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Factors Affecting Foreign Direct Investment In 10 Asean Countries 2015-2018 With Fixed Effect Model Approach on Panel Data Regression

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ABSTRACT

ASEAN has a strategic location, abundant natural resources, high quality human resources, and economic growth that is resistant to crisis so that it can compete and become an attractive region as an investment destination. According to a UNCTAD survey of transnational companies in 2013-2015, ASEAN countries are classified as the priority country for the host country for FDI (Foreign Direct Investment). FDI can create broad employment opportunities, bring money and tools, which are able to have a good impact on accelerating the country's economic development. So that foreign direct investment (FDI) needs to be a common priority to be able to advance the economies of ASEAN member countries. Therefore, researchers want to find out what factors influence FDI from 9 independent variables consisting of the percentage of economic growth, population growth, percentage of inflation, interest rates, money supply (M2), HDI, access to internet services, and GDP in the sector industry and services in 10 ASEAN countries in 2015-2018. By using panel data regression method, this method is able to analyze multiple objects or (cross-sectional units) from an observation in several consecutive time periods or units of time. As for the results using the fixed effect model, a significant variable influences FDI, namely internet service access and HDI, where for every 1% increase in FDI, internet service access will increase by 0.0681%, and HDI will increase by 0.0412%.

Keywords : Foreign Direct Investment, ASEAN Economy, Fixed Effect Model, Panel Data

I. INTRODUCTION

Since its formation in 1967, the ASEAN (Association of South East Asian Nations) has transformed from five developing countries to ten countries consisting of Brunei Darussalam, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand and Vietnam which these countries have been taken into account in the global arena. ASEAN has been involved economically, trade and investment with all the world's major economies. For this reason, many programs are carried out by ASEAN to achieve its goals, one of which is economic development through the AEC. According to Sri Nazir Razak on (Asean Bussiness Club, 2016) the ASEAN Economic Community (AEC) will become a reality, an important milestone in the long and winding journey towards the economic integration of the ten ASEAN economies.

As of December 31, 2017, there were 72 out of 118 priorities equal to those successfully implemented. AEC aims to make ASEAN economies increasingly integrated and cohesive; competitive and dynamic;

improved sectoral connectivity and cooperation; tough, inclusive, oriented and community centered; and global ASEAN (Ministry of Foreign Affairs, 2015). In dealing with the MEA, we must be able to take advantage of existing opportunities and face challenges. Strategic location, abundant natural resources, high quality human resources, and economic growth that is resistant to crises, makes ASEAN able to compete and be relied upon by other countries.

Judging from the level of investment, the ASEAN region has become an attractive region as an investment destination. Based on a survey conducted by UNCTAD of transnational companies during 2013-2015, ASEAN countries remain classified as the priority country for the host country for FDI (Foreign Direct Investment). In general, with so many investments coming into a country, it will also have a positive impact on the country's economic growth. Capital that comes from foreign direct investment is the most potential financing when compared with other capital (Sarwedi,2002). That is because foreign capital not only creates broad employment opportunities, brings money and tools, but also brings technical skills, which are able to encourage entrepreneurs to cooperate with foreign companies. So the impact can help modernize society and strengthen the state and private sectors, and that will help accelerate the country's economic development (Fabriana dkk, 2014).

According to (OECD, 2002) Foreign direct investment (FDI) is an open and effective integral part of the international economic system and a major catalyst for development. However, the benefits of FDI do not increase automatically and evenly across all countries, sectors and surrounding communities. National policy and international investment architecture are issues to attract FDI to a large number of developing countries and to reap the full benefits of FDI for development. The main challenge is overcoming the host country, which needs transparency, breadth and effectiveness to enable a policy environment for investment and build the capacity of people and institutions to implement it.

Therefore, foreign direct investment or known as FDI needs to be a joint priority to be able to advance the economies of ASEAN member countries and strengthen ASEAN's position in the international economic arena (towle, 2012). Several attempts were made to attract FDI, one of which was by maintaining stability in several sectors, in addition, there needed to be an effort to improve the factors that could attract FDI in ASEAN. Therefore, this study aims to find out what factors influence FDI in order to develop it to attract investors.

In previous studies that discussed the effect of FDI factors, there are several variables used, such as cross-country trade, contract enforcement, tax payments, population by (Dianawati, 2018) then inflation, interest rates, GDP, trade openness, depreciation by (Ruth, 2014) GDP, trade openness, perceived corruption, and inflation by (Fatmala, 2019) economic growth, inflation, interest rates and trade openness by (Anwar, 2016) as well as GDP, inflation, interest rates and volatility by (Marpaung, 2013). These studies have different results, according to their respective methods but have a common identification of factors that affect FDI both positively and negatively. There is a limitation in the previous studies as the background of this study, with the aim to add a reference to find out the factors influencing FDI in ASEAN.

In this study an approach is used with panel data regression method, because this method is able to analyze several objects or (cross-sectional units) of an observation in several consecutive time periods or units of time (Baltagi, 2005). Based on the background description above, the researchers made this study which aims to find out what factors affect FDI from 9 independent variables consisting of the

percentage of economic growth, population growth, percentage of inflation, interest rates, money supply (M2), HDI, access internet services, and GDP in the industrial sector, and services in 10 ASEAN countries in 2015-2018.

II. LITERATURE REVIEW

1.1 Investation

Investment is an expenditure that is shown to increase or maintain a stock of capital goods. The capital goods stock consists of factories, machinery, offices, and other durable products that are used in the production process. Investment is divided into two forms, namely direct investment such as Foreign Direct Investment (FDI) and National Domestic Investment (NDI) and other forms of investment namely portfolio investment through the stock market.

1.2 Foreign Direct Investment

Foreign direct investment or known as (Foreign Direct Investment) FDI has been regulated in Law no. 25 of 2007 concerning Investment. The Organization for Economic Cooperation (OEEC) also provides a formula that foreign direct investment (FDI) is a form of foreign investment where investors are given the flexibility of management and leadership in companies where capital is invested in the sense that investors have capital or capital control. There are many definitions of Foreign Direct Investment (FDI), one of which according to the WTO, foreign direct investment is considered as an investment in which an investor from a country invests in a foreign country in the creation of company assets (property), with the right to control its business (Kukaj, 2016).

1.3 Interest Rates

Definition of interest rates according to (Sunariyah, 2004) is the price of the loan. Interest rates are expressed as a percentage of the principal per unit time. Interest is a measure of the price of resources used by debtors to be paid to creditors. The interest rate is one indicator in determining whether someone will invest or save (Boediono, 1995).

1.4 Inflation

According to BPS, inflation is a value when the level of prices prevails in an economy. As one of the indicators in looking at the economic stability of a particular region, the development of prices for services and goods in general can be calculated through the price index of consumers. Meanwhile according to the KBBI, according to the KBBI (Big Indonesian Dictionary), inflation is a decline in the value of money (paper) because of the amount and speed of money (paper) in circulation, causing the price of goods to rise. Inflation rate can affect the size of the production of an item, prices will increase including the factors of production. When the prices of factors of production increase, the company tends to reduce its investment, causing investment to decline (Mishkin, 2001).

1.5 Money Supply

According to Rahardja and Manurung in (Anggarini, 2016) states that technically the money supply is money that is really in the hands of the community. The development of the money supply reflects the development of the economy. Money supply in broad terms is also called economic liquidity or M2 and in the narrow sense abbreviated as M1. According to Bank Indonesia money supply is in the narrow sense (M1) and in the broad sense (M2). M1 includes currency held by the public and demand deposits (demand deposits denominated in Rupiah), while M2 covers M1, quasi money, and securities issued by the monetary system owned by the domestic private sector with a remaining time of up to one year.

1.6 Pertumbuhan Ekonomi

According to (Boediono, 1994) economic growth is a process of increasing per capita output in the long run. Meanwhile, according to (Lincolin, 1997) economic growth is interpreted as an increase in

GDP or GNP regardless of whether the increase is greater or smaller than the rate of population growth, and whether there is a change in economic structure or not. The economy is said to grow if the real income of the people in a certain year is greater than the real income of the community in the previous year (Basri, 2002).

1.7 GDP

Gross domestic product (GDP) is a standard measure of the value of final goods and services produced by a country in a period. GDP is an important indicator to capture economic activity (OECD, 2009). GDP includes many other sectors including agriculture, industry and services.

1.8 HDI

The Human Development Index (HDI) is a statistic developed and compiled by the United Nations to measure and rate the social and economic development of various countries. It consists of four main areas of interest: the average school year expected school year, life expectancy at birth, and gross national income per capita. This index is a tool used to track changes in the level of development over time and to compare the level of development in various countries.According to BPS, HDI explains how residents can access the results of development in obtaining income, health, education, and so on. The HDI was introduced by UNDP in 1990 and published regularly in the annual Human Development Report (HDR) report. HDI can determine the ranking or level of development of a region / country.

1.9 Panel Data Regression

Panel data is data that is the result of observations on several individuals or (cross-sectional units) in an observation that is observed in several consecutive time periods or units of time (Baltagi, 2005). Panel regression model According to Wanner & Pevalin in (Sembodo, 2013) is a set of techniques to model the effect of explanatory variables on response variables in panel data. In general there are two approaches used in estimating models from panel data, namely models without individual influence (common effect) and models with individual influence (fixed effect and random effect).

1.9.1 Fixed Effect Model

The method for estimating panel data regression in the fixed effect model uses the technique of adding dummy variables or Least Square Dummy Variables (LSDV). There are two assumptions in the fixed effect model (Hsiao, 2003), which are as follows:

Slope is constant but intercept varies between individual units

$$Y_{it} = \beta_{0i} + \sum_{j=1}^{K} \beta_j X_{jit} + \mu_{it} \quad (1.1)$$

Slope is constant but intercept varies between individual units and time periods

$$Y_{it} = \beta_{0it} + \sum_{j=1}^{K} \beta_j X_{jit} + \mu_{it} \quad (1.2)$$

With,

- Y_{it} = dependent variable on i-th individual unit and t-time
- β_{0i} = the intercept coefficient
- β_{0it} = $\beta_1, \beta_2, \ldots, \beta_K$isa coefficient of*slope*into-*j*.
- X_{jit} = jth independent variable of the i-th individual unit and t-th time period
- μ_{it} = residual in individual unitinto-*i* andtimeinto-*t*

1.10 Test of Significance

Significance test is a procedure used to test the truth or error of the null hypothesis results from the sample. The basic idea underlying the significance test is the statistical test (estimator) of the sample distribution of a statistic under the null hypothesis. The decision to process H0 is based on statistical test values obtained from existing data (Gujarati, 1997).

1.10.1 Overall Test

This test aims to simultaneously test the coefficient hypothesis. In general, the hypothesis is written as follows.

H_0 : $\beta_1 = \beta_2 = \cdots = \beta_K = 0$ (The independent variable does not simultaneously influence the dependent variable)

H_1 : there is at least one $\beta_j \neq 0$, $j = 1, 2, \ldots, K$ (The independent variables simultaneously influence the dependent variable)

Test Statistics:

$$F = \frac{(R^2)/(n+K-1)}{(1-R^2)/(nT-n-K)} \quad (1.3)$$

With,

R^2 = coefficient of determination

n = number of cross sections

T = number of time series

K = number of independent variables

Test criteria ie H0 is rejected if $F_{hitung} > F_{(\alpha,\ n+K-1,\ nT-n-K)}$ or p value $<\alpha$ means that the relationship between all independent variables and the dependent variable has a significant effect (Gujarati, 2004).

1.10.2 Partial Test

This test is to find out how much influence the independent variables have on the dependent variable. The hypothesis used is:

H_0: $\beta_j = 0$ (The independent variable has no partial effect on the dependent variable)

H_1: $\beta_j \neq 0$, $j = 1,2,\ldots,K$ (The independent variable has a partial effect on the dependent variable)

Test Statistics:

$$t_{hitung} = \frac{\hat{\beta}_j}{SE(\hat{\beta}_j)} \quad (1.4)$$

With,

$\hat{\beta}_j$ = Estimated regression coefficient

= Standard error of estimated regression coefficients

Standard error of estimated regression coefficient $|t_{hitung}| > t_{\left(\frac{\alpha}{2};\, nT-n-K\right)}$ *atau* p-value $<\alpha$

1.11 Classic Assumption Test

According to (Gujarati, 2004) a good regression model is a model that produces an unbiased linear estimation (Best Linear Unlock Estimator), this condition will occur if it is filled with several assumptions, which are called classical assumptions. The panel data model has the potential for heteroscedasticity and multicollinearity problems. Both of these classic assumption problems occur because they are a combination of cross section and time series data that must be addressed.

III. RESEARCH METHODOLOGY

In this study panel data regression method is used to analyze the factors that affect FDI (Foreign Direct Investment) in 10 ASEAN countries consisting of Brunei, Malaysia, Singapore, Indonesia, the Philippines, Vietnam, Laos, Myanmar, Cambodia and Cambodia in the 2015 period. -2018. According to Wanner & Pevalin in (Sembodo, 2013) it is said that panel regression is a set of techniques to model the effect of explanatory variables on response variables in panel data. Panel data in question is data that is the result of observations on several individuals or (cross-sectional units) observed in a certain period of time (Baltagi, 2005).Panel data regression models used are the Common Effect Model, Fixed Effect Model, and Random Effect Model. The flow of research is as follows:

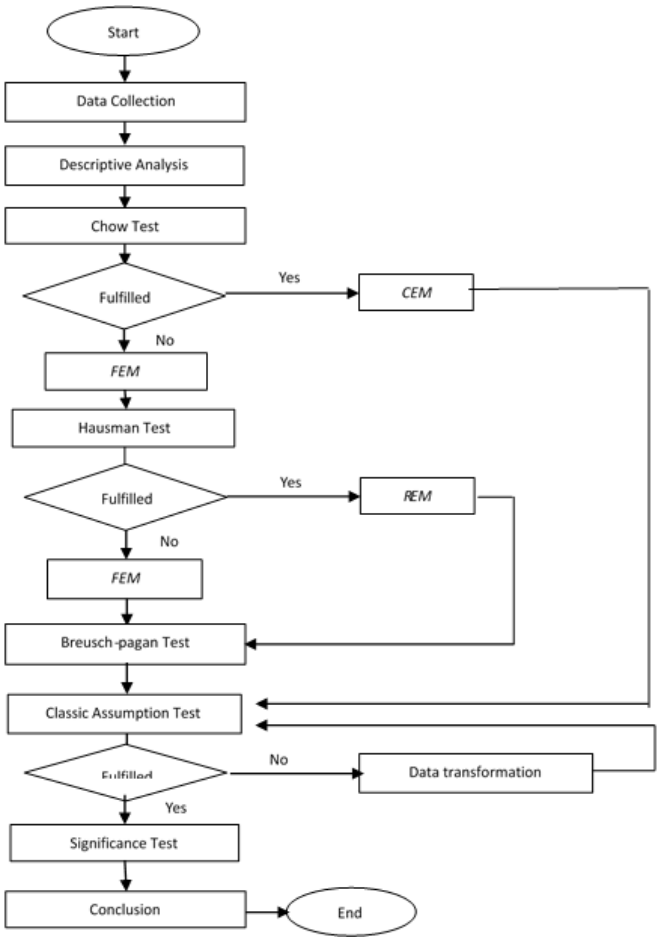

Figure 1. Research Flow

RESEARCH VARIABLE

In this study two types of variables are used, they are dependent and independent. The various types of variables include the following:

Table 1: Research Variables

Variable Type	Variable Name	Variable Definition	Scale
Dependent	(FDI)	Foreign direct investment inward flows to ASEAN by host country	US$ Million
Independent	(INFLASI)	Inflation rates in ASEAN: 3 month deposite	Percent
	(M2)	Money growth (M2) in ASEAN, year on year end of the period	Percent
	(INTEREST)	Interest rates in ASEAN year on year average of period	Percent
	(ECO)	Rate of economic growth in ASEAN	Percent
	(INDUSTRY)	GDP share of major group of Industries	Percent
	(SERVICE)	GDP share of major group of Service	Percent
	(INTERNET)	Access to internet services in ASEAN	Percent
	(POP)	Population growth in ASEAN	Percent
	(IPM)	Human Development Index (HDI) in ASEAN	index

Source: ASEAN Statistical Yearbook 2019

IV. RESULTS AND DISCUSSION

Based on the results of the analysis carried out, in accordance with the previous research flow obtained the following results :

1. Descriptive Analysis

In this descriptive analysis presented an overview of FDI data in ASEAN in 2015-2018 and 2 independent variables representing HDI and internet users in ASEAN. The following is a general description of the data:

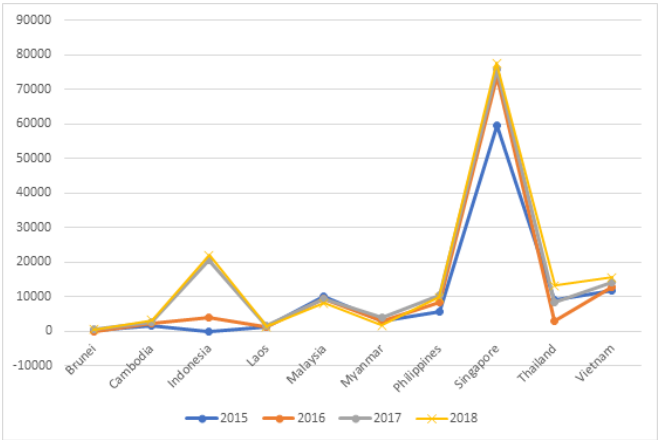

Figure 2. Graph of FDI data in ASEAN countries in 2015-2018

The FDI data graph above illustrates that there is an insignificant increase seen every year, it indicates that the value of FDI in 10 ASEAN countries is still underdeveloped, so it is necessary to make efforts so that the value of FDI can be supported by an increase. As for the 10 countries in ASEAN, the countries with the highest FDI values were Singapore, Indonesia, Vietnam, Thailand, Malaysia, Philippines, Cambodia, Brunei, Myanmar and Laos. Indonesia is one country that has a significant increase in 2018, although it has not surpassed Singapore.

Furthermore, the HDI data of 10 countries in ASEAN from 2015 to 2018 can be seen in the following figure

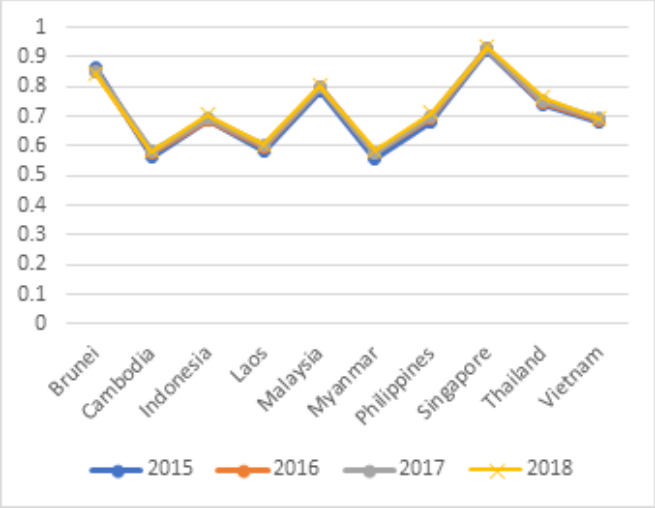

Figure 3. Graph of HDI data in ASEAN countries 2015-2018

Based on the results, it is known that there is no significant increase from year to year for all countries in ASEAN. The highest HDI in ASEAN is Singapore, then Brunei Darussalam and Malaysia. In addition to the following HDI data internet user data in each country in ASEAN from 2015 to 2018 is shown in the graph below,

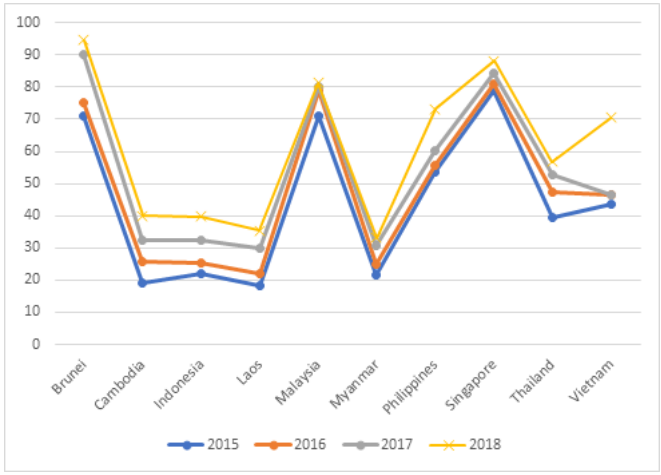

Figure 4. Graph of data access to internet services in ASEAN countries in 2015-2018

Internet users continue to increase each year, the highest growth occurred in Vietnam which in 2015 the number shot away from 40 to 70. While for other countries relatively continued to increase although not so significant. The HDI and internet data are independent variables that are also analyzed to see the effect factors. Visually, it can be seen that FDI has data patterns from each country and each year is the same as the HDI and Internet data. This will be proven using panel data regression analysis in this study.

2. Panel Data Regression Analysis

In this panel data regression analysis testing is done to select the best model to be used, while the test consists of 3 stages, namely the chow test, the hausman test, and the breush-pagan test, the following test results for the selection of the best model:

2.1 Chow Test

This test is done to compare the best modeling between the CEM model and FEM model. The null hypothesis will be rejected if the p-value is smaller when compared to α (0.05).

Table 2 : Chow Test Results

Effect Test	Statistic	d.f	Prob
Cross-section F	15.778802	(9.21)	**0.0000**
Cross-section Chi-square	81.971372	9	0.0000

Source : Eviews9

Based on the results of the output in the table above, it is known that the probability value is 0.000, so by using a 95% confidence level it can be concluded that the right model used is FEM and there are individual effects and significant time.

2.2 Hausman Test

Furthermore, to ensure that the FEM model is proper to be used, a retest is done to compare the FEM model with REM using the Hausman test, the following outputs are obtained,

Table 3 : Hausman Test Results

Effect Test	Chi Sq Statistic	Chi Sq d.f	Prob
Cross-section Random	142.009217	9	**0.0000**

Source : Eviews9

The probability value in the hausman test is 0.000, which is less than α (0.05), which means the best model that can be used is the FEM model. The two tests, namely the chow and hausman tests, have chosen the FEM model as the right model to use, but there is still one more test that needs to be seen, namely the breush-pagan test.

2.3 Breush Pagan Test

According to Widarjono in (Riyanti, 2018), the Breusch-Pagan Test is used to find out whether in the model there are time effects, individual effects, or both. Here are the results of the test,

Table 4 : Breush-Pagan Test Results

	Cross-section	Time	Both
Breusch-Pagan	6.442457 **(0.0111)**	0.002049 (0.9639)	6.444506 (0.0111)

Source : Eviews9

Based on the results of the output obtained, it can be concluded that by using a 95% confidence level the decision is to reject the null hypothesis, which means that an appropriate model is used that is the REM model.

From the three tests above, it is known that the FEM model was selected in 2 types of tests namely chow and hausman, while the REM model was only selected once namely in the breusch-pagan test. Therefore, this research will use the FEM model as the best model to describe the factors that influence FDI in 10 ASEAN countries.

3. Classic Assumption Test

3.1 Normality Test

Normality test is done to see the distribution of data. The regression has a classic assumption, one of which is the data must be normally distributed, which can be seen using a jarque-fallow test, following the normality test results obtained,

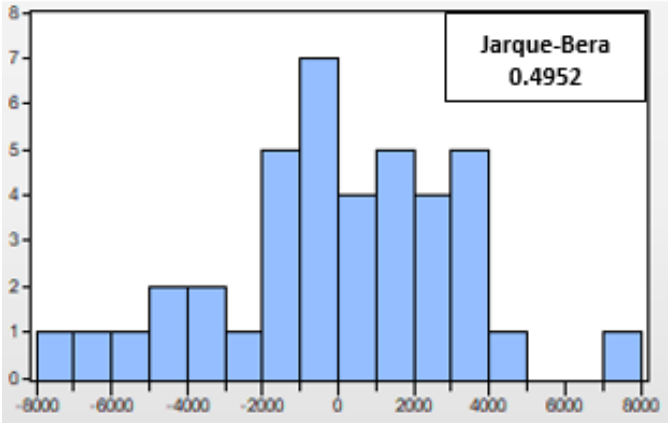

Figure 5. Normality Test

Normality test results show a fallow jar value of 0.50 which is greater than α (0.05) so that the decision fails to reject the null hypothesis, meaning that the data meets the assumption of a normal distribution.

3.2 Multicollinearity Test

Multicollinearity test is performed to determine whether there is a linear relationship between independent variables. According to (Widarjono, 2005) a data is said not to occur multicollinearity if the VIF value is less than 10. The following hasIL output,

Table 5 : Breush-Pagan Test Results

Variance Inflation Factors	
ECO	6.6338
INDUSTRY	7.5333
INFLASI	3.2354
INTEREST	2.8525
INTERNET	6.8971
IPM	1.9280
M2	2.2705
POP	1.2099
SERVICE	4.0408

Source : Eviews9

Based on the above output results, all VIF values are less than 10, so it can be concluded that there are no symptoms of multicollinearity in the data, and the assumption of multicollinearity is fulfilled.

3.3 Heteroscedasticity Test

Heteroscedasticity test is performed to test whether in the regression model there is an inequality of variance of residuals between observations. Data is said to occur heteroscedasticity if the variance between residuals is different. To test heteroscedasticity, one of them is by using the pagan godfrey heteroscedasticity test, the following is the output of the test.

Table 6 : Heteroscedasticity Test Results

Heteroskedasticity Test: Breusch-Pagan-Godfrey	
Prob F	0.0881
Prob Chi-Square	0.1026

Sumber : Eviews9

Based on the results of glacial test output, a probability value of 0.0881 is obtained, which is greater than α (0.05), so it can be concluded that there are no symptoms of heteroscedasticity in the data.

4. Significance Test

Significance test is a procedure used to test the truth or error of the null hypothesis results from the sample. The basic idea underlying the significance test is the statistical test (estimator) of the sample distribution of a statistic under the null hypothesis. The decision to process the null hypothesis is based on statistical test values obtained from existing data (Gujarati, 1997). Statistical tests consist of overall test (F) and partial test (t). Here are the results of the significance tests on the FEM model that have been selected.

4.1 Overall Test

The F test, or commonly known as the overall test, is carried out to determine the feasibility of the selected model and to determine whether all the independent variables that have been selected jointly influence the dependent variable FDI in this study. The following is the overall test output,

Table 7 : FEM Model Output

Fixed Effect Model	
Prob (F-Statistics)	0.000

Source : Eviews9

In the significance test of the model, researchers used an α value of 10% or 0.1. Because the probability value or F-statistics in the FEM model is 0.000 where it is less than α of 0.1, it can be concluded that the

FEM model is feasible to use and the independent variables used have a significant effect on the dependent variable together.

4.2 Partial Test

T-test or commonly known as partial test is done to find out whether the independent variables affect the dependent variable partially. Following are the results of partial test outputs on the FEM model,

Table 8 : Partial Test of FEM model

Variables	Coefficient	Probability
C	72371.48	0.41
ECO	843.45	0.54
INDUSTRY	-414.42	0.72
INFLASI	-54.44	0.94
INTEREST	17.47	0.82
INTERNET	265.10	0.07*
IPM	-18.35	0.04*
M2	-61.79	0.64
POP	-823.90	0.29
SERVICE	-1267.97	0.31

Source : Eviews9

Based on the probability value of each independent variable presented in table 8 above, it is known that there are only 2 variables that significantly influence the dependent variable FDI, these variables are the number of internet users and HDIs that are given information (*).

4.3 Coefficient of Determination

The coefficient of determination is also referred to as the R-squared which from the FEM model obtained an R-squared value of 0.9778, which means that all the independent variables used are able to explain the dependent variable FDI of 97.78%, while the remaining 2.22% is explained by other variables not yet included in this research.

4.4 Model Interpretation

Based on the results of partial and overall tests on the FEM model that have been carried out, it is continued by interpreting the coefficient of significant variables to become a regression model that will be used as a prediction model. As for the significant variables that affect FDI namely the internet and HDI, the following model is obtained,

$$\mathrm{FDI}_i = 0.0681\ \mathrm{INTERNET}_i + 0.0412\ \mathrm{IPM}_i \quad (4.1)$$

The purpose of the model in equation 4.1 above is that all variables have a positive effect on FDI. Where for every 1% increase in FDI, the internet will increase by 0.0681%, and the HDI will increase by 0.0412%.

V. CONCLUSION

Based on a series of analyzes that have been carried out, the fixed effect model is the best model chosen to be interpreted, and from this model, it is known the factors that affect FDI from 9 independent variables consisting of the percentage of economic growth, population growth, percentage of inflation, interest rates, money supply (M2), HDI, access to internet services, and GDP in the industrial sector, and services. The factors that have a significant influence on FDI are internet service access and HDI. Access to internet services in ASEAN countries has a positive influence on FDI. This is consistent with the theory put forward in research (Napiorkowski, 2017) which says that technology transfer has an impact on the level of change in the level of technology in the host economy. In the absence of inward FDI and an abundance of technology transfer, the level of domestic technology will grow at a natural rate which is only stimulated by domestic activities including trade. Because technological progress is a positive change and can hardly be undone.

Then HDI also has a positive influence on FDI, which according to research (Gokmenoglu, et al, 2018) to obtain optimal results policy makers must be aware of and weigh the pros and cons of FDI inflows on several aspects of human development. The results of his research show there is a positive effect of FDI on income and education development, which can attract foreign investors.

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