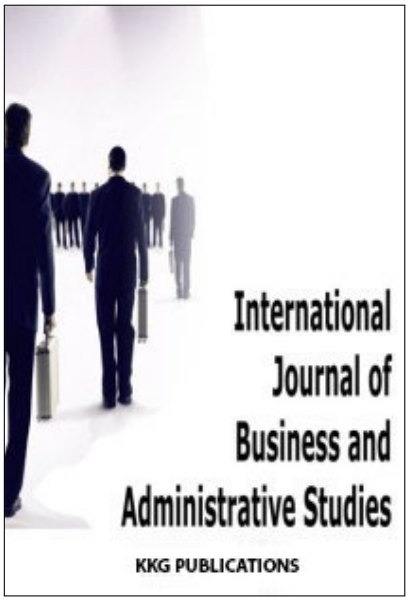

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Published online: 05 December 2015

To cite this article: Phyoe, E. E. (2015). The Relationship between foreign direct investment and economic growth of selected ASEAN Countries. *International Journal of Business and Administrative Studies, 1*(4), 132-146.
DOI: https://dx.doi.org/10.20469/ijbas.10002-4

To link to this article: http://kkgpublications.com/wp-content/uploads/2015/12/IJBAS10002-4.pdf

International Journal of Business and Administrative Studies
2015, 1(4), 132-146

IJBAS

THE RELATIONSHIP BETWEEN FOREIGN DIRECT INVESTMENT AND ECONOMIC GROWTH OF SELECTED ASEAN COUNTRIES

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Keywords:
Foreign Direct Investment
Economic Growth Theory
Panel Unit Root
Panel Granger Causality
Panel Ardl Approach
Selected Asean Economies

Received: 03 March 2015
Accepted: 20 May 2015
Published: 05 December 2015

Abstract. This research examines the relationship between foreign direct investment and economic growth of selected ASEAN nations, namely Myanmar, Singapore, Thailand, Malaysia, and Indonesia, over the study period from 1991 to 2013. In theoretical terms, the neoclassical growth and endogenous growth theories have been mainly applied to support this study. The different methods of Levin, Lin and Chu (LLC) (1992), Im, Pesaran and Shin (IPS) (1997), and Fisher-Type unit root tests were used to analyze our data set to determine whether they have a unit root or, if not, whether they are stationary. This resulted in some being stationary at the I(0) and some stationary at I(1). In addition, the Panel Granger Causality test was carried out and found that there is only one-way causality from Gross Domestic Product (GDP) to Foreign Direct Investment (FDI); the country's economic prospects attract foreign direct investment inflows of the selected countries. Choosing the panel ARDL approach is proper for this study because it can analyze long-run and short-run dynamics even when the variables are a mix of stationary and non-stationary time series. Pooled Mean Group (PMG), Mean Group (MG) and traditional Dynamic Fixed-Effect Estimator (DFE) were used to forecast the short-run and long-run relationship between variables. As the PMG and DFE are efficient estimation methods according to the Hausman Test, we cannot conclude that foreign direct investment has a positive or negative impact on the economic growth in the long run as the results are not significant, but the FDI's impact on GDP is positive in the short-run at the panel level. As the second of individual-level findings, FDI of Myanmar, Thailand, and Singapore has a favourable impact on the growth process of their economies except in Malaysia and Indonesia. Moreover, the trade openness impact is either positive or negative on GDP for Malaysia, while it shows negative in Myanmar. Furthermore, the effect of exchange is significantly negative on the economic performance of the country's GDP of Thailand, Singapore, Malaysia, and Indonesia.

INTRODUCTION

The rapid integration of production and financial market has been the most prominent face of globalization over the last decade; trade and investment are the basic driving forces behind the globalization. FDI has become a vital role which is driving economic growth around the world. In fact, the importance of FDI is much higher in developing countries. It shows that how the FDI is very important for developing countries, especially, Myanmar. FDI is a foreign investment for the host country. It has an impact on physical capital stock and spillover of technological progress throughout these two basic transmission channels; thus FDI generates the growth rate on output. Therefore, all the countries, both developed and developing economies in the world have been trying to attract FDI for many decades.

FDI has been thought as a potential mechanism for economic prosperity even though especially for the third-world. Thus if those countries open the doors for Multinational Enterprises (MNE), it will be an increasing trend of development regarding that FDI would flow economic improvements. And it can also be considered as the main source of external finance and one of the two important elements in lower-income countries and reducing poverty. In economic terms, FDI is the investment made by foreign countries in a country. FDI can be an important factor to improve the technical process, advance technology, and improve the quality of products and human resources as the advantages of it. It can also create jobs in an effort to increase productivity and the need for skilled and semi-skilled workers, hence, to further reduce unemployment and thus reduce social problems. According to the IMF, FDI refers to an investment made to acquire lasting long-term interest in enterprises operating outside of the investors. The investment is direct because the investor, which could be a foreign person, company, or group of entities, is seeking to control, manage, or have significant influence over themforeign enterprise.

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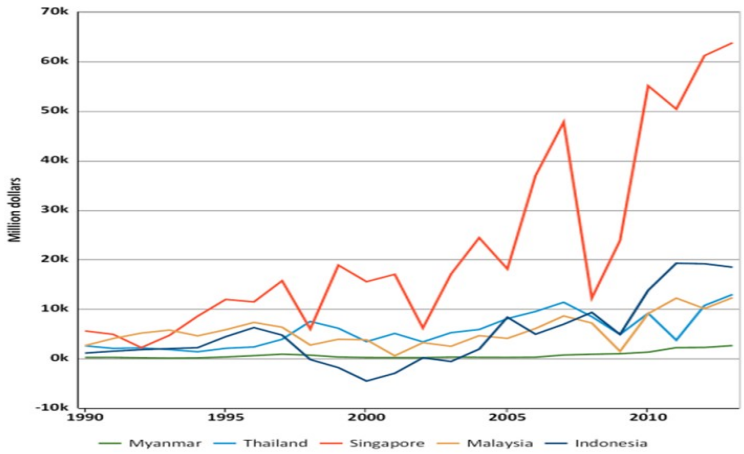
This paper focuses on selected ASEAN economies, one of less-developed countries, Myanmar, and most developed countries such as Indonesia, Thailand, Malaysia, and Singapore, members of the AEC countries during the period of 1991 to 2013, for 22 years. The members of ASEAN have benefitted greatly from FDI, and their investment policies have evolved around this development. This study aims to analyze the impact of FDI on economic growth in different countries. Myanmar's economy has been reformed since 1988, adopted market-oriented economy and then welcomed FDI inflows. There are many scholars who have studied about the impact of FDI on economic growth in different aspects and resulted differently. According to the previous study of Myanmar authors using descriptive methods over the study period from 2000-2001 to 2010-2011, it was found out that the growth of Myanmar's economy does not depend on the foreign direct investment (Myint, 2012).

Myanmar has quite a smaller FDI if we compare it to other countries in this study shown in Figure-1. In the process of Thailands economic development, FDI has played an important role. It sustained the rapid rate of growth with the growing of FDI and exports. Since the 1994, FDI of Thailand has increased continuously. Since 1990, Malaysia has become one of the fastest growing economies in the Southeast Asian region and the third richest followed by the Brunei and Singapore. The FDI liberalization policy was one of the important factors behind the massive inflows of FDI into Malaysia in the late 1980s and boosted the economy of Malaysia. (Har, Teo & Yee, 2008) also proposes that FDI has been seen as a key driver for Malaysian economy: FDI has the significant positive impact on the economic growth of Malaysia, in other words, FDI and economic growth are positively related.

Another finding is that there is a positive relationship between FDI and economic growth only in the high income countries (Honking, Japan, Singapore, Taiwan and South Korea) and middle income countries (Indonesia, Malaysia, Thailand, China, India and Philippines) which have the appropriate economic structure. In other words, FDI does not necessarily enhance the economy of its host countries unless there exist the appropriate economic conditions. But for the lower income countries, there is no positive relationship between FDI and growth of economies. The reason is that lower income countries (Myanmar, Cambodia, Laos and Vietnam) have lower ability to absorb the benefits of FDI like technology transfer from developed countries to host countries (Kotrajaras, 2010). Pradhan (2009) also found that there is bidirectional causality between two variables, FDI and economic growth in only four countries (Indonesia, Singapore, Thailand and Philippine) except Malaysia among ASEAN-5 countries.

FIGURE 1
FDI Inflows of Selected ASEAN Countries



Source. United Nations Conference on Trade and Development

Apparently, the above Figure 1 shows that Myanmar's FDI inflow is the smallest among the other countries. The FDI inflow of Singapore shown by the red line is significantly higher and larger than the rest. However, in early 2009, Indonesia was behind Thailand and Malaysia, but during later years it became second to follow Singapore. More specifically, during the financial crisis of 1997 the FDI inflows of those selected countries had declined in the 2008 financial crisis as shown in Figure 1.

There have been numerical empirical studies that have investigated the FDI effect on growth of economies across different countries with different techniques. These ASEAN member countries have been studied as well. This research focuses on ASEAN-5 countries, the most developed countries with

Thailand, Singapore, Malaysia, and Indonesia being member states. One question comes that whether FDI plays a vital role in their economic achievement. Myanmar, one of the least developed countries, has the lowest FDI inflows, so, it can be learnt from the other nations using panel ARDL approach.
The main objective of this research is to analyze the impact of FDI on economic growth over selected ASEAN nations. More specifically this study tries to answer this question: whether FDI causes the economic growth of countries; if not whether the prospects of host countries attract inflow of FDI through Granger Causality test.

Theory

This section presents a brief of economic growth theory which is related with this research paper. A detailed theoretical background will be expressed in the subsections 2.1, 2.1.1 and 2.1.2.

Economic Theory

Theoretical background and empirical model will be discussed in this section. Since we know FDI and export are major factors that stimulate the capital stock, advanced technology through technology spillover and hence lead to rapid economic growth for host country. Due to this reason, Solow Swan model and endogenous growth theory, two main theories are taken into account in order to support this paper.

The Neoclassical Growth Theory

The neoclassical economic theory is an extension of Harrod-Domar growth model. All the theories depend on assumptions which are not so true. It is what the theory made by (Solow, 1956) states. Solow's neoclassical growth model assumes that only one commodity and output are represented as Y_t in the whole economy. Labor (L), capital (K) and Knowledge or effectiveness of labor (A) are assumed as the important factors to produce output (Y) in this model. Then we get the following fundamental production function:

$$Y_t = F(K_t, L_t, A_t) \tag{1}$$

$$A_{t+1} = (1 + g_A)A_t \tag{2}$$

A_t is the technology level at time t, g_A is the exogenous growth rate of it, capital stock K_t and labor supply L_t respectively. In the equation (1), the technological progress is labor augmenting, in the other words; it stimulates to increase the amount of labor. Therefore, there is technical progress "capital augmenting" or "neutral" technological progress $Y_t = F(K_t, L_t)$. And here F is assumed to be a production function of "neoclassical". In this model, the key point is that in the entire economy there is only one commodity and the production of the good, denoted as Y_t. And the rest of outputs are assumed to be consumption, saving and investment. In the production function, capital (K), labor (L) and technology level (A) are key factors to make production the output.

Endogenous Growth Theory

In the Solow's model the growth rate is taken into account as the exogenous meaning that theory is not able to describe why growth rates (especially the rate of technology progress) might change from one period to another and as the second, neo-classical growth theory is failing to explain the large and lasting differentials in per-capita income that we analyze across countries and regions. Moreover, some economists and policy makers find troublesome that the neo-classical growth models provide no mechanism by which the saving rate and investment rate can affect the steady state of growth. Behind the endogenous growth model, the principle engine is the elimination of decreasing returns to capital assumption. And Romer's model commonly reverts to the simple Solow assumptions about saving (Parker 2012). For new growth theorist, Romer (1990) "innovation or technical change, the embodiment in production of some new idea or invention that enhances capital and labor productivity, is the engine of growth". Paul M. Romer was the first who formulated this growth model with technical progress resulting from deliberate actions taken by private agents who respond to market incentives.
And his theory was based on the following three premises,
1) Technological change and capital accumulation are key factors to drive the Economic growth; technological progress gives the incentives to accumulate capital stock continuously and both are taken into account to increase the output per hour worked. Thus this model resembles the technological change of Solow (1956) model.
2) Technological progress results from deliberate actions taken by private agents who respond to market incentive. This is the reason why this model is endogenous rather than exogenous technological progress.
3) Technological knowledge is a non-rivalrous input (modeled as positive knowledge spill-overs).
The aim of this model is to explain the process and growth rate from the resulting of invention and consequent technological progress. This model includes four basic inputs, capital, labor, human capital and the level of the technology (Romer, 1990). Model focuses on technological change that arises from the foreign investment. In this model, the standard growth model takes the simple Cobb-Douglas form of production function,

$$Y = A(t)K^{1-\beta}L^{\beta} \tag{3}$$

Where *A(t)* = the level of technology, *K* = capital and *L* = labor. Then we can express the output in per capita terms divided by the labor supply,

$$\frac{L}{A} = y = A(t)K^{1-\beta} \tag{4}$$

We will get familiar with the equation of growth accounting, if we take log of equation (10) and differentiate with respect to time,

$$\frac{y'}{y} = \frac{A'}{A} + (1-\beta)\frac{k'}{k} \tag{5}$$

Or

$$\hat{y} = (1-\beta)\hat{k} + A \tag{6}$$

Equation (11) relates to the growth in per capita income to the capital labor ratio growth and productivity growth (Ickes 1996).

LITERATURE REVIEW In this part, we will review the previous empirical studies briefly. Many researchers analyzed whether the FDI has the positive effect on economic growth in different aspects. Then they found out that Foreign Direct Investment and economic growth are positively related in the long-run. Alfaro (2003) has studied at the sectorial level of 47 countries for the period 1981-1999 and aims to emphasize the foreign direct investment and economic growth. He analyzed the impact of FDI on growth in the sectors of primary, manufacturing, and services by using cross-country data. In order to focus on the different type of FDI on economic growth, the cross-section regressions have been used in this paper. And then he observed that there is a positive effect on growth in the manufacturing sector, while investment in the primary sector has negative impact. But there is an ambiguity in the service sector. Geijer (2008) has taken another aspect of single country's FDI of Mexico from 1993 to 2007. This paper intended to analyze whether the FDI has any impact on the economic growth of Mexico and employed a dynamic adjustment model to investigate the dependency of ln GDP per capita on ln FDI with two different sources to see if the results are different. He used GDP per capita as dependent variable with a multiple regression analysis in order to find out the possible effects on economic growth. The results were like the previous studies that there is a positive effect of FDI through knowledge and technological spillovers on economic growth of Mexico.

Ismail, Smith and Kugler (2009) have examined about the role of AFTA in the increasing ASEAN countries' attractiveness for FDI from non-members and members during the period from 1995 to 2003. In this study they analyzed the analysis of cross section and panel data using the gravity model. They considered the two major effects, the effect of REI on intra-regional FDI flows and the effect of REI on extra-regional FDI flows. Then found out that the investment between members of ASEAN-5 countries is less than the investment in the new members of ASEAN. And the investment of European countries increases than any other region. Additionally, the US and Japan invested more in ASEAN-5 than the new members.

Durnel (2012) studied the effect of FDI on Turkish economy at the individual sector level from 2000 to 2009 for ten sectors. The author employs the panel data techniques in order to avoid the unobserved sector-specific effects and reduce the omitted variable bias. And then Granger-Causality, Arellano-Bond Dynamic Panel-data estimation with one step GMM estimator techniques are also used to accomplish the research. In his findings, FDI has a positive impact on the growth rate of overall economy of Turkey and most beneficial growth rate was in some sectors like Manufacturing, Electricity, Wholesale and Retail Trade sectors and Gas and Water. Additionally, he also found out the one way causality that only FDI caused GDP.

Ramirez and Tretter (2013) have taken another aspect in order to find out significant determining factors of FDI inflows employing panel data analysis across Southeast Asian Countries from 1995 to 2011. The panel fixed-effects regression has been used to investigate the effect of foreign investment policies on the flows of FDI among eight ASEAN member countries, Brunei had not been considered due to lack of data. The findings of this paper are that real exchange rate and FDI inflow are statistically significant and negative relationship exists between them. Then, they try to explain that as the market of Myanmar is not particularly bigger with the larger population, so, there is more potential in larger labor force and consumer base would properly lead to increase the GDP of the country in the future.

Another study of single country is the FDI impact on economic growth of Ethiopia based on annual time series data for the period from 1974 to 2011. It examines how FDI effects on GDP growth and estimates three different growth model specifications to analyze the connection between FDI and economic growth using Ordinary Least Square (OLS) method. Then results say that FDI has a positive and statistically significant effect on contemporary economic growth for lagged two years. Although FDI had positive impact on economic growth in early 1990s of trade liberalization but has been found to produce statistically insignificant effect. Furthermore, when FDI assumes that it has a positive impact, and hence, the positive impact of domestic investment on economic growth has become less, the effect of crowding out of FDI on domestic investment becomes prominent (Menamo, 2014).

Chung (2014) has examined in another aspect of the impact of horizontal and vertical FDI on host countrys economic growth in the ten member countries of the Association of Southeast Asian Nations (ASEAN) over the period from 1995 to 2011 by using an unbalanced panel data analysis. In the findings of this

research, HFDI and VFDI inflows have a positive impact on growth in Southeast Asia. And there is only an insignificant sign of HFDI outcomes while VFDI variable has significant negative results in four regressions. These insignificant effects on growth are not as expectedd. As the weak point of this paper, the effects of HFDI on growth might be larger than the effects of VFDI on growth; the facts in the VFDI are found to produce significant negative results.

LITERATURE REVIEW REGARDING MYANMAR'S CASE

Cho (2007) has studied the FDI and economic development of Myanmar from 1989 to 2006. The descriptive method has been applied in this paper. The main purpose of this paper is to investigate the critical role of FDI in the economic growth of Myanmar and attempts to examine the issues of Myanmar for the lower FDI inflows relative to ASEAN countries and dialogue partner countries and also to study how Myanmar can learn from the other countries. The FDI inflows have increased dramatically before the 1997 financial crisis, but declined in the later years until 2003 is discovered. And then during 2004 and 2005, the inflows of FDI fluctuated. Moreover, as the effect of Asian financial crisis, the inflows of FDI in hotel and tourism sectors declined sharply over the period of 1996 to 2006.

Htwe (2007) studied taking the another aspect on the interrelationship between FDI and human resource capacity in ASEAN-4 for the period of 1980 to 2004 using descriptive method. This paper attempts to compare human resource competitiveness indicators in ASEAN-4, namely, Malaysia, Thailand, Indonesia and the Philippines for these countries. The results suggest that the percentage increase in labor costs and productivity in these four economies is relatively small as compared to that of the Asian Newly Industrialized countries (NICs). According to some indicators the educational achievement is relatively high in these four countries, even the technological progress is still relatively slow. And also the intensity of skilled and knowledge-based professionals in ASEAN-4 is still remaining in lower rate.

Khine (2008) illustrated about the Foreign Direct Investment Relations between Myanmar and ASEAN implying Descriptive statistics method. The author tries to explain that FDI is a key solution for Myanmar in order to reduce the development gap with leading ASEAN countries. After adopting the market-oriented economic policy, FDI policy has been enacted to boost the FDI inflows of Myanmar. ASEAN member countries are main investors in Myanmar as compared to other nations of the world. Thailand is the largest investor in Myanmar, followed by Singapore and Malaysia among the member countries. Totally about 65 percent of FDI inflows are into the gas, power and oil sectors and then the author points it out that Myanmar should be aware of the effect of policy while opening up and encouraging the foreign investors of ASEAN countries to other potential sectors.

Myint (2012) has examined the foreign direct investment in Myanmar over the period from 2000-2001 to 2010-2011. This paper intends to examine the rapid growth of the economy and the situation of foreign direct investment in the economy of Myanmar using descriptive method with available statistical data and secondary data. The results say that the economic growth of Myanmar over the study period did not depend on the foreign direct investment. In other words, the effects of FDI could not facilitate the development process of Myanmar.

THEORETICAL FRAMEWORK

In order to analyze the relationship between FDI and economic growth, the selected ASEAN countries, namely, Myanmar, Thailand, Indonesia, Malaysia and Singapore are the major consideration of this research paper. Based upon the above equation, the model will be specified as the following simple model,

$$GDP_{j,t} = f(FDI_{j,t}, EXR_{j,t}, DOP_{j,t}) \qquad (7)$$

Where,

$GDP_{j,t}$ = the gross domestic product in different countries specified as *j* at time *t*

$FDI_{j,t}$ = the foreign direct investment inflows in different countries specified as *j* at time *t*

$EXR_{j,t}$ = the exchange rate in different countries specified as *j* at time *t*

$DOP_{j,t}$ = the sum of export and import divided by GDP for different countries specified as *j* at time *t*

The equation will be expressed as follows,

In this model, FDI and GDP are taken as the growth rate.

There are three types of openness defined by the (Yanikkaya 2003) the first degree of openness defined as the Export plus Import divided by the GDP, a second degree of openness as the ratio of import and GDP and third degree of openness as a proxy for trade orientation. But many scholars accepted the first degree measurement of openness mostly.

In this model, only three control variables, FDI and, EXR and DOP are considered without taking into account the other factors, the magnitude of all those variables that have impact on growth will be collected in the error term. Commonly, most of scholars have studied with single time-series analyses or single cross-section analyses, however, panel data analysis has become more popular and more used in macro-economic analyses. In this study, panel ARDL approach and panel unit root, that later turned to panel Granger-Causality test and panel

ARDL, will be mainly used to examine the relationship between FDI and economic growth in the long-term and analyze causal relationship between variables.

RESEARCH METHODOLOGY

Panel Data Analysis

Panel data are repeated measures of one or more variables on one or more persons (repeated cross-sectional time-series). Panel data or longitudinal data are the data sets that contain time series observations of individual number which can provide multiple observations for individual sample. Thus, the panel data observations include at least two dimensions called cross-sectional dimension (indicated by subscript i) and a time-series dimension (indicated by subscript t). From the advantages point of view of Panel data, they are more accurate inference of model parameters. Secondly, it has the greater capability for capturing the complexity of human behavior than a single cross-section or time-series data. Finally, the calculation is also simplified and draws inference statistically (Hsiao 2007). Durnel (2012) points out that by using panel data method, we can control unobserved sector-specific effects and can also reduce the omitted variables bias.

Panel Unit Root

Panel unit root test emerged from the testing of time series unit root and it has become popular and widely used in most empirical studies. Every individual unit root test has limited power. And it has become a standard procedure in time series analyses. Panel unit root tests are similar, but they are not identical. In our analysis, Eviews software packages are used and will be reviewed by different kinds of unit root tests according to Levin and Lin (2002) and Madala and Wu (1999) that are available in the packages and we will also follow the work of (Hurlin and Mignony 2006; Hoang & Mcnown 2006; Barbieri 2006; Hlouskova & Wagner 2005).

Levin et al. (2002) suggests the following hypotheses,

Null hypothesis,

H_0 = each time series contains a unit root

Alternative hypothesis,

H_1 = each time series is stationary

LLC considers a model in which the lagged dependent variable's coefficient is restricted to be homogenous across all units of panel. Then the model is specified as below,

$$\Delta Y_{i,t} = \beta_i \rho_i y_{i,t-1} + \sum_{z=1}^{\rho_i} \sigma_i \Delta Y_{i,t-z} + \mu_{i,t} \qquad (8)$$

$N, t = 1, ..., T$

Where, the errors term $\mu_{i,t} i.i.d(0, \sigma^2_{\mu_i})$ are assumed to be independent across the units of the sample. And Levin and Lin tests assume that $\rho_i = \rho$ for all *i* and are interested in testing the null hypothesis,

$H_0 : \rho = 0$

Against the alternative hypothesis,

$H_1 : \rho_i = \rho < 0$

For all $i = 1..., N$, with a supplementary assumption about the effects of individual. Since the autoregressive parameters are identical across the panel, the alternative hypothesis is restrictive (Pesaran, Shin & Smith, 1999).

The Im, Pesaran and Shin test is based on the cross-sectional independence assumptions. As the opposite of LLC, IPS test allows for heterogeneity in the value of ρ_i under the alternative hypothesis. The model has been constructed with individual effects and without time trend as follows,

$$\Delta y_{i,t} = \beta_i + \rho_i y_{i,t-1} + \sum_{z=1}^{\rho_i} \delta_{i,z}, \Delta y_{I,t-z} + \mu_{i,t} \qquad (9)$$

Null and alternative hypotheses are defined as:

$H_0 : \rho_i = 0, i = 1, 2, ..., N$

And the alternative,

$H_1 : \rho_i < 0, \qquad i = 1, 2, ...N_1, \rho_i = 1,$

$i = N_1 + 1, N_1 + 2, ..., N$

The alternative hypothesis of IPS let for some (but not all) of the individual series to have unit roots. Thus, they use separate unit root tests for the N-cross section.

Fisher-Type Test

The unit root tests of LLC and IPS have been reviewed in the previous section. This section will present Fisher-type test which is based on *p*-value with a long history in meta-analysis while IPS uses an average statistic. According to Maddala and Wu (1999) and Choi (2001) the Fisher-type test uses *p*-values from unit root tests for each cross-section *i*. In order to test unit root in panel data, they proposed the use of a non-parametric Fisher-type test which is based on a combination of the *p*-values of the test-statistics for a unit root in each cross-sectional unit. The test formula is defined by Maddala and Wu (1999) and Choi (2001) as follows,

$$P_{MW} = -2 \sum_{i=1}^{N} lnp_i \qquad (10)$$

The test is asymptotically chi-square distributed with 2N degrees of freedom ($T_i \to \infty$ for finite *N*). It tests the significant levels for rejecting the null for unit root instead of using *t*-test values. The hypothesis of Fisher-type test is the same as IPS that, the null hypothesis is: $H_0 : \rho_i = 0$ for all $i = 1, ..., N$ (means that all the time series are unit roots) and the alternative hypothesis defined as: $H_1 : \rho < 0$ for $i = 1, ..., N_1$ (means that some i is non-stationary) with $\rho_i = 0$ for $i = N_1 + 1. .... N$

with $0<N_1 \leq N$. As the advantages of Fisher-type test, it does not need a balanced panel as in case of IPS test. Secondly, it can be carried out for any unit root test resulting. And as the third advantage, it is also possible to use different lag lengths in the individual ADF regression (Barbieri, 2006).

Panel Granger Causality

In order to analyze the panel granger causality test between three variables; GDP, FDI and DOP of this research paper, we followed the work of Eviews package. And panel granger causality test was carried out by the following models.

Part. i) Between GDP and FDI

$$GDP_{i,t} = \alpha_{o,i} + \alpha_{1,i} GDP_{i,t-1} + \ldots + \alpha_{1,i} GDP_{i,t-1} + \beta_{1,i} FDI_{i,t-1} + \ldots + \beta_{1,i} FDI_{i,t-1} + \varepsilon_{i,t} \quad (11)$$

$$FDI_{i,t} = \alpha_{o,i} + \alpha_{1,i} FDI_{i,t-1} + \ldots + \alpha_{1,i} FDI_{i,t-1} + \beta_{1,i} GDP_{i,t-1} + \ldots + \beta_{1,i} GDP_{i,t-1} + \varepsilon_{i,t} \quad (12)$$

Part. ii) Between GDP and DOP

$$GDP_{i,t} = \alpha_{o,i} + \alpha_{1,i} GDP_{i,t-1} + \ldots + \alpha_{1,i} GDP_{i,t-1} + \beta_{1,i} DOP_{i,t-1} + \ldots + \beta_{1,i} DOP_{i,t-1} + \varepsilon_{i,t} \quad (13)$$

$$DOP_{i,t} = \alpha_{o,i} + \alpha_{1,i} DOP_{i,t-1} + \ldots + \alpha_{1,i} DOP_{i,t-1} + \beta_{1,i} GDP_{i,t-1} + \ldots + \beta_{1,i} GDP_{i,t-1} + \varepsilon_{i,t} \quad (14)$$

Part. iii) Between FDI and DOP

$$FDI_{i,t} = \alpha_{o,i} + \alpha_{1,i} FDI_{i,t-1} + \ldots + \alpha_{1,i} FDI_{i,t-1} + \beta_{1,i} DOP_{i,t-1} + \ldots + \beta_{1,i} DOP_{i,t-1} + \varepsilon_{i,t} \quad (15)$$

$$DOP_{i,t} = \alpha_{o,i} + \alpha_{1,i} DOP_{i,t-1} + \ldots + \alpha_{1,i} DOP_{i,t-1} + \beta_{1,i} FDI_{i,t-1} + \ldots + \beta_{1,i} FDI_{i,t-1} + \varepsilon_{i,t} \quad (16)$$

Where, *t* denotes the time period of the panel data and i denotes the cross-sectional dimension. In the equation (11) GDP is the dependent variable of FDI that is examined to determine whether GDP influences FDI, but in equation (12) FDI is assumed to be dependent variable and the same way will be applied in the equations (13), (14), (15) and (16).

And the hypothesis of Granger-causality test can be expressed as follows;

The null-hypothesis is defined as, $H_0 : \beta_i^k = 0$

(*Y* does not cause *X*)

For all lagged *k* is specified as, $H_0 : \beta_i \neq 0$

(*Y* does cause *X*)

Failing to reject the null hypothesis in this case allows concluding that *X* is not Granger-causing *Y* in all the *N* individuals of the sample.

Panel ARDL Approach

In this research paper, panel ARDL (Autoregressive-Distributed Lag) regression model has been applied considering the problem of large number of estimations. ARDL can test for cointegration and forecast long-run and short-run dynamics while the variables are mixture of $I(0)$ and $I(1)$. Assume that we have data on a number of time periods $t = 1, \ldots T$ and a number of groups $i = 1, \ldots N_1$ and then ARDL model is defined as follows,

Where,

$$y_{i,t} = \sum_{i=1}^{p} \alpha_{i,t-1} + \sum_{i=0}^{q} \beta'_{i,j} x_{i,t-j} + \lambda'_i d_t + \mu_{i,t} \quad (11)$$

$x_{i,t}(k \times 1), d_t(s \times 1) =$, = the vectors of explanatory variables

$\alpha_{i,j}, \beta'_{i,j}, \lambda`_i =$, , = the coefficients of the lagged dependent variables

The regressors of d_t vary over time period while those of $x_{i,t}$ vary over both time periods and groups. As the ARDL approach is suitable with larger number of observations, we can estimate the model for individual group (Pesaran et al., 1999).

The re-parameterization of above equation,

$$\Delta y_{it} = \phi_i y_{i,t-1} + \gamma_i' x_{it} + \sum_{j=1}^{q-1} \alpha_{ij}^* \Delta y_{i,t-j} + \sum_{j=0}^{q-1} \beta_{ij}^* \Delta x_{i,t-j} + \lambda_i' d_t + \mu_{it} \quad (18)$$

$i = 1, 2, \ldots, N$ and $t = 1, 2, \ldots T$

The cointegrated variables feature is their responsiveness to any deviation from long-run equilibrium. This implies that an error correction model, the short-run dynamics of the variables in the system is influenced by the deviation from equilibrium. Then the error correction equation can be formulated from equation (29) as follows:

$$\Delta y_{it} = \phi_i y_{i,t-1} + X_{it} \gamma_i^* + \sum_{j=1}^{q-1} \lambda_{ij}^* \Delta y_{i,t-1} + \sum_{j=0}^{q-1} \Delta X_{i,t-j} \delta_{ij}^* + D \lambda_i + \mu_{it} \quad (19)$$

Where, ϕ= the error-correcting speed of adjustment term After the ARDL approach introduced the PMG estimator, MG estimator and DFE will be discussed in the below subsections.

PMG Estimator

The PMG is an estimator, which contains both pooling and averaging. The estimator allows the intercepts, short-run coefficients and error variances to differ freely across groups, but the long-run coefficients are constrained to be the same. It is the ML that forecasts the long-run coefficient and the group-specific error-correction coefficients that can be calculated by maximizing the following equation with respect to γ.

$$\ell_T(\gamma) = -\frac{T}{2} \sum_{i=1}^{N} \ln 2\pi\sigma_i^2 - \frac{1}{2} \sum_{i=1}^{N} \frac{1}{\sigma_i^2} (\Delta y_i - \phi_i \xi_i(\theta))' H_i (\Delta y_i - \phi_i \xi_i(\theta)) \quad (20)$$

Where, $H_i = I_T W_i (W_i' W_i)^{-1} W_i', I_T$, refers to an identity matrix of order *T*, and $\gamma = (0', \phi', \sigma')'$.

The above equation is under the assumption of $\mu_{i,t}$ that is normally distributed. This estimator referred to as the pooled mean group estimator is used to highlight the pooling effect of homogeneity restrictions on the predicts of the long-run coefficients and the fact that average groups are applied to get group-wide mean estimates of error-correction coefficients and the other short-run parameters of the model.

Pesaran et al. (1999) proposes two different likelihood-based algorithms to calculate PMG estimators. Firstly, the "back substitution" algorithms that only make use of first derivatives

of equation (29) are considered,

$$\hat{\theta} = -\left\{\sum_{i=1}^{N} \frac{\hat{\phi}_i^{\,2}}{\bar{\sigma}_i^{\,2}} X_i' H_i X_i\right\}^{-1} \left\{\sum_{i=1}^{N} \frac{\hat{\phi}_i^{\,2}}{\bar{\sigma}_i^{\,2}} X_i' H_i (\Delta y_i - \hat{\theta}_i y_{i,-1})\right\} \quad (21)$$

$$\hat{\phi}_i = (\bar{\xi}_i' H_i \bar{\xi}_i)^{-1} \bar{\xi}_i' H_i \Delta y_i \quad (22)$$

$$\bar{\sigma}_i^{\,2} = T^{-1} (\Delta y_i - \hat{\theta}_i \bar{\xi}_i H_i)' H_i (\Delta y_i - \hat{\theta}_i \bar{\xi}_i H_i) \quad (23)$$

$i = 1, 2, ...N$

$\bar{\xi}_i = y_{i,-1} - X_i \hat{\theta}^{\circ}$ says starting with an initial estimate of θ and using equations (31) and (32) that we can estimate of ϕ_i and σ_i^2. Then in order to estimate of θ and $\hat{\theta}^1$, those equations have to be substituted in equation (30) until the convergence is achieved. PMG estimator can also be calculated by the familiar Newton-Raphson algorithm which uses both first and second derivatives alternatively.

PMG estimator allows us to investigate the common long-run coefficient without making the less plausible assumption of identical dynamics in individual interest and also allows examining long-run homogeneity without imposing parameter homogeneity in the short-run. The default results of the PMG option include the long-run parameter estimates and the averaged short-run parameter estimates.

MG and Dynamic Fixed Effects

The MG estimator either estimates N separate regressions and computes the coefficient means or pools the data and accepts that the slope coefficients and error variances are identical. There are two general procedures which are commonly adopted in panel data. MG estimator will yield consistence estimations of the average of parameters. It does not consider the fact that certain parameters may be the same across groups. And this estimator allows parameters, intercepts, short-run coefficient, long-run coefficients and error variances not to be the same across groups. The econometric theory suggests that imposing homogeneity causes an upward bias in the coefficient of the lagged dependent variable, and the estimation of MG suggests much faster adjustment than the PMG and DFE. The adjustment coefficient also has smallest standard error in the prediction of MG and it is also consistent for large *N* and *T*.

The Mean Group parameters are simply unweighted means of each coefficient. In this estimator the average long-run coefficient can be obtained in three ways. Firstly, the long-run coefficient can be obtained from the mean of long-run industry-specific coefficients. Secondly, that can be obtained from the average of industry-specific short-run coefficients and finally, from the mean coefficients in the industry-specific cointegrating regressions.

For example, the forecasting of error-correction coefficient of MG ϕ is,

Here the mean and variance of other short-run coefficients are similarly forecasted (Pesaran & Smith, 1995).

Fixed-effect estimation approach could be applied in which time- series data for individual group are pooled and only the intercepts are allowed to differ across groups. If the slope coefficients are not identical, however FE approach produces inconsistent and potentially misleading results. Another extreme is that the model could be fitted separately for individual group and a simple arithmetic average of the coefficients could be computed. And FE is similar to the PMG estimator that restricts the coefficients of the cointegrating vector to be equal across panels. All coefficients from the dynamic FE model are probably similar to the PMG and MG estimators (Blackburne & Frank, 2007).

$$\hat{\phi} = \sum_{i=1}^{N} \frac{\hat{\phi}_i}{N} \quad (24)$$

With the variance,

$$\bar{\Delta}_{\hat{\phi}} = \frac{1}{N(N-1)} \sum_{i=1}^{N} (\hat{\phi}_i - \hat{\phi})^2 \quad (25)$$

Data Collection

In order to make the link between GDP and FDI, there are four variables applied over the period from 1991 to 2013 for selected ASEAN countries. The secondary data are used in this research and the different variables of data come from the different sources. The finding and collection of appropriate data is the biggest challenge of this paper for a wide span of time.

The data of this paper have been collected from six main sources. Data for GDP have been collected from the International Monetary Fund (IMF) and the Statistical Year Books of Myanmar, FDI inflows from the United Nations Conference on Trade and Development, Export (EXP) from the UN statistics Division, Import (IMP) obtained from the World Trade Organization (WTO) and the last one Exchange rate (EXR) got from the Center of International Comparisons at the University of Pennsylvania.

EMPIRICAL RESULTS AND FINDINGS

The empirical results and findings will be expressed in this chapter. Panel unit root results will be presented in the subsection of 7.1. It is an essential step of data for the empirical studies to check whether they are stationary or non-stationary.

Secondly, the subsection of 7.2 will examine the panel granger causality test. Thirdly, this subsection of 7.3 will present the analysis of panel ARDL approach to test for cointegration and

predict short-term and long-term dynamics of variables.

Panel Unit Root Test Results

The different kind of techniques of unit root tests, Levin, Lin and Chu (LLC) (1992) Pesaran Shin and Smith (IPS) (1997), and Fisher-Type are applied to this empirical research. Among the tests LLC (1992) is assumed as common unit root and the IPS (1997) and Fisher-Type tests are carried out in the form of individual unit root process. The LLC test is generally appropriate because it can cover the most general specification for all the pooled variables with inclusion of a constant, a trend and lags (Mathiyazhagan, 2005).The advantage of Fisher-Type unit root test is that it can be applied in almost every set of data (Durnel 2012). According to the test of Persaran-Shin (2003) that did the Monte-Carlo simulations to compare the test that they proposed (IPS) and the Levin-Lin test, with the assumption of no cross-sectional correlation in panels, they showed that the IPS test is more powerful than the LL test.

As the absolute value of statistics is larger than the critical value of normal test at 5%, then it is assumed that the provability value is smaller than 5% level. Otherwise, the data set is stationary. The different unit root tests of results show that we can reject the null-hypothesis for three variables GDP (growth rate), FDI (growth rate), and DOP since P-Values are lower than 5 percent level. Accepting the alternative hypothesis for those three variables, it means that they do not have unit root and all the results of Levin, Lin & Chu, Im, Pesaran and Shin, ADF - Fisher Chi-square and PP - Fisher Chi-square significantly indicate that they are stationary at the level I (0). But, we can see EXR data set contains unit root at the level. Therefore, we need to take the first difference to the exchange rate D (EXR), according to the results shown in Table 5.1, the exchange rate is stationary at I(1) after taking first difference.

Panel Granger Causality Test Results

Pradhan (2009) argues that foreign direct investment and economic growth have bidirectional causality at the panel level of selected ASEAN five countries except Malaysia. In other words, Indonesia, Singapore, Philippines and Thailand have been found out that they have bidirectional causality between foreign direct investment and economic growth not only at the panel level but also at the individual level. And Roy (2012) also found out that Malaysia has no causality between foreign direct investment and economic growth in his study of selected Asian nations. In order to examine the panel granger causality between variables, all of the variables should not have unit roots (stationary).

As the absolute value of statistics is larger than the critical value of normal test at 5%, then it is assumed that the probability value is smaller than 5% level. Otherwise, the data set is stationary. The different unit root tests of results show that we can reject the null-hypothesis for three variables GDP (growth rate), FDI (growth rate), and DOP since P-Values are lower than 5 percent level. Accepting the alternative hypothesis for those three variables, it means that they do not have unit root and all the results of Levin, Lin & Chu, Im, Pesaran and Shin, ADF - Fisher Chi-square and PP - Fisher Chi-square significantly indicate that they are stationary at the level I (0). But, we can see EXR data set contains unit root at the level. Therefore, we need to take the first difference to the exchange rate D (EXR), according to the results shown in Table 5.1, the exchange rate is stationary at I(1) after taking first difference.

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The granger causality tests have been examined between the variables of GDP, FDI and DOP. The Zbar-stat is too small for long-run estimation as the standard error is too big if we compare with the value of coefficient. When we take the coefficient divided by standard error, it will give a small number of Z-statistic. Therefore, the probability of coefficient which responds to Z-statistic will be larger. This leads to the insignificant result of the test. After that we cannot reject null hypothesis rather we accept it. According to the results of above table one-way causal relationship is discovered from GDP to FDI at 0% of significance level. Otherwise, the result indicates that the GDP influences the inflows of FDI of selected ASEAN countries.

TABLE 1
Panel Unit Root Test Results

Methods	Variables	Individual Intercept Level	Individual Intercept and Trend	None
Levin, Lin and Chu	GDP(growth rate)	-7.29290(0.0000)	-6.15134(0.0000)	-6.12916(0.0000)
	FDI (growth rate)	-6.97633 (0.0000)	-5.82043 (0.0000)	-9.58383(0.0000)
	DOP	-2.28855 (0.0111)	-2.63554(0.0042)	0.27817 (0.6096)
	EXR	0.68656 (0.7538)	1.58998 (0.9441)	-0.33185 (0.3700)
		First Difference		
	D(EXR)	-6.57033 (0.0000)	-6.23367 (0.0000)	-7.76284(0.0000)
		Level		
Im, Pesaran and Shin W-stat	GDP(growth rate)	-5.98944 (0.0000)	-4.56156 (0.0000)	.....
	FDI (growth rate)	-8.18177 (0.0000)	-6.94217 (0.0000)	.....
	DOP	-1.80540 (0.0355)	-0.61754 (0.2684)	.....
	EXR	1.88703 (0.9704)	3.20462 (0.9993)	.....
		First Difference		
	D(EXR)	-5.37778 (0.0000)	-4.34289 (0.0000)	.....
		Level		
ADF - Fisher Chi-square	GDP(growth rate)	50.8454(0.0000)	36.4685 (0.0001)	53.4863 (0.0000)
	FDI (growth rate)	71.6251 (0.0000)	55.9690 (0.0000)	93.3543 (0.0000)
	DOP	19.2468 (0.0372)	12.7088 (0.2404)	4.08479 (0.9434)
	EXR	4.61200(0.9155)	2.23153 (0.9942)	3.71919 (0.9591)
		First Difference		
	D(EXR)	45.4773 (0.0000)	35.0053 (0.0001)	70.9338 (0.0000)
		Level		
PP - Fisher Chi-square	GDP (growth rate)	50.4861 (0.0000)	36.7933 (0.0001)	52.0233 (0.0000)
	FDI (growth rate)	121.807 (0.0000)	140.873 (0.0000)	93.2906 (0.0000)
	DOP	18.5858 (0.0459)	13.3396 (0.2053)	4.19092 (0.9383)
	EXR	4.10456 (0.9425)	1.85224 (0.9974)	4.87600 (0.8993)
		First Difference		
	D(EXR)	46.6916 (0.0000)	40.9228 (0.0000)	71.1236 (0.0000)

Source: Calculation

Notes: Null hypothesis; panel data has unit root (assume common unit root process), Alt hypothesis; panel data has not unit root (stationary), *p*- Values are in brackets (...)

PMG, MG and DFE Results

These three estimators consider the long-run equilibrium and heterogeneous dynamic adjustment process as mentioned in above chapter (Demetriades & Hook Law, 2006). These estimators are also calculated by maximum likelihood estimations (Rafindadi & Yosuf, 2013).

TABLE 2
Panel Granger Causality Tests Results

No.	Null Hypothesis:	Zbar-Stat	Prob
Part. (i)	FDI does not homogeneously cause GDP	0.15693	0.8753
	GDP does not homogeneously cause FDI	2.72349	0.0065
Part. (ii)	DOP does not homogeneously cause GDP	0.21584	0.8291
	GDP does not homogeneously cause DOP	1.27914	0.2008
Part.(iii)	DOP does not homogeneously cause FDI	-0.17349	0.8623
	FDI does not homogeneously cause DOP	0.48730	0.6260

Source: Calculation

The granger causality tests have been examined between the variables of GDP, FDI and DOP. The Zbar-stat is too small for long-run estimation as the standard error is too big if we compare with the value of coefficient. When we take the coefficient divided by standard error, it will give a small number of Z-statistic. Therefore, the probability of coefficient which responds to Z-statistic will be larger. This leads to the insignificant result of the test. After that we cannot reject null hypothesis rather we accept it. According to the results of above table one-way causal relationship is discovered from GDP to FDI at 0% of significance level. Otherwise, the result indicates that the growth process of economies GDP influences the inflows of FDI of selected ASEAN countries.

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These three estimators consider the long-run equilibrium and heterogeneous dynamic adjustment process as mentioned in above chapter (Demetriades & Hook Law, 2006). These estimators are also calculated by maximum likelihood estimations (Rafindadi & Yosuf, 2013).

TABLE 3
Results of PMG, MG and DFE Estimations for long-run

Dependent Variable	Independent Variable	PMG Estimation	MG Estimation	DFE Estimation
GDP	FDI	-.0010202(0.889)	-.0054793 (0.839)	.0186282 (0.387)
	DOP	-.9260664 (0.678)	12.99372(0.140)	7.491934(0.001)
	EXR	.0006081 (0.077)	-4.824479(0.414)	.000473 (0.001)

According to the replaced PMG estimation results, the long-run and short-run coefficients determined the relationship between explanatory variables and dependent variable shown in table 3 and table 4 at the panel level. The speed of adjustment in the model equals -0.8685057 with the probability value of 0% level. The significant negative sign of speed of adjustment leads to the conclusion of existence and efficiency of the long-run equilibrium in the model. It means that the model has long-run relationship between the explanatory variables and the dependent variable. A brief of the results indicates that even foreign direct investment has no impact on the economic growth in the long-run, but the FDI positively affects the GDP in the short-run. Moreover, however the EXR has the positive impact in the long-run, in the short-run there is a negative effect on the dependent variable at the first lag.

Estimating the replace MG for the long-run of panel level, the results are not significant at any level. Again, the speed of adjustment is -1.234927 with the probability value of 0% level significantly. Briefly the result shows that there is no significant variable in the long-run to explain GDP, but in the short-run foreign direct investment has negative impact on economic growth measured by gross domestic product. After that, we move to Hausman test to analyze the difference between PMG and MG to find out which one is significant in efficiency estimation method. If the result is not significant we cannot reject null-hypothesis rather we have to accept null hypothesis.

According to the findings of DFE, DOP and EXR have the positive effect on dependent variable of GDP in the long-run, the coefficients say that with 1% increase of DOP and EXR, GDP will increase by 749.1934% and 0.0473%, respectively with the same probability value of 0.001. For the short-run analysis, FDI has negative effect on GDP of first lag. Moreover, the DOP and EXR have negative effect on GDP of second lag and first lag. In more details, a 1% increase of FDI causes GDP to be decreased by 0.61957% at 1% significance level and a 1% increase of DOP will lead GDP to be increased by 709.3441%. In other words, there is a positive relationship between DOP and GDP. To summarize the findings, the FDI has no impact on the GDP while the DOP and EXR impact is positive in the long-run. But in the short-run, we found out that FDI has a negative impact on GDP.

TABLE 4
Results of MG Estimator for Short-run

Dependent Variable	Independent Variable	Lags	PMG Estimation	MG Estimation	DFE Estimation
GDP	FDI	D1.	.0426119 (0.003)	.0619366 (0.152)	.0074941(0.359)
		D2.	-.0220701 (0.009)	-.0368933(0.074)	-.0061957 (0.005)
	DOP	D1.	-2.649117 (0.927)	-42.69978(0.346)	-15.21607 (0.262)
		D2.	-14.61374(0.044)	3.297501 (0.721)	7.093441 (0.016)
	EXR	D1.	-30.59765 (0.106)	-24.50252 (0.406)	-.0081016 (0.000)
		D2.	5.038917 (0.222)	7.248596 (0.545)	-.0015225 (0.389)

Source: Calculation

TABLE 5
Hausman Test

```
. hausman mg pmg, sigmamore

                 ---- Coefficients ----
                 (b)          (B)            (b-B)     sqrt(diag(V_b-V_B))
                  mg          pmg         Difference          S.E.
-------------------------------------------------------------------------
         fdi   -.0054793   -.0010202       -.0044591        .0435802
         dop    12.99372   -.9260664        13.91978        14.25537
         exr   -4.824479    .0006081       -4.825087        9.686604
-------------------------------------------------------------------------
                           b = consistent under Ho and Ha; obtained from xtpmg
        B = inconsistent under Ha, efficient under Ho; obtained from xtpmg

    Test:  Ho:  difference in coefficients not systematic

                  chi2(3) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                          =          1.19
                Prob>chi2 =        0.7562
```

The calculation of Hausman statistics is 1.19 and is distributed as chi square. If the null hypothesis cannot be rejected, we use PMG estimator which is efficient. According to the empirical result we have to accept null-hypothesis since the *p*-value is 75%. In other words, this means that we accept PMG estimator which is an efficient method to use in our analysis. Accepting null-hypothesis equivalent with the rejection of alternative hypothesis which stated that MG estimator is an efficient estimation method.

TABLE 6
HHausman Test

```
. hausman mg DFE, sigmamore

                 ---- Coefficients ----
                 (b)          (B)            (b-B)     sqrt(diag(V_b-V_B))
                  mg          DFE         Difference          S.E.
-------------------------------------------------------------------------
         fdi   -.0054793    .0186282       -.0241075        .0115672
         dop    12.99372    7.491934        5.501784        7.667771
         exr   -4.824479     .000473       -4.824952        5.356199
-------------------------------------------------------------------------
                           b = consistent under Ho and Ha; obtained from xtpmg
        B = inconsistent under Ha, efficient under Ho; obtained from xtpmg

    Test:  Ho:  difference in coefficients not systematic

                  chi2(3) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                          =          0.78
                Prob>chi2 =        0.8538
                (V_b-V_B is not positive definite)
```

Since the probability value is 85%, the null hypothesis is accepted in which DFE is preferred to apply in this research paper. On the other hand, the alternative hypothesis is rejected so the MG estimator is not an efficient method.

TABLE 5
Full PMG (Pooled Mean Group of Individual Cross Section Estimation)

Countries	Dependent Variable	Independent Variable			
		Lags	FDI	DOP	EXR
Myanmar	GDP	D1.	.0827947(0.096)	-110.7028 (0.004)	-.0067438(0.703)
		D2.	-.0411532 (0.218)	-30.62046 (0.370)	-.0186452(0.280)
Thailand	GDP	D1.	.0482223(0.072)	6.280068 (0.684)	-2.730402(0.001)
		D2.	-.0168203(0.261)	5.780102 (0.562)	-.7097744(0.339)
Singapore	GDP	D1.	.0616485 (0.002)	-.0531228 (0.987)	-91.65866 (0.000)
		D2.	-.0429932(0.000)	-.5205933 (0.785)	4.853886 (0.814)
Malaysia	GDP	D1.	.0106144 (0.387)	53.74867 (0.000)	-58.58219 (0.000)
		D2.	-.0042174 (0.434)	-26.32009 (0.011)	21.07004 (0.039)
Indonesia	GDP	D1.	.0097797 (0.269)	37.48157 (0.436)	-.0102762 (0.005)
		D2.	-.0051662 (0.258)	-21.38766 (0.238)	-.0009276(0.810)

Source: Calculation

Since we accept the null hypothesis that PMG estimator is the best estimation method to apply to our analysis, then we analyze full PMG for individual level estimation. The value of speed of adjustment for all individual countries is significant with the probability value of 0% level. In a brief of results, foreign direct investment of Myanmar, Thailand and Singapore has an encouraging impact on the growth process of their economies except Malaysia and Indonesia as shown in the Table 7.

The degree of openness of Myanmar has negative impact on the country's GDP while there is a positive impact on Malaysia's economic growth process. But the other countries such as Thailand, Singapore and Indonesia have found out insignificant results related to the degree of openness. This is because of their larger *p*-values of 68%, 98% and 43% respectively. Moreover, there is a significant effect of exchange rate on the economic performance of country's GDP only for the countries of Thailand, Singapore, Malaysia and Indonesia except Myanmar.

CONCLUSION AND IMPLICATIONS In this research paper, the relationships between FDI and economic growth of selected countries (Myanmar, Thailand, Singapore, Malaysia, and Indonesia) have been examined using the panel ARDL approach. However, many researchers have studied about the impact of FDI on economic growth with different methods and aspects as mentioned in the literature review. In the model, GDP is defined as the dependent variable and it is controlled by three independent variables, degree of openness, foreign direct investment and exchange rate, in order to meet the main objective of this research.

We studied for 23 years over the period from 1991 to 2013 with 115 observations. In the analysis of Granger-causality test between variables GDP, FDI and DOP, the result indicated that one-way causal relationship exists from GDP to FDI. When the economy is getting growth, the inflows of FDI followed in the same direction. In other words, the prospects of economies attract the foreign direct investment inflows of studied individual countries: GDP caused FDI.

Then we analyzed the MG, PMG and DFE estimation methods employed to find out the relationship between dependent and independent variables in the short-run and long-run. By using the Hausman test, the null hypothesis is accepted that PMG and DFE estimators are the best forecasting methods to apply in this study. PMG estimator results confirmed that we cannot say whether foreign direct investment has positive or negative impact on economic growth in the long-run as the results are insignificant. However, the FDI has not only a positive but also a negative effect to the GDP at the significance level in the short-run. Secondly, the results of DFE estimator, gave the same answer between FDI and GDP in the long-run due to insignificant result, but its impact on GDP is negative in the short-run. Therefore, to summarize, foreign direct investment has either positive or negative impact on the economic growth process measured by GDP for Myanmar, Thailand, Singapore, Malaysia, and Indonesia but only in the short-run.

Finally, in the individual level findings of PMG individual estimation method, in Myanmar, the less-developed country among ASEAN member states, FDI is assumed to be important for the growth of Myanmar's economy with the probability value of 9% level. There is a negative impact of trade openness on the GDP of Myanmar significantly. The FDI of Thailand is also supposed to be important as the result confirmed the positive impact on the growth process of Thailand while the impact of exchange rate is negative on the GDP.

One of the most developed countries among the states, Singapore has FDI that can be assumed as key driver of the development of its economy; even the findings were forced to conclude that the impact of FDI is positive or negative on its economy. Moreover, the impact of degree of openness is either positive or negative for Malaysia while Myanmar is negative when found with the *p*-value of 0% or 1% at 0% significance level. In addition, there is a significant negative effect of exchange rate on the economic performance of country's GDP only for the countries of Thailand, Singapore, Malaysia, and Indonesia.

Based on the findings of this research, FDI has a positive impact on the economic growth, especially, Myanmar, Thailand and Singapore. As these three economies are different characters, the government has to deal with different ways to pursue more FDI inflows into the countries in order to be more advantageous for the nations economy. The FDI inflows of Myanmar are quite smaller, the reason may be poor infrastructure to attract foreign investors. Since this research found out that FDI has played positively in the growth process of Myanmar, the government should develop the infrastructure in order to pursue more inflows of foreign investment. Secondly, as major FDI inflows are into the natural gas, fishing and mining sectors, the policy-makers should intend to promote FDI policies for further FDI inflows into the potential sectors such as manufacturing, construction, financial and retail trade to be more beneficial for its economy. Thailand has the larger FDI inflows into these secotors (such as manufacturing, construction, financial and retail trade) which play an important role in the development process of its economy as the previous research found (Puapan 2014). This paper also discovered that FDI impact is positive on Thailand's economic growth, therefore, the policy-maker should strongly aim at the FDI promotion policies to make more inflows of foreign investment.

ACKNOWLEDGEMENTS

First and foremost, I would like to acknowledge the following professors, lecturers, friends, and every individual who shared their knowledge and guidance, and gave useful suggestions to complete this study.

Second, I would like to describe my deepest gratitude to the International Master Program of Economics, Faculty of Economics, Chiang Mai University for giving me the greatest chance to study in this field.

Third, I would like to express my heartfelt thanks to my respected Assoc. Prof. Dr Kanchana Chokethaworn, for her permission to conduct this research and giving her precious time, encouragement, and guidance, to accomplish my thesis. Without her help, this paper could not have been completed.

Moreover, I would also like to express my special thanks to my co-adviser, Lect. Dr. Chukiat Chaiboonsri, who gave much support, helpful comments, and remarks to make this a comprehensive and understandable research paper.

Additionally, I owe my appreciation to my family, brothers, sisters and all my friends for their kindness, encouragement, support, and help during the process of my thesis. Finally, I would like to thank the officers of the Faculty of Economics, Chiang Mai University who helped throughout my research.

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