Dynamic Relationship Between Foreign Direct Investment (FDI) Variables and Economic Variables on GDP in Indonesia

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Abstract. Indonesia's economic growth is supported by the large population of people in Indonesia, which causes aggregate demand to increase. Meeting high aggregate demand requires a level of capital to produce goods and services and appropriate policies such as monetary policies to support economic growth. This study examines the influence of investment and monetary variables on gross domestic product (GDP) to analyze the dynamic relationship between foreign direct investment (FDI) variables and economic variables on GDP and prove the hypothesis of FDI-led growth in Indonesia. This study uses an autoregressive distributed lag (ARDL) approach model and uses Eviews 14 software. The variables used in investment research used in this research are Foreign Direct Investment (FDI) and the Composite Stock Price Index (CPSI). Then, the monetary variables used are Exchange Rate (Kurs), Interest Rate (BI rate), and Inflation and Gross Domestic Product (GDP) as independent variables. The data used in this study is time series data sourced from BPS, BI, OJK, and Yahoo Finance from 2014 Q1 to 2022 Q4. Based on the test results, several variables have a significant effect in the short term, namely the Exchange Rate variable (negative), Inflation (positive), and Consumer Stock Price Index (negative). In the long run, the exchange rate and Inflation variables significantly affect GDP positively. On the other hand, the FDI and interest rate variables do not substantially affect GDP in the short term or long term. Then, it can be concluded that the FDI-led Growth Hypothesis is not proven to apply in Indonesia.

Keywords: Gross Domestic Product (GDP); Foreign Direct Investment (FDI); Exchange rate; Inflation; Composite Stock Price Index (CPSI).

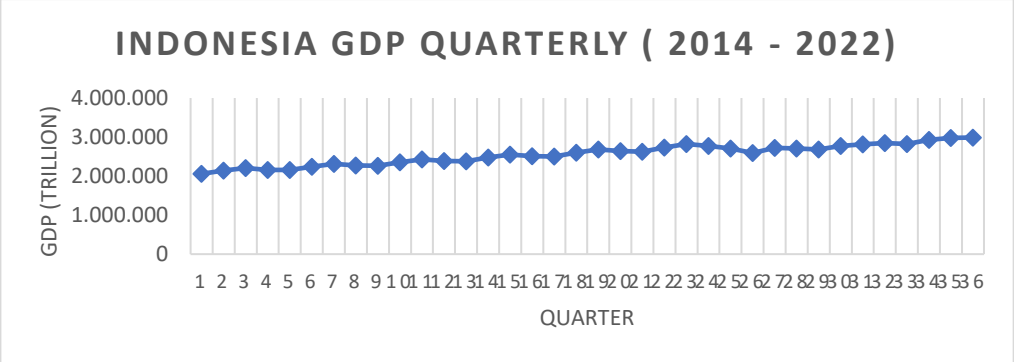
1 INTRODUCTION

Gross Domestic Product (GDP) is the overall value of goods and services in a country produced by citizens of that country as well as foreign countries (Sadono, 2011:36). GDP growth can be influenced by several factors and approaches, in the GDP expenditure approach can be influenced by public consumption, investment, government spending, and net exports. Indonesia's GDP growth is supported by Indonesia's large population, which encourages the level of production of goods and services to meet the needs of the community. Then, if you look

at the theory of economic growth earlier as Adam Smith said in his book *The Wealth of Nations* said that one of the factors of economic growth is the number of population and natural wealth. Proven by research (Wicaksono et al., 2021) which says that population creates aggregate demand so as to encourage aggregate consumption as well, as a result of which people's productivity increases and the economy will be evenly distributed. However, if it depends on the population, Indonesia's economy will not progress. There is also a neo-classical theory put forward by Solow and Swan says that technological progress in influencing economic growth. (Setiawati & Al Qoodir, 2021) In his research said that this theory is true and applicable to developed countries such as the United States because technological advances create stable GDP growth for their countries.

GDP shows the variation in all economic activities including the ability to show how a country produces goods and services GDP also shows the business cycle which is likely to affect the performance of a country's institutions (Salim & Suripto, 2023). Indonesia as an agricultural country where most of the territory still works as farmers is experiencing difficulties. The land area that began to decrease caused total production to decrease. This has an impact on the welfare level of these farmers which is then disrupted because their income is also reduced. The need for new innovations in the agricultural sector by using food technology to maintain national agricultural quality and production so that the contribution of the agricultural sector to GDP increases. This strategy requires a high level of ability, so it is necessary to increase skills in the field of agrotechnology for the people of Indonesia (Yuniarti & Sukarniati, 2021). Indonesia in advancing its economy has several limitations including limited capital resources and economic instability due to price fluctuations and the impact of global economic turmoil. Therefore, in this case, Bank Indonesia as the monetary authority must always control the inflation rate so that it is within the predetermined target. Putting pressure on price stability by enacting monetary policy is aimed at promoting sustainable economic growth and strengthening currency purchasing power (Umaru & Zubairu, 2012)

High inflation can destabilize by undermining economic expectations. Chronic inflation creates forecasts that the prices of goods and services will continue to rise. For consumers, this forecast drives more purchasing power than it should. The goal is to save consumption expenditure (Rahardja et al., 2008). Then, as a developing country like Indonesia needs foreign investment to trigger growth and improve the quality of output. This is in line with the opinion (Jufrida et al., 2017) which pays attention to the production point of view, FDI can increase the output produced by companies through technology transfer brought into the country and can then increase the competitiveness and superiority of domestic products. Supported by opinions (Dikson, 2021) mentioned that economic growth is related to per capita output which pays attention to two things, namely total GDP output and population.



Since the fourth quarter of 2014, Indonesia's GDP has continued to fluctuate and remains at 2 thousand trillion rupiah. Then in the fourth quarter of 2022, Indonesia's GDP almost reached 3 thousand trillion. Transaction activities are now growing with the many online marketplaces available. This makes it easier for people to consume goods and services. Without realizing it, online shopping helps drive the economy because most sellers in the marketplace are MSMEs who digitize their sales who initially opened physical stores. In the context of globalization, digitalization of the national economy plays an important role in integrating the economies of developed countries (Jurayevich &; Bulturbayevich, 2020). Indonesia as a G20 member country which is the ruler of 80% of global GDP, has the economic advantage of being integrated with the global market. So that local products in the future can access the global market easily. In addition, information exchange can occur faster and allow market expansion for businesses in Indonesia so that GDP growth can develop with the digital transformation of the economy. However, all of that cannot be done without the help of sufficient capital to develop his business. This can be supported by providing credit loans to MSME players so that Indonesia's post-pandemic economic recovery can occur in all business lines. In line with this, research conducted by (Nasir et al., 2022) said that providing credit guarantees can help MSMEs in recovering their businesses after the COVID-19 pandemic.

Post-pandemic Foreign Direct Investment (FDI) development in Indonesia shows a fairly high trend, starting in 2021Q1 with a total investment of 8 million USD and 10 million USD in 2022Q1. Post-covid Indonesia is undergoing transformation and digitalization from various sectors, especially the economy. The post-covid government focuses its activities on massive economic recovery. With the large flow of FDI in Indonesia in the last 2 years, it has resulted in an increase in production and employment in Indonesia. Various policies have been carried out in the context of economic recovery in each province, one of which is to provide an injection of funds to local industries so that they develop and can recover (Purwoharyono et al., 2023). Capital provision in the government sector is also an instrument to encourage regional economic recovery. This is proven through research (Ramadhona et al., 2022) which says that there is indeed a positive relationship between government spending and increasing regional income. On the other hand, if you look at international relations, Indonesia as an ASEAN member country also has economic cooperation relations with other member countries. The ASEAN region, which is considered as a market country, creates a lot of FDI flows into member countries. As a result, it can create a wider market and create jobs for local workers as well as technological and expert assistance, thereby encouraging increased funding needs and accelerating economic growth in ASEAN (Crescenzi et al., 2021).

2 LITERATURE REVIEW & HYPOTHESIS DEVELOPMENT

Research conducted by (Kurniawan &; A'yun, 2022) found that FDI and real GDP do not have a two-way relationship, if you look at the value of the coefficients of both are consistently negative which means there is a consistently negative relationship between FDI and real GDP. These results indicate that FDI in Indonesia has a small role and is not strong enough to influence the local economy. Later, (Zhang, 2001) has also tested the hypothesis of economic growth driven by foreign investment in East Asian and Latin American countries. He found mixed results. This means that FDI causes economic growth in some countries and economic growth causes FDI in some others. (Bengoa &; Sanchez-Robles, 2003) suggest that in order for FDI to

have a positive impact on economic growth, the recipient country must have macroeconomic and political stability, credibility policies and improved *open economy principles*. While on the other hand, (Dausa J., 2007) said it did not detect any causal relationship between FDI and economic growth in Malaysia, but showed that FDI did contribute to the stability of its growth.

Other economic variables such as exchange rates are also a major problem in developing countries when associated with economic growth. Each country has its own policy in managing its exchange rate to regulate the stability and economic growth rate of the country. (Muhammed Aslam, 2016) in his research concluded that exchange rates have a significant positive influence on economic growth in Sri Lanka. This is in line with the findings (Kogid et al., 2012) in Malaysia which say that in the short and long run, exchange rates have a significant positive relationship with economic growth. (Subanti et al., 2019) assess that exchange rates have an important role in trade activities, when exchange rates are unpredictable it will cause uncertainty and can eliminate profits from international trade.

Inflation is also one of the instruments to encourage economic growth. Research (Mahrus Lutfi Adi Kurniawan, 2014) says that inflation and economic growth have a positive two-way relationship which results in many investors starting to invest their capital with the expectation of high returns due to rising prices. While another study conducted by (Arslan Ahmad &; Ali, 2013) said that in Pakistan inflation and exchange rates have a negative influence on economic growth. This is because developing countries certainly carry out a lot of import activities to develop their economies. On the other hand, exports are weak so there is a trade balance deficit which causes their exchange rate to weaken and of course it will affect economic growth.

Based on several research results on the causes of the increase in GDP in Indonesia, especially external factors outside of the calculation method of several approaches. In this case the influence of other factors such as macroeconomic variables and monetary policy. In a study by Pratiwi et al (2015) said that the variables of FDI and Interest Rates have a significant positive effect on increasing GDP, then the variables of Exchange Rate and Inflation have a negative and significant influence on GDP growth, while according to (Vincent et al., 2021) Composite Stock Price Index (IHSG) variables have a positive effect on GDP growth. Based on the previous research above, researchers are interested in conducting in-depth research by adding time periods and looking at the relationship of the above variables simultaneously with the research title "Dynamic Relationship between FDI, Exchange Rate, Interest Rate, Inflation, and CPSI to GDP in Indonesia".

3 RESEARCH METHOD

This study aims to test the hypothesis, namely to test whether there is a fundamental relationship and answer the research questions proposed. This research also uses quantitative data types, this research is research that utilizes data in the form of numbers and the type of data used is time series data with quarter data and data periods from 2014Q1 – 2022Q4. The amount of data applied in this study was 36 observations. The variables used in this research include Foreign Investment, Exchange Rate, Interest Rate, Inflation, Composite Stock Index, and Gross Commercial Product. The data sources used in this research were obtained from Bank Indonesia, the Central Bureau of Statistics, the Financial Services Authority and Yahoo Finance.
In this study, the GDP variable as the dependent variable. As for the independent variables, namely FDI, Exchange Rate, Interest Rate, Inflation, and Composite Stock Index. The method

used in this study is the *Autoregressive Distributed Lag method*, thus creating the following equation:

$$lnGDP_t = \alpha_0 + \alpha_1\, ln\text{PDB}_t + \alpha_2\, ln\text{PMA}_t + \alpha_3 ln\text{Exrate}_t + \alpha_4\, \text{IntRate}_t + \alpha_5\text{Inflasi}_t + \alpha_6 ln\text{IHSG}_t + \varepsilon_t$$

$$lnPDB_t = \alpha_0 + \sum_{i=1}^{n1} \alpha_1 \Delta lnPDB_{t-1} + \sum_{i=1}^{n1} \alpha_2 \Delta lnPMA_{t-1} + \sum_{i=1}^{n1} \alpha_3 \Delta lnExRate_{t-1} + \sum_{i=1}^{n1} \alpha_4 \Delta IntRate_{t-1} + \sum_{i=1}^{n1} \alpha_5 \Delta Inflasi_{t-1} + \sum_{i=1}^{n1} \alpha_6 \Delta lnIHSG_{t-1} + \alpha_7 Trend + \partial_1\, ln\text{PDB}_t + \partial_2\, ln\text{PMA}_t + \partial_3 ln\text{Exrate}_t + \partial_4\, \text{IntRate}_t + \partial_5\text{Inflasi}_t + \partial_6 ln\text{IHSG}_t + \mu_t$$

Dimana:

$\partial_1\, ln\text{PDB}_t$ = Gross Domestic Product (GDP) released by BPS in the long run (Y)

$\partial_2\, ln\text{PMA}_t$ = Foreign Direct Investment in the long run (X1)

$\partial_3 ln\text{Exrate}_t$ = Rupiah Exchange Rate released by BI in long term (X2)

$\partial_4\, \text{IntRate}_t$ = Interest Rates in the long run (X3)

$\partial_5\text{Inflasi}_t$ = Inflation Rate Indonesia in the long run (X4)

$\partial_6 ln\text{IHSG}_t$ = Composite Stock Index on IDX in the long run (X5)

$\sum_{i=1}^{n1} \alpha_1 \Delta lnPDB_{t-1}$ = Gross Domestic Product (GDP) released by BPS in the short run (Y)

$\sum_{i=1}^{n1} \alpha_2 \Delta lnPMA_{t-1}$ = Foreign Direct Investment in the short run (X1)

$\sum_{i=1}^{n1} \alpha_3 \Delta lnExRate_{t-1}$ = Rupiah Exchange Rate released by BI in short run (X2)

$\sum_{i=1}^{n1} \alpha_4 \Delta IntRate_{t-1}$ = Interest Rates in the short run (X3)

$\sum_{i=1}^{n1} \alpha_5 \Delta Inflasi_{t-1}$ = Inflation Rate Indonesia in the short run (X4)

$\sum_{i=1}^{n1} \alpha_6 \Delta lnIHSG_{t-1}$ = Composite Stock Index on IDX in the short run (X5)

The technique in analyzing data in this mini research is using the autoregressive distribution lag (ARDL) method approach. This is because there are differences in the level of stationarity in some variables used, so that by using this method the problem can be overcome. ARDL is a regression approach that inputs the lag of dependent and independent variables simultaneously. Then, you can use this model to test the short and long term relationships between variables and can find out when a variable regains its balance in the long run. Short-term and long-term reactions to the ARDL approach emerge. The stages that need to be done in conducting an autoregressive distribution lag (ARDL) method analysis:

1. Unit Root Test

This test is run to find out whether the data used is stationary or vice versa. Stasionerity is an important requirement in conducting econometric modeling using *time series* data . Data needs to be checked again for stability if it is not stationary, because regression results from data that are not stationary can result in *spurious regression* or false regression. The results of regression show good results with high R^2 values, but there is no correlation between the two. In this model used *root test units*, with the Dickey-Fuller and Phillips-Perron Augmented methods. If the data is not stationary in level I(0) then it can be continued at the next level, namely first difference I(1) or second difference I(2). In this case the researcher uses a degree of significance of 5%, so that the hypothesis can be made that:

H0 : prob. > α (there is a problem of unit roots or non-stationary variables)

HA : prob. < α (no unit root or stationary variable issues)

2. Cointegration Test

This test looks at whether there is an influence over a long period between dependent and independent variables. This test is a continuation of the stationarity test. If there is a long-term relationship between dependent and independent variables, it can be concluded that there is cointegration. Conversely, when there is no relationship in the long run, it means that the variables are not cointegrated. With the hypothesis below:

H0 : (has no cointegration)
HA : (cointegration)

Untuk melihat terdapat kointegrasi dalam model adalah dengan memperhatikan nilai F-Statistic, apabila nilai F-Statistic terletak di atas *upper critical bound* maka dapat disimpulkan adanya kointegrasi dalam model. Begitupula sebaliknya, jika nilai F-Statistic terletak di bawah garis *upper critical* maupun *lower critical bound*, maka model tidak memenuhi syarat kointegrasi.

1. Classical Assumption Test

1. Normality Test

This test is used in mini-research to find out whether the data is normally distributed or not. This test uses the Jargue-Bera approach or JB Test. Through the hypotheses below:

H0 : $\rho > \alpha$ (normal data distribution)
HA : $\rho < \alpha$ (data distribution is not done normally)

2. Autocorellation Test

This test is used to detect autocorrelation problems in the model. To detect these problems, the *Breusch-8 Godfrey Serial Correlation LM Test* approach is used. This is done by applying a comparison between *the chi-square* value and the α(alpha) value. So that the following hypothesis can be made:

H0 : $\rho > \alpha$ (no autocorrelation problem)
HA : $\rho < \alpha$ (autocorrelation problem encountered)

3. Heteroscedasticity Test

This test is run to review whether the model has heteroscedasticity problems or not, because a good model is a model with homogeneous residuals. The problem of heteroscedasticity can be detected using a test developed by Breusch Pagan Godfrey. So that the following hypothesis can be made:

H0 : $\rho > \alpha$ (no heteroscedasticity problem found)
HA : $\rho < \alpha$ (heteroscedasticity problem)

4. Uji *Error Correction Term (ECT)*

This test is run to obtain information from the balance that occurs between the variables of GDP, PMA, Exchange Rate, Inflation, Interest Rates, and IHSG in the short term, this test looks at the level of speed or how long it takes for variables to adjust to the long-term balance.

5. Stability Test

Stability Test is used to see the stability of the research model. This test is run by applying the CUSUM *Test* and *CUSUM of Square test (Cusum Q).* The expected result in this test is that the existing line must not cross the upper and lower limit lines that have been set.

4 RESULT AND DISCUSSION

Stationary Test

The current study applies the Dickey-Fuller, Philips-Perron, and Kwiatkowski-Phillips-Schmidt-Shin augmented approaches as unit root tests *to determine if the* time series data *contains* unit root problems. The unit root test applies two equations between *trend and intercept* and *intercept no trend*. The difference between ADF and PP is that the model in PP contains corrections to heteroscedasticity problems in the data while in KPSS has the strength of the indication with the percentage of wrong decisions varies greatly depending on the type of

data process tested. In addition, the KPSS test is very suitable for the process *of deterministic trend data with noise and random walk with drift* using *truncated lag* (Fajar, 2016).
Table 1 shows that in the ADF trend approach there are five stationary variables, namely GDP, FDI, ExRate, IntRate InfRate, and IHSG. The ADF approach shows only one variable that is not stationary i.e. Interest Rate which is an independent variable with a probability value of > 0.05. However, the PP approach in *no trend* with *first difference testing* shows a probability value of < 0.05. The same thing happens with the KPSS approach, all stationary variables are in the form of *no trend* with *first difference* testing because in this test there is no probability value.

Table 1 Stasionecity Test Results

Variable	***ADF***		***PP***		***KPSS***	
	Trend	***No. Trend***	***Trend***	***No. Trend***	***Trend***	***No. Trend***
	Level					
lnGDP	-1.585869	-0.811315	-3.240460*	-1.678779	0.155107**	0.703167**
lnFDI	-0.812807	-0.068798	-0.777975	-0.027754	0.140345*	0.384141*
lnExRate	-4.231955**	-2.172498	-4.158080**	-2.664485*	0.101881	0.746161***
IntRate	-1.436074	-1.932.507	-1.275226	-1.661.417	0.086876	0.534502**
InfRate	-1.988231	-1.868.683	-2.009598	-2.392.826	0.153190**	0.475231**
lnIHSG	-2.613611	-1.836629	-2.764657	-1.857266	0.071276	0.530350**
	First Difference					
lnGDP	-8.564780***	-8.674410***	-7.651464***	-7.682706***	0.1659655**	0.242838
lnFDI	-5.608769***	-5.285885***	-5.698942***	-5.268707***	0.132799*	0.277854
lnExRate	-8.811945***	-8.910949***	-9.772913***	-9.554266***	0.188451**	0.228839
IntRate	-3.055816	-2.860966*	-3.107695	-2.945839*	0.084918	0.178835
InfRate	-8.560522***	-8.042259***	-8.606826***	-7.872240***	0.063741	0.2781128
lnIHSG	-6.110322***	-6.206040***	-6.766225***	-6.705585***	0.131797**	0.131871

Note: ***, **, and * indicate statistical significance levels at 1%, 5%, and 10%, respectively.

Cointegration Test

The bonded approach cointegration test is applied to test the stability of the model over the long term. The model examines the impact of FDI, exchange rates, and other monetary variables, and IHSG using the Schwarz-Bayesian Criterion. The criteria approach (SBC) is used to obtain the optimal lag in the model. The optimal lag in the model shows values of (2, 2, 3, 0, 3, 4). The results of the bound test show that the calculated value of F Statistics > from the Critical Value of both the lower and upper limits, indicating that the model developed shows balance in the long run.

Table 2 Cointegration Test Results

F- Statistics	%	Lower Bound I (0)	Upper Bound I(1)
	Distributed Lag (2, 2, 3, 0, 3, 4)		
13.00500****	90%	2.08	3
	95%	2.39	3.38
	97,5%	2.7	3.73
	99%	3.06	4.15

Note: ****, ***, **, and * show statistical significance levels at 1%, 2.5%, 5%, and 10%, respectively.

ARDL Estimation

Based on Table 3 below there are a number of independent variables that have a short-term relationship to the dependent variable in the model. The significance value or *degree of freeedom* used in the model is 0.05 or alpha (5%). so that when the probability value of each variable is more than then it shows the result of receiving H0 means that the independent variable does not have a significant influence in the short-term or long-term relationship to the dependent variable in the model.$\alpha)(\alpha)$

On the other hand, when the probability value of any variable is less than 5% or 0.05, of course, the decision to reject H0 means that the variable has a significant influence in the short-term relationship with the dependent variable. Table 3 below shows that there are several variables that have a probability below 0.05 which means that the ExRate, IHSG, and inflation variables have a significant influence in the short term on the Gross Domestic Product (GDP) variable in the period 2014Q1 – 2022Q4 in Indonesia. While other variables in the model such as Foreign Direct Investment (FDI) and interest rates have a probability value of more than 0.05, meaning that there is no significant short-term effect on Gross Domestic Product (GDP) in the period 2014Q1 – 2022Q4. While in the long run it can be seen in table 3, that exchange rate variables and the Composite Stock Price Index have a significant influence on the long run. On the other hand, *FDI, Exchange Rate,* and inflation variables do not have a significant long-term effect on Gross Domestic Product (GDP) in the period 2014Q1 – 2022Q4 in Indonesia.

The FDI variable has a probability value of > 0.05 and a coefficient value of -0.000242 in the short term and 0.0066 in the long term, this means that PMA has no significant effect in the short and long term. The same thing happened to research conducted by (Lian &; Ma, 2013) in China in the period 1986 – 2010 and research conducted by (Bermejo Carbonell &; Werner, 2018)(Bermejo Carbonell & Werner, 2018) in Spain. In the short term, FDI shows a negative influence, while in the long term it shows a positive influence. This happens because FDI cannot instantly cause economic growth, there are other factors that cause this to happen such as lack of qualified human resources in capital recipient countries and unstable macroeconomic conditions can cause failure in economic growth. This is supported by the opinion (Sadni-Jallab

et al., 2011) which says that economic improvement by increasing the amount of FDI depends on the economic stability of the recipient country. As said (Yalta in Prasetyo &; Susandika, 2022), *the FDI led Growth hypothesis* requires a large *market size*. Not only that, the increase in FDI must be accompanied by an improvement in the quality of human resources and macroeconomic stability of recipient countries. Economic instability and the quality of human resources that occur in Indonesia require time to develop so that FDI can be utilized properly. This makes *the FDI led growth hypothesis* does not occur in Indonesia.

The exchange rate variable has a coefficient of -0.983 with a probability value smaller than 0.05, indicating a significant negative influence on the Gross Domestic Product variable in the short term. In another sense, when the exchange rate variable increases, it will result in the variable GDP decreasing in the short run. Supported by research conducted by (Lastri &; Anis, 2020) there is a significant negative relationship in the short term between exchange rates and economic growth. When the price of imported goods increases, especially raw materials *due to the weakening exchange rate, it will cause* the cost of production to also become expensive then production capacity decreases because the price of raw materials rises as a result of which the price of goods in Indonesia also increases and people's purchasing power will decrease. However, in the long run there is a significant positive influence between the exchange rate and. In accordance with research (Kogid et al., 2012) which found that there is a significant positive relationship between the exchange rate and GDP in the long run. This statement uses a policy point of view, when Applying policies related to exchange rates is designed to provoke economic development, so exchange rates can be used as a tool to create economic growth. In line with this thinking (Eichengreen et al., 2007) said that in countries such as East Asia such as Japan, Hong Kong, Singapore, South Korea, Taiwan and China have successfully implemented related real exchange rates as relevant policy tools in economic development.

The variable interest rate has a probability value of > 0.05 in the short or long term, which means that the variable interest rate does not have a significant effect on the short or long term. This finding is supported by research (Harswari &; Hamza, 2017) which found variable interest rates have a significant negative influence on economic growth. In contrast to that (Pratiwi et al., 2015) explained that there is a significant positive relationship in interest rates to economic growth. When interest rates are low, the money supply will increase, thus boosting purchasing power and creating economic growth. Conversely, when interest rates are high, then little funds flowing will result in decreased economic growth.

Meanwhile, there is a significant positive influence in the short term but not significant in the long run between inflation variables and Gross Domestic Product. When inflation occurs in Indonesia, it means that the economy is experiencing a *bubble*, the cause of the increase in the price of goods often occurs because aggregate demand has increased so that the supply of goods is depleted. Then, from the supply side, it will try to meet market demand so that it will increase productivity so that the total output increases. Similar to research (Umaru &; Zubairu, 2012) says that inflation can support economic growth through increased productivity and increased total output. On the other hand, in the long run, inflation is no longer the right instrument to encourage economic growth. This is because inflation that is too high will also be bad for the economy. An economy that continues to experience *a bubble* in the long run will heat up, resulting in financial instability.

Then, the Composite Stock Price Index (IHSG) variable has a coefficient of -0.2465 with a probability of less than 0.05 which means that IHSG has a significant negative relationship in the short term to the Gross Domestic Product (GDP) variable. However, in the long run, IHSG has a significant positive influence. This happens because to create economic growth, the stock market must have high liquidity so that the stock market can trigger economic growth quickly,

while liquidity in developing countries, especially Indonesia, is still low so it requires a *time gap* to at least affect economic activity. Evidenced by the negative influence on the short term and positive on the long term. This is in line with the opinion (Levine in Sikarwar &; Appalaraju, 2018) which says that the stock market may affect economic activity. Supported by opinions (Paudel &; Acharya, 2020) which confirm that stock market liquidity can facilitate companies to obtain the required capital quickly so as to facilitate cost allocation and create economic growth. However, increased liquidity can be the cause of low or slow economic growth. The need for a review of policies related to the right level of liquidity so as to ensure economic growth.

Table 3 ARDL Estimation

Variabel	**Coefficient (t-stat)**	**Variabel**	**Coefficient (t-stat)**
Short - run		*Long - run*	
LnPDB(-1)	-1.161 (-7.405)**	LnPMA	0.0066 (0.1555)
LnPMA(-1)	0.007 (0.156)	LnExRate	1.0108 (7.3969)**
LnExRate(-1)	1.173 (5.068)**	IntRate	-0.0117 (-1.9477)
IntRate**	-0.013 (-1.766)	Inflasi	-0.003076 (-0.37399)
Inflasi(-1)	-0.0035 (-0.376)	LnIHSG	0.23307 (5.4227)**
LnIHSG(-1)	0.270 (3.782)**	C	3.0694 (3.2597)
ΔLnPDB(-1)	0.459 (0.0051)**		
ΔLnPMA	-0.000242 (-0.006480)		
ΔLnPMA(-1)	-0.052 (-1.3687)		
ΔLnExRate	0.256 (1.872)		
ΔLnExRate(-1)	-0.983 (-6.8635)**		
ΔLnExRate(-2)	-0.4636 (-3.2443)**		
ΔInflasi	0.0089 (2.2500)**		
ΔInflasi(-1)	0.0157 (2.1845)**		
ΔInflasi(-2)	0.0112 (2.4945)**		
ΔLnIHSG	0.0298 (0.3753)		
ΔLnIHSG(-1)	-0.2465 (-4.0666)**		
ΔLnIHSG(-2)	-0.0820 (-1.182967)		
ΔLnIHSG(-3)	0.0540		

(1.01532)	
Diagnostic Tools	
Normality Test	0.977989
Autocorellation	0.0660
Heteroskedasticity	0.6728

Note: ** indicates that the probability value of the variable is less than 0.05

Classical Assumption Test

Normality tes

Based on the output table above, it is known that the test value is 0.977989, this value is greater than the test standard, which is 0.05. So according to the provisions of the normality test, the research data is normally distributed. So the requirements of the classical assumption test have been met and this study does not experience classical assumption problems.

Autocorellation

Based on the output table above, the Autocorellation value of 0.0660 is greater than 0.05. While the Obs*R-squared value is 5.437216. So this study shows that there is no problem of Autocorrelation.

Heteroscedasticity

Based on the output table above, the Heteroskedasticity value of 0.6728 is greater than 0.05. Squeeze the Obs*R-squared value of 15.76707. So this study shows that there is no problem of heteroscedasticity.

Uji Error Correction Term (ECT)

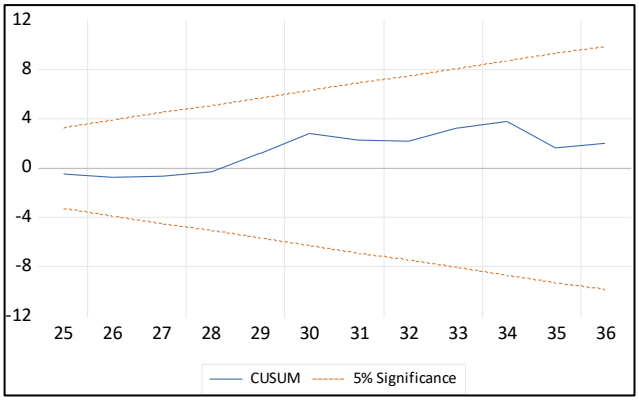
Tabel 4 Error Correction Term

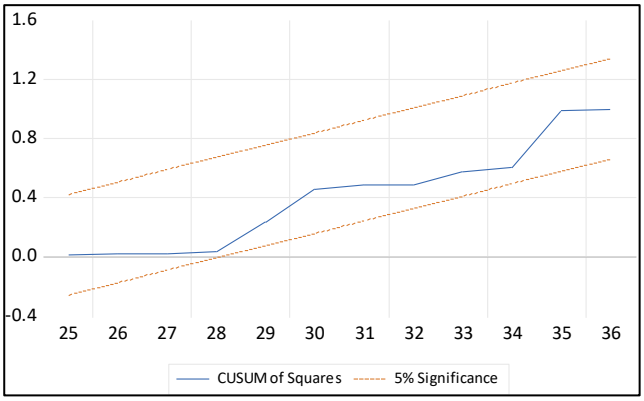
Variabel	**Coefficient**	**t-Statistic**	**Prob.**
ΔLnPDB(-1)	0.459726	5.261908	0.0002
ΔLnPMA	-0.000242	-0.009291	0.9927
ΔLnPMA(-1)	-0.052073	-2.111043	0.0564
ΔLnExRate	0.256165	3.054477	0.0100
ΔLnExRate(-1)	-0.983532	-10.40181	0.0000
ΔLnExRate(-2)	-0.463690	-4.739584	0.0005
ΔInflasi	0.008997	3.959911	0.0019
ΔInflasi(-1)	0.015789	5.827229	0.0001
ΔInflasi(-2)	0.011260	5.031708	0.0003
ΔLnIHSG	0.029802	0.683075	0.5075
ΔLnIHSG(-1)	-0.2466538	-5.856761	0.0001
ΔLnIHSG(-2)	-0.082012	-1/624752	0.1302
ΔLnIHSG(-3)	0.054085	1.834077	0.0915
CointEq(-1)*	-1.161244	-11.68557	0.00000

From Table 4 it is obtained that the value of prob. The ECT < 0.05 or less than α(5%), and the coefficient is negative, so the model is acceptable. Then from the value of the coefficient of -1.161244 we can know that when there is a problem in the short term, the model will correct and get its balance back in the long term takes 11.6 quarters.

Stability Test

To analyze the stability test on long-term and short-term GDP in Indonesia. CUSUM and CUSUMQ approaches were applied to this study. The estimation of the CUSUM and CUSUMQ tests will be considered stable based on the value of *the cumulative sum of recursive residuals*. When the plot of CUSUM and CUSUMQ reaches a critical value of 5% or remains between the upper and lower limits of the CUSUM and CUSUMQ tests, the test results are considered stable. However, if the estimation on the CUSUM and CUSUMQ tests passes the critical value of 5% or crosses the upper and lower limit lines, the test results are considered unstable. The graph below shows the values of the CUSUM and CUSUMQ tests in this study. The results show that there is stability that occurs in this study because the value of the test is below the critical value of 5% or does not cross the lower and upper limit lines. Then it can be concluded that this model was successfully created by the ARDL method.





5 CONCLUSION AND RECOMMENDATION

This research focuses on examining the dynamic relationship between Foreign Direct Investment (FDI) variables and exchange rates as independent variables and interest rates, inflation, and IHSG as control variables for Gross Domestic Product as dependent variables. Based on the results of the explanation above, it can be concluded that there are 3 variables that have a significant influence in the short term on GDP, namely the exchange rate, inflation, and IHSG. Meanwhile, there are 2 variables that have a significant influence on GDP in the long run, namely the exchange rate and IHSG. Foreign direct investment (FDI) variables have no significant effect either in the short or long term. This means that *the FDI led Growth hypothesis* does not apply to the Indonesian state. This is because although Indonesia has a large market size, it is not accompanied by an increase in quality *human resources* so that the Indonesian people still lack the ability to do something that requires high skills. Improving skills can increase salaries and reduce poverty rates. As said (Az zakiyyah et al., 2021) a good HDI can reduce poverty and promote macroeconomic stability. So that FDI cannot spur economic growth effectively. While exchange rate variables have a significant negative relationship in the short term. However, it has a significant positive effect in the long run on Gross Domestic Product. Exchange rate instability can affect the price of imported goods which are relatively cheaper,

especially *raw materials* because it can increase production costs which will result in an increase in overall prices of goods, especially in developing countries. However, in the long run if the increase in prices of imported goods continues due to the weakening exchange rate. Then the community will try to produce goods using domestic raw materials and switch to consuming domestic goods. Increased domestic productivity will encourage exports and will later cause foreign exchange reserves to increase and the exchange rate to strengthen again.

More research is needed to explain why the FDI-led Growth hypothesis only affects developed countries, and differs in other countries. In addition, further research needs to be focused on adding macroeconomic variables as well as other policies that can boost economic growth in Indonesia.

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