

# Similarity result of\_Determinants of Foreign Direct Investment (Fdi) in Indonesia Short Term and Long Term

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### **Determinants of Foreign Direct Investment (Fdi) in Indonesia: Short Term and Long Term**

**Abstract. Introduction.** Foreign capital flows have an important role in a sustainable Indonesian economy, these flows have a significant influence on developing countries, especially Indonesia to encourage increased economic growth. This study focuses on analyzing the determination of macroeconomic variables including economic growth, interest rates, rupiah exchange rates, and the number of residents who subscribe to cellular phones.

**Purpose.** This study focuses on long-term analysis of macroeconomic variables in determining foreign direct investment (FDI).

**Results.** The findings of this study indicate that in the short term economic growth has a positive and significant effect on foreign direct investment. while the rupiah exchange rate, interest rate, and the number of residents who subscribe to cellular phones have a negative and significant effect on foreign direct investment. while in the long term economic growth has a positive but not significant effect on foreign direct investment. while the interest rate and the number of residents who subscribe to cellular phones have a positive and significant effect. Meanwhile, the rupiah exchange rate in the long term has a negative and significant effect.

**Conclusions.** Based on the short-term estimation, Economic Growth has a positive and significant effect on Foreign Direct Investment. Meanwhile, the Rupiah Exchange Rate, Interest Rate, and Number of Residents Subscribing to Cellular Phones have a negative and significant effect on Foreign Direct Investment and Based on the long-term estimation, Economic Growth has a positive but not significant effect on Foreign Direct Investment. Meanwhile, the interest rate and the number of residents who subscribe to cell phones have a positive and significant effect. Meanwhile, the Rupiah Exchange Rate in the long term has a negative and significant effect.

**Keywords:** : economic growth; BI rate; exchange rate; cell phone subscribers.

УДК 330.3

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### **Короткострокові та довгострокові детермінанти прямих іноземних інвестицій (ПІІ) в Індонезії**

Потоки іноземного капіталу відіграють важливу роль у стійкій економіці Індонезії, вони мають значний вплив на країни, що розвиваються, особливо Індонезію, адже стимулюють зростання економіки. У статті зосереджено увагу на аналізі визначення макроекономічних змінних, включаючи економічне зростання, процентні ставки, обмінні курси рупії та кількість жителів, які підписалися на мобільні телефони.

Результати цього дослідження свідчать про те, що в короткостроковій перспективі економічне зростання має позитивний і значний вплив на прямі іноземні інвестиції, водночас як обмінний курс рупії, процентна ставка та кількість жителів, які підписалися на мобільні телефони, мають негативний і значний вплив на прямі іноземні

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інвестиції. У довгостроковій перспективі економічне зростання має позитивний, але не значний вплив на прямі іноземні інвестиції, тоді як процентна ставка та кількість мешканців, які підписалися на стільникові телефони, мають позитивний і значний вплив. Між тим, курс рупії в довгостроковій перспективі має негативний і значний вплив.

Виходячи з короткострокової оцінки, з'ясовано, що економічне зростання має позитивний і значний вплив на прямі іноземні інвестиції. Проте обмінний курс рупії, відсоткова ставка та кількість жителів, які підписалися на мобільні телефони, мають негативний і значний вплив на прямі іноземні інвестиції, і, за довгостроковими оцінками, економічне зростання має позитивний, але не значний вплив на прямі іноземні інвестиції. Водночас процентна ставка та кількість мешканців, які підписалися на мобільні телефони, мають позитивний і суттєвий вплив. Між тим, курс рупії в довгостроковій перспективі має негативний і значний вплив.

**Ключові слова:** економічне зростання; швидкість ВІ; курс обміну валют; абоненти мобільного зв'язку.

**JEL Classification:** E22; E44; F41; F43; O11.

**Formulation of the problem.** Foreign direct investment has an important role in a sustainable Indonesian economy, this flow has a significant influence on developing countries, especially Indonesia to encourage increased economic growth [3]. The development of foreign direct investment in 2019 in Southeast Asia, especially in Singapore and Indonesia, has increased compared to the previous year [25]. In particular, it can be seen that the position of foreign direct investment in Indonesia compared to countries categorized as economic hosts, foreign investment inflows in Indonesia increased in 2019 which amounted to US\$ 23 billion. Meanwhile, in 2018 Foreign Direct Investment in Indonesia amounted to US\$ 21 billion. This increase puts Indonesia in 17th place, which shows that Indonesia's position beats European countries such as Sweden and Ireland, which are far below Indonesia's ranking. The development of foreign investment flows in Indonesia during the 2010-2019 period experienced fluctuating movements, it can be seen that in the 2010-2014 period there was an increase but in 2014-2016 there was a significant decline reaching 4 billion US\$. Meanwhile, in the 2019 period, there was a significant increase compared to the previous year, which was US\$ 24.9 billion. The development of Foreign Direct Investment which tends to fluctuate cannot be separated from macroeconomic conditions including conditions of economic growth, exchange rates, and technological infrastructure [19].

Interest rates and the rupiah exchange rate against the US\$ in Indonesia experienced fluctuating movements in the 2014-2019 period, but the condition of interest rates and the rupiah exchange rate tended to experience positive movements in the 2017-2019 period. In 2019 the Interest Rate reached 5.65 percent and 14,146 rupiahs for the Rupiah Exchange Rate against US\$. In addition to the macroeconomic conditions described previously, one of the determinants of Foreign Direct Investment is technological progress as measured by the technological infrastructure in the country, in this case, technological progress is measured using the number of people in Indonesia who subscribe to cellular phones [7]. The development of the number of people who subscribe to cellular phones experienced a positive trend in the 2010-2017 period, while in 2018 it decreased to 119,838 per 100 people and increased in 2019 by 127,492 per 100

people. This condition shows that the population subscribing to cellular phones has experienced a positive movement but has experienced a decline in several periods. This shows that the trend of technological development is growing rapidly, especially cellular phone users, thus becoming one of the reasons for foreign investors to invest in Indonesia. The overall condition of direct investment flows has enormous potential, seen from the value of a direct investment in Indonesia, which ranks relatively high which makes Indonesia one of the most promising countries to invest in, this condition cannot be separated from the priority investment sectors, namely infrastructure, agriculture, industry, maritime, tourism, Special Economic Zones (SEZ) and Industrial Estates, as well as the digital economy, these sectors are very open to Foreign Direct Investment (FDI). The high foreign investment in Indonesia is inseparable from the value of Indonesia's GDP which is categorized as high and the sectoral structure of the national economy can support promising indicators of the market potential in investing.

Several studies that discuss Foreign Direct Investment from the macroeconomic side, especially related to investment flows in developing and developed countries, including [16]. Who found a link between economic growth and investment which this relationship significantly explains the economic condition of a country will support an increase in investment, and the increase in investment will support an increase in overall economic growth. Meanwhile, several macroeconomic variables also determine investment, namely exchange rates, interest rates, and technology. According [5] Found that technological improvements will determine investment increases, while exchange rates and interest rates are considered as considerations for investing. Consistent with this, [11] found that interest rates have a negative and significant effect on Foreign Direct Investment in ASEAN countries. In addition, real sector variables such as economic growth determine investment directly.

Apart from that, investment is also determined by changes in technology, in terms of increasing the rate of population growth using cellular phones. Based on the phenomena and differences in the literature review, the research will focus on the causal relationship between Economic Growth and Investment and analyze the effect

of these variables in the short and long term on Foreign Direct Investment in Indonesia.

**Analysis of recent research and publications.** Examines the determinants of FDI and its impact on economic growth. This study uses a simultaneous equation analysis tool with 2SLS and SAS methods. The results of the study found that the determinants of FDI were labor, economic growth, and market conditions as measured by export growth. In terms of the influence of the trade balance, labor and export growth rates are key factors and have a positive and significant effect on FDI in a country [17].

Analyzed the Analysis of Regional Government Expenditures and Regional Development on the Island of Sumatra. The analytical tool used is panel data regression. The results show that regional economic development as measured by GRDP is influenced by regional development as a proxy for investment spending, the number of PNSD workers as a proxy for labor, and road length as an infrastructure proxy element [23].

A study conducted by [30] examines human capital and convergence in Indonesia. This study uses an analysis method, namely panel data regression. The results of the study found that an increase in government spending will increase conditional convergence ( $\beta$ ). PMDN is positive but not significant, inflation is significant and negative towards conditional convergence ( $\beta$ ), the number of high school graduates is negative and significant to conditional convergence ( $\beta$ ). The decrease in the number of high school graduates increases the conditional convergence scores.

Analyzed the flow of foreign investment and its impact on the economic conditions of developing countries. The analytical tool in this research is multiple regression. The results show that GDP per capita, cost of wages, per capita debt, per capita public aid, and price volatility play an important role in attracting FDI. In terms of influence, it shows that economic growth and exchange rates have a significant effect on FDI [21].

Study on foreign investment flows and economic growth in European countries. The analytical method used is multiple regression. The results show that market size, exchange rates, and regulations have a positive and significant impact on FDI inflows in Europe [2].

Analyzes the determinants of investment flows in China and the impact of macro variables. The research uses the Panel Data regression method with the results showing that the determinants of Chinese FDI are determined by market size variables, exchange rates, and exports which have a positive impact on foreign investment flows, thus it is necessary to consider the size of the domestic market, cost advantage, and openness to the rest of the world [8].

Examined the determinants of investment in Australia. This study uses multiple regression analysis methods with the determinant variables are wages, regulations, GDP, exports, and Rupiah exchange rate. The

results show that wages, GDP, and exports have a positive effect on FDI in Australia. Meanwhile, regulations and exchange rates have a negative and significant effect [29].

Analyzed the determinants of the flow of foreign investment in infrastructure in China. The analytical model used is multiple regression with the determinant variables are GDP of the trade sector, the number of railroads, the number of roads, GDP per capita, regulation, and economic openness. The results show that the trade sector, the number of railroads, the number of roads, GDP per capita, regulation, and economic openness have a positive and significant effect on FDI on infrastructure in China [22].

[28] Examines the relationship between exchange rates and foreign investment flows in China. The variables used are a local investment, foreign investment, export, import, consumption, regulation, and exchange rate. The results show that there is causality between local investment, foreign investment, exports, imports, consumption, regulation, and exchange rates [28].

Examined FDI and Economic Growth as potential sources in developing countries. The analytical method used is panel data regression. The results show that FDI does not have a positive effect in the long term on GDP. No relationship was found between the impact of FDI growth and the level of per capita income, education level, level of openness, and level of financial market development in developing countries [10]

Examine FDI and Employment in the Industrial Sector and the Service Sector. The analytical tools used are Causality and ARDL which find that the interaction between FDI inflows and employment in the service sector in Singapore provides useful insights for promoting foreign investment in developing regions and workforce development [12].

Analysis related to the determinants of FDI using the Regime-Switching was carried out by [6] with the analysis model using the Markov Regime-Switching Model approach. The results show that Turkey's FDI growth equation has significant structural changes. This condition shows a significant shift in the coefficients in the explanatory variables including GDP growth, labor costs, electricity, sulfur, oil prices, natural gas, export growth, and import growth.

Analyzed the relationship between exports and FDI in India by using an analytical tool, namely the causality model. The results show that there is a long-term and short-term causal relationship between FDI, GDP, and exports in India from 1991 to 2010 [9].

Analyze FDI as inflows of business operations and economic growth in Turkey. The analytical model used is Cointegration Analysis and Granger Causality. The results show that there is a significant correlation between FDI inflows and GDP (economic growth) in the short and long term [24].



Examine the flow of foreign investment in Central Europe with econometric studies. The analytical model used is Multiple Regression. The results of the research show that the capability of the workforce will determine foreign capital flows. The determinant variables are efficiency and labor specifications, namely labor costs, research, and development [13].

Examine the determinants of foreign capital flows based on the structure of developing countries using a dynamic model, namely VAR analysis. The results show that foreign investment shocks hurt capital flows, while foreign interest rate shocks have a positive effect and domestic productivity shocks cause an increase in FDI [26].

Analyzes the determinants and measures of the feasibility of Foreign Investment Flows (FDI) in several countries. This study uses the Country Brand Strength Index (CBSI). The results show that tourism, exports, FDI, government policies to develop index brand trust and strong country brands help in increasing exports, tourism, investment, and immigration [14].

Examine economic growth, FDI, and corruption in developed and developing countries. This study uses a panel causality model. The results show that flows of capital, labor, and human capital are found to be important in the long term for both developed and developing countries. The results show the importance of profitability, incentives directed by the government, local institutions and the effectiveness of human capital and corruption has a negative influence on foreign capital flows (FDI) [15].

Analyzed the determinants of Foreign Capital Flow (FDI) using causality, cointegration, and VECM. The results show that the effect of fixed estimates finds that the market size of labor costs and infrastructure quality

as significant coefficients about FDI. A two-way short-term relationship between market size and labor costs was found in the short run, while a short-term unidirectional relationship was found between infrastructure quality, market size, and labor costs [1].

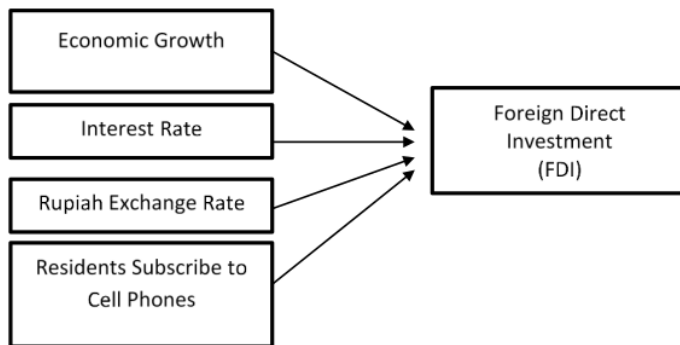
[4] examines the relationship between trade, FDI, and Economic Growth in Tunisia using the Auto-Regressive Distributed Lag (ARDL) analysis model, Cointegration, and VECM. The results show that there is no significant Granger causality running from FDI to economic growth, from economic growth to FDI, from trade to economic growth, and from economic growth to trade.

Analyzed the Regional Determinants of FDI with a Panel Causality Approach. The results show that short-term and long-term causal flows involve FDI and a comprehensive set of possible determinants such as FDI, GDP, domestic investment, infrastructure, and quality of the workforce. In the short and long term, GDP growth directly affects FDI while growth in local infrastructure and local investment has an indirect effect [7].

Examine the political climate and foreign capital flows in OECD countries. The analytical method used is panel data regression analysis with Fixed Effect Model and Random Effect Model. The results show that political factors play an important role in determining FDI because they greatly influence investment decisions [27].

Examines economic freedom and its impact on FDI in developed countries. The analytical method used is regression using the Generalized Least Square (GLS) model. In this study, it is explained that a better economy, less government participation in the economy, less state intervention, the absence of wage and price controls, and a higher level of political freedom lead to higher FDI inflows [20].

**Model Auto Regressive Distributed Lag (ARDL)**



**Model Kausalitas**

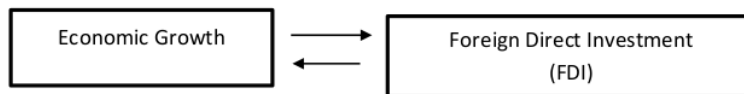


Figure 1 – The Flow of Thought

Source: generated by the authors



$$FDI_t = \alpha_i + \sum_{1i} \beta FDI_{t-1} + \sum_{1i} FDI EG_{t-1} + \varepsilon_{1t} \quad (3)$$

$$EG_t = \alpha_{2i} + \sum_{2i} \beta FDI_{t-1} + \sum_{2i} FDI EG_{t-1} + \varepsilon_{2t} \quad (4)$$

**Outline of the main research material.** Initial testing begins with Augmented Dickey Fuller (ADF) using a five percent significance level. This test is based on the absolute value of the t statistic and the MacKinnon critical value. If the probability value of the t-statistic is less than the significance level then reject Ho, meaning that the data used is stationary or does not contain unit-roots. Stationary time series can also be seen from the probability value (critical value) which is less than 5 percent.

Table 1. Results of unit root testing for first difference and second difference

Variabel	First Difference		Second Difference	
	t-statistik	Probabilitas	t-statistik	Probabilitas
D(FDI)	-5,399901	0,0001	-8,71134	0,0000
D(EG)	-9,706162	0,0000	-15,8254	0,0000
D(R)	-11,11891	0,0000	-13,5179	0,0000
D(EXR)	-6,789076	0,0000	-9,77938	0,0000
D(TECH)	-0,594765	0,8570	-6,81506	0,0000

Source: The results of processing using Eviews 10, processed 2021

Based on Tabel 1 stationary at the first difference level seen from the probability value greater than the significance level. Meanwhile, at the second difference level, all variables, namely FDI, EG, R, EXR, TECH, seen from the probability that the t-statistical value is smaller than the significance level and thus, it means that the data used is stationary or does not contain unit roots at the second difference level.

The next stage is testing the cointegration of the model. [18] suggest that the cointegration test aims to determine whether the non-stationary variables are cointegrated or not. The cointegration test used in this study uses the Bound Test. In this approach, cointegration can be seen from the F-statistic value with a critical value that has been compiled by [18].

here are two asymptotic critical limit values to test cointegration when the independent variable is integrated into I(d) where  $(0 \leq d \leq 1)$ . The lowest value (lower bound) assumes an integrated regressor on I(0) while the highest value (upper bound) assumes an integrated regressor on I(1). If the F-statistic value is below the lower bound, it can be concluded that there is no cointegration. If the F-statistic value is above the upper bound, it can be concluded that cointegration occurs. However, if the F-statistic is between the lower bound and upper bound, then the result is inconclusive. The results of cointegration testing using the bound test can be seen in Table 2 below.

Tabel 2. Result Bound Test

Test Statistic	Value	K
F-statistic	7,018447	4
Critical Value Bounds		
Significance	I(0) Bound	I(1) Bound
10%	2,2	3,09
5%	2,56	3,49
2,50%	2,88	3,87
1%	3,29	4,37

Source: Processing results using Eviews 10, processed 2021

The results of the cointegration test based on the bound test in Table 4.7 show the F-statistic of 7.018447. This F-statistic value is greater than the highest value (upper bound) with a significance level of 10% and 5%, which means that there is cointegration in the variables in the model being tested so that there is a short-term to long-term balance in these variables.[18] If the F-statistic value is greater than the highest value (upper bound), then there is cointegration in the variables in the model

being tested, which means that there is a short-term to long-term balance in these variables. Based on the results of the cointegration test in this study, there has been a long-term balance in the relationship between the factors that influence foreign direct investment in Indonesia. The results of long-term and short-term relationships based on the ARDL model can be estimated as in Tables 3 and 4 below:

Tabel 3. Long Term Coefficient

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EG	0,292817	0,192772	1,518983	0,1726
R	0,460869	0,134653	3,422649	0,0111
EXR	-0,000638	0,000135	-4,719827	0,0022
TECH	2,413220	0,461709	5,226708	0,0012
C	-3,018731	2,117728	-1,425457	0,1971

$$EC = FDI - (0.2928*EG + 0.4609*R - 0.0006*EXR + 2.4132*TECH - 3.0187)$$

\*\*\*), \*\*), and \*) Significant at the level of significance 1%, 5%, and 10%

Source: Processing results using Eviews 10

Tabel 4. Coefficient Short Term

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(FDI(-1))	-0,838641	0,131299	-6,387250	0,0004
D(FDI(-2))	-0,696811	0,099513	-7,002228	0,0002
D(FDI(-3))	-0,406904	0,109514	-3,715554	0,0075
D(EG)	0,140210	0,041159	3,406576	0,0113
D(EG(-1))	0,263177	0,041753	6,303201	0,0004
D(EG(-2))	0,210593	0,052826	3,986533	0,0053
D(R)	0,011904	0,012386	0,961127	0,3685
D(R(-1))	-0,292802	0,040633	-7,206110	0,0002
D(R(-2))	-0,191904	0,035212	-5,449947	0,0010
D(R(-3))	-0,067620	0,018015	-3,753496	0,0071
D(EXR)	-0,000262	6,26E-05	-4,186573	0,0041
D(EXR(-1))	-0,000168	7,82E-05	-2,141260	0,0695
D(EXR(-2))	-0,000500	9,43E-05	-5,307456	0,0011
D(EXR(-3))	-0,000304	8,10E-05	-3,761185	0,0071
D(TECH)	2,775193	0,821035	3,380115	0,0118
D(TECH(-1))	-0,637967	1,333704	-0,478342	0,6470
D(TECH(-2))	-2,403085	1,216745	-1,975011	0,0888
CointEq(-1)*	-0,795688	0,093649	-8,496455	0,0001

\*\*\*), \*\*), and \*) Significant at significance level 1%, 5%, and 10%

Source: Results of processing using Eviews 10

$$D(FDI) = -0.838641 - 0.696811*D(FDI(-2)) - 0.406904*D(FDI(-3)) + 0.140210*D(EG) + 0.263177*D(EG(-1)) + 0.210593*D(EG(-2)) + 0.011904*D(R) - 0.292802*D(R(-1)) - 0.191904*D(R(-2)) - 0.067620*D(R(-3)) - 0.000262*D(EXR) - 0.000168*D(EXR(-1)) - 0.000500*D(EXR(-2)) - 0.000304*D(EXR(-3)) + 2.775193*D(TECH) - 0.637967*D(TECH(-1)) - 2.403085*D(TECH(-2))$$

The results of the analysis show that the variable Economic Growth in the short term has a significant and positive effect at the five percent level of significance, Foreign Direct Investment with a coefficient of 0.263177. So if there is an increase in Economic Growth by one percent, it will increase Foreign Direct Investment by 0.263177 percent. Meanwhile, in the long term it has a positive and insignificant effect of 0.292817 coefficient value, which means, if there is an increase in Economic Growth of one percent, it will increase Foreign Direct Investment by 0.263177 percent. The results showed that economic growth had a positive effect in the short and long term in line with research conducted by [21].

The results of the study indicate that Economic Growth has a significant effect on FDI.

Interest rates in the short term have a significant and negative effect on the five percent level of significance, Foreign Direct Investment with a coefficient of -0.292802. That is, if there is a change in interest rates by one percent, it will reduce Foreign Direct Investment by -0.292802 percent. Meanwhile, in the long term, it has a positive and significant effect of 0.460869 coefficient value, which means that if there is an increase in interest rates of one percent, it will increase by 0.460869 percent. Based on long-term and short-term estimates that are in line with research conducted by [29] examined the effect of interest rates (BI Rate) on Foreign



Direct Investment with the result that interest rates have a negative and significant effect on FDI in the short term.

The negative influence of interest rates (BI Rate) on the FDI index could be caused by an increase in the BI Rate. In general, banks will respond quickly by increasing lending rates, so that lending rates will increase in general, but gradually. An increase in loan interest rates hurts all issuers in the short term because it will increase credit interest expenses and reduce net income.

The Exchange Rate variable in the short term has a significant and negative effect at the five percent level of significance, Foreign Direct Investment with a coefficient of -0.000262. This means that if there is a one percent change in the exchange rate, it will reduce Foreign Direct Investment by -0.000262 percent. Meanwhile, in the long term, it has a negative and significant effect of -0.000638 coefficient value, which means that if there is an increase in the exchange rate of one percent, it will reduce by -0.000638 percent. Based on long-term and short-term estimates in line with research conducted by [20], the results of his research state that the difference in the short-term and long-term direction of the effect of the rupiah exchange rate on the movement of Foreign Direct Investment (which is negative) can be caused by different conditions between external factors (the rupiah exchange rate) with the company's internal factors (performance and other fundamental aspects) which are likely to be more perspective in the view of investors.

Variable Number of Population Subscribe to Cellular Phones in the short term has a significant and negative

effect on the five percent level of significance, Foreign Direct Investment with a coefficient of -2.403085. This means that if there is a change in the number of residents who subscribe to cell phones by one percent, it will reduce Foreign Direct Investment by -2.403085 percent. Meanwhile, in the long term, it has a positive and significant effect on the coefficient value of 2.413220, which means that if there is an increase in interest rates by one percent, it will increase by 2.413220 percent. Based on this estimate, it is in line with previous research which says that technological progress is measured by the technology infrastructure in the country, in this case, technological progress is measured using the number of people in Indonesia who subscribe to cellular phones [7].

**2 Conclusions.** Based on the short-term estimation, Economic Growth has a positive and significant effect on Foreign Direct Investment. Meanwhile, the Rupiah Exchange Rate, Interest Rate, and Number of Residents Subscribing to Cellular Phones have a negative and significant effect on Foreign Direct Investment and Based on the long-term estimation, Economic Growth has a positive but not significant effect on Foreign Direct Investment. Meanwhile, the interest rate and the number of residents who subscribe to cell phones have a positive and significant effect. Meanwhile, the Rupiah Exchange Rate in the long term has a negative and significant effect.

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