THE IMPLICATIONS OF EMERGENCE OF CHINA TOWARDS ASEAN-5: FDI-GDP PERSPECTIVE

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ABSTRACT

The relationship between Foreign Direct Investment (FDI) and Gross Domestic Products (GDP) had become the centre piece of recent researches in identifying the short run and long run implications between the two variables. Using the hypotheses of FDI led GDP and GDP led FDI as theoretical framework, this study intends to analyze the implications of the rise of China towards the ASEAN-5 countries, namely Indonesia, Malaysia, the Philippines, Singapore and Thailand from the perspective of FDI and GDP. The cointegration and vector error correlation estimate test results showed that there is a significant positive long run relationship between FDI of China and GDP of ASEAN-5. However, we failed to detect any short run causal relationship among the variables under study.

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Introduction

Foreign Direct Investment (FDI) has become the fundamental instrument of economic growth in 1990s especially in the Asia region. In fact, ASEAN and China had undergone a progressive economic growth in the last decade and referred as the most dynamic economies in the world (Zhang and Ow, 1996). ASEAN and China share a vital cohesion where both have high dependency on FDI as a tool of export-led growth. Generally, China had recorded immense net inflow of FDI that increased from average annually increment of US$3 billion from 1990 to over US$40 billion between short period of 1996 and 2000 (see Table 1). The FDI inflow into China is showing a tremendous upward trend from 2001 onwards and reached US$60.6 billion in 2004 (UNCTAD, 2002 and 2004).

In relative, the performance of FDI inflow into ASEAN countries indicating favorable increment by 48% from US$13.7 billion in 2002 to US$20.3 billion in 2003 (ASEAN Statistical Yearbook, 2004). Correspondingly, ASEAN-5[1] had successfully attracted high volume of FDI prior 1990s where recorded US$25.4 billion in 1997 but the volume declined to US$18.8 billion due to Asian Financial Crisis in 1997 (see Table 2). Nevertheless, the FDI inflow into ASEAN-5 remained favorable with progressive performance and reached US$23.6 billion in 2004 (ASEAN Statistical Yearbook, 2004).

Although ASEAN and China become rivalry from the perspective of FDI recipient in the region, there is a significant bilateral relationship exist between ASEAN and China. The bilateral trade between China and ASEAN amounted US$105.9 billion in 2004 with annual growth of 38.9% between the periods of 2002 to 2004 (Xinhua, 2006). Therefore, this study aims to address the issue of whether the emergence of China would leave favorable impact from the huge market and potential trading partner to ASEAN or acts as rival to ASEAN countries in attracting FDI inflow into the region from the perspective of FDI and GDP.

The economic growth of ASEAN and China has shown robust trend commencing year 2000 although facing severe implication from Asian Financial Crisis in 1997. Table 3 indicates the real GDP growth rate of ASEAN-5 where ASEAN-5 countries had recorded impressive high growth rate prior 1998. The stability and vigorous economic growth especially contributed by liberalization of foreign investment had stimulated favorable GDP growth in ASEAN-5. Nevertheless, the Asian Financial Crisis in 1997 leaves severe implications to the ASEAN-5 countries where majority of the countries achieved contradict GDP growth rate. Although ASEAN-5 countries gradually recovered from the crisis in 1999, the GDP growth rate in the region is growing at a slow pace due to United States economic downturn in 2001. ASEAN-5 countries recorded sustainable growth rate from 2002 onwards and remains at favorable growth level within the following years especially in 2004 with Singapore and Malaysia recorded 5.0% and 4.0% respectively.

Comparatively, China recorded extreme high real GDP growth rate prior 1998, at 9.6% in 1996. This is due to the acceleration in liberalizing the foreign investment in China beginning in 1992. Although ASEAN-5 countries suffered financial crisis in 1997 and United States economic recession in 2001, the GDP growth rate of China

[1] ASEAN-5 refers to Indonesia, Malaysia, the Philippines, Singapore and Thailand.

remained high, which is over than 7% per year. The accession of China into WTO in 2001 and becoming the hub of FDI inflow in Asian region had contributed to the high growth rate in China. The GDP growth rate of China is showing constructive upward trend and recorded over 9% in 2003 as well as 2004.

This study adopts two main hypotheses as the core of the theoretical model. Firstly, the hypothesis of FDI led growth with endogenous growth model as the foundation element of this hypothesis where the growth driving determinants of FDI are physical capital, human capital, technology and export that have major implications on the economic growth (Borensztein *et al*., 1998). Some researches proved that FDI inflows might stimulate economic growth of a country from the perspective of technology transfer and spillover efficiency. This is due to the absorption of tangible and intangible assets of Multi-National Corporation (MNC) by the domestic firms. In addition, the forward and backward FDI linkages and the role of MNC in providing technical assistance to the domestic firms also contributed to increasing of the technology and productivity level (Blomstorm *et al*., 1994).

Meanwhile, the second hypothesis is growth led FDI which is based on MNC theory. Dunning (1993 and 1997) introduced Eclectic Paradigm which stated that the ownership advantages and locational advantages play vital roles in determining investment in a country via FDI. Hence, the growth led FDI hypothesis emphasizes on locational determinants such as market size (measured in GDP or GNP) as the core determinants of FDI. This is due to an increase of market size or GDP aligns with high economic growth holding ceteris paribus, the expectation of high profitable investments may cause increase in FDI. High economic growth will result increase of aggregate demand as well, which includes demand for domestic and foreign investments (Zhang, 2001). Despite that, favorable economic growth also demonstrates excellent infrastructures facilities and greater opportunities of profit making.

Table 1: Foreign Direct Investment Inflows into China from 1985 to 2004

	1985-1995	1997	1998	1999	2000	2001	2002	2003	2004
FDI Inflow	11.7	44.2	43.8	40.3	40.8	46.8	52.7	53.5	60.6

Notes: All figures are in US$ billion. Data obtained from UNCTAD, 2002 & 2004.

Table 2: Foreign Direct Investment Inflow into ASEAN-5 from 1997 to 2004

	1997	1998	1999	2000	2001	2002	2003	2004
Indonesia	4.68	(0.36)	(2.75)	(4.55)	(3.28)	0.15	(0.59)	1.02
Malaysia	2.96	1.77	1.99	0.79	(1.94)	3.20	2.47	4.62
Philippines	1.26	1.72	1.36	1.53	1.05	1.79	0.32	0.47
Singapore	12.84	8.22	12.83	5.39	8.58	5.73	11.41	16.06
Thailand	3.63	7.43	6.15	3.28	3.81	1.07	1.80	1.41
Total	25.37	18.77	19.58	6.43	8.23	11.94	15.41	23.59
Growth rate (%)	-	(19.6)	4.3	(67.1)	27.9	45.1	29.1	53.1

Notes: All figures are in US$ billion. Data obtained from ASEAN Statistical Yearbook (2004).

Table 3: Real GDP Growth Rate of ASEAN-5 and China

	Indonesia	Malaysia	Philippines	Singapore	Thailand	China
1996	7.8	10.0	5.8	7.5	5.9	9.6
1997	4.7	7.3	5.2	8.5	(1.4)	8.8
1998	(13.1)	(7.4)	(0.6)	0.1	(10.8)	7.8
1999	0.8	5.8	3.3	5.9	4.2	7.1
2000	4.8	8.3	4.0	10.3	4.6	8.0
2001	3.3	0.4	3.4	(2.0)	1.8	7.5
2002	3.7	4.2	4.4	2.2	5.2	8.3
2003	4.5	5.3	4.7	1.1	6.8	9.3
2004	5.1	5.0	6.1	4.0	6.1	9.5

Notes: All figures are in percentage. Data obtained from ASEAN Finance and Macroeconomic Surveillance Unit (FMSU) Database and International Monetary Fund.

Relationship between FDI and GDP

The rapid growth in FDI over the 1990s especially in the developing countries has draw the attention of researches in investigating the implication of FDI towards economic growth, as measured in GDP, in the recipient country. De Mello (1999) conducted a causality study on 32 countries where 17 countries are non-OECD countries based on time series analysis. The outcome of the study showed that the long-run effect of FDI on GDP is heterogeneous across the countries and postulated that there is a negative short-run implication of FDI on GDP using mean group estimator. Niar-Reichert and Weinhold (2001) examined the causality on cross-country panels covering 24 countries from 1971 to 1995. Using Mixed Fixed and Random (MFR) coefficient approach, they discovered that FDI generally has significant effects on growth even though the relationship is heterogeneous across countries. Zhang (2001) carried out test on long run causality based on an error correction model using country to country time series data in 11 countries. The outcome indicated that there is a strong Granger causal relationship between FDI and GDP growth.

Despite that, Liu *et at*. (2002) investigated the causal linkage between FDI, GDP and trade in China using cointegration test on quarterly data. Their findings showed that a bi-directional causality present between FDI, GDP and export. In addition, they also discovered that FDI, GDP and export in China are mutual reinforcing. Despite that, Basu *et al*. (2003) studied the two-way link between FDI and growth based on a sample of 23 countries. By adopting country specific cointegrating vectors and individual country and time fixed effects, they discovered that FDI and growth are cointegrated. Furthermore, Choe (2003) conducted a study on the causal relationship between FDI, Gross Domestic Income (GDI) and economic growth in 80 countries over the period of 1971-1995 via a panel VAR model. The outcome indicated that FDI Granger causes economic growth and vice-versa. Nevertheless, the effect is more obvious from economic growth to FDI rather than from FDI to economic growth. The findings of the study postulated that there is a strong relationship between FDI and GDI and economic growth but does not indicates that FDI or GDI lead to economic growth.

ASEAN-5 and China as Competitor in FDI Destination Preference

Remarkable success of China as crowd-puller of FDI inflow into the region has arises concern among the Asia countries in regards of FDI diversion from other Asia countries. ASEAN countries face intensive competition as an exporter of labor-intensive manufacturer due to the rise of China in providing pools of low labor cost market. ASEAN may be losing its positions in labor-intensive manufacturers (LIM)

markets to China when ASEAN LIM export became relatively less competitive since 1978 compared to China (Tyers *et al*., 1987). Progressive economic growth of China has eventually overtaken the role of ASEAN as FDI destination in the region. This phenomenon leaves negative impact on ASEAN countries where ASEAN suffered the most due to China's entry into Japan import market (Herschede, 1991).

Some studies postulated that China poses severe threat to ASEAN especially in the labor-intensive products as it is one of China's comparative advantages and may spread implication on broader technological range (Lall, 2003). China has become the preference of foreign investors due to ability in producing low labor cost and huge market. Due to that, foreign investments tend towards seeking low production cost as to gain competitive advantage. Consequently, there is perception on possibility extensive FDI diversion of developing countries in Asia towards China as to accommodate large domestic market as well as in seeking for more cost efficient production locations (Rajan, 2003a and b).

ASEAN-5 and China as Trading Partner

On the other hand, some researchers foresee that the rise of China is not a zero-sum game from the perspective of FDI where FDI diversion is not at the expense of other ASEAN countries. Beyond the FDI diversion aspect, China is viewed as friendly trading partner in term of providing massive market for ASEAN countries' export market. Although the rapid economic expansion of China may leave unfavorable impact on ASEAN-5 in short run, however, the potential economic benefit to ASEAN-5 far outweighs the cost. This is due to rising opportunities for ASEAN-5 countries to expand trade, greater location for direct investment and thus diversifying highly concentrated market structures of its foreign trade (Zhang and Ow, 1996; Srivastava and Rajan, 2003).

Regional Trading Agreement (RTA) is gaining momentum in 2000s and may leave impact on the incentive for FDI via varieties means (Blomstrom and Kokko, 1998). RTA leaves significant implication on the FDI in the region as FDI and trade are largely complementary. Nevertheless, the benefits of FDI inflow due to RTA are unlikely to be distributed equally among member countries (Yeyati *et al*., 2002). Chantasasawat *et al*. (2004) conducted a research in estimating the crowding out effect by China on eight Asian countries from 1985 to 2001. They postulated that the levels of FDI inflows into China and other Asian countries are positively related. Due to that, they discovered that those Asian countries in fact could benefit from the increase amount of FDI inflows to China. This is based on the linkage to production-networking activities among Asian countries and increase demand of raw materials and resources from an expanding China's economy.

Furthermore, China's inward FDI is generally not the core determinants of FDI inflows to these Asian countries. Zebregs (2004) provided estimation based on 1995 input-output data that extra-Asia demand accounted for approximately 78% of total exports from emerging Asia. In other words, the huge market size and vigorous economic growth of China have been providing the Asia region with domestic demand. In addition, Rumbaugh and Blancher (2004) estimated that approximately half of the import of China from the region is for internal consumption. This indicates that although China emerges as new economic power in Asia region, nevertheless, at the same time China also bring beneficial outcome to Asia countries by acting as a huge market for Asia countries export. The rise of the economy of China in fact leaves significant benefits in the East Asia region. This is due to the shift of China economy from an export-oriented to a more domestic demand-driven. In addition, the

accession of China into WTO indicating China is opening its huge domestic market for import and hence providing enormous opportunities in the region (Abeysinghe *et al*., 2003). Jaumotte (2004) claimed that FDI inflow from outsiders become major part of FDI in developing countries in relative to capital flight, this indicates that the creation of RTA will increase the ultimate level of FDI into the region.

Methodology

Firstly, the non-stationarity properties of the univariate time series will be examined via Augmented Dickey-Fuller (ADF) unit root test. The ADF test consists in running on ordinary least square (OLS) regression of the first difference of the series against the series lagged once, lagged difference terms and optionally, a constant and a time trend. Besides that, it also considers the problem of autocorrelation in the error process. The ADF regression for a time series Y_t is as below:

$$\Delta Y_t = \beta_1 + \beta_2 T + \delta Y_{t-1} + \alpha_1 \sum_{i=1}^{m} \Delta Y_{t-1} + \nu_t \qquad (1)$$

where Y_t is variable of interest, Δ represents differencing operator, T acts as time trend variable, ν_t is the white noise disturbance term, and $\{\beta_1, \beta_2, \delta, \alpha_1 \ldots, \alpha_m\}$ is a set of parameters to be estimated. The null hypothesis in the ADF unit root test is $\delta = 0$, implying Y_t is non-stationary. We reject the null hypothesis if the *t*-test statistic from the ADF test is negative and significantly less than the critical value tabulated in MacKinnon (1991).

Secondly, cointegration is conducted to determine the long-run economic relationship between the variables besides minimizing spurious regression risk. The residuals from the vectors (lagged one period) in the dynamic vector error correcting mechanism system are inclusive if cointegration relationship exists between the variables. In this study, the error-correction cointegration technique due to Johansen (1988) and Johansen-Juselius (1990) will be applied to identify the cointegration relationship between the variables as follow:

$$Y_t = \Pi_1 Y_{t-1} + \ldots + \Pi_k Y_{t-k} + \varepsilon_t \qquad t = 1 \ldots T \qquad (2)$$

where Y_t is a vector of p variables of interest, $\prod_1$ represents p x p coefficient matrices, ε_t is the distributed p-dimensional vector with zero mean and covariance matrix. The cointegrating matrix is given as below:

$$\prod = \mathrm{I} - \prod_1 - \prod_2 \ldots - \prod_k \qquad (3)$$

where I is the identity matrix and $\prod$ is a p x p matrix. Johansen (1988) showed that the coefficient matrix Π_k conveys the information concerning the long run relationship between the Y_t variables. The rank of the matrix Π_k indicates the number of cointegrating relationships existing between the variables in Y_t. If Π_k has zero rank, $p = 0$, then the two variables are not cointegrated, which means all elements of Y_t have unit roots and first differencing could be employed. If Π_k is full rank p, all elements are stationary in levels. If the rank is r, in which $r < p$, there will exist r possible stationary linear combinations among the elements of Y_t, and $p - r$ common stochastic trends. When $r < p$, it implies that $\Pi_k = \alpha\beta'$, where α and β are p x r matrixes. β is a

matrix of cointegrating vectors while α is a matrix of speed of adjustment parameters representing the speed of error-correction mechanism.

Johansen's cointegration test only can be used to determine the number of cointegration vector(s) if the variables are non-stationary and are integrated of the same order. Johansen and Juselius (1990) suggested two statistic tests with the aim to determine the number of cointegration vector(s). The first test is trace test (λ_{trace}). It tests the null hypothesis, in which the number of distinct cointegrating vector(s) is less than or equal to *r*, against a general unrestricted alternative that the rank of $\Pi \geq r + 1$. The trace statistic test is calculated as follow:

$$\lambda_{trace} = -T \sum_{i=r+1}^{P} \ln(1 - \lambda_i) \quad (4)$$

where λ_i is the smallest value eigenvectors (p - r) and T is the number of observations. The null hypothesis is at most r cointegrating vector(s). The second test is the maximum eigenvalue test (λ_{max}), which is calculated according to Equation (5) below:

$$\lambda_{max} = -T \ln(1 - \lambda_{r+1}) \quad (5)$$

where λ_{r+1} is an estimated eigenvalue. The null hypothesis is r cointegrating vector(s), against the alternative of r + 1 cointegrating vector(s). Critical values for both the maximum eigenvalue and trace tests are tabulated in Osterwald-Lenum (1992).

Thirdly**,** if the variables contain a cointegrating vector, causality exists in at least one direction. The direction of a causal relationship can be detected in the vector-error correction model (VECM). Engel and Granger (1987) found that in the presence of cointegration, there always exists a corresponding error-correction representation, captured by the error-correction term (ECT). This means that changes in the dependent variable are a function of the level of disequilibrium in the cointegrating relationship, as well as changes in other explanatory variable(s)[2]. The ECT captures the long-run adjustment of cointegration variables. As such, in addition to the direction of causality, the incorporation of ECT in the VECM allows us to detect both short- and long-run causal relationship between the variables. The short-run causal relationship is given by the χ^2-test of the joint significance of explanatory variables, while the *t*-test of the lagged ECT indicates the existence of long-run causal effect. On the other hand, if there is no cointegrating vector exists in the model, the standard VAR should be applied to test for the causal relation between variables.

Empirical Results

Unit Root Test Results

Unit root test is essential as to examine the stationarity property of the time series where significant relationship only exists when the variables in the model are in the same order of integration. The results of the ADF unit root test are depicted in Table 4. Empirical results indicate that all variables are non-stationary in their level. Thus, the null hypothesis cannot be rejected where the times series data contained a unit root. Consequently, higher order of differencing is a must. In the first difference, the null hypothesis of unit root test is being rejected for all series tested. Ultimately, the FDI and GDP variables demonstrated to be integrated of order one, $I(1)$ and we

[2] See detail discussion in Masih and Masih (1996).

can proceed to test their long-run equilibrium relationship using cointegration test since they become the stationary variables after being once differencing[3].

Johansen and Juselius Cointegration Test Results

The bivariate cointegration test was conducted to investigate the long-run relationship between FDI in ASEAN-5 (LFDIA5) against GDP of China (LGDPC) and FDI of China (LFDIC) against GDP of ASEAN-5 (LGDPA5). The outcomes of cointegration test are presented in Table 5. Both the trace and maximal eigenvalue tests statistics for the model of LFDIA5 and LGDPC are insignificant at 5% level of significance. The computed statistic values are smaller than the critical values and this shows that there is no cointegrating vector exists in the model, implying there is no significant long-run relationship between FDI of ASEAN-5 and GDP of China. Notwithstanding, the computed statistic values for trace and maximal eigenvalue for the model of LFDIC and LGDPA5 have contradictory results. The null hypothesis of no cointegration can be rejected at 5% level of significance in both tests, indicating there exists a common stochastic trend within the two-variable set data between FDI of China and GDP of ASEAN-5.

Granger Causality Test Results

Since the variables are cointegrated in the model of FDI of China and GDP of ASEAN-5, the Granger causality test was conducted in the VECM framework. The result of Granger causality test based on VECM is reported in Table 6. The χ^2-test statistics for the lag values of the explanatory variables indicate that we cannot reject the null hypothesis of no causality among the variables under study in the short-run. However, the lagged ECT values show that there is a significant bi-directional long-run causal relationship between FDI of China and GDP of ASEAN-5.

On the other hand, for the model of FDI in ASEAN-5 against GDP of China, since the data are non-stationary and not cointegrated, we use the standard VAR in estimating their causal relationship. Table 7 shows the Granger causality test results using standard VAR. Empirical results indicate that we cannot reject the null hypothesis of Granger non-causality as all the *p*-values are greater than 0.10. These results are similar for four different lag periods. Therefore, GDP of China does not Granger cause FDI of ASEAN-5 in the short-run, and vice-versa.

Vector Error Correlation Estimates

Since there is a long-run stable relationship between FDI of China and GDP of ASEAN-5, we can proceed to form an equation in order to further identify the effect of FDI of China towards the GDP of ASEAN-5, and vice-versa. The formation of the equation is based on the vector error correlation estimate where all the values are the normalized coefficients for the dependent variable in the model. The following is the equation for referring FDI of China as dependent variable whereas GDP of ASEAN-5 as independent variable as stated in Equation (6) and GDP of ASEAN-5 as dependent variable and FDI of China as independent variable as stated in Equation (7):

[3] See for example, Engle and Granger (1987).

$$LFDIC = -3.636 + 1.075\ LGDPA5 \quad (6)$$
$$(2.116)$$

$$LGDPA5 = 3.381 + 0.929\ LFDIC \quad (7)$$
$$(4.796)$$

Figures in parentheses are *t*-statistics. Based on the Equation (6), there is a significant positive relationship between FDI of China and GDP of ASEAN-5 in the long run. The estimated coefficient shows that a 1% increase in the GDP of ASEAN-5 will contribute to approximately 1.075% increase of FDI in China, which is almost one to one ratio. Meanwhile referring to Equation (7), there is also a similar significant positive relationship between GDP of ASEAN-5 and FDI of China, in which an increase of 1% in the FDI of China will cause an increase of about 0.929% of GDP in ASEAN-5[4].

Table 4: ADF Unit Root Test Results

Series	Level	First Difference
	Trend	No Trend
LFDIC	-1.6830 (9)	-3.0924 (8)**
LFDIA5	-2.2379 (5)	-4.7187 (3)***
LGDPC	-2.8124 (0)	-7.7234 (0)***
LGDPA5	-2.1630 (5)	-4.0181 (3)***

Notes: LFDIC = Natural logarithm of FDI in China, LFDIA5 = Natural logarithm of FDI in ASEAN-5, LGDPC = Natural logarithm of GDP of China and LGDPA5 = Natural logarithm of GDP of ASEAN-5. Asterisks (***) and (**) denote significant at 1% and 5% levels, respectively.

Table 5: Johansen and Juselius Cointegrating Test Results

LFDIA5 & LGDPC	H_0	H_1	λ_{trace}	$CV_{(trace, 5\%)}$
	r = 0	r ≥ 1	7.595	17.860
	r ≤ 1	r ≥ 2	1.698	8.070
	H_0	H_1	λ_{max}	$CV_{(max, 5\%)}$
	r = 0	r = 1	5.897	14.880
	r ≤ 1	r = 2	1.698	8.070
LFDIC & LGDPA5	H_0	H_1	λ_{trace}	$CV_{(trace, 5\%)}$
	r = 0	r ≥ 1	23.473**	17.860
	r ≤ 1	r ≥ 2	6.899	8.070
	H_0	H_1	λ_{max}	$CV_{(max, 5\%)}$
	r = 0	r = 1	16.574**	14.880
	r ≤ 1	r = 2	6.899	8.070

Notes: r is the number of cointegrating vector. Asterisks (**) denote significant at 5% level.

Table 6: Granger Causality Test Results based on VECM

LFDIC ⇏ LGDPA5		LGDPA5 ⇏ LFDIC	
ECT_{t-1}	χ^2-statistic	ECT_{t-1}	χ^2-statistic
0.066	2.727	-0.049	0.173
(0.020)**	(1.000)	(0.011)**	(0.677)

Notes: Figures in parentheses ( ) are the *p*-values. Asterisks (**) denote statistically significant at 5% level.

[4] We also estimate the coefficients in the model of FDI of ASEAN-5 against GDP of China using OLS with first difference data. The finding is consistent with the result obtained from cointegration test in which the estimated coefficients are statistically insignificant, implying there is no significant long-run relationship between the two variables.

Table 7: Granger Causality Test Results based on Standard VAR

Null Hypothesis	F-Statistics (*p*-values)			
	Lag 1	Lag 2	Lag 3	Lag 4
FDI of ASEAN-5 does not Granger cause GDP of China (LFDIA5 $\nRightarrow$ LGDPC)	0.118 (0.733)	0.111 (0.895)	0.093 (0.964)	0.088 (0.986)
GDP of China does not Granger cause FDI of ASEAN-5 (LGDPC $\nRightarrow$ LFDIA5)	0.012 (0.915)	0.045 (0.956)	0.070 (0.976)	0.099 (0.982)

Notes: Figures in parentheses ( ) are the *p*-values. Asterisks (**) denote statistically significant at 5% level.

Discussion and Conclusion

Causality Relationship between FDI and GDP of ASEAN-5 and China

The empirical results indicate that FDI of China and GDP of ASEAN-5, and vice-versa, do not have significant short-run relationship based on the Granger causality test. However, these results generally do not supported by findings of several studies such as De Mello (1999), Niar-Reichert and Weinhold (2001), Liu *et al*. (2002), Basu *et al*. (2003) and Choe (2003), where they found that there is a short-run linkage between FDI and GDP. One of the reasons is due to the approach used in this study where Granger causality test was conducted based on ASEAN-5 as a whole instead of individual ASEAN-5 member countries against China. Another reason is due to the nature of FDI, which can be characterized as long-term investment and the implications can be viewed upon longer period of time instead of short time frame. This means that the FDI inflow into China does not affect the economic growth of ASEAN-5 in the short-run.

Besides that, the other explanation is related to the economic policy of ASEAN-5 countries as most of the member countries do not rely much on FDI as the core determinant in stimulating economic growth anymore. Although the FDI inflow into ASEAN-5 is showing an upward trend from US$6.4 billion in 2000 towards US$23.6 billion in 2004, nevertheless, the growth rate of FDI inflow into ASEAN-5 is relatively low compared in 1990s (ASEAN Statistical Yearbook, 2004). Due to the liberalization of the market and establishment of Free Trade Area (FTA) either internal or external of the region, ASEAN-5 countries have to adapt to the dynamic economic environment and emphasize on their own core competencies instead of relying too much on FDI. For instance, service sectors such as financial, tourism and education, have become the top agenda as the important economic growth determinants among the ASEAN-5 countries.

Even though there is a number of studies such as Tyers *et al*. (1987), Herschede (1991), Lall (2003) and Rajan (2003a and b) concluded that FDI diversion occurs at the expense of ASEAN countries due to the emergence of China, our empirical findings based on VECM results indicated that the linkage between FDI of China and GDP of ASEAN-5 portrays a significant positive long-run bi-directional relationship. This means that the diversion of FDI to China in long run will not bring unfavorable implications to ASEAN-5 economies, but instead it will help to stimulate the economic growth of ASEAN-5. These outcomes tend to be supported by findings of De Mello (1999), Nair-Reichert and Weinhold (2001), and Basu *et al*. (2003), in which FDI and GDP have long-run effect and heterogeneous impacts across different countries.

The main reason contributed to this situation is due to the closer relationship between ASEAN-5 and China in recent year and near future. After the accession of China into WTO in December 2001, China has been fostering relationship with

ASEAN countries especially in economic sector. This can be seen from the commitment in establishing China-ASEAN Free Trade Area (CAFTA) by 2010 and creation of East Asia Community (EAC) in the future. The increase of FDI inflow into China will in fact produce favorable spillover effects to ASEAN-5 countries due to greater bilateral trade volume between ASEAN-5 and China upon reduction or removal of tariff barriers. China will remain as the huge export market for ASEAN-5 countries while the source import of China will still rely on ASEAN-5 countries in addition to greater demand for resources from ASEAN-5. Consequently, this will stimulate the economic growth of ASEAN-5. As a result, the inflow of FDI into China will leave favorable implications on the GDP of ASEAN-5.

On the other side, we notice that there is no significant short- and long-run relationship between GDP of China and FDI of ASEAN-5 via Granger causality test and cointegration test. The main justification to this outcome can be related to the finding of Liu *et al*. (2002) where there exists significant relationship between economic growth of China and FDI inflow into China. This indicates that the GDP of China is affected by FDI inflow into the country instead of influenced by FDI inflow into ASEAN-5. Thus, FDI inflow into ASEAN-5 does not have significant impact on GDP of China. Despite that, the volume of FDI inflow into ASEAN-5 is relatively small compared to FDI inflow into China. The total FDI inflow into ASEAN-5 had reached US$23.6 billion meanwhile China had recorded US$60.6 billion in year 2004 (ASEAN Statistical Yearbook, 2004 and UNCTAD, 2004). These figures indicate that FDI inflow into ASEAN-5 accounted less than half of the total FDI inflow into China. As a result, the FDI of ASEAN-5 does not significantly affect the economic growth in China.

China either as Competitor or Comrade to ASEAN-5

Based on the cointegration test, there is a significant positive long-run relationship between FDI of China and GDP of ASEAN-5. This result indicates that FDI of China will influence the growth measured in GDP of ASEAN-5. Furthermore, this outcome is similar to the findings of several researches that perceived emergence of China as beneficial to ASEAN countries instead of disadvantages[5]. The rise of China although causes FDI diversion from ASEAN-5 countries, however, the development of closer relationship between ASEAN-5 and China has eventually creates massive opportunities of trade expansion, strategic location for foreign investment and hence varying highly concentrated market structures of ASEAN-5 as concluded by Zhang and Ow (1996). This is also parallel with the findings by Srivastava and Rajan (2003) as they discovered that potential mutual benefits and closer association between ASEAN and China has prevailed over the unfavorable implications of FDI diversion from ASEAN towards China due to robust growth and trade expansion. Correspondingly, the FDI inflows into China are proven to have favorable impact on the FDI inflow to Asian countries based on studies conducted by Chantasasawat *et al*. (2004). They discovered that the core linkage between the relationships is the production-networking activities among Asian countries apart from increasing in demand of raw materials as to accommodate the expanding market of China. Due to that, FDI inflow into China may lead to increasing FDI inflow into Asian countries and thus contributed to economic growth of Asian countries as well (see for example, Nair-Reichert and Weinhold, 2001 and Zhang, 2001).

[5] See for example, Zhang and Ow (1996), Blomstrom and Kokko (1998), Abeysinghe *et al*. (2003), Chantasasawat *et al*. (2004), Jaumotte (2004), Zebregs (2004), and Rumbaugh and Blancher (2004).

The other reason sustaining increase of FDI in China lead to increase in GDP of ASEAN-5 is that rapid economic growth of China and huge market in addition to accession of China into WTO has eventually creating beneficial to ASEAN-5 in term of providing domestic demand in Asia region (Abeysinghe *et al*. 2003 and Zebregs, 2004). Furthermore, China plays a vital role in the region where acting as huge export market for Asia countries. This is due to most of the sources import of China in term of acquiring raw materials and resources are from the region and thus contribute to trade expansion of Asia countries (Rumbaugh and Blancher, 2004). The bilateral trade between ASEAN and China reached US$105.9 billion in 2004 with annual growth of 38.9% between the years 2002 to 2004 (Xinhua, 2006). Hence, this trade figure indicates that both ASEAN countries and China play their own essential roles in sustaining reciprocal benefits between them. Eventually, increase of FDI inflow into China will eventually creates favorable spillover effects to the ASEAN-5 in term of economic growth.

References

Abeysinghe, T., and Lu, D. (2003). China As an Economic Powerhouse: Implications on Its Neighbors. China Economic Review, 14, 164-85.

ASEAN Secretariat, ASEAN Finance and Macroeconomic Surveillance Unit (FMSU) Database.

ASEAN Secretariat, ASEAN Statistical Yearbook 2004.

Basu, P., Chakraborty, C., and Reagle, D. (2003). Liberalization, FDI, and Growth in Developing Countries: A Panel Cointegration Approach. Economic Inquiry, 41, 510-516.

Blomstrom, M., and Kokko, A. (1998). Multinational Corporations and Spillovers. Journal of Economic Survey, 12, 247-77.

Blomstrom, M., Lipsey, R. E., and Zejan, M. (1994). What Explains Developing Country Growth? National Bureau of Economics Research (NBER), Working Paper No. 4132.

Borensztein, E., de Gregorio, J., and Lee, J. W, (1998). How Does Foreign Investment Affect Economic Growth? Journal of International Economics, 45, 115-35.

Chantasasawat, B., Fung, K.C., Hitomi, I., and Siu, A. (2004). Foreign Direct Investment in China and East Asia, unpublished manuscript, National University of Singapore, UC Santa Cruz and University of Hong Kong.

Choe, J. I. (2003). Do Foreign Direct Investment and Gross Domestic Investment Promote Economic Growth? Review of Development Economics, 7, 44-57.

De Mello, L. (1999). Foreign Direct Investment Led Growth: Evidence from Time-Series and Panel Data. Oxford Economic Papers, 51, 133-51.

Dickey, D. A., and Fuller, W. A. (1979). Distribution of Estimators for Autoregressive Time Series with a Unit Root. Journal of American Statistical Association, 74, 123-144.

Dunning, J. (1993). Multinational Enterprises and the Global Economy. Harlow: Addison-Wesley.

Dunning, J. (1997). The European Internal Market Programmed and Inbound Foreign Direct Investment. Journal of Common Market Studies, 35(2), 189–223.

Engel, R., and Granger, C. (1987). Cointegration and Error Correction: Representation, Estimation and Testing. Econometrica, 55, 251-276.

Granger, C. (1969). Investigating Causal Relationship by Econometric Models and Cross Spectral Method. Econometrica, 37, 424-458.

Herschede, F. (1991). Competition among ASEAN, China and the East Asian NICs: A Shift-Share Analysis. ASEAN Economic Bulletin, 7(3), 290-306.

International Monetary Fund. International Financial Statistics, various issues. Washington, D.C.: IMF.

Jaumotte, F. (2004). Foreign Direct Investment and Regional Trade Agreements: The Market Size Effect Revisited. International Monetary Fund, Working Paper No. 04/206.

Johansen, S., (1988). Statistical Analysis of Cointegrating Vectors. Journal of Economic Dynamic and Control, 12, 231-254.

Johansen, S., and Juselius, K. (1990). Maximum Likelihood Estimation and Inference on Cointegrating with Applications for the Demand for Money. Oxford Bulletin of Economics and Statistics, 52, 169-210.

Lall, S. (2003). Assessing Industrial Competitiveness: How does Singapore fare? In: R. Rajan (Eds.), Sustaining Competitiveness in the New Global Economy: A Case Study of Singapore. Cheltenham: Edward Elgar for IPS.

Liu, X., Burridge, P., and Sinclair, P. J. N. (2002). Relationship between Economic Growth, Foreign Direct Investment and Trade: Evidence from China. Applied Economics, 34, 1433-1440.

MacKinnon, J. (1991). Critical Values for Cointegration Tests. In: R.F. Engle & C.W.J. Granger (Eds.), Long-run Economic Relationship: Readings in Cointegration. 267-276. New York: Oxford University Press.

Masih, A. M. M., and Masih, R. (1996). Temporal Causality and the Dynamics of Different Categories of Crime and Their Socioeconomic Determinants: Evidence from Australia. Applied Economics, 28, 1093-1104.

Niar-Reichert, U., and Weinhold, D. (2001). Causality Test for Cross-Country Panels: A New Look at FDI and Economic Growth in Developing Countries. Oxford Bulletin of Economics and Statistics, 63, 153-71.

Osterwald-Lenum, M. (1992). A Note with Quantiles of the Asymptotic Distribution of the ML Cointegration Rank Test Statistics. Oxford Bulletin of Economics and Statistics, 54, 461-472.

Rajan, R. (2003a). Implications of the Emergence of the PRC as an Economic Power for ASEAN: Threat, Opportunity, or Both? Unpublished report for the Asian Development Bank (April).

Rajan, R. (2003b). Emergence of China as an Economic Power: What Does It Imply for Southeast Asia? Economic and Political Weekly, 38, 2639-2644.

Rumbaugh, T., and Blancher, N. (2004). China: International Trade and WTO Accession. IMF Working Paper, No. 04/36.

Srivastava, S., and Rajan, R. S. (2003). Implication of the Economics Rise of the PRC for ASEAN and India: Trade and Foreign Direct Investment. IPS Working Paper No.14.

Tyers, R., Philips, P., and Findlay, C. (1987). ASEAN and China Export of Labor-Intensive Manufacturers. ASEAN Economic Bulletin, 3(3), 339-367.

UNCTAD. World Investment Report, various issues. New York: UNCTAD.

Xinhua News Agency, ASEAN Becomes China's 4th Largest Trade Partner, May 5, 2005.

Zebregs, H. (2004). Intra-Regional Trade in Asia. IMF Policy Discussion Paper, No.04/1.

Zhang, K. H. (2001). Does Foreign Direct Investment Promote Economic Growth? Evidence from East Asia and Latin America. Contemporary Economic Policy, 19, 175-185.

Zhang, Z., and Ow, C.H. (1996). Trade Interdependence and Direct Foreign Investment between ASEAN and China. World Development, 24(1), 155-170.