

# THE EVALUATION OF FDI INFLOWS INTO CHINA FROM SELECTED ASEAN COUNTRIES USING PANEL ESTIMATION

**Sallahuddin Hassan, Fatimah Wati Ibrahim, Nor ‘Aznin Abu Bakar,  
Mohammad Helmi Hidthir**

Faculty of Economics  
Universiti Utara Malaysia  
06010 UUM Sintok  
Kedah Darul Aman  
Malaysia

{din636, fatimah, noraznin, helmi} @uum.edu.my

## **Abstract**

China has recently embraced globalization in the area of trade and foreign direct investment (*FDI*) by joining WTO. Globalization has had positive results on its economic growth through trade expansion and *FDI* that opened new channels for economic expansion. The Fourth Ministerial Meeting of the WTO in Doha, Qatar approved China's Protocol of Accession. China's accession to the WTO means a more open China. As a result, China has transformed itself from one with virtually no foreign-invested firms to the largest developing-country destination for *FDI*. Giving the above scenario, the purpose of this paper is to evaluate the *FDI* inflows in China from the selected ASEAN countries using panel data analyses. The *FDI* model has been utilized in determining factors that influence *FDI* inflows into China from selected ASEAN countries. In panel estimation, two alternative models, one-way fixed effect model and random effect model were used to estimate factors affecting the *FDI* inflows into China. The results of the study are consistent with the predictions of the previous study particularly related to trade openness (*OPENESS*) and relative exchange rate (*RELEXC*). We found evidence that *OPENESS* and *RELEXC* are an important factor in influencing *FDI* flows between selected ASEAN countries and China.

**Keywords:** Globalization, Foreign Direct Investment and Panel Estimation

## 1. Introduction

China has recently embraced globalization in the area of trade and foreign direct investment (FDI). Globalization has provided several positive and negative effects to China economy, particularly in terms of income distribution, employment, and the need for skilled and educated workforce. Obviously, globalization has had positive results on the China's economic growth through trade expansion and *FDI* that opened new channels for economic expansion.

In 1978, the Deng Xiaoping-led Chinese government formally adopted the 'opening-to-the-outside-world' principle as a new national policy. Since then, China has transformed itself from one with virtually no foreign-invested firms to the largest developing-country destination for *FDI*. On Nov 10, 2001, the Fourth Ministerial Meeting of the WTO in Doha, Qatar approved China's Protocol of Accession. China's accession to the WTO means a more open China. This will further accelerate the reform process and undoubtedly create more business opportunities for foreign investors. Basically, there are three mutually reinforcing reasons why China decided to enter WTO: strengthening economic reforms, supporting economic growth through a better allocation of resources, and maintaining large inflows of *FDI* by providing them new opportunities in service sectors. *FDI* in manufacturing industry is expected to slow-down as several sectors are now saturated and suffer from over-capacity. In these industries, investment in capacity is expected to level off, but foreign investment may help the rationalization program currently implemented as the opening of the capital of state-owned enterprise is now considered as a way to attract the most dynamic forms of global *FDI* (mergers and acquisitions).

As a matter of fact, China has been opening up its economy for more than twenty years, however it is considered that its accession to WTO will imply far-reaching consequences for its economy. China's opening up policy has aimed at promoting exports, while protecting the domestic market. This was achieved through a dualistic trade regime, which has granted tariff exemptions on imports of intermediate by export-oriented industries, and through a selective policy, which has channeled *FDI* into manufacturing production targeted for exports or for import substitution. As a result, *FDI* inflows has played a major part in the opening up of China's industry and its integration into the international division of labor. The rapid expansion of its international trade and large capital inflows provide evidence of the increasing integration of China in the world economy. Since 1980, China's share in international trade has trebled, rising from less than one percent to more than three percent in 1999. China has become the second largest recipient of *FDI*, after the U.S with cumulated inflows amounting to more than US\$ 300 billion at the end of 1999. Table 1 shows the detail statistics of *FDI* inflows into China from all over the world during 1979-1997. The USA, Japan, the UK, France and Germany are considered as the top five *FDI* outflows countries.

The 'opening-to-the-outside-world' principle adopted by China has also contributed mutual benefits among ASEAN countries and China. In addition, a well-defined economic relation through the establishment of AFTA and ASEAN+3 initiatives highlighted the budding role of China, stand-in as a catalyst to jumpstart the inventiveness of an open-integrated market

characterized by active involvement of the countries. As a result, it is observed that *FDI* inflows into China from ASEAN increasing over time (Table 2). According to Shu and Zeng (2006), *FDI* inflows from ASEAN into China is now approximately fifty times as much as it was in 1990. During 1994-2004, the cumulative amount of China's actually utilized *FDI* from ASEAN reached US\$33.73 billion, which exceeded the cumulative amount of China's actually utilized *FDI* from the UK, France and Germany combined, which was US\$27.21 billion.

**Table 1: Foreign Direct Investment in China by Source Country or Region, 1990 -1997 (amount contracted in US\$ million)**

Country	1990	1991	1992	1993	1994	1995	1996	1997	Change (%)
Hong Kong*	3,833	7,215	40,044	73,939	46,971	40,996	28,002	18,220	-35
Japan	457	812	2,173	2,960	4,440	7,592	5,131	3,400	-34
USA	358	548	3,121	6,813	6,010	7,471	6,916	4,940	-29
Taiwan**	1,000	3,430	5,543	9,965	5,395	5,849	5,141	2,810	-45
Others	1,948	3,405	7,241	17,759	19,864	29,374	28,086	22,410	-20
Total	7,596	11,980	58,122	111,436	82,680	91,282	73,276	51,780	-29

*Sources:* Ministry of Foreign Trade and Economic Cooperation (MOFTEC), Almanac of China's Foreign Economic Relations and Trade, issues 1991/2 - 1996/7, for 1990-95 data. State Statistical Bureau (SSB), using MOFTEC figures, for 1996 and 1997.

*Note:* \* This includes investments made through Hong Kong subsidiaries of foreign firms. Hong Kong figures from 1979-1989 also include investments made through Macao, as for much of this time they were calculated together. Macao's contribution to the figure is roughly 3% or less of the total. Prior to 1992, MOFTEC did not track Taiwan investment as foreign direct investment. Taiwan investment data from 1987-1991 are estimates from US-China Business Council files.

**Table 2: Foreign Direct Investment in China by ASEAN Countries, 1990-2004 (amount contracted in US\$ million)**

Country	Malaysia	Indonesia	Singapore	Thailand	The Philippines	ASEAN
1990	64	100	5043	672	167	6046
1991	196	218	5821	1962	585	8782
1992	2467	2017	12593	8432	1655	28390
1993	9142	6575	49180	23437	12250	102385
1994	20099	11570	11791	23487	14040	189300
1995	25900	11163	186061	28824	10578	265356
1996	45995	9354	224716	32818	5551	319396
1997	38183	7998	260641	19400	15563	342800
1998	34049	6879	340397	20538	17927	422318
1999	23771	12917	264249	14832	11728	328877
2000	20288	14694	217220	20357	11112	284458
2001	26298	15964	214355	19421	20939	298395
2002	36786	12164	233720	18772	18600	325594
2003	25103	15013	205840	17352	22001	292543
2004	38504	10452	200814	17828	23324	304053

*Sources:* Shu and Zeng (2006)

It is thus interesting to eavesdrop on the increasing role of ASEAN countries in China. In the limelight of China's rigorous involvement in open market trade and international finance, we observed an increased participation between ASEAN countries and China. In addition, with the mutually complementary economic strength and increasing economic cooperation, China and ASEAN will achieve the goal of common development and common prosperity.

Giving the above scenario, the purpose of this paper is to analyze the impact of globalization on ASEAN-China economies. Specifically, this paper examines quantitatively the impact of China's open door policies on *FDI* inflows between ASEAN countries and China by using panel estimation.

The rest of the paper is organized as follows. Section 2 reviews the existing literature on globalization, foreign direct investment and trade. Section 3 describes the data used and the methodology of determining factors that influence the level of *FDI* inflows using the panel analysis approach. The empirical results of the study and discussion are reported in Section 4 and Section 5 concludes the study.

## **2. Review of Literature**

The issue of globalization, and its economic impact on the economies of both developed and developing countries, continues to attract widespread attention and extensive research. Globalization is essentially a process of the integration of economic, political, and cultural systems across the globe. A big part of globalization is a shift away from close economy to open economy through various types of international cooperation such as the Association of Southeast Asian Nations (ASEAN) and the Asia Pacific Economic Cooperation (APEC), regional economic integration such as the European Union (EU) and the Australia New Zealand Closer Economic Relations Treaty (ANZCERT) or trade agreement such as NAFTA, AFTA and WTO. Such integration takes place mainly through trade and the activities of multinational enterprises (MNEs). In addition, increasingly, international cooperation is opening alternatives to production and trade that would not exist or would be too costly to maintain in a single country. In fact, international cooperation through trade agreement had expanded globalization opportunities among involved countries. As a result, the past decade has witnessed rapid globalization in international trade and investment.

Previous researches, particularly in the area of globalization, *FDI* and trade fall roughly into two strands. The first strand is the analysis of the relationship between *FDI* and trade; and the second strand is the analysis of the impact of economic integration on *FDI* and trade. In this section we will only reviews literature on the second strand, that is, the analysis of the impact of economic integration on *FDI* and trade.

The globalization has liberalized trade and investment regimes because it has been driven by policies that have opened economies domestically and internationally. Many governments have adopted free-market economic systems, vastly increasing their own productive potential and creating myriad new opportunities for international trade and investment. Governments also

have negotiated dramatic reductions in barriers to commerce and have established international agreements to promote trade in goods, services, and investment. Taking advantage of new opportunities in foreign markets, corporations have built foreign factories and established production and marketing arrangements with foreign partners. Therefore, the globalization has assisted for the growth of trade and investment. Related to this issue, thus, the second strand of the literature focuses on analyzes the interface between trade, *FDI* inflows, and the activities of globalization.

Some studies present a conceptual framework and some focus on empirical evaluation for evaluating this interface. The earliest empirical studies on trade agreements are by Scaperlanda (1967) and Ralph d'Arge (1969) have focused on changes in the United States direct investment in E.F.T.A and the E.E.C. Scaperlanda concluded that the formation of the E.E.C. had no significant impact on trends in the United States *FDI*. Ralph d'Arge has also found that the formation of the E.E.C. had no statistically significant impact on the United States direct investment in the E.E.C. However, he did find that United States direct investment in E.F.T.A. significantly increased. The studies by Scaperlanda and Ralph d'Arge had been continued by Schmitz (1970).

To complement these earliest analytical studies, a number of contributions present several new pieces of empirical research. In particular, Ash and Kueh (1993) have studied that economic integration has stimulated trade and *FDI*. Using the case of China, Hong Kong and Taiwan, they have found that changes in the level of investment flows from Hong Kong and Taiwan to Southern China provide a measure of the growing economic integration of the region.

Shu and Zeng (2006) in their descriptive analysis have indicated three factors that exert significant influence on *FDI* inflows between China and ASEAN. Those factors are new bilateral economic agreements, China's new mega economic zone, and ASEAN reforms and new foreign policy. Bilateral agreements such as Framework Agreement on Comprehensive Economic Cooperation (FACEC) between ASEAN and P.R. China signed in 2002, for instance, can strengthening economic relations, which is a strategic goal of both sides. This agreement can facilitate China's *FDI* in ASEAN or otherwise. The size of *FDI* flows between two economic has grown. Before 2002, the flow of *FDI* from China into ASEAN remained relatively scarce. As of 2003, the cumulative amount of *FDI* from China into ASEAN was US\$0.63 billion, accounting for less than 0.3 percent of global investments in the region. A large variety of Chinese products have been exported, on a large scale, into ASEAN member countries. After signing FACEC agreement, China provides survival and growth opportunities for ASEAN investors and traders.

### **3. Methodology of Estimation**

Due to lack of time series data, panel analysis method was used to analyze the determinants of *FDI* inflows and to evaluate the effect of implementation of WTO policy in China. Actually, panel data have two

important advantages over time series data: first, the number of observations and hence the degrees of freedom is larger so that estimate efficiency improves; and second, flexibility in modeling differences in behavior across individuals is greater.

### 3.1 Data

Secondary data are utilized in the study. The balanced panel consists of annual data for *FDI* inflows in China from five selected ASEAN countries, namely Malaysia, Thailand, The Philippines, Indonesia and Singapore for the period of 1990-2004. Data on each variable is measured in US dollars. The data are gathered and verified from various sources i.e. International Financial Statistics by IMF, Direction of Trade Statistics, World Development Indicators and World Debt Tables.

### 3.2 Variables

Our list of possible factors that influence *FDI* inflows in China includes level of trade openness (*OPENESS*), the exchange rate of China relative to each of individual ASEAN countries (*RELEXC*), gross domestic product (*GDP*) and population of China (*POP*). Among these four time-varying explanatory variables are employed in this analysis, *OPENESS* is considered as the key time-varying explanatory variable. The choice of these variables relies on the data accessibility.  $FDI_{it}$  represents the total *FDI* inflows into China from selected ASEAN countries. *OPENESS* is the level of trade openness. It is measured by the ratio of real trade share (export + import) to gross domestic product; *RELEXC* is the exchange rate of China relative to each of the individual ASEAN countries; *GDP* is the gross domestic product of China; and *POP* is the total number of population in China.

### 3.3 Model

We utilized *FDI* model in determining factors that influence *FDI* inflows from selected ASEAN countries. In panel estimation, two alternative models, fixed effect model and random effect model was used to estimate factors affecting the *FDI* inflows into China. Equation [3.1] is used for fixed effects estimation.

[3.1]

$$FDI_{it} = a_i + \beta_1 OPENESS_{it} + \beta_2 RELEXC_{it} + \beta_3 GDP + \beta_4 POP_i + \mu_{it}$$

where  $FDI_{it}$ ,  $i$  denotes the cross-sectional unit which represents *FDI* inflows into China from each selected ASEAN country and  $t$  denotes the time period; *OPENESS* represents the degree of openness of China;  $RELEXC_{it}$  represents the relative exchange rate between China and selected ASEAN

countries, and  $GDP_{it}$  represents gross domestic product of China, and  $POP_i$  represents total population of China.

Meanwhile, the variable  $a_i$  which is called as unobserved country effect captures all unobserved heterogeneity such as country heterogeneity, time-constant factor that affect  $FDI_{it}$ . Unobserved country effect referred to as a fixed effect since its value fixed over time. Furthermore, it is assumed that there is an arbitrary correlation between  $a_i$  and the explanatory variables,  $(X_{ijt})$  in each time period or  $Cov(X_{ijt}, a_i) \neq 0$ , for all t, s, and j. The error  $\mu_{it}$  is called as idiosyncratic error or time-varying error, because it represents unobserved factors that change over time and affect  $FDI_{it}$ . For each t, the expected value of the idiosyncratic error given the explanatory variables in all time periods and the unobserved effect is zero;  $E(u_{it}|X_i, a_i) = 0$ ;  $Var(u_{it}|X_i, a_i) = Var(u_{it}) = \sigma_u^2$  for all  $t = 1, \dots, T$ ; and the idiosyncratic errors are uncorrelated;  $Cov(u_{it}, u_{is}|X_i, a_i) = 0$  for all  $t \neq s$ .

The second model is random effect model. The random effects model is used to handle the constants for each country not as fixed, but as random parameters. Thus, it is assumed that the unobserved effect,  $a_i$  is uncorrelated with each explanatory variable in each time period or  $Cov(X_{ijt}, a_i) = 0$ , for all t, s, and j. The random effects model takes the following form:

[3.2]

$$FDI_{it} = \beta_0 + \beta_1 OPENESS_{it} + \beta_2 RELEXC_{it} + \beta_3 GDP + \beta_4 POP_i + v_{it}$$

where  $v_{it} = a_i + \mu_{it}$

In the random effects model,  $v_{it}$  are defined as the composite error term and serially correlated across time. Thus,  $Cov(v_{it}, v_{is}) = \sigma_a^2 / (\sigma_a^2 + \sigma_u^2), t \neq s$ , where  $\sigma_a^2 = Var(a_i)$  and  $\sigma_u^2 = Var(u_{it})$ . The assumptions of idiosyncratic error for random effects model are similar to fixed effects model.

### 3.4 Methods of Estimation

Equation [3.1] and [3.2] are estimated using fixed effects and random effects, respectively. In the fixed effects method the constant is treated as country-specific. This means that the model allows for different constants for each country. Fixed effects method is employed to essentially capture all effects which are specific to a particular individual country and which do not vary over time. So if we had a panel of countries the fixed effects would take full account of things such as geographical factors, natural endowments and any other of the many basic factors which vary between countries but not over

time. Meanwhile, the random effects method is used to handle the constants for each country not as fixed, but as random parameters.

#### 4. Empirical Results

Table 3 reports the descriptive statistics of each variable used in the econometrics analysis. Meanwhile Table 4 shows the estimates of the FDI model in equation [3.2] and [3.5] using both fixed and random effects methods. In particular, the results of these estimations are given under One-Way Fixed Effects and Random Effects Models.

**Table 3: Descriptive Statistics**

	<b>FDI</b>	<b>OPENESS</b>	<b>RELEXC</b>	<b>GDP</b>	<b>POP</b>
Mean	46356.17	0.086	138.499	71902.80	1238.613
Median	17828.00	0.066	3.787	74463.00	1242.410
Maximum	340397.00	0.172	1239.239	160280.00	1307.990
Minimum	64.00	0.055	0.170	18548.00	1155.310
Std. Dev.	77655.52	0.038	325.645	38287.81	47.571
Observations	75	75	75	75	75

**Table 4: The Results of Fixed Effects and Random Effects Estimation**

<b>Variables</b>	<b>Methods of Estimation</b>					
	<b>Fixed Effects</b>			<b>Random Effects</b>		
	Coefficient	Std. Error	t-Statistic	Coefficient	Std. Error	t-Statistic
C	-718036.300	429997.300	-1.669	-722161.700	429266.600	-1.682
OPENESS	-503160.400	205562.300	-2.448*	-502681.800	204833.700	-2.454*
RELEXC	-41.141	19.513	-2.108*	-42.858	18.502	-2.316*
GDP	0.179	0.513	0.349	0.177	0.511	0.346
POP	646.212	371.794	1.738	649.816	370.181	1.755
R <sup>2</sup>	0.746			0.289		
Adj R <sup>2</sup>	0.715			0.248		
F-statistic	24.211			7.106		
Prob (F-statistic)	0.000000			0.000073		
Wald Test (Chi-square)	5.991* (0.014)			6.023* (0.014)		

Note: Wald test – Probability value of Chi-square in parentheses.

To test between the fixed and random effect models, Hausman's test (Greene, 2000, pp.576-7) has been conducted. The test results show that we fail to reject means either that the random effects and fixed effects estimates

are sufficiently close so that it does not matter which is used (Wooldridge, 2006). However, in term of goodness-of-fit, fixed effects model is considered good since its  $R^2$  is considered higher than  $R^2$  of random effects. Based on  $R^2$  value, 74.6 percent of time variation in the  $FDI_{it}$  is explained by the time variation in the explained by the time variation in the explanatory variables.

The results in both estimations methods show that the coefficient of *OPENESS* and *RELEXC* are highly statistically significant with the correct expected sign at the five percent significance level, suggesting that *OPENESS* plays a major role in influencing *FDI* inflows into China. An increase in *FDI* flows into China is due to openness policy which has been gradually implemented since 2001. The implementation of openness policy has exposed China to international market which would then lead to accelerating *FDI* inflows. The positive effect of *OPENESS* on selected ASEAN countries *FDI* inflows into China is consistent with the idea that a higher degree of a country's trade openness tend to stimulate *FDI*. This is because trade openness tends to reduce import and export barriers, which in turn will lead to an improved business climate on *FDI*. The results of this study has supported the evidence provided by Ash and Kueh (1993) that claimed economic integration can stimulate trade and *FDI*.

Meanwhile, the *RELEXC* coefficient is also statistically significant with the correct expected sign at the five percent significance level. The results of both estimations method show that there is a negative association between *FDI* inflows into China. As *RELEXC* increases, there is a tendency that *FDI* inflows into China decreases. A depreciation of the China real exchange rate will lowers the cost of production and investment in China, thus raising the profitability of *FDI* inflows into China. Even though the *GDP* and *POP* coefficients have anticipated signs, there are insignificant in both estimations. This suggests that *GDP* and *POP* of China have no significant impact on the *FDI* inflows into China.

## 5. Conclusion

In this paper we examine qualitatively the key channels through which China's open door policies have impacts on the Malaysian economy. We analyzed investment policies in both Malaysia and China. Then, we proceed to determine possible factors that may influence the level of *FDI* inflows into China using the panel analysis. The results of the study are consistent with the predictions of the theory. We find evidence that trade openness is an important factor in influencing *FDI* inflows from selected ASEAN countries into China.

There are several conclusions that can be made from our study. First, our findings indicate that trade openness has a positive effect on the *FDI* inflows of the selected ASEAN countries into China. This suggests that to gain mutual benefits of bilateral economies of ASEAN countries and China for long term foreign direct investments, priority should be given by policy makers to improve on policy openness in the promotion of economic

cooperation and regional integration arrangements in the region. With the mutually complementary economic strength and increasing economic cooperation, ASEAN and China will achieve the goal of common development and common prosperity. Second, the variable exchange rate of China relative to each of the individual selected ASEAN countries does cause any changes in *FDI* inflows from ASEAN countries into China. Finally, the variables GDP and population of China have no significant impact on the *FDI* inflows into China. With regards to the variable GDP, the finding suggests that as the wealth and economic performance of China rises there will not attract more *FDI* inflows into China.

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