

FOREIGN DIRECT INVESTMENT IN SOUTHEAST ASIA: DETERMINANTS AND SPATIAL DISTRIBUTION

Hong Hiep HOANG

Centre of Studies and Research on International Development (CERDI)
University of Auvergne, CNRS
65 boulevard François Mitterrand, 63000 Clermont-Ferrand (France)
E-Mail : Hong_Hiep.Hoang@u-clermont1.fr or Hoanghonghiep@gmail.com

The DEPOCEN WORKING PAPER SERIES disseminates research findings and promotes scholar exchanges in all branches of economic studies, with a special emphasis on Vietnam. The views and interpretations expressed in the paper are those of the author(s) and do not necessarily represent the views and policies of the DEPOCEN or its Management Board. The DEPOCEN does not guarantee the accuracy of findings, interpretations, and data associated with the paper, and accepts no responsibility whatsoever for any consequences of their use. The author(s) remains the copyright owner.

DEPOCEN WORKING PAPERS are available online at <http://www.depocenwp.org>

**FOREIGN DIRECT INVESTMENT IN SOUTHEAST ASIA:
DETERMINANTS AND SPATIAL DISTRIBUTION**

Hong Hiep HOANG

Centre of Studies and Research on International Development (CERDI)

University of Auvergne, CNRS

65 boulevard François Mitterrand, 63000 Clermont-Ferrand (France)

E-Mail : Hong_Hiep.Hoang@u-clermont1.fr or Hoanghonghiep@gmail.com

Abstract

This paper analyzes the factors of FDI inflows to countries in Southeast Asia over the period 1991 to 2009. The results indicate that the market size, openness of the economy, quality infrastructure, human capital, labor productivity are the main factors that have a positive impact on FDI flows. Additionally, exchange rate policy, real interest rates, political risk and institutional quality also affect FDI flows. Surprisingly, the cheap labor does not help to attract FDI to the region, because foreign investors are particularly interested in labor productivity. This study also showed that the Asian financial crisis in 1997 affects the amount of FDI inflows, but not on the nature of FDI inflows in the region.

Keywords: Foreign direct investment, ASEAN, panel, determinants

JEL Codes: F21, F23, E22

Acknowledgements

I am grateful to Tam Bang VU, René TAPSOBA and Alexandre SAUQUET for their helpful.

I. Introduction

With high economic development achievements in the period 1991-1997, Southeast Asia (ASEAN) has become a *red destination* for international investors in the choice of investment location. In this period, FDI flows to ASEAN reached about 8% of world total FDI, ASEAN is an important component of international investment activities.

The Asian financial crisis of 1997 ended *the golden age* of ASEAN in attracting FDI. Asia in general and ASEAN in particular is no longer a "paradise" in the eyes of international investors, international investment patterns have changed dramatically, FDI flows shifts to developed countries (Table 1). The period 1998-2002, FDI flows into ASEAN declined sharply, along with the deterioration of the economic growth in some ASEAN member countries (Figure 1), the percentage of FDI flows to ASEAN on the total global FDI has fallen significantly from 7,85% in 1996 to 2,76% in 2002.

The success of economic reform and the revival of economic growth after the crisis have boosted FDI flows into ASEAN, FDI in the region rose from 17,33 billion U.S. dollars in 2002 to 24,84 billion U.S. dollars in 2003 and peaked in 2007, which is 73,97 billion U.S. dollars, or 3,52% of total global FDI.

The global economic crisis in 2008 had a negative impact on FDI flows into ASEAN, FDI fell sharply from 74,39 billion U.S. dollars in 2007 to 49,49 billion U.S. dollars in 2008 and continues drop to 39,62 billion U.S. dollars in 2009. Meanwhile, although global FDI has fallen sharply to 2100 billion U.S. dollars in 2007 to 1114 billion U.S. dollars in 2009, but China and India still maintain a high growth rate in the attraction of FDI.

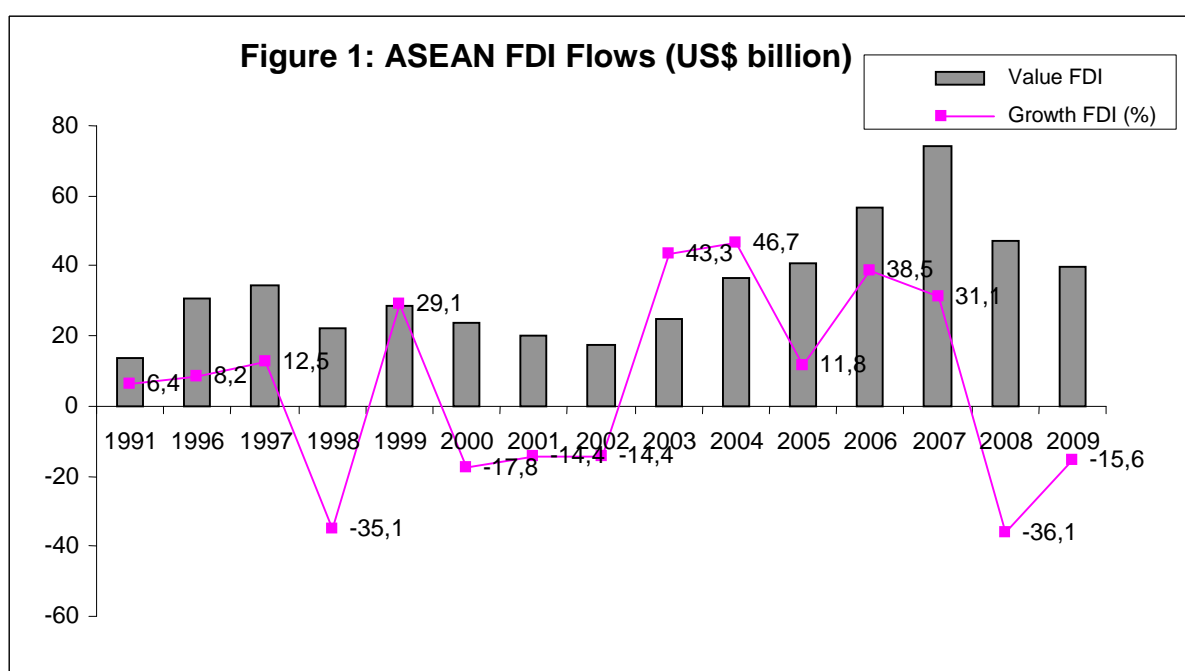
The purpose of this paper is to provide an overview of current distribution of FDI flows into ASEAN, both about the determinants of FDI inflows in the region. The rest of the paper is organized as follows: Section 2 presents the spatial distribution of FDI flows into ASEAN, Section 3 presents the literature review and model specification, Section 4 presents the results, and Section 5 concludes.

Table 1: Share of FDI inflows, selected countries and regions (%)

PAYS/REGION	1991	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
United States	14,80	21,71	21,26	24,67	26,09	22,40	19,32	11,86	9,39	18,55	10,63	16,25	12,66	18,33	11,66
Europe	53,74	33,81	31,86	41,89	48,11	51,72	47,88	50,43	49,47	29,79	51,65	43,07	47,07	31,12	33,96
Australia	1,67	1,20	1,71	1,11	0,22	1,11	1,34	2,40	1,66	5,80	-2,46	2,13	2,17	2,64	2,03
China	2,84	10,73	9,30	6,43	3,71	2,91	5,68	8,40	9,46	8,28	7,34	4,98	3,98	6,12	8,53
India	0,05	0,65	0,74	0,37	0,20	0,26	0,66	0,90	0,76	0,79	0,77	1,39	1,19	2,28	3,11
Japan	0,83	0,06	0,66	0,45	1,17	0,59	0,76	1,47	1,12	1,07	0,28	-0,45	1,07	1,38	1,07
Korea, Republic of	0,74	0,52	0,54	0,72	0,91	0,64	0,50	0,54	0,77	1,23	0,72	0,33	0,13	0,47	0,52
ASEAN	8,86	7,85	7,06	3,15	2,65	1,69	2,45	2,76	4,39	4,97	4,13	3,87	3,52	2,67	3,58
Developing economies	25,82	37,81	39,21	26,97	20,97	18,30	26,01	28,03	32,51	39,86	33,49	29,77	26,90	35,58	42,93
Transition economies	0,13	1,51	2,13	1,14	0,78	0,50	1,15	1,79	3,52	4,15	3,15	3,75	4,33	6,92	6,28
Developed economies	74,04	60,68	58,67	71,89	78,25	81,20	72,83	70,17	63,97	55,99	63,36	66,48	68,77	57,50	50,79
Monde	154	389	486	707	1088	1401	825	628	566	732	986	1459	2100	1771	1114

Note: World FDI flows are in billions of U.S. dollars.

Source: UNCTAD Stat

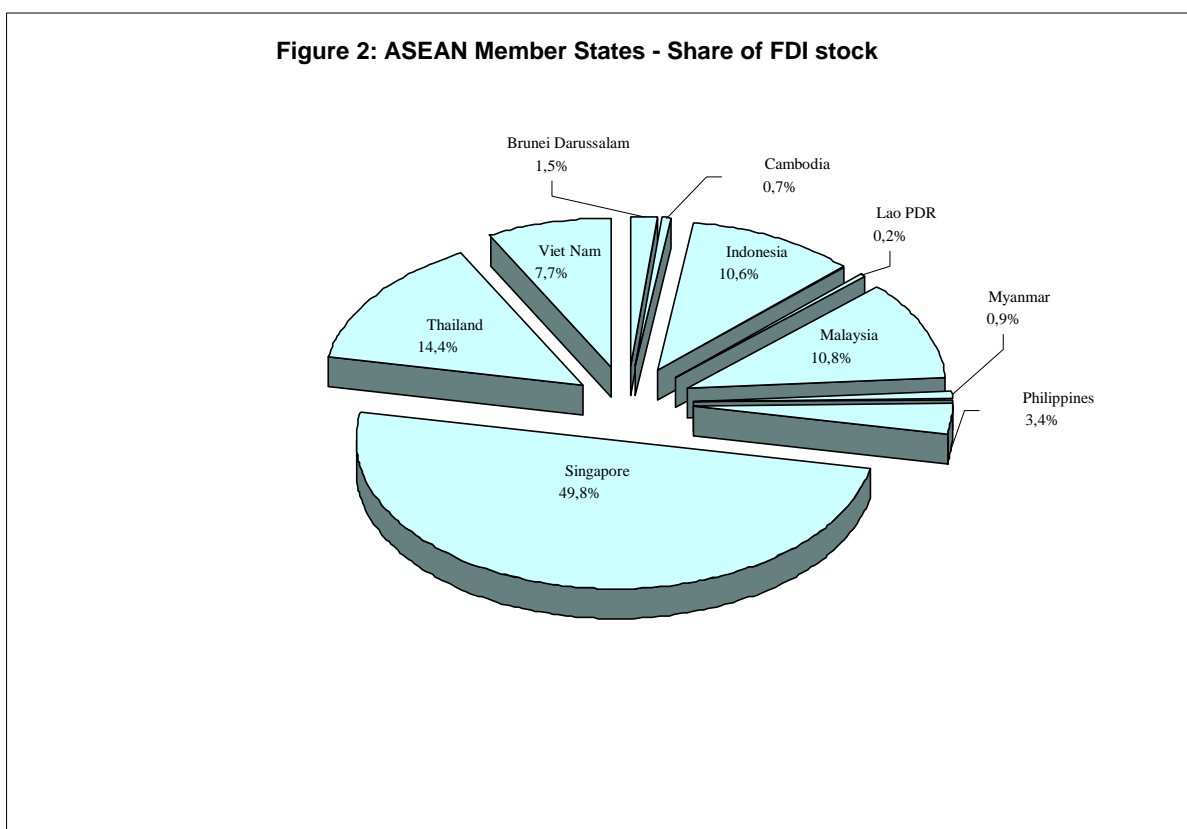


Source: UNCTAD Stat.

II. The spatial distribution of FDI flows into ASEAN

II.1 Distribution of FDI among the ASEAN members

FDI inflows are distributing unevenly among the members (see Figure 2). At the end of 2009, the stock of FDI mainly focuses ASEAN6 countries with a total value of 666,47 billion U.S. dollars, or 96,7% of total FDI in ASEAN. In particular, Singapore has attracted 349,6 billion U.S. dollars, representing about 50% of total FDI in ASEAN, respectively Thailand: 99 billion U.S. dollars, Malaysia: 74,6 billion U.S. dollars, Indonesia: 72,8 billion U.S. dollars, Vietnam: 52,8 billion U.S. dollars, Philippines: 23,6 billion U.S. dollars. The rest is only about 3.4% of total FDI in ASEAN, the lower the Lao PDR which attracted 1,56 billion U.S. dollars, or 0,2% of total FDI in ASEAN.



Source: UNCTAD Statistics

The global financial crisis in 2008 had a significant effect for FDI inflows to ASEAN, FDI flows into ASEAN fell sharply, especially extra-ASEAN investments. WTO accession helps Viet Nam in 2008 to have the benefits to attract more FDI, including access to FDI extra-ASEAN. In the context of the current decline in global FDI flows in 2009, Vietnam has attracted billion U.S. dollars, or 19,2% of total FDI flows to ASEAN, ranked second in this region (see Table 2).

Table 2 : Share of FDI inflow to ASEAN

Country	2007			2008			2009			Share to total net inflow to ASEAN, 2009			Share of Intra-ASEAN 2009		
	Intra ASEAN	Extra ASEAN	Total inflow	Intra ASEAN	Extra ASEAN	Total inflow	Intra ASEAN	Extra ASEAN	Total inflow	Intra ASEAN	Extra ASEAN	Total inflow	Intra ASEAN	Extra ASEAN	Total inflow
Brunei Darussalam	62	198	260	1	238	239	0	177	177	0,0	0,5	0,4	0,1	99,9	100
Cambodia	271	596	867	241	574	815	171	359	530	3,9	1,0	1,3	32,2	67,8	100
Indonesia	1 108	5 820	6 928	3 398	5 920	9 318	1 380	3 497	4 877	31,2	9,9	12,3	28,3	71,7	100
Lao PDR	100	223	324	48	180	228	57	261	319	1,3	0,7	0,8	18,0	82,0	100
Malaysia	3 780	4 758	8 538	1 608	5 711	7 318	-270	1 651	1 381	-6,1	4,7	3,5	-19,5	119,5	100
Myanmar	94	621	715	104	872	976	20	559	579	0,4	1,6	1,5	3,4	96,6	100
Philippines	6	2 910	2 916	140	1 404	1 544	19	1 929	1 948	0,4	5,5	4,9	1,0	99,0	100
Singapore	1 225	34 553	35 778	816	10 096	10 912	2 038	14 219	16 256	46,0	40,4	41,0	12,5	87,5	100
Thailand	2 489	8 841	11 330	1 402	7 169	8 571	586	5 371	5 957	13,2	15,3	15,0	9,8	90,2	100
Viet Nam	546	6 193	6 739	2 705	6 874	9 579	429	7 171	7 600	9,7	20,4	19,2	5,6	94,4	100
Total	9 682	64 713	74 395	10 462	39 038	49 500	4 429	35 194	39 623	100	100	100	11,2	88,8	100
ASEAN 6 ^a	9 155	63 075	72 229	10 069	37 174	47 242	4 181	33 838	38 019	94,4	96,2	95,9	11,0	89,0	100
BCLM ^b	527	1 639	2 166	393	1 865	2 258	248	1 356	1 604	5,6	3,8	4,1	15,4	84,6	100

Note: a. ASEAN6 comprises Singapore, Thailand, Malaysia, Indonesia, Vietnam, and Philippines.

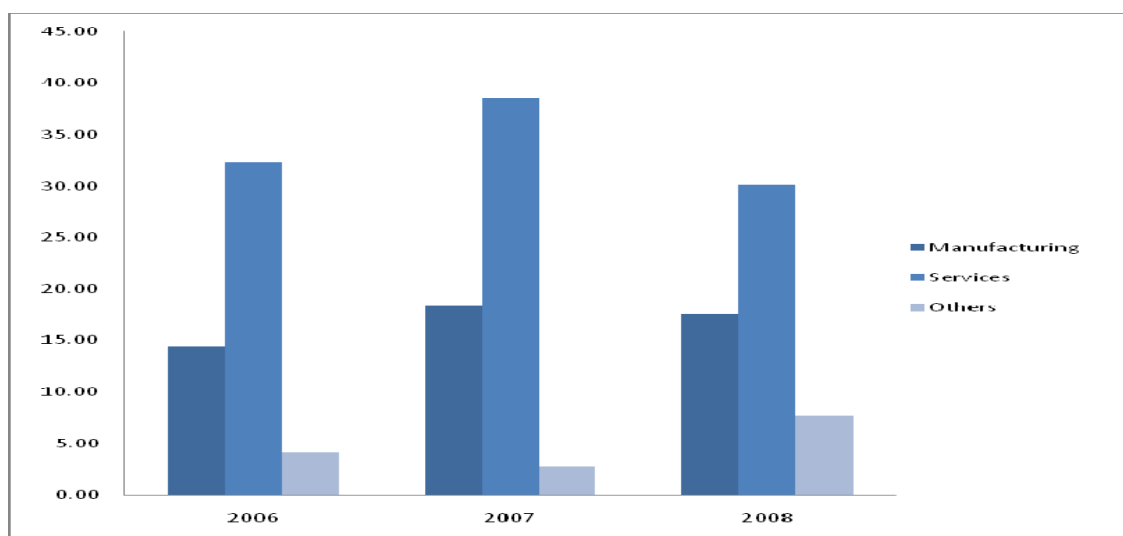
b. BCLM comprises Brunei Darussalam, Lao PDR, Cambodia, and Myanmar.

Source: ASEAN Foreign Direct Investment Statistics Database. Value in US\$ million; share in percent.

II.2 Distribution of FDI by sector

FDI flows into ASEAN distribute mainly in the service sector and manufacturing (Figure 3). According to ASEAN Investment Report (2009), in 2008, FDI into the services sector reached 30.1 billion U.S. dollars, representing 50,5% of total FDI in ASEAN. In the structure of FDI in the services sector in 2008, the financial services sector attracted the most FDI, with nearly 40% of total FDI in the services sector. FDI in the manufacturing sector reached 17,6 billion U.S. dollars in 2008, representing 29,4% of total FDI in ASEAN. FDI sector accounted for only 20,1% remaining.

Figure 3 – ASEAN FDI By Sector



Source: ASEAN investment report 2009. Value in US\$ billion.

II.3 Distribution of FDI by country of origin

Foreign investors in ASEAN are abundant, and they come from certain continents. However, most of FDI comes from countries that have a strong financial capacity and high technological. The period 2007-2009, 12 countries (see Table 3) accounted for almost 70% of total FDI in the region, and about 50% of total FDI in ASEAN is from developed countries (European Union, United States States, Japan, Korea, Australia, Canada).

Table 3: Foreign direct investment net inflow to ASEAN from selected partner countries/regions

Partner country/region	Value				Share to total net inflow			
	2007	2008	2009	2007-2009	2007	2008	2009	2007-2009
European Union (EU)-25 ^c	17765,5	9520,1	7297,2	34582,8	23,9	19,2	18,4	21,1
ASEAN	9682,0	10461,5	4428,9	24572,4	13,0	21,1	11,2	15,0
Japan	8828,7	4657,8	5308,4	18794,9	11,9	9,4	13,4	11,5
USA	8067,6	5132,6	3357,7	16557,9	10,8	10,4	8,5	10,1
Republic of Korea	2715,5	1583,5	1421,8	5720,8	3,7	3,2	3,6	3,5
China	1684,3	2109,5	1509,5	5303,3	2,3	4,3	3,8	3,2
India	1466,2	698,6	983,6	3148,4	2,0	1,4	2,5	1,9
Australia	1491,5	919,7	700,9	3112,1	2,0	1,9	1,8	1,9
Canada	394,1	799,4	310,9	1504,4	0,5	1,6	0,8	0,9
Russia	31,0	82,3	157,3	270,6	0,0	0,2	0,4	0,2
New Zealand	100,7	-165,1	239,9	175,5	0,1	-0,3	0,6	0,1
Pakistan	21,1	5,9	8,0	35,0	0,0	0,0	0,0	0,0
Total selected partner countries/regions	52248,2	35805,7	25724,2	113778,1	70,2	72,3	64,9	69,6
Others ^d	22147,1	13694,1	13898,8	49740,0	29,8	27,7	35,1	30,4
Total FDI inflow to ASEAN	74395,3	49499,8	39623,0	163518,1	100,0	100	100	100

Note: c. Includes Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, and United Kingdom

d. Includes inflow from all other countries, as well as total reinvested earnings and inter-company loans in the Philippines.

Source: ASEAN FDI Statistics Database. Value in US\$ million; share in percent

III. Literature Review and Model Specification

There are many theories which attempt to explain the determinants of FDI. Among them, John H. Dunning and Sarianna Lundan (2008) have proposed a comprehensive theoretical framework relatively of the determinants of FDI. They describe four main types of FDI. The first type of FDI is called *market-seeking*: These are enterprises that invest in a particular country or region to supply goods or services to local and regional markets. Market-seeking investment may be undertaken to sustain or protect existing markets, or to exploit or promote new markets. Together with market size and market growth of the host economy, obstacles to accessing local markets, such as tariffs and transport costs, also encourage this type of FDI. A second type of FDI is called *resource-seeking*: There are three main types of resource seekers. First, there are those seeking physical resources of one kind or another. The resources they seek include mineral fuels, industrial minerals, metals and agricultural products, etc. The second group of resource-seeking MNEs comprise those seeking plentiful supplies of cheap and well-motivated unskilled or semi-skilled labour. The third type of resource-seeking FDI is prompted by the need of firms to acquire technological capability, management or marketing expertise and organisational skills. The third type of FDI, called *efficiency-seeking*: Efficiency-seeking FDI is of two main kinds. The first is that designed to take advantage of differences in the availability and relative cost of traditional factor endowments in different countries. The second kind of efficiency-seeking investment is that which takes place in countries with broadly similar economic structures and income levels and is designed to take advantage of the economies of scale and scope, and of differences in consumer tastes and supply capabilities. The fourth type of FDI, called *strategic asset-seeking*: They usually come by acquiring the assets of foreign corporations, to promote their long-term strategic objectives - especially that of sustaining or advancing their global competitiveness.

In addition, UNCTAD (1998) also has analysed relatively the host country determinants of FDI. They have been classified into the three groups. These are politic factors, business facilitation and economic factors.

Asiedu (2002) has analyzed the determinants of Foreign Direct Investment to developing countries and examined why sub-Saharan Africa (SSA) has been *relatively* unsuccessful in attracting FDI despite policy reform. Using ordinary least square (OLS) for cross-section regressions and a panel regression, he find that the factors that drive FDI to developing countries have a different impact on FDI to SSA. Specifically, infrastructure development and a higher return on capital promote FDI to non-SSA countries, but have no significant impact on FDI to SSA. Openness to trade promotes FDI to both SSA and non-SSA countries. However, the marginal benefit from increased openness is less for SSA - suggesting that trade liberalization will generate more FDI to non-SSA countries than SSA countries.

Wasseem Mina (2007) studies the location determinants of FDI flows to the six Gulf Cooperation Council (GCC) countries for the period 1980-2002. Adopting panel data models methodology, he surprisingly finds that oil production, oil reserves, and oil prices reduce FDI inflows. He also finds that while better institutional quality, trade openness and infrastructure development increase FDI inflows, human capital significantly reduces them.

There are very few empirical studies of the determinants of FDI flows into ASEAN. Mamadou Camara (2002) analyzed the factors of FDI into ASEAN and Latin America (MERCOSUR) for the period from 1980 to 1998. He has found that the exchange rate and market size are factors that impact significantly to FDI flows into MERCOSUR. Meanwhile, FDI flows into ASEAN are only affected by the exchange rate. The analysis also explains why foreign capital flows contribute to print for a regional integration process a higher vetical degree in ASEAN than in MERCOSUR.

Normaz Wana Ismail (2009) used a semi gravity model to identify the determinants of FDI in ASEAN countries covering the period from 1995 to 2003. The dataset covers 18 source countries from various investors in the world and nine host countries which include all ASEAN members except Cambodia. The results revealed that besides the market size for host and source country, other criteria such as the shorter the distance, common in language and border, the extended market relative to distance also attracts more foreign investors. Other macroeconomic factors such as lower inflation rate, the slightly higher in exchange rate and good management of the government budget are among the key factors that attract more FDI. In addition to economic factors, social factors such as good

telecommunication and infrastructure and non-economic factors such transparency and trade policy also encourage more investors to the ASEAN.

Tajul and Hussin (2010) studied the impact of institutional quality on FDI flows into ASEAN for the period 1996 - 2008. Adopting panel data models methodology, they found an indication that improving the institutional quality is also crucial as part of future policy strategy to further attract new FDI flows into the region. Besides, they also found positive effects of market size, human capital, and the opening of the economy for FDI flows into ASEAN.

The model for this study is specified as:

$$FDI_{it} = f(SIZE_{it}, OPEN_{it}, WAGE_{it}, HUMAN_{it}, PRODUCTIVITY_{it}, INFLATION_{it}, INFRAS_{it}, RISK_{it}, CORRUP_{it}, EXCHANGE_{it}, INTEREST_{it}, FINANCE_{it}) \quad (1)$$

We use i for some countries and t for some time units.

Foreign direct investment (FDI) is the dependent variable, measured by net inflows of foreign direct investment. We use the natural logarithm of net inflows of FDI.

Market size of the host country (SIZE) reflects the economic conditions and potential demand, it is an important factor affecting the decision of the foreign investors. Foreign investors may be attracted by the size of the market that can enable them to take advantage of sales in the host country. The importance of the scale of the internal market has been validated by studies of Schneider and Frey (1985), Wheeler and Mody (1992), Hattari et al (2008), Rojid et al (2009), Khondoker and Kaliappa (2010), and Tajul Hussin (2010). To represent the market size, we use gross domestic product (GDP)¹. This variable is used to reflect the potential of the internal market for products of foreign investors, we expect a positive impact on FDI inflows. We use the natural logarithm of gross domestic product.

The openness of economy (OPEN) represents the opening, the link, the level of economic integration in the host country with the world economy. The opening means that trade barriers for goods the host country have been gradually relaxed. It is an opportunity for foreign investors who can exploit the comparative advantage of host country to re-export to the country of origin as well as increased exports to the rest of the world (vertical FDI). Studies Noorbakhsh et al (2001), Rojid et al (2009), Khondoker and Kaliappa (2010), Tajul and Hussin (2010) confirmed a significantly positive effect of openness to

FDI. In this study, we use the ratio of trade (imports + exports) to GDP to present economic openness (OPEN_GDP). We expect a significantly positive correlation between openness and FDI inflows.

Labor cost (WAGE) is an important factor of production that can directly influence the economic benefit of investors. Foreign investors often take advantage of cheap labor in developing countries to minimize production costs. Thus, the low labor cost has an important role to attract FDI (see Schneider and Frey, 1985; Friedman et al, 1996; Rojid et al, 2009). However, labor cost also has a close relationship with labor productivity. So, if labor costs present the qualification of labor, FDI flow may to areas that have a higher level of wages due to its high demand for skilled labor. Studies by Wheeler and Mody (1992), Wei (2000), Kostas Axarloglou (2004), confirmed the existence of a positive correlation between labor costs and FDI inflows. In this study, we used two proxies for labor costs:

(1) First, we use the nominal wage (average monthly salary) in the industry representing the variable labor costs (WAGE1) as the studies of Woodward (1992), Wheeler and Mody (1992)². We use the natural logarithm of WAGE1.

(2) Second, we use the relative wage (WAGE2), it reflects the real cost of labor paid in the relative relationship between the nominal wage and productivity³. As the approach of Woodward (1992), Noorbakhsh (2001), Kostas (2004), WAGE2 is calculated as follows: $WAGE2 = \text{average wage of a worker in the manufacturing sector (WAGE1)} / \text{average productivity in manufacturing}$, average productivity is the value of production per industrial worker.

Human Capital (HUMAN) represents the quality of labor in host countries, the qualitative worker can handle quickly and efficiently machines and new technologies, and in general it has a higher labor productivity. Depending on the type and the nature of productive activities (application of technology up or down), the difference between nominal wages and relative wages (through the analysis of labor productivity) that human capital has different effects for investment decision of foreign investors. Frey and Schneider (1985), Noorbakhsh et al (2001), Tajul (2010), Kostas (2004), and Rojid et al (2009), found a significantly positive correlation between human capital and FDI inflows, and human capital plays a key role in attracting FDI into the host country. We use the ratio of skilled labor to numbers of employees as a proxy for human capital

(SKILL_LABOUR). Skilled labor is defined as the total employees in categories (1) professional, technical and related workers, (2) administrative and managerial workers and (3) clerical and related workers.

Labor productivity (PRODUCTIVITY) reflects the efficiency of labor in the economy. Cushman (1987) found that the decline in labor productivity has limited FDI flows from the UK, France, Germany, Canada, Japan into the United States. Woodward (1992) and Kostas (2004) also found a positive relationship between labor productivity and FDI inflows. Labor productivity is measured by GDP per employee. We use the natural log of PRODUCTIVITY.

Political stability (RISKS) indicates the level of political risk, institutional quality, and it also partly reflects the investment environment "soft". Schneider Frey (1985), Wei (2000), Hattari et al (2008), Rojid et al (2009), and Tajul Hussin (2010), found a significant positive relationship between FDI inflows and political stability. Fathi et al (2010) also found a significant impact of institutional quality for FDI in manufacturing, and particularly in services. In this study, we use the general index of political risk from the International Country Risk Guide (ICRG) which is synthesized from 12 different criteria (see ICRG) to represent the variable of political stability (RISK_POL). The progress of the overall index reflects the level of political risk becoming smaller, or political stability is progressive. We use the natural logarithm of RISK_POL. In addition, we also use The Control of Corruption index (ICRG database) to measure the quality of institutions in each country (see Asiedu (2005), Khondoker (2007)), higher index indicates better control of corruption.

Inflation rate (INFLATION) reflects the macroeconomic instability. The stable macroeconomy may reduce the uncertainty of the investment environment, and increase the level of confidence for the economy. Thus, high inflation could limit FDI inflows. Schneider and Frey (1985), Kinda (2008), found a significant negative impact of inflation for FDI inflows. In this study, the variable of inflation is measured by the annual percentage change in the index of consumer prices (INFLATION).

Interest rate (INTEREST) reflects the cost of capital when investors want to use the financial resources in the host country, this is the entry costs of production activities and business. A low interest rates may encourage investors to raise capital in the host country to finance their investment activities. Therefore, interest rate is also an important factor for

FDI inflows. Culem (1988) found that the difference between the nominal interest rate of the host country and the rest of the world has a significant negative correlation with FDI inflows. Similarly, Francisca and Suzanne (1996) found that the difference in interest rates between the two countries has a negative relationship with FDI flows of U.S. to Europe. Conversely, Ismail and Burak (2007) found a positive correlation between real interest rates and FDI flows to developing countries and economies in transition. Mercereau Benoit (2005) also concluded that the low interest rates in the G3 (U.S., Japan, Germany) have a positive impact on FDI flows to Asia. We use the real interest rate for the variable INTEREST and expect a negative relationship with FDI inflows.

Financial development (FINANCE): The financial development enables companies (mostly private) to approach easily and effectively funding sources with low-cost. It also creates an environment conducive to the exchange and cooperation between companies, including foreign firms with domestic firms. The study Noorbakhsh et al (2001) showed a significant positive correlation between financial development and FDI flows to developing countries. Using a panel of 97 countries over the period of 20 years, Dutta and Roy (2008) found a concave relationship between financial development and FDI inflows: before the financial development reaches a certain threshold, financial development has a positive impact on entries FDI, but when he crosses the threshold, financial development has a negative impact on FDI inflows. Asiedu (2002), Kinda (2008), also found a positive correlation between financial development and FDI inflows but not statistically significant. In this study, we use the domestic credit provided by banking sector (% of GDP) to present the financial development variable (CREDIT_BANK).

Infrastructure development (INFRAS) increases productivity of investment and is an important factor to attract FDI flows. Wheeler and Mody (1992), Asiedu (2002), Imad and Buly (2006), Kinda (2008), found that the quality of infrastructure has a positive effect on FDI inflows. We use total numbers of phones and mobile phone users (per 100 people) to represent the development of infrastructure (TEL). We expect a positive correlation between FDI inflows and developing infrastructure.

Exchange rate (EXCHANCE) represents price competition. We expect a positive relationship between FDI inflows and exchange rates, because a higher exchange rate (that is to say that the currency of the host country depreciates against the currency compared) reflects an improvement in competitiveness of exported goods. Klein and Rosengren (1990) found that after controlling for relative wages, a percentage increase in the value of

foreign currency (as a percentage of depreciation of U.S. dollar) will have a significant impact on FDI flows to United States. Froot et Jeremy (1991) also concluded that in general FDI flows to the United States have a significantly negative correlation with the value of U.S. dollar and that a currency devaluation will encourage foreign investors to buy the control productive assets of domestic companies. Mamadou (2002) found a significant positive correlation between exchange rates and FDI flows into ASEAN. We use the exchange rate of currency of the host country against the U.S. dollar for present exchange rate (EXCHANGE). We use the natural logarithm of EXCHANGE.

IV. Regression Methodology and Results

This study uses a panel of the six ASEAN countries: Vietnam, Indonesia, Malaysia, Philippines, Singapore, and Thailand, the period 1991-2009. Because the number of countries is small ($i = 6$) and there is a strong correlation between certain variables (such as skill_labour, open_gdp, lnproductivity, lnWAGE1, interaction), we introduce these variables alternatively in different models. Technically, the panel data may exist group effects, time effects, or both. These effects can be fixed effects or random effects. The Hausman test is performed to find whether the fixed effects model (FEM) or random effects models (REM) is suitable. In addition, we also use the Ramsey-Reset test to verify the characteristics of model. The results showed that the REM model is more appropriate than the model FEM. Then we use the Wald test to test group-wise Heteroscedasticity (Greene, 2000), and the test proposed by Wooldridge (2002) to test the serial correlation. In case all models are group-wise heteroscedasticity and the number of individuals is less than twice the number of time units, the Feasible Generalized Least Squares (FGLS) is the right choice (Beck and Katz, 1995; Daniel Hoechle, 2007). The FGLS regression results are presented in Table 4. The results of the regression REM and test results are presented in Appendix B. In general, the results of the FGLS regression and REM are similar.

Table 4: Determinants of FDI inflows in ASEAN (1991-2009)

Dependent variable: Ln(FDI)

Model	(1)	(2)	(3)	(4)	(5)	(6)
Estimation method	FGLS	FGLS	FGLS	FGLS	FGLS	FGLS
SIZE = Log(GDP)	0.252* (0.070)	0.657*** (0.000)	0.383*** (0.001)	0.622*** (0.000)	0.637*** (0.000)	0.268*** (0.000)
EXCHANGE = Log(EXCHANGE)	0.164*** (0.000)	0.128*** (0.000)	0.201*** (0.000)	0.161*** (0.000)	0.0565** (0.012)	
INTEREST = Real Interest Rate	-0.026** (0.014)	-0.069*** (0.000)	-0.034*** (0.002)	-0.033*** (0.004)	-0.032*** (0.002)	
CORRUP = control of corruption		0.491*** (0.000)	0.339*** (0.000)	0.317*** (0.002)		0.258*** (0.000)
WAGE2	-2.321*** (0.004)					
WAGE1 = Log(monthly wage rate)	0.959*** (0.000)					
HUMAIN = skill_labour		0.028*** (0.000)				
PRODUCTIVITY = Log(productivity)			0.647*** (0.000)			
INTERACTION = WAGE1*PRODUCTIVITY				0.039*** (0.000)		
RISK_POL = Log(risk_pol)					2.376*** (0.001)	
OPEN = open/gdp					0.004*** (0.000)	
INFLATION = Inflation rate						-0.004 (0.823)
INFRAS = TEL						0.011*** (0.000)
FINANCE = credit_bank						0.002 (0.258)
constant	10.64*** (0.002)	3.207 (0.319)	5.195* (0.060)	3.072 (0.324)	-4.913 (0.222)	13.938*** (0.000)
<i>Number of Observation</i>	92	94	104	92	106	102

p-values in parentheses* *p* < 0.1, ** *p* < 0.05, *** *p* < 0.01

Note: Model 1 is run with robust standard errors and AR(1), Other FGLS models are run with robust standard errors.

Estimation results in Table 4 shows:

The domestic market size has a positive effect statistically significant for FDI flows into ASEAN. This result is similar to the conclusions of Normaz (2009), Tajul (2010). Thus, the size of the internal market is an important factor in attracting FDI flows to ASEAN.

For factors of macro-economic policy: The coefficient of the exchange rate is positive statistically significant. This shows that the evaluation of currency of the host country lower than the U.S. dollar may attract FDI flows to the region, this result is similar to the search of Mamadou (2002). The coefficient of real interest rate is negative statistically significant. Obviously, the increase of the real interest rates encourage capital costs to increase, it also means that the financial risks exist, so it will limit FDI flows into the region. The coefficient of inflation is negative, as expected, but not statistically significant, this finding is also consistent with the conclusion of Normaz (2009). As expected, the coefficient of financial development is positive but not statistically significant. Clearly, in developing countries, the financial development has often a positive effect on the foreign indirect investment flows via the capital market rather than FDI inflows (Kinda, 2008).

The coefficient of the infrastructure development is positive and statistically significant. Thus, as the conclusion of Normaz (2009), the quality of infrastructure plays an important role in attracting FDI flows into ASEAN. Similarly, the coefficient of openness of the economy is positive and statistically significant. Studies Normaz (2009), Tajul (2010) also confirmed the positive role of openness to attract FDI into the region.

As expected, the coefficient of the political stability is positive and statistically significant. This means that greater political stability (meaning that the lower political risk) will strongly encourage FDI flows to the region. Similarly, the coefficient of control of corruption is positive and statistically significant at 1%. Clearly, a good control of corruption helps to reduce unofficial costs, to raise quality of institution, to improve the investment environment, those are the favorable conditions to attract FDI inflows.

An important factor in choosing investment destinations for foreign investors is the low labor cost⁴. However, not as expected, the coefficient of the nominal labor cost (the average monthly wage) is positive and statistically significant at 1%. To clarify the significance of this results, we analyze an impact of labor productivity, human capital and relative wages (via the labor productivity - WAGE2) for FDI inflows.

The results show that the estimated coefficient of labor productivity and human capital that reflect the labor quality are all positive and statistically significant at 1%. This shows that, in determining the location of investments in the region, foreign investors are very interested by the skilled labor and labor productivity. This is also evident through the

analysis of the coefficient of the relative wages, the coefficient is negative and significantly significant at 1%, as expected. This means that an increase of the relative wage deter FDI inflows to this region.

Thus, foreign investors are interested by the relative wages rather than the low nominal wages in ASEAN. We can see that in the microeconomic aspect, the productive wage can affect clearly the objective of maximizing corporate profits rather than the nominal wage, as Cushman (1987) demonstrated in his empirical study. Hence, in ASEAN, the rise of the nominal wages may be the result of improved productivity work⁵ and foreign investors are interested by the labor quality and labor productivity instead of the low nominal labor cost, investors can pay higher nominal wages for skilled workers who have a high productivity. To clarify this analysis, we add an interaction variable between the nominal wage and the labor productivity (INTERACTION). As expected, the coefficient of the interaction variable is positive and statistically significant at 1%. This suggests a close relationship between the nominal wage rate and the high labor productivity, and this relationship helps to promote FDI flows into the region.

Another aspect we see that depending on the type and nature of investments that the demand for skilled labor of FDI projects is different. Because of the characteristics of FDI projects, the demand for skilled labor may encourage investors to pass up the concerns of cheap labor cost to find labor quality. The analysis of the current structure of FDI flows into ASEAN shows that foreign investors have strong demand for the skilled labor resource⁶. This explains partly the positive impact of the nominal wage for FDI flows to the region.

We also use the Chow test to examine the impact of the Asian financial crisis in 1997 to the stability of the regressive coefficients of the models (see Appendix B). These results show that the Asian financial crisis does not affect the nature of the factors of FDI flows to the region.

V. Conclusion and policy implications

Using panel data, this study analyzed the determinants of FDI inflows in ASEAN countries in the period 1991 - 2009. The results indicate that the market size, openness of the economy, the quality of the infrastructure are the factors that have a positive impact on FDI inflows. Associated with macroeconomic factors, the policy of exchange rate has a significant impact on FDI inflows. Additionally, the real interest rates also affect significantly the FDI inflows. However, the inflation rate and the financial development seem to have no statistically significant impact on FDI inflows. About the social and political environment, the political risk and the institutional quality strongly influence FDI inflows in the region.

The interesting finding of the study is the impact of labor factors. The nominal labor cost, the human capital, the labor productivity have a positive impact statistically significant on FDI inflows in the region. Foreign investors are always interested by the skilled labor and the labor productivity rather than the cheap nominal labor costs, they are willing to pay high salaries to achieve greater labor productivity, and their ultimate goal is the relative wages but not the nominal wage. Thus, the cheap labor is not the advantage in attracting FDI flows into ASEAN. So, the strategic orientation of ASEAN countries in attracting FDI is to improve quickly the labor quality, especially the skilled labor. In addition, they must improve the quality of the infrastructure, promote the liberalization of trade, improve the quality of the institutions, control the corruption, minimize the political risks for foreign investors.

NOTE

1. We use the inflation rate (GDP deflator) to eliminate the effects of inflation from the nominal GDP.
2. Due to data limitations overall average wage in the economy, we use the average monthly wage in the manufacturing sector which present the nominal wage costs.
3. Cushman (1987) has called the unit wage rate.
4. FDI flows into least developed countries (Schneider and Frey, 1985) and into African countries (Rojid et al, 2009) are interested by the cheap nominal labor cost.
5. In this sample, the variable nominal wage (lnwage1) is strongly correlated with the variable labor productivity (the correlation coefficient between these two variables is 0.937) and with the variable skilled labor (the correlation coefficient is 0.934).
6. FDI inflows in the services sector accounts about 50% of total FDI inflows in ASEAN, is the sector that has strong demand for the high qualitative labor. In addition, approximately 50% of total FDI flows into ASEAN came from developed countries who have a strong financial capacity and high technological (such as the European Union, the United States, Japan, Cayman Island, the Republic of Korea). It is clear that their FDI projects can have high standards and strict for the quality of labor resource to operate effectively their machines, their high technology, including the technology of management.

REFERENCES

- ASEAN Investment report, 2009, Sustained FDI Flows Dependent on Global Economic Recovery.
- Asiedu E, 2005, Foreign direct investment in Africa: the role of natural resources, market size, government policy, institutions and political instability". *WIDER Research paper* No.2005/24. World institute for development economic research, United Nations University, Helsinki.
- Asiedu, E, 2002, On the Determinants of Foreign Direct Investment to Developing Countries: Is Africa Different? *World Development*, **1**, pp 107–19.
- Beck, N., and J. N. Katz, 1995, What to do (and not to do) with time-series cross-section data. *American Political Science Review*, **89**, pp. 634–647.
- Culem C, 1988, Direct Investment Among Industrialized Countries. *European Economic Review*, **32**, pp 885-904.
- Cushman, David O, 1987, The Effects of Real Wages and Labor Productivity on Foreign Direct Investment. *Southern Economic Journal*, pp 174-85.
- Daniel Hoehle, 2007, Robust Standard Errors for Panel Regressions with Cross-Sectional Dependence. *The Stata Journal*, **3**, pp. 281-312.
- Dutta, Nabamita and Roy, Sanjukta, 2011, Foreign Direct Investment, Financial Development and Political Risks. *The Journal of Developing Areas*, **2**, pp. 303-327.
- Fathi A. Ali, Norbert Fiess and Ronald MacDonald, 2010, Do Institutions Matter for Foreign Direct Investment?. *Open Econ Rev*, **21**, pp 201–219.
- Francisca M. Beer and Suzanne N. Cory, 1996, The Locational Determinants of U.S. Foreign Direct Investment in the European Union. *Journal of Financial and Strategic Decisions*, **2**.
- Friedman, J., Fung, H. G., Gerlowski, D. A., Silberman, 1996, A Note on State Characteristics and the Location of Foreign Direct Investment Within the United States. *Review of Economics and Statistics*, **2**, pp. 367-68.
- Froot, Kenneth A. and Jeremy C. Stein, 1991, Exchange Rates and Foreign Direct Investment: An Imperfect Capital Markets Approach. *Quarterly Journal of Economics*, **4**, pp. 1191-1217.
- Greene, W, 2000, *Econometric Analysis*. 4th Edition, New Jersey: Prentice Hall.

- Hattari, R., Rajan R.S and Thangavelu S, 2008, Understanding Intra-ASEAN FDI flows: Trends and Determinants and the role of China and India, Mimeo.
- Imad A. Moosa and Buly A. Cardak, 2006, The Determinants of Foreign Direct Investment: An Extreme Bounds Analysis. *Journal of Multinational Financial Management*, **2**, pp. 199-211 .
- Ismail Çevis and Burak Çamurdan, 2007, The Economic Determinants of Foreign Direct Investment in Developing Countries and Transition Economies. *The Pakistan Development Review*, **3**, pp. 285–299.
- John H. Dunning and Sarianna Lundan, 2008, *Multinational Enterprises and the Global Economy*. 2nd edition, Edward Elgar.
- Khondoker A M and Kaliappa K, 2010, Determinants of Foreign Direct Investment in Developing Countries: A Comparative Analysis. *The Journal of Applied Economic Research*, **4**, pp. 369-404.
- Khondoker Abdul Mottaleb, 2007, “Determinants of Foreign Direct Investment and Its Impact on Economic Growth in Developing Countries”, Civil Service College, Dhaka, 63 New Eskaton, BIAM, Dhaka-1000.
- Kinda T, 2008, *Infrastructure and Private Capital Flows in Developing Countries*. Munich Personal RePEc Archive Paper No. 19158.
- Klein Michael W and Eric Rosengren, 1990, *Determinants of Foreign Direct Investment in the United States*. Clark University.
- Kostas Axarloglou, 2004. Local Labor Market Conditions and Foreign Direct Investment Flows in the U.S. *Atlantic Economic Journal*, **1**, pp. 62-66.
- Mamadou Cama, 2002, Les Investissements Directs de l'étranger et l'intégration régionale: les exemples de l'ASEAN et du MERCOSUR. *Revue Tiers Monde*, **169**, pp 47-69.
- Mercereau Benoit, 2005, FDI Flows to Asia: Did the Dragon Crowd Out the Tigers? IMF Working Paper WP/05/189.
- Noorbakhsh F, Paloni A, Youssef A, 2001, Human Capital and FDI Inflows to Developing Countries: New Empirical Evidence. *World Development*, **7**, pp. 1593-1610.
- Normaz Wana Ismail, 2009, The Determinant of Foreign Direct Investment in ASEAN: A Semi-Gravity Approach. *Transition Studies Review*, **16**, pp. 710-722.
- Rojid Sawkut, Seetanah Boopen, Ramessur-Seenarain Taruna, and Sannasse Vinesh, 2009, Determinants of FDI: Lessons from African Economies. *Journal of Applied Business and Economics*, **1**.

- Schneider F, Frey B, 1985, Economic and Political Determinants of Foreign Direct Investment, *World Development*, **2**, pp 161-175.
- Tajul Ariffin Masron and Hussin Abdullah, 2010, Institutional Quality as A Determinant for FDI inflows: Evidence from Asean. *World Journal of Management*, **3**, pp. 115 – 128 .
- UNCTAD, 1998, World Investment Report 1998: Trends and Determinants. New York and Geneva.
- Wasseem Mina, 2007, The location determinants of FDI in the GCC countries. *Journal of Multinational Financial Management*, **4**, pp. 336-348.
- Wei Shang-Jin, 2000, How Taxing Is Corruption On International Investors? *The Review of Economics and Statistics*, **1**, pp. 1–11
- Wheeler D, Mody A, 1992, International Investment Location Decisions: The case of U.S. firms. *Journal of International Economics*, **33**, pp 57-76.
- Woodward, D. P, 1992, Locational Determinants of Japanese Manufacturing Start-ups in the United States. *Southern Economic Journal*, **3**, pp. 690-708.
- Wooldridge, J.M, 2002, Econometric Analysis of Cross Section and Panel Data. Cambridge, MA: MIT Press.

APPENDIX A: Summary of Statistics

Variable		Mean	Std. Dev.	Min	Max	Observations
Infdi	overall	21.89601	1.039766	18.79283	24.30058	N = 109
	between		.77458	20.88257	23.14419	n = 6
	within		.7440318	18.86418	23.55504	T-bar = 18.1667
Ingdp	overall	25.23113	.775693	22.44093	26.9343	N = 114
	between		.6726405	24.03535	25.97774	n = 6
	within		.4704522	23.6367	26.36132	T = 19
inflation	overall	5.46493	6.550768	-1.710337	58.38709	N = 109
	between		3.662316	1.617677	11.78669	n = 6
	within		5.580295	-2.603378	52.06533	T-bar = 18.1667
interest	overall	4.771938	5.446603	-24.60022	17.71854	N = 111
	between		1.209758	2.524173	5.852805	n = 6
	within		5.341883	-25.20645	17.11231	T = 18.5
lnexchange	overall	4.444392	3.44934	.3436187	9.699059	N = 113
	between		3.762711	.4717465	9.498538	n = 6
	within		.3391215	3.411352	5.084198	T = 18.8333
lnrisk_pol	overall	4.200391	.1658682	3.637586	4.490507	N = 114
	between		.1448801	4.005205	4.427749	n = 6
	within		.0993257	3.717774	4.379778	T = 19
tel	overall	37.16206	42.74283	.1488459	170.1161	N = 114
	between		30.78686	13.67743	95.05582	n = 6
	within		32.09518	-21.60659	136.1052	T = 19
lnwage1	overall	5.411718	1.189523	3.18747	7.935705	N = 101
	between		1.225072	4.035993	7.380229	n = 6
	within		.3160667	4.563194	6.385583	T-bar = 16.8333
skill_labour	overall	23.76207	17.27976	6.757746	64.50324	N = 99
	between		17.71676	8.151699	54.66123	n = 6
	within		5.014636	10.1619	33.60408	T = 16.5
open_gdp	overall	157.0031	108.2053	45.43859	440.2721	N = 114
	between		114.1761	60.25007	372.6204	n = 6
	within		27.36373	107.5987	232.121	T = 19
lnproductivity	overall	8.379684	1.394729	5.164237	11.26702	N = 112
	between		1.459838	6.568139	10.76115	n = 6
	within		.3656334	6.975783	9.318859	T = 18.6667
interaction	overall	47.41883	18.45812	18.77984	88.65535	N = 100
	between		18.97041	28.01511	79.50298	n = 6
	within		4.105969	35.59878	58.42029	T = 16.6667
credit-bank	overall	82.84177	41.12927	15.71207	177.5767	N = 112
	between		40.0353	44.99658	134.8005	n = 6
	within		18.67054	28.73903	134.0304	T = 18.6667
corrup	overall	2.752924	1.010328	.666667	4.5	N = 114
	between		.8225511	1.982456	4.192982	n = 6
	within		.6722711	1.437135	4.437135	T = 19
wage2	overall	.3215661	.1362057	.0742598	.7390401	N = 100
	between		.1433669	.1284526	.5302513	n = 6
	within		.0640941	.1992305	.5433555	T = 16.6667

APPENDIX B: Determinants of FDI Flows in ASEAN (1991-2009)

Dependent variable: Ln(FDI)

Model	(1)	(2)	(3)	(4)	(5)	(6)
Estimation methode	Random-Effets	Random-Effets	Random-Effets	Random-Effets	Random-Effets	Random-Effets
SIZE = Log(GDP)	0.165 (0.205)	0.681*** (0.001)	0.309*** (0.003)	0.515*** (0.000)	0.650*** (0.000)	0.399 (0.175)
EXCHANGE = Log(EXCHANGE)	0.145*** (0.000)	0.082 (0.278)	0.163** (0.027)	0.119* (0.073)	0.058*** (0.002)	
INTEREST = Real Interest Rate	-0.044** (0.031)	-0.081*** (0.000)	-0.046*** (0.000)	-0.051** (0.025)	-0.039*** (0.000)	
CORRUP = control of corruption		0.418* (0.070)	0.231 (0.205)	0.203 (0.365)		0.302** (0.033)
WAGE2	-2.740*** (0.000)					
WAGE1 = Log(monthly wage rate)	0.987*** (0.000)					
HUMAIN = skill_labour		0.0264*** (0.000)				
PRODUCTIVITY = Log(productivity)			0.670*** (0.000)			
INTERACTION = WAGE1*PRODUCTIVITY				0.0418*** (0.000)		
RISK_POL = Log(risk_pol)					2.330** (0.021)	
OPEN = open/gdp					0.004*** (0.002)	
INFLATION = Inflation rate						-0.014 (0.621)
INFRAS = TEL						0.010*** (0.000)
FINANCE = credit_bank						0.002 (0.498)
constant	12.89*** (0.000)	3.010 (0.574)	7.332** (0.019)	6.173 (0.103)	-5.106 (0.192)	10.497 (0.159)
<i>Number of Observation</i>	92	94	104	92	106	102
R-squared						
Within	0.376	0.438	0.384	0.434	0.373	0.344
Between	0.936	0.732	0.856	0.811	0.936	0.763
Overall	0.666	0.600	0.629	0.642	0.649	0.558
Hausman Test	(0.108)	(0.616)	(0.867)	(0.983)	(0.533)	(0.801)
Ramsey Reset Test	(0.787)	(0.486)	(0.908)	(0.460)	(0.204)	(0.309)
Wooldrige Test	(0.100)	(0.227)	(0.800)	(0.122)	(0.743)	(0.707)
Breush-Pagan Test	(0.823)	(0.000)	(0.000)	(0.000)	(0.100)	(0.000)
Modified Wald Test	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Chow Test	(0.374)	(0.429)	(0.830)	(0.993)	(0.947)	(0.767)

p-values in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Note: All **Random-Effets** regressions are run with robust standard errors. Chow Test with OLS.

APPENDIX C: Data Source

Variable	Source
Gdp	World Development Indicator, 2010
Exchange Rate	World Development Indicator, 2010
Real Interest Rate	World Development Indicator, 2010
Corruption	The International Country Risk Guide (ICRG)
Monthly Wage Rate (US \$)	International Labor Organization (ILO), LABORSTA - database of labour statistics; http://laborsta.ilo.org/
Wage2	Department Of Statistics Malaysia; http://www.statistics.gov.my Statistics Indonesia; http://dds.bps.go.id General Statistics Office of Vietnam; http://www.gso.gov.vn World Development Indicator, 2009
Skill_labour	International Labor Organization (ILO), LABORSTA - database of labour statistics; http://laborsta.ilo.org/
Productivity	World Development Indicator, 2010
Risk_pol	The International Country Risk Guide (ICRG)
Open_gdp	World Development Indicator, 2010
Inflation	World Development Indicator, 2010
Tel	World Development Indicator, 2010
Credit_bank	World Development Indicator, 2010 ²