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A Study on the Factors Influencing Foreign Direct Investment in Indonesia

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ABSTRACT: Foreign direct investment (FDI) can serve developing countries as a basis for accelerating investment and economic growth. Many developing countries need large amounts of development capital while national revenues remain too low. This study aims to determine which factors affect FDI in Indonesia. Using panel data for 34 Indonesian provinces over 2017–2022, it estimates a random effects panel regression model in STATA, with data from Bank Indonesia, the Central Bureau of Statistics, the Ministry of Trade and other official websites. The results show that import value and export value have a significant positive effect on FDI and the exchange rate has a significant negative effect, whereas gross regional product and labor force have no significant effect. Based on these findings, the study proposes corresponding policy recommendations.

KEYWORDS: Foreign Direct Investment; Indonesia; Determinants; Panel Data Model; Random Effects Model; Exchange Rate

I. INTRODUCTION

Every country must have economic activity, the purpose of which is to use the country's existing resources to meet the needs of its people and provide for their welfare. In striving to achieve social welfare, the government seeks to act through a variety of policies, which are then shaped within the government's mechanisms. A good government should formulate appropriate policies to create a favorable economic environment.

Amid the current economic globalization, all developed and developing countries in the world are inevitably involved, Indonesia included. The operation of this global economy creates conditions of interdependence among countries and gives rise to cooperative processes in economic activities, covering both the real sector and the financial sector. One component that plays an important role in dealing with this economic globalization is investment. Investment can serve as a source of funds for economic activity and infrastructure development, supporting the facilities and infrastructure that underpin the welfare of a country's people.

Indonesia is one of the developing countries and requires substantial funds for economic development. In terms of financing, economic development can draw on various sources, both domestic and foreign. Domestic funds can take the form of tax revenue and domestic savings, while foreign financing can come from external debt and foreign investment. In practice, owing to the shortage of domestic funds, external debt is the easiest way for the government to finance economic development. However, if a country's government continues to rely on debt, then in the long run this will lead to an accumulation of debt and place a burden on the national budget, because debt carries an additional interest burden. Another option is to increase foreign investment.

Investment can promote a country's economic development, because capital formation can raise productive capacity, increase national income and create new jobs, which will expand employment opportunities (Todaro and Smith, 2020). Investment, particularly investment by investors, is therefore very important for developing the various economic sectors (Suryani, 2023).

Foreign direct investment (FDI) is a capital flow originating from abroad that enters the private sector either through direct investment or through indirect investment in portfolio form. Direct investment refers to investment in which the investor participates directly in the business operations carried out; therefore, the policies formulated by the company concerned and the business dynamics of the goals to be achieved cannot be separated from the parties involved (the foreign investors). Indirect (portfolio) investment, by contrast, is financial investment made abroad: investors purchase debt or equity in the hope of obtaining economic benefits from the investment. A common form of portfolio investment is the purchase of domestic bonds/stocks by foreign individuals/companies (Ulinnuha et al., 2020).

Among all the provinces of Indonesia, each region of course has a different endowment of resources. Foreign investment in Indonesia can be utilized because investors are interested in Indonesia's future development. Investors invest in Indonesia in the hope and expectation that Indonesia's future development potential will be very good. Accordingly, this study aims to understand

the scale, spatial distribution and development trends of FDI in Indonesia, and to explore the main factors influencing FDI in Indonesia. Several earlier studies on Indonesia rely on time-series data (Rijal, 2017; Septifany et al., 2015; Syantini et al., 2020). This study instead uses a panel of Indonesia's 34 provinces, which makes it possible to exploit variation both across provinces and over time.

II. LITERATURE REVIEW

Foreign direct investment is itself a composite of capital stock, knowledge and technology, which can effectively alleviate a country's internal scarcity of these economic factors. Absorbing and utilizing FDI has therefore become an important component of nearly all developing countries' efforts to develop open economies. On the one hand, FDI can directly bring a capital effect, thereby acting directly on the host country's economic growth; on the other hand, FDI can act indirectly on the host country's economic growth by influencing other economic factors (Lee, 2021).

A. The Capital Accumulation Effect of Foreign Direct Investment

The capital accumulation effect of FDI is mainly caused by the combined effect of the forward and backward linkage effects, demonstration effects and competition effects arising from the entry of foreign-funded enterprises. Because the three effects differ in direction and magnitude, the way they ultimately take shape also differs. The resultant of forces of different directions and scales further forms a "crowding-in" or "crowding-out" effect on domestic capital. Specifically, the capital accumulation effect of FDI can be explained in terms of the vertical direction of interaction between upstream and downstream firms: foreign firms' demand for factors or intermediate products can promote the development of upstream firms and produce a backward linkage effect; foreign firms can also promote the development of downstream industries by supplying high-quality intermediate products to downstream firms, producing a forward linkage effect; such forward and backward linkages arise between industries. Through this effect, investment in related industries can be expanded, that is, a "crowding-in" of domestic capital is formed among industries. The experience of developing countries shows that there are often investment–saving gaps and foreign exchange gaps, which are reflected in budget deficits. In general, most developing countries introduce foreign capital to narrow these gaps. Developing countries' hope for the role of foreign capital entering their economies is that it can be used by developing countries as a basis for accelerating investment and economic growth; after growth accelerates, the structure of production and trade needs to change; foreign capital can play an important role in mobilizing funds and in structural transformation; once structural change has actually occurred, the demand for foreign capital declines (Chenery and Strout, 1966).

B. The Technology Spillover Effect of Foreign Direct Investment

Whether FDI generates technology spillovers is conditional rather than automatic. Feng (2020) shows that FDI does have spillover effects on technology, but that their occurrence depends on many objective and subjective factors, and even on the estimation method; spillovers are unlikely in protected industries. Hoang et al. (2021) identify two factors that shape them: the host country's technological absorptive capacity and the technology gap between the home and host countries.

Two earlier studies, as reviewed by Hoang et al. (2021), illustrate the role of the gap. Haddad and Harrison (1993) studied Moroccan manufacturing firms by tracking the productivity gap between typical firms and the most productive firm in the same industry, and concluded that spillovers arise only when domestic and foreign-invested firms are not too far apart in productivity. Barrios and Strobl (2002) studied manufacturing firms in Spain, extending their model with industry-specific dummy variables and firms' R&D spending as a proxy for technological capability, and found that only firms with sufficient capability benefit from positive spillovers.

Hoang et al. (2021) further report that industries with a larger share of FDI also tend to have smaller productivity gaps, and that domestic firms narrow the gap mainly because of competitive pressure from foreign firms rather than through technology transfer. Firms with a smaller technology gap are more likely to receive positive and significant spillovers; domestic firms that invest in R&D and technology development are therefore better placed to capture them than firms with a large gap.

C. The Institutional Change Effect of Foreign Direct Investment

Institutional change is a process of permanent transformation and is part of development. Institutional change can also be defined as a continuous process aimed at improving the quality of interaction among participants. Institutional reform related to FDI aims to change the names of institutions and to expand their functions and authority. This is a necessary condition for attracting investment, so that investment can operate well—for example, by adding functions and authority. The functions and powers added may be coordination and policy functions, particularly those related to licensing facilities (Nurilla, 2016).

D. Studies on the Determinants of Foreign Direct Investment

Several studies have previously examined the factors influencing FDI in Indonesia. Swanitarini (2016) investigated the determinants of FDI in Indonesia. Using a random effects model, the results show that gross regional product, the provincial minimum wage and export value jointly affect FDI.

Rijal (2017), using time-series data for 2001–2013, studied the determinants of FDI in Indonesia. The study used five variables: gross domestic product (GDP), Indonesia's inflation, the exchange rate, openness and infrastructure. The results show that gross regional product, inflation and trade openness have significant effects on FDI in Indonesia in both the short run and the long run. In the long run, infrastructure has a positive and significant effect on FDI. In the short run, however, infrastructure has a positive but insignificant effect on FDI inflows into Indonesia. As for the exchange rate variable, in the long run its effect on FDI inflows into Indonesia is not significant. In the short run, however, it proves to have a positive and significant effect on FDI inflows into Indonesia.

Septifany et al. (2015), using time-series data for 2006–2014, found that inflation, interest rates, the rupiah exchange rate and foreign exchange reserves have significant effects on FDI in Indonesia. According to the partial hypothesis test results, the inflation and rupiah exchange rate variables have significant negative effects on FDI in Indonesia. According to the partial hypothesis test results, the SBI interest rate variable and foreign exchange reserves have significant positive effects on FDI in Indonesia. Among the four independent variables, the dominant influence on FDI is foreign exchange reserves.

According to Syantini et al. (2020), using time-series data for 2005–2019, FDI inflows into Indonesia are affected by gross regional product, the exchange rate, inflation and exports. Gross regional product and inflation have positive effects, while the exchange rate and exports have negative effects. In spatial terms, the short-run variables of gross regional product and inflation are positive but not significant, whereas in the long run they have a positive and significant effect. For the exchange rate and export variables, in both the short run and the long run they have negative and significant effects.

III. RESEARCH DESIGN

A. Model Specification

Drawing on the research of scholars at home and abroad and taking into account the specific circumstances of the factors influencing FDI in Indonesia, this paper selects gross regional product (GDP), import value (IMP), export value (EXP), labor force (L) and the exchange rate (EXC) to empirically analyze the effects of these influencing factors on foreign investment in Indonesia. After consulting various studies, the extended investment gravity model is selected for the empirical analysis, and the following model is constructed:

$$lnFDI_{it} = \beta_0 + \beta_1 lnGDP_{it} + \beta_2 lnIMP_{it} + \beta_3 lnEXP_{it} + \beta_4 lnL_{it} + \beta_5 lnEXC_{it} + \mu$$

where β_0 is the constant term, β denotes the elasticity coefficient of each explanatory variable with respect to the dependent variable, i denotes the province, t denotes time, and μ is the random disturbance term.

B. Variable Description and Data Sources

1) Dependent Variable: The dependent variable is foreign direct investment (FDI) in each Indonesian province, entered in natural logarithm (lnFDI). It is compiled from the official sources listed in Section III-B-3.

2) Explanatory Variables: Gross regional product (GDP): it can reflect the scale of economic development of a country or region and be used to judge its overall economic strength and the pace of its economic development; it can also be used for analysis of economic structure, such as industrial structure, demand structure and regional structure, and is an important basis for macroeconomic decision-making; import value (IMP): used to capture the benefits obtained through lower-cost production inputs; export value (EXP): it can bring foreign exchange earnings, promote the development of domestic industries, and enhance a country's international standing and influence; labor force (L): the sum of the physical and mental capacities used to produce material goods; exchange rate (EXC): used to express the conversion ratio between the currencies of two countries; in this paper it is the exchange rate of the Indonesian rupiah against the US dollar.

3) Data Sources: This paper selects 2017–2022 as the research period, with the factors influencing FDI in Indonesia as the research object. It uses panel data from Bank Indonesia, the Central Bureau of Statistics (Badan Pusat Statistik) and the Ministry of Trade. It uses FDI, gross regional product, import value, export value, labor force and exchange rate data for Indonesia's 34 provinces.

IV. EMPIRICAL ANALYSIS

A. Descriptive Statistics

Table I reports the descriptive statistics for Indonesia's 34 provinces over 2017–2022, covering a total of 170 observations. The FDI variable (lnFDI) has a minimum of 1.932, a maximum of 8.68 and a mean of 5.784847, with a standard deviation of 1.578635.

The variable represented by domestic gross regional product (lnGDP) has a minimum of 7.656 and a maximum of 12.125. The mean gross regional product of the 34 provinces over 2017–2022 is 9.577629. The standard deviation of gross regional product is 1.12371.

The variable represented by import value (lnIMP) has a minimum of 0 and a maximum of 11.472. The mean import value of the 34 provinces over 2017–2022 is 5.732212. The standard deviation of import value is 2.54385.

TABLE I: DESCRIPTIVE STATISTICS

Variable	*Mean*	*Max*	*Min*	*Std. Dev.*	*Obs.*
lnFDI	5.784847	8.68	1.932	1.578635	170
lnGDP	9.577629	12.125	7.656	1.12371	170
lnIMP	5.732212	11.472	0	2.54385	170
lnEXP	7.368276	11.813	1.224	1.911272	170
lnL	11.84701	14.815	9.154	1.28398	170
lnEXC	9.551	9.581	9.514	.0229763	170

Source: Processed by the author.

The variable represented by export value (lnEXP) has a minimum of 1.224 and a maximum of 11.813. The mean export value of the 34 provinces over 2017–2022 is 7.368276. The standard deviation of export value is 1.911272.

The variable represented by labor force (lnL) has a minimum of 9.154 and a maximum of 14.815. The mean labor force of the 34 provinces over 2017–2022 is 11.84701. The standard deviation of labor force is 1.28398.

The variable represented by the exchange rate (lnEXC) has a minimum of 9.514 and a maximum of 9.581. The mean exchange rate over 2017–2022 is 9.551. The standard deviation of the exchange rate is 0.0229763.

B. Correlation Analysis

The correlation coefficients are listed in Table II. The correlation coefficient between lnFDI and lnGDP (FDI and gross regional product) is 0.6618, which indicates a relatively high positive correlation.

TABLE II: CORRELATION MATRIX OF THE VARIABLES

	lnFDI	*lnGDP*	*lnIMP*	*lnEXP*	*lnL*	*lnEXC*
lnFDI	1.0000					
lnGDP	0.6618	1.0000				
lnIMP	0.8084	0.7378	1.0000			
lnEXP	0.6874	0.7087	0.7062	1.0000		
lnL	0.4594	0.6184	0.4871	0.4230	1.0000	
lnEXC	-0.0412	0.0540	0.0164	0.0881	0.0362	1.0000

Source: Processed by the author.

The correlation coefficient between lnFDI and lnIMP (FDI and import value) is 0.8084. The correlation coefficient between lnFDI and lnEXP (FDI and export value) is 0.6874. The correlation coefficient between lnFDI and lnL (FDI and labor force) is 0.4594. Then, the correlation coefficient between lnFDI and lnEXC (FDI and the exchange rate) is -0.0412.

C. Regression Results Analysis

From the Lagrange multiplier (LM) test results in Table III, Prob>chibar2 is 0.0000, which is less than 0.05, meaning that the null hypothesis (H0: pooled least squares, PLS) is rejected in favor of the alternative (H1: random effects, RE). It can therefore be concluded that the random effects model should be used.

TABLE III: REGRESSION MODEL SELECTION RESULTS

Test	*Result*	*Model*
Lagrange Multiplier (LM) Test	Prob>chibar2=0.0000	Random Effects Model
Hausman Test	Prob>chi2=0.1057	Random Effects Model

Source: Processed by the author.

From the Hausman test results above, Prob>chi2 is 0.1057, which is greater than 0.05, meaning that H0 (random effects, RE) is not rejected in favor of H1 (fixed effects, FE), so it can be concluded that the random effects model should be used. Based on the model selection tests already carried out (the Lagrange multiplier test and the Hausman test), the regression model adopted in this study is the random effects model.

Observing the regression results, in the first model the R-squared is 0.663, which means that model (1) explains 66.3% of the variation in FDI. The coefficients of all explanatory variables in this model are positive; that is, all explanatory variables are positively correlated with the dependent variable. The lnGDP variable fails the significance test even at the 10% level, while the lnIMP variable passes at the 1% level. This indicates that domestic gross regional product has no significant effect on FDI in Indonesia, whereas import value has a significant effect on FDI in Indonesia.

TABLE IV: REM REGRESSION RESULTS

Variables	*Model (1)*	*Model (2)*	*Model (3)*	*Model (4)*
lnGDP	0.168	0.089	0.089	0.104
	(0.109)	(0.111)	(0.112)	(0.111)
lnIMP	0.320***	0.261***	0.260***	0.247***
	(0.046)	(0.05)	(0.051)	(0.051)
lnEXP		0.179***	0.178***	0.204***
		(0.065)	(0.066)	(0.066)
lnL			0.004	0.008
			(0.085)	(0.084)
lnEXC				-5.064**
				(2.16)
Constant	2.345***	2.118**	2.084*	50.142**
	(0.956)	(0.935)	(1.180)	(20.522)
R^2	0.663	0.679	0.679	0.682
Wald χ^2	79.96	93.41	93.11	100.21
N	170	170	170	170

Note: (1) Robust standard errors are in parentheses; (2) *, ** and *** denote significance at the 10%, 5% and 1% levels, respectively.

In the second model, the R-squared is 0.679, which means that model (2) explains 67.9% of the variation in FDI. The coefficients of all explanatory variables in this model are positive; that is, all explanatory variables are positively correlated with the dependent variable. The signs and significance of lnGDP and lnIMP are consistent with model (1), and the lnEXP variable is significantly positive at the 1% level. This indicates that the effects of domestic gross regional product and import value on FDI in Indonesia remain unchanged, and that export value has a significant promoting effect on FDI in Indonesia.

In the third model, the R-squared is 0.679, which means that model (3) explains 67.9% of the variation in FDI. The coefficients of all explanatory variables in this model are positive; that is, all explanatory variables are positively correlated with the dependent variable. Among them, the lnL variable fails the significance test even at the 10% level, and the other explanatory variables are consistent with model (2). This indicates that labor force has no significant effect on FDI in Indonesia; the effects of the other explanatory variables are not repeated here.

In the fourth model, the R-squared is 0.682, which means that model (4) explains 68.2% of the variation in FDI. Except for the coefficient of lnEXC, which is negative, the coefficients of the other explanatory variables are all positive and consistent with model (3), so they are not repeated here. In addition, the lnEXC variable passes the test at the 5% level of significance, indicating that the exchange rate is negatively correlated with FDI: if the value of the exchange rate increases, the scale of FDI will decrease.

V. CONCLUSIONS AND IMPLICATIONS

Foreign direct investment is one of the instruments for increasing income and employment growth, upgrading technology and promoting socio-economic development, and it goes hand in hand with improving income distribution and reducing poverty in Indonesia. This paper therefore focuses on Indonesia's 34 provinces, takes the factors influencing FDI in Indonesia as its research

topic, and analyzes the current state of FDI by collecting relevant data on FDI in Indonesia. In the empirical analysis, through regression analysis, we identify which factors influence FDI in Indonesia.

The results show that, during 2017–2022, import value and export value both have a positive and significant effect on FDI in Indonesia, whereas gross regional product and labor force have positive but insignificant effects. The rupiah exchange rate has a negative and significant effect on FDI, which means that when the exchange rate (EXC) rises, FDI in Indonesia decreases.

The government, through Bank Indonesia as Indonesia's central bank, should aim to keep the value of the rupiah stable and set competitive interest rates, so that foreign investors are interested in investing in Indonesia while attention remains on economic growth. The significant effect of the exchange rate found in this study underlines the importance of exchange-rate stability. In addition, because export value has a positive and significant effect on FDI, the government should adopt policies that promote exports, which would also increase the country's foreign exchange reserves.

The government can also formulate several strategies to encourage investment in Indonesia, including: facilitating licensing procedures; using internet technology together with fast licensing procedures; and offering exporters a lower tax on deposit interest.

This study has several limitations. First, the exchange rate is a national-level variable that varies only over time, so its estimated effect rests on limited time variation and should be interpreted with caution. Second, the model includes only five explanatory variables and does not control for other determinants discussed in the literature, such as inflation, interest rates, infrastructure and institutional factors. Future research could extend the model with these variables and test the robustness of the results, for example with alternative panel specifications.

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