

Determinants of Bilateral Foreign Direct Investment Intra-ASEAN : Panel Gravity Model

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Abstract

Purpose – This paper aims to find and analyze factors that determine the flows of bilateral foreign direct investment in intra-ASEAN. It specifically focuses on the dimension of macro-economic, natural resources, human resources, and the quality of governance.

Research design, data, and methodology – Data were collected from 64 bilateral relations between ASEAN nations from 2002 to 2013. Panel gravity model was utilized to find factors that determine the flows of bilateral foreign direct investment.

Results – Significant factors were identified that determine the flows of bilateral foreign direct investment: GDP home country, GDP host country, real interest rate, distance, and total natural resources rent. Unexpectedly, natural resources have a negative effect.

Conclusions – In a situation of increasing the flow of FDI among the countries of ASEAN, the government should control the interest rates and maintain good relations with nearby countries. The negative effect of total natural resource rents implies that ASEAN countries should not depend on their natural resources to attract foreign investments.

Keywords: Foreign Direct Investment, Intra-ASEAN, Panel Gravity Model.

JEL Classifications: C23, E22, F2.

1. Introduction

Economic development in the developing countries requires substantial funds. However, their domestic funds still have not been able to finance it. Foreign direct investment (FDI) is one of the sources foreign financing which is expected to be cover-

ing the gap between the economic development and the domestic capital.

Developing countries prefer FDI as foreign capital compared with other investments because of a source of financing FDI foreign financing with the most potential. According to Panayotou (1998) FDI is more important in guaranteeing the continuity of development compared to the flow of aid or capital portfolio, the cause of FDI in a the state will be followed by the transfer of technology, know-how, management skills, business risk is relatively smaller and more profitable.

The determinants of FDI flows can be differ from a one country to another. FDI to developing countries depends on two things. First, the choice of foreign investors to invest. UNCTAD (2006) reveals the motive Multinational Corporation (MNC) to invest are: market seeking, efficiency seeking, resource seeking, and created asset seeking. Second, the ability of developing countries to attract inward investment both in the creation of good investment climate or through the availability of resources. The condition of the host country called pull factor and the condition of the home country called push factor.

The openness of a country to the entry of FDI is characteristic of the globalized economy. Many countries in the world seeking to improve FDI inflows, including countries in South East Asia in Association of South East Asian Nations (ASEAN). ASEAN countries can develop of potential factors to attracting FDI so it can to compete with other countries. By the enactment of ASEAN Economic Community (AEC) which reduced barriers of investment flows, then the effort to increase FDI Bilateral Intra-ASEAN will be more competitive.

Therefore, it is interesting to analyze the determinants of bilateral FDI flows intra-ASEAN, both pull factors and inhibiting factors of FDI flows. This research uses variables based on the some dimensions of the determinants of FDI flows: macro-economic performance, natural resources, human resources, and quality of governance.

2. Literature Review

Generally, FDI was defined as long-term investment is carried on directly by foreign investor. Many determinants of FDI in-

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flows, according to the previous studies such as; political risk, business conditions, and macroeconomics variables (Jun & Singh, 1996), traditional market-related and non-traditional (Nunnenkamp & Spatz, 2002), human resources (Majeed & Ahmad, 2008), and natural resources (Poelhekke & Frederick, 2010). Macroeconomic performance such as GDP, inflation and unemployment is a description of a country economic performance. Macroeconomic performance certainly very influential to the interest of investor other than natural resource and human resource. Moreover, the role of government also can not be ignored in the determining of FDI flows. Quality of governance played an important role of the investment climate in a country.

Therefore, in this study the determinants of FDI flows will be tested include dimensions; macroeconomic (inflation, openness, real interest rates), human resources (percent of productive age population, human development index), natural resources (forest area, total rents of natural resources) and quality of governance (corruption index, political stability index).

3. Methodology

To find out the determinants of bilateral FDI inflows intra-ASEAN is used augmented panel gravity model, arguing that FDI flows between countries resemble the gravitational force of two objects in the model physics. With approach of random effects models were obtained by testing the best models, the transformation model of gravity Bergstrand (1985) in this study is:

$$\begin{aligned} \text{LnFDI}_{ijt} = & \alpha_0 + \beta_1 \text{LnGDP}_{it} + \beta_2 \text{LnGDP}_{jt} + \beta_3 \text{LnD}_{ij} + \beta_4 \text{Inflation}_{it} + \beta_5 \text{Openness}_{jt} \\ & + \beta_6 \text{Interestrat}_{it} + \beta_7 \text{Pop15_64}_{jt} + \beta_8 \text{HDI}_{it} + \beta_9 \text{Coc}_{jt} + \beta_{10} \text{PS}_{jt} \\ & + \beta_{11} \text{Lnforestare}_{it} + \beta_{12} \text{TotalNR}_{jt} + \varepsilon_{ijt} \end{aligned}$$

FDI is the function of GDP of home country (LnGDPit), GDP of host country (LnGDPjt), Distance (LnDij), Openness (Opennessjt), Real interest rates (Interestratijt), percentage of productive age population (Pop15_64jt), human development index (HDIjt), control of corruption (COCjt), political stability (PSjt), forest area (Lnforestareajt), total rents of natural resources (TotalNRjt).

Hypothesis of this study are distance, corruption, political stability, inflation and interest rates have negative affect on bilateral FDI flows intra-ASEAN and GDP, openness, percentage of productive age population, value-added of agriculture, forest area, total rents of natural resources have positive affect on bilateral FDI flows intra-ASEAN.

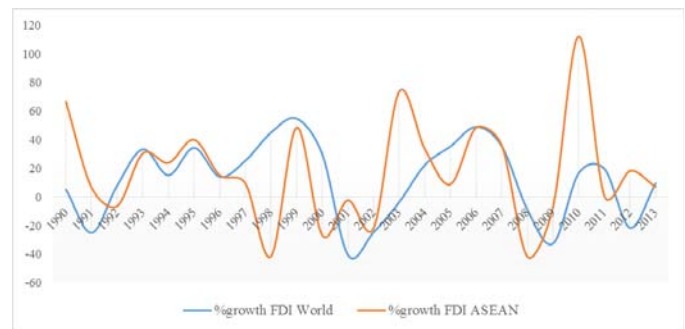
FDI data sourced from ASEAN Secretariat and the United Nations Conference on Trade and Development. GDP data at constant prices, inflation, real interest rates, the percentage of the population of productive age, human development index, total natural resource rents, political stability and absence of violence/terrorism and control of corruption sourced from the World Bank. Openness of data obtained from the ratio between total exports and imports to GDP at constant prices sourced

from the World Bank. Distance data sourced from <http://www.infoplease.com/atlas/calculate-distance.html>. This study includes 64 bilateral relationships from nine ASEAN countries Nine ASEAN Countries: Singapore, Malaysia, Indonesia, Philippines, Thailand, Vietnam, Cambodia, Lao PDR, Brunei Darussalam. in period 2002-2013.

4. Result and Discussion

4.1. FDI Flows of intra-ASEAN

Generally, during 1990 to 2013 trend of growth ASEAN FDI flows have the same trend with trend of growth world FDI flows, although at a few point of time have different trends. This is caused Asian financial crisis happens and especially affecting to ASEAN countries but did not have a global impact <Figure 1>. On the average, the value of ASEAN FDI during 1990 to 2013 reached US\$ 45.39 billion/ year with growth at 17.73 percent/year greater than the growth of world FDI flows were only at 12.07 percent/year.



<Figure 1> FDI Growth ASEAN and World

The amount of FDI in ASEAN countries is certainly sourced from another countries and regions. The amount of FDI in ASEAN countries is certainly sourced from countries and other regions. The existence of countries or regions become as a substantial investors consistently must be a concern of host countries whose receive the investment. FDI are sourced from intra-ASEAN countries have considerable value and look consistent every year <Table 1>.

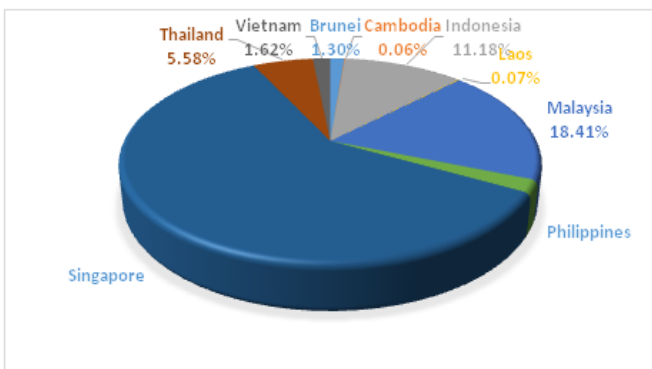
<Table 1> Top Ten Sources of ASEAN Foreign Direct Investments Inflow

Country/Region	FDI Inflow to ASEAN (US\$ Millions)			
	2012	2013	2014	2012-2014
(1)	(2)	(3)	(4)	(5)
European Union (EU)	6.542,3	22.255,7	29.268,5	58.066,4
ASEAN	20.548,8	19.399,6	24.377,4	64.325,8
Japan	21.206,1	21.766,0	13.381,1	56.353,3
USA	14.395,7	4.913,3	13.042,3	32.351,2

Hong Kong	5.480,1	5.230,2	9.504,9	20.215,3
China	5.718,1	6.778,5	8.869,4	21.366,0
Australia	3.219,2	3.489,2	5.703,4	12.411,8
Republic of Korea	1.577,0	3.652,4	4.468,9	9.698,3
Taiwan	2.838,2	1.349,9	2.814,1	7.002,2
Canada	1.048,0	1.030,3	1.264,0	3.342,2
Total top ten sources	82.573,6	89.865,1	112.693,9	285.132,5
Lainya	32.879,3	27.821,9	23.487,5	84.188,7
Total FDI inflow to ASEAN	115.452,8	117.687,0	136.181,4	369.321,2

Source: ASEAN (2015).

If viewed of each country, the country with the largest FDI flows is Singapore with an average of 59.82 percent / year of total intra-ASEAN FDI during 2002 through 2013. Although as the smallest country among other ASEAN countries Singapore able to attract intra-ASEAN FDI is greater than the other ASEAN countries < Figure 2>.



<Figure 2> Average Percentage of Intra-ASEAN FDI Flows in 2002-2013

4.2. Model Estimation

The estimation results of the model between countries ASEAN FDI inflows have been through several stages of statistical tests <Table 2>.

<Table 2> Estimation of Panel Gravity Model

Dependent Variabel : Foreign Direct Investment Inflow (LnFDI)			
Independet variabel	Estimation	Standard error	P-Value
Constanta	-17.3987	4.1782	0.0000
GDP of Home Country (LnGDPit)	0.7253	0.1074	0.0000
GDP of Host Country (LnGDPjt)	0.3994	0.1741	0.0221
Distance (LnDij)	-1.7182	0.3130	0.0000
Inflation	0.0222	0.0148	0.1351
Population 15-65 ages (Pop15_64jt)	0.0548	0.0427	0.2003
HDI (HDIjt)	1.1604	3.0037	0.6993

Real Interest Rate (Interestratejt)	-0.0219	0.0100	0.0293
Openness (Opennessjt)	0.1309	0.1462	0.3711
Forest Area (Lnforestareajt)	-0.0475	0.1075	0.6588
total rents of natural resources (TotalNRjt)	-0.0274	0.0108	0.0120
Control of Corruption (COCjt)	-0.5073	0.2992	0.0904
Political Stability (PSjt)	0.2423	0.1494	0.1053
R-Square	0.1723		
F-Stat (P-Value)	13.1009	(0.0000)	

The regression coefficient shows that the explanatory variables is used on the model have significantly affect to the dependent variable. The dependent variable is able to be explained by the independent variable by 17.23 percent, while 82.77 percent of the rest is explained by other variables outside the model.

4.3. Determinants of Bilateral FDI flows intra-ASEAN

4.3.1. GDP

Every increase of 1 percent of GDP home country, then the flow of FDI destination country will increase 0.725 percent, while ceteris paribus and any increase of GDP host country 1 percent would cause rise FDI flows to the country 0.399 percent while other variables constant. GDP shows the ability of the country's market to produce output of factors production. For the home country, the increase in national income shows that the country's production capabilities an enlarge so that it will increase the ability for investment, both domestic and foreign. For the host countries, the increase in national income will also increase FDI. GDP is an indicator used to measure success of development.

Theoretically, it can be said that the more advanced development the economy of a country the greater its GDP (both in total and per capita) so that the welfare of society is increasing with the assumption growth was higher than population growth. Sukirno (2006) states that a high level of national income will increases public revenues, and further high-income societies will increase demand for goods and services. Then, corporate profits will be increase so that it will encourage more investment.

4.3.2. Distance

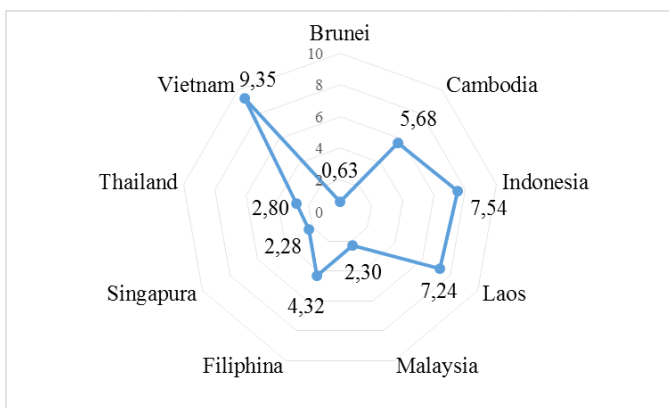
Every one percent the distance between the ASEAN countries increase, it will cause the flow of FDI decreased by 1.718 percent. Distance indicates the elapsed travel time and transportation costs incurred by investors. A long distance between origin and destination countries resulted in increased travel time and increased transportation costs. This tends to happen when the investment directly related to bilateral trade.

4.3.3. Macroeconomic

The estimation results showed that FDI flows affected by real interest rates. Every a rate increase 1 percent, it will cause a

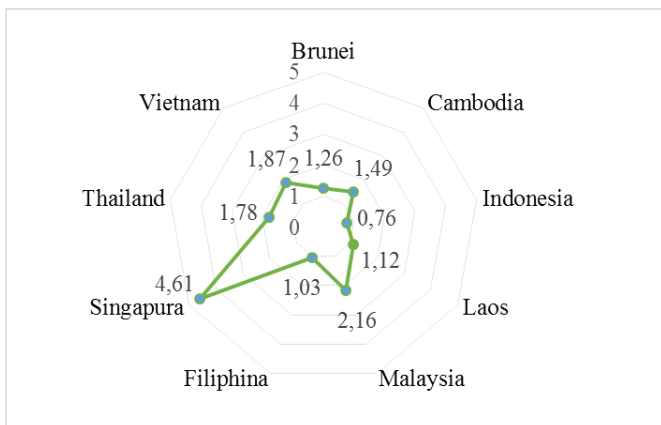
decrease in the flow of FDI into the country by 0.0222 percent while *ceteris paribus*. Samuelson and Nordhaus (2001) stated that apart of inflation, interest rates will affect the cost of the investment. Sukirno (2006) said that if the interest rate is higher than the return on capital, the planned investment is not profitable, so the company plans to invest will be canceled.

The inflation rate has no significant effect on FDI flows because most of ASEAN countries are still able to press inflation rate below 10 percent < Figure 3>. Inflation in the level below 10 percent are still in the category of inflation lightweight so it will not really affect the cost of production. However, inflation uncontrollable reflects instability of a country's economy as a whole and will lead economic instability, social, and political. Therefore, inflation is still necessary to be controlled because if left alone will affect the climate investment.



<Figure 3> Average Rate of Inflation ASEAN Countries in 2002-2013

The openness has no significant effect on FDI flows but the increased openness gives meaning to the decreasing barriers on international trade, so that FDI through companies MNC oriented market-seeking further expand its reach in the international trade sector to meet the needs of foreign markets. One of them, Singapore has the highest average of openness in ASEAN is 4.61 < Figure 4>.



<Figure 4> Average of Openness ASEAN Countries in 2002-2013

4.3.4. Human resources

The estimation results showed that at 5 percent significance there is no variables of human resources have significant affect FDI flows. This happens because of foreign investors do not just look at the availability and quality of productive labor in the country, but also look inexpensive labor costs. As found Kurniati, Prasmuko, & Yanfitri (2007) that the cost of labor and the productivity of existing workers in China are factors that attract Japanese companies to invest in China. However, if viewed from a sign of coefficients, FDI has a positive relationship on the percentage of the population of productive age and IPM. Therefore, the availability of human resources both from an increase in the number and quality improvement is that still need attention.

4.3.5. Natural resources

The estimation results showed that at 5 percent significance there is only one variable of natural resources who has a significant affect on FDI flows. The significant variable is total natural resources rent. Any increase in the total natural resources rent 1 percent, it will cause a decrease in the flow of FDI of 0.0274 percent when *ceteris paribus*. The total natural resources rent increased also showed an increase in depreciation of the value of natural resources that affect foreign investors in investing capital. Depreciation natural resources reduce interest of the investor to invest their money. OECD defines that in the economic sense, total natural resources rent can be divided into nature and the depreciation of natural capital. The total value of the total natural resources rent increased also showed an increase in depreciation of natural resources thus affecting foreign investors to invest. Shrinkage of natural resources reduces investor's interest in investing. This negative relationship is also seen from the ability of Singapore as a country will be minimal SDA but able to attract the largest FDI in ASEAN. Forest has no significant effect on the increase in FDI flows between countries of ASEAN. This is possible happens because of the type of investment is not an investment concentrated in agriculture and forestry so that increase value added of agricultural and forest area does not affect the increase in total FDI.

4.3.6. Quality of Governance

The estimation results showed at 5 percent of significance variable corruption and political stability index has no significant effect on FDI flows. However, the significance of the 10 percent of the corruption index variables significantly influences the flow of FDI. In *ceteris paribus*, it can be interpreted that if the destination countries increased the corruption index 1 percent, the FDI will be decreased by 0.507 percent. This is consistent with the view that says that helping hand corruption becomes the driving direct investment. Leff (1964) and Huntington (1968) corruption argued efficient for several reasons: First, corruption prevail as speed money or fast money, bribes make entrepreneurs avoid the bureaucratic delays. Second, while the structural em-

ployees who earn low wages are not motivated to work coupled with the lack of the responsibility of the bureaucrats can make them not run responsibilities well, then using bribes they will motivated to do the work more efficiently. Tanzi (1998) found investors "bribed" the government in host country will easily gain wider access such as the company's monopoly, and ease of licensing. The conveniences will provide great benefits for investors and willing to "bribe" the government and interested to invest back. Nonetheless, the increase in corruption cases should be avoided because corruption has many negative impacts. Nawatmi (2013) says that the sectors of the economy, the negative impact of corruption would complicate economic development. Political stability index no significant effect on FDI flows.

4.4. Differences among Countries

The individual effects are visible through the cross-section of each effect random effects model of interstate relations is a picture of heterogeneity of relations between countries that can be mutually compared. This matter reflects the presence of unobservable country-effect. Therefore, the individual effects can also be interpreted as the advantages of the interstate relations to relations another interstate (Gujarati, 2003).

The estimation results indicate that the cross-section effect of relationship between countries is very diverse. This indicates that if the variables in the model are ignored then FDI inflows will have diverse changes too <Table 3>. Cross-section effect host country which has the highest value positive is Singapore. There are 5 of 6 Singapore bilateral relations with other ASEAN countries showed a positive cross-section effect coefficient. This indicates that Singapore has the advantage would be other factors outside the model to attract FDI. It's such as advantage in management, science and high technology.

While the destination country that has an intercept with the highest negative value is Thailand. There are 5 of 7 Thailand bilateral relations with other ASEAN countries showed a negative cross-section effect coefficient. This is possible because the government policy specifically against foreign investment. In 2006, issuance of policies on foreign investment as the investment is protected against changes in foreign currency as well as to reduce the stake foreign investors be a maximum of 50 percent.

<Table 3> Cross-section Effect of Bilateral Relations ASEAN Countries

Country	Cross-effect	Country	Cross-effect
(1)	(2)	(1)	(2)
SIN-IND	3,23	THA-MAL	-0,18
SIN-VIE	3,04	BD-THA	-0,22
SIN-THA	2,63	CAM-IND	-0,26
MAL-VIE	1,84	PHI-MAL	-0,28
BD-LAO	1,57	PHI-THA	-0,31
IND-SIN	1,36	MAL-LAO	-0,35

BD-VIE	1,35	THA-CAM	-0,42
VIE-CAM	1,27	THA-LAO	-0,48
MAL-BD	1,10	PHI-IND	-0,52
MAL-CAM	1,05	VIE-LAO	-0,60
SIN-PHI	1,03	THA-BD	-0,60
THA-VIE	0,85	BD-PHI	-0,67
LAO-IND	0,76	VIE-IND	-0,69
LAO-PHI	0,76	IND-VIE	-0,73
MAL-IND	0,73	CAM-MAL	-0,78
SIN-BD	0,70	PHI-BD	-0,82
BD-SIN	0,70	BD-IND	-0,85
BD-MAL	0,65	IND-MAL	-0,92
SIN-MAL	0,63	IND-BD	-0,92
VIE-MAL	0,53	IND-THA	-1,06
MAL-THA	0,53	CAM-VIE	-1,08
CAM-LAO	0,50	PHI-CAM	-1,08
THA-IND	0,49	THA-PHI	-1,13
VIE-SIN	0,48	LAO-VIE	-1,18
MAL-SIN	0,44	VIE-PHI	-1,41
SIN-CAM	0,44	PHI-VIE	-1,50
SIN-LAO	0,23	CAM-THA	-1,52
THA-SIN	0,20	IND-CAM	-1,55
VIE-BD	0,15	IND-PHI	-1,62
LAO-MAL	0,13	LAO-THA	-1,63
BD-CAM	0,10	VIE-THA	-1,85
MAL-PHI	0,08	PHI-SIN	-2,32

5. Conclusion

The determinants of FDI flows between countries of ASEAN can be explained by the panel augmented gravity models using a random effect model. Pull factor FDI flows between countries of ASEAN is the GDP of the host countries and low interest rates. Push factor FDI flows between countries of ASEAN is the GDP of home country. While the factors inhibiting FDI flows between countries of ASEAN are the distance, high interest rates and the total natural resources rent.

Based on these conclusions, to increase the flow of FDI between countries of ASEAN, the government should control the interest rates and maintain good relations with nearby countries. The negative effect of total natural resource rents implies that ASEAN countries should not depend on natural resources to attract the foreign investment.

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