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Determinant Foreign Direct Invesment (FDI) in Indonesia

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Abstract:- This study is to investigate impact of Gross Domestic Product (GDP), inflation, interest rates, exports and imports on Foreign Direct Investment (FDI) in Indonesia. The analysis employs is Ordinary Least Square (OLS) with Error Correction Model (ECM) using Eviews 12. The findings indicate that in the long-term inflation, interest rates, exports, and imports affect FDI. However, in the short term just inflation and imports have a significant impat on FDI in Indonesia.

Keywords:- *FDI, Macroeconomic, ECM.*

I. INTRODUCTION

Indonesia as a developing country requires investment to tackle its multifaceted issues. Government policies will have a significant impact on economic growth and capital inflows in Indonesia (Budiono, 2023). FDI is essential for the development of developing countries, as it not only brings in capital but also technology, skills and knowledge that can improv productivity leading to increased employment and reduced unemployment (Nurmasari, 2018) and (Jufri, 2021).

Since 1958, Indonesia has seen a fluctuation in FDI entering country (Haris, 2018). According to World Bank Data this trend has continued for 22 years, as illustrated in figure 1 (World Development Indicator, 2023).

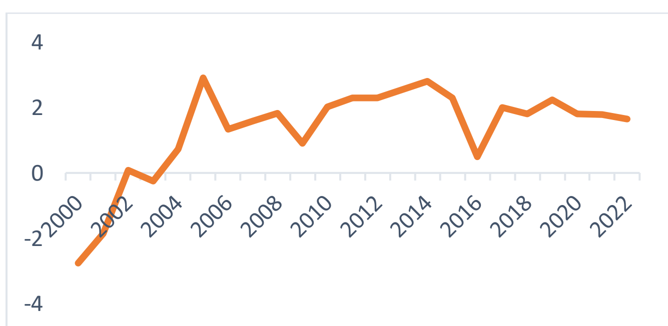

Fig 1. FDI Net Inflow in Indonesia 2000-2022
Source: (World Development Indicator 2023)

Figure 1 illustrates the average FDI growth in Indonesia at 1.39%. The sharpest decrease occurred in 2000 at -2.67% attributed to the impact of the monetary crisis in 1998, while growth was recorded in 2005 at 2.91%. This e this was increase was a result of the stability of the Indonesian economy, which was achieved through economic reforms a imed at attracting foreign investment into Indonesia.

Fluctuating FDI in Indonesia can be influenced by factors, including increased economic grwoth. Higher economic growth can lead to increased income and purchasing power, making the country more attractive to investor. Previous studies have examined the relationship between GDP and FDI. Research by (Tran, 2023) (Fazaalloh, 2019), and (Arbi, 2018) has found a positive impact on economic growth on FDI, however a study by (Vinet, 2011) found a negative effect of economic growth on FDI.

Indonesia which adheres to an open economy is certainly affected by the exchange rate, as rising or falling exchange rates will impact the return of FDI. Research by (Sasana, 2019), and (Arbi, 2018) suggest that the exchange rate has a negative effect on FDI, as some investors prefer to invest in countries with weak currencies, however research by (Vinet, 2011) found that exchange rates actually have a positive affect on FDI.

Another factor that affects investment is inflation. The monetary crisis led to increase in inflation, which in turn has a negative impacton Invesment. High reduces people's purchasing power, leading to a decrease in production. Research by (Iskandar, 2016), (Fikri, 2005), and (Arbi, 2018) found inflation has a negative affect the influx of FDI, however a research by (Vinet, 2011) found that inflation actually had a positive effect on FDI.

Interest rates are a crucial factor in determining FDI. High interest rates can lead to a decrease in investments as investors may choose to hold onto their money rather than invest due to the low return on capital. Research by (Pham, 2023), and (Nizar, 2017) has found that interest rates negative impact on FDI, investor funds which often come from banks are influenced by interest rates, however research by (Nurmasari, 2018), and (Malisa, 2017) found interest rates have a positive effect on FDI.

A country's strong is often indicated by a high volume of exports in comparison to imports. Research by (Dewata, 2013) and (Febriana, 2014) found exports have a positive and significant impact on FDI. This is due to the fact that an increase in exports is perceives as a sign of a stable economy by potetial investors, however research by (Anindita, 2021) found exports have a negative effect on FDI.

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II. LITERATUR REVIEW

Research conducted by Malisa (2017) focused on the "Analysis of Foreign Direct Invesment in Indonesia". This study utilized quartely data from 2005.3-2014.4 and employed the Ordinary Least Square (OLS). The result indicated that GDP and interest rate have a significant positive impact on FDI in Indonesia, while the exchange rate has a significanly negative on FDI in Indonesia.

Research conducted by Sasana (2019) focused on the "Determinant of Foreign Direct Invesment (FDI) in ASEAN (Cambodia, Indonesia, Malaysia, Plippines, Thailand and Vietnam) from 2007-2016. The method used to analyze the data was multiple linear regresion. The result indicated that market size, government integrity, and infastructure quality positively affected FDI; while wages and exchange rates had a negative effect. Additionally, the study found that economic crisis had negative effect only Malaysia. Economic openness, tax rate, and interest rate were effect on FDI inflow in ASEAN Countries.

Research conducted by Syantini (2020) focused on the "Analysis Determinant Factor of Foreign Direct Invesment in Indonesia". The purpose this study is to analyze variables that effect the inflow of FDI in Indonesia. The method of analysis uses Vector Error Corecction Model (VECM), with secondary data 2015-2019 (quartely). The result show, partially in the short-term, GDP and inflation did not have a significant effect, exchange rate had a negative significant effect, export has a negatively significant effect. In the long-term exchange rates did not have a significant effect, while GDP and inflation had a positive significant effect, export has a negative effect.

Research conducted by Khaerunnisa (2022) focused on the "Determinant Foreign Direct Invesment (FDI) in Indonesia. The purpose this study was to examine the facto influencing FDI in Indonesia by analyzing purposive sample of 20 sub-sectors. The researches used a multiple linear regression of panel data as the method of analysis. The result indicated that interest rates and exchange rates had a negative significant effect on FDI, while labor wages had a positive significant effect on FDI in Indonesia.

Research conducted by Pham (2023) focused on the "Determinant of FDI Inflows; Aggregate versus country-spesific evidence from ASEAN-6". The study aimed to determine the factors influencing FDI inflows in Indonesia, Malaysia, Phippines, Singapore, Thailand, and Vietnam from 1995-2019. Aggregate model estimation with the Driscoll-Kraay panel regression approach, as well country-spesific analysis based on the Fully Modefied Ordinary Least Square (FMOLS) approach. The findings revealed that at aggregate level, GDP, trade openness, unemployment, working age population, and interest rate spread are the main drivers of FDI inflows into the ASEAN-6. Additionally, percapita GDP, real interest rate and the global financial crisis were found to have no significant impact on FDI inflows.

Empirical reviews have shown a relationship between GDP, inflation, interest rate, exchange rate, and exports. However, previous studies have found different result and a lack of empirical studies regarding the relationshop between imports and FDI. This gap has been used by researches to exam the relationship berween imports and FDI.

III. METHODOLOGY

This research is descriptive quantitative type. The data used in this study are secondary data obtained from Bank Indonesia (BI) Badan Pusat Statistik (BPS) and World Development Indicator (WDI).

Table 1. Variables Operational Definition

Variables	Definition	Source
FDI	FDI net inflows (% from GDP)	WDI
GDP	Annual GDP growth in (%)	WDI
Inflation	Consumer price (annual %)	WDI
Interest rate	Bank Indonesia Certificate (BIC)	BI
Exchange rate	Rupiah against the dollar (middle rate)	BPS
Exports	Export of goods and services (%)	WDI
Imports	Import of goods and services (%)	WDI

The analysis model used in this study is the Error Correction Model (ECM). Data that are non stationary at the level are expected to exhibit both short-term and long-term relationship. The equation for the long-term model is as follows:

$$FDI_t = \beta 1 + \beta 2GDP_t + \beta 3INF_t + \beta 4BIC_t + \beta 5KURS_t + \beta 6X_t + \beta 7M_t + u_t \quad (1)$$

From a long-term model, short-term implications can be derived:

$$\Delta FDI_t = \alpha 1 + \alpha 2\Delta GDP_t + \alpha 3\Delta INF_t + \alpha 4\Delta BIC_t + \alpha 5\Delta KURS_t + \alpha 6\Delta X_t + \alpha 7\Delta M_t + ECT\ (-1) + u_t \quad (2)$$

Where β is the coefficient of the long-term eqeuation, α is the coefficient of the short-term, Δ represents the change in the variables, ECT is the residual of equation (1), u is the residual, and $_t$ is time series.

IV. RESULT AND DICUSSION

This study utilized Eviews 12 as a tool for processing and examines the impact of independent variable on the dependent variable. Since it involves time series data, various test sare conducted including stationary test, cointegration test, normality test, autoccorelation test, heteroskedasticity test, t test, F test, and R-square test.

Table 1. Dickey-Fuller Root Test

Variables	Level	First difference
FDI	-3.64 [0.01] ***	-5.63 [0.00] ***
GDP	-3.56 [0.01] ***	-5.13 [0.00] ***
Inflation	-2.62 [0.10]	-6.66 [0.00] ***
Interest rate	-2.54 [0.12]	-5.87 [0.00] ***
Exchange rate	-0.16 [0.93]	-4.65 [0.00] ***
Export	-2.56 [0.11]	-5.02 [0.00] ***
Import	-2.21 [0.20]	-6.48 [0.00] ***

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Notes: Values in [ ] is value prob, *** denotes significance at 5%

The results of the stationary test showed that FDI and GDP were stationary at the level, while the exchange rate, inflation, export, and imports were stationary at the first difference. If there is a long-term relationship between FDI and determinants, then long-term and short-term regression will be conducted.

Table 2. Result of OLS

Variables	**Coefficient**	**Std. Error**	**t-Statistik**	**Prob**
GDP	-0.08	0.11	-0.71	0.48
Inflation	0.20	0.07	2.81	0.01 ***
Interest rate	-0.31	0.10	-2.87	0.01 ***
Exchange rate	-0.02	0.09	-0.25	0.80
Export	-0.28	0.07	-3.76	0.00 ***
Import	0.38	0.10	3.47	0.00 ***
C	1.82	2.02	0.89	0.00

Based on the significant number of variables in the model, it seems that multicollinearity is not a concern, as indicated by the correlation coefficient. However, the result of the multicolinearity test reveal a high level of multicolinearity between exports, imports, and interest rates. It is generally considered risk if the correlation coefficient exceeds 0.9 (Rhee, 2000).

R-squared	**Adj. R-square**	**S.E of regression**	**DW statistic**	**F-statistic**
0.82	0.76	0.69	2.50	12.64

Table 3 presents the results of the ECM analysis, which only includes the ECT (t-1) based on the FDI equation, as this study only specifically focuses on the FDI equation. A negative and significant ECT value indicates a valid long-term equilibrium relationship between FDI and its determining factors. Additionally, the last ECM statisfies a series-of tests includng Jarque Bera test, serial correlation LM test, heteroscedastisity test.

Table 3. Result of ECM (last estimate)

Variables	**Coeffisien**	**Std. Error**	**t-Statistik**	**Prob**
GDP	-0.04	0.06	-0.66	0.51
Inflation	0.17	0.04	3.66	0.00 ***
Interest rate	-0.11	0.08	-1.41	0.17
Exchange rate	-0.27	0.16	-1.68	0.51
Exports	-0.09	0.08	-1.10	0.28
Imports	0.22	0.07	2.87	0.01 ***
ECT (-1)	-1.21	0.19	-6.14	0.00 ***
C	0.23	0.13	1.72	0.10
R-squared	Adj. R-square	S.E of regression	DW statistic	F-statistic
0.82	0.74	0.50	2.13	9.58
Jarque Bera test	Serial Correlation LM test		Heteroskecastisity test	
0.93	0.51		0.21	

Notes: *** is significant at 5%. Jarque Bera test, serial correlation LM test, and heteroscedastisity test showed a significant level greater than 5%.

Table 4 summarizes forecasts from long-term and short-term analyses. In the long run, variables such as inflation, interest rate, exchange rate, exports, and imports partially significantly affect the entry of FDI in Indonesia. On the other hand, in the short-term inflation and imports partially significantly affect FDI entry in Indonesia. The results of the F and R2 tests indicate that all independent variables affect the dependent variable by 82%, while 18% of factors outside the model.

Tables 4. Sumarry Long-Term and short-term (significant of FDI)

Long-term				
Variables	**Coefficient**	**Std. Error**	**t-Statstic**	**Prob**
Inflation	0.20	0.07	2.81	0.01 ***
Interest rate	-0.31	0.10	-2.87	0.01 ***
Exports	-0.28	0.07	-3.76	0.00 ***
Imports	0.38	0.10	3.47	0.00 ***
Short-term				
Inflation	0.17	0.04	3.66	0.00 ***
Imports	0.22	0.07	2.87	0.01 ***
T-table [1.75]		F-table [2.79]		R-square [0.82]

Notes: *** is significant at 5%

- *Discussion*

  - *The effect of GDP on FDI*

The findings indicate that GDP has a negative but not significant impact on FDI in Indonesia. In both the short-term and long-term. This study contradicts the hypothesis, that GDP would have a significant positive effect on FDI in Indonesia. These a lign with previous research (Vinet, 2011) suggesting that GDP actually has a negative impact on FDI, this is attributed to the fact that economic growth leads to higher wages and production costs, potentially reducing the appeal of investing in the country for foreign companies.

  - *The effect of inflation on FDI*

The findings indicate that both short-term and long-term inflation have a notable positive impact on FDI in Indonesia. This suggests that as inflation rises, so does FDI in Indonesia. This outcome contradicts the hypothesis, which proposed that inflation has a significant negative impact on FDI in Indonesia. These results a lign with a previous study (Vinet, 011) which also found that inflation has a positive effect. The rationale behind this is that an increase in inflation can signal economic growth and stimulate production, making it less of a concern for investors.

➢ *The effect of interest rates on FDI*

The finding indicated that both long-term and short-term interest rate have a negative but only significant long-term effect on FDI in Indonesia. This means that an increase in the interest rate will lead to a decrease of FDI in Indonesia. This result aligns with the hypothesis, which suggest that interest rates have a significant negative effect on FDI in Indonesia. These findings are consistent with previous studies by (Khaerunnisa, 2017) and (Putriyanti, 2022) which also found that interest rates have a negative effect, this is because when interest rates rise, investors tend to prefer to deposit their money in the bank rather than invest.

➢ *The effect of exchange rates on FDI*

The findings indicated that both shorth-term and long-term exchange rates have a negative, but not significant on FDI in Indonesia. This outcome contradic the hypothesis, namely that exchange rates have a significant negative effect on FDI in Indonesia. These results a lign with previous study (Vinet, 2011) and (Jufri, 2021) which also found that the exchange rate has a negatively effect. Specifically, an increase in a country's currency is expected to impact the rate of return on investment.

➢ *The effect of Export on FDI*

The findings indicated that exports had a negative and significant impact on long-term FDI. This suggests that an increase in exports will lead to a reduction in FDI. this result condratics the hypotesis, which predicted a significant positive effect of exports in FDI. These results lign with study by (Anindita, 2021) which suggest that an increase innexports, perticularly of raw materials, may lead to shortage of raw materials for production, thereby decreasing foreign invesment interest.

➢ *The Effect of imports on FDI*

The findings indicated that both long-term and sort-term imports had a positive and significant impact. This suggest that an increase in imports will influence an increase in FDI. This outcome aligns with the hypothesis, that imports have a significant positive effect. This could be attributed to the high imports for infrastructure and productivity enhancements, which can attract foreign investor. furthurmore, FDI and imports have a strong correlations, as an increase in FDI brings not only capital, but also technology, making the two factors inter dependent

V. CONCLUSION

In the long-term, FDI inflow in Indonesia is significanly affected by inflation, interest rate, exports, and imports. In the short-term, inflation and imports have a significant impact on FDI. Importanly, imports have the greatest influence on FDI in both the long-term and short-term, as indicated by coefficient. This study can provide insights into the relationship between imports and FDI.

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