.795153. This suggests that a one-unit increase in interest rates is associated with an increase in imports (approximately 0.795 units). However, the t-statistic (1.434527) implies that this coefficient is not statistically significant (p-value > 0.05). The constant term C is 13.84921. This represents the intercept when all other independent variables are zero. The t-statistic (3.081081) indicates that the constant term is statistically significant (p-value < 0.05).

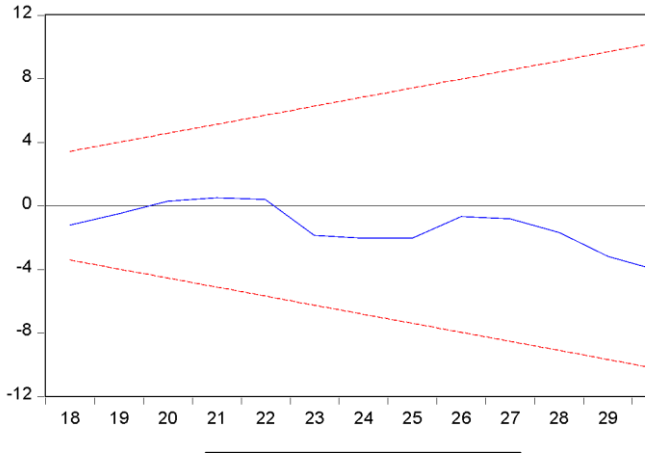

Figure 2. Model Stability Test using Cusum Test

The CUSUM test results are displayed on the graph. Apply the CUSUM test to find subtle, long-lasting deviations from the intended mean. In this graph, the blue line represents the CUSUM statistic, and the red dotted line represents the 5% significance level. The blue line (CUSUM) fluctuates around zero but does not cross the red dotted line (5% significance). This shows no significant mean shift, indicating that the model is stable.

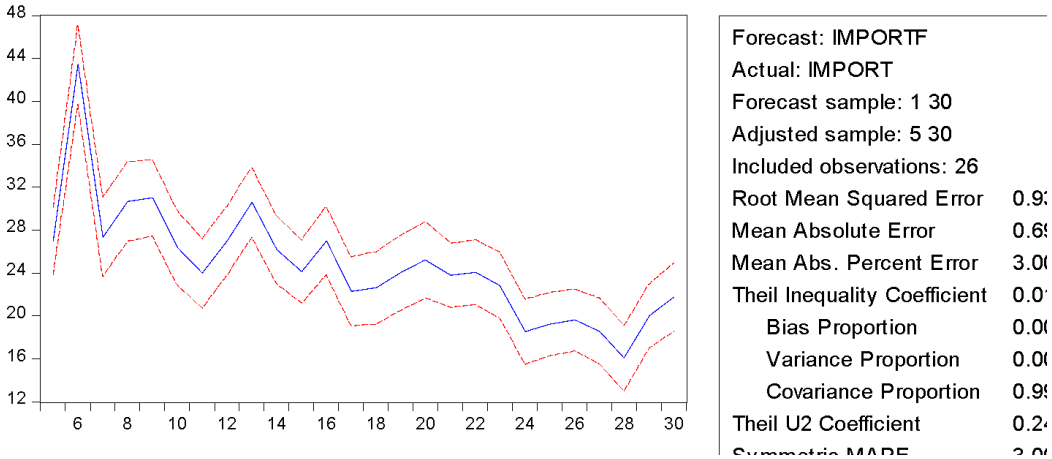

Figure 3. Forecast

The forecasting or prediction model is stable, as indicated by the blue lines in the output graphic above, which display the upper and lower bounds of the 5% error degree.

Conclusions

Inflation affects imports. When inflation increases, imports tend to decrease. That is, changes in inflation in the previous period harmed imports. Changes in exports have a positive effect on imports. When exports increase, imports also tend to increase. Changes in interest rates harm imports. When interest rates increase, imports tend to decrease. In the long run, if exports increase, imports also tend to increase, although the impact is minimal. However, there is no substantial evidence that this relationship is statistically significant. Increases in inflation are associated with increased imports. However, the effect is negligible. However, there is no substantial evidence that inflation significantly affects imports. Increases in interest rates are also associated with increased imports, but the impact is limited. However, there is no solid statistical evidence to confirm this relationship.

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