The Influence of Macroeconomic Variables on Foreign Direct Investment in the Manufacturing Industry Sector in Indonesia

Nidya Ayu Setya Ningrum[a] *, Inayati Nuraini Dwiputri[b]

[a,b]Department of Development Economics, Faculty of Economics and Business, State University of Malang, Indonesia

* Corresponding author: niayuningrum@gmail.com , inayati.dwiputri.fe@um.ac.id

Info Article	Abstract
	The purpose of this research is to examine the effect of macroeconomic variables in the form of economic growth, inflation, exchange rates, interest rates, and the money supply on Foreign Direct Investment in the manufacturing industry sector in Indonesia and see whether the presence of the Covid -19 pandemic has affected FDI in the manufacturing sector in Indonesia. Indonesia in the short and long terms. This research was conducted for 13 years every quarter, starting in 2010-2022, because, since 2010 until now, the manufacturing sector has made the most significant contribution to Indonesia's GDP. This study was analyzed using Autoregressive Distributed Lag (ARDL) with a dummy variable. The research results show that short-term economic growth increases FDI in Indonesia's manufacturing sector. The variables of inflation, interest rates, total money in circulation, and the COVID-19 pandemic have implications for reducing FDI flows in the manufacturing sector in Indonesia. Meanwhile, the exchange rate does not significantly affect FDI in Indonesia's manufacturing sector. In the long term, economic growth and inflation variables increase the flow of FDI in the manufacturing sector. Interest rates have had the effect of reducing FDI flows in Indonesia's processing industry sector. Meanwhile, the exchange rate, total money in circulation, and the COVID-19 pandemic have no long-term impact on FDI in Indonesia's manufacturing industry sector in the long term.

INTRODUCTION

Foreign direct investment (FDI) is one of the crucial factors and primary sources for achieving economic development, especially for developing countries, including Indonesia. Compared to domestic investment, foreign investment makes a relatively significant contribution to economic growth. It is an essential means of technology transfer (Akadiri et al., Apart from providing capital, FDI also offers advanced technology, intellectual knowledge, and various types of employment to create positive economic growth and reduce unemployment and poverty. (Setyadharma & Fadhilah, 2021) , (Ben-David et al. , 2000) Foreign direct investment can increase the stock of economic capital, increasing productivity and wages. In addition, with FDI in poor countries, it will be easier to learn how to use technology developed by rich countries to reduce the gap between rich and poor. (Mankiw, 2018) (Romer, 1993) .

Figure 1. Distribution of GDP per Sector
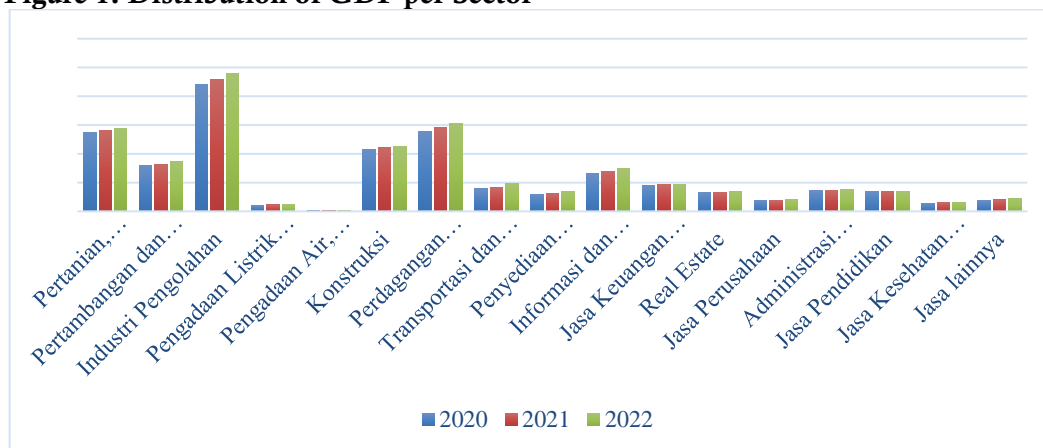
Source: Central Statistics Agency, 2023

The processing industry sector has a vital role in the national economy. As one of the sectors that contributed the most to national GDP from 2010 until the peak of the COVID-19 pandemic in 2020-2021, this sector has become one of the main sectors driving national development and supporting national economic resilience. Apart from that, this sector is capital-intensive and receives the most significant inflow of foreign capital in Indonesia based on the distribution of sectoral FDI data. The average distribution of foreign investment in the processing industry sector during 2010-2018 reached 67.4% and occupied the highest position during the COVID-19 pandemic. Apart from that, the processing industry is the government's priority in facing the Industrial Revolution 4.0. Five processing industry sectors are prioritized to face the Industrial Revolution 4.0 era, namely the food and beverage, automotive, chemical, electronic, textile, and apparel industries (Sumiyati, 2020) .

Considering the critical role of the processing industry sector in encouraging accelerated economic growth and development in Indonesia, it is necessary to examine the variables that influence FDI in this sector. A country's fundamental macroeconomic conditions are crucial factors that can attract and increase the flow of FDI. Therefore, the macroeconomic policies made must be appropriate to attract FDI. (Wilantari et al., 2020) . The economic condition of a country is a consideration for investors before investing. (Marsela, 2014) According to Dunning's eclectic paradigm theory, three things motivate companies to invest: ownership advantages, location advantages, and internalization. (Setyadharma & Fadhilah, 2021) .

Investors will be interested in investing their capital in countries with large market sizes. The larger the market size, the more FDI will be attracted. This aligns with the Dunning/OLI eclectic paradigm theory, which states that companies will look for countries with more extensive market opportunities when investing. Apart from that, a country's economic stability is one factor that investors consider before investing. Investors will choose to invest in countries that have low inflation rates. The high level of inflation will make the prices of goods and services high and cause people's purchasing power to decrease the profits obtained by investors, so investors give up their intention to invest. The exchange rate has a crucial influence on FDI. Exchange rate stability reflects the financial stability of a country. Depreciation of the currency value will positively impact FDI flows. Interest rates are also an essential

economic indicator and can influence FDI. High interest rates will reduce investment due to high capital costs and vice versa. The money supply is the most important tool of monetary policy to attract FDI. An increase in the money supply will improve the national economic position, attracting more FDI and vice versa.

Several studies have shown that macroeconomic variables such as economic growth, inflation, exchange rates, and interest rates influence foreign direct investment. (Megasari & Saleh, 2021) , (Mukhtarov et al., 2020) , (Asiamah et al., 2019) , (Sasana & Fathoni, 2019) , (Mahmood & Alkhateeb, 2018) , and (Boateng et al., 2015) However, the results of this research show different influences of macroeconomic variables on foreign direct investment. Some have the effect of increasing FDI flows, and some have the effect of reducing FDI flows. Research results Supriani & Fianto (2020) and Abdul et al. (2018) show that economic growth affects FDI; however, Fathia et al. (2021) and Mahmood & Alkhateeb show that economic growth affects FDI. (2018) This shows that economic growth has no significant effect on GDP. In addition, Wilantari et al. (2020) And Asiamah et al. (2019) The significant negative effect of inflation on FDI was found. Different from Megasari & Saleh's findings (2021) , Alshamsi et al. (2015) , and Omankhanlen (2011) Who found that there was no influence between inflation and FDI. Harifi -Renani & Mirfatah (2012) and Cuyvers et al. (2011) Found that the exchange rate influences FDI positively. However, Sasana & Fathoni (2019) , Asiamah et al. (2019) , and Xaypanya et al. (2014) Found that the exchange rate affects FDI negatively. Other research conducted by Megasari & Saleh (2021) Castro et al. (2013). Found no influence between the exchange rate and FDI. According to Ajija and Fanani (2021), Interest rates negatively influence FDI flows. Meanwhile, Sasana & Fathoni (2019) Found that interest rates did not affect FDI. Finally, Mukhtarov et al. (2020) Found that total money in circulation affected increasing FDI flows in Jordan. This aligns with Hina Anayat's research (2019) and Shafiq et al. (2015) and in contrast to Boateng et al. (2015) This shows that the money supply has the effect of reducing FDI flows.

Researchers are interested in conducting this research based on the inconsistency of previous research results and the critical role of the processing industry sector in encouraging accelerated economic growth and development in Indonesia. Researchers also want to see whether the COVID-19 pandemic affects FDI in Indonesia's processing industry. This research examines the influence of macroeconomic variables, namely economic growth, inflation, interest rates, exchange rates, and money supply, on FDI inflows in the manufacturing industry sector in Indonesia, with the COVID-19 pandemic as a dummy variable in the long-term and short-term.

RESEARCH METHODS

Foreign Direct Investment in the processing industry sector in Indonesia is the dependent variable in this research. Economic growth, inflation, interest rates, exchange rates, and total money in circulation are the independent macroeconomic variables of this research. Meanwhile, the COVID-19 pandemic is a dummy variable from the second quarter of 2020 to the third quarter of 2022 (1 = pandemic, 0 = no pandemic). This research uses quantitative secondary data from the quarterly time series from 2010Q1 to 2022Q3. The data sources for this research come from the Central Statistics Agency (BPS) and Bank Indonesia (BI). GDP data is obtained from

BPS, while FDI data for the processing industry sector, inflation, interest rates, exchange rates, and total money in circulation come from Bank Indonesia.

The Autoregressive Distributed Lag (ARDL) method, which used dummy variables, was used in this research to analyze the data. The ARDL method is an econometric method for time series data that assumes that a variable is influenced not only by the variable itself but also by the past in both the long and short term. The advantage of the ARDL method is that it can use short-run data, and the number of samples in the research does not matter. Another benefit of this method is that the resulting estimates are consistent with the long-term coefficients, regardless of whether the independent variable is stationary at level I(0) or the first difference level I(1).

The basic model for estimating FDI in the processing industry sector in Indonesia can be written as follows:

$$LnFDI_t = \beta_0 + \beta_1 LnPDB_t + \beta_2 INF_t + \beta_3 LnNT_t + \beta_4 SB_t + \beta_5 LnJUB_t + \beta_6 D_t + \varepsilon_t \dots \dots \dots (1)$$

Where β_0 is a constant; β_1, β_2, β_3, β_4, β_5, β_6 are coefficients; LnFDI is the natural logarithm of foreign direct investment in the manufacturing industry sector; LnGDP is the logarithm of economic growth; INF is inflation; LnNT is the natural logarithm of the exchange rate; SB is the interest rate; LnJUB is the natural logarithm of total money in circulation and D is a dummy variable (where, 0 = no pandemic, 1 = pandemic).

Based on the estimation equation above, the long-term and short-term ARDL equations in this research can be written, namely:

Long run equation

$$LnFDI_t = \beta_0 + \beta_1 LnFDI_{t-i} + \beta_2 LnPDB_{t-i} + \beta_3 INF_{t-i} + \beta_4 LnNT_{t-i} + \beta_5 SB_{t-i} + \beta_6 LnJUB_{t-i} + \beta_7 D_{t-i} + \varepsilon_t \dots \dots \dots (2)$$

Short term equation

$$\Delta LnFDI = \alpha + \alpha_1 \sum_{i=1}^{p} \Delta LnFDI_{ti} + \alpha_2 \sum_{i=1}^{p} \Delta LnPDB_{ti} + \alpha_3 \sum_{i=1}^{p} \Delta INF_{ti} + \alpha_4 \sum_{i=1}^{p} \Delta LnNT_{ti} + \alpha_5 \sum_{i=1}^{p} \Delta SB_{ti} + \alpha_6 \sum_{i=1}^{p} \Delta LnJUB_{ti} + \alpha_7 \sum_{i=1}^{p} \Delta D_{ti} + \delta ECT_{ti} + \varepsilon_t \dots \dots \dots (3)$$

Where Δ is the change between two variable values in consecutive periods? α and δ are the estimated coefficients, and ECT is the error correction.

The stages of determining the ARDL model start from the stationarity test, which determines the maximum lag, the ARDL cointegration test, the diagnostic test, and the stabilization test. (Ekananda, 2016) .

The stationarity test is a pre-estimation test for time series data. This test was carried out to ensure that the data used in the research were not stationary at the second difference level I(2). This test can be carried out using two approaches, namely the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) methods. In this research, researchers used the Phillips-Perron approach to test the stationarity of the data. This is because measurements using Phillips Perron have advantages compared to the ADF approach, including elements of structural changes in the data. The test criteria are that the data is stationary if the ADF or PP probability value is less than 5% or 0.05. Meanwhile, the data is not stationary if the ADF or PP probability value is more than 5% or 0.05.

After the stationarity test, the next step is determining the maximum lag. In this research, the maximum lag of cointegration is determined using the Akaike

Information Criteria (AIC) because this approach provides the closest picture to reality.

The ARDL Cointegration Test is used to determine whether there is a long-term relationship between the independent and dependent variables in the research. The ARDL cointegration test hypothesis in this research can be written as follows.

H0 : β 1 = β 2 = β 3 = β 4 = β 5 = β 6 = 0 (no long-term correlation)

H1: one of the β coefficients ≠ 0 (long-term correlation exists)

If the F-statistic exceeds the critical value at both level I(0) and first difference I(1), then there is cointegration in the long run. On the other hand, if the F-statistic value is less than the critical value at both level I(0) and first difference I(1), then there is no co-integration of the variables at hand.

Another way to ensure the ARDL model's goodness of fit is to carry out diagnostic and stability tests. Diagnostic tests include normality tests, heteroscedasticity tests, and autocorrelation tests. (Gujarati, 2007) . The stability test used *the cumulative sum of recursive residuals (CUSUM) and the sum of squares of recursive residuals* (CUSUMSQ).

RESULTS AND DISCUSSION

The stationarity test in the ARDL method does not require the data to be stationary at the same level of difference. As a result, the data may be stationary at level I(0) or first difference I(1). This test ensures that the data used in this research is not stationary at the second difference level. The stationary test will be carried out using the Phillips-Perron (PP) Test because PP can include elements of structural changes that occur in the data while ADF does not. Based on the results of the stationary test using the unit root test with the Phillips-Perron approach, it is known that only the Foreign Direct Investment variables and money supply are stationary at the level I(0) while the economic growth, inflation, exchange rate, interest rate, and dummy variables are stationary at first difference level I(1). Based on the results obtained, it can be concluded that the data passes the stationarity test because the PP probability value is less than 5% or 0.05. The following are the results of the stationarity test using the Phillips-Perron approach.

Table 1. Stationarity test results using the Phillips-Perron (PP) approach

Variable	Levels		1ˢᵗ Difference	
	PP test	Prob	PP test	Prob
Ln_FDI	-5.868022	0.0000*	-27.84647	0.0001*
Ln_GDP	-1.974904	0.2967	-8.615676	0.0000*
Inflation	-1.939406	0.3121	-6.407303	0.0000*
Ln_Exchange Rate	-0.980114	0.7535	-5.114171	0.0001*
Interest rate	-1.158208	0.6853	-3.369302	0.0170*
Ln_JUB	-3.976192	0.0032*	-16.78295	0.0000*
Dummies	-0.464758	0.8892	-7.000001	0.0000*

PP Critical Value (5%): -2.921175

*) stationary

after carrying out the stationarity test, the next step is determining the maximum lag. This research uses the Akaike Information Criteria (AIC) approach, which was

chosen because it provides the closest picture to reality. Testing the maximum lag using the AIC approach shows that the maximum lag set is lag 4. This is indicated by the most asterisks being on lag 4, making lag four the maximum lag chosen. The test results for determining the maximum lag are presented in Table 2 below.

Table 2. Optimal Lag Determination Test Results

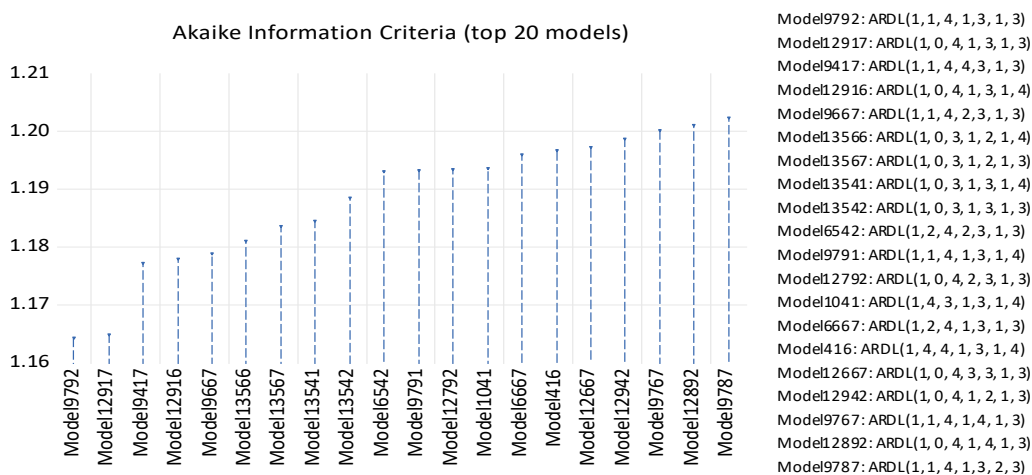| Lag	LogL	L.R	FPE	AIC	S.C	HQ
0	21.25882	NA	1.29e-09	-0.606758	-0.331204	-0.503065
1	329.7903	512.0311	2.10e-14	-11.65065	-9.446222*	-10.82111
2	389.9382	81.90351	1.50e-14	-12.12503	-7.991723	-10.56964
3	471.8561	87.14661	5.48e-15	-13.52579	-7.991723	-11.24455
4	591.0612	91.30603*	6.73e-16*	-16.51324*	-8.522178	-13.50615*

Notes :
LR: Likelihood Ratio; FPE: Final prediction error; AIC: Akaike Information Criterion; SC: Schwarz Information Criterion; HQ: Hannan-Quinn Information Criterion
*) Optimal Lag Length

After the data passes the stationary test and the maximum lag is determined, the next step is determining the best ARDL model using AIC. The best model is determined according to the maximum lag test results obtained by selecting the smallest criterion value. The estimation results show that the lag used to estimate the variables in this study is (1, 1, 4, 1, 3, 2, 3). The estimation results of the best model for FDI in the processing industry sector in Indonesia are presented in the figure below.

Figure 1. ARDL model estimation results

Akaike Information Criteria (top 20 models)

Model9792: ARDL(1, 1, 4, 1, 3, 1, 3)
Model12917: ARDL(1, 0, 4, 1, 3, 1, 3)
Model9417: ARDL(1, 1, 4, 4, 3, 1, 3)
Model12916: ARDL(1, 0, 4, 1, 3, 1, 4)
Model9667: ARDL(1, 1, 4, 2, 3, 1, 3)
Model13566: ARDL(1, 0, 3, 1, 2, 1, 4)
Model13567: ARDL(1, 0, 3, 1, 2, 1, 3)
Model13541: ARDL(1, 0, 3, 1, 3, 1, 4)
Model13542: ARDL(1, 0, 3, 1, 3, 1, 3)
Model6542: ARDL(1, 2, 4, 2, 3, 1, 3)
Model9791: ARDL(1, 1, 4, 1, 3, 1, 4)
Model12792: ARDL(1, 0, 4, 2, 3, 1, 3)
Model1041: ARDL(1, 4, 3, 1, 3, 1, 4)
Model6667: ARDL(1, 2, 4, 1, 3, 1, 3)
Model416: ARDL(1, 4, 4, 1, 3, 1, 4)
Model12667: ARDL(1, 0, 4, 3, 3, 1, 3)
Model12942: ARDL(1, 0, 4, 1, 2, 1, 3)
Model9767: ARDL(1, 1, 4, 1, 4, 1, 3)
Model12892: ARDL(1, 0, 4, 1, 4, 1, 3)
Model9787: ARDL(1, 1, 4, 1, 3, 2, 3)

Before carrying out a cointegration test, the first steps are diagnostic and stability tests to avoid errors in interpretation and conclusions. Diagnostic tests also aim to ensure that the ARDL model meets classical assumptions. Diagnostic tests used in this research include the normality test (Jarque Bera Test), heteroscedasticity test (Breusch-Pagan-Godfrey), and autocorrelation test (*Breusch-Godfrey et al. test)*. Table 3 below displays the results of the ARDL model diagnostic test.

Table 3. Diagnostic Test (Classical Assumption Test)

No	Classic assumption test	P-Value
1	Normality Test (*Jarque Bera test*)	0.4213
2	Autocorrelation Test (*Breusch-Godfrey et al. test*)	0.1406
3	Heteroscedasticity Test *(Breusch-Pagan-Godfrey)*	0.3639

Based on the diagnostic test results above, it can be seen that the ARDL model used in this research meets classical assumptions. From Table 3 above, the P-value value obtained from the results of the normality test, autocorrelation test, and heteroscedasticity test is more than 0.05 or 5%, which means that the error is normally distributed, does not contain serial correlation (not subject to autocorrelation) and there is no heteroscedasticity. The multicollinearity test was not used in this research because the BLUE estimator does not require the assumption that there is no correlation between the independent variables and the observation data used is more than 30. Multicollinearity will only result in difficulties when obtaining estimator values with relatively small standard errors.

Next is the stability test. The stability of the ARDL model was tested using *the cumulative sum of recursive residuals (CUSUM) and the cumulative sum of squares of recursive residuals* (CUSUMSQ). The stability test results can be seen in the following graph.

Figure 2. Model Stability Test CUSUM Test and CUSUMQ Test
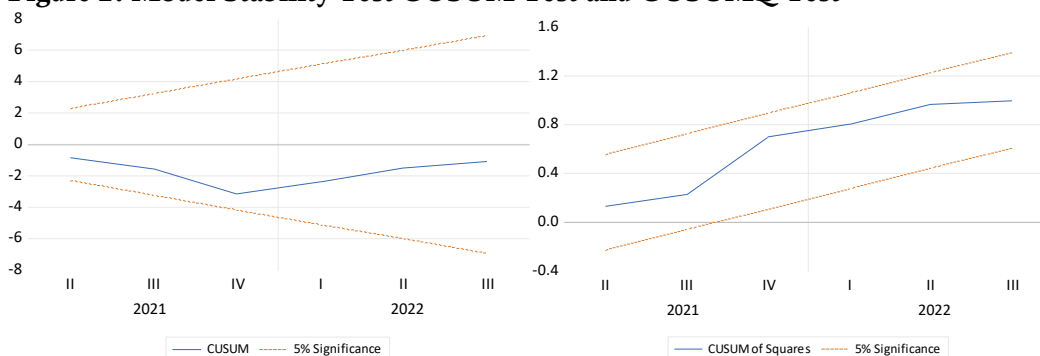
The graph above shows that the CUSUM and CUSUMQ plots are within the 5% critical bounds interval or do not cross the lower and upper bound lines. So, the ARDL model estimates are considered stable.

Diagnostic and stability tests have been carried out on the ARDL model, which shows that it can be used for cointegration tests. In this study, the cointegration test was carried out using the bounds testing cointegration method. The results of the cointegration test are presented in Table 4 below.

Table 4. ARDL cointegration test results

Statistical Tests	Value	Significant.	I(0)	I(1)
F Statistics	13.07917	10%	2.12	3.23
K	6	5%	2.45	3.61
		2.5%	2.75	3.99
		1%	3.15	4.43

Based on table 4 shows that the F-statistic value is greater than the critical value I(1). The F statistic value obtained is 13.07917, while the critical value I(1) at 1%, 2.5%, 5%, and 10% significance is 3.23, 3.61, 3.99 and 4.43. This means a cointegration

relationship exists between macroeconomic variables and FDI in Indonesia's processing industry.

The next stage in the ARDL approach is to test the short-run coefficients. The short-term ARDL estimation results are presented in Table 5 below.

Table 5. ARDL Short-Term Estimation Results

Variables	Coefficient	Std. Error	t-Statistics	Prob
C	-90.41328***	8.548103	-10.57700	0.0000
D(LN_GDP)	10.19991***	2.323078	4.390688	0.0002
D(INFLATION)	0.125912*	0.063269	1.990124	0.0572
D(INFLATION(-1))	-0.236391***	0.064440	-3.668410	0.0011
D(INFLATION(-2))	-0.382192***	0.061703	-6.194140	0.0000
D(INFLATION(-3))	-0.153804**	0.066525	-2.311954	0.0290
D(LN_VALUE OF EXCHANGE)	4.735949*	2.497677	1.896141	0.0691
D(SUKUBUNGA)	-0.489533**	0.213940	-2.288179	0.0305
D(SUKUBUNGA(-1))	0.5302148**	0.227989	2.325613	0.0281
D(SUKUBUNGA(-2))	0.438932*	0.215102	2.040574	0.0516
D(LN_JUB)	-16.62597***	4.280962	-3.883700	0.0006
D(DUMMY)	0.113838	0.377489	0.301567	0.7654
D(DUMMY(-1))	0.468784	0.365798	1.281537	0.2113
D(DUMMY(-2))	-1.368973***	0.362929	-3.772011	0.0008
CointEq(-1)*	-1.282030***	0.120773	-10.61518	0.0000

*Note: *, **, and *** indicate significance of 10%, 5% and 1% respectively*

The estimation results above show a cointegration between macroeconomic variables and FDI in the processing industry sector in Indonesia. This can be seen from the negative and significant value of the ECT coefficient (-1) or error-correction coefficient -1.282030 (P-score 0.0000).

From the short-term ARDL test results, it can be seen that the economic growth variable has a positive and significant influence on FDI flows in the manufacturing industry sector in Indonesia. Every 1% increase in GDP will increase FDI in the manufacturing industry sector by 10.19% in the same period. This shows that economic growth or GDP has a vital role in boosting FDI inflows in the manufacturing industry sector in Indonesia, which is in line with Hymer, Dunning's eclectic theory/OLI paradigm that when companies decide to invest they will look for countries that have more excellent market opportunities. large (Aprianto et al., 2020) . This aligns with research by Megasari and Saleh., Setyadharma and Fadhilah, and Abdulmohsen and Bel (2020). The more significant the GDP, the greater the flow of FDI in the manufacturing sector in Indonesia. An increase in a country's GDP reflects an increase in its market size. The increasingly large market size will provide opportunities for investors who invest their capital in the processing industry sector to utilize resources efficiently and exploit economies of scale. The larger market size will increase the demand for goods and services in the processing industry, resulting in increased production, sales, and profits for investors.

Inflation has a significant effect on reducing FDI in the manufacturing industry sector in Indonesia at lags 1, 2, and 3. These results show that an increase in inflation of 1% will reduce FDI flows in the processing industry sector by 0.23%, 0.38%, and

0.15% in three quarterly periods. This is supported by research by Wilantari et al. (2020), Asiamah et al. (2019), and Boateng et al. (2015), who found a significant negative effect of inflation on FDI. Every increase in inflation will reduce the flow of FDI in Indonesia's processing industry sector. The higher inflation rate will increase production costs and prices of goods in the processing industry sector. High production costs and prices of goods will reduce aggregate supply and people's purchasing power for goods and services in the processing industry sector. This will cause the rate of business failure to increase, making investment in the processing industry sector less attractive.

The exchange rate has a positive but insignificant influence on FDI in Indonesia's short-term manufacturing industry. This finding is supported by the theory " The Currency Areas Hypothesis," which states that if a country's exchange rate strengthens compared to its investment destination, investors will invest in that country to get a higher rate of return. However, in this research, the exchange rate does not influence FDI. Megasari & Saleh's research supports the findings in this research., Xaypanya et al. and Gharaibeh (2014). Investors in the processing industry generally consider infrastructure conditions and economic growth. Foreign investors do not consider the exchange rate because it fluctuates in the short term, while foreign direct investment is long-term.

In the short term, the interest rate variable has a significant negative effect on FDI in the manufacturing industry sector in Indonesia in the same period with a coefficient of 0.48. On the other hand, at lag one, the interest rate increases FDI flows in the manufacturing industry sector with a coefficient of 0.53. These results show that every 1% increase in interest rates will reduce FDI in the manufacturing industry sector by 0.48% in the same period and increase FDI by 0.53% in the following quarter. In Indonesia, many entrepreneurs or investors invest and do business in the processing industry sector using banking capital as a source. Banks increasing interest rates will increase the burden on investors to pay loan interest. Therefore, when bank interest rates are high, investors will consider borrowing capital from the bank because their interest burden is quite significant, in line with Ajija & Fanani's findings (2021), Who found that interest rates influence FDI negatively significantly in 5 ASEAN countries. Boateng et al. (2015) It also found that interest rates have implications for reducing FDI in Norway. In addition, the results of this research are supported by Keynes's *Marginal Efficiency of Investment* (MEI) theory, which shows a negative relationship between interest rates and investment. High interest rates will reduce the investment flow obtained. This is because the high cost of capital causes investors to reduce capital flowing into the processing industry sector. On the other hand, if interest rates are low with the assumption that the return in the destination country is greater than the country of origin, then investors will channel their capital because the cost of capital is cheap. Interest rates significantly affect investment because investors see differential interest rates as a signal that needs to be considered before investing.

Total money in circulation influences FDI in the manufacturing industry sector negatively and significantly, with a coefficient of 16.62, where every 1% increase in the amount of money in circulation will reduce FDI in the processing industry sector by 16.62% in the short term. This study's results differ from the results of research by Mukhtarov et al., Hina & Anayat, and Shafiq et al. (2015), Who found that total

money in circulation increased FDI flows. However, these findings support the research of Boateng et al. (2015), who also found a negative influence between the money supply (M2) and FDI flows in Norway. An increase in the money supply will cause inflation, so investors who want to invest in the processing industry sector will be less interested in investing their capital.

The COVID-19 pandemic negatively affected FDI in the manufacturing industry sector in Indonesia at lag 2 with a coefficient of 1.36. The COVID-19 pandemic reduced FDI flows in the processing industry sector in Indonesia by 1.36%. The COVID-19 pandemic has affected the attractiveness of FDI in the processing industry sector in Indonesia. At the start of the COVID-19 pandemic, the level of FDI in the processing industry sector experienced a very drastic decline. This is due to restrictions on community activities, which result in hampered business activities that impact the economy, namely decreased economic growth and foreign direct investment in the processing industry sector. (Nadia, 2021) In this research, researchers want to emphasize GDP's vivacious and significant influence on FDI in the processing industry sector. Economic recovery during the COVID-19 pandemic will encourage inflows of foreign direct investment in this sector. Foreign investors' confidence in the economic recovery of host countries during the COVID-19 pandemic is also essential.

The error correction model in the short-term balance estimation results above was obtained from the long-term. The coefficient of the variable ect(-1) is -1.282030 and is significant. This means that 128% of the disequilibrium between FDI in the processing industry sector will be corrected again within one period (one quarter). The negative coefficient sign indicates that there is a correction mechanism for deviations from the long-term balance. After estimating the short-term ARDL, the next step is to assess the long-term ARDL. The following are the long-term ARDL estimation results.

Table 6. Long-term ARDL estimation results

Variables	Coefficient	Std. Error	t-Statistics	Prob
LN_GDP	11.02267***	3.273407	3.367337	0.0024
INFLATION	0.251888**	0.107425	2.344784	0.0269
LN_VALUE OF EXCHANGE	-1.227801	1.886825	-0.650723	0.5209
INTEREST RATE	-0.448388***	0.146159	-3.067804	0.0050
LN_JUB	-4.583694*	2.270661	-2.018661	0.0539
DUMMY	-0.193578	0.367015	-0.527439	0.6024

*Note: *, **, and *** indicate significance of 10%, 5% and 1% respectively*

Based on Table 6, it is known that in the long term, the variables GDP, inflation, and interest rates significantly influence FDI in the manufacturing industry sector in Indonesia in different directions. Meanwhile, the exchange rate variables, money supply (M2), and the COVID-19 pandemic do not have a significant effect.

Just like the effect of GDP on FDI in the short term, in the long term, the GDP variable has a positive and significant impact on FDI in Indonesia's manufacturing sector. Every 1% increase in economic growth will increase FDI flows by 11.02%. This shows that economic growth or GDP has a vital role in increasing FDI inflows in the manufacturing industry sector in Indonesia, which is in line with Hymer, Dunning's eclectic theory/OLI paradigm that when companies decide to invest they will look for countries that have more excellent market opportunities. large (Aprianto et al., 2020)

. Setyadharma & Fadhilah's research. Supporting these research findings, Megasari & Saleh (2021), Sumiyati (2021), and Abdulmohsen & Bel (2020) found that a high level of economic growth will attract more FDI flows. An increase in a country's GDP reflects an increase in the size of a country's market. The increasingly large market size, especially in the processing industry sector, will increase demand for goods and services. This increase will impact increasing production and sales in the processing industry sector, followed by rising profits obtained by investors who invest in the processing industry sector. The positive and significant influence between GDP and FDI in the processing industry sector shows that GDP is one of the main factors attracting FDI flows in Indonesia's processing industry sector.

In the long term, inflation significantly positively influences FDI in Indonesia's manufacturing industry sector, with a coefficient of 0.25. This means that every increase in inflation will increase FDI flows in the manufacturing industry sector in Indonesia by 0.25%. This finding does not align with the *cosh push inflation theory,* which states that rising production costs will reduce aggregate supply. Apart from that, an increase in production costs will also make the price of goods high, causing people's purchasing power to fall. In line with Manan & ais yah's research (2023) And. However, this differs from the research of Asiamah et al., Wilantari et al., and Boateng et al . (2015), which shows that inflation reduces FDI flows. Inflation in developing countries is caused by the significant demand for goods and services, which is not balanced by the availability of goods and services. In other words, there is more demand than supply of desired goods and services. This significant and continuously increasing demand can occur due to economic growth, population growth, income levels, and purchasing power, followed by increased output. The increasing demand for goods and services in the processing industry sector when inflation and high prices encourage investors to increase production. The high prices of goods and services will result in high investor profits. Thus, investors must increase their investment in the processing industry sector. (Fathia et al., 2021) .

The exchange rate does not affect FDI in Indonesia's processing industry sector in the long term. This finding is not by the theory " *The Currency Areas Hypothesis, "*which states that if a country's exchange rate strengthens compared to the investment destination country, it will invest in that country in the hope of getting a higher rate of return. Apart from that, the results of this study are also supported by Megasari & Saleh's research, Xaypanya et al., and Gharaibeh. , also found no significant influence between the exchange rate and FDI because investors who invest their capital in the processing industry sector generally look at infrastructure conditions and economic growth. Foreign investors do not consider the amount of the exchange rate because the exchange rate fluctuates in the short term. In contrast, foreign direct investment in the processing industry sector is long-term.

Just like the influence of interest rates on FDI in the short term, interest rates have a significant negative impact on FDI flows in the manufacturing industry sector in Indonesia in the long term, with a coefficient of 0.44. This means that every 1% increase in interest rates will reduce FDI in the processing industry sector by 0.44%. High interest rates will reduce FDI flows. (Ajija & Fanani, 2021) (Boateng et al., 2015) . This is because in Indonesia, especially in the processing industry sector, many investors invest using capital sources that come from banking. So, when banks increase

their interest rates, the burden on investors to pay loan interest will also increase. Therefore, when bank interest rates are high, investors will consider borrowing capital from the bank because the interest burden they bear is quite significant. Keynes' theory, namely Marginal Efficiency of Investment (MEI), also supports this research's findings, which show that the relationship between interest rates and investment is negative. This means that a country's high interest rate will reduce or reduce the amount of investment obtained by that country. The reason is that high capital costs cause investors to reduce capital flowing to destination countries. On the other hand, if interest rates are low with the assumption that the rate of return in the destination country is more significant than that in the country of origin, then investors will channel their capital because the cost of capital is cheap. The considerable influence between interest rates and investment occurs because interest rates are something that investors need to consider before investing because the motive for investment is to seek profit.

The money supply (M2) does not affect *foreign direct investment.* This indicates that an increase in the money supply will not have implications for FDI flows in the manufacturing industry sector in Indonesia in the long term. This finding is not based on the research results of Mukhtarov et al., Hina & Anayat, and Shafiq et al. (2015), Who found that the money supply increases FDI flows. However, the results of this research are supported by research by Edalmen. (2013) It was found that an increase in total money in circulation did not affect FDI but significantly affected domestic investment. This is because foreign investment comes from the financial sector abroad. Apart from that, an increase in the money supply does not directly affect FDI in the manufacturing industry sector but through short-term interest rates, which will cause borrowing costs to decrease, stimulating investment spending. (Mankiw, 2018).

The dummy variable for the Covid-19 pandemic impacted reducing FDI, but the decrease was insignificant. This means that initially, the pandemic reduced FDI in Indonesia's processing industry sector. However, this decline is insignificant because even though the COVID-19 pandemic hit Indonesia and impacted foreign direct investment in the processing industry sector, this sector still has investment attractiveness. After all, it has a large market size, abundant resources, and economic growth.

CONCLUSION

Several conclusions can be drawn based on the research findings above. First, in the short term, economic growth increases FDI in Indonesia's processing industry. The variables inflation, interest rates, total money in circulation, and the COVID-19 pandemic have implications for reducing FDI flows in the manufacturing industry sector in Indonesia. Meanwhile, the exchange rate does not significantly influence FDI in Indonesia's manufacturing industry. Second, in the long term, GDP and inflation variables increase FDI flows in the processing industry sector. Interest rates reduce FDI flows in Indonesia's manufacturing industry sector. Meanwhile, the exchange rate, total money in circulation, and the COVID-19 pandemic have not affected FDI in the processing industry sector in Indonesia in the long term.

Researchers can advise policymakers to expand the market in the processing industry sector. The larger the market size, the more FDI flows will flow into that

sector. For example, the government can provide convenience and incentives for manufacturing companies at various levels, focusing on domestic and foreign sales (exports). Another effort the government can make to attract foreign investment is maintaining the stability of Indonesian bank interest rates.

This research's limitation is that it only uses macroeconomic variables and examines one economic sector. Therefore, further research must add institutional variables such as political stability, democracy, corruption, tax rates, cultural distance, and other variables that can be observed to make it more complex. Future research could also examine several different economic sectors.

REFERENCES

Abdul, B., Abdul, Z., & Naufal, M. (2018). Corruption and Foreign Direct Investment (FDI) in ASEAN-5 : A Panel Evidence. *Economics and Finance in Indonesia*, *64* (2), 145–156.

Abdulmohsen, A., & Bel, T. (2020). Foreign direct investment determinants in an oil abundant host country : Short and long-run approaches for Saudi Arabia. *Resources Policy*, *66* (October 2019), 101616. https://doi.org/10.1016/j.resourpol.2020.101616

Ajija, SR, & Fanani, FF (2021). Macroeconomic Variables and Foreign Direct Investment in ASEAN 5. *Economics Development Analysis Journal*, *3* (3), 298–307. http://journal.unnes.ac.id/sju/index.php/edaj

Akadiri, A.C., Gungor, H., Akadiri, S. Saint, & Bamidele-Sadiq, M. (2020). Is the causal relationship between foreign direct investment, trade, and economic growth complement or substitute? The case of African countries. *Journal of Public Affairs*, *20* (2), 1–12. https://doi.org/10.1002/pa.2023

Alshamsi, KH, Hussin, MR Bin, & Azam, M. (2015). The impact of inflation and GDP per capita on foreign direct investment: The case of the United Arab Emirates. *Investment Management and Financial Innovations*, *12* (3), 132–141.

Aprianto, R., Alla Asmara, & Sahara. (2020). Determinants of Foreign Direct Investment Inflows to Low-Income Countries. *Journal of Development Economics and Policy*, *7* (2), 174–188. https://doi.org/10.29244/jekp.7.2.174-188

Asiamah, M., Ofori, D., Afful, J., Asiamah, M., Ofori, D., & Afful, J. (2019). Analysis of the determinants of foreign direct investment in Ghana. *Journal of Asian Business and Economic Studies*, pp. *1*, 56–75. https://doi.org/10.1108/JABES-08-2018-0057

Ben-David, D., Nordstrom, H., & Winters, L. A. (2000). Trade, income disparity and poverty. In *Special Studies 5. Geneva: World Trade Organization, 2000, pp. iv, 69* (Issue 5). http://proxy.library.carleton.ca/login?url=http://search.proquest.com/docview/56028750?accountid=9894%5Cnhttp://wc2pu2sa3d.search.serialssolutions.com/?ctx_ver=Z39 .88-2004&ctx_enc=info:ofi/enc:UTF-8&rfr_id=info:sid/EconLit&rft_val_fmt=info:ofi/fmt:kev:mtx

Boateng, A., Hua, X., Nisar, S., & Wu, J. (2015). Examining the determinants of inward FDI : Evidence from Norway. *Economic Modelling*, *47*, 118–127. https://doi.org/10.1016/j.econmod.2015.02.018

Borensztein, E., De Gregorio, J., & Lee, J. W. (1998). How does foreign direct

investment affect economic growth? *Journal of International Economics*, *45* (1), 115–135. https://doi.org/10.1016/S0022-1996(97)00033-0

Castro, P.G. de, Fernandes, E.A., & Campos, A.C. (2013). The Determinants of Foreign Direct Investment in Brazil and Mexico: An Empirical Analysis. *Procedia Economics and Finance*, *5* (13), 231–240. https://doi.org/10.1016/s2212-5671(13)00029-4

Cuyvers, L., Soeng, R., Plasmans, J., & Van Den Bulcke, D. (2011). Determinants of foreign direct investment in Cambodia. *Journal of Asian Economics*, *22* (3), 222–234. https://doi.org/10.1016/j.asieco.2011.02.002

Edalmen. (2013). *Analysis of Factors Affecting Foreign Investment and Domestic Investment in Indonesia for the 1990-2011 Period* (pp. 174–190). http://ijecm.co.uk

Ekananda, M. (2016). *Econometric Analysis of Time Series* (2nd ed.). Media Discourse Partners.

Farichah, S.A. (2022). Inflation Analysis in Indonesia: Autoregressive Distributed Lag (Ardl) Approach. *Journal of Scientific Horizons*, *1* (10), 2467–2484.

Fathia, N., Silvia, V., & Gunawan, E. (2021). Analysis of Foreign Investment Determinants in Indonesia. *Economics Development Analysis Journal*, *10* (3), 338–350. https://doi.org/10.15294/edaj.v10i3.45375

Gharaibeh, AMO (2015). The Determinants of Foreign Direct Investment-Empirical Evidence from. *International Journal of Business and Social Science*, *6*, 94–106.

Gujarati, D.N. (2007). *Basics of Econometrics Volume 2*. Erlangga.

Hina, M., & Anayat, U. (2019). The Role of Money Supply : Foreign Direct Investment & Economic Growth in Pakistan. *International Journal of Economics, Commerce and Management*, *VII* (2), 281–289. http://ijecm.co.uk

Ibhagui, O. (2020). How does foreign direct investment affect growth in sub-Saharan Africa? New evidence from threshold analysis. *Journal of Economic Studies*, *47* (1), 149–181. https://doi.org/10.1108/JES-06-2018-0198

Jaiblai, P., & Shenai, V. (2019). The determinants of FDI in sub-Saharan economies: A study of data from 1990–2017. *International Journal of Financial Studies*, *7* (3). https://doi.org/10.3390/ijfs7030043

Jawaid, ST, Raza, SA, Mustafa, K., & Karim, MZA (2016). Does Inward Foreign Direct Investment Lead Export Performance in Pakistan? *Global Business Review*, *17* (6), 1296–1313. https://doi.org/10.1177/0972150916660394

Mahmood, H., & Alkhateeb, TTY (2018). Foreign direct investment, domestic investment, and oil price nexus in Saudi Arabia. *International Journal of Energy Economics and Policy*, *8* (4), 147–151.

Manan, SA, & Aisyah, S. (2023). The Influence of Gross Domestic Product, Interest Rates, Inflation, and Economic Growth on Foreign Direct Investment in Asean. *Economics: Journal of Economics and Business*, *7* (1), 159–163. https://doi.org/10.33087/economics.v7i1.764

Mankiw, N.G. (2018). *Introduction to Macroeconomics* (7th ed.). Salemba Four.

Marsela, N. (2014). THE EFFECT OF INFLATION RATE, GRDP, CREDIT INTEREST RATES, AND DOLLAR EXCHANGE ON INVESTMENT. *UDAYANA UNIVERSITY E-JOURNAL OF DEVELOPMENT ECONOMICS*, pp.

3, 77–87.

Megasari, T., & Saleh, S. (2021). Determinants of FDI Inflows in OIC Countries. *International Journal of Islamic Economics and Finance (IJIEF)*, *4* (1), 31–50. https://doi.org/10.18196/ijief.v4i1.9473

Muhammad Syaikhu, A., & Haryati, T. (2018). Analysis of the Effect of Inflation, Credit Interest Rates, Labor, and Technology on Investment in Indonesia. *Economics Development Analysis Journal*, *6* (1), 8–15. https://doi.org/10.15294/edaj.v6i1.22195

Mukhtarov, S., Alalawneh, M.M., Azizov, M., & Jabiyev, F. (2020). The impact of monetary policy and tax revenues on foreign direct investment inflows: An empirical study on Jordan. *Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis*, *68* (6), 1011–1018. https://doi.org/10.11118/actaun202068061011

Nadia, MU (2021). Analysis of the Realization of Foreign Investment Before and During the Covid-19 Pandemic in East Java. *Udayana University Economics and Business E-Journal*, *10* (01), 33–38.

Omankhanlen, A. E. (2011). The Effect of Exchange Rate and Inflation on Foreign Direct Investment and Its Relationship with Economic Growth in Nigeria. *Economics and Applied Informatics*, *17* (1), 5–16. http://www.ann.ugal.ro/eco/Review.htm%5Cnhttp://ezproxy.lib.monash.edu.au/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=ecn&AN=1285444&site=ehost-live&scope=site

Romer, P. (1993). Idea gaps and object gaps in economic development. *Journal of Monetary Economics*, *32* (3), 543–573. https://doi.org/10.1016/0304-3932(93)90029-F

Sasana, H., & Fathoni, S. (2019). Determinants of Foreign Direct Investment Inflows in ASEAN Countries. *Traces*, *12* (2), 253–266. https://doi.org/10.15294/jejak.v12i2.18785

Setyadharma, A., & Fadhilah, SN (2021). Determinants of Foreign Direct Investment Inflows in Seven ASEAN Countries During 2010-2017: Dunning Model Approach. *Journal of Development Economics: Study of Economic and Development Problems*, *22* (1), 1–11. https://doi.org/10.23917/jep.v22i1.11180

Shafiq, N., Ahmad, H., & Hassan, S. (2015). Research Article Examine the Effects of Money Supply M1 and GDP on FDI in Pakistan. *International Journal of Current Research*, *7* (03), 13498–13502.

Sharifi-Renani, H., & Mirfatah, M. (2012). The Impact of Exchange Rate Volatility on Foreign Direct Investment in Iran. *Procedia Economics and Finance*, *1* (12), 365–373. https://doi.org/10.1016/s2212-5671(12)00042-1

Sumiyati, E.E. (2020). Factors Affecting Manufacturing Exports. *Journal of Economics, Business, & Accountancy Ventures*, *23* (2), 254–266. https://doi.org/10.14414/jebav.v23i2.2303

Sumiyati, E.E. (2021). What Determines Foreign Direct Investment in Indonesia? *Journal of Economics, Business, & Accountancy Ventures*, *24* (2), 258–270. https://doi.org/10.14414/jebav.v24i2.2721

Supriani, I., & Fianto, BA (2020). What drives the inflow of FDI in OIC countries?

Evidence from top 10 hosts of inward FDI flows. *Journal of Islamic Economics & Finance*, *6* (2), 91–105. https://doi.org/10.20885/JEKI.vol6.iss2.art2

Wilantari, RN, Saragih, GS, & Prianto, FW (2020). Perceptions of Corruption and Macroeconomic Conditions on Foreign Investment in Indonesia, the Philippines and Thailand. *Media Trends*, *15* (1), 174–184. https://doi.org/10.21107/mediatrend.v15i1.6745

Xaypanya, P., Rangkakulnuwat, P., & Paweenawat, S. (2014). The determinants of foreign direct investment in ASEAN. *International Journal of Social Economics*, *42* (3 pp), 239–250.