

**YANGON UNIVERSITY OF ECONOMICS
DEPARTMENT OF STATISTICS**

**A STUDY ON THE EFFECTS OF SOME ECONOMIC
FACTORS ON FOREIGN DIRECT INVESTMENT INFLOWS OF
ASEAN COUNTRIES**

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M.Econ (Statistics)
Roll No. 2**

MAY, 2018

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ABSTRACT

Foreign Direct Investment (FDI) is seen widely as a vital source of investment, technology transfer and growth. The factors that attract FDI have been a longstanding source of debate. The objective of this paper is to find the effects of some economic factors such as GDP growth rate, unemployment rate and net trade on FDI inflows. The data is a panel data which consist of ten ASEAN countries for the period 2001-2016. The two panel data regression models (fixed effect model and random effect model) are applied to examine the effects of some economic factors on FDI inflows. GDP growth rate and net trade have the positive effects on FDI inflows. But unemployment rate has a negative effect on FDI inflows. Then Hausman test is used to evaluate the more appropriate model for this study. According to the results of Hausman test, fixed effect model is more appropriate than random effect model. None the less the effects of GDP growth rate, unemployment rate and net trade on FDI inflows are the same in both models.

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LIST OF ABBREVIATIONS

ASEAN	=	Association of Southeast Asian Nation
ECM	=	Error Component Model
FDI	=	Foreign Direct Investment Inflows
FEM	=	Fixed Effect Model
GDP	=	Gross Domestic Product (GDP) Growth Rate
GLS	=	Generalized Least Square Method
IVs	=	Independent Variables
LSDV	=	Least Square Dummy Variable Model
OLS	=	Ordinary Least Square
RGC	=	Royal Government of Cambodia
UNCTAD	=	United Nations Conference on Trade and Development Division on Investment and Enterprise
UR	=	Unemployment Rate

CHAPTER I

INTRODUCTION

1.1 Rationale of the Study

Foreign Direct Investment (FDI) is a conventional measure to assess the level of direct investments in a country by foreign investors and is also used to measure the attractiveness of a country's economy for potential investors. The higher is the FDI index for a certain country the more attractive this country is for foreign investments. FDI is an investment made by a resident of one economy in another economy, and it is of a long-term nature. The UNCTAD Manual includes in the FDI index the investments into industries, companies, and businesses which would generate profit in the long-term. Foreign investments can be realized either by buying a company in the target country or by expending operations of an existing business in that country.

The advantage of FDI for the receiver country is the following: when resources and domestic investments are limited, the economies develop faster by attracting foreign direct investments. Thus, there is a direct positive association between FDI and economic growth (Lipsey's, 2002). At the same time, advantages for foreign investors are: can available new market, new resources, new knowledge (Nachum and Zaheer, 2005). However, FDI inflow depends on a number of factors in a host country, such as economic growth, labor migration, size of the market, growth of population, gross domestic product (GDP) level, balance of trade, interest rate, exchange rate, national debt, consumer spending, inflation level and unemployment.

There are several factors that affect the decisions of investing in a country and every industry or actually every single investment may consider different factors. Nonetheless there are several factors that in general effect all companies that want to invest in a country. There are the ones which are going to analyze, the economic factors that affect FDI.

GDP measures the total production of a country in one year. As this is equivalent to the size of the market, which means that the larger the size of the market, the larger the size of FDI. GDP should have a positive relation with FDI. This is fairly direct reasoning, with a higher market there are higher incentives for foreign companies to try to conquer the local market. It is also true for companies who buy other companies, with higher GDP there must be more companies and so more options of companies to buy.

Unemployment rate refers to the amount of labor force that does not work but is seeking for employment. Unemployment can be a positive index for FDI but it's not always true (Habib & Zurawachi, 2002). Definition of labor force and unemployment differ by country.¹

Net trade (term of trade) in goods and services is derived by offsetting imports of goods and services. Exports and imports of goods and services comprise all transactions involving a change of ownership of goods and services between residents of one country and the rest of the world. The relationship between trade and FDI have been examined in numerous studies. There is a positive relationship between trade and FDI.²

FDI is an indicator which indicates the economic situation of a country. To assess the economic situation of ASEAN countries, FDI inflows of those countries are needed to study. The FDI of a country depend on the some economic factors such as GDP growth rate, unemployment rate and net trade and so on. Therefore, in this study, the effects of GDP growth rate, unemployment rate and net trade on FDI are analyzed.

1.2 Objectives of the Study

The objectives of the study are:

- (i) To analyze FDI inflows and some economic factors of ASEAN countries
- (ii) To examine the effects of some economic factors (GDP growth rate, unemployment rate, net trade) on FDI inflows of ASEAN countries.
- (iii) To choose the appropriate model of FDI inflows and some economic factors for ASEAN countries.

1.3 Scope and Limitations of the Study

The study area focuses on ASEAN member countries, namely Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand and Vietnam. The main sources of data are World Development Indicators, World Data Bank and study period is from year 2001 to year 2016.

¹ Ohlsson, Morcos Hilding (2007). "Impact of Corruption on FDI."

² Gang Liu, Li (1998). "The Relationship between Trade and Foreign Investment."

1.4 Method of Study

Descriptive statistics were used to analyze FDI inflows and some economic factors of ASEAN countries. Panel data analysis methods (Fixed Effect Model, Random Effect Model) were applied to examine the effects of some economic factors on FDI inflows. Hausman test will be used to choose the appropriate model of FDI inflows and some economic factors.

1.5 Organization of the Study

This study composes of five chapters. Chapter I: introduction concerns with rationale of the study, objectives of the study, scope and limitations of the study, method of study, and organization of the study. Overview of FDI inflows and some economic factors of ASEAN countries are presented in Chapter II. Theoretical background of panel data analysis models have been described in chapter III. The effects of some economic factors on FDI inflows have been examined in Chapter IV. The conclusion is expressed in Chapter V.

CHAPTER II
OVERVIEWS OF FDI INFLOWS AND
SOME ECONOMIC FACTORS IN ASEAN COUNTRIES

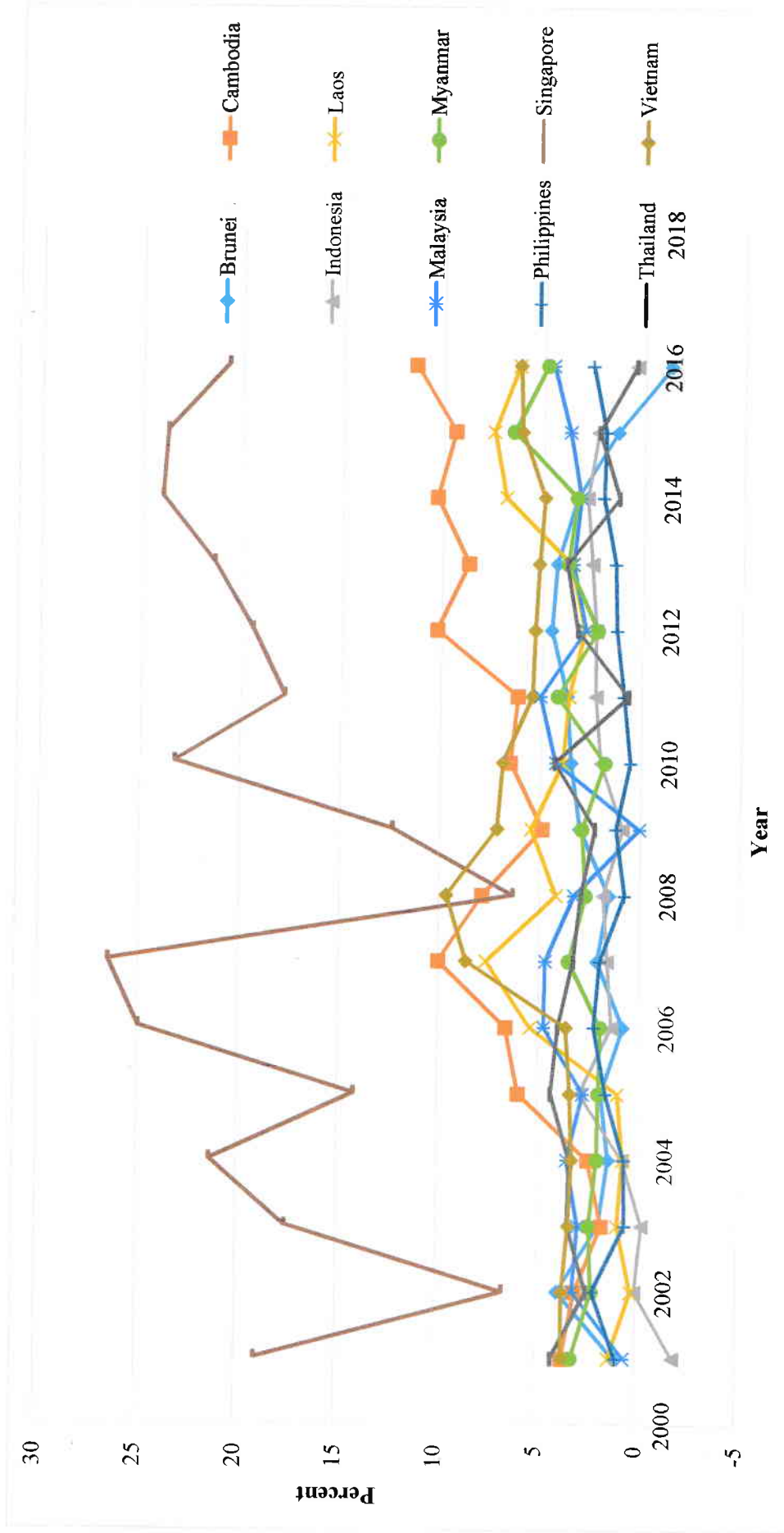
2.1 Foreign Direct Investment

A big factor in economic development is considered to be the international capital. In order to boost their economic developments, a large number of countries have started soliciting international funds. To enlarge the production frontier of other countries, an international capital is used which is a fund that comes from an outside territory. There are several forms of international capital movements between countries such as multilateral aids, bilateral and trade, portfolio investments, grants, loans and foreign direct investments. The number of FDI flows has increased during the past two decades, particularly in developing nations. The World Investment Report (UNCTAD 2002) signified that the policies toward attracting FDI have revised in 180 nations.

Foreign Direct Investment (FDI) in developing economies has been extraordinary and has offered to the general economic growth of the nations. In accordance with the World Investment Report (2011), in the year 2010, more than fifty percent of global FDI inflows have been attracted by the developing economies. Foreign Direct Investment (FDI) is known to be one of the most dynamic international resource flows to developing countries. FDI is usually a combination of tangible and intangible assets and firms deploy FDI are often important players in the global economy. Some argue that FDI respond to local economic growth and business opportunities, improves access to local markets, facilitates transfer of new technology, and helps to improve worker's skill and well-being.

Foreign direct investment (FDI), net inflows, as a percentage of GDP is obtained from the World Bank. According to the World Bank, FDI is defined as follows: "net inflows of investment to acquire a lasting management interest in an enterprise operating in an economy". This definition implies that foreign investors have reasons to invest money in some enterprises. At the same time, additional investments are beneficial for businesses. Moreover, FDI includes investments in terms of equity capital, reinvested earnings and intra-company loans. FDI inflows of ASEAN countries from 2001 to 2016 are described in APPENDIX- A. Figure (2.1) illustrates the line-chart for FDI inflows of ASEAN countries from 2001 to 2016.

Figure (2.1) FDI inflows of ASEAN Countries from 2001 to 2016



Source: World Data Bank

Figure (2.1) shows that Singapore has the highest FDI inflows each year except 2008. It may be the effect of the global crisis in 2008-2009 has hurt Singapore but recovery is at hand for 2010 and beyond

Descriptive Statistics of FDI Inflows in ASEAN Countries

Descriptive statistics of FDI inflows in ASEAN countries from 2001 to 2016 are shown in Table (2.1).

Table (2.1) Descriptive Statistics of FDI Inflows in ASEAN Countries Analysis (percent)

Variable	Mean	Standard Deviation	Minimum	Maximum
Brunei	2.3131	1.5563	-1.3206	4.5405
Cambodia	6.8302	3.0619	1.7513	11.4256
Indonesia	1.3756	1.3029	-1.8557	2.9161
Laos	3.8559	2.5104	0.2532	7.6610
Malaysia	3.2966	1.3767	0.0367	5.0744
Myanmar	3.0958	1.2782	1.8190	6.5236
Philippines	1.4264	0.6603	0.5363	2.6018
Singapore	18.7253	6.0758	6.3471	26.5212
Thailand	2.8943	1.2538	0.4205	4.3396
Vietnam	5.4209	1.9541	3.2575	9.6630

Source: World Data Bank

According to the results, the percent of FDI inflows is the highest in Singapore and the lowest in Indonesia. Similarly, the mean value of FDI inflows is highest in Singapore and lowest in Indonesia.

2.2 GDP Growth Rate

GDP is an important economic variable which is used to indicate economic growth and standards of living in a country. Many empirical studies find that economic growth is an incentive for FDI inflows (e.g. Al Nasser 2010; Kandil 2011; Mohamed and Sidiropoulos 2010). There are several reasons why foreign investors might prefer faster growing markets. For examples, cost efficiency of production and the realization of economies of scale and scope in production are closely linked with market size. A growing market can be attractive to FDI of the likelihood that a larger market will enable a more efficient scale of production through the realization of economies of scale. That is, growth is a measure and signal of market demand and market demand attracts FDI.

Torrisi(1985) has noted that while FDI location decisions depend only on recent or past earnings, they rely also on the potential and expected profitability of the specific investment project in a particular location. The prospect for market growth would need to be favorable to ensure a long- term commitment by the foreign investor. Lim (1983) and Zhang (2001) has argued that a higher economic growth rate, other things being equal, lead to a higher level of aggregate demand, leading to greater opportunities for making profits and, hence, increasing the incentive to invest.

A higher rate of economic growth signals the size of the potential market, which could be expended in the future. Economic growth motivates foreign firms to plan new projects or new production facilities. Regions that are experiencing rapid economic growth are also generating more profitable opportunities, and they give the promise of growing markets and growing profit.

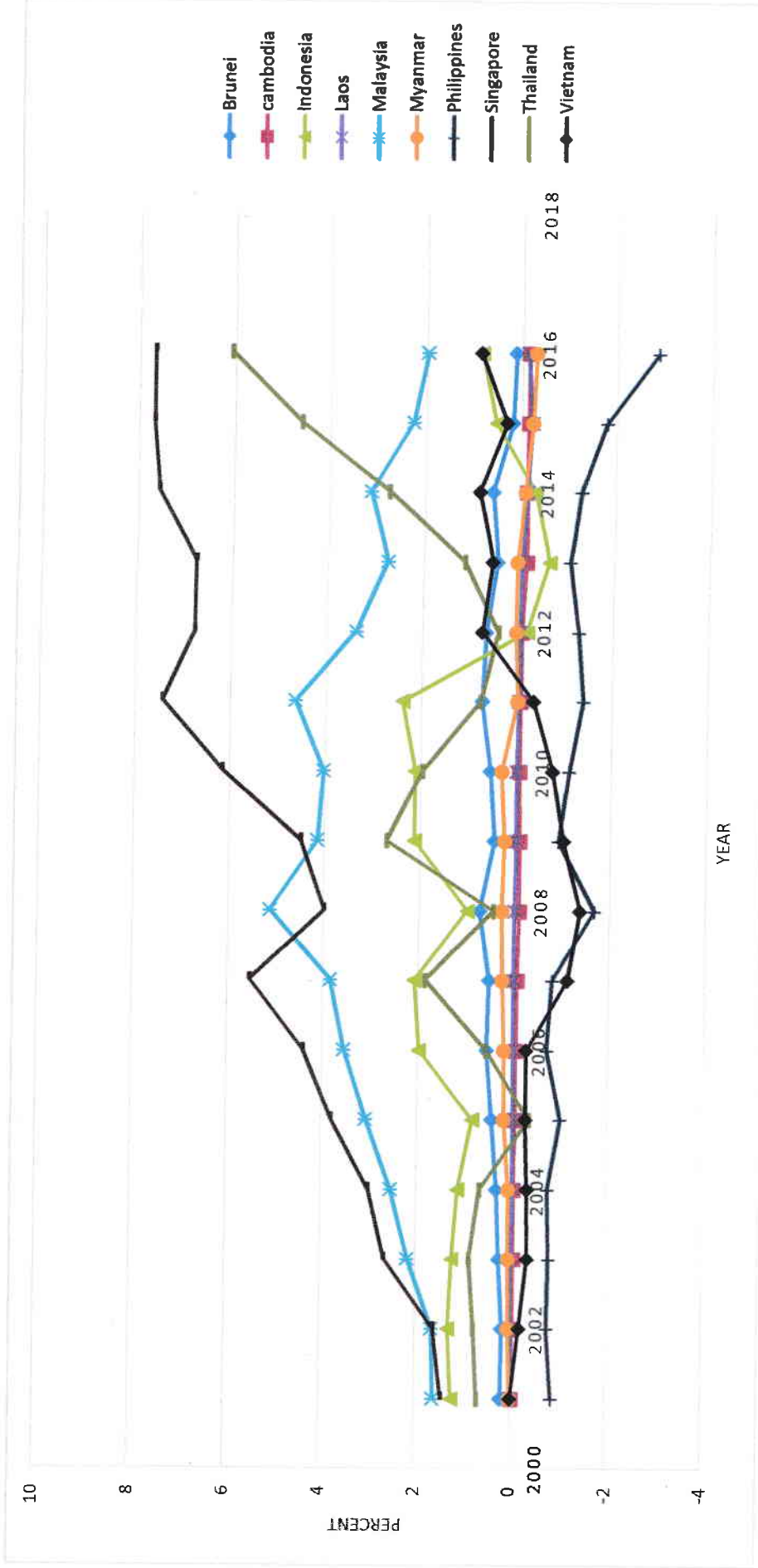
Growing economies provide growing prospects for profitable investments. Where FDI is attracted by economic growth it will tend to be targeted at the recipient nation's domestic market rather than for exports. The size of the recipient's market can be particularly important for horizontal FDI where economies of scale are especially important. Growth, however, is unlikely to be important for vertical FDI.

The economies of scale and optimum utilization of the resources in the large market is not only beneficial to the investors but also to the growth of the country. Therefore, the increasing growth rate has attracted more foreign investment to the country than any other.

Using GDP as one of the variable which can affect the amount of FDI is therefore intuitive. In other words, countries with high standards of living as well as

with high rank of GDP (high price of final goods and services produced in one year in a country are expected to attract foreign investors for making further profits. This can be proved by GDP components [Patterson & Heravi, (1991)], which include, investment government spending and net export. GDP growth rate of ASEAN countries from 2001 to 2016 are described in APPENDIX-A. Figure (2.2) illustrates the line chart for GDP growth rate of ASEAN countries from 2001 to 2016.

Figure (2.2) GDP Growth Rate of ASEAN Countries from 2001 to 2016



Source: World Data Bank

According to the Figure (2.2), it can be observed that GDP growth rate of ASEAN countries decline in 2008-2009 it recovers for year 2010 and beyond. The global financial crisis of 2008-2009 can cause very hurt the manufacturing, wholesale and retail trade, transport and storage, information and communication, and financial services sectors.

Descriptive Statistics of GDP Growth Rate in ASEAN Countries

Descriptive Statistics of GDP growth rate in ASEAN countries from 2001 to 2016 are shown in Table (2.2).

Table (2.2) Descriptive Statistics of GDP Growth in ASEAN Countries Analysis(percent)

Variable	Mean	Standard Deviation	Minimum	Maximum
Brunei	0.6881	2.4232	-2.4655	4.3977
Cambodia	7.7094	2.8254	0.0867	13.2501
Indonesia	5.3134	0.7539	3.6435	6.3450
Laos	7.3293	0.9004	5.7514	8.6193
Malaysia	4.8301	2.6961	-2.5258	9.4277
Myanmar	10.1869	2.7342	5.5915	13.844
Philippines	5.2701	1.7931	1.1483	7.6323
Singapore	5.1079	4.2008	-0.9523	15.2404
Thailand	4.0070	2.3329	-0.6907	7.5136
Vietnam	6.3669	0.7258	5.2474	7.5472

Source: World Data Bank

According to the results, the GDP growth rate is the highest in Singapore and the lowest in Malaysia. But the mean value of GDP growth rate is the highest in Myanmar and lowest in Malaysia.

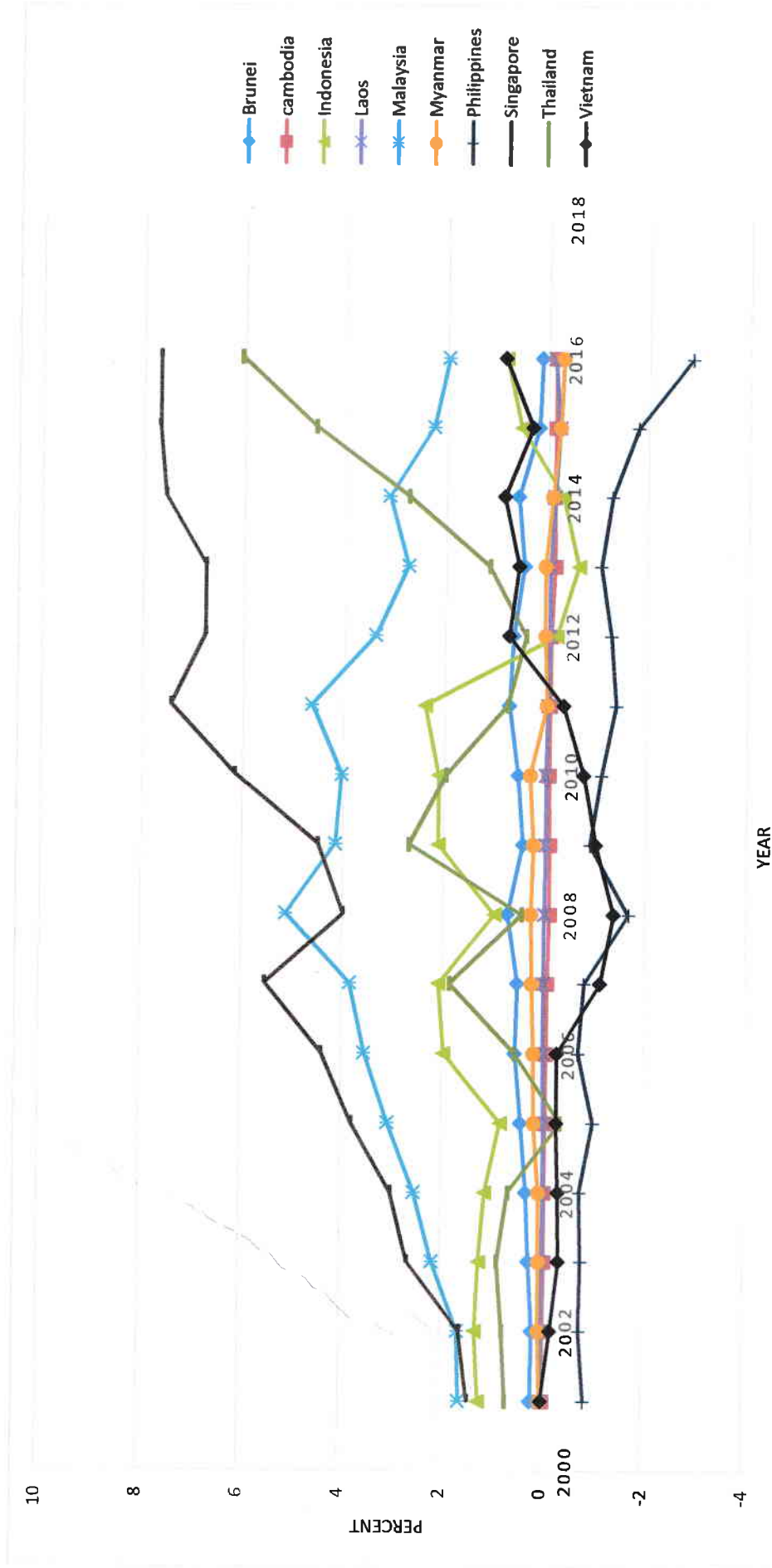
2.3 Unemployment Rate

The unemployment rate (fully) is defined as the number of unemployed person divided by the labor force in a particular region, such as a state or country. The unemployment rate is the percentage of total workforce that is unemployed and is looking for employment. The unemployment rate is one of the most closely watched statistics because a rising rate indicates a weak economy.

The unemployment rate is the share of the labor force that is jobless, expressed as a percentage. When the economy is in poor shape and jobs are scarce, the unemployment rate can be expected to rise. When the economy is growing at a healthy rate and jobs are relatively plentiful, it can be expected to fall. Unemployment is described as the state of not having a job for some people who are able to and want to work but unable to find a job. The economic and social costs caused by the people who do not take part in the production process are quite high. In the economies having higher unemployment rate, first of all the actual rate of national output falls behind the potential rate of national output since all of the resources cannot be used effectively. Furthermore, unemployment constitutes an important risk factor for poverty.

Long-term unemployment can have serious ramifications for the individual and for the economy. People who are out of work for a long time lose their job skills and become less employable as time goes by. They also lose the motivation to look for work and become dissatisfied and depressed. Long-term unemployment can also be a burden upon taxpayers and social service systems. There are a few of the negative consequences of a high unemployment rate on FDI inflows. Unemployment rate of ASEAN countries from 2001 to 2016 are described in APPENDIX-A. Figure (2.3), illustrates the line chart for unemployment rate of ASEAN countries from 2001 to 2016.

Figure (2.3), Unemployment rate of ASEAN countries from 2001 to 2016



Source: World Data Bank

In Figure (2.3), it can be found that the Philippines has the highest unemployment rate among the ASEAN countries. In that period (2001-2016), job was not fast enough to reduce the unemployment rate, given period population growth and increased labor force participation in the Philippines. Cambodia has the lowest unemployment rate in ASEAN countries. Royal Government of Cambodia (RGC) always pays attention to the promotion of investment in Cambodia in order to create work opportunities for people. After 2006, the unemployment rate decreased in all ASEAN countries.

Descriptive Statistics of Unemployment Rate in ASEAN Countries

Descriptive statistics of unemployment rate in ASEAN countries from 2001 to 2016 are shown in Table (2.3)

Table (2.3) Descriptive Statistics of Unemployment Rate in ASEAN Countries Analysis(percent)

Variable	Mean	Standard Deviation	Minimum	Maximum
Brunei	2.1221	0.4544	1.658	3.051
Cambodia	0.8883	0.8020	0.1	2.117
Indonesia	7.9931	1.7476	5.6	11.2
Laos	1.5519	0.3189	1.328	2.413
Malaysia	3.3105	0.2343	2.87	3.7
Myanmar	0.8304	0.0301	0.8	0.881
Philippines	8.1773	2.010	5.876	11.85
Singapore	3.8331	1.3830	1.69	5.93
Thailand	1.1883	1.5305	0.58	2.6
Vietnam	2.2478	0.2847	1.8	2.8

Source: World Data Bank

According to the result, the unemployment rate is the highest in Philippines and lowest in Cambodia. However, the mean value of unemployment rate is the highest in Philippines and lowest in Myanmar.

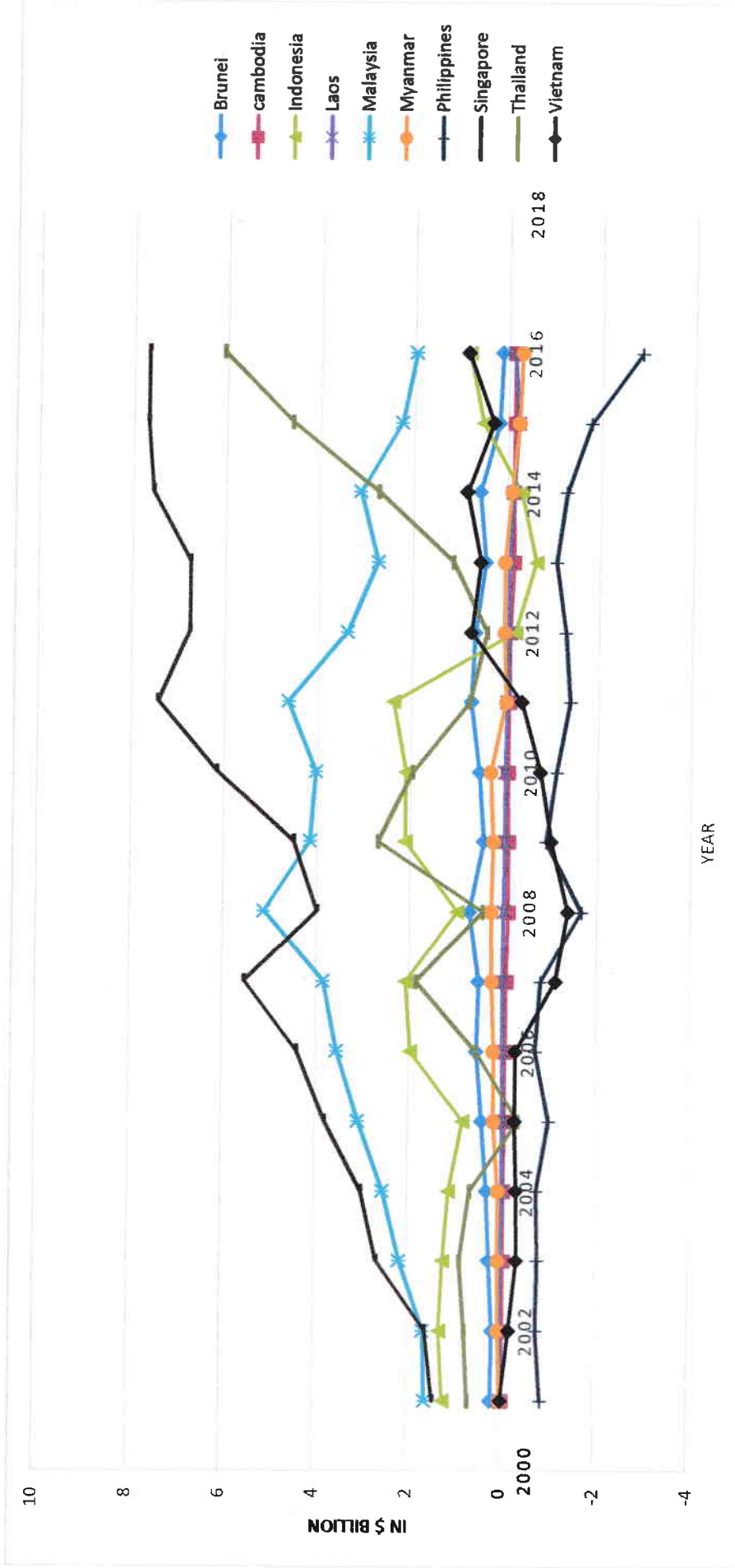
2.4 Net Trade

The trade and foreign direct investment are two variables that have an important impact on globalization process, the relationship among them being different from a country to another. The causality between these two variables definitely influences the decision-making process. Trade and FDI are interlinked at the firm level in international production and distribution of goods. This will shed light on policy-making at both national and multinational levels.

Trade, which is a mode for distribution of goods, is in fact the extension or expansion of domestic sales. FDI occurs when a domestic firm undertakes international production or cross-border service through a presence. FDI may also take place in international distribution of goods. FDI as an international capital flow can be regarded as a variation of domestic investment.

Most studies on the relationship between trade and FDI undertaken by trade theorists and international business academics have focused on the issue of 'substituability or complementarity' between trade and FDI. Results from most empirical studies are mixed: some studies conclude that trade and FDI are generally supportive of each other, some conclude that they are substitutes for each other, and some maintain that the result is inconclusive. Net trade of ASEAN countries from 2001 to 2016 are described in APPENDIX-A. Figure (2.4), illustrates the line chart for net trade of ASEAN countries from 2001 to 2016.

Figure (2.4), Net trade of ASEAN countries from 2001 to 2016



Source: World Data Bank.

In Figure (2.4), it can be found that the net trade (term of trade) of Singapore is the highest among the ASEAN countries except 2008. Although the financial crisis began in the United States, it soon spread and financial institution and economies throughout the developed and developing countries. ASEAN is the United States' fourth largest trading partner. The financial crisis has disrupted the normal functioning of the banking system and deprived firms. So, financial crisis of 2008-2009 may be damaged trade of ASEAN countries. But the net trade of Cambodia and Myanmar didn't heavily change during the analyzing period 2001-2016. The net trade of Cambodia and Myanmar didn't heavily change during the analyzing period 2001-2016.

Descriptive Statistics of Net Trade in ASEAN Countries

Descriptive statistics of net trade in ASEAN countries from 2001 to 2016 are shown in Table (2.4).

Table (2.4) Descriptive Statistics of Net Trade in ASEAN Countries Analysis (in \$ billion)

Variable	Mean	Standard Deviation	Minimum	Maximum
Brunei	0.4329	0.1996	0.1348	0.7305
Cambodia	-0.0814	0.0399	-0.1488	-0.0346
Indonesia	1.1086	0.9193	-0.6237	2.4021
Laos	-0.0426	0.0645	-0.2262	0.0092
Malaysia	3.1230	1.0603	1.6182	5.1313
Myanmar	0.0671	0.1697	-0.2840	0.3057
Philippines	-1.1841	0.5536	-2.8505	-0.6982
Singapore	5.0670	2.1801	1.4473	7.6942
Thailand	1.6227	1.6968	-0.3471	6.0764
Vietnam	-0.1660	0.6948	-1.3733	0.8613

Source: World Data Bank

According to the result, the net trade is the highest in Singapore and lowest in Philippines. Similarly, the highest and lowest mean values of net trade are in Singapore and Philippines.

CHAPTER III

PANEL DATA REGRESSION MODELS

3.1 Panel Data

Panel data are the combination of time series and cross-section data. There are other name for panel data, such as pooled data (pooling of time series and cross-sectional observations), micro panel data, longitudinal data (a study over time of a variable or group of subjects), event history analysis and cohort analysis. Although there are subtle variations, all these names essentially connote movement over time of cross-sectional units. In panel data the same cross-sectional unit is surveyed over time. Panel data have spaced as well as time dimensions.

A panel data set contains n entities or subjects (e.g. firms and states), each of which includes T observations measured at 1 through t time period. Thus, the total number of observations is nT . Ideally, panel data are measured at regular time intervals (e.g., year, quarter, and month). Otherwise, panel data should be analyzed with caution. A short panel data set has many entities but few time periods (small T), while a long panel has many time periods (Large T) but few entities (Cameron and Trivedi 2009: 230). Panel data may have group effects, time effects, or the both, which are analyzed by fixed effect and random effect models.

3.2 Panel Data Regression Models

The regression models based on the panel data are called panel data regression models. Panel data models examine group (individual-specific) effects, time effects, or both. These effects are either fixed effect or random effect. A fixed effect model examines if intercepts vary across groups or time periods, whereas a random effect model explores differences in error variances.

3.3 Fixed Effect (Within) Model

$$Y_{it} = \beta_{1i} + \beta_2 X_{1it} + \beta_3 X_{2it} + \beta_4 X_{3it} + u_{it} \quad (3.1)$$

where, $i = 1, 2, \dots, n$

$t = 1, 2, \dots, T$

i is the i^{th} subject and

t is the time period for the variables.

Equation (3.1) is known as the fixed effects (regression) model (FEM). The term "Fixed effects" is due to the fact that, although the intercept may differ across subjects, each entity's intercept does not vary over time, that is, it is time-invariant. The fixed effect model examines differences in intercepts, assuming the same slopes and constant variance across entities or subjects. Since a group (individual specific) effect is time invariant and considered a part of the intercept, u_i is allowed to be correlated to other regressors.

One way to estimate a pooled regression is the fixed-effect within group estimator. It is to eliminate the fixed effect, β_{1i} , by expression the values of the dependent and explanatory variables. It will obtain the sample mean values of each variables and subtract them from the individual values of the variables. The resulting values are called 'de-meaned' or mean corrected values.

A within group effect model does not need dummy variables, but it uses deviations from group mean. Thus, the model is the OLS of $(Y_{it} - \bar{Y}_i) = (X_{1it} - \bar{X}_{1i})\beta_2 + (X_{2it} - \bar{X}_{2i})\beta_3 + (X_{3it} - \bar{X}_{3i})\beta_4 + (u_{it} - \bar{u}_i)$ without an intercept. The incidental parameter problem is no longer an issue. The parameter estimates of regressors in the within effect model are identical to those of LSDV. The within effect model in turn has several disadvantages.

Since this model does not report dummy coefficients, it need to compute them using the formula $\hat{\beta}_{1i} = \bar{Y}_i - \bar{X}_{1i}\hat{\beta}_2 - \bar{X}_{2i}\hat{\beta}_3 - \bar{X}_{3i}\hat{\beta}_4$.

\bar{Y}_i = dependent variable mean of group i .

\bar{X}_i = means of independent variables (IVs) of group i .

3.4 Random Effect Model

$$Y_{it} = \beta_{1i} + \beta_2 X_{1it} + \beta_3 X_{2it} + \beta_4 X_{3it} + u_{it} \quad (3.2)$$

The intercepts β_{1i} are assumed to be random variables with mean value

$$E(\beta_{1i}) = \beta_1 \quad (3.3)$$

and the intercept value for individual i can be expressed as

$$\beta_{1i} = \beta_1 + \varepsilon_i, \quad i = 1, \dots, n \quad (3.4)$$

where $E(\varepsilon_i) = 0$ and

$$V(\varepsilon_i) = \sigma_\varepsilon^2$$

The equation (3.2) becomes that

$$\begin{aligned} Y_{it} &= \beta_1 + \varepsilon_i + \beta_2 X_{2it} + \beta_3 X_{3it} + \beta_4 X_{4it} + u_{it} \\ Y_{it} &= \beta_1 + \beta_2 X_{2it} + \beta_3 X_{3it} + \beta_4 X_{4it} + w_{it} \end{aligned} \quad (3.5)$$

where $w_{it} = \varepsilon_i + u_{it}$

The composite error term w_{it} consists of two components ε_i , which is the cross-section, or individual-specific, error component and u_{it} , which is the combined time series and cross-section error component because it varies over-section (subject) as well as time. The other name of random effect model is called error component model (ECM) because the composite error term consists of two (or more) error components.

A random effect model estimates variance components for groups (or times) and error, assuming the same intercept and slopes. u_{it} is a part of the errors and thus should not be correlated to any regressor; otherwise a core OLS assumption is violated. The difference among groups (or time periods) lies in their variance of the error term, not in their intercepts. A random effect model is estimated by generalized least squares (GLS).

Assumptions about the error components

$$\begin{aligned} \varepsilon_i &\sim N(0, \sigma_\varepsilon^2) \\ E(\varepsilon_i \varepsilon_j) &= 0 \text{ for } i \neq j \\ u_{it} &\sim N(0, \sigma_u^2) \end{aligned} \quad (3.6)$$

$$E(u_{it} u_{is}) = E(u_{it} u_{it}) = E(u_{it} u_{js}) = 0 \text{ for } i \neq j; t \neq s$$

$$E(\varepsilon_i u_{it}) = 0$$

that is, the individual error components are not correlated with each other and are not auto correlated across both cross-section and time series units.

$$E(w_{it}) = 0 \quad (3.7)$$

$$\text{var}(w_{it}) = \sigma_\varepsilon^2 + \sigma_u^2 \quad (3.8)$$

As Equation (3.8) shows, the error term is homoscedastic. However, it can be shown that w_{it} and w_{is} ($t \neq s$) are correlated; that is, the error terms of a given cross-sectional unit at two different points in time are correlated. The correlation coefficient, $\text{corr}(w_{it}, w_{is})$ is

$$f = \text{corr}(w_{it}, w_{is}) = \frac{\sigma_\varepsilon^2}{\sigma_\varepsilon^2 + \sigma_u^2} ; t \neq s$$

3.5 Fixed Effects versus Random Effects Model

1. If T (the number of time series data) is large and n (the number of cross-sectional units) is small, there is likely to be little difference in the values of the parameters estimated by FEM and ECM. Hence the choice here is based on computational convenience. On the score, FEM may be preferable.
2. When n is large and T is small, the estimates obtained by the two methods can differ significantly. In ECM $\beta_{1i} = \beta_1 + \varepsilon_i$, where ε_i is the cross-sectional random component whereas in FEM, β_{1i} treats as fixed and not random. In that case, FEM is appropriate. If the cross-sectional units in the sample are regarded as random drawings, then ECM is appropriate.
3. If the individual error component ε_i and one or more regressors are correlated, then ECM estimators are biased, whereas those obtained from FEM are unbiased.
4. If n is large and T is small, and if the assumptions underlying ECM hold, ECM estimators are more efficient than FEM.
5. Unlike FEM, ECM can estimate coefficients of time-invariant variables. The FEM does control for such time-invariant variables, but it cannot estimate them directly, as is clear from the LSDV or within-group estimator models.

If it is assumed that ε_i and X 's are uncorrelated, ECM may be appropriate, where as if ε_i and the X 's are correlated, FEM may be appropriate. In FEM each cross-sectional unit has its own (fixed) intercept value, in all n such values for n cross-sectional units. In ECM, the common intercept represents the mean value of all the (cross-sectional) intercepts and the error component ε_i represents the (random) deviation of individual intercept for this mean value.

3.6 Hausman Test

The Hausman specification test compares the fixed versus random effects under the null hypothesis that the individual effects are uncorrelated with the other regressors in the model [Hausman (1978)]. If correlated (H_0 is rejected), a random effect model produces biased estimates, violating one of the Gauss-Markov assumptions; so a fixed effect model is preferred. Hausman's essential result is that the covariance of an efficient estimator with its difference from an efficient estimator is

zero [Greene (2003)]. Hausman test is a good way to choose which model is better for the researches. The test statistic developed by Hausman test has an asymptotic Chi-square distribution.

Test hypotheses is:

Null Hypothesis : The random effect model is appropriate.

Alternative Hypothesis: The fixed effect model is appropriate.

CHAPTER IV
APPLICATION OF PANEL DATA REGRESSION MODELS
FOR FOREIGN DIRECT INVESTMENT INFLOWS OF ASEAN COUNTRIES

The effects of some economic factors on FDI inflows are studied in this chapter. The model consists of one explained variable and three explanatory variables. The explained variable is FDI inflows and the three explanatory variables are some economic factors; GDP growth rate, unemployment rate, net trade (term of trade). The data is a panel data and the panel data regression models (fixed effect model, random effect model) have been used to examine the effects of some economic factors on FDI inflows. Hausman test has been also used in this study to choose the appropriate model between the fixed effect model and the random effect model. The panel data which consist of ten ASEAN countries, for the period from 2001 to 2016 time series has been used in this study. The data are shown in APPENDIX-A.

4.1 The Fixed Effect Model for FDI Inflows and Some Economic Factors of ASEAN Countries

The explained variable FDI inflows and the three explanatory variables (GDP growth rate, unemployment rate and net trade) are analyzed by using the fixed effect model. A fixed effect model examines differences in intercepts, assuming the same slopes and constant variance across countries. Since individual specific effect is time invariant and considered a part of the intercept, u_i is allowed to be correlated to other regressors.

The fixed effect model for FDI inflows and some economic factors(GDP growth rate, unemployment rate, net trade) is as follows:

$$FDI_{it} = \beta_1 + \beta_2 GDP_{1it} + \beta_3 UR_{2it} + \beta_4 TRADE_{3it} + u_{it}$$

where, $i = 1, 2, \dots, 10$

$t = 1, 2, \dots, 16$

$\beta_1 =$ Intercept

FDI = FDI inflow

$\beta_2 =$ Slope of GDP growth rate

GDP = GDP growth rate
 β_3 = Slope of unemployment rate
 UR = Unemployment Rate
 β_4 = Slope of net trade
 TRADE = Net Trade

The following Table (4.1) presents the fixed effect model for some economic factors and FDI inflows in ASEAN countries.

Table (4.1) Summary Results for Fixed Effect Model of FDI Inflows

Variables	Coefficient	Std.error	t	P-value
Constant	5.1797	0.8221	6.30	0.000***
GDP growth rate	0.2754	0.0814	3.38	0.001***
Unemployment rate	-0.6665	0.1946	-3.43	0.001***
Net trade	0.3231	0.1932	1.67	0.097*
Sigma u	4.8557			
Sigma e	2.3906			
Rho	0.8049			
F (3,147)	8.80			
P-value	0.0000***			
No: of groups	10			
No: of time (year)	16			
No: of observations	160			

Source: STATA output

***, **, * statistically significant at 1% level, 5% level and 10% level.

According to the result, in the fixed effect model all the variables are individually, statistically significant. GDP growth rate, unemployment rate and net trade are statistically significant at 10 percent level, given the fact that the probability values (0.0001, 0.001, 0.097) is smaller than 0.10.

The estimated fixed effect (within) regression model for FDI inflows and some economic factors of ASEAN countries can be expressed as follow:

$$FDI_{it} = 5.1797 + 0.2754GDP_{it} - 0.6665UR_{it} + 0.3231TRADE_{it} \quad (4.1)$$

From the above equation, it is found that GDP growth rate and net trade have positive effects on FDI inflows which is the theoretically justified. The unemployment rate has negative effect on FDI inflows.

If GDP growth rate rises by 1 %, FDI inflows will increase by 0.2754%. Therefore, it can be concluded that GDP growth rate increases, FDI inflows will be increased. Similarly net trade rises by 1%, FDI inflows will increase by 0.3231%. Therefore, it can be concluded that net trade increases, FDI inflows will be increased. It is found that if unemployment rate rises by 1%, FDI inflows will reduce by 0.6665%. Therefore, it can be concluded that if unemployment rate increases, FDI inflows will be decreased. The overall model is also statistically significant at 1% level. The intercept 5.1797 is the average of ten ASEAN countries.

The intercepts of ten ASEAN countries can be obtained as follow:

$$\hat{\beta}_{1i} = \overline{FDI}_{i.} - \overline{GDP}_{1i} \hat{\beta}_2 - \overline{UR}_{2i} \hat{\beta}_3 - \overline{TRADE}_{3i} \hat{\beta}_4.$$

$$\begin{aligned} \text{Brunei: Intercept} &= 2.3131 - 0.6881(0.2754) - 2.1222(-0.6665) - 0.4329(0.3231) \\ &= 3.3982 \end{aligned}$$

$$\begin{aligned} \text{Cambodia: Intercept} &= 6.8302 - 7.7094(0.2754) - 0.8883(-0.6665) - (-0.0814)(0.3231) \\ &= 5.3254 \end{aligned}$$

$$\begin{aligned} \text{Indonesia: Intercept} &= 1.3756 - 5.3134(0.2754) - 7.9931(-0.6665) - 1.1086(0.3231) \\ &= 4.8815 \end{aligned}$$

$$\begin{aligned} \text{Laos: Intercept} &= 3.8559 - 7.3293(0.2754) - 1.5519(-0.6665) - (-0.0427)(0.3231) \\ &= 2.8855 \end{aligned}$$

$$\begin{aligned} \text{Malaysia: Intercept} &= 3.2966 - 4.8301(0.2754) - 3.3105(-0.6665) - 3.1239(0.3231) \\ &= 3.1638 \end{aligned}$$

$$\begin{aligned} \text{Myanmar: Intercept} &= 3.0958 - 10.1869(0.2754) - 0.8304(-0.6665) - 0.0671(0.3231) \\ &= 0.8221 \end{aligned}$$

$$\begin{aligned} \text{Philippines: Intercept} &= 1.4264 - 5.2701(0.2754) - 8.1773(-0.6665) - (-1.8410)(0.3231) \\ &= 6.0200 \end{aligned}$$

$$\begin{aligned} \text{Singapore: Intercept} &= 18.7253 - 5.1080(0.2754) - 3.8331(-0.6665) - 5.0670(0.3231) \\ &= 18.2362 \end{aligned}$$

$$\begin{aligned} \text{Thailand: Intercept} &= 2.8943 - 4.007(0.2754) - 1.1883(-0.6665) - 1.6227(0.3231) \\ &= 2.0585 \end{aligned}$$

$$\begin{aligned} \text{Vietnam: Intercept} &= 5.4209 - 6.3669(0.2754) - 2.2478(-0.6665) - (-0.1660)(0.3231) \\ &= 5.2193 \end{aligned}$$

The ten regression equations of ASEAN countries are

$$\text{Brunei: FDI}_{it} = 3.3982 + 0.2754\text{GDP}_{it} - 0.6665\text{UR}_{it} + 0.3231\text{TRADE}_{it}$$

$$\text{Cambodia: FDI}_{it} = 5.3254 + 0.2754\text{GDP}_{it} - 0.6665\text{UR}_{it} + 0.3231\text{TRADE}_{it}$$

$$\text{Indonesia: FDI}_{it} = 4.8815 + 0.2754\text{GDP}_{it} - 0.6665\text{UR}_{it} + 0.3231\text{TRADE}_{it}$$

$$\text{Laos: FDI}_{it} = 2.8855 + 0.2754\text{GDP}_{it} - 0.6665\text{UR}_{it} + 0.3231\text{TRADE}_{it}$$

$$\text{Malaysia: FDI}_{it} = 3.1638 + 0.2754\text{GDP}_{it} - 0.6665\text{UR}_{it} + 0.3231\text{TRADE}_{it}$$

$$\text{Myanmar: FDI}_{it} = 0.8221 + 0.2754\text{GDP}_{it} - 0.6665\text{UR}_{it} + 0.3231\text{TRADE}_{it}$$

$$\text{Philippines: FDI}_{it} = 6.0200 + 0.2754\text{GDP}_{it} - 0.6665\text{UR}_{it} + 0.3231\text{TRADE}_{it}$$

$$\text{Singapore: FDI}_{it} = 18.2362 + 0.2754\text{GDP}_{it} - 0.6665\text{UR}_{it} + 0.3231\text{TRADE}_{it}$$

$$\text{Thailand: FDI}_{it} = 2.0585 + 0.2754\text{GDP}_{it} - 0.6665\text{UR}_{it} + 0.3231\text{TRADE}_{it}$$

$$\text{Vietnam: FDI}_{it} = 5.2192 + 0.2754\text{GDP}_{it} - 0.6665\text{UR}_{it} + 0.3231\text{TRADE}_{it}$$

4.2 The Random Effect Model for FDI Inflows and Some Economic Factors of ASEAN Countries

The explained variable FDI inflows and the explanatory variables (GDP growth rate, unemployment rate and net trade) is analyzed by using the random effect model. The random effect model estimates variances components for groups (or times) and error, assuming the same intercept and slope. u_i is a part of errors and thus should not be correlated to any regressor.

The random effect model for FDI inflows and some economic factors (GDP growth rate, unemployment rate, net trade) is as follows:

$$FDI_{it} = \beta_1 + \beta_2 GDP_{it} + \beta_3 UR_{it} + \beta_4 TRADE_{it} + w_{it}$$

where, $i = 1, 2, \dots, 10$

$t = 1, 2, \dots, 16$

$\beta_1 =$ Intercept

FDI = FDI inflow

$\beta_2 =$ Slope of GDP growth rate

GDP = GDP growth rate

$\beta_3 =$ Slope of unemployment rate

UR = Unemployment Rate

$\beta_4 =$ Slope of net trade

TRADE = Net Trade

The following Table (4.2) presents the random effect model for some economic factors and FDI inflows in ASEAN countries.

Table (4.2) Summary Effect for Random Effect Model for FDI Inflows

Variables	Coefficient	Std.error	t	P-value
Constant	4.8591	1.5418	3.15	0.001***
GDP growth rate	0.2694	0.0811	3.32	0.001***
Unemployment rate	-0.5914	0.1829	-3.23	0.020**
Net trade	0.4373	0.1885	2.32	0.002***
Sigma u	4.1374			
Sigma e	2.3906			
Rho	0.7497			
Wald χ^2	27.85			
P-value	0.0000***			
No: of groups	10			
No: of time (year)	16			
No: of observations	160			

Source: STATA output

***, **, statistically significant at 1% level and 5% level.

According to the result, in the random effect GLS regression model all the variables are individually, statistically significant. GDP growth rate, unemployment rate and net trade are statistically significant at 10 percent level, given the fact that the probability values (0.0001, 0.02) is smaller than 0.10.

The estimated random effect GLS regression model for FDI inflows and some economic factors of ASEAN countries can be expressed as follow:

$$FDI_{it} = 4.8591 + 0.2694GDP_{it} - 0.5914UR_{it} + 0.4373TRADE_{it} \quad (4.2)$$

From the above equation, it is found that GDP growth rate and net trade have positive effects on FDI inflows which is the theoretically justified. The unemployment rate has negative effect on FDI inflows.

It is observed that if there is no GDP growth rate, unemployment rate and net trade, FDI inflows will be around 4.8591%. If GDP growth rate rises by 1 %, FDI inflows will increase by 0.2694%. Therefore, it can be concluded that GDP growth rate increases, FDI inflows will be increased. Similarly net trade rises by 1%, FDI inflows will increase by 0.4373%. Therefore, it can be concluded net trade increases, FDI inflows will be increased. It is found that if unemployment rate rises by 1%. FDI inflows will reduce by 0.5914%. Therefore, it can be concluded that if unemployment rate increases, FDI inflows will be decreased. The overall model is also statistically significant at 1% level.

4.3 Hausman Test

The Hausman test is used to determine which model is appropriate fixed effect model or random effect model.

Test Statistic:

Table (4.3) presents the results of Hausman Test.

Table (4.3) Estimate Results of Hausman Test

Variable	Coefficients		(b-B) Difference	Standard Error
	(b) Fixed effect model	(B) Random effect model		
GDP Growth Rate	0.2754	0.2694	0.0061	0.0064
Unemployment Rate	-0.6665	-0.5914	-0.0752	0.0662
Net Trade	0.3231	0.4373	-0.1142	0.0426

Source: Stata Output

$$\chi^2 = 11.77$$
$$\text{p-value} = 0.0082$$

According to the results of the Hausman test, it shows that the significant level, p-value 0.0082 is less than 1 percent level. It means that the null hypothesis is rejected. Therefore, it can be concluded that the fixed effect model is more appropriate for this study

CHAPTER V

CONCLUSION

In this study the two panel data regression models (fixed effect model and random effect model) are used to analyze the panel data. The panel data which consists of ten ASEAN countries for the period 2001-2016 are used to find the impact of some economic factors on FDI inflows.

According to the results for fixed effect model and random effect model, it has been found that the coefficient of GDP growth rate is a positive effect on FDI inflows. Moreover, the coefficient of unemployment rate is a negative effect on FDI inflows. Similarly, the coefficient of net trade is a positive effect on FDI inflows.

Later, the Hausman test is used to choose the appropriate model (fixed effect model or random effect model). According to the results, fixed effect model is more appropriate than random effect model. None the less GDP growth rate and net trade have positive effects on FDI inflows and unemployment rate has negative effect on FDI inflows.

The GDP growth rate is very important for any country for foreign investor to make decisions for investment. The high levels of growth in the host country indicates a high level of production that enhances the confidence level of investors. On the other hand, the higher income in host countries attracts the foreign investor interest to invest in that country. The GDP growth rate is considered as the national income growth indicator of the economic performance of the country, which is reflected through production, consumption, and varieties of goods and other economic facilities provided in the country. High economic growth rates are likely to lure investors in finding the market potential for higher return values on investments which are confined to higher levels of FDI. Consistent growth of GDP is the good sign for any economy, which will attract the foreign investor to invest in the concerned country. The GDP growth rate is also very important determinant for the FDI.

Unemployment rate is another economic factor which affects FDI inflows. Unemployment rate is one of the significant variables that depicts the health of an economy. A higher unemployment rate reflects that people are not earning according to their desire and ability. Unemployment is measured annually as percentage of labor force that can't find a job. Unemployment rate is not a healthy sign for a country from social and economic point of view. It causes poverty, political and social unrest

Therefore unemployment rate not only shows the weak economy of nation but also reduce foreign investors for a host country.

Another economic variable is net trade that affect the level of FDI inflows. Net trade also attract the foreign investment to the country. Trade openness remains one of the strongest forces determining the volume of FDI inflows in host countries. They further emphasis that the need for more investment in the primary, manufacturing and services sectors further reinforces the need for trade liberalization. The findings from this study confirm a positive relationship between FDI inflows and trade.

It can be concluded that if GDP growth rate and net trade increase, FDI inflows can more attractive by a host country. However, the higher unemployment rate can reduce to attract FDI inflows.

APPENDIX

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APPENDIX-A

**Table (1)- FDI Inflows, GDP Growth Rate, Unemployment Rate and Net Trade
Values of Brunei (2001-2016)**

Year	Country Code	FDI (percent)	GDP Growth Rate	Unemployment Rate	Trade (in \$ billion)
2001	1	1.0836	2.7440	3.051	0.1989
2002	1	3.9305	3.8721	2.868	0.1779
2003	1	1.8883	2.9040	2.696	0.2568
2004	1	1.4380	0.5043	2.532	0.3199
2005	1	1.8368	0.3875	2.373	0.4335
2006	1	0.7658	4.3977	2.223	0.5569
2007	1	2.1035	0.1546	2.085	0.5196
2008	1	1.5437	-1.9397	1.957	0.7304
2009	1	3.0337	-1.7645	1.837	0.4370
2010	1	3.5070	2.5989	1.722	0.5424
2011	1	3.7309	3.7453	1.72	0.7303
2012	1	4.5405	0.9128	1.698	0.6609
2013	1	4.2868	-2.1260	1.679	0.4557
2014	1	3.3166	-2.3497	1.658	0.5813
2015	1	1.3247	-0.5668	1.86	0.1903
2016	1	-1.3206	2.4655	1.995	0.1347

Source: World Development Indicators, World Data Bank

**Table (2)- FDI Inflows, GDP Growth Rate, Unemployment Rate and Net Trade
Values of Cambodia (2001-2016)**

Year	Country code	FDI (percent)	GDP Growth Raate	Unemployment Rate	Trade (in \$ billion)
2001	2	3.6768	8.1484	1.8	-0.0346
2002	2	3.0569	6.5789	1.916	-0.0362
2003	2	1.7514	8.5059	2.034	-0.0467
2004	2	2.4619	10.3405	2.117	-0.0390
2005	2	5.9936	13.2501	1.793	-0.0534
2006	2	6.6424	10.7711	1.462	-0.0558
2007	2	10.0389	10.2126	0.871	-0.0652
2008	2	7.8747	6.6916	0.438	-0.0956
2009	2	4.9137	0.0867	0.187	-0.0859
2010	2	6.5396	5.9631	0.35	-0.0663
2011	2	6.2002	7.0696	0.2	-0.0745
2012	2	10.2645	7.3133	0.2	-0.0849
2013	2	8.7059	7.4279	0.3	-0.1488
2014	2	10.3133	7.0715	0.1	-0.1278
2015	2	9.4237	7.0361	0.179	-0.1433
2016	2	11.4256	6.8826	0.265	-0.1441

Source: World Development Indicators, World Data Bank

**Table (3)- FDI Inflows, GDP Growth Rate, Unemployment Rate and Net Trade
Values of Indonesia (2001-2016)**

Year	Country Code	FDI (percent)	GDP Growth Rate	Unemployment Rate	Trade (in \$ billion)
2001	3	-1.8557	3.6435	8.1	1.2364
2002	3	0.0742	4.4995	9.1	1.3131
2003	3	-0.2543	4.7804	9.5	1.2456
2004	3	0.7382	5.0309	9.9	1.1341
2005	3	2.9161	5.6926	11.2	0.8411
2006	3	1.3479	5.5010	10.276	1.9786
2007	3	1.6030	6.3450	9.106	2.0912
2008	3	1.8263	6.0137	8.392	0.9918
2009	3	0.9039	4.6289	7.873	2.1191
2010	3	2.0252	6.2239	7.14	2.1212
2011	3	2.3029	6.1698	7.478	2.4022
2012	3	2.30978	6.0301	6.128	-0.1884
2013	3	2.5514	5.5573	6.167	-0.6237
2014	3	2.8200	5.0067	5.94	-0.3027
2015	3	2.2965	4.8763	5.99	0.5352
2016	3	0.4035	5.0156	5.6	0.8472

Source: World Development Indicators, World Data Bank

**Table (4)- FDI Inflows, GDP Growth Rate, Unemployment Rate and Net Trade
Values of Laos (2001-2016)**

Year	Country Code	FDI (percent)	GDP Growth Rate	Unemployment Rate	Trade (in \$ billion)
2001	4	1.3515	5.7514	1.849	-0.0055
2002	4	0.2532	5.9187	1.816	0.0001
2003	4	0.96230	6.0670	2.089	-0.0028
2004	4	0.7149	6.3577	2.413	-0.0202
2005	4	1.0133	7.1076	1.4	-0.0164
2006	4	5.4248	8.6193	1.399	0.0008
2007	4	7.6610	7.5968	1.396	0.0092
2008	4	4.1839	7.8249	1.393	-0.0018
2009	4	5.4621	7.5018	1.389	-0.0147
2010	4	3.9115	8.5269	1.382	-0.0066
2011	4	3.6404	8.0387	1.371	-0.0350
2012	4	2.8885	8.0263	1.359	-0.0546
2013	4	3.5728	8.0247	1.344	-0.0571
2014	4	6.8829	7.6135	1.328	-0.1342
2015	4	7.4991	7.2709	1.418	-0.2262
2016	4	6.2718	7.0228	1.484	-0.1176

Source: World Development Indicators, World Data Bank

**Table (5)- FDI Inflows, GDP Growth Rate, Unemployment Rate and Net Trade
Values of Malaysia (2001-2016)**

Year	Countries	FDI (percent)	GDP Growth Rate	Unemployment Rate	Trade (in \$ billion)
2001	5	0.5970	0.5177	3.5	1.6182
2002	5	3.1661	5.3909	3.5	1.6565
2003	5	2.9209	5.7885	3.6	2.1757
2004	5	3.5079	6.7834	3.5	2.5415
2005	5	2.7344	5.3321	3.5	3.0776
2006	5	4.7272	5.5848	3.3	3.5472
2007	5	4.6869	9.4277	3.2	3.8520
2008	5	3.2808	3.3196	3.3	5.1313
2009	5	0.0567	-2.5258	3.7	4.1551
2010	5	4.2686	6.9809	3.4	4.0435
2011	5	5.0744	5.2938	3.1	4.6437
2012	5	2.8291	5.4744	3	3.3876
2013	5	3.4943	4.6929	3.1	2.7540
2014	5	3.1412	6.0121	2.87	3.1342
2015	5	3.7001	4.9688	3.1	2.2712
2016	5	4.5606	4.2389	3.298	1.9791

Source: World Development Indicators, World Data Bank

**Table (6)- FDI Inflows, GDP Growth Rate, Unemployment Rate and Net Trade
Values of Myanmar (2001-2016)**

Year	Country Code	FDI (percent)	GDP Growth Rate	Unemployment Rate	Trade (in \$ billion)
2001	6	3.2156	11.344	0.881	0.0123
2002	6	2.2207	12.0255	0.876	0.0510
2003	6	2.3778	13.844	0.87	0.0621
2004	6	2.0002	13.5647	0.863	0.0715
2005	6	1.9597	13.5689	0.856	0.1768
2006	6	1.9018	13.0761	0.845	0.1909
2007	6	3.5175	11.9914	0.833	0.2431
2008	6	2.7113	10.2553	0.824	0.2679
2009	6	2.9236	10.5500	0.815	0.2320
2010	6	1.8189	9.6344	0.809	0.3057
2011	6	4.2013	5.5915	0.805	-0.0124
2012	6	2.2331	7.3327	0.803	0.0364
2013	6	3.7494	8.4260	0.801	0.0444
2014	6	3.3169	7.9912	0.8	-0.0942
2015	6	6.5236	7.2940	0.8	-0.2309
2016	6	4.8615	6.500	0.806	-0.2895

Source: World Development Indicators, World Data Bank

**Table (7)- FDI Inflows, GDP Growth Rate, Unemployment Rate and Net Trade
Values of Philippines (2001-2016)**

Year	Country Code	FDI (percent)	GDP Growth Rate	Unemployment Rate	Trade (in \$ billion)
2001	7	0.9966	2.8939	10.95	-0.8553
2002	7	2.1744	3.6459	11.51	-0.7532
2003	7	0.5864	4.9704	11.39	-0.7814
2004	7	0.6479	6.6976	11.85	-0.7461
2005	7	1.6144	4.7777	7.74	-0.9998
2006	7	2.2154	5.2429	7.98	-0.6982
2007	7	1.9542	6.6167	7.39	-0.8008
2008	7	0.7693	4.1528	7.33	-1.6675
2009	7	1.2265	1.14833	7.47	-0.8962
2010	7	0.5363	7.6323	7.35	-1.1094
2011	7	0.8955	3.6598	7.03	-1.3866
2012	7	1.2857	6.6838	6.99	-1.2747
2013	7	1.3748	7.0640	7.1	-1.0647
2014	7	2.0168	6.1453	6.59	-1.2754
2015	7	1.9261	6.0665	6.29	-1.7854
2016	7	2.6018	6.9239	5.876	-2.8505

Source: World Development Indicators, World Data Bank

**Table (8)- FDI Inflows, GDP Growth Rate, Unemployment Rate and Net Trade
Values of Singapore (2001-2016)**

Year	Country Code	FDI (percent)	GDP Growth Rate	Unemployment Rate	Trade (in \$ billion)
2001	8	19.0476	-0.9523	3.76	1.4473
2002	8	6.6969	4.2117	5.65	1.6228
2003	8	17.5785	4.4353	5.93	2.6686
2004	8	21.3597	9.5492	5.84	3.0100
2005	8	14.1977	7.4892	5.59	3.7978
2006	8	24.9828	8.8602	4.48	4.4074
2007	8	26.5212	9.1115	3.9	5.5401
2008	8	6.3471	1.7876	3.96	3.9956
2009	8	12.3806	-0.6034	4.3	4.5031
2010	8	23.2956	15.2404	3.1	6.1588
2011	8	17.8360	6.2244	2.9	7.4367
2012	8	19.4481	3.8715	2.8	6.7707
2013	8	21.3826	5.0012	2.8	6.7648
2014	8	24.0105	3.5723	2.801	7.5696
2015	8	23.7769	1.9326	1.69	7.6942
2016	8	20.7421	1.9963	1.829	7.6848

Source: World Development Indicators, World Data Bank

**Table (9)- FDI Inflows, GDP Growth Rate, Unemployment Rate and Net Trade
Values of Thailand (2001-2016)**

Year	Country Code	FDI (percent)	GDP Growth Rate	Unemployment Rate	Trade (in \$ billion)
2001	9	4.2122	3.4442	2.6	0.6957
2002	9	2.4882	6.1489	1.76	0.7714
2003	9	3.4359	7.1893	1.54	0.8804
2004	9	3.3895	6.2893	1.51	0.6748
2005	9	4.3396	4.1878	1.35	-0.3471
2006	9	4.0213	4.9679	1.22	0.5668
2007	9	3.2836	5.4351	1.18	1.8682
2008	9	2.9382	1.7257	1.18	0.4452
2009	9	2.2759	-0.6907	1.49	2.6977
2010	9	4.3232	7.5136	1.04	1.9684
2011	9	0.6671	0.8399	0.66	0.7633
2012	9	3.2446	7.2429	0.58	0.4081
2013	9	3.7895	2.7325	0.77	1.1413
2014	9	1.2239	0.9145	0.84	2.7489
2015	9	2.2552	2.9412	0.666	4.6039
2016	9	0.4205	3.2299	0.626	6.0764

Source: World Development Indicators, World Data Bank

**Table (10)- FDI Inflows, GDP Growth Rate, Unemployment Rate and Net Trade
Values of Vietnam (2001-2016)**

Year	Country Code	FDI (percent)	GDP Growth Rate	Unemployment Rate	Trade (in \$ billion)
2001	10	3.6836	6.192	2.8	-0.0091
2002	10	3.6893	6.3208	2.1	-0.1804
2003	10	3.3944	6.8991	2.3	-0.3359
2004	10	3.2575	7.5364	2.1	-0.3159
2005	10	3.3904	7.5472	2.326	-0.2735
2006	10	3.6160	6.9779	2.445	-0.2784
2007	10	8.6547	7.1295	2.415	-1.1193
2008	10	9.6630	5.6618	2.29	-1.3733
2009	10	7.1688	5.3979	2.61	-1.0028
2010	10	6.9006	6.4232	2.64	-0.7597
2011	10	5.4818	6.2403	2.02	-0.343
2012	10	5.3703	5.2474	1.8	0.7446
2013	10	5.1979	5.4219	1.95	0.5604
2014	10	4.9408	5.9837	1.87	0.8596
2015	10	6.1064	6.6793	2.12	0.3096
2016	10	6.2187	6.2108	2.178	0.8613

Source: World Development Indicators, World Data Bank

Country		Code
Brunei	=	1
Cambodia	=	2
Indonesia	=	3
Laos	=	4
Malaysia	=	5
Myanmar	=	6
Philippines	=	7
Singapore	=	8
Thailand	=	9
Vietnam	=	10

2. Stata Output of Random Effects Model

Random-effects GLS regression

Number of obs = 160

Group variable: countries

Number of groups = 10

R-sq: within = 0.1497

Obs per group: min = 16

between = 0.1744

avg = 16.0

overall = 0.1692

max = 16

Wald chi2(3) = 27.85

corr(u_i, X) = 0 (assumed)

Prob > chi2 = 0.0000

fdi	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
gdp	.2693569	.0811724	3.32	0.001	.110261	.4284519
ur	-.5913804	.1829802	-3.23	0.001	-.9500151	.2327458
trade	.4372901	.1885512	2.32	0.020	.0677366	.8068437
_cons	4.859085	1.541896	3.15	0.002	1.837024	7.881146

sigma_u | 4.1374853

sigma_e | 2.390643

rho | .74970727 (fraction of variance due to u_i)