

Impact of Economic Integration on Foreign Direct Investment into ASEAN5

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Abstract: The paper aims to analyse the relationship between economic integration and FDI for ASEAN5, namely Indonesia, Malaysia, Philippines, Singapore and Thailand through panel analysis. In order to compete, in the face of the two regional growing giants, China and India, it is crucial to identify and understand the determinants of FDI flowing into the regional trade area (RTA), in particular, whether economic integration to form a larger entity, does contribute to FDI inflow. FDI inflow into ASEAN5 was thought to be profit-seeking in nature. This study finds that FDI inflow into ASEAN5 is more market-seeking. This may result from the growing internal markets of ASEAN5.

Keywords: Economic integration, foreign direct investment, panel analysis

JEL classification: C33, F15, F23

1. Introduction

Regional integration has been known to cause increased foreign direct investment (FDI) inflows into host countries within a regional trade area (RTA). With liberalisation of trade and investment, entering an RTA will bring about an increase in FDI inflows of both horizontal and vertical types into the member countries. The changing FDI landscape in the world also encourages FDI flows. There are now more transnational corporations (TNCs) together with even more of their affiliates that can move their physical and financial capital elsewhere to operate a business. What remains for host countries and RTAs are their resolve and determination to improve their lot through the desired type of FDI inflows.

FDI had always been a traditional area that contributes towards growth in ASEAN5. The growth effect of FDI through direct physical stock building and technology spillovers, particularly for the manufacturing sector through endogenous effects and dynamic effects of long term economic integration together with liberal policies and adequate and suitable

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Table 1. FDI/GFCF in ASEAN5 (1970-2005) (%)

Year	ASEAN5
1970	2.41
1975	6.19
1980	5.88
1985	4.37
1990	12.04
1995	12.19
2000	21.46
2005	19.23

Source : Authors' compilation from UNCTAD and IFS, various years.

human resources, is widely proven. FDI itself contribute strongly to gross fixed capital formation (GFCF) from the ratio of FDI to GFCF for ASEAN5 as illustrated in Table 1. Despite negative growth rates of gross domestic product (GDP) towards the end of the century, FDI inflows are increasing as a percentage of GFCF. The importance of FDI for ASEAN5 cannot be denied.

For ASEAN5, the promotion of growth through economic integration and FDI is crucial in the short to medium term. There are, however, problems in realising the integration-led inflow of FDI.

The first of the problems is the small market size and resource availability of individual countries of ASEAN5. In operating individually, each of the ASEAN5 countries face keen competition for FDI. The high growth rate of FDI inflows into ASEAN5 in the late eighties had tapered off in the early nineties with the emergence of China. In addition, the emergence of India will pose a definite threat to ASEAN. The 1997 Asian Financial Crisis had also affected FDI inflows into ASEAN5 significantly. The spectacular growth experienced earlier has not repeated itself in the twenty-first century. The average growth rates of FDI in ASEAN5 in comparison with gross fixed capital formation and GDP are shown in Table 2. FDI inflows suffered negative growth from 2001 to 2004 before picking up again in 2005. The Asian Financial Crisis together with fierce competition has caused a significant drop in FDI inflows. In order to compete in the face of the two regional growing giants, China and India, ASEAN5 needs to integrate into a larger entity and align its internal policies properly to draw in FDI. Any failure to do so may cause a further drop in its growth.

It is therefore crucial to identify and understand the determinants of FDI flowing into the RTA, in particular whether economic integration to form a larger entity does contribute to FDI inflows. With a larger combined market, FDI inflows may veer towards market-seeking type rather than just the efficiency and resource-seeking type.

In view of the drop in FDI inflows into ASEAN5 after the crisis and the structural changes to the economy over this period, the nature and determinants of new FDI inflows may have changed. The new large inflows in 2005 reflect the changes that have taken place. ASEAN5 as an RTA must understand the changes that have occurred and tap such changes with a strong sense of urgency. There is a strong need to pull in the required types

Table 2. Average growth rate of FDI, GFCF and GDP in ASEAN5 (1970-2005) (%)

Period	Average growth rate of		
	FDI	GFCF	DP
1971-1975	25.97	10.13	19.36
1976-1980	17.42	8.62	14.04
1981-1985	-8.39	5.95	0.98
1986-1990	33.95	7.30	11.33
1991-1995	14.15	6.46	10.61
1996-2000	-0.88	6.19	-5.63
2001-2005	10.97	11.53	9.04
1971-1980	20.37	12.46	18.81
1981-1990	13.20	14.31	4.87
1991-2000	7.11	13.50	3.32

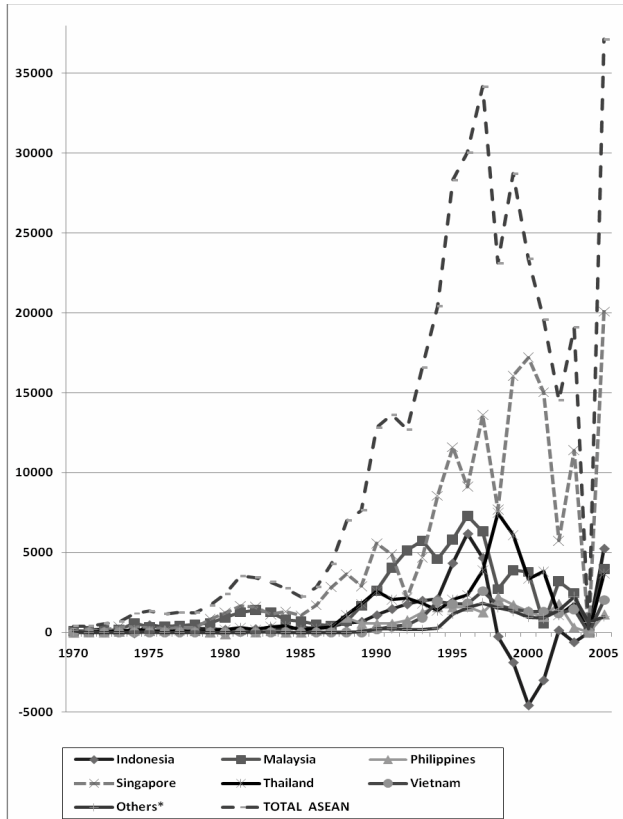
Source : Authors' compilation from UNCTAD and IFS, various years.

of FDI across the RTA in an integrated manner. The proposed ASEAN Investment Area (AIA), which will serve as a platform for national treatment of FDI in the RTA is still being finalised. The lost opportunities are seriously being left unattended while other RTAs surge forward. In studying this problem, understanding the determinants of FDI and the respective size of their effects on FDI for individual countries and the RTA as a whole, through economic integration, are crucial.

Hence, this study aims to look at the relationship between economic integration and FDI for ASEAN5, namely Indonesia, Malaysia, Philippines, Singapore and Thailand by employing panel analysis. Given the diversity of ASEAN and the weak overall integration at this point in time, the outcome of the research will provide useful input for planners and implementers of economic integration to step up or maintain the current pace of regional integration of ASEAN as an RTA. The output of this study will comprise both qualitative and quantitative results presented in Sections 2 and 3 respectively. The urgency to bring about greater economic integration in ASEAN will be discussed qualitatively and highlighted based on empirical analysis in Section 4. The conclusion will be provided in the last section.

2. FDI Trends in ASEAN

The FDI trends are reviewed using UNCTAD statistics and FDI statistics of the ASEAN secretariat. UNCTAD statistics is longer in term but lower in coverage. The available data series stretch from 1970 to 2005. On the other hand, the ASEAN secretariat data include sectoral information and source matrix allowing the possibility of intra-regional analysis. The datum of both sources of data may be different and joint analysis, unless through ratios, is not possible. This section of the study will look into FDI trends of ASEAN in a longer term perspective using UNCTAD data.



Note : Others comprise Brunei, Cambodia, Laos and Cambodia
 Source: World Investment Report, various years

Figure 1: FDI Inflows into ASEAN, 1970-2005 (USD million)

The inflows of FDI into ASEAN are depicted in Figure 1. FDI inflows in the seventies were low and have been rising gradually before the sharp rise in the early nineties, in step with increased global flows. The FDI inflows peaked in 1997 before falling due to the Asian Financial Crisis. Since 1997, despite a small rise in 1999, the inflows of FDI have been sliding till 2002 before recovering in 2003. The following sections detail the FDI flow trends in ASEAN based on UNCTAD data.

2.1 FDI Trends in ASEAN in the Eighties

Despite the recession in the early eighties, FDI inflows into ASEAN continued to increase. After the 1982 peak of USD3.5 billion, the effects of recession moved in to cause a drop till 1985 before picking up again on a continued rise to the next decade. Outflows in the eighties do not exhibit any consistent pattern except for a general rising pattern towards the nineties.

Throughout the decade, Singapore managed to receive the lion's share of FDI inflows and also gave out the largest amount of FDI outflows. The FDI activity level in the city-state, despite the lack of natural resources and a smallish market size, reflects its popularity as a FDI destination. Singapore, being one of the newly industrialising economies faced with a current account surplus, appreciating currencies, rising production cost at home and fear of protectionist measures in the ASEAN5 markets, has emerged as one of the new outward investors. Three out of the five ASEAN5 economies are in the ranks of the top ten FDI destinations among developing countries in the decade. These three are Singapore (12%), Malaysia (6%) and Thailand (3%). The sterling performance of ASEAN as a FDI host is a result of revisions of FDI legislation to make them more favourable, the growth of investment opportunities and intra-regional flows of FDI.

2.2 FDI Trends in ASEAN in the Nineties

FDI outflows recovered in 1993 after slowing down in the recessionary years of 1990 to 1992. Armed with rapid economic growth, privatisation programmes and liberalisation of the FDI regulatory framework, FDI inflows into developing economies have not suffered but are still concentrated. Despite the uneven distribution of FDI inflows, FDI flowing into East and South-east Asia were significant. Flows into the newly industrialising economies slowed down. Intra-regional flows compensated for some of the losses in FDI inflows from developed economies. The loss in locational advantages of some newly industrialising economies led to the emergence of TNCs from these countries seeking cheaper labour bases. Vietnam was a large beneficiary of this development in East and South-East Asia.

In the first half of the nineties, international production was widely lauded as the key to FDI inflows and economic growth and capital formation in developing countries. TNCs had used FDI not only for market access but also to gain access to factors of production to meet the growing pressures of international competition. One of which, is cheap labour of the right caliber, which abounds in South, East and South-East Asia. Improved communications and transportation had made coordination of cross-border trade and factor flows easier than before. To gain a larger share of FDI inflows, the countries in this region had unilaterally liberalised their FDI regimes.

China was the second largest recipient of FDI flows worldwide in 1994, accounting for 40 per cent of flows into developing economies in 1994. This had raised the issue of whether the FDI inflows into China were at the expense of her neighbours in Asia. Export-oriented FDI seeking a low cost production base is being heavily diverted from ASEAN to China. This may not be true for market-seeking investments and resource-seeking investments that will be directed to the destination countries in any case. Hence, it is becoming more important for ASEAN to consolidate and establish a market of size with internal factor sharing to counter future diversions of FDI inflows. It is unlikely that the pool of labour in China will dry up in the near future or the cost increase fast enough to exceed that in ASEAN.

In 1996, ASEAN members were preparing to launch the ASEAN Investment Area (AIA) with the signing of a protocol updating the 1987 ASEAN Agreement for the Promotion and Protection of Investment. Singapore received the second largest FDI inflows after China for developing countries. Indonesia, Malaysia, Philippines and Thailand together received

some USD17 billion in 1996, an increase of 43 per cent over 1995. However, the proportion of inflows into ASEAN compared to the region had declined, from 61 per cent in 1990-1991 to 30 per cent in 1994-1996. This decline is due to domestic capacity constraints, infrastructure bottlenecks and stiff competition from other economies.

In 1997, discussions were rife on regional trade agreements. This included the Free Trade Agreement of the Americas to consolidate and integrate the various existing free trade and investment areas. ASEAN was scheduled to establish the ASEAN Investment Area, emphasising policy flexibility, cooperative endeavours and strategic alliances and avoid legally binding commitments. Multi-lateral wide ranging discussions were also taking place in the WTO and UNCTAD. At the same time, countries in East and South-East Asia were hit by the Asian Financial Crisis. The crisis affected not only their economic performance, but also currency valuations and performance of individual TNCs.

The five worst affected economies were Indonesia, Malaysia, Philippines, Thailand and Korea. ASEAN as a whole was therefore severely affected by the crisis. FDI inflows in 1998 for Thailand and Philippines registered large gains under the ambit of IMF while that for Malaysia, Singapore, Indonesia and Vietnam suffered declines. For the remaining part of the nineties, FDI inflows were volatile and mergers and acquisitions represented a large part of the FDI involved.

2.3 FDI Trends in ASEAN in the Twenty-first Century

Global FDI inflows peaked in 2000 at USD1.3 trillion. ASEAN FDI inflows, however, peaked in 1997 before falling in 1998 and hitting a lower peak of USD28.7 billion in 1999. Since 1999, FDI inflows into ASEAN had been falling till 2002 before recovering again in 2003 at USD19.1 billion. FDI outflows from ASEAN since 1997 have been volatile in pattern, hitting a highest peak of USD17.5 billion in 2001, originating mainly from Singapore, which registered outflows of USD17.1 billion.

ASEAN's share in total FDI flows to developing countries in Asia continued to shrink to 10 per cent in 2000, compared with 30 per cent in the mid-nineties. This was largely due to rising inflows into other countries in Asia and significant divestments in Indonesia since the onset of the financial crisis. In 2001, global FDI flows dropped further by 51 per cent due to economic slowdown in the FDI triad of United States, Japan and European Union as well as a sharp decrease in stock market activities. This was further exacerbated by the events of 11 September 2001. The continued fall in global FDI inflows is also seen in ASEAN.

In 2003, FDI inflows into ASEAN recovered, reaching USD19.1 billion from USD14.5 billion in 2002. The bulk of the FDI inflows went to Singapore. Shares of Brunei, Malaysia, Thailand and Vietnam were significant. The large increase for Singapore is part of the sectoral shift to services for FDI inflows. Other ASEAN countries fared badly. FDI inflows into South, East and South-east Asia reached USD165 billion in 2005, equal to 18% of world inflows. Two-thirds of this amount went to China (USD72 billion) and Hong Kong (USD36 billion). South-east Asia received USD37 billion with Singapore receiving USD20 billion followed by Indonesia (USD5 billion) and Malaysia and Thailand with USD4 billion each. Over half the inflows came from developing economies, mostly within the region. This shift in the source and destinations of FDI inflows will probably set the trend for the future.

Manufacturing FDI has been increasingly attracted to the region although the specific locations have shifted as some countries move up the value chain. FDI in automotive, electronics, steel and petrochemical industries continued to flow significantly into South-east Asia. Vietnam, for example has just become a new location of choice. Intel had invested in a USD300 million plant for a semiconductor assembly plant (WIR, 2006). At the same time, South, East and South-east Asian countries are emerging as new sources of FDI.

3. Methodology

3.1 Theoretical Framework of Economic Integration and FDI Flows

The volume of literature linking economic integration to FDI is small and inconclusive. Carr *et al.* (2001) and Markusen and Venables (1998; 2000), in studying a two-country setup, found, *ceteris paribus*, a decrease in trade barriers would generate an increase in trade flows but a decrease in FDI of the horizontal type. FDI and trade flows for the vertical type will, however, increase in parallel with the drop in trade barriers. In analysing the effects of economic integration on oligopolistic TNCs in a three country setup (one source and two hosts within the same RTA), Motta and Norman (1996) found improvements in market accessibility cause parallel trade and FDI flows. TNCs tend to invest in market accessibility and this applies mainly to the tariff-jumping horizontal type of FDI. Puga and Venables (1997) further extended the study to include a multi-country case involving a core-periphery model. Altomonte (2004) had summarised the studies and propounded a theoretical model of international location choice of TNCs in the context of regional economic integration. He found that both vertical and horizontal TNCs benefit from positive profit opportunities and parallel reduction in trade barriers and an increase in FDI flows. The theoretical framework of this study was based on Altomonte's work which relied on the profit motive of TNCs in the location of new plants in an RTA. This theoretical framework is in line with Dunning's Ownership, Location, Internalisation (OLI) framework (Dunning, 1977, 1981, 1993, 1997).

Assuming a potential TNC can invest in z alternative RTAs each with N^z heterogeneous countries, such that $j^z = 1, \dots, N^z$. Let $i =$ a country in RTA z , $h =$ variety of goods $= 1, \dots, n_j$. The utility function of a representative consumer in each country i belonging to a RTA z is a constant economy of scale function as follows:

$$U_i = \left(\sum_{j=1}^N \sum_{h=1}^{n_j} (q_{ijh})^{\frac{\sigma-1}{\sigma}} \right)^{\frac{\sigma}{\sigma-1}} \quad \text{with } \sigma > 1 \quad (1)$$

where q_{ijh} = quantity consumed in country i of h variety of products produced in country j .

The production of each variety is subject to increasing returns and monopolistic competition of the same variety. In particular, the technology is characterised by a single factor of production, labour; in every RTA the marginal production cost in each country j is denoted by $\phi_j w_j$, where w is the wage and ϕ is the inverse of labour productivity, with increasing returns derived from fixed costs in labour $w_j F$. For a TNC to set up a plant in country j to sell to country i , the additional trade cost is equal to τ_{ij} . The budget constraint is given by the expenditures of country i on all k varieties produced in all j countries (including country i) belonging to z , i.e., $k = \sum_j n_j$. If p_{ij} = c.i.f. price of goods imported

from country j to i ; m_{ij} = value of imports from j to i and q_{ij} = quantity of goods produced in j and consumed in i , then the budget constraint for a representative variety q_{ij} produced in country j and consumed in country i can be written as $M_i = \sum_k m_{ik} = \sum_k q_{ik} p_{ik}$. The total profit accruing to a firm which serves all the N countries in the RTA from a plant in j within the RTA z is

$$\pi_j = \frac{(\phi_j w_j)^{1-\sigma}}{\sigma} \sum_{i=1}^N \frac{1}{\sum_k n_k (\phi_k w_k \tau_{ik})^{1-\sigma}} \tau_{ij}^{1-\sigma} M_i \tag{2}$$

The profit is a decreasing function ($\sigma > 1$) of the production costs ($\phi_j w_j$) in the same country j , a decreasing function of the intensity of competition with rivals $[\sum_k n_k (\phi_k w_k \tau_{ik})^{1-\sigma}]$, itself increasing with the number of rivals n_k and decreasing with the production costs ($\phi_k w_k \tau_{ik}$) they face, and finally an increasing function of the market potential ($\sum_{i=1}^N \tau_{ij}^{1-\sigma} M_i$) of country j , i.e. the total demand that is accessible from a production plant located in country j .

The aggregate potential profit Π of a generic RTA is equal to the sum of all profits π_j obtainable in different locations j in the RTA as follows:

$$\Pi = \sum_{j=1}^N \left[\frac{(\phi_j w_j)^{1-\sigma}}{\sigma} \sum_{i=1}^N \frac{1}{\sum_k n_k (\phi_k w_k \tau_{ik})^{1-\sigma}} \tau_{ij}^{1-\sigma} M_i \right] \tag{3}$$

Equation (3) can be rearranged into

$$\Pi = \sum_{j=1}^N \frac{1}{\Theta} \Gamma_j \Psi_j \tag{4}$$

with $\Gamma_j = \frac{(\phi_j w_j)^{1-\sigma}}{\sigma} \sum_{i=1}^N [1/\sum_k (\phi_k w_k \tau_{ik})^{1-\sigma}]$ a measure of the comparative advantages of country j with respect to the other N countries of the region, $\Theta = n_k$ representing the total number of firms (varieties) operating in the RTA (recalling $k = \sum_j n_j$) and $\Psi_j = \sum_{i=1}^N \tau_{ij}^{1-\sigma} M_i$ measuring the market potential of country j . Therefore a RTA can have higher profit when, *ceteris paribus*, the region is characterised by a larger increase in Ψ_j , which is induced by greater reduction in trade barriers τ_{ij} among member countries.

Equation (4) can also be used to study the dynamics of the process of economic integration. Taking logs and adding a time component yields the potential profits of a given RTA at time t

$$\pi_t = \sum_{j=1}^N \gamma_{jt} + \sum_{j=1}^N \psi_{jt} - \vartheta_t \tag{5}$$

where γ_{jt} = log (comparative advantages of country j with respect to the other N countries of the region at time t), the term ψ_{jt} captures the j -th country's (log (market potential)), and ϑ_t indicates the (exogenous) number (in logs) of rival firms operating in the area, always at time

t. Equation (5) is a simple estimation measure of the profitability of each RTA with respect to the dynamics of economic integration.

From the above, the economic integration represented by the reduction in trade cost can lead to increased profit opportunity, thereby causing more FDI to locate plants within the RTA. The extent of profitability depends directly on the comparative advantages and market potential of the RTA and is negatively related to the number of rival firms operating at the time.

The FDI, economic integration and growth theories and their theoretical framework do not provide a clear guide as to the appropriate set of variables that should be included in the regression equation. Hermes and Lensink (2003) explained that explanatory variables included in any study depend very much on the aim of the study and the insight and belief of the author. King and Levine (1993) and Levine and Renelt (1992) found that empirical evidence suggests that only a few variables have a robust effect on economic growth and as such the number of variables should be kept low. To establish the robustness of the explanatory variables, the variables will therefore have to be statistically tested (Sala-I-Martin 1997).

3.2 Model for Effects of Economic Integration and Other Variables on FDI

The effect of economic integration on FDI, through the theoretical framework as contained in Equation (5), had not been tested on ASEAN as yet. The potential profits which attract FDI can be equated to FDI inflows into the country/RTA. The comparative advantage factor comprises several variables. The basic ones are the production factors of wage and labour productivity as well as trade cost. The production factors can be proxied by the quantity and quality of the labour force, which can be transformed from data on labour force, education level and human capital. The trade cost factor can be proxied using the inverse of trade cost to reflect the level of economic integration. A higher level of economic integration will imply a lower trade cost and higher FDI inflows. The second element of the explanatory variables is market potential. This can be extended to include not only the actual market size but also factors that affect the environment of the market size. The variables that can be used as proxies include GDP, exports to major markets for the RTA and market openness. The market size element can also be used to examine whether the nature of FDI inflows has been transformed. In particular, FDI inflows in the early years in the sixties and early seventies were mainly looking for cost reduction and were profit seeking in nature.

There are limited studies on the determinants of FDI inflows into ASEAN as a whole. Ismail (2009) has identified several key determinants of bilateral FDI inflows into ASEAN based on economic factors (i.e. market size), social indicators (i.e. skilled labour and infrastructure), and non-economic factors (i.e. transparency and trade policy). Masron and Kamaruddin (2009) found that market size remains the main and standard determinant of FDI inflow in ASEAN. They also reported that stronger regional economic integration can be anticipated to further attract FDI inflow into ASEAN. Ang (2008) has obtained consistent findings with the market size hypotheses where any increase in the size of the domestic market will cause an increase in FDI inflows into Malaysia. Noorbakhsh *et al.* (2001) examined the importance of human capital in attracting FDI inflows into developing countries (26 countries from Africa, Asia and Latin America) and found that human capital is one of

the most important determinants of FDI inflows. They also found that the growth of domestic markets, stable macro-economic environment, liberalisation policies, the availability of energy and a generally supportive business environment are significant determinants of FDI inflows. In our study, factors such as market size, infrastructure, human capital, the stock of existing FDI and economic integration have been identified as the most relevant set of determinants that emerge from economic literature.

Finally, the third element in Equation (5) indicates the exogenous factor, that is, the number of rival firms operating in the area at time t . This can be proxied by using the amount of FDI stock or to eliminate the time effect, the ratio of FDI stock over GDP, existing in the country at the moment in time. As per theoretical requirements, all variables will be taken as logarithms and the proposed econometric model for FDI taking into account economic integration is as follows:

$$FDI_{it} = \beta_0 + \beta_1 MS_{it} + \beta_2 EI_{it} + \beta_3 HC_{it} + \beta_4 INFRA_{it} + \beta_5 FDISTK_{it} + \mu_{it} \quad (6)$$

where

- $FDI_{it(A)}$ = FDI inflows for country i ($i = 1, \dots, N$) and at time t ($t = 1, \dots, T$)
- MS = market size, proxied by real GDP
- EI = economic integration, proxied by real trade within RTA/Real RTA GDP
- HC = skilled labour, proxied by the secondary school gross enrolment/population
- INFRA = number of telephone lines per 1,000 population
- FDISTK = stock of existing FDI, proxied by FDI Stock/GDP to eliminate time effects

The above proxy for economic integration was chosen after careful assessment. In a nutshell, economic integration refers to the combination of markets, specifically markets for goods and services through trade, as well as capital markets and labour markets due to the mobility of these factors once trade barriers are removed. Viner (1950) used trade data to represent the state of integration as the elimination of barriers lead to trade diversion and trade creation. Although, gravity models were developed in the mid-sixties to describe the trade patterns among countries and regions, such models were found by Helliwell (1998) to be ineffective in explaining some trade flows. Robson (1980) and Harris (2001) argued against the adequacy of trade data to represent integration and proposed other measures. Dennis and Zainal (2003), in developing integration indicators for ASEAN, had adopted as the economic integration indicator, the average of the intra-regional trade index and intra regional FDI index by reasoning that trade and investments are the two channels of economic integration and the use of two key indices is more manageable than a host of indices. The argument is also in line with ASEAN Vision 2020 which clearly proposes free flow of goods, services and investment and a freer flow of capital. This study proposes to adopt the ASEAN Economic Integration index propounded by Dennis and Zainal (2003). Moreover, the integration of ASEAN is still at the free trade area level, where the main achievements remain at trade liberalisation and substantial liberalisation of capital flows. However, the lack of data for intra-regional FDI dating back to 1970 had made the use of a composite index

of FDI and trade impossible. Shortening the study time period to just 10 years just to keep to the proposed index will not be meaningful and conducive to econometric analysis. As such, only the intra-regional trade data is used in this study as the indicator for economic integration. Marasco (2007) had used the same index to study the relationship between FDI, growth and economic integration while George *et al.* (2005) had used the same index to assess the economic integration, regional structural change and cohesion in the EU.

The data used in the analysis are from the period of 1970 to 2005 and are extracted from databases of UNCTAD, International Financial Statistics by International Monetary Fund and World Development Indicators published by World Bank.

In this study, the IPS (Im *et al.* 2003) are used as the principal tests and the LLC tests (Levin *et al.* 2002) are used as the supplementary tests to test for the unit roots in panel analysis. An important issue in econometrics is the need to integrate short-run dynamics with long-run equilibria. The theory of cointegration developed by Granger (1981) and elaborated in Engle and Granger (1987) addresses this issue of integrating short-run dynamics with long-run equilibria. In simple terms, two variables are said to be cointegrated in a regression equation if they do not drift too far apart from each other over time, thus suggesting a long-run equilibrium relationship between them.

For the last two decades, cointegration techniques have been widely used in empirical economics to examine the long-run relationships between non stationary variables.¹ However, it is sometimes difficult to find high frequency time series data for some empirical studies. The span of the data is another major problem in time series.² Both the problems have reduced the power of cointegration tests on non stationary time series data. To overcome these limitations, the advantages of cross-sectional series together with the time series properties are used and the panel cointegration model for pooled time series panels was developed. Panel cointegration techniques allow us to selectively pool information regarding common long-run relationships from across the panel while allowing the associated short-run dynamics and fixed effects to be heterogeneous across members of the panel. This approach has been applied in testing the validity of purchasing power parity (e.g. Pedroni, 2004) and growth and convergence and international R&D spillovers (e.g. Kao, 1999). In this study, we employed the cointegration test developed by Pedroni (2004). This test is employed to examine the long-run relationship among economic variables within different models.

Pedroni's (2000) method is based on fully modified FMOLS principles. The method can accommodate considerable heterogeneity across individual members of the panel. One important advantage of using this cointegrated panel approach is that it allows researchers to selectively pool the long-run information in the panel while permitting the short-run dynamics and fixed effects to be heterogeneous among different members of the panel. An important convenience of the fully modified approach is that in addition to producing asymptotically unbiased estimators, it also produces nuisance parameter-free standard

¹ Cointegration tests have been widely used since the introduction of cointegration tests by Engle and Grangers' (1987) residual-based two-step procedure.

² For example, Shiller and Perron (1985) have shown a span of data that reduces the power of cointegration tests of time series data.

Table 3. Unit root test results for ASEAN5

Variable		IPS		LLC	
		Level	First-order difference	Level	First-order difference
FDI	Constant	-0.79775(1)	-6.85345(1)*	-1.50617(1)	-4.11789(1)*
	Constant with trend	-1.04305(1)	-5.67124(1)*	0.36621(1)	-3.00912(1)*
MS	Constant	0.24739(1)	-5.38015(1)*	-1.23808(1)	-4.43346(1)*
	Constant with trend	0.16711(1)	-4.44670(1)*	-0.25768(1)	-3.54372(1)*
EI	Constant	2.39253(1)	-8.94248(1)*	0.65980(1)	-7.87167(1)*
	Constant with trend	-1.37674(1)	-8.29265(1)*	-1.52899(1)	-6.94663(1)*
HC	Constant	-1.25230(1)	-4.30483(1)*	-1.05765(1)	-3.01177(1)*
	Constant with trend	-1.58635(1)	-3.23022(1)*	-1.40790(1)	-2.15839(1)**
INFRA	Constant	0.76766(1)	-2.50802(1)*	-0.96249(4)	-4.71435(4)*
	Constant with trend	0.93096(1)	-1.99260(1)*	0.39660(1)	-1.29481(1)***
FDISTK	Constant	0.16787(1)	-4.66415(1)*	-0.30828(1)	-3.03955(1)*
	Constant with trend	-1.13042(3)	-3.809951(1)*	-0.41512(3)	-1.89830(1)*
	Constant with trend	-0.44039(1)	-2.00700(1)**	-0.99442(1)	-2.71682(1)*

***, **, * Reject the null of unit root at 10%, 5% and 1% levels respectively. Optimal lag lengths are provided in parentheses.

normal distributions. In this way, inferences can be made regarding common long-run relationships which are asymptotically invariant to the considerable degree of short-run heterogeneity that is prevalent in the dynamics typically associated with the panels of aggregated national data. The estimators will be tested on significance through t -statistics as well as the expected sign in accordance with theory.

4. Results and Discussion

The presence of unit roots was first checked by the Im-Pesaran-Shin test (IPS) (2003) and confirmed using the Levin, Lin and Chu test (LLC) (2002). The results of the unit root tests using IPS w -statistic and LLC t^* statistics for ASEAN5 on FDI are presented in Table 3. The optimal lags for all the variables are also identified and shown in parenthesis.

Both the IPS and LLC tests show that the null hypothesis of a unit root cannot be rejected for all the series in level. However, for the series in the first difference, both the IPS

Table 4. Cointegration test results for ASEAN5

Panel- <i>v</i> statistic	Panel- ρ statistic	Panel- <i>t</i> statistic	Panel- <i>adf</i> statistic	Group- ρ statistic	Group- <i>t</i> statistic	Group- <i>adf</i> statistic
Without Trend (lag=4)						
2.40308*	-1.38650***	-3.64442*	-2.70402*	-0.86570	-4.22585*	-3.46120*
With Trend (lag=4)						
1.29057***	-0.83876	-3.44424*	-2.91230*	-0.14829	-3.772640*	-3.26633*

***, **, * Rejected the null of no cointegration at 10%, 5% and 1% levels respectively.

and LLC tests rejected the hypothesis of unit roots for all the series. This implies that all the series are integrated to order one or I (1). The series above are therefore expedient for cointegration analysis.

The Pedroni cointegration tests on the FDI equation using the ASEAN5 panel data reveal the existence of strong cointegration (Table 4). The cointegration of the specification without trend is, however, stronger than that with a trend specification. Most of the statistics reveal significance levels of 1 per cent. Since all the other statistics are significant, the existence of cointegration for the relationships cannot be denied. The panel-*v* test significantly rejects the null hypothesis of no cointegration for the 'without trend' specification. This is a set of powerful results because this test tends to under-reject the null of no cointegration with small N and T (Pedroni, 2001).

The existence of cointegration as per the theoretical framework for economic integration-led FDI inflows is consistent with the findings of Altomonte (2004) and Velde and Bezemer (2006).

The results of the FMOLS regressions estimation for FDI are shown in Table 5. All the variables in the group equation are significant to 1 per cent. The signs of the variables are also consistent with theory. Market size, economic integration, human capital, infrastructure are all positively related to FDI while existing FDI stock is negatively related.

The results for ASEAN5 were found to be congruent with Dunning's (2000) assessment of the internal market programme (IMP) of EU. He found that the dynamic impact of the IMP on FDI flows has been through its effects on other variables affecting FDI, notably market-size, income levels, the structure of economic activity and agglomeration economies. With IMP as an independent variable, both extra and intra-FDI inflows were stimulated, although sector specific biases were present.

For the group mean of ASEAN5, the elasticity of market size is high. A one per cent increase in market size will lead to a 2.89 per cent increase in FDI inflows. This shows a distinct level of market-seeking activity. The traditional sectors where market-seeking activities gravitate are the food products and beverages sector. In addition, the new non traditional sectors feeding the domestic market are those related to supporting industries to the export oriented industries such as fabricated metal products, rubber and plastic products and others. Combined, the market seeking FDI flows into ASEAN for 2000 onwards, exceed 30 per cent of the total FDI inflows (ASEAN FDI Database). Similar findings were made by Motta and Norman (1996) where market accessibility generates extra-regional FDI

Table 5. FMOLS regressions of FDI for ASEAN5

Country	Coefficients (<i>t</i> -statistics in parentheses)				
	MS	EI	HC	INFRA	FDISTK
Indonesia	10.38* (2.55)	0.58 (-0.12)	4.66 (1.00)	1.37 (0.12)	-6.09 (-0.42)
Malaysia	3.54* (4.40)	1.16** (-2.36)	1.61 (0.44)	2.34* (-5.54)	-4.84** (-1.97)
Philippines	1.82* (-2.85)	1.21 (0.48)	3.39*** (1.89)	0.74 (-0.26)	-6.78* (-5.58)
Singapore	1.60* (2.90)	0.19* (-2.50)	0.13* (-8.13)	0.16* (-4.20)	-1.64** (-2.28)
Thailand	0.76*** (-1.86)	0.59 (-0.94)	2.43* (-6.43)	1.35 (1.00)	-6.64 (-1.64)
ASEAN5	2.89* (2.92)	0.75* (-2.22)	1.47* (-5.02)	0.26* (-3.97)	-6.60*** (-1.75)

***, **, * Significant coefficient with 90%, 95% and 99% confidence levels respectively.

investment inflows into the RTA. The high elasticity of market size of Indonesia is also explained by the ranking of Indonesia's market size in the Global Competitiveness Report (2007-08) for 2007. Indonesia is ranked 15 in the world and is the highest ranking country in ASEAN5.

Economic integration, which measures the extent of intra-regional trade activities, is also significant to 1 per cent level. The elasticity of economic integration is however lower at 0.75. Yeyati *et al.* (2003) had similarly found, using panel data analysis, that common membership in an RTA with a source country increases FDI from the source by around 27 per cent. Only Malaysia and Singapore show significance for this variable. Based on the 2007 Global Competitiveness Report, the market sizes of these two countries are the smallest among ASEAN5 countries due to their smaller population sizes. The significance of their economic integration on FDI shows that FDI tend to move to these two countries with more integration of ASEAN5. Malaysia and Singapore therefore appear to be the hub of ASEAN5.

Similarly, human capital is significant to a high level with elasticity of 1.47. This endogenous factor is a reflection of the endogeneity of the FDI inflows into ASEAN5. Although the factor shows a general rising trend as well, the rate of growth had slackened in recent years, revealing a tendency towards saturation. In some nations, this remains an important factor for the attraction of FDI. UNCTAD (2000: 20) states that the ability to create a skilled human resource base acts as an important factor for MNCs to relocate electronic firms and world-class high-tech plants to the host countries. Campos and Kinoshita (2002) found that FDI inflows into transition economies are mainly driven by host country market size, availability of skilled workers and sufficient infrastructure. In particular,

the importance of human capital as an attractor of FDI inflows is also confirmed by Noorbakhsh *et al.* (2001) in their study on developing countries where FDI is tilted more towards the manufacturing sector than the primary sector.

One interesting finding on human capital is the inverse proportionality of elasticity among individual countries with the GDP per capita. Ignoring the significance levels, Singapore with the highest GDP per capita in ASEAN5 has the lowest elasticity for human capital followed by Malaysia to Indonesia. The lower the per capita income of the country in ASEAN5, the higher is the impact of human capital on FDI. The need to improve human capital is therefore stronger for the countries with a lower per capita income.

Although infrastructural level is highly significant, its elasticity is low at 0.26. UNCTAD (1994) had pointed out that a well-developed transportation and communication infrastructure is a necessary condition for the attraction of FDI, in combination with other factors. This is also one of the locational advantage factors in Dunning's OLI framework. Campos and Kinoshita (2002) also found sufficient infrastructure to be a key variable of FDI for transition economies. As a group, some ASEAN5 countries are already very highly developed in infrastructure. This is especially so for Singapore. The Singapore effect may saturate the effects of infrastructure of other countries leading to the low elasticity. As such, this group effect may not translate into similar effects for individual countries. The increase in the level of infrastructure in ASEAN5 from 1970 to 2005 augurs well for the RTA. Singapore and Malaysia are ranked much higher in the Global Competitiveness Report (WEF, 2007) than Thailand, Indonesia and Philippines for institutions and infrastructure. It is therefore not surprising that only the infrastructure variables of Singapore and Malaysia are significant in ASEAN5. Perhaps Singapore and Malaysia can still draw in FDI that fits the level of sophistication accorded by their infrastructural level while FDI fitting for the level of infrastructural development in Thailand, Indonesia and Philippines are being diverted to countries with better comparative advantage in labour cost. This can be a cause of concern for Thailand, Indonesia and Philippines. Either the infrastructural development level must be improved or they must compete for FDI with countries such as China, Vietnam and India where labour cost are cheaper or more efficient.

As expected, the existence of FDI stock in the region causes a negative elasticity to FDI. The impact of this variable on FDI is high, with elasticity at -6.60. Such high elasticities are evident for all countries except Singapore. This shows that the FDI level in ASEAN5 had reached some state of saturation or some bottleneck in accommodating FDI may have been reached or there is concentration of FDI in specific sectors. Although there is a huge jump in the later half of the nineties, the trend in recent years has been negative while FDI move in the last two years positively upwards for ASEAN5. This is reflected in the lower significance level for this variable as compared to the other variables. In view of the high elasticity, care must be taken to select the type of FDI to attract into the region.

In conclusion, for ASEAN5 as a whole, the FDI relationship is found to be congruent with theory.

5. Conclusion

FDI inflows and outflows exploded in volume from the mid-eighties and turned into a major influencing factor. The FDI flows hit a peak in 2000 before subsiding to a trough in 2003 and

rising again in 2004 and 2005. The effects of economic integration separately, and together with FDI on growth are varied and depend upon factor endowments, demographic, political and economic characteristics of the country and RTAs. RTAs and individual countries are, in recent years, actively signing agreements for free trade and double taxation with prospective countries to enhance and defend their attractiveness and choice as the host countries for FDI. In this way, some countries had opted for integration-led FDI inflows and FDI-led integration to bring about growth.

The elasticity for market size for the FDI model is high at 2.89. This is particularly so for Indonesia at 10.38 and Malaysia at 3.54. The high elasticity suggests that some FDI entering Indonesia and Malaysia are market seeking in nature. The elasticities for other countries are much lower. Care must be taken to ensure a good mix of incoming FDI, particularly FDI into the manufacturing industry. Otherwise the medium- and long-term endogenous effects will not be felt by Indonesia and Malaysia.

FDI inflow into ASEAN5 was thought to be profit-seeking in nature. This study finds that FDI inflow into ASEAN5 is more market seeking. This may result from the growing internal markets of ASEAN5.

The elasticity of the human capital variable is inversely proportional to GDP per capita of the five countries. Singapore with the highest in GDP per capita has the lowest elasticity while Indonesia and Philippines with the lowest GDP per capita have the highest elasticity. The human capital effect in attracting FDI is therefore higher when the per capita income is lower. This implies that the countries with lower per capita income should focus more on their human capital development.

Only the infrastructure variables for Singapore and Malaysia are significant in attracting FDI inflows. This may imply that Indonesia, Philippines and Thailand may not have reached the higher threshold to attract further FDI into high technology sectors. This is apparent from the predominance of machine building capability among Singaporean and Malaysian companies for the high technology sectors. The infrastructure development of Indonesia, Philippines and Thailand needs to be upgraded to improve and spread the type of FDI inflows.

Except for Singapore, the elasticities of existing FDI stock are very high for ASEAN5 countries. This can imply that FDI has reached saturation levels or there is concentration in certain sectors or industry. It is more likely that sectoral saturation or other bottlenecks may have been reached. Malaysia's bottleneck could be labour availability while those for Indonesia, Philippines and Thailand may be infrastructural bottlenecks. As such, the need to push for infrastructural and human capital development is crucial for Indonesia, Philippines and Thailand while for Malaysia the selection of the type of FDI is crucial in order not to tighten the bottleneck of labour availability.

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