GDP Growth and FDI Nexus in ASEAN-5 Countries: The Role of Macroeconomic Performances

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Abstract

Numerous papers have examined the effect of national income on FDI using cross-country data, including in developing countries. However, few papers focus on one specific region, particularly in ASEAN developing countries. This study analyzes the effect of GDP growth on FDI in ASEAN-5 countries from 2004 to 2019. Panel data regression with fixed effect estimation was performed to document the relationship between GDP growth and FDI. Using some macroeconomic control variables, the findings demonstrated that GDP growth has a positive and significant impact on the FDI. Additionally, the effects of the currency rate, trade openness, and inflation on FDI are positive. Therefore, macroeconomic performances such as GDP growth, exchange rate, trade openness, and inflation are the main factors attracting FDI in ASEAN-5 countries.

Key words : Gross Domestic Product Growth, FDI, ASEAN Region, Developing Countries, Panel Data Estimation.

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INTRODUCTION

Sustainable economic growth requires investment capital to create jobs, encourage industrial capacity, stimulate business competitiveness, and transform potential economies into real economic strengths (Scheyvens et al., 2016; Chen et al., 2018). Economic development could be facilitated by foreign or domestic investment capital (Bermejo & Werner, 2018).

Investment is important and needed by developed countries and developing countries. According to Landesmann and Stöllinger (2019) and Hema and Osathanunkul (2019), investment encourages growth in some economic sectors, such as industry, trade, and services sectors. Therefore, it stimulates the activities of

these sectors, leading to more competitiveness and superiority. A country requires capital provided by international investors to finance its development projects (Aghion et al., 2016; Mc Collum et al., 2018).

Foreign direct investment is one form of investment from overseas (Hence after, FDI). The rapid growth of FDI is an opportunity for developing countries to obtain financing to develop their economies (Sarkodie & Strezov, 2019; Baloch et al., 2019; Gheasi & Nijkamp, 2017, Ta et al., 2020). FDI is an important aspect for developing countries because its inflow is accompanied by technology, organizational experience, technical skills, product renewal. Furthermore, it comes with advanced production techniques, market information, experts, and training of local workers for new skills. Developing countries are characterized by insufficient capital, resulting in low investment (Qamruzzaman et al., 2019). ASEAN nations (Indonesia, Thailand, the Philippines, Malaysia, and Vietnam) are examples of developing countries with low investments. Figure 1 shows the FDI to GDP ratio fluctuation in ASEAN-5 countries.

Another problem in developing countries, including the ASEAN-5 countries, is the lack of national savings to finance economic development, which requires large capital (Turcott, 2016; Erum et al., 2016). Domestic financing is considered inadequate for development due to the large gap between required and provided capital. FDI is one of the best solutions to close the gap between investment and savings in developing countries. This is because it is not a vulnerable capital flow and is a relatively long-term solution to the economic turmoil in the host country (Jimborean and Kelber, 2017; Choi and Yoon, 2020).

One of the elements that make an investment profitable is the high public demand for goods and services. In this case,

investors are attracted to developing countries when they expect to get good returns. According to Feldstein (2017) and Feller and Senses (2017), the increase in demand for goods and services is reflected in increased income. As a result, this stimulates more investment, which increases the number of projects being undertaken.
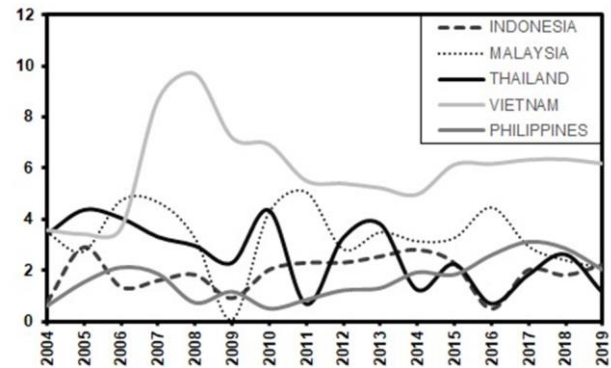

Figure 1. FDI to GDP ratio in ASEAN-5 countries

In Figure 1, we can see that foreign direct investment inflows in ASEAN tend to fluctuate from 2004 to 2019. In 2004, the average FDI inflow to GDP ratio was 7.02347%, then it increased until 2010. Then there was a decline. in 2011 followed by an increase again in the following year until 2019.

This paper assesses the effect of GDP growth and some economic variables, such as inflation, exchange and interest rates, and trade openness, on the FDI inflow in ASEAN-5 countries. Previous empirical studies examined the link between growth and FDI, such as Rashid et al. (2017), Sayari et al. (2018), Sabir et al. (2019), Jaiblai and Shenai (2019), and Sengupta and Puri (2020). Rashid et al. (2017) found a positive influence of GDP on FDI in 15 countries from 2000 to 2013. Similarly, Sayari et al. (2018) found a positive association between GDP growth and FDI in CEE countries. In contrast, Sabir et al. (2019) found a negative influence of GDP on FDI in 39 emerging and 44 advanced countries from 1996 to 2016. According to Jaiblai and Shenai (2019), GDP had a positive effect on FDI in 10 SSA nations from

2003 to 2017. Furthermore, Sengupta and Puri (2020) showed a positive link between GDP and FDI in South Asian nations.

Previous studies investigated the influence of currency rate on FDI, including Khandare (2016), Polat and Payaslıoğlu (2016), and Deseatnicov (2016). Other studies are Nguyen and Do (2020), and Lee and Brahmasrene (2020). The effect of inflation on FDI was examined by Babajide and Lawal (2016), Ambaw and Sim (2018), Jaiblai and Shenai (2019), Sajilan et al. (2019), and Agudze and Ibhagui (2021).

The link between openness and FDI was investigated by Asghar (2016), (Lal 2017), Donghui et al. (2018), Lindelwa (2018), and Rathnayaka et al. (2021). The impact of interest rate on FDI was analyzed by Musyoka and Ocharo, (2018), Hossain and Ahmed (2018), Albulescu and Ionescu (2018), Islam and Sahajalal (2019), and Awad (2020).

Prior empirical studies have investigated the influence of economic growth on FDI and they find a positive effect of economic growth on FDI. There are some limitations of those studies on the influence of economic growth on FDI: (i) their studies mostly focus on developed countries; (ii) none of the studies investigate FDI per GDP; and (iii) they fail to to explain the differences in the impact of the economic growth on FDI in different countries. These issues arise a research gap on the effect of economic growth on FDI. The main motivation of this paper is to fill this research gap.

This study assesses the effect of GDP growth on FDI inflow in ASEAN-5 countries using panel data regression with fixed effect estimation. The first model estimated the GDP growth and exchange rate on FDI. The result showed that growth has a positive influence on FDI. The second model added the interest rate in model 1, showing that GDP growth positively affects FDI. Model 3 included trade openness and found that GDP

growth has a positive impact on FDI. In model four, the interest rate was on model 3, and the results showed a positive connection of GDP growth and FDI. Overall, the results showed that GDP growth has a positive impact on FDI in ASEAN-5 countries. Furthermore, the effects of the currency rate, inflation, and trade openness on FDI are significant and positive. However, the influence of interest rate on FDI is negative but insignificant.

METHOD

This study used a panel data methodology with fixed effect estimation in 5 ASEAN nations, including Indonesia, Malaysia, Singapore, Thailand, Vietnam, and the Philippines, from 2004 to 2019.

FDI is the foreign direct investment inflow to the host country. The study used some control variables that significantly affect FDI, such as GDP, exchange and interest rates, inflation, and trade openness.

Panel data with fixed effect estimation were performed to analyze the effect of GDP growth on FDI. In the equation of the research model, classical assumption and other necessary tests were also performed. The following is a simple panel regression:

$$Y_{it} = \beta_0 + \beta_1 \, X_{it} + u_{it} \qquad\qquad (1)$$

Where i is country cross-section, t represents time. Y is dependent variable, and X is matrix of explanatory variables. u is error disturbance, with:

$$u_{it} = \mu_{it} + v_{it} \qquad\qquad (2)$$

Where μ_i denotes the unobservable country-specific effect and v_{it} represents the remainder disturbance. The country-specific effects, such as cultural, political, and institutional factors that change over time, are not included in the model. Concerning the one-way error component model. Baltagi, 2021 stated that these unobservable country-specific effects are accounted into the model.

Table 1. Variable Definitions

Variable Name	Type	Measurement	Sources	Period
FDI	Dependent	Foreign direct investment inflow to host country	The World Bank	2004 - 2019
GDP growth (GDP)	Independent	Real GDP growth	The World Bank	2004 - 2019
Exchange Rate ER)	Independent	The bilateral exchange rate to US dollar	The World Bank	2004 - 2019
Inflation	Independent	The change in the current consumer price index	The World Bank	2004 - 2019
Trade Openness (Openness)	Independent	Export plus import to GDP ratio	The World Bank	2004 - 2019
interest Rate (IR)	Independent	Riil interest rate	The World Bank	2004 - 2019

The equation for the fixed effect is:

$$Y_{it} = \beta_o + \beta_1 X_{it} + \mu_{it} + v_{it} \tag{3}$$

For each country observation i, averaging equation:

$$\overline{Y_I} = \beta_o + \beta_1 \overline{X_I} + \mu_i + \overline{v}_i \tag{4}$$

Then subtracting Equation (4) from Equation (3) gives:

$$Y_{it} - \overline{Y_I} = \beta(X_{it} - \overline{X_i}) + (v_{it} - \overline{v}_i) \tag{5}$$

The unobservable country-specific effect, μi, disappears. The transformation process in Equation (5) is known as within transformation.

This study examines the association between GDP growth and FDI based on the (Sayari et al., 2018) model.

$$FDI_{it} = \beta_o + \beta_1 GDP_{it} + \varepsilon_{it} \tag{6}$$

In model 1, Eq (6) was extended by adding the exchange rate control variable. According to Polat and Payaslıoğlu (2016), Khandare (2016), Deseatnicov (2016), Nguyen and Do (2020), and Lee and Brahmasrene, (2020), the exchange rate is one of the main factors of FDI. Furthermore, inflation was included in model two to make the results robust. This was performed following Karim et al. (2019), which investigated the link of inflation and FDI. Second, trade openness was included in model 3. This was adopted from Asghar (2016), which assessed the connection between FDI and trade openness. The interest rate was included in model four because it is one of the necessary factors for FDI. According to Petrović-Ranđelović (2017), there is a negative association between interest rate and FDI. Then, models 1 to 4 are:

Model 1:

$$FDI_{it} = \beta_o + \beta_1 GDP_{it} + \beta_2 ER_{it} + \varepsilon_{it} \tag{7}$$

Model 2:

$$FDI_{it} = \beta_o + \beta_1 GDP_{it} + \beta_2 ER_{it} + \beta_3 \ Inflation_{it} + \varepsilon_{it} \tag{8}$$

Model 3:

$$FDI_{it} = \beta_o + \beta_1 GDP_{it} + \beta_2 ER_{it} + \beta_3 Inflation_{it} + \beta_4 Openness_{it} + \varepsilon_{it} \tag{9}$$

Model 4:

$$FDI_{it} = \beta_o + \beta_1 GDP_{it} + \beta_2 ER_{it} + \beta_3 Inflation_{it} + \beta_4 Openness_{it} + \beta_5 IR_{it} + \varepsilon_{it} \tag{10}$$

Where FDI is a dependent variable, GDP is gross domestic product growth, ER is the exchange rate, inflation is the inflation rate, openness is trade openness, IR is the interest rate, and ε is error disturbance.

The first hypothesis is that economic growth has a positive effect on FDI. The second hypothesis is inflation has positive effect on FDI. The third hypothesis is exchange rate has positive effect on FDI. The third hypothesis is trade openness has positive effect on FDI. And the last hypothesis is interest rate has negative effect on FDI.

RESULTS AND DISCUSSION

Table 2 shows the descriptive variables. The data from 2004 to 2019 showed that the FDI to GDP ratio had a lowest of 0.0566% and a highest of 28,5981%, with an average of 5.9890%. Additionally, data on GDP growth shows that the average GDP growth achieved in ASEAN-5 countries is relatively small at 4.9121%. However, some countries achieve a maximum domestic product of 14.52% (Malaysia in 2010) and a minimum of -1.51% (Mala-

ysia in 2009) during the post-global economic crisis.

The average inflation in all ASEAN-5 countries was 3.7091%, with the maximum of 23.115% recorded in Vietnam in 2008. However, the minimum interest rate was recorded in Thailand at -0.900425%. Furthermore, the domestic currency to the US dollar shows the purchasing power of the currencies of ASEAN-5 countries against one US dollar. The strongest purchasing power was 1.2497 Malaysian Ringgit against 1 US dollar in 2012, while the weakest was 23050.24 Vietnamese Dong against 1 US dollar in 2019. Trade openness data shows that the average growth in ASEAN-5 was 5.395579%. The highest trade openness was 210.4002, and the lowest trade openness was 37.3034. Furthermore, the real interest rates had a minimum of 1.21% and a maximum of 13%.

Table 2. Descriptive Statistic

Variable	Mean	Std Dev.	Min.	Max.
FDI	5.9890	7.2587	0.0566	28.5981
GDP	4.9121	2.3206	-1.5135	14.5256
INFLATION	3.7091	3.8201	-0.9004	23.1154
ER	5,363.7230	8,140.1970	12497	23,050.2400
OPENNESS	113.5948	50.9774	37.3034	210.4002
IR	4.3390	2.3079	1.2100	13.0000

Table 3 presents the results of fixed effect estimation for four models. The effects of GDP growth, inflation, exchange rate, and trade openness on FDI are positive and significant, with a significance level at 1 %. In contrast, the effect of interest rate on FDI is negative but insignificant. The coefficient determination test results show the R-square values between 0.7857 and 0.8202. The coefficients of determination after adjustment (adjusted R-square) were between 0.7843 and 0.7997. This shows that explanatory variables explain the changes in foreign direct investment by around 80%,

while variations outside the model explain the remaining 20%. The F-statistic of the four models ranged between 35.4687 and 44.6195, and significant at the 1% level. These results reflect that explanatory variables have a significant influence on the FDI.

GDP growth has a significant positive influence on FDI with coefficients of 0.3714 to 0.4085. This result implies that a rise of 1% GDP growth increases FDI by between 0.3714 and 0.4085%, ceteris paribus. Furthermore, the exchange rate positively and significantly influences FDI in the five selected ASEAN region countries with coefficients from 0.0001 to

0.0002. This result implies that α 1% increase in exchange rate raises FDI by between 0.0001 and 0.0002%. The effect of inflation on FDI in ASEAN-5 countries from 2004 to 2019 is significant positive at α 1% level with the coefficients of 0.1090, 0.1064, 0.1159 for models 2, 3, and 4, respectively. These findings mean that α 1% increase in inflation raises FDI by around 0.11%

in ASEAN-5. Furthermore, trade openness has a significant positive effect on FDI in the ASEAN-5 countries from 2004 to 2019, with coefficients 0.0252 and 0.0261, for models 3 and 4, respectively. Therefore, α 1% increase by 1 in export and import to GDP ratio raises FDI by between 0.0252 and 0.0261%. The last variable was interest rate, which has no significant effect on FDI.

Table 3. Fixed Effect Estimation

Variable	Model 1:	Model 2:	Model 3:	Model 4:
GDP	0.3582***	0.3714***	0.3750***	0.3559***
	(0.0428)	(0.0565)	(0.0727)	(0.0399)
INFLATION	0.0696	0.1090**	0.1061**	0.0883*
	(0.0406)	(0.0355)	(0.0289)	(0.0391)
ER		0.0001***	0.0001*	0.0001*
		(0.0000)	(0.0000)	(0.0000)
OPENNESS			-0.0212*	-0.0228**
			(0.0079)	(0.0006)
IR				-0.0249
				(0.0248)
C	4.8120***	3.6538***	6.4462***	6.8361***
	(0.1873)	(0.3110)	(0.0079)	(0.9887)
R²	0.7952	0.8034	0.8483	0.8595
Adjusted R²	0.7783	0.7843	0.8312	0.8414
F-Statistic	47.2233***	42.0264***	49.6263***	35.4687

GDP growth has a significant positive influence on FDI in ASEAN-5 countries. According to Sahu (2020), GDP is the main factor that stimulates the FDI inflow in developing countries. Moreover, Piketti et al. (2018) stated that a higher GDP growth means an increase in people's income in developing countries. This results in a higher purchasing power of people, resulting in increased demand for goods and services. Consequently, the investor's profits expectation increases, encouraging more investment. This result is in line with the output and market size hypothesis theory. The theory states that the FDI flowing into a country depends on the output of multinati-

onal companies or the market size in that country measured by GDP (Doytch & Uctum, 2016). This is in line with Rashid et al. (2017), Karim et al. (2019), Sayari et al. (2018), and Jaiblai and Shenai (2019), which found that GDP growth significantly affect FDI.

The exchange rate has a positive and significant influence on FDI in the ASEAN-5 nations. These results support Khandare (2016), Deseatnicov (2016), and Nguyen and Do (2020), which showed that the exchange rate significantly affects FDI. Additionally, this finding is in line with the theory of currency areas developed (Mundell, 1961). The theory states that companies in a country with a strong currency invest more than those in countries with

weak currencies. This is because countries with weak currencies have higher risks of currency depreciation. Strong currency countries are the source of FDI, fueled by countries with weak currencies (receiving FDI). Since the ASEAN-5 are developing countries with a weak exchange rate, they are the destinations of FDI.

Latief and Lefen (2018) revealed that the exchange rate is an main factor that attracts FDI in developing countries. The rapid international economic development makes countries interrelated, increasing trade and the flow of money and capital (Zaidi et al., 2019). Macroeconomic performance achievement in a country indirectly influences the performance in other countries, especially when they are in one area, such as ASEAN (Haraguchi et al., 2017). One of the macroeconomic indicators with a vulnerable influence in developing countries is the exchange rate (Luo et al., 2018). Consequently, one of the variables affecting FDI is the exchange rate. This finding strengthen the previous work of Polat and Payaslıoğlu (2016), Nguyen and Do (2020), and Lee and Brahmasrene (2020)

The results demonstrate that inflation seems to have a favorable impact on FDI in the ASEAN-5 nations. This supports Babajide and Lawal (2016), Ambaw and Sim (2018), Jaiblai and Shenai (2019), Sajilan et al. (2019), and Agudze and Ibhagui (2021), which showed that inflation has a positive and significant effect on FDI. According to Babajide and Lawal (2016), inflation could be a good signal for investors in the capital market. This is because it could raise the price of goods and services, increasing the company's income. Consequently, when the rise in income is higher than the increase in production costs, the company's profitability increases. This is in line with Karim et al.

(2019), which stated that the inflation rate positively affects foreign investment.

Trade openness has a negative and significant effect on FDI in the ASEAN-5 countries. These results support Asghar (2016), Lal (2017), Donghui et al. (2018), and Lindelwa (2018). Trade openness describes the level of global trading of a country. Therefore, the greater the value of trade openness, the more open the economy of a country. Furthermore, export-oriented multinational companies prefer to be located in countries with more open economies because of lower trade barriers, reducing transaction costs associated with exports and imports (Sazali et al., 2018). The rapid technological development has had an economic impact on international trade for all countries. The participation of a country in international trade makes it have economic openness and interact freely with other economies worldwide. This economic openness provides many advantages, including a wider market, where citizens of a country have a more diverse choice of goods. Also, producers give out an output with cheaper inputs from other countries. This finding relevant with the previous study of (Lal 2017), Donghui et al. (2018), and Rathnayaka et al. (2021)

The interest rate has a negative but insignificant effect on FDI. It is the cost of fund or investment and leads to lower investment when it is increased because of higher costs. However, in ASEAN-5 countries, an increase in interest rate does not reduce investment. This is because foreign investors expect higher returns on their investment in ASEAN-5 countries. One of the results concerns the interest rate as one of the factors that increase FDI. According to Awad (2020), the interest rate is the expense of borrowing or using money. Therefore, an increase in the interest rate decreases investment due to the high costs. This finding supports Hossain and Ahmed (2018), which

showed that the connection of interest rate and FDI is negative but insignificant.

The Gauss assumption tests were performed to determine the validity of the data. The Gauss assumption tests consist of Multicollinearity, Heteroscedasticity and Autocorrelation tests. Table 4 presents a correlation matrix to detect whether or not there is a multicollinearity problem in relation to our data.

Based on the result of the multicollinearity test using a correlation matrix, as seen in Table 4, the correlation among independent variables is less than 0.80. It can be concluded that there is no linear relationship between independent variables. Thus, there is no multicollinearity problem in our data.

Table 5 shows the results of the LR test to detect the existence of the heteroscedasticity problem, the Durbin-Watson test to detect the existence of the autocorrelation problem. We conclude that the data in this study is free from heteroskedasticity as well as autocorrelation problems.

Table 4. The Result of Multicollinearity Test

	GDP	INFLATION	ER	OPENNESS	IR
GDP	1	0.2192	0.2814	-0.1448	-0.2491
INFLATION	0.2192	1	0.5264	-0.5092	-0.4167
ER	0.2814	0.5264	1	-0.7990	0.0924
OPENNESS	-0.1448	-0.5092	-0.7990	1	-0.1712
IR	-0.2491	-0.4167	0.0924	-0.1712	1

Source: Authors' statistical results

Table 5. The Result of Heteroscedasticity, Autocorrelation and Normality Tests

Num.	Testing	Model 1	Model 2	Model 3	Model 4	Conclusion
1.	Heteroscedasticity (LR test)					
	Value	9.1294	7.4043	10.9509	9.9293	No Heteroscedasticity
	df	5	5	5	5	
	Probability	0.1040	0.1923	0.0524	0.0773	
2.	Autocorrelation (Durbin-Watson test)					
	Durbin-Watson Statistics	1.5121	1.5857	1.5684	1.5358	No Autocorrelation
	D_L	1.106	1.106	1.106	1.106	
	D_U	1.371	1.371	1.371	1.371	
	$4-D_U$	2.894	2.894	2.894	2.894	
	$4-D_L$	2.629	2.629	2.629	2.629	
	Prob.	0.4776				

Source: Authors' statistical results

CONCLUSION

This research examines the relationship between GDP growth and FDI influx in ASEAN-5 nations. This analysis indicated, in accordance with Jaiblai and Shenai (2019) and Sengupta and Puri (2020), that high GDP growth resulted in greater FDI inflow to developing nations, particularly the ASEAN-5 countries. Additionally, the study employed other controls, including inflation, interest and currency rates, and trade openness, on several models to determine the relationship between GDP growth and FDI. All model findings

indicate that GDP growth is positively associated with FDI.

According to empirical research, the exchange rate has a favourable effect on FDI, which confirms the findings of Nguyen and Do (2020). Furthermore, this study supports Agudze and Ibhagui (2021), which found a positive link of inflation and FDI. Trade openness has a positive and significant effect on FDI, which is in line with Lindelwa (2018). However, this study could not prove a negative significant impact of interest rate on FDI.

This study recommends that policymakers must pay more attention to the factors influencing FDI inflows. Moreover, the government needs to increase the GDP growth and international trade to attract more FDI inflow.

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