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# The Role of FDI in Economic Development in Vietnam + 5 Nations: Empirical Evidence between 1986–2020

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## Abstract

This research work aims to investigate the role of FDI in Economic Development by assessing its relationship with GDP per capita in Vietnam +5 from 1986–2020. Through descriptive statistical, correlation matrix analysis, and econometric models, including Vector Error Correction Model (VECM) and Feasible Generalized Least Squares (FGLS) estimation methods using Stata 15.1. The VECM estimation method results show that FDI positively impacts Economic Development in the short run while not finding a long-run relationship. In addition, it is found that a clear relationship between Exports and Economic Development in both the short run and the long run. Meanwhile, CO<sub>2</sub> emissions and Employment Opportunities have no clear relationship with Economic Development in the short run. However, the relationship is reversed in the long run, as the empirical study in Vietnam. The results of the FGLS estimation method show that FDI, CO<sub>2</sub> emissions, and Exports have a significant and positive impact on Economic Development in five selected Southeast Asian countries without Employment Opportunities in the long run. From these findings, the author proposes some policy implications of attaching FDI to sustainable Economic Development in Vietnam next time.

**Keywords:** FDI, FGLS, Sustainable Economic Development, VECM, Vietnam

**JEL Classification Code:** C1, E2, E24, F43

## 1. Introduction

Within a generation, Vietnam went from being one of the world's poorest countries to have a low average income. From 2002 to 2021, GDP per capita increased 3.6 times, reaching almost 3,700 USD. The poverty rate (US\$ 3.65/day, 2017 PPP) declined from 14 in 2010 to 3.8 percent in 2020 (World Bank, 2022). The results achieved in the process of Vietnam's extensive international economic integration since joining the ASEAN-AFTA Free Trade Area Agreement in 1993 up to now, Vietnam has signed and implemented 15 bilateral and multilateral Free Trade Agreements (FTAs) come into force (Center for WTO and International Trade-

VCCI, 2022). This participation not only creates many new growth drivers, expands and diversifies markets, contributes to improving the adaptability of the economy, but also contributes to strengthening trade relations between Vietnam and partners, removing trade barriers to participate more deeply in global production and supply chains, thereby creating more favorable conditions for Vietnam to attract Foreign Direct Investment (FDI) from partners. Besides the enormous role of FDI in economic development, its effects on environmental degradation, employment opportunities, and exports in Vietnam, etc., which has attracted many economists' and policymakers' interest lately. However, many results of empirical research work have been published in different and controversial. Nguyen and Le (2018) find that there is not enough statistical evidence to conclude that FDI impacts environmental pollution in Vietnam, but the GDP variable is significantly positive in long-run estimation. The empirical results show that although FDI negatively impacts economic growth in the short run, it helps stimulate economic growth in the long run in developing countries of the lower-middle-income group over 2000–2014, including Vietnam (Dinh et al., 2019). There is the relationship between FDI (net inflows), aid, exports, and GDP (current) has a

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positive effect at a 1% significance level (Nguyen, 2020). It is found that FDI has a significantly negative impact on CO<sub>2</sub> emissions at a 10% significance level, and FDI is also found to have a significant and positive impact on the GDP growth of Southeast Asian countries, including Vietnam (Nguyen, 2021). In the short run, FDI appears to result in a reduction in CO<sub>2</sub> emissions. However, the effect is reserved in the long run. Especially the empirical result shows that fossil fuel energy consumption deteriorates the environment in the long run and at any level of economic development in Vietnam (Vo & Ho, 2021). Vietnam's export suffered a long-term positive impact from FDI, and the FDI sector has a bigger impact on Vietnam's export growth than the DI sector (Do et al., 2022).

Drawing lessons from theory and practice, the current urgent issue is to ensure that FDI is an important part and resource contributing to the goal of sustainable development, economic growth, protecting the environment, raising incomes, creating more jobs for people, towards the goal that by 2030, Vietnam is a developing country with modern industry, high-middle income, by 2050 to become a developed country, high-income, and net CO<sub>2</sub> emissions of "Zero" as committed by Vietnam at COP26 (Conference of the Parties). With that important significance level, an empirical study on the role of FDI in economic development in Vietnam is very necessary and more authentically evaluated than previous research results. Due to the limitation of time and data collection, the study only concentrates on assessing the relationship between FDI and Economic Development in Vietnam through GDP per capita and considers the relationship of other macro-factors, including CO<sub>2</sub> emissions, Employment Opportunities, and Exports on Economic Development in Vietnam during the period 1986–2020. In addition, an empirical study is employed to assess macro factors' impact on Economic Development in five developed economies in Southeast Asia, including Indonesia, Malaysia, Philippines, Singapore, and Thailand, thereby drawing lessons for Vietnam. From these findings, the author proposes some policy implications of attaching FDI to sustainable Economic Development in Vietnam next time.

The remainder of this paper is structured as follows: Section 2 includes a review of the literature contents. Section 3 explains the data and model. Section 4 describes the results and discussions. Section 5 concludes and makes policy implications.

## 2. Literature Review

Foreign Direct Investment (FDI) is considered one of the important factors contributing to the economic development of a country, especially developing countries, including Vietnam. However, many results of international research work from theory and practice have been different and controversial about the role of FDI in Economic Development till now.

On the one hand, Bjorvatn et al. (2001) stated that FDI is not necessary to achieve Economic Development. The entry of foreign firms may play an important role in adding technology and competition to the host economies. In the case of Malaysia, there is no strong evidence of a bidirectional causality and long-run relationship between FDI and economic growth. This suggests that FDI indirectly affects economic growth in Malaysia (Karimi & Yusop, 2009). Strong evidence from 12 Asian economies shows that FDI in the manufacturing sector has a significant and positive effect on economic growth in the host economies. FDI inflows in nonmanufacturing sectors do not significantly enhance economic growth (Wang, 2009). Azman-Saini et al. (2010) showed that FDI alone has no direct (positive) effect on output growth. Instead, the effect of FDI is contingent on the level of economic freedom in the host countries. In other words, the countries that promote greater freedom of economic activities gain significantly from the presence of multinational corporations through an empirical result in a panel of 85 countries. To explore the interplay between economic freedom, foreign direct investment, and economic growth, using panel data analysis for a sample of 79 developing countries from 1998 to 2014 (Hossain, 2016). No evidence of any short- or long-run causal flow from FDI to growth with financial deepening accompanying in Nigeria (Adeniyi et al., 2012). Acquah & Ibrahim (2020) stated that the effect of FDI on economic development in 45 African countries is ambiguous, although, for the most part, higher FDI is associated with higher growth. FDI aggregated per year does not give a comprehensive picture of the situation and, in many cases, leads to incorrect strategic decisions, as has happened in many countries, including Georgia (Charaia et al., 2020).

On the other hand, there is a beneficial role of FDI in growth. However, the role of FDI in growth could be limited by human capital in Nigeria (Adegbite & Ayadi, 2010). Feridun and Sissoko (2011) found a unidirectional Granger causation from foreign direct investment to economic growth in Singapore. The empirical results confirm that HK (Human capital) development is critical to economic growth. Similarly, it is found that FDI facilitates promoting growth in the former Soviet Republics now comprising Central Asian independent economies. This is despite country-specific differences across CIS (Azam & Ahmed, 2015). FDI has positively affected the economic growth of the South Asian Association of Regional Cooperation countries-SAARC (Erum et al., 2016). Popovici & Călin (2016) find a positive significant bidirectional relationship between FDI and GDP and a unidirectional relationship between GDP and Exports in Romania from 2005–2014. It stated that FDI positively affects economic growth and found bidirectional causality between FDI and economic growth in Carbo Verde (Duarte et al., 2017).

The panel VECM Granger causalities support a short-run one-way causal association between FDI to growth and a long-run two-way causal connection between FDI and growth for a sample of 11 Central and Eastern European countries from 2003 to 2016 (Gherghina et al., 2019). The results also indicate that FDI has a positive impact on economic growth and that this positive impact is enhanced by IFRS (Akisik et al., 2020). Kurbanov (2020) indicated GDP Granger causes FDI, and a change in the GDP indicates in advance a change in the level of FDI in Uzbekistan over 2010–2019. Joo & Shawl (2021) found a significant positive FDI impact on economic growth in BRICS. However, Exports, Human capital, and Inflation (macroeconomic instability) negatively impact the economic growth of BRICS, whereas domestic investments positively impact growth. Louail and Zouita (2021) showed an impact of both economic growth and financial development in the FDI flows to the study of countries during the period 1985–2019 in the long run, while no such proof is affirmed in the short run. The overall impact of FDI and Employment on Economic growth is found ambiguous. However, FDI has had a positive impact and bidirectional causality in economic growth in HIE in BRICS and ASIAN nations from 1993 to 2019 (Irshad & Qayed, 2022). Another relevant study, such as evidence of structural stability of the relationship between Economic development and CO2 emissions per capita, is found (Azomahou et al., 2006); In the long run, economic growth can curb CO2 emissions (Jian et al., 2019). It is found

that there is a relationship between FDI and employment opportunities (Khan et al., 2022).

### 3. Data and Methods

#### 3.1. Data

Data collection: This paper uses the secondary-annual data for GDP per capita (current US dollars) (proxy of Economic Development) as the dependent variable. The independent variables for the study are FDI net inflows (BOP, current US dollars), CO2 emissions (metric tons per capita), labor force participation rate (total (% of total population ages 15–64) (modeled ILO estimate)) (proxy of Employment Opportunity), and Export (Goods, value of export, US dollars). All available data is gathered from the World Bank (WB) except Export data, which is collected from the International Financial Statistics (IFS) of the International Monetary Fund (IMF), which would also ensure the relevance and reliability of data.

All variables in Table 1 are in the log transformation form to achieve mean-reverting relationships and to make the econometric testing procedure valid (Feridun & Sissoko, 2011).

#### 3.2. Model

In this paper, we use two research models with two distinct regression methodologies to assess the relationship

**Table 1:** Variables Definitions

Variables	Symbol	Description and Unit	Source	Sampling Time	Expectations
<b>Dependent Variable</b>					
Economic development	logGDPc	GDP per capita is a proxy of Economic Development (current US dollars). Data is collected from WB.	Azomahou et al. (2006); Feridun & Sissoko (2011); Vo & Ho (2021)	1986–2020	
<b>Independent Variables</b>					
Foreign direct investment	logFDI	FDI net inflow (BOP, current US dollars). Data is collected from WB.	Feridun & Sissoko (2011); Nguyen (2020); Khan et al. (2022)	1986–2020	+
CO2 emissions	logCO2	CO2 emissions per capita (Metric ton). Data is collected from WB.	Nguyen & Le (2018); Vo & Ho (2021)	1990–2019	+
Employment Opportunity	logEO	Labor force participation rate (total (% of total population ages 15–64) (modeled ILO estimate) is a proxy of Employment opportunity. Data is collected from WB.	Khan et al. (2022)	1990–2019	+
Export	logEX	Goods, the value of export (US dollars). Data is collected from IMF.	Popovici & Călin (2016); Do et al. (2022)	1986–2020	+

between FDI and Economic Development, and it is shown as follows:

### 3.2.1. Model 1 (Vector Error Correction Model – VECM)

Based on the previous research works (Adeniyi et al., 2012; Popovici & Călin, 2016; Jian et al., 2019; Kurbanov, 2020; Do et al., 2022), the study uses the VECM estimation method with time series data to assess the relationship between FDI and Economic Development in Vietnam over the period of 1986–2020. First, descriptive statistics and correlation matrix methods are used. Next, to ensure that all conditions are met for the implementation of the VECM method, the study tests the stationarity of the data series by the Augmented Dickey-Fuller (ADF) test (Dickey & Fuller, 1979) and Phillips-Perron (PP) (Phillips, 1991), determines the selection of the optimal Lag Length of the model according to the majority standard AIC (Akaike Information Criterion), HQC (Hannan-Quinn Information Criterion), SBC (Schwars Bayesian Criterion), and FPE (Final Prediction Error) by Wald test. Cointegration test according to Johansen and Juselius (1990) by Trace and Max-Eigen tests. After estimating the VECM, the study performs the validity of the model test, which applies to the residual tests to ensure stability and satisfy the requirements of the VECM. First, the series correlation of the residuals test is done by the LM (Lagrange-multiplier) series correlation test. Next, the residual test of the normally distributed VEC estimates is done by the Jarque-Bera test, and finally, the stability condition of VEC estimates is checked by the eigenvalue stability condition. In particular, the regression equation in model 1 is shown below:

$$\log \text{GDPc}_t = \alpha_0 + \alpha_1 \log \text{FDI}_t + \alpha_2 \log \text{CO2}_t + \alpha_3 \log \text{EO}_t + \alpha_4 \log \text{EX}_t + \varepsilon_t$$

Where:  $\alpha_0$  is constant,  $\alpha_1, \alpha_2, \alpha_3, \alpha_4$  are the coefficient for those independent variables,  $\varepsilon_{it}$  is error term.

### 3.2.2. Model 2 (Multiple Linear Regression Model)

Based on the previous research works (Wang, 2009; Hossain, 2016; Akisik et al., 2020; Joo & Shawl, 2021; Nguyen, 2021; Irshad & Qayed, 2022). The author used a multiple linear regression model with annual panel data to assess the macro-factors affecting Economic Development in five selected Southeast Asian countries, including Indonesia, Malaysia, Philippines, Singapore, and Thailand, from 1986–2020. The study employs a descriptive statistical correlation matrix analysis and a regression model by the Ordinary Least Squares method (Pooled OLS), Fixed Effects Model (FEM), and Random Effects Model (REM). However, all model's

final results are not the best due to still suffering from the phenomenon of heteroscedasticity and autocorrelation (Tran et al., 2020). Therefore, the researcher used the Feasible Generalized Least Squares (FGLS) estimation method to overcome heteroscedasticity and autocorrelation in the regression model for panel data (Beck & Katz, 1995). In particular, the regression equation in model 2 is shown below:

$$\log \text{GDPc}_{it} = \alpha_0 + \alpha_1 \log \text{FDI}_{it} + \alpha_2 \log \text{CO2}_{it} + \alpha_3 \log \text{EO}_{it} + \alpha_4 \log \text{EX}_{it} + \varepsilon_{it}$$

Where:  $\alpha_0$  is constant,  $\alpha_1, \alpha_2, \alpha_3, \alpha_4$  are the coefficient for those independent variables,  $\varepsilon_{it}$  is error term.

All calculation processes are done by using Stata 15.1

## 4. Results and Discussion

### 4.1. Results and Discussion for Model 1

Descriptive statistics and correlation matrix for variable results: Table 2 presents the descriptive statistics and correlation matrix of variables in Model 1 with all the latest available time-series data over 1986–2020.

The results of descriptive statistics in Table 2 indicate that the values of variables are relatively equal. That makes the test results more reliable and significant. The results of the correlation matrix in Table 2 also indicate that the GDPc variable has a high positive correlation with FDI, CO2, and Export variables. On the other hand, the GDPc variable has a low negative correlation with the EO variable.

Unit Root Test Results: Research with time series data aims to predict that behavior can only be studied for the period under consideration if a time series is not stationary. Therefore, the non-stationary series will have no practical application value, and the resulting regression will lead to “spurious regression” (Granger & Newbold, 1974). Hence, to ensure that all conditions are met for the implementation of the VECM method, the study tests the stationarity of the data series by the Augmented Dickey-Fuller (ADF) test (Dickey & Fuller, 1979) and Phillips-Perron (PP) (Phillips, 1991) to examine the stationarity of variables in the Model 1. The results of the test for variable stationery are shown in Table 3.

Results from Table 3 reveal that just only the FDI variable is stationary at the root level (0) at a 1% significance level. Meanwhile, the remaining variables are stationary at the first level (1) in both ADF and PP test cases, indicating that the VECM test approach would be suitable.

Selection of Optimal Lag Length: The selection of optimal lag length is of vital importance in the analysis of time series before testing the existence of the long-run relationship between variables. This model's limited

**Table 2:** Descriptive Statistics and Correlation Matrix for Variables in Model 1

	logGDPc	logFDI	logCO2	logEO	logEX
Observations	35	35	30	30	35
Mean	6.516187	21.0424	-0.0426798	4.405776	23.73654
Std. Dev	1.096681	2.767942	0.7584132	0.0091252	1.818221
Min	4.549284	10.59663	-1.257686	4.389499	20.486228
Max	8.167997	23.50333	1.249418	4.421368	26.3674
logGDPc	1.000000				
logFDI	0.5903 (0.0002)	1.000000			
logCO2	0.9851 (0.0000)	0.9176 (0.0000)	1.000000		
logEO	-0.1454 (0.4433)	-0.1669 (0.3779)	-0.1789 (0.3443)	1.000000	
logEX	0.8914 (0.0000)	0.8268 (0.0000)	0.9951 (0.0000)	-0.1771 (0.3492)	1.000000

$p$ -value is displayed in parentheses “().”

**Table 3:** Results from the ADF and PP for Unit Root Test

Variables	Level I(0)		Level I(1)	
	ADF	PP	ADF	PP
logGDPc	-0.064 (0.9529)	-0.195 (0.9391)	-4.324*** (0.0004)	-4.343*** (0.0004)
logFDI	-5.695*** (0.0000)	-6.414*** (0.0000)		
logCO2	0.209 (0.9727)	0.327 (0.9785)	-4.975*** (0.0000)	-5.071*** (0.0000)
logEO	-0.656 (0.8577)	-1.102 (0.7143)	-3.170** (0.0000)	-3.078** (0.0282)
logEX	-1.640 (0.4625)	-2.218 (0.1997)	-5.357*** (0.0000)	-5.364*** (0.0000)

$p$ -value is displayed in parentheses “().” \*Significant at 10% level \*\* Significant at 5% level. \*\*\*Significant at 1% level.

observations led us to consider only models with a max of 2 lags. The study employs majority standard AIC (Akaike Information Criterion), SBC (Schwars Bayesian Criterion), HQC (Hannan-Quinn Information Criterion), and FPE (Final Prediction Error) by Wald test to determine the selection of the optimal lag length of the model. Results present that FPE, AIC, HQC, and SBC criteria unanimously choose an optimal lag length of 1 for the model in regression analysis.

**Johansen Cointegration Test Results:** Results show a vector cointegrating between the variables at level 1. It means that there is the long-term relationship between GDPc, FDI, CO2, EO, and EX variables was confirmed in this research. Hence, the VECM estimation method is used to estimate one cointegration equation. Vector Error Correlation Model (VECM): The results determined all variables are stationary at both level (0) and level (1), the optimal lag length is 1, and there is an existing vector cointegrating in Model 1. Therefore, the application of the VECM to assess both the short- and long-run relationships between variables in this research model.

The results of short-run estimation in Table 4 reveal that the FDI variable has a significant and positive impact on the GDPc variable with  $p$ -value = 0.3% < 5% of the significance level. The result indicates that a one percent increase in FDI causes an increase of 0.147% in Economic Development, respectively. The other findings show that the EX variable has a significant and positive impact on the GDPc variable with  $p$ -value = 1.2% < 5% significance level. CO2 variable has a negative impact on the GDPc variable but is insignificant with  $p$ -value = 34.8% > 5% of the significance level. EO variable has a positive impact on the GDPc variable but is insignificant with  $p$ -value = 34.7% > 5% of the significance level. From these findings, it is found that a clear relationship between FDI and Economic Development in the short run. This result is consistent with the findings by Gherghina et al. (2019). Similarly, export has a clear relationship with Economic Development in the short run. Meanwhile, CO2 emissions and Employment Opportunities have an unclear relationship with Economic Development in the short run. This finding is consistent with the findings by Vo and Ho

**Table 4:** Results of VECM Estimation

Results of Short-Run Estimation						
	Coef.	Std. Err.	z	P >	[95% Conf. Interval]	
D_logGDPc						
_Cel_L1.	0.2640288	0.059595	4.43	0.000	0.1472249	0.3808328
logGDPc LD.	-0.6363661	0.1945393	-3.27	0.001	-1.017656	-0.255076
logFDI LD.	0.1471325	0.049846	2.95	0.003	0.0494361	0.2448288
logCO2 LD.	-0.2006653	0.2139582	-0.94	0.348	-0.6200155	0.218685
logEO LD.	3.909264	4.159749	0.94	0.347	-4.243693	12.06222
logEX LD.	0.2978072	0.1189696	2.50	0.012	0.0646311	0.5309833
_Cons	-0.0317406	0.0416925	-0.76	0.446	-0.1134565	0.0499753
Results of Long-Run Estimation						
logGDPc	1					
logFDI	0.0241274	0.753408	0.32	0.749	-0.1235378	0.1717926
logCO2	3.212921	0.6128991	5.24	0.000	2.01166	4.414181
logEO	-19.16914	4.001983	-4.79	0.000	-27.01288	-11.32539
logEX	-2.349688	0.3247303	-7.24	0.000	-2.986148	-1.713229
_Cons	134.621					

(2021) when considering the short-run relationship between Economic growth and the quality of the environment in Vietnam.

The results of long-run estimation in Table 4 show that the FDI variable has a positive impact on the GDPc variable but is insignificant with  $p$ -value = 74.9% > 5% of the significance level. The other findings reveal that the CO2 variable positively impacts the GDPc variable and is significant with  $p$ -value < 5% of the significance level. The EO and EX variables have a negative impact on the GDPc variable and are signed with a  $p$ -value < 5% of the significance level. These findings show no clear relationship between FDI and Economic Development in the long run. This result is consistent with the findings by Karimi and Yushop (2009), Azman-Saini et al. (2010), Adeniyi et al. (2012), and Acquah and Ibrahim (2020). CO2 emissions significantly and positively impact Economic Development in the long run. Meanwhile, Employment opportunities and Exports have a clear relationship with Economic Development but have a negative impact in the long run. These results are consistent with the findings by Joo and Shawl (2021).

Validity of model – tests applied on the residuals

Aiming to test serial correlation, the study used to apply VEC residual serial correlation LM tests with the null hypothesis of  $H_0$ : No serial correlation at any lag orders.

The results proved the absence of serial correlation at both lag one and lag 2 with  $p$ -value = 10.45% and 59.4% > 5% of significance level, respectively.

To test for normally distributed VEC estimates done by the Jarque-Bera test. It was found that the series are jointly normally distributed with  $p$ -value = 66.849% > 5% of the significance level. Finally, the study also tested the stability of the model, and the results show that all the inverse roots are inside the unit circle.

In short, this research model, which overcomes all the tests applied to the residuals and is stable, could be used in analysis and forecasting.

## 4.2. Results and Discussion for Model 2

Descriptive statistics and correlation matrix for variable results: Table 5 presents the descriptive statistics and correlation matrix for variables in Model 2 with all the latest available data covering the period from 1986 to 2020 in five selected Southeast Asian countries.

The results of descriptive statistics in Table 5 reveal that the values of the variables are relatively equal. That makes the test results more reliable and significant. The results in Table 5 also indicate that the GDPc variable has a high positive correlation with FDI, CO2, and Exports variables.

**Table 5:** Descriptive Statistics and Correlation Matrix for Variables in Model 2

	logGDPc	logFDI	logCO2	logEO	logEX
Observations	175	169	150	150	161
Mean	8.266954	22.23537	1.066556	4.234062	25.21513
Std. Dev	1.27589	1.401765	0.881873	0.0763189	0.8857758
Min	6.091797	18.55752	-0.4453288	4.123418	22.90662
Max	11.11035	25.43711	2.407697	4.372229	26.78182
logGDPc	1.000000				
logFDI	0.7786 (0.0002)	1.000000			
logCO2	0.8788 (0.0000)	0.5887 (0.0000)	1.000000		
logEO	0.3288 (0.0000)	0.4155 (0.0000)	0.3206 (0.0001)	1.000000	
logEX	0.7589 (0.0000)	0.8106 (0.0000)	0.6622 (0.0000)	0.3301 (0.0001)	1.000000

*p*-value is displayed in parentheses “().”

**Table 6:** Summary of Regression Model Estimation Results in Model 2

Variables	Summary of Regression Model Estimation Results – logGDPc is the Dependent Variable			
	Pooled OLS	FEM	REM	FGLS
logFDI	0.291*** (5.86)	0.0859*** (3.88)	0.291*** (5.86)	0.251*** (5.42)
logCO2	0.866*** (14.07)	0.435*** (4.09)	0.866*** (14.07)	0.941*** (15.42)
logEO	-0.582 (-1.07)	2.450*** (3.33)	-0.582 (-1.07)	-0.320 (-0.67)
logEX	0.265*** (3.02)	0.523*** (11.57)	0.265*** (3.02)	0.265*** (3.37)
_Cons	-3.318 (-1.29)	-17.57*** (-6.57)	-3.318 (-1.29)	-3.714 (-1.56)
N	135	135	135	135
Prob > F/Chi <sup>2</sup>	0.0000	0.0000	0.0000	0.0000
R-sq	0.861	0.894		

\*Significant at 10% level. \*\*Significant at 5% level. \*\*\*Significant at 1% level. *T*-statistic value is displayed in parentheses “().”

On the other hand, the GDPc variable has a low negative correlation with the EO variable.

Regression model estimation results: The author used Pooled OLS, FEM, REM, and FGLS estimation methods in the research model. However, the model that is best suitable for the FGLS method is chosen because it overcomes the phenomenon of heteroscedasticity and autocorrelation in the regression model with panel data. Several tests have been performed in the estimation procedure, such as multicollinearity by VIF (Green, 1991), heteroscedasticity (White, 1990), autocorrelation (Wooldridge, 2002), and the Hausman test. The results meet the requirements of the regression model with panel data.

From the FGLS estimation method, the results in Table 6 show that the impact of the FDI variable on the GDPc variable is significant and positive at 1% of the significance

level. The result indicates that a one percent increase in FDI causes an increase of 0.251% in Economic Development, respectively. The other findings reveal that the impact of the CO2 variable on the GDPc variable is significant and positive at a 1% of the significance level. EO variable has a negative impact on the GDPc variable but is insignificant. The EX variable’s impact on GDPc is positive and significant at a 1% significance level. From these findings, FDI impacts Economic Development in the long run positively. This result is consistent with the findings by Wang (2009), Erum et al. (2016), Dinh et al. (2019), Nguyen (2020), Joo and Shawl (2021), Nguyen (2021), Louail and Zouita (2021), and Irshad and Qayed (2022). CO2 emissions and Exports have a positive impact on Economic Development. Meanwhile, there is no clear relationship between Employment Opportunities and Economic Development in the long run.

## 5. Conclusion and Policy Implications

The study aims to assess the relationship between FDI and Economic Development in Vietnam through GDP per capita and consider the relationship of other macro-factors, including CO<sub>2</sub> emissions, Employment Opportunities, and Exports on Economic Development in Vietnam from 1986–2020. In addition, an empirical study is employed to assess the impact of macro-factors on Economic Development in five developed economies in Southeast Asia, including Indonesia, Malaysia, Philippines, Singapore, and Thailand, during the same period. The empirical findings from the study can be summarized as follow. First, the VECM estimation method results show that FDI positively impacts Economic Development in the short run, while no proof is affirmed in the long run. A clear relationship is found between Exports and Economic Development in both the short- and long-run.

Meanwhile, CO<sub>2</sub> emissions and Employment Opportunities have no clear relationship with Economic Development in the short run. However, the relationship is reversed in the long run, as the empirical study in Vietnam. Next, the FGLS estimation method results show that FDI, CO<sub>2</sub> emissions, and export positively impact Economic Development in the long run in five selected Southeast Asian countries without Employment Opportunities. From these findings, the author proposes some policy implications of attaching FDI to sustainable Economic Development in Vietnam next time.

As a result, it is shown that FDI plays a very important role in Economic Development. However, it is only an effective impact in the short term in Vietnam. Hence, the author proposes some policy recommendations as follows:

1. Vietnam needs to quickly attract FDI inflows from multinational corporations worldwide to ensure sustainable Economic Development in the long run through clear, transparent attraction policies. In addition, we should review and prioritize potential strategic investors and high-tech enterprises aiming to build global production chains by promoting supporting industries in Vietnam.
2. It is a forced condition to strictly control FDI investors by focusing solely on Vietnam's development needs associated with environmental protection. Specifically, we need to refuse poor-quality FDI investors intending to transfer outdated technology, which causes huge CO<sub>2</sub> emissions and limits the risks of becoming the future technology landfill.
3. To improve the capacity of the labor force from management capacity and professional qualifications through a comprehensive education system to meet the demand for labor's qualification skilled available aiming to attract new FDI enterprises looking for advantage business locations or demand to generate

large scale manufacturing plants with modern technology in the long term. Furthermore, it helps create many jobs and enhances the laborer's income.

4. Besides the goal of attracting FDI inflows, the Vietnamese economy needs to come up with effective solutions to mobilize resources in the economy, such as: Mobilizing financial resources from the private sector economy as well as natural resources available such as land, natural resources, minerals, tourism environment, etc. for promoting the development of export production, creating many jobs, and raising incomes for laborers.

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