

TESTING THE VALIDITY OF THE IS CURVE IN INDONESIA ARDL APPROACH

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Abstract

This study aims to determine the effect of interest rates, exchange rates, inflation and GDP on the flow of foreign direct investment (FDI) in Indonesia and the relationship of interest rate variables to FDI using the IS curve. This study utilizes time series data from the first quarter of 2010 to the fourth quarter of 2023, the data is from the website of Bank Indonesia and the Central Bureau of Statistics. The model used in this study is ARDL (Autoregressive Distributed lag), then processed using Eviews 10. The data used Maximum Lag 2 and Minimum Lag 4. The study found that the interest rate variable had a significant positive effect in the short term but a significant negative effect in the long term on FDI. The exchange rate variable has a significant negative effect at the 10% level in the short term and has no effect in the long term on FDI. Meanwhile, Inflation and GDP variables in the long run and short run have no influence on FDI.

Keywords: ARDL; FDI; Interest Rate; Exchange Rate; Kurve IS

INTRODUCTION

Indonesia is one of the countries that adheres to an open economy and has a strong relationship with domestic and international economic impacts (Shara & Khoirudin, 2021) . As a developing country, Indonesia needs capital injection from investors to accelerate economic development. Domestic savings or national savings that serve as the main source of funding for economic development have limitations due to low income levels, so the government needs to find sources of financing from abroad through foreign direct investment or FDI (Eliza, 2013) Meanwhile, it cannot continue to rely on foreign debt to obtain the necessary capital (Tri Septifany et al., 2015). Indonesia's participation in economic relations with various countries opens up opportunities to attract foreign investment.

Foreign direct investment (FDI) has a very crucial contribution in supporting economic growth for a country and is widely recognized, especially in developing countries. Foreign investors make long-term investments usually realized through the establishment of companies, development of production facilities, and procurement of equipment and raw materials (Eliza, 2013) . Foreign Direct Investment (FDI) plays a role in the industrialization process by filling the existing gaps in management, entrepreneurial spirit, production technology and work skills. Companies not only offer funds and set up new factories, but also provide the necessary support for overall development, such as training and work experience. The company will train local managers to understand how to build cooperation with foreign banks, obtain alternative resources, as well as expand the marketing network to the global level and bring insights and advanced technology in production that encourages the community to adapt to modern technology that helps employment, which will have an impact on reducing inequality between the rich and the poor (Yalta, 2013). Thus, the availability

of investment can increase capital or human resources (HR) and infrastructure that can improve the quality of skills in the target country of investment. Meanwhile, for investors, foreign direct investment is one way to expand operations and markets and can increase profitability. Furthermore, Foreign Direct Investment (FDI) also has a positive impact on efforts to reduce the gap between the target amount of foreign exchange required and the actual realization of foreign exchange from exports added to net foreign aid. Thus, the entry of FDI not only reduces the balance of payments deficit, but is able to reduce the deficit in a longer period of time (Adiyudawansyah & Santoso, 2018).

If the circumstances and factors in a country are favorable, it will result in a good investment process that will influence the decision of foreign investors to invest in the country. Indonesia still has a great opportunity to become a destination for foreign investment, because it has abundant natural resources, a large domestic market and a large population. Many foreign investors decide to invest in Indonesia because the majority of Indonesian people have more consumptive characteristics (Putriyanti, 2022).

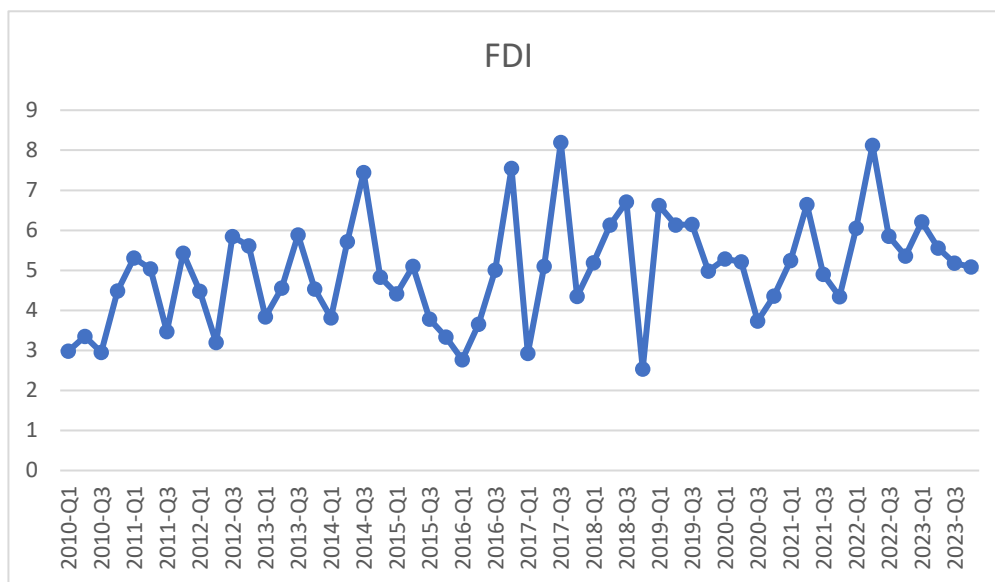


Figure 1. Chart of Foreign Direct Investment 2010Q1-2023Q4
Source: Bank Indonesia (processed)

Figure 1 shows that FDI inflows in Indonesia from 2010Q1-2023Q4 faced inconsistent changes that were influenced by various factors, such as global economic conditions, ineffective bureaucratic systems, difficulties in obtaining funds, and unfavorable labor regulations. In addition, frequent policy changes, harmful tax regulations, corruption and unstable government conditions also contributed. The global crisis that hit in 1998 affected Indonesia's economy, reflected in a decline in economic growth, in addition to causing the economy to collapse. ketidakstabilan politik dan keamanan, yang membuat banyak investor ragu untuk berinvestasi di Indonesia due to high risk. This condition causes the amount of foreign investment to decline (Hossain et al., 2024) .

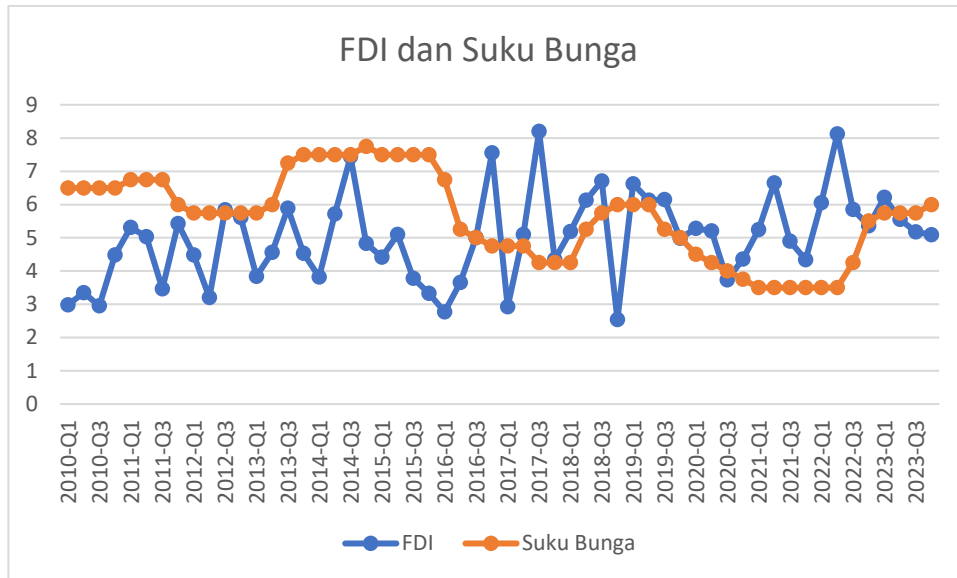


Figure 2. Chart of FDI and Interest Rate from 2010Q1-2023Q4
Source: Bank Indonesia (processed)

Figure 2 shows other factors that affect the rise and fall of FDI, one of which is the amount of interest rates of a country. According to (Nurmasari & Arifin, 2018) investors will pay attention to the interest rate because when the interest rate exceeds the rate of return on capital, the investment to be made becomes unprofitable, this condition will affect investor interest. The problem in investment is related to determining the amount and opportunity based on the theory of Marginal Efficiency of Investment (MEI), namely someone will invest if the expected rate of return on investment when there is an additional investment unit under certain conditions and time is greater than the prevailing interest rate or in other words the profit generated from the investment must be greater than the interest rate. According to (Iswardono, 1999) there are two factors that affect the expected profit from investment, namely objective factors and subjective factors. Objective factors that affect profit expectations such as technology, infrastructure, relative prices of production factors and future demand for goods. Furthermore, the increase in interest rates makes investors prefer to save rather than invest. This means that if the increase in interest rates is not matched by an increase in returns, investors will switch to other more promising instruments (Melinda Dewi & Cahyono, 2022). Such conditions require the Indonesian government to conduct comprehensive research to understand how high interest rates are needed in the economy, as this has an impact on the flow of domestic or foreign investment (Anwar, 2016).

However, in 2014Q1-2014Q3, the interest rate of 7.5 actually encouraged a significant increase in FDI, previously in Q1 it was 3.817 rising to 5.72 and rising again to 7.444. This condition was influenced by confidence in political stability in Indonesia, because that year coincided with the election of Joko Widodo as president who brought an economic reform agenda such as bureaucratic reform (simplifying business licenses) and infrastructure development so that it increased foreign investors' confidence in the long-term prospects of the economy in Indonesia which had an impact on the profitability obtained by investors. However, this condition is different from the concept in the IS curve which states that if a country's interest rate increases, investment inflows will decrease and if interest rates fall, there will be an increase in investment.

In addition to interest rates, a country's currency exchange rate is considered to be a factor in the entry of foreign investment into the destination country. The strength of a country's currency is able to increase foreign investment profits and become a sign of the economic stability of the country. The stable exchange rate makes it easier for investors to calculate the production costs to

be incurred and makes it easier to calculate the return or profit to be obtained. Then the weakening of the rupiah exchange rate will cause an increase in costs borne by investors, thus reducing the level of profit earned by investors (Tri Septifany et al., 2015). In this study using data on FDI, interest rates, exchange rates, inflation and GDP in 2010Q1-2023Q4 it was found that interest rates had a significant negative impact on FDI in the long term while in the short term, interest rates had a significant positive impact on FDI. The results of this study are in accordance with research conducted by (Fuji Astuty, 2017) namely interest rates have a negative and significant relationship to Foreign Direct Investment in Indonesia. Then the exchange rate has a negative and significant impact on the 10% level in the short term and has a positive and insignificant effect in the long term. Furthermore, Inflation and GDP variables have no effect on foreign direct investment inflows. This condition is in line with (Wage, 2020) which states that inflation and GDP have no effect on FDI in Indonesia.

The research gap in this study is to develop a model to test the validity of the IS curve in Indonesia using the Interest Rate variable using other supporting variables, namely Exchange Rate, Inflation and GDP, and apply stability tests to the three models with the CUSUM approach and the Cusum of square test to get an unbiased model. This study aims to test the hypothesis of FDI in Indonesia and provide information to the literature such as the validity of IS in Indonesia, knowing the dynamic relationship of interest rates to FDI and knowing the long-term and short-term estimates of interest rates on FDI.

LITERATURE REVIEW AND HYPOTHESIS FORMULATION

Foreign Direct Investment (FDI) plays a crucial role in the economic growth of a country, including Indonesia. FDI is defined as long-term investment made directly by foreign investors in domestically-owned businesses. Foreign direct investment (FDI) is a form of investment that tends to be stable in the long run. This will contribute to economic recovery, which requires substantial funding and large-scale employment. In addition, the entry of FDI signals the confidence of foreign investors to carry out economic activities in a country which in turn will encourage capital inflows (Aprianto et al., 2018).

FDI can contribute to increasing production capacity, job creation, technology transfer, and increasing the competitiveness of domestic industries. The presence of foreign investment is also often associated with infrastructure improvements and increased domestic market efficiency, which in turn supports overall economic growth. FDI has various impacts on recipient countries, both positive and negative. Positive impacts include contributing to economic growth through increased production and exports, technology transfer that enables the upskilling of the local workforce, and job creation for the community. However, negative impacts also need to be considered, such as the dominance of foreign companies that can threaten the sustainability of local businesses, economic dependence that can cause instability if investors withdraw their capital suddenly, and exploitation of natural resources that can harm the environment and local communities. In various studies that have been conducted in Indonesia, it is found that FDI is influenced by several macroeconomic factors, such as Gross Domestic Product (GDP), inflation, interest rates, and exchange rates. Studies conducted by several researchers in Indonesian academic journals show that GDP has a positive relationship with FDI, where stable and increasing economic growth is attractive to foreign investors. This is because a growing market promises greater profit opportunities for foreign investment.

In addition, inflation also has an influence on FDI. High inflation generally reflects economic instability and may discourage foreign investors due to increased investment risk. Conversely, controlled inflation can create a more conducive business environment for FDI inflows. Interest rates are also an important variable in attracting foreign investment. Interest rates are an important factor influencing foreign investment decisions. Higher interest rates may increase the cost of capital, thereby discouraging foreign investors from investing. Conversely, low interest rates create a more conducive environment for foreign investment. Research (Batubara et al., 2022) shows that interest rates have a significant influence on FDI in Indonesia.

Exchange rate is another factor that affects FDI, especially in the context of investment competitiveness. Depreciation of a country's exchange rate can make domestic assets cheaper for foreign investors, thus increasing FDI inflows. However, high exchange rate volatility can increase uncertainty for investors, which in turn can discourage foreign investment. Exchange rate fluctuations can affect the expected returns from foreign investment. Depreciation of the local currency can make domestic assets cheaper for foreign investors, thereby increasing FDI. However, high exchange rate volatility can add to investment risk. A study by (Tambunan et al., 2015) found that the exchange rate of the rupiah against the US dollar negatively affects the realization of FDI in Indonesia. Interest rate is an important variable in foreign direct investment (FDI) decisions as it relates to the cost of borrowing and the rate of return on investment.

RESEARCH METHODS

Data Source

This research uses time series data in the form of quarters from 2010Q1-2023Q4 in Indonesia. This study uses 4 independent variables, namely interest rates, exchange rates, inflation and GDP. As well as using one dependent variable, namely FDI. The data source taken for this study comes from Bank Indonesia.

Unit Root Test

Stationarity test is the first step in analyzing time series data. This study uses the Augmented Dickey-Fuller (ADF) and Philips-Perron (PP) approaches to conduct stationarity tests, if the ADF statistical value is smaller than the critical value, then the variable is considered non-stationary at Level 1 (0) and vice versa, but can be converted into the first difference form if it is not stationary. A cointegration test can be performed if the variable is stationary at the 1(1) first difference level. The ARDL approach has the assumption that the variables can be stationary at 1(0) and 1(1). The unit root cannot be transformed into the second difference 1(2), because it can produce a regression that is wrong and cannot be interpreted (Kurniawan & A'yun, 2022).

ARDL Model and Bound Cointegration Test

The cointegration test using the tied test approach aims to estimate the long-run coefficients through the F test. Then, the estimation of short-run coefficients of all variables can be done simultaneously with the estimation of long-run coefficients using a model with error correction mechanism (ECM) or ARDL error correction format. The format can determine the speed of adjustment of the equilibrium direction with the following formula:

$$\phi(L)y_t = \alpha_0 + \alpha_1 t + \beta' + \sum_{i=0}^{q-1} \beta_j^* \Delta x_{t-j} - \phi^*(L) \Delta y_t + \mu_t \quad (1)$$

Where $\phi(L) = 1 - \sum_{j=1}^p \phi_j L^j$, dan $\beta(L) = \sum_{j=0}^q \beta_j L^j$, y_t is the dependent variable, x is the independent variable and L is the lag operator. The ARDL model requires an ECM model with short-term adjustment and error correction methods used to achieve long-term equilibrium (Kurniawan & A'yun, 2022). This study uses economic variables such as interest rates, exchange rates, inflation and GDP. The model equation is as follows:

$$FDI_t = \alpha_0 + \alpha_1 \ln Suku Bunga_t + \alpha_2 \ln Kurs_t + \alpha_3 \ln Inflasi_t + \alpha_4 \ln PDB + \varepsilon_t \quad (2)$$

Where $\ln FDI$ is Foreign Direct Investment; $\ln Interest Rate$ is Bank Indonesia Interest Rate; $\ln Equity$ is exchange rate against US\$; $\ln Inflation$ is Inflation; $\ln PDB$ is Gross Domestic Product; $\ln$ notation indicates the data is converted into natural logarithm; values 1, 2, 3 and 4 are coefficient values; α_0 is constant value; and ε_t is error term. The formula in the ARDL error correction model is as follows:

$$\Delta \ln FDI_t = \alpha_0 + \sum_{i=1}^{n1} \alpha_1 \Delta \ln Suku Bunga_{t-1} + \sum_{i=1}^{n1} \alpha_2 \Delta \ln Kurs_{t-1} + \sum_{i=1}^{n1} \alpha_3 \Delta \ln inflasi_{t-1} + \sum_{i=1}^{n1} \alpha_4 \Delta PDB_{t-1} + \delta_1 \ln Suku Bunga_{t-1} + \delta_2 \ln Kurs_{t-1} + \delta_3 \ln inflasi_{t-1} + \delta_4 PDB_{t-1} + \mu_t \quad (3)$$

Where the parameters α_t , δ_t $t = 1, 2, 3, 4$ as long-run multipliers, while the function parameters $\alpha_1, \alpha_2, \alpha_3, \alpha_4$ as short-run coefficients in the ARDL model. The cointegration test in the ARDL model is to test the F-statistic. The initial hypothesis (null hypothesis) indicates that there is no cointegration or disintegration ($H_0: \delta_1 = \delta_2 = \delta_3 = \delta_4 = 0$), while the alternative hypothesis indicates that there is cointegration among the variables. If integrated, then the next step is to estimate the long-run and short-run adjustments. The CUSUM and CUSUMQ approaches are applied to the residual values of the model to test the stability of the model.

RESULTS AND DISCUSSION

Table 1 is a summary of the processed descriptive statistical data, where all variables in the model such as Foreign Direct Investment (FDI), Interest Rate, Exchange Rate, Inflation and Gross Domestic Product (GDP) have a mean value higher than the standard deviation value. This indicates that all variables in the model show a high level of variability. The skewness value indicates the distribution of the data. If the skewness value is negative, the data tends to lean to the left, then if the skewness value is positive, the data tends to lean to the right. Interest Rates, Exchange Rates and Gross Domestic Product have negative skewness values so that the data tends to lean to the left. Meanwhile, the Foreign Direct Investment (FDI) and Inflation variables show a positive skewness value so that the data tends to lean to the right.

During the research period FDI had an average of 5.010375, the distance or range between Maximum and Minimum is high indicating an increase during the research period for FDI. From the first quarter of 2010 to the fourth quarter of 2023 shows that the Indonesian government is serious in increasing investment for infrastructure development to support economic development.

Table 1. Descriptive statistics

Variabel	FDI	Suku Bunga	Kurs	Inflasi	PDB
Mean	5.010375	5.638393	12756.11	4,249464	4.741964
Maximum	8.197000	7.750000	16367.00	8.400000	7.100000
Minimum	2.539000	3.500000	8597.000	1.330000	-5.300000
Std.Dev	1.322288	1.292390	2288.352	1.882401	2.330052
Skewness	0,270797	-0.118121	-0.644139	0.52755	-2.917047
Kurtosis	2.829235	1.984309	2.002989	2.488221	11.38474
Jacque-Bera	0.752466	2.537355	6.191941	3.208694	243.4612
Obsevation	56	56	56	56	56

Notes: Processed Data

The kurtosis value is used to assess whether the data has a normal distribution or not. If the kurtosis value reaches 3 or close to it, it can be said that the data is normally distributed. Then, if the kurtosis value exceeds 3, it indicates that the data distribution is in the highest position. Conversely, if the kurtosis is below the number three, then the data distribution is considered flat. The variables that show a kurtosis value of more than three are the FDI and Gross Domestic Product variables, indicating that the data distribution is at a high peak. Meanwhile, other variables with kurtosis values below 3 indicate flat data distribution. All variables have the same number of observations, which is 56 observations.

Initial testing is needed to ensure that the time series data is stationary before modeling. This is because usually time series data are stochastic (results that cannot be predicted with certainty), have unstable trends, or have stationary problems. A data is considered stationary if its average

remains the same over time (constant) and its variance must also remain or show no tendency towards a particular trend. This study applies unit root tests using the Augmented Dickey-Fuller (ADF) and Philips-Perron (PP) approaches to analyze non-stationary stochastics. Unit root testing applies “trend and intercept” as a “trend” unit root test and uses “intercept” for unit root testing with “non trend” (Kurniawan & A’yun, 2022) In the ADF approach, the t statistic value tends to be negative. If the t statistic value shows a positive number, the data may experience stationarity problems and potentially autocorrelation. Furthermore, PP testing has the advantage of not requiring lags and being able to overcome autocorrelation and heterocedesticity problems. The following are the results of stationarity testing conducted with the ADF and PP approaches processed using Eviews 10.

Table 2. ADF and PP unit root test results

Variabel	ADF		PP	
	Intercept	Trend & Intercept Level	Intercept	Trend & Intercept
FDI	-6,531091***	-6,728579***	-6,498086***	-7,183255***
Suku Bunga	-2,146550	-2,451096	-1,760321	-1,899000
Kurs	-1,179423	-2,507256	-1,140917	-2,507256
Inflasi	-2,265755	-3,189556	-2,425827	-3,405063
PDB	-2,965410	-3,171470	-3,063301	-3,313604
<i>First Difference</i>				
FDI	-8.145979***	-8.115070***	-30.94106***	-36.10244***
Suku Bunga	-4,331274***	-4,322823***	-4,262596***	-4,245014***
Kurs	-10,47510***	-10,42197***	-11,06983***	-11,22994***
Inflasi	-5,767552***	-5,716350***	-8,462319***	-8,380370***
PDB	-8,230174 ***	-8,158405***	-8,220512***	-8,150168***

Notes: The *** and * indicate statistically significant levels at 1%, 5% and 10%. The values in brackets () represent the lag length automatically selected using the Schwarz In-formation Criterion (SIC) for ADF, then the PP test values are obtained by the automatic bandwidth, which is selected by the Newey-West method using the Bartlett Kernel.

Table 2 shows the results of the ADF and PP unit root tests, where Foreign Direct Investment (FDI), Interest Rate, Burs, Inflation and Gross Domestic Product are stationary at the first difference of 1(1) based on the unit root test results of the ADF or PP approach. all variables produce mixed values in the unit root test at the 1(0) level. At the 1(0) level only the FDI variable is stationary and the interest rate variable. Exchange rate, inflation and GDP are not stationary at 1(0). The unit root test does not use the second difference 1(2) because it has the potential to produce a wrong regression. From the unit root test results, the ARDL model can be applied.

Table 3. Cointegration Test Analysis Bound test analysis

Test Statistic	Value	Signif	Batas Bawah 1(0) Model (2, 4, 4, 1,0)	Batas atas 1(1)
F-Statistic	9,645853***	10%	2,2	3,09
K	4	5%	2,56	3,49
		2,5%	2,88	3,87
		1%	3,29	4,37

Note: ***, ** and * indicate statistically significant levels at 1%, 5% and 10% respectively. The values in parentheses () represent the lag length automatically selected using the Schwarz

Information Criterion (SIC). Cointegration test with tied test approach is used to obtain the equilibrium of the model in the long run. The model is built to test the hypothesis of what variables affect FDI in Indonesia, where FDI is the dependent variable. The test results in table 3, show that the F-statistic value exceeds the F critical value of the upper bound 1(1) and the lower bound 1(0). The F-statistic value obtained is 9.645853 which is higher than the upper bound 1(1) at 10%, 5%, 2.5%, 1% significance levels of 3.09, 3.49, 3.87 and 4.37. The lower bound 1(0) at the same significance level has values of 2.2, 2.56, 2.88, 3.29 respectively. Thus, the analysis of table 3 shows the existence of cointegration in all variables which means that the model can estimate the short term and long term.

Table 4. Diagnostic test analysis

Tes diagnostik	(p-value)
Normalitas Prob. Jarque-Berra	0,350432
Autokorelasi Prob. Chi-Square (2)	0,9234
Heterokedastisitas Prob. Chi-Square (15)	0,5425

Source: Data Processing Results, Eviews 10

Table 4 shows the results of diagnostic tests consisting of normality, serial correlation and heterokedasticity values. Diagnostic tests can be used to clearly assess the feasibility of the model built. Jarque-Bera is used in the normality test, so the results can show that the variables have normally distributed data. A good diagnostic test if the probability value is more than 5% or 0.05, the diagnostic test results in this study show the probability value is more than 0.05. It can be concluded that the feasibility of the model built is clear.

Table 5. Short-term coefficient results

Variabel	Coefficient	Std.Error	t-Statistic	Prob.
C	0.820593	2.295321	0.357507	0.7228
LOG(Y(-1))*	-1.476662	0.201016	-7.346009	0.0000
X1(-1)	-0.127197	0.046747	-2.720983	0.0100
LOG(X2(-1))	0.216610	0.236373	0.916390	0.3656
X3(-1)	0.055970	0.035092	1.594953	0.1195
X4**	-0.000531	0.016267	-0.032627	0.9742
DLOG(Y(-1))	0.353753	0.131785	2.684307	0.0109
D(X1)	-0.014356	0.101186	-0.141878	0.8880
D(X1(-1))	0.205033	0.097014	2.113432	0.0416
D(X1(-2))	-0.130838	0.109129	-1.198930	0.2384
D(X1(-3))	0.276556	0.099644	2.775446	0.0087
DLOG(X2)	0.210578	0.920537	0.228755	0.8204
DLOG(X2(-1))	0.232147	0.985460	0.235573	0.8151
DLOG(X2(-2))	-1.842305	0.939272	-1.961418	0.0576

DLOG(X2(-3))	-1.257174	0.843755	-1.489975	0.1449
D(X3)	0.012286	0.035019	0.350843	0.7278
CointEq(-1)*	-1.476662	0.181884	-8.118702	0.0000

Source: Data Processing, Eviews 10

From table 5, it shows the cointEq (-1) value with a coefficient of -1.476662, meaning that in the short term the above model is valid and has short-term cointegration. Based on the short-term estimation results, it shows that the Interest Rate variable (X1) has a positive and significant effect on FDI with a probability value of 0.0416 and 0.0087. In short-term theory, if the interest rate increases by 1 percent, FDI will increase by 0.205033 percent or if the interest rate increases by 1 percent, it will increase FDI by 0.276556. This could happen because in the short term investors often look at short-term economic conditions which assume that high interest rates are evidence of efforts to control inflation and maintain economic stability so as to increase their confidence to invest and investors perceive high interest rates as an opportunity to achieve greater profits in the short term. These results are not in line with research conducted (Tri Septifany et al., 2015) which states that interest rates have a significant negative effect on FDI.

The exchange rate variable (X2) has a significant negative effect on Foreign Direct Investment (FDI) with a probability value of 0.0576, that is, when the exchange rate increases by 1 percent, FDI will decrease by 1.842305 in the short term. This condition can occur due to fluctuations in exchange rates which create uncertainty in the economy and increase the risk of loss for investors. In addition, exchange rate instability can increase transaction costs and reduce the competitiveness of local goods in the global market, when a country's currency strengthens compared to other currencies causes the price of the country's products to be more expensive for foreign markets and when the currency value weakens, the price of the country's products becomes cheaper, as a result economic instability affects the decision of investors to invest and will cause a decrease in the flow of foreign direct investment (Tambunan, 2015). However, the findings in this study in the long run, the exchange rate has no significant effect on FDI with a probability value of 0.3560, in line with the findings of (Tulong & Topowijono, 2015) who said that the exchange rate has no impact on the volume of FDI in Indonesia. Fluctuations in exchange rates tend to occur in the short term, while the characteristics of FDI are decisions made for the long term, so that changes in exchange rates are less responsive by foreign investors. Then the long-run estimation is also conducted. The following are the results of long-term estimation using Eviews 10.

Table 6. Long-term coefficient results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Suku Bunga	-0,086138	0,031712	-2,716254	0,0101
Kurs	0,146689	0,156876	0,935058	0,3560
Inflasi	0,037903	0,024010	1,578629	0,1232
PDB	-0,000359	0,011017	-0,032624	0,7239
C	0,555708	1,560744	0,356053	0,7239

Source: Data Processing Results, Eviews 10

The long-term estimation results show that the interest rate variable has a negative and significant impact on foreign direct investment (FDI) with a probability value of 0.0101. This means that if interest rates increase by 1 percent, FDI decreases by 0.086138. These results differ from the short-term estimation results that show interest rates have a positive effect on FDI inflows. However,

in general, investment focuses on long-term conditions, high interest rates in the long run can cause various problems such as increasing borrowing costs and inhibiting economic growth which will have an impact on reducing investor attractiveness, so interest rate policy must be carefully managed and reviewed in order to ensure a balance between maintaining economic stability and attracting investment. The results of this study are in accordance with (Putri et al., 2021) which shows that interest rates have a significant negative impact on FDI. The relationship between interest rates and FDI is known as the goods market which can be explained using the IS curve and is also related to the money market.

The movement of the goods market is strongly influenced by interest rates and investment. When interest rates are high, the cost of borrowing for firms will increase which will result in higher expenditure on the purchase of capital goods (such as machinery or other equipment), making investment more expensive. In addition, high interest rates usually strengthen the domestic currency exchange rate, making export goods more expensive. This may lead to a lack of interest from foreign investors as it is perceived to reduce profitability. High interest rates tend to encourage investors to switch to bond or deposit instruments that offer higher returns (Sirait et al., 2023). This suggests that high interest rates will affect both domestic investment inflows and FDI inflows.

According to Keynes, interest rates are determined by the supply and demand for money in the money market. Money plays a role in economic activity, while fluctuations in interest rates can affect investment flows that impact Gross National Product (GNP), which is the total value of goods or services produced by individuals living in the country and abroad within one year. The equation for the goods market is

$$Y = C + I + G$$

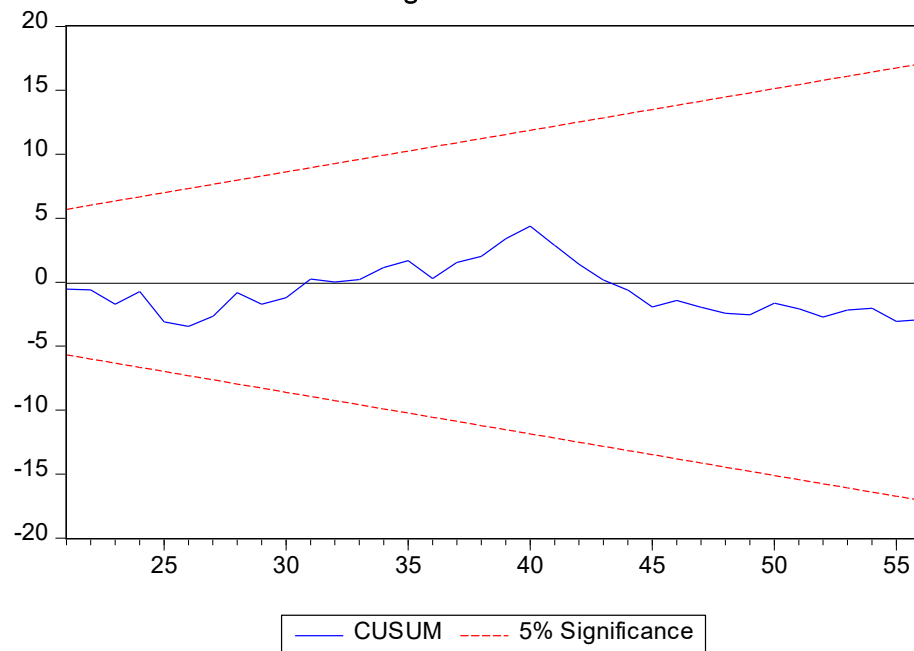
Where the equation can shift the IS curve. The first cause of IS change is a change in fiscal policy (G), where the government increases government spending (shifting the IS curve to the right), reduces government spending (shifting the IS curve to the left) and the government can also raise taxes which can cause a decrease in consumer spending (shifting the IS curve to the left) or reduce taxes which increase consumer spending (shifting IS to the right). The second is the change in consumer savings rate C, that is, if consumers decide to save more, the marginal consumption tendency decreases, meaning that consumer spending decreases (shifting the IS curve to the left), then if consumers decide to save less, the marginal consumption tendency increases, meaning that consumer spending increases (shifting the IS curve to the right). The third is the change in investment (I), that is, if consumers or companies feel confident about the future, they will invest more regardless of the interest rate, so it will increase investment (shifting the IS curve to the right), but if consumers or companies are less confident about the future, they will invest less regardless of the interest rate, so it will decrease investment (shifting the IS curve to the left).

According to (Sirait et al., 2023) fluctuations in interest rates that vary not only affect investment flows, but also have a very broad effect on people's lives. It can affect individual choices in terms of consumption, bond purchases and savings. In addition, interest rates are also related to the health of the economy in terms of investors' decisions to invest in new projects or increase capacity, which is related to market equilibrium. Market equilibrium relates to the demand and supply of a particular good, as well as how the forces of demand and supply and the prevailing interest rate affect the setting of the market equilibrium price. Income is key in aggregate equilibrium.

The exchange rate (X2) has no significant impact on Foreign Direct Investment (FDI) with a probability value of 0.3560. This condition may occur because investors focus on conditions that affect profits in the long run, such as government policies, adequate infrastructure, political stability and interest rates. This finding is in line with (Purba et al., 2015) which states that exchange rates have no impact on FDI flows.

Next is the model stability test which consists of, CUSUM (Cumulative Sum of Recursive Residual) and CUSUMQ (Cumulative Sum of square of Recursive Residual). The following are the results of the stability test:

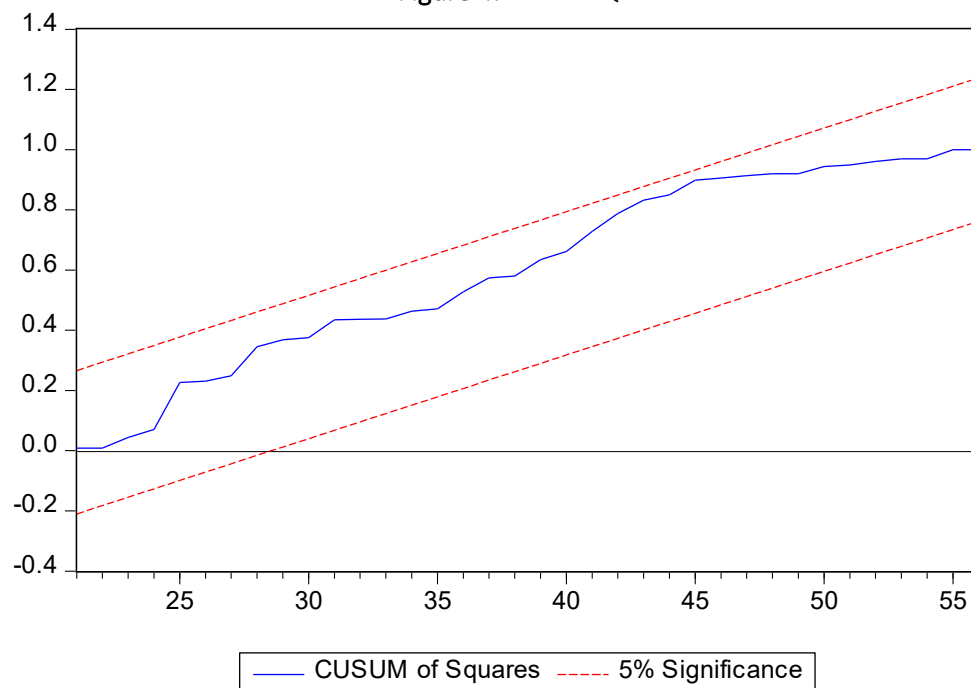
Figure 3. Cusum Test



Source: Data Processing, Eviews 10

Based on Figure 3, the two red lines show the lower limit and upper limit of movement based on analysis at the 5% significance level, then the blue line is the W_r quantity plot which shows that the line moves in the middle and does not cross the lower limit or upper limit, so it can be interpreted that the estimated model has a good level of stability.

Figure 4. CUSUMQ Test



Source: Data Processing Results, Eviews 10

In Figure 4 above, the results of the CUSUMQ test show that the blue graph or Sr quantity plot remains at the lower limit and upper limit at the 5% significance level. It can be concluded that both stability tests, namely CUSUM and CUSUMQ, along with their coefficients and regression models are in a stable condition.

CONCLUSION

This study aims to determine and analyze the macroeconomic variables that have an impact on the flow of Foreign Direct Investment (FDI) in Indonesia and the relationship between the Interest Rate variable and FDI using the IS Curve. The findings of this study indicate that the interest rate variable has a significant positive impact in the short term because investors consider an increase in interest rates an effort from a country to control inflation and maintain economic stability, these conditions increase their confidence to invest and increase the profits to be obtained. However, in the long term, interest rates have a significant negative impact because generally investments focus on long-term conditions, high interest rates can cause various problems in the economy that will affect the decisions of investors which will have an impact on reducing FDI. Then showing the relationship between interest rates and FDI using the IS curve (goods market), namely fluctuations in interest rates not only affect FDI but can also have a broad effect on people's lives and affect GNP, which ultimately results in a shift in the IS curve and the equation in the goods market has the potential to shift the IS curve.

The exchange rate variable has a significant negative impact on Foreign Direct Investment (FDI) in Indonesia in the short term because exchange rate fluctuations can increase the risk that will be accepted by investors, but does not show a significant impact in the long term because investors focus on conditions that affect profits in the long term such as government policies, political stability, adequate infrastructure and interest rates. While Inflation and GDP variables have no impact in the long and short term on Foreign Direct Investment (FDI).

BIBLIOGRAPHY

- Adiyudawansyah, A., & Santoso, D. B. (2018). *Analisis Faktor-Faktor Yang Mempengaruhi Foreign Direct Investment Di Lima Negara ASEAN*.
- Anwar, C. J. (2016). FAKTOR-FAKTOR YANG MEMPENGARUHI FOREIGN DIRECT INVESTMENT (FDI) DI KAWASAN ASIA TENGGARA. *Media Trend*, 11(2), 175. <https://doi.org/10.21107/mediatrend.v11i2.1621>
- Aprianto, R., Asmara, A., & Sahara. (2018). *Determinan Aliran Masuk Foreign Direct Investment ke Negara-negara Berpendapatan Rendah: Analisis Data Panel* (Vol. 7, Issue 2).
- Batubara, A. A., Aliyah, C., Harahap, A. H., & Izza, S. N. (2022). *ANALISIS PENGARUH KURS DAN INFLASI TERHADAP INVESTASI DI SUMATERA UTARA PERIODE 2001-2020*.
- Eliza, M. (2013). *ANALISIS PENGARUH VARIABEL MAKROEKONOMI TERHADAP INVESTASI ASING DI INDONESIA (TAHUN 2000:1-2011:4)*.
- Fuji Astuty. (2017). ANALISIS INVESTASI ASING LANGSUNG DAN FAKTOR-FAKTOR YANG MEMPENGARUHINYADI INDONESIA. In *Jurnal Mutiara Akuntansi* (Vol. 2, Issue 2).
- Hossain, M. S., Voumik, L. C., Ahmed, T. T., Alam, M. B., & Tasmim, Z. (2024). Impact of geopolitical risk, GDP, inflation, interest rate, and trade openness on foreign direct investment: Evidence from five Southeast Asian countries. *Regional Sustainability*, 5(4). <https://doi.org/10.1016/j.regsus.2024.100177>
- Iswardono. (1999). *SUKU BUNGA DITURUNKAN, INVESTASI AKAN MENINGKAT ?*
- Kurniawan, M. L. A., & A'yun, I. Q. (2022). Dynamic Analysis On Export, FDI and Growth in Indonesia: An Autoregressive Distributed Lag (ARDL) Model. *Journal of Economics, Business, & Accountancy Ventura*, 24(3), 350–362. <https://doi.org/10.14414/jebav.v24i3.2717>

- Melinda Dewi, T., & Cahyono, H. (2022). *PENGARUH PERTUMBUHAN EKONOMI, BI RATE, DAN INFLASI TERHADAP INVESTASI ASING LANGSUNG DI INDONESIA*.
- Nurmasari, N., & Arifin, Z. (2018). ANALISIS PENGARUH PRODUK DOMESTIK BRUTO DAN SUKU BUNGA TERHADAP FOREIGN DIRECT INVESTMENT DI INDONESIA TAHUN 1997-2016. In *Jurnal*.
- Putriyanti, E. M. (2022). ANALISIS FAKTOR-FAKTOR YANG MEMPENGARUHI INVESTASI ASING LANGSUNG DI INDONESIA. *JURNAL ECONOMINA*, 1(3).
- Shara, Y., & Khoirudin, R. (2021). Analisis Jangka Pendek dan Panjang Foreign Direct In-vesment di Indonesia. In *Journal of Macroeconomics and Social Development* (Vol. 1, Issue 1). <https://economics.pubmedia.id/index.php/jmsd>
- Sirait, F. Y., Fitri, M., Harahap, I., Masharif Al-Syariah, J., Ekonomi, J., & Syariah, P. (2023). *MARKETS EQUILIBRIUM: THE IS-LM MODEL*. 8(2), 1096–1105. <https://doi.org/10.30651/jms.v8i2.19072>
- Tambunan, R. S. (2015). PENGARUH KURS, INFLASI, LIBOR DAN PDB TERHADAP FOREIGN DIRECT INVESMENT (FDI) DI INDONESIA. In *JOM FEKON* (Vol. 2, Issue 1).
- Tambunan, R. S., Yusuf, Y., & Mayes, A. (2015). *PENGARUH KURS, INFLASI, LIBOR DAN PDB TERHADAP FOREIGN DIRECT INVESMENT (FDI) DI INDONESIA*.
- Tri Septifany, A., Hidayat, R. R., & Sulasmiyati<Sri. (2015). ANALISIS PENGARUH INFLASI, TINGKAT SUKU BUNGA, NILAI TUKAR RUPIAH DAN CADANGAN DEVISA TERHADAP PENANAMAN MODAL ASING DI INDONESIA (Studi Pada Bank Indonesia Periode Tahun 2006-2014). In *Jurnal Administrasi Bisnis (JAB)/Vol* (Vol. 25, Issue 2).
- Tulong, G. A., & Topowijono, S. (2015). ANALISIS PENGARUH MAKRO EKONOMI TERHADAP KEPUTUSAN INVESTASI ASING DI INDONESIA (Studi Pada Bank Indonesia Periode 2005-2013). In *Jurnal Administrasi Bisnis (JAB)/Vol* (Vol. 22, Issue 2).
- Wage, S. (2020). FAKTOR FAKTOR YANG MEMPENGARUHI INVESTASI ASING LANGSUNG DI INDONESIA. In *Sunarto Wage JURNAL AKUNTANSI BARELANG* (Vol. 5, Issue 1).
- Yalta, A. Y. (2013). Revisiting the FDI-led growth Hypothesis: The case of China. *Economic Modelling*, 31(1), 335–343. <https://doi.org/10.1016/j.econmod.2012.11.030>