

**FOREIGN DIRECT INVESTMENT EFFECT ON ECONOMIC GROWTH IN
ASEAN COUNTRIES (2002 - 2019)**

By

Htet Htet Htoo

THESIS

Submitted to

KDI School of Public Policy and Management

In Partial Fulfillment of the Requirements

For the Degree of

MASTER OF DEVELOPMENT POLICY

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Committee in charge:

Professor Lee, Jinsoo, Supervisor



Professor Kim, Dongseok



Professor Cho, Dongchul



Approval as of May, 2022

ABSTRACT

FOREIGN DIRECT INVESTMENT EFFECT ON ECONOMIC GROWTH IN ASEAN COUNTRIES (2002-2019)

By

HTET HTET HTOO

The determination of our empirical investigation is to study the foreign direct investment (FDI) effect on ASEAN's economic growth utilizing human capital. Moreover, our empirical investigation aims to investigate how FDI interacts with domestic investment, human capital, and trade in developing countries to promote economic growth. The World Bank Indicators is the source of data obtained for the period of year 2002 to 2019 and OLS approach was used to analyze. One of the most important components in the development of a successful economy is human capital. Although FDI has favorable impact on ASEAN economic growth, human capital, domestic investment, and trade don't have positive effect in ASEAN countries. This research's conclusive finding is FDI effects on economic growth are independent of the human capital level of the host country. It can be concluded that the higher the quality of a country's human capital, the greater its economic growth and FDI inflows will be.

ACKNOWLEDGEMENTS

I would like to pass my heartfelt gratitude to my Professors, Professor Jinsoo Lee and Professor Dongseok Kim, who gave me the golden opportunity to do this wonderful study. I would like to express my gratitude to both of them for their patient direction, passionate encouragement, and constructive criticism of this study. My sincere and deepest gratitude goes to my academic professors who provided me essential knowledge with valuable information that aided in the successful completion of my research and studies. Their invaluable contributions during my studies have served as a beacon for my advancement. My heartfelt gratitude also extended to KDI School, which has assisted me in completing my schoolwork flawlessly. I am grateful to the COLOMBO and our KDI School for this scholarship programme that has provided to Myanmar students with the opportunity to learn the master's degree and have helped us to acquire new academic knowledge and skills in the field of Research and Development. Finally, my warmest thanks go to my parents for their support and wish for me to succeed my studies although the words are not sufficient to express my gratitude to both of them. Therefore, I would like to express my attitude that everything I am and everything I have is belong to my parents.

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CHAPTER ONE: INTRODUCTION

1.1. STUDY BACKGROUND

E. Borensztein, J. De Gregorio(1995) stated that economic growth as measured by GDP refers to a rise in the growth rate of GDP and the factors of each component's increasing is different. Rather than a specific population, a condition, pattern, or behavior that emerge from or is linked with a major economic component is a factor of macroeconomic. The characteristic could be a significant geopolitical, economic, or environmental occurrence that has a significant influence on a national or regional economy. When it comes to growth rate, macroeconomic factors such as population growth, unemployment, inflation, gross domestic product (GDP), foreign direct investment (FDI), government expenditure, exports, imports, interest rate, unemployment, and other factors are crucial. Therefore, consumers, corporations, and governments all emphasize indications of economic performance. Macroeconomic factors might be neutral, unfavorable, or favorable.

In a recent study of economic growth, the relevance of FDI in developing countries' technological advancement was highlighted. Findlay (1978) claims that the technological growth rate in the host country is accelerated by FDI due to a 'contagion' impact resulting from the foreign enterprises' adoption of more sophisticated technology, management practices, and so on. Wang (1990) assumed that a result of FDI is increased in 'knowledge' applied to production. Wang fits this theory into a neoclassical growth model.

On the other hand, the use of the more advanced technologies necessitates the presence of host country economy's sufficient human capital. A developing country's absorptive capacity is limited by the host country's human capital stock as of the discoveries of Benhabib and Spiegel (1994) and S.Phelps (1965). As a result, the concept emphasizes the importance of both advanced technology requirements and the host country's ability to absorb it as economic

growth determinants, and advocates conducting empirical study on the complementarity of FDI and human capital in the productivity growth process.

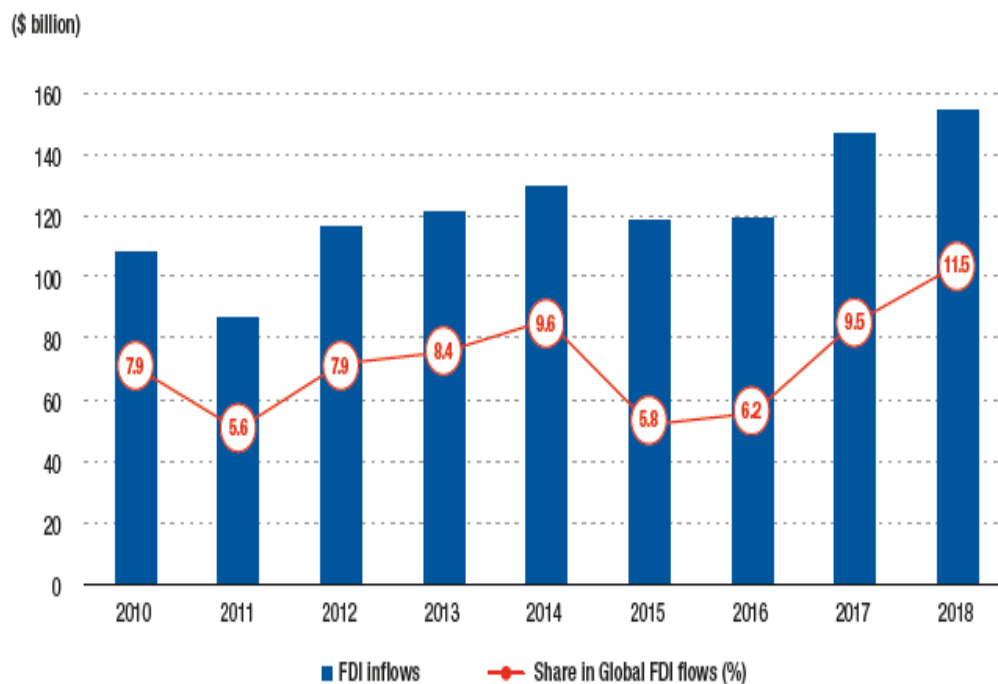
1.2. STATEMENT OF PROBLEM

Since the rate of economic growth is vital for economic development, it is crucial to investigate its pattern and answers to the country's macroeconomic transformation. The fall in economic growth could delay investments in productive sectors and also has an impact on the country's economic stability. The main task for each government, no matter developed or developing, is how to develop the economy of a country and improve the lives of the people. This analysis aims to provide insight on the factors that primarily determine economic growth in Southeast Asian countries for all of these reasons. The goal of this research is to verify the elements that may have a significant impact on successful economic growth in Southeast Asian countries: Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand, and Vietnam over the period from 2002 to 2019.

Sofilda et al. (2015) studied in the last two decades, the Association of Southeast Asian Nations (ASEAN) has grown into a desirable investment destination and regional production base. With a total Gross Domestic Product (GDP) of USD 1.1 trillion and a combined population of 567.6 million people in 2012, ASEAN has potential in enormous market and economic. Natural resources, aside from advantageous demographic trends, and the expanding purchasing power of regional residents, hold promise for the growth of the economy. As a result, FDI inflows have been gradually rising each and every year. FDI inflows to ASEAN totaled roughly USD 75.7 billion in 2010, up from USD 37.8 billion in 2009. In 2010, the value surpassed the previous high, which was over USD75.6 billion, prior to the 2008 financial crisis. I Inflows of FDI into ASEAN increased by 19 percent on average during the last decade (2002-2010).

ASEAN Investment Report (2019) described, ASEAN’s FDI inflows are at all-time high in year 2018, marking the third year in a row that investment has increased (figure 1). From 2017 to 2018, FDI increased to \$155 billion from \$147 billion. The four Member States namely, Indonesia, Singapore, Cambodia, and Viet Nam set up new highs at that time. Similarly, in 2018, the global FDI inflows of the region's proportion increased to 11.5 percent. Taking into consideration the region's fast industrial advancements and improved investment and business environment, this trend is projected to continue.

Figure 1. FDI flows in ASEAN (2010-2018) (Billions of Dollars and Percent)



Source: ASEAN Secretariat, ASEAN FDI database.

Acemoglu (2012) explained that the organizations’ role in economic growth is a new topic of studies within the economic growth hypothesis. His concept is organizational work is more effective than the individual and the role of organizations is to facilitate the use of existing technology and coordinate the economic activities. ASEAN is an attractive institution among the other organizations. This study focuses the importance of organizations as well as the

complementarity of ideas in relation to standardization, which is viewed as both a barrier and a driver for economic growth.

This study examines the factors that influenced economic growth from 2002 to 2019, as well as the most recent economic growth patterns in ASEAN. This research makes an attempt to explain this by applying the appropriate econometric model and variables. The findings would provide policy suggestions for implementing appropriate policies with a beneficial impact on the growth of economy in the selected countries. Proper statistical methods and other research tools will be used to determine success factors and the relationship between constraints and success factors.

1.3. OBJECTIVES OF STUDY

The purpose of this study to observe the FDI effects on economic growth of ASEAN countries, as well as how FDI interacts with education, capital formation, and trade in ASEAN countries. For this aim, OLS regression was used, and this research finds that FDI, human capital, domestic investment, and trade affect the economic growth in ASEAN member countries. This research would suggest several policy recommendations that can be applied for the ASEAN countries.

The ASEAN countries were chosen because FDI into the region is expected to continue to rise, owing to dynamic development in industrialization (at the same time, the production links with and shifts in production from China creating the new growth opportunities for ASEAN), a better regional investment environment, and progress in regional integration. Multinational Enterprises (MNEs) from a variety of countries (including Japan, Australia, and some European Union countries, as well as the United States have indicated their desires to make and expand the investment activities in ASEAN in the future. This is extremely beneficial to ASEAN countries in terms of developing their own potential.

For a country, FDI is an essential source of capital or financing, especially for the poor nations. By transferring assets, improving management, and transferring technologies in order to boost a country's economy, FDI contributes significantly to development as well. On the other hand, an interesting phenomenon is arising in ASEAN countries where several major firms are relocating their core manufacturing operations among those countries.

1.4. RESEARCH QUESTIONS AND HYPOTHESIS

1.4.1. RESEARCH QUESTIONS

1. How does FDI effect on economic growth in ASEAN countries?
2. Does human capital have a positive impact on FDI which leads to economic growth in ASEAN countries?

1.4.2. HYPOTHESIS

According to the research objective and questions, the following hypothesizes are constructed for factors that affect the economic growth:

- i. FDI has a positive impact on economic growth in ASEAN countries.
- ii. Human capital has a positive impact on FDI on economic growth in ASEAN countries.

1.5. COMPOSITION OF STUDY

The first section will present the introduction and background of the study and the section two will describe the review of the literature. Then followed by the third section that the methodology and data will be described. Section four describes the statistical interpretation, results, and discussion. Section five will conclude policy recommendations and conclusion. And finally, references are provided in the last section.

CHAPTER TWO: LITERATURE REVIEW

Many researchers from all over the world have observed the relationship between FDI and economic growth. Researchers are looking at not only a single country, but also regions or continents, using a variety of methodologies to study the relationship between GDP and FDI. Most of the studies point out that FDI on economic growth has a significant positive effect. FDI has been expanding at a higher rate than global GDP, and it is now a significant part of total foreign investment as described by E. Borensztein, J. De Gregorio (1995).

Tiwari and Mutsacu (2011) used data from 1986 to 2008 of 23 Asian countries to undertake the empirical research in the context of a panel. In the analysis, a two-way impact is also included since the assumptions of random and fixed effects across countries and over time are quite feasible. Tiwari and Mutsacu examined in Asian countries' economic growth, nonlinearities linked with FDI and exports and found that FDI and exports enhance the economic growth of Asian countries and also labor and capital help in that process.

Agrawal and Khan (2011) examined experimentally the association between economic growth and FDI in selected Asian nations using a heterogonous panel from 1983 to 2008. Their empirical findings demonstrated a positive relationship between FDI and economic growth.

Elikplimi Komla Agbloyor et, al (2016) examined that after managing the institutional quality and financial market development, there is no significant evidence that FDI increases Sub-Saharan Africa's growth. Foreign capital inflows and trade liberalization are undeniably beneficial to economic growth, which varies according to trade and investment volumes. However, in the sub-Saharan Africa countries, the absence of investment in innovation, economic freedom, quality infrastructure, quality institutions, quality labor force, and human capital may obstruct the development and growth even when foreign capital inflows are at the stock up.

Alarcón Osuna (2016) found that general FDI and multinational firms were looking for low-cost labor and natural resources in the beginning is the key contributions. This clarifies why does FDI have a negative impact on economic growth. Alarcón Osuna (2016) explained again that FDI was a significant influence in regional development, employment, and economic expansion and there existed a nonlinear relationship between human capital formation and FDI, where postgraduate enrolment was found to be more important than tertiary enrollment.

Many studies have pointed out that FDI has positive impact and also significant on the host country's economic growth through increasing domestic investment and employment, transferring technology, and increasing inter-sectoral linkages. However, according to some other research, FDI may have a detrimental impact on economic growth. Tho Quynh Nguyena (2017) used the Threshold Auto Regressive (TAR) model to examine the statistical relevance of the threshold impact on the relationship between economic growth rate and FDI using panel data from year 2002 to year 2014 of eight ASEAN countries. The findings suggest that economic growth rate and FDI have a non-linear connection. Additionally, the findings suggest that depending on the level of FDI inflows, FDI can influence growth in a variety of ways.

Using panel data econometrics, Alvarado et al.(2017) observed the FDI effect on economic growth in 19 Latin American countries. In high-income nations, FDI has significantly and positively effects on products, whereas the effect is insignificant and uneven in upper-middle-income countries. In lower-middle-income countries, the effect is negative and statistically significant. Except in high-income countries, their findings demonstrated that FDI was not an effective approach for accelerating Latin America's economic growth.

Sokang (2018) assessed the impact of FDI on the Cambodian economy using the method of two-stage least squares. Sokang verified the FDI positive effect on Cambodia's economic growth using data from 2006 to 2016, and figured that FDI enhanced the economic growth of Cambodia through encouraging learning by doing and providing labor training and

through the transferring contemporary technology. Sokang suggested the Cambodia government to continue economic reforming in order to attract more FDI.

Having a favorable investment climate is one of the most critical factors in attracting FDI. The size of market, qualified production factors, a risk-free political environment, and logistic costs are comprised in appealing investment climate. Consequently, human capital contributes as an vital role of important, particularly in technology-based multinational corporations that generate added value in significant amounts, seeking skilled labor force in business administration, organizational skills, engineering, and technology, and is one of the most important factors of production in countries accompanied by successful FDI attraction experience as of the analysis of Nantharath and Kang (2019).

From 1993 to 2015, the effects of institutional quality, trade openness, human capital, and FDI on Lao PDR's economic growth were investigated by Nantharath and Kang (2019). The findings revealed that trade openness and FDI had a beneficial impact on economic growth of Lao PDR, but institutional quality and human capital had a negative impact.

Nguyen (2020) made a study on FDI and international trade effects on Vietnam's economic growth for the period of 2000 to 2018, by using the ordinary least-square method. In that paper, Vietnam's economic growth is related with international trade and FDI, although economic variables have diverse effects. The government of Vietnam has suggested five recommendations with the aim of enhancing FDI and international trade effects on economic growth by the author. These five recommendations are: to select foreign investors on the basis of efficiency, quality, environmental protection and high technology; to maintain preferential policies in order to attract FDI; to boost the value added to the exported goods and limit the imported goods type; to increase trade liberalization through trade agreements; and to keep pursuing an export-oriented policy.

It cannot deny that FDI made growth rate of GDP positively affected on average in the region. However, the FDI effect on economic growth may be different from country to country in the region. Therefore, the more interesting question is what makes the differences in the region. ASEAN countries, there have developing and developed countries and a lot of heterogeneity problems, and which factor is driving force of the FDI effect on ASEAN's economic growth. At the present time, trade and investment liberalization are emphasized for the economic growth. However, whether increasing trade and FDI through liberalization can bring the economic growth actually is questionable. In this concern, the research is developed to find the result of FDI effect on economic growth.

CHAPTER THREE: DATA AND METHODOLOGY

3.1. TYPES OF DATA AND VARIABLES

The data applied in this paper has been derived from the World Bank Indicators. The period used in this paper is limited to 18 years from (2002-2019). The data type is annually panel (longitudinal) and the investigation is done on the ASEAN countries. The variables described below are decided as main economic growth determinants of ASEAN countries.

This study would use a quantitative method to construct an empirical model. We applied the Ordinary Least Squares (OLS) method using the Stata 17 statistical software package for the estimation of our model.

The data from the world bank indicators are used to analyze in this study. Economic growth, or GDP growth rate (GDP) in yearly percent of ASEAN countries would be the dependent variable. Gross capital formation (K) (%of GDP), foreign direct investment (FDI) (%of GDP), imports and exports of goods and services (T) (%of GDP), and secondary school enrollment (HC) in % gross would be analyzed as the independent variables.

TABLE 1: LIST OF VARIABLES

Variable	Description	Predicted Effect
GDP	GDP growth (annual %)	Dependent Variable
FDI	Foreign direct investment (% of GDP)	Independent Variables (+)
HC	School enrollment, secondary (% gross)	Independent Variables (+)
K	Gross capital formation (% of GDP)	Independent Variables (+)
T	Imports and exports of goods and services (% of GDP)	Independent Variables (+)

3.1.1. Factors of Economic Growth

The most essential determinants of economic growth and their indexes have been selected based on prior studies as below.

3.1.1.1. Dependent Variable

a) GDP growth (annual %)

The Annual GDP percentage growth rate at market prices is calculated using a constant 2010 US dollars (constant local currency). GDP is computed by adding any product taxes to the total gross value added by all local producers in the economy and subtracting any subsidies that are not included in the products value. It is computed without taking into account natural resource degradation and depletion or depreciation of assets that have been manufactured. The GDP growth rate for each ASEAN country is defined as economic growth. The growth rate of GDP is calculated by multiplying the GDP difference between current year and previous year by a factor of a hundred.

For instance, the economic growth in 2010 can be shown by comparing the GDP growth rate in 2010 with the growth rate of GDP in 2009. As a result, if the GDP growth rate for 2010 is higher than the growth rate for 2009, it indicates that economic growth occurred in 2010, and vice versa. The GDP growth rate can be calculated as follows:

GDP growth rate = $[\text{GDP (2010)} - \text{GDP (2009)}] / \text{GDP (2009)}$ / Meanwhile, GDP is determined by independent variables such as secondary education, FDI, capital formation, and exports plus imports since they have the ability to effect the economic growth as of the research of Hussin and Saidin (2012).

3.1.1.2. Independent Variables

a) Secondary school enrollment (% gross)

The gross enrollment ratio is the proportion of overall enrollment to the population of the age group regardless of age that officially correlates to the educational level shown. By offering more subject- or skill-oriented instruction using more specialized teachers, secondary education so that it can provide a foundation for human development and lifelong learning. Moreover, the provision of fundamental education, which began in primary school are completed in secondary education.

b) Foreign direct investment (% of GDP)

Net cash inflows used to obtain a long-term managerial share (voting shares 10 percent or more) in a firm that performs in a country apart from the investors are referred to as Foreign Direct Investment (FDI). It is the summation of earnings reinvestment, equity capital, other short-term capital, and long-term capital as represented in the balance of payments. The ratio of net inflows (less disinvestment from new investment inflows) from foreign investors in the reporting country to GDP is shown here.

c) Gross capital formation (%of GDP)

Gross capital formation is the result of expenditures on accompaniments to the economy's fixed assets, as well as net changes in the inventories level. Land improvements (waterways, fences, drainage system, and so on); factory, equipment, and purchasing equipment; and the construction of railway lines, road, and other similar structures, such as industrial and commercial buildings, hospitals, private residential dwellings, schools, and

offices are all examples of fixed assets. Stocks of items retained by businesses to meet transitory or unforeseen swings in production or sales. The formation of capital is the net acquisitions of assets according to System of National Accounts 1993 (1993 SNA).

d) Imports of goods and services (%of GDP)

The total value of all kinds of goods and services obtained from the rest of the world is referred to as imports of products and services. Merchandise, freight, insurance, transportation, traveling, royalty, license, and other services such as government, personal, business, information, financial, construction, and communications services are all included. Employee compensation, transfer payments, and investment income (previously known as factor services) are not included.

e) Exports of goods and services (%of GDP)

The total value of all kinds of goods and services given to the rest of the world is referred to as exports of goods and services. Merchandise, freight, insurance, transportation, traveling, royalty, license, and other services such as government, personal, business, information, financial, construction, and communications services are all included. Employee compensation, investment income (previously known as factor services), and transfer payments are not included.

3.2. DESCRIPTIVE STATISTICS

To present a clear description of practical proof for this paper, the data comprised is clarified with the tables and graphs below;

Table 2. Descriptive Statistics

Variables 	Observations	Mean	Std. Dev	Min	Max
GDP	180	5.667	3.074	- 2.508	14.526
HC	125	75.278	21.852	22.927	120.651

FDI	180	5.529	6.048	- 1.321	32.170
K	171	25.998	6.025	10.437	41.066
T	177	127.471	94.091	.167	437.327

3.3. METHODOLOGY

The objective of this research is to learn more about how FDI affects economic growth with the human capital of the ASEAN countries. We start with a basic panel regression: Our growth equation is given by equation (1) below, the growth rate of GDP is the dependent variable and school enrollment (secondary), FDI, gross capital formation (formerly gross domestic investment), and trade are the other explanatory variables. In this study, ordinary methods have been used to show whether the chosen factors are significant or not for the economic growth of the chosen groups of countries. The model we estimate is:

$$GDP_{it} = \beta_0 + \beta_1(FDI_{it}) + \beta_2(HC_{it}) + \beta_3(K_{it}) + \beta_4(T_{it}) + \beta_5(FDI * H_{it}) + \beta_6(FDI * K_{it}) + \beta_7(FDI * T_{it}) + \alpha_i + e_{it} \quad (1)$$

$i=1, 2, \dots, 10, \quad t=1, 2, \dots, 18$

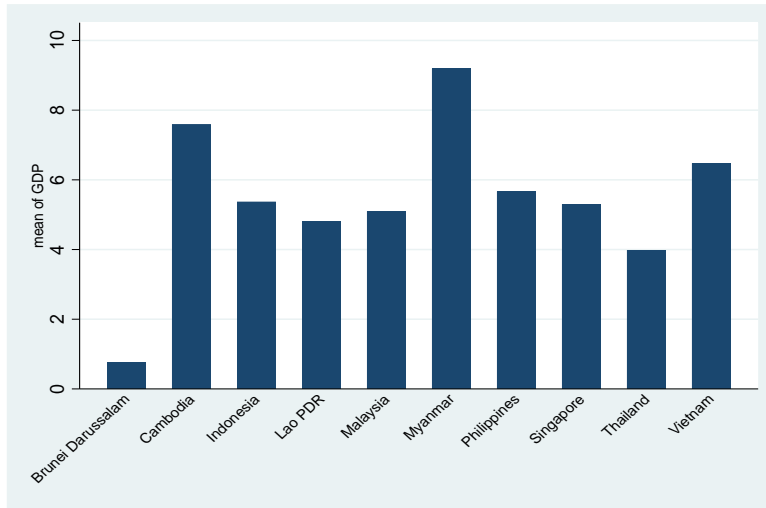
where GDP is GDP growth (annual %), FDI is the foreign direct investment (% of GDP), HC is School enrollment, secondary (% gross), K is Gross capital formation (% of GDP), T is imports and exports of goods and services (% of GDP), and α_i is the countries variables and e_{it} is the error term.

CHAPTER FOUR: EMPIRICAL RESULTS

4.1. ASEAN Countries and Their Mean Variables

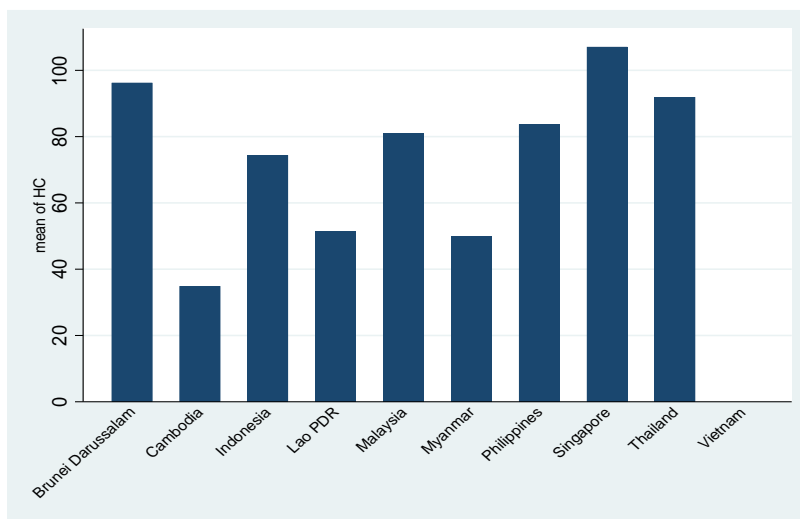
The annual average tables for the period of 2002-2019 were used to investigate the status of the selected countries in each variable. And it explained as following;

FIGURE (2) Average Annual GDP growth rate in ASEAN Countries (2002-2019)



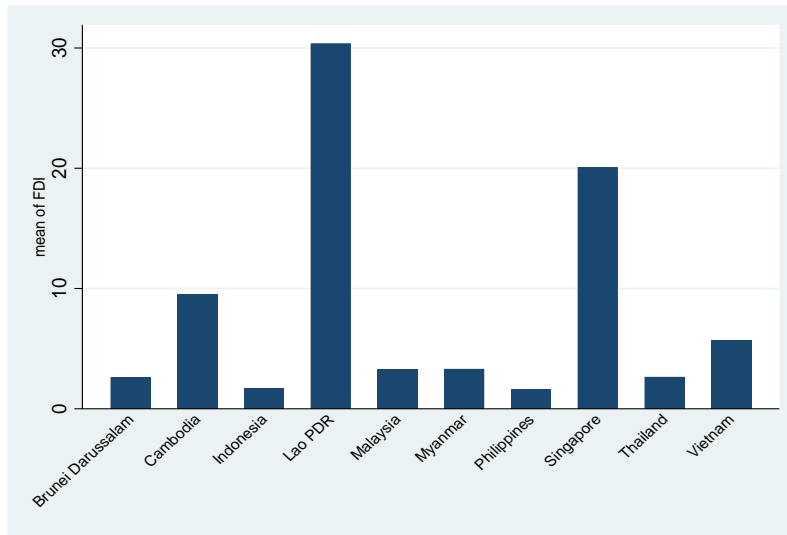
In figure 2, Myanmar which is regarded as one of the most developed countries stands first with an average GDP growth rate during the period (2002-2019). In terms of GDP growth rate, Cambodia is placed second among the ten countries, while GDP growth rate of Vietnam is ranked third over the last eighteen years.

Figure (3) School enrollment, secondary (% gross) in ASEAN Countries (2002-2019)



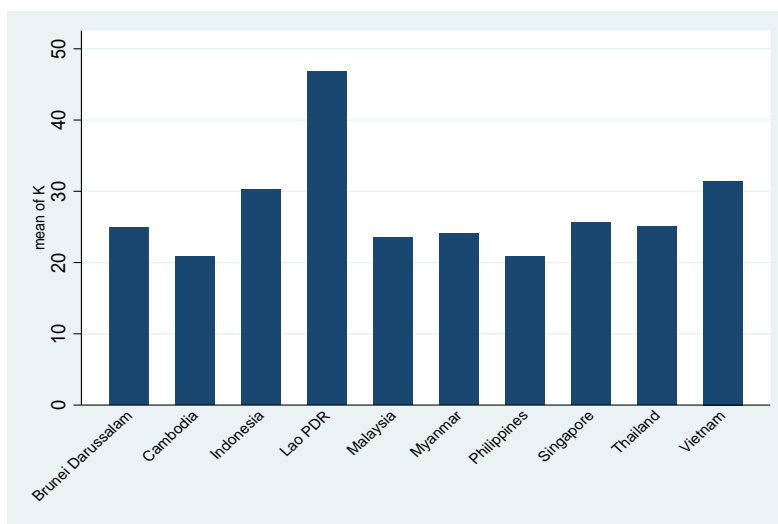
In figure 3, Singapore, which is considered one of the most developed countries in the world, comes in first place in secondary school enrollment during the period (2002-2019). Brunei is shown in the second rank in secondary school enrollment among the ten countries, whereas Thailand gets third place over eighteen years.

Figure (4) Foreign Direct Investment in ASEAN Countries (2002-2019)



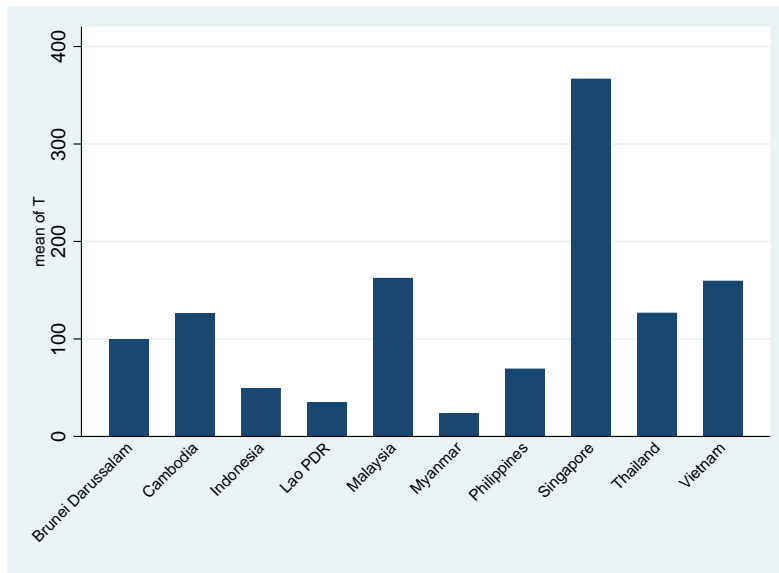
In figure 4, Laos, one of the least developing countries, stands first in terms of FDI during the period (2002-2019). Singapore is shown in the second rank in FDI among the ten countries, whereas Cambodia gets the third place over eighteen years.

Figure (5) Domestic Investment in ASEAN Countries (2002-2019)



In figure 5, with the concern of domestic investment in ASEAN countries, Laos, one of the least developing countries, stands first in terms of domestic investment during the period (2002-2019). Vietnam is shown in the second rank in domestic investment as one of the ten ASEAN countries, whilst Indonesia has been ranked third for the past eighteen years.

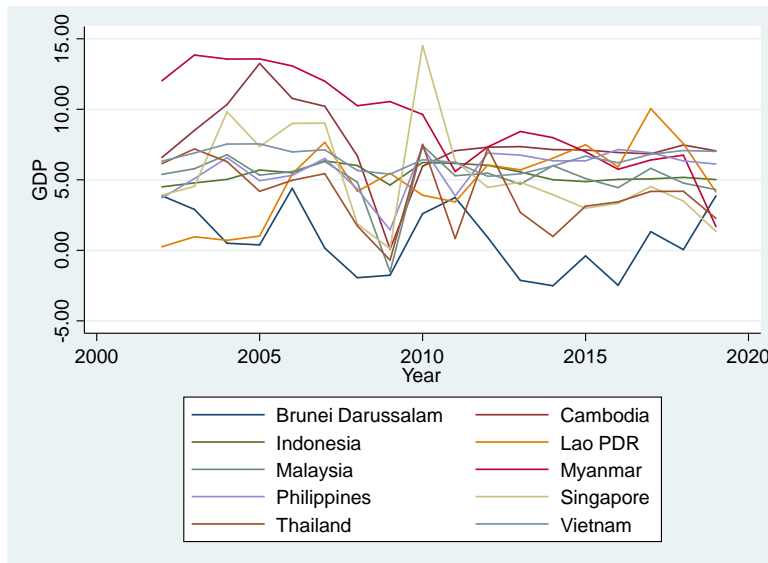
Figure (6) Trade in ASEAN Countries (2002-2019)



As seen in figure 6, Singapore, one of the most developed countries in ASEAN, stands first ranking in terms of trade value during the period (2002-2019). Vietnam is shown in the second rank in trade among the ten countries, whereas Malaysia gets the third place over eighteen years.

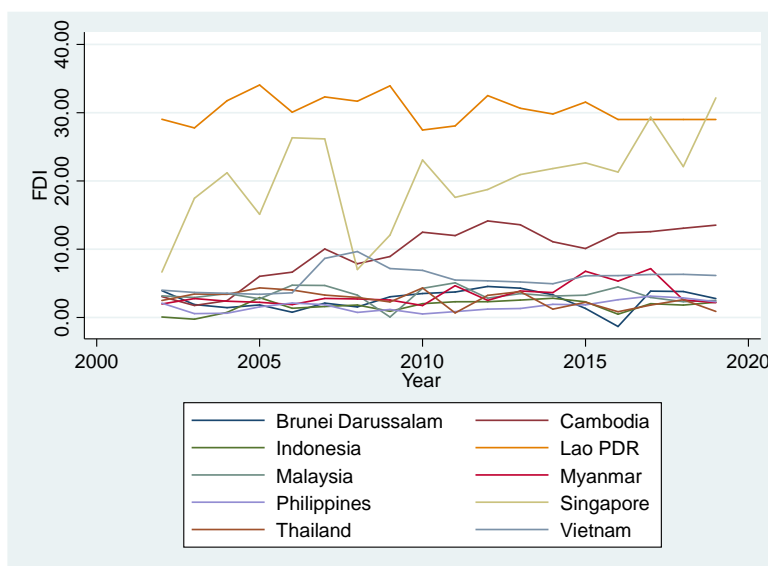
4.2. VARIABLE GRAPHS FOR ASEAN COUNTRIES

GRAPH (1) GDP growth rate in ASEAN countries



Several changes have happened in Singapore which is concerned with the GDP growth rate. In 2010, Singapore reached a remarkable GDP growth rate of nearly 15% and after 2010 gradually declined. Not only Singapore but also other countries are decreasing in GDP growth rate before 2010. Among ASEAN countries, only Brunei prospect to increase after 2019.

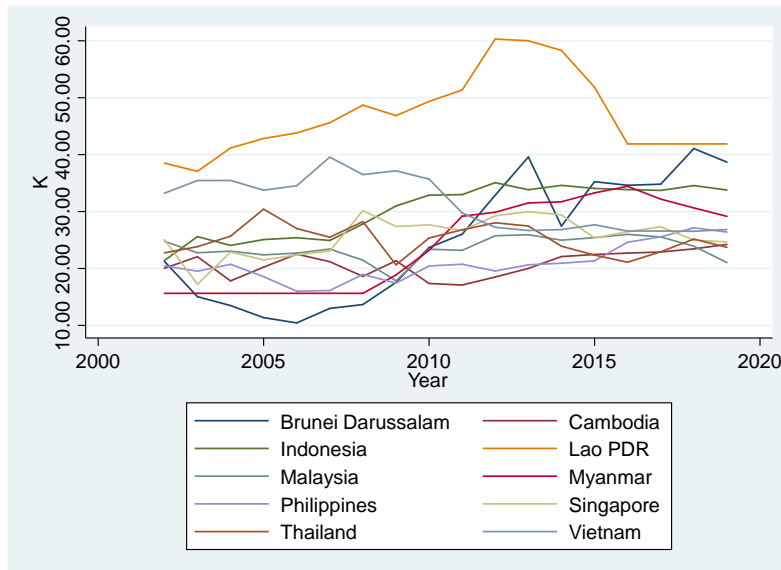
GRAPH (2) FDI in ASEAN countries



Although a lot of changes have occurred in Singapore in terms of FDI, it can be seen increasing until now. On the other hand, Cambodia is increasing gradually. In 2010, Myanmar

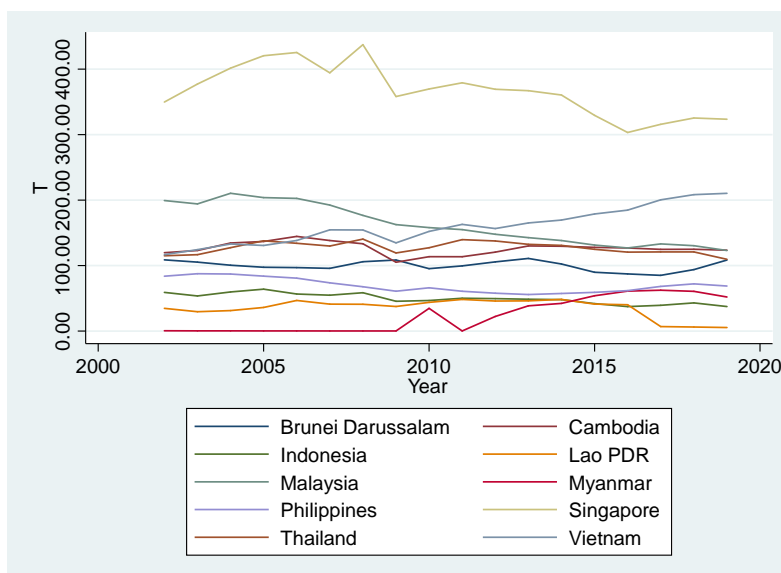
reached suddenly a high level of FDI because this time is the first civilian government in Myanmar and attracted FDI from other countries.

GRAPH (3) Domestic investment in ASEAN countries



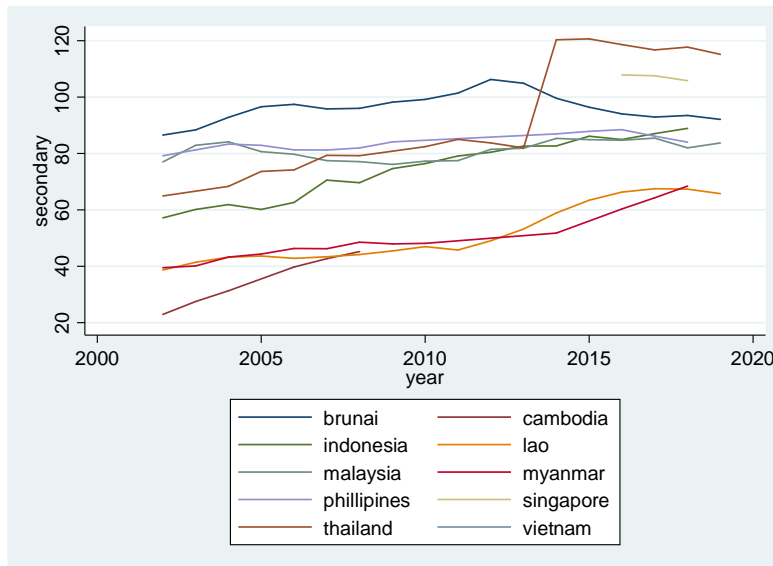
Regarding the domestic investment in ASEAN countries, each country's respective ratios have been progressively increasing and Laos possesses the highest rate. Every year of the domestic investment in other countries has also revealed an increased tendency. In the future, one of the key concerns in each country would be domestic investment.

GRAPH (4) Trade in ASEAN countries



When comparing ASEAN countries' trade, the apparent disparity between Singapore and its peers is evident. However, the author observed a gradual rise in trade in Vietnam from 2002 to 2019. Myanmar is viewed as the last position rate from 2002 to 2012 and after that gradually increase.

GRAPH (5) Secondary Education in ASEAN countries



When assessing the secondary education of ASEAN countries, all countries are gradually increasing and can be seen even though different education enrollment rate levels. Between 2010 and 2015, Thailand's education increases sharply.

4.3. EMPIRICAL RESULTS

The FDI impacts on economic growth in ASEAN countries are studied using the following method, which consists of six equations using GDP growth rate as a dependent variable and it will also analyze how FDI acts together with education, trade, and capital formation.

$$GDP_{it} = \beta_0 + \beta_1(HC_{it}) + \beta_2(FDI_{it}) + \beta_3(K_{it}) + B_4(T_{it}) + e_{it} \quad \text{---(2)}$$

$$GDP_{it} = \beta_0 + \beta_1(HC_{it}) + \beta_2(FDI_{it}) + \beta_3(K_{it}) + e_{it} \quad \text{-----(3)}$$

$$GDP_{it} = \beta_0 + \beta_1(HC_{it}) + \beta_2(FDI_{it}) + \beta_3(K_{it}) + B_4(T_{it}) + \beta_5(FDI * H_{it}) + e_{it} \quad \text{----(4)}$$

$$GDP_{it} = \beta_0 + \beta_1(HC_{it}) + \beta_2(FDI_{it}) + \beta_3(K_{it}) + B_4(T_{it}) + \beta_5(FDI * H_{it}) + \beta_5(FDI * K_{it}) + e_{it} \quad \text{----(5)}$$

$$GDP_{it} = \beta_0 + \beta_1(HC_{it}) + \beta_2(FDI_{it}) + \beta_3(K_{it}) + B_4(T_{it}) + \beta_5(FDI * H_{it}) + \beta_6(FDI * K_{it}) + \beta_7(FDI * T_{it}) + e_{it} \quad \text{----(6)}$$

$$GDP_{it} = \beta_0 + \beta_1(HC_{it}) + \beta_2(FDI_{it}) + \beta_3(K_{it}) + B_4(T_{it}) + \beta_5(FDI * H_{it}) + \beta_6(FDI * K_{it}) + \beta_7(FDI * T_{it}) + \alpha_i + e_{it} \quad \text{---(7)}$$

Table 3. Multicollinearity test

Variable	HC	FDI	K	T
Vif	1.13	2.17	1.12	2.40

Table 3 shows the result of the multi-collinearity issues in our model and we did not have any problems with our model.

Table 4. OLS estimation in ASEAN region

OLS Independent variable	GDP growth rate is Dependent variable				
	4-1	4-2	4-3	4-4	4-5
Intercept	12.698*** (1.227)	12.042*** (1.155)	11.028*** (1.501)	10.377*** (1.848)	10.402*** (1.847)
HC	-.088*** (.010)	-.093*** (.009)	-.070*** (.014)	-.069*** (.014)	-.081*** (.018)
FDI	.139*** (.061)	.071* (.042)	.595*** (.249)	.861* (.504)	.994** (.519)
K	-.024 (.033)	-.008 (.032)	-.027 (.034)	-.002 (.053)	.010 (.055)

T	- .008		- .008	- .008	- .006
	(.005)		(.005)	(.005)	(.006)
FDI*HC			-.005**	-.005**	.0005
			(.002)	(.002)	(.005)
FDI*K				-.010	-.020
				(.016)	(.019)
FDI*T					- .001
					(.001)
R ²	0.476	0.465	0.493	0.494	0.500
Sample size	116	116	116	116	116

*, **, *** show significance level at 10%, 5%, and 1%.

Table 4 exposes various intriguing findings about the FDI effect on economic growth. The FDI coefficient has positive efficient and also significant as of Regression 4-1 and regression 4-2 indicated. Although the coefficient of trade, domestic investment, and human capital doesn't have positive impacts, FDI has a positive and statistically significant impact on the ASEAN region's economic growth. This description follows our hypothesis; FDI has a positive impact on economic growth in ASEAN countries.

The regression's overall performance improves after taking into account the relationship between FDI and human capital. The specification in regression 4-3 explains the FDI variable is highly statistically significant and FDI has positive coefficient although the interaction between FDI and human capital doesn't have positive relationship. While this description follows closely developed in our hypothesis, Other important factors may influence the interaction term's significance.

As a result, this study will look at FDI and human capital measurement - secondary school attainment. We can see if these variables have an effect on growth on their own or

through the interaction term in this method. In regression 4-4, such a specification is used, indicating that the interaction term is negative and statistically significant although the FDI coefficient is positive and statistically significant.

We also observed trade and FDI relationship in regression 4-5, it doesn't have positive effect of interaction term while FDI have highly significant and positively effect to economic growth. However, this type has also had a beneficial and considerable impact on the FDI inflow nature as described in this sample.

Table 5. OLS estimation in ASEAN by countries

OLS Independent variable	GDP growth rate is Dependent variable				
	5-1	5-2	5-3	5-4	5-5
Intercept	2.410 (4.105)	.642 (2.903)	7.314*** (2.218)	6.949*** (2.482)	6.241*** (2.466)
HC	-.031** (.016)	-.030** (.016)	-.028* (.017)	-.028* (.017)	-.042*** (.018)
FDI	.258*** (.097)	.242*** (.093)	.401 (.293)	.532 (.490)	.872* (.509)
K	-.026 (.032)	-.026 (.032)	-.025 (.032)	-.013 (.048)	.005 (.048)
T	-.007 (.011)		-.007 (.011)	-.007 (.011)	.001 (.011)
FDI*HC			-.002 (.004)	-.002 (.004)	.005 (.005)
FDI*K				-.005 (.015)	-.021 (.017)

FDI*T					-.003***
					(.001)
Brunei	1.930	2.976	-3.061***	-3.036***	-3.090***
	(2.948)	(2.392)	(.656)	(.663)	(.653)
Cambodia	7.537***	8.481***	2.239*	2.157	2.318*
	(2.880)	(2.423)	(1.399)	(1.427)	(1.406)
Indonesia	5.954**	7.327***	.872	.892	1.280
	(3.399)	(2.543)	(1.084)	(1.091)	(1.089)
Lao	6.727***	7.968***	1.521	1.584	1.870
	(3.178)	(2.437)	(1.217)	(1.236)	(1.224)
Malaysia	6.000***	6.665***	1.013	.987	.773
	(2.580)	(2.333)	(.705)	(.712)	(.708)
Myanmar	7.479***	8.991***	2.312	2.382*	2.471*
	(3.493)	(2.459)	(1.474)	(1.496)	(1.472)
Philippines	6.235**	7.463***	1.184	1.221	1.404*
	(3.172)	(2.447)	(.874)	(.884)	(.874)
Singapore	0	0	-3.366	-3.539	-.175
			(4.237)	(4.287)	(4.516)
Thailand	5.019**	5.890***	0	0	0
	(2.791)	(2.393)			
Vietnam	0	0	0	0	0
R ²	.681	.680	.682	.682	.695
Sample size	116	116	116	116	116

*, **, *** show significance level at 10%, 5%, and 1%.

In Table 5, additional variables for other factors impacting economic growth are included in regressions 5-1 to 5-5. Regression 5-1 to 5-5 contains ASEAN countries variables and outcomes of FDI coefficient is still positive and highly significant result similar with table 4. Moreover, the variables of ASEAN countries except Brunei and Singapore are positive relationship on the economic growth added to the basic regressions excluding trade in regression 5-4.

The goal of our experimental study is to evaluate the FDI effects on economic growth and to look into the channels via which FDI can help the economic growth. As stated in the hypothesis, we are interested in seeing how FDI interacts with human capital effect to the economic growth rates. Whether FDI has an impact on the total amount of investment and efficiency of FDI for a country is also sought in this research.

The overall impact of FDI on economic growth is positive as of the primary regression results. However, the amount of this benefit is unaffected by the host economy's human capital supply. Because of the nature of FDI interaction with human capital, direct effect of FDI in some ASEAN countries is still beneficial for low of human capital levels countries.

Overall, the regressions in Tables 4 and 5 reveal that FDI has large complementing impacts on growth rates of GDP. This outcome is in line with the idea that FDI can boost the host economy's growth rate. In addition, R-squared value is quite reasonable in Table 5 with compared in Table 4.

CHAPTER FIVE: CONCLUSIONS AND POLICY RECOMMENDATIONS

The primary outcomes are strongly influenced by the inclusion of these other growth determinants. According to these all research, the FDI has the potential to boost the host country's GDP growth rate. The FDI coefficient is positive and statistically significant for economic growth. However, the interaction term between human capital and FDI is not positive.

The interaction term, when it comes to domestic investment, is a result of technological nature differences between domestic investment and FDI. In other words, FDI complements domestic investment. Furthermore, the interaction term of trade and FDI is inversely proportional to the economic growth.

The goal of this research is to see how FDI affects economic growth in developing countries and to analyze how FDI acts together with education, trade, and capital formation for ASEAN countries for the 2002 – 2019 period. Empirical results recommend that FDI growth positively affects the economic growth rate, and This research can shed light on each country's economic situation and performance within the ASEAN region with the capital formation, trade, and human capital condition. As a result, it is critical to figure out what elements have the most impact on their economic growth.

Although FDI has positive effect on ASEAN economic growth, human capital, domestic investment, and trade don't have a positive effect in ASEAN countries. The most interesting result is that, regardless of the models, the coefficient of the interaction term between human capital and FDI is negative although its effect on FDI coefficient is positive. This explains some of the ASEAN member countries' education quality doesn't not guarantee to attract the FDI. In some ASEAN countries, the investors (home countries) make their investment because of natural resources or because of market-seeking reasoning of FDI. They are seeking the natural resources and cheap labor force, rather than the efficiency-seeking logic which is considering knowledge in required technological infrastructure provided by human

capital and highly skilled workforce. This result spillover to the region. H. Van Nguyen et al. (2020) found that negative correlation between FDI and secondary education enrollment. This is the outcome of FDI in these ASEAN countries weighing on exploitation of natural resources, rather than a local labor force, according to this study.

The aforesaid findings can be drawn to a conclusion that the greater the improvement in FDI, the higher the economic growth will be. ASEAN should keep its momentum on FDI promotion. The quantity to quality should be emphasized in education sector for ASEAN. ASEAN should make more investment in education sector to enhance the quality so that it can attract the FDI with human capital rather than the natural resource and cheap labor force. Moreover, ASEAN countries should implement import substitution plan and then enhance to export promotion. This finding has important policy suggestions for the government's consideration in order to boost the economic growth. Additionally, the results of this study are beneficial to policymakers in drafting the appropriate government policies to boost the country's economic growth rate.

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APPENDICES

STATA Output for Table

. regress GDP H FDI K T

Source	SS	df	MS	Number of obs	=	116
Model	452.524452	4	113.131113	F(4, 111)	=	25.23
Residual	497.625645	111	4.48311392	Prob > F	=	0.0000
				R-squared	=	0.4763
				Adj R-squared	=	0.4574
Total	950.150097	115	8.26217475	Root MSE	=	2.1173

GDP	Coefficient	Std. err.	t	P> t	[95% conf. interval]	
H	-.0880621	.0098314	-8.96	0.000	-.1075437	-.0685806
FDI	.1385599	.0613219	2.26	0.026	.0170463	.2600734
K	-.0244142	.0338642	-0.72	0.472	-.0915184	.04269
T	-.0080034	.0052664	-1.52	0.131	-.0184391	.0024323
_cons	12.69788	1.226552	10.35	0.000	10.26739	15.12838

. regress GDP H FDI K T

Source	SS	df	MS	Number of obs	=	116
				F(4, 111)	=	25.23
Model	452.524452	4	113.131113	Prob > F	=	0.0000
Residual	497.625645	111	4.48311392	R-squared	=	0.4763
				Adj R-squared	=	0.4574
Total	950.150097	115	8.26217475	Root MSE	=	2.1173

GDP	Coefficient	Std. err.	t	P> t	[95% conf. interval]
H	-.0880621	.0098314	-8.96	0.000	-.1075437 -.0685806
FDI	.1385599	.0613219	2.26	0.026	.0170463 .2600734
K	-.0244142	.0338642	-0.72	0.472	-.0915184 .04269
T	-.0080034	.0052664	-1.52	0.131	-.0184391 .0024323
_cons	12.69788	1.226552	10.35	0.000	10.26739 15.12838

. regress GDP H FDI K

Source	SS	df	MS	Number of obs	=	116
				F(3, 112)	=	32.50
Model	442.17049	3	147.390163	Prob > F	=	0.0000
Residual	507.979606	112	4.5355322	R-squared	=	0.4654
				Adj R-squared	=	0.4510
Total	950.150097	115	8.26217475	Root MSE	=	2.1297

GDP	Coefficient	Std. err.	t	P> t	[95% conf. interval]
H	-.0926468	.0094116	-9.84	0.000	-.1112948 -.0739988
FDI	.070939	.0424422	1.67	0.097	-.0131548 .1550329
K	-.0083919	.0323688	-0.26	0.796	-.0725265 .0557428
_cons	12.04225	1.15487	10.43	0.000	9.754028 14.33048

. regress GDP H FDI K T c.FDI#c.H

Source	SS	df	MS	Number of obs	=	116
Model	468.169905	5	93.633981	F(5, 110)	=	21.37
Residual	481.980192	110	4.38163811	Prob > F	=	0.0000
				R-squared	=	0.4927
				Adj R-squared	=	0.4697
Total	950.150097	115	8.26217475	Root MSE	=	2.0932

GDP	Coefficient	Std. err.	t	P> t	[95% conf. interval]	
H	-.0700545	.0136119	-5.15	0.000	-.0970301	-.0430789
FDI	.5952843	.249188	2.39	0.019	.1014523	1.089116
K	-.0272998	.0335136	-0.81	0.417	-.0937158	.0391163
T	-.007638	.00521	-1.47	0.145	-.017963	.002687
c.FDI#c.H	-.0046164	.002443	-1.89	0.061	-.0094579	.0002251
_cons	11.02751	1.500593	7.35	0.000	8.053685	14.00133

. regress GDP H FDI K T c.FDI#c.H c.FDI#c.K

Source	SS	df	MS	Number of obs	=	116
Model	469.793252	6	78.2988754	F(6, 109)	=	17.77
Residual	480.356844	109	4.40694352	Prob > F	=	0.0000
				R-squared	=	0.4944
				Adj R-squared	=	0.4666
Total	950.150097	115	8.26217475	Root MSE	=	2.0993

GDP	Coefficient	Std. err.	t	P> t	[95% conf. interval]	
H	-.0692731	.0137117	-5.05	0.000	-.0964493	-.0420969
FDI	.8611395	.5043086	1.71	0.091	-.1383839	1.860663
K	-.0020845	.0534388	-0.04	0.969	-.1079983	.1038294
T	-.0081756	.0052996	-1.54	0.126	-.0186792	.002328
c.FDI#c.H	-.0046665	.0024515	-1.90	0.060	-.0095252	.0001923
c.FDI#c.K	-.0099327	.0163655	-0.61	0.545	-.0423686	.0225032
_cons	10.37677	1.847803	5.62	0.000	6.714483	14.03905

. regress GDP H FDI K T c.FDI#c.H c.FDI#c.K c.FDI#c.T

Source	SS	df	MS	Number of obs	=	116
				F(7, 108)	=	15.41
Model	474.759667	7	67.8228096	Prob > F	=	0.0000
Residual	475.390429	108	4.40176323	R-squared	=	0.4997
				Adj R-squared	=	0.4672
Total	950.150097	115	8.26217475	Root MSE	=	2.098

GDP	Coefficient	Std. err.	t	P> t	[95% conf. interval]	
H	-.0808674	.0175195	-4.62	0.000	-.1155942	-.0461406
FDI	.9944809	.51941	1.91	0.058	-.0350798	2.024042
K	.0096395	.0545359	0.18	0.860	-.0984602	.1177391
T	-.0055968	.0058264	-0.96	0.339	-.0171456	.0059521
c.FDI#c.H	.0004935	.0054406	0.09	0.928	-.0102908	.0112777
c.FDI#c.K	-.0195526	.0186959	-1.05	0.298	-.056611	.0175059
c.FDI#c.T	-.0013705	.0012902	-1.06	0.291	-.0039279	.001187
_cons	10.40167	1.846865	5.63	0.000	6.740866	14.06248

```
. regress GDP H FDI K T Brunei Cambodia Indonesia Lao Malaysia Myanmar Philippines Singapore
> Thailand Vietnam
note: Singapore omitted because of collinearity.
note: Vietnam omitted because of collinearity.
```

Source	SS	df	MS	Number of obs	=	116
Model	647.021916	12	53.918493	F(12, 103)	=	18.32
Residual	303.128181	103	2.94299205	Prob > F	=	0.0000
				R-squared	=	0.6810
				Adj R-squared	=	0.6438
Total	950.150097	115	8.26217475	Root MSE	=	1.7155

GDP	Coefficient	Std. err.	t	P> t	[95% conf. interval]
H	-.0306274	.0164966	-1.86	0.066	-.0633444 .0020896
FDI	.2580471	.0973571	2.65	0.009	.0649622 .451132
K	-.0262054	.0320789	-0.82	0.416	-.0898264 .0374156
T	-.00652	.0106701	-0.61	0.543	-.0276817 .0146417
Brunei	1.930048	2.94759	0.65	0.514	-3.9158 7.775897
Cambodia	7.536667	2.879832	2.62	0.010	1.825199 13.24814
Indonesia	5.95416	3.39888	1.75	0.083	-.786717 12.69504
Lao	6.726862	3.178334	2.12	0.037	.4233859 13.03034
Malaysia	6.000456	2.580201	2.33	0.022	.8832346 11.11768
Myanmar	7.478973	3.493829	2.14	0.035	.5497868 14.40816
Philippines	6.234967	3.172128	1.97	0.052	-.0562012 12.52614
Singapore	0 (omitted)				
Thailand	5.019054	2.791246	1.80	0.075	-.516724 10.55483
Vietnam	0 (omitted)				
_cons	2.409712	4.10465	0.59	0.558	-5.730894 10.55032

```
. regress GDP H FDI K Brunei Cambodia Indonesia Lao Malaysia Myanmar Philippines Singapore
> hailand Vietnam
note: Singapore omitted because of collinearity.
note: Vietnam omitted because of collinearity.
```

Source	SS	df	MS	Number of obs	=	116
Model	645.923036	11	58.720276	F(11, 104)	=	20.07
Residual	304.227061	104	2.9252602	Prob > F	=	0.0000
				R-squared	=	0.6798
				Adj R-squared	=	0.6459
Total	950.150097	115	8.26217475	Root MSE	=	1.7103

GDP	Coefficient	Std. err.	t	P> t	[95% conf. interval]
H	-.0296115	.016363	-1.81	0.073	-.06206 .0028371
FDI	.2419758	.0934544	2.59	0.011	.0566522 .4272994
K	-.0256394	.0319688	-0.80	0.424	-.0890348 .037756
Brunei	2.976226	2.392148	1.24	0.216	-1.767493 7.719944
Cambodia	8.480608	2.423123	3.50	0.001	3.675464 13.28575
Indonesia	7.327077	2.542657	2.88	0.005	2.284893 12.36926
Lao	7.968028	2.437231	3.27	0.001	3.134908 12.80115
Malaysia	6.664904	2.332823	2.86	0.005	2.038829 11.29098
Myanmar	8.990853	2.459363	3.66	0.000	4.113843 13.86786
Philippines	7.46289	2.447032	3.05	0.003	2.610334 12.31545
Singapore	0 (omitted)				
Thailand	5.889549	2.393099	2.46	0.015	1.143944 10.63515
Vietnam	0 (omitted)				
_cons	.6417697	2.902779	0.22	0.825	-5.114551 6.39809

```
. regress GDP H FDI K T c.FDI#c.H Brunei Cambodia Indonesia Lao Malaysia Myanmar Philippin
> Singapore Thailand Vietnam
note: Thailand omitted because of collinearity.
note: Vietnam omitted because of collinearity.
```

Source	SS	df	MS	Number of obs	=	116
Model	647.823334	13	49.8325642	F(13, 102)	=	16.81
Residual	302.326762	102	2.96398786	Prob > F	=	0.0000
				R-squared	=	0.6818
				Adj R-squared	=	0.6413
Total	950.150097	115	8.26217475	Root MSE	=	1.7216

GDP	Coefficient	Std. err.	t	P> t	[95% conf. interval]	
H	-.0283197	.0171398	-1.65	0.102	-.0623165	.005677
FDI	.4014546	.2925864	1.37	0.173	-.1788891	.9817982
K	-.0247232	.0323191	-0.76	0.446	-.088828	.0393817
T	-.0071036	.0107668	-0.66	0.511	-.0284595	.0142523
c.FDI#c.H	-.0019347	.0037207	-0.52	0.604	-.0093147	.0054453
Brunei	-3.060881	.6559921	-4.67	0.000	-4.362039	-1.759724
Cambodia	2.238885	1.399235	1.60	0.113	-.5364913	5.014261
Indonesia	.8724389	1.084495	0.80	0.423	-1.278652	3.02353
Lao	1.521315	1.216514	1.25	0.214	-.8916338	3.934265
Malaysia	1.013032	.7050036	1.44	0.154	-.3853394	2.411403
Myanmar	2.311581	1.4743	1.57	0.120	-.6126854	5.235848
Philippines	1.184389	.8735335	1.36	0.178	-.5482604	2.917039
Singapore	-3.366015	4.237065	-0.79	0.429	-11.77021	5.038182
Thailand	0	(omitted)				
Vietnam	0	(omitted)				
_cons	7.314363	2.218302	3.30	0.001	2.914371	11.71435

```
. regress GDP H FDI K T c.FDI#c.H c.FDI#c.K Brunei Cambodia Indonesia Lao Malaysia Myanmar
> hilippines Singapore Thailand Vietnam
note: Thailand omitted because of collinearity.
note: Vietnam omitted because of collinearity.
```

Source	SS	df	MS	Number of obs	=	116
Model	648.156058	14	46.2968613	F(14, 101)	=	15.48
Residual	301.994039	101	2.99003999	Prob > F	=	0.0000
				R-squared	=	0.6822
				Adj R-squared	=	0.6381
Total	950.150097	115	8.26217475	Root MSE	=	1.7292

GDP	Coefficient	Std. err.	t	P> t	[95% conf. interval]	
H	-.0281883	.0172195	-1.64	0.105	-.0623472	.0059705
FDI	.5322212	.4899271	1.09	0.280	-.4396624	1.504105
K	-.012798	.0482875	-0.27	0.792	-.1085874	.0829914
T	-.0067603	.0108628	-0.62	0.535	-.0283093	.0147886
c.FDI#c.H	-.0019076	.0037379	-0.51	0.611	-.0093227	.0055074
c.FDI#c.K	-.0050142	.0150312	-0.33	0.739	-.0348321	.0248038
Brunei	-3.036076	.6630516	-4.58	0.000	-4.351392	-1.72076
Cambodia	2.157053	1.42662	1.51	0.134	-.6729774	4.987084
Indonesia	.8919848	1.090826	0.82	0.415	-1.27192	3.055889
Lao	1.584243	1.236325	1.28	0.203	-.8682929	4.036779
Malaysia	.9869767	.7123901	1.39	0.169	-.4262135	2.400167
Myanmar	2.381855	1.495675	1.59	0.114	-.5851619	5.348871
Philippines	1.220954	.8841848	1.38	0.170	-.5330307	2.974939
Singapore	-3.539049	4.287141	-0.83	0.411	-12.04358	4.965485
Thailand	0	(omitted)				
Vietnam	0	(omitted)				
_cons	6.949453	2.482087	2.80	0.006	2.025661	11.87325

```

. regress GDP H FDI K T c.FDI#c.H c.FDI#c.K c.FDI#c.T Brunei Cambodia Indonesia Lao Malays:
> Myanmar Philippines Singapore Thailand Vietnam
note: Thailand omitted because of collinearity.
note: Vietnam omitted because of collinearity.

```

Source	SS	df	MS	Number of obs	=	116
				F(15, 100)	=	15.22
Model	660.728219	15	44.0485479	Prob > F	=	0.0000
Residual	289.421878	100	2.89421878	R-squared	=	0.6954
				Adj R-squared	=	0.6497
Total	950.150097	115	8.26217475	Root MSE	=	1.7012

GDP	Coefficient	Std. err.	t	P> t	[95% conf. interval]	
H	-.0418658	.0181679	-2.30	0.023	-.0779105	-.0058211
FDI	.8723053	.5088828	1.71	0.090	-.1373036	1.881914
K	.0048728	.0482581	0.10	0.920	-.0908699	.1006155
T	.001204	.011135	0.11	0.916	-.021314	.0237221
c.FDI#c.H	.0052643	.0050364	1.05	0.298	-.0047278	.0152564
c.FDI#c.K	-.0213685	.0167413	-1.28	0.205	-.0545827	.0118457
c.FDI#c.T	-.0026441	.0012687	-2.08	0.040	-.0051611	-.0001272
Brunei	-3.090081	.6528551	-4.73	0.000	-4.385327	-1.794835
Cambodia	2.31764	1.405688	1.65	0.102	-.4712049	5.106485
Indonesia	1.28005	1.089236	1.18	0.243	-.8809643	3.441064
Lao	1.869625	1.224036	1.53	0.130	-.5588279	4.298078
Malaysia	.77305	.7083581	1.09	0.278	-.6323124	2.178412
Myanmar	2.471426	1.472141	1.68	0.096	-.4492608	5.392112
Philippines	1.403768	.8743129	1.61	0.112	-.3308434	3.13838
Singapore	-.1745748	4.516244	-0.04	0.969	-9.134674	8.785525
Thailand	0	(omitted)				
Vietnam	0	(omitted)				
_cons	6.241002	2.465536	2.53	0.013	1.349449	11.13255