Long-Term Relationship between Intra-Trade and Total Trade of Member Countries of ASEAN

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Abstract

This paper uses cointegration and regression analyses to examine the long-term relationship between intra-trade of the five original member countries of ASEAN, namely, Indonesia, Malaysia, Philippines, Singapore, and Thailand , and their total trade with non- member Countries of ASEAN. The LR tests based on maximal eigenvalue of the stochastic matrix and the trace of the stochastic matrix suggest that the null hypothesis of no cointegration cannot be rejected for all the five original members countries of ASEAN. Thus, there is no evidence of long-term relationship between intra-trade of each ASEAN member with other members and total trade with non-ASEAN countries. The regression results suggest that ASEAN intra- trade with both the Phillipines and Thailand grew at a much faster rate than the total trade of these two members during the period 1980-2004. The opposite seems to be true in case of Singapore. Its intra-trade with other ASEAN members grew at a much slower rate than its total trade. As for Indonesia and Malaysia, the growth in intera-trade with other ASEAN members was a little bit higher than the growth in their total trade. Hence, the postulates of the theory of customs unions gradually become increasingly more relevant to ASEAN trade with the Phillipines and Thailand. On the other hand, the past growth of ASEAN intra-trade with Singapore suggests that its economic integration with the other four members is not likely the increase their economic welfare if the current path of intra-trade growth continues.

Introduction

The Association of Southeast Asian Nations or ASEAN was established on 8 August 1967 in Bangkok by the five original Member Countries, namely, Indonesia, Malaysia, Philippines, Singapore, and Thailand. Brunei Darussalam joined on 8 January 1984, Vietnam on 28 July 1995, Laos and Myanmar on 23 July 1997, and Cambodia on 30 April 1999.

The ASEAN Declaration states that the aims and purposes of the Association are: (i) to accelerate the economic growth, social progress and cultural development in the region through joint endeavors in the spirit of equality and partnership in order to strengthen the foundation for a prosperous and peaceful community of Southeast Asian nations, and (ii) to promote regional peace and stability through abiding respect for justice and the rule of law in the relationship among countries in the region and adherence to the principles of the United Nations Charter.

When ASEAN was established, trade among the Member Countries was insignificant. Estimates between 1967 and the early 1970s showed that the share of intra-ASEAN trade from the total trade of the Member Countries was between 12 and 15 percent. Thus, some of the earliest economic cooperation schemes of ASEAN were aimed at addressing this situation. One of these was the Preferential Trading Arrangement of 1977, which accorded tariff preferences for trade among ASEAN economies. Ten years later, an Enhanced PTA Programme was adopted at the Third ASEAN Summit in Manila further increasing intra-ASEAN trade.

The Framework Agreement on Enhancing Economic Cooperation was adopted at the Fourth ASEAN Summit in Singapore in 1992, which included the launching of a scheme toward an ASEAN Free Trade Area or AFTA. The strategic objective of AFTA is to increase the ASEAN region's competitive advantage as a single production unit. The elimination of tariff and non-tariff barriers among the member countries is expected to promote greater economic efficiency, productivity, and competitiveness. The Fifth ASEAN Summit held in Bangkok in 1995 adopted the Agenda for Greater Economic Integration, which included the acceleration of the timetable for the realization of AFTA from the original 15-year timeframe to 10 years.

In 1997, the ASEAN leaders adopted the ASEAN Vision 2020, which called for ASEAN Partnership in Dynamic Development aimed at forging closer economic integration within the region.

The vision statement also resolved to create a stable, prosperous and highly competitive ASEAN Economic Region, in which there is a free flow of goods, services, investments, capital, and equitable economic development and reduced poverty and socio-economic disparities. The Hanoi Plan of Action, adopted in 1998, serves as the first in a series of plans of action leading up to the realization of the ASEAN vision.

In addition to trade and investment liberalization, regional economic integration is being pursued through the development of Trans-ASEAN transportation network consisting of major inter-state highway and railway networks, principal ports and sea lanes for maritime traffic, inland waterway transport, and major civil aviation links. ASEAN is promoting the interoperability and interconnectivity of the national telecommunications equipment and services. Building of Trans-ASEAN energy networks, which consist of the ASEAN Power Grid and the Trans-ASEAN Gas Pipeline Projects are also being developed.

ASEAN cooperation has resulted in greater regional integration. Within three years from the launching of AFTA, exports among ASEAN countries grew from US$43.26 billion in 1993 to almost US$80 billion in 1996, an average yearly growth rate of 28.3 percent. In the process, the share of intra-regional trade from ASEAN's total trade rose from 20 percent to almost 25 percent. Tourists from ASEAN countries themselves have been representing an increasingly important share of tourism in the region. In 1996, of the 28.6 million tourist arrivals in ASEAN, 11.2 million or almost 40 percent, came from within ASEAN itself.

Today, ASEAN economic cooperation covers the following areas: trade, investment, industry, services, finance, agriculture, forestry, energy, transportation and communication, intellectual property, small and medium enterprises, and tourism.

Table 1 shows that the volume of intr-trade between the original member countries of ASEAN has increased substantially over the last quarter of a century. The increase in the volume of intra-trade was much grater in the cases of the Philippines, Thailand and Malaysia than in the cases of Indonesia and Singapore. ASEAN Intra-trade with Philippines in 2003 was almost 17 times its value in 1980, ASEAN intra-trade with Thailand in 2003 was approximately 12 times its value in 1980 and Asian intra-trade with Malaysia in 2003 was 9 times its value in 1980. On the other hand, the volume of ASEAN intra-trade with Indonesia and Singapore in 2003 was only 5 times its value in 1980, while the Intra-trade with ASEAN members as a proportion of total trade increased substantially in the case of the Phillipines during the period 1980-2003 and in the cases of Indonesia and Thailand during the periods 1990-2003. The same proportion did not change much in the cases of Malaysia and Singapore over the last two decades

Table 1: Intra-trade between Original Member Countries of ASEAN

Country	1980		1985		1990		1995		2000		2003	
	Intra-Trade $m	Intra-Trade as a % of Total Trade	Intra-Trade $m	Intra-Trade as a % of Total Trade	Intra-Trade $m	Intra-Trade as a % of Total Trade	Intra-Trade $m	Intra-Trade as a % of Total Trade	Intra-Trade $m	Intra-Trade as a % of Total Trade	Intra-Trade $m	Intra-Trade as a % of Total Trade
Indonesia	3345	12.9	2951	11.0	4315	9.1	11826	13.2	16523	17.3	17279	18.5
Malaysia	4665	19.6	6736	24.0	14090	24.1	33064	21.9	44790	24.9	44453	23.7
Philippines	843	6.1	1287	12.9	1729	9.0	5075	11.1	11950	16.4	14250	19.3
Singapore	11447	26.4	11650	23.8	24459	21.5	64299	26.5	76638	27.8	63942	23.4
Thailand	1946	12.4	2373	16.74	6502	11.5	19345	14.8	20388	17.8	24589	17.7

Source: calculated using data in IMF: Direction of Trade Statistics Yearbook (different issues)

Earlier studies for the Asia Pacific region (Hamilton and Winters, 1992; Frankel, 1993; Frankel and Wei, 1994; Kreinin, and Plummer(2000); Petri, 1993; Sharma and Chua, 2001) used the gravity model to investigate the intra-regional trade bias. Hamilton and Winters studied the regional grouping of small countries and found that ASEAN shows a strong bias toward intra-regional trade. However, most of these studies concluded that ASEAN does not show a strong trend toward intra-regional trade in Southeast Asia, except for an APEC grouping which includes East Asia, Australia, New Zealand, Canada and the United States. Sharma and Chua (2000) also used a gravity model is estimated for each of the five ASEAN countries based on the data from 1980 to 1995. Analysis reveals that the trade in ASEAN countries increases with the size of the economy. The ASEAN integration scheme did not increase intra-ASEAN trade, but an increase in trade occurred with members of a wider APEC group. Meanwhile, Yamazawa *et al.* (1991), Goto and Hamada (1994), Young (1993), and Drysdale and Garnaut (1992) used the trade intensity index to assess the degree of interconnectedness in trade among Asian countries. They found that, contrary to the gravity studies above, the degree of trade interdependence is quite strong among Asian countries. Singapore and Japan, for example, show a high value of trade intensity with other countries in Asia.

The approach of this paper is different to all previous papers in two ways. Most of the studies mentioned above analysed the effect of integration up to the year 1995. In this study, we utilize a more recent data set, i.e. from 1982 to 2003. In previous studies, either a Gravity model or trade intensity index approach was used to test the integration. In this paper, we use a cointegration approach to test the integration.

The aim of this paper is to test if there is a long-term relationship between intra-trade of the five original Member Countries of ASEAN, namely, Indonesia, Malaysia, Philippines, Singapore, and Thailand , and their total trade with non- member Countries of ASEAN. If such a relationship exists, this would suggest that the two variables do not drift too far apart from each other over time. In other words there is evidence of cointegration between the two variables. However if there is no evidence of cointegration, the relative magnitude of ASEAN intra-trade with its ASEAN partners may be increasing or decreasing over-time. If there is evidence of an increase in the relative magnitude of intra-trade with other ASEAN partners, this would suggest that the customs union between the ASEAN countries is more likely to raise welfare of the State of ASEAN as time goes on. The paper is divided into three sections. Section 1 uses Johansen technique to test for long-term relationship between ASEAN intra-trade with other members of the ASEAN and ASEAN total trade. Regression analysis is used in Section 2 to examine the pattern of behavior of ASEAN intra-trade with the ASEAN. Finally, section 3 summarises the main conclusions of the paper.

Cointegration tests of long-term relationship between intra-trade of the five original Member Countries of ASEAN and their total trade with non- member Countries of ASEAN

If a long-run relationship exists between intra-trade with other members of the ASEAN and total trade with non-ASEAN countries, the two variables must form a unique integrating vector. In order to test for cointegration, and in particular to investigate whether a unique cointegrating vector can be identified, we have employed the maximum likelihood estimation technique developed by Johansen (1988) and Johansen and Juselius (1990). This approach does not have the now well-documented drawbacks of the Engle and Granger (1987) approach to cointegration and can be used in a multivariate setting to establish the numbers of distinct cointerating vectors (Maddala and Kim, 1998 and Neg and Perron,1997).

The first step in implementing this approach is to test for the order of integration of each variable included in the model. It is a common practice to apply the Augmented Dickey – Fuller Test (ADF) given by the following equation for variable Z.

$$Z_t = \alpha + \beta Z_{t-1} + \sum_{i=1}^{k} \tau_i \Delta Z_{t-i} + \omega_t$$ where, ω is an error term (Dickey and Fuller, 1979 and

Dickey and Rossana, 1994)).

The cumulative distribution of the ADF test statistic is provided by Mackinnon (1991). If the calculated statistics is less than its critical value, then Z is said to be stationary or 1(0).

Table 2 represents the results of the Augmented Dickey – Fuller test. It is clear that the calculated ADF statistic for the variables representing ASEAN intra-trade with other members of the ASEAN and with non-ASEAN countries is less than its critical value only for the differenced variables. This indicates non-stationarity of these variables at the level and that the variables have achieved stationarity after being differenced once. Thus, the variables are integrated of order one, I(1). This fact enables us to conduct the cointegration analysis. (Johansen, 1988).

Table 2
Unit Root Tests of Total Trade Intra-Trade of Members of ASEAN

Variable	log (TT)	Δlog (TT)	log (Int.T)	Δlog(Int.T)
Indonesia	-2.2157	-4.6156	-2.0898	-4.3562
Malaysia	-2.0715	-5.4847	-2.7618	-8.1971
Philippines	-2.9692	-5.5362	-2.5806	-4.8064
Singapore	-2.4125	-4.0030	-1.9697	-3.8273
Thailand	-2.2032	-3.4924	-1.9332	-3.7149

We are now in the position to carry out the cointegration tests proposed by the Johansen technique. This technique suggests a maximum likelihood estimation procedure that provides two test statistics for determining the number of cointegrating vectors as well as estimate of all cointegrating vectors that could exist among a set of variables.

The Johansen's maximum likelihood method specifies three cases:

1. The case of non-trended variables. This case assumes that there are no deterministic trend in the variables and the underlying date generating process (DGP).
2. Trended variables with no trend in DGP. This case assumes that all variables have deterministic trend term in the DGP.
3. Trended variables with trend in DGP. This case assumes that variables as well as DGP have deterministic trend.

Since the variables show steadily rising trends, the relevant options are cases (ii) and (iii). Both of these options yield the same test statistics, but are subject to slightly different critical values (Li and Maddala, 1995 and Johansen, 1995).

The trended case, with no trend in DGP, which has higher critical values, was considered in this analysis (Wickens, 1996). The first step is to specify a lag length for the VAR, which, on the basis of the likelihood ratio test proposed by Maddala and Kim (1998), was set at four periods. Tables 2-1 to 2-5 give the cointegration results for the long-term relationship between intra-trade of the five original member countries of ASEAN, namely, Indonesia, Malaysia, Philippines, Singapore, and Thailand , and their total trade with non- member Countries of ASEAN.

The co-integration results of Tables 3-1 to 3-5 indicate that The LR tests based on maximal eigenvalue of the stochastic matrix and the trace of the stochastic matrix suggest that the null hypothesis of no cointegration cannot be rejected in each case. Thus, there is no evidence of long-term relationship between each member's intra-trade with other ASEAN members and its total trade with non-ASEAN countries. In other words, each membert's intra-trade with the ASEAN and its total trade with non-ASEAN countries drifted apart from each other more and more as time went on.

Table 3-1
Results of Cointegration Analysis for Indonesia Total Trade and Intra-Trade with ASEAN Members

Cointegration LR Test Based on Maximal Eigenvalue of the Stochastic Matrix

Null	Alternative	Statistic	95% Critical Value	90% Critical Value
r = 0	r = 1	8.1284	19.2200	17.1800
r<= 1	r = 2	4.2933	12.3900	10.5500

Cointegration LR Test Based on Trace of the Stochastic Matrix

Null	Alternative	Statistic	95% Critical Value	90% Critical Value
r = 0	r = 1	12.4217	25.7700	23.0800
r<= 1	r = 2	4.2933	12.3900	10.5500

Table 3-2
Results of Cointegration Analysis for Malaysia Total Trade and Intra-Trade with ASEAN Members

Cointegration LR Test Based on Maximal Eigenvalue of the Stochastic Matrix

Null	Alternative	Statistic	95% Critical Value	90% Critical Value
r = 0	r = 1	7.0888	19.2200	17.1800
r<= 1	r = 2	4.9522	12.3900	10.5500

Cointegration LR Test Based on Trace of the Stochastic Matrix

Null	Alternative	Statistic	95% Critical Value	90% Critical Value
r = 0	r = 1	12.0410	25.7700	23.0800
r<= 1	r = 2	4.9522	12.3900	10.5500

Table 3-3
Results of Cointegration Analysis for Philippines Total Trade and Intra-Trade with ASEAN Members

Cointegration LR Test Based on Maximal Eigenvalue of the Stochastic Matrix

Null	Alternative	Statistic	95% Critical Value	90% Critical Value
r = 0	r = 1	14.1422	19.2200	17.1800
r<= 1	r = 2	4.9030	12.3900	10.5500

Cointegration LR Test Based on Trace of the Stochastic Matrix

Null	Alternative	Statistic	95% Critical Value	90% Critical Value
r = 0	r = 1	19.0452	25.7700	23.0800
r<= 1	r = 2	4.9030	12.3900	10.5500

Table 3-4
Results of Cointegration Analysis for Singapore Total Trade and Intra-Trade with ASEAN Members

Cointegration LR Test Based on Maximal Eigenvalue of the Stochastic Matrix

Null	Alternative	Statistic	95% Critical Value	90% Critical Value
r = 0	r = 1	8.4573	19.2200	17.1800
r<= 1	r = 2	4.4333	12.3900	10.5500

Cointegration LR Test Based on Trace of the Stochastic Matrix

Null	Alternative	Statistic	95% Critical Value	90% Critical Value
r = 0	r = 1	12.8906	25.7700	23.0800
r<= 1	r = 2	4.4333	12.3900	10.5500

Table 3-5
Results of Cointegration Analysis for Thailand Total Trade and Intra-Trade with ASEAN Members

Cointegration LR Test Based on Maximal Eigenvalue of the Stochastic Matrix

Null	Alternative	Statistic	95% Critical Value	90% Critical Value
r = 0	r = 1	8.7787	19.2200	17.1800
r<= 1	r = 2	4.8905	12.3900	10.5500

Cointegration LR Test Based on Trace of the Stochastic Matrix

Null	Alternative	Statistic	95% Critical Value	90% Critical Value
r = 0	r = 1	13.6692	25.7700	23.0800
r<= 1	r = 2	4.8905	12.3900	10.5500

Patterns of Growth of Total Trade and Intra-Trade of ASEAN Countries

The results of cointegration analysis suggest that there is no evidence of long-term relationship between intra-trade of ASEAN members and total trade of each member. These results suggest that total trade of each the five original member countries of ASEAN and their intra-trade with ASEAN members have been drifting apart from each other more and more over the last three decades. This could imply that the relative magnitude of ASEAN intra-trade with its ASEAN partners may be increasing or decreasing over-time. The question is: how did the two variables drift apart? In other words, did intra-trade grow faster than trade with other countries? This section attempts to answer this question.

If ASEAN intra-trade with ASEAN countries is increasing faster than its total trade with other countries, the postulates of the theory of customs unions gradually become increasingly more relevant to ASEAN trade with other ASEAN members (Lipsey, 1957 and Meade,1955).

To test these findings and also check if the same conclusion applies to individual ASEAN trading partners, a number of regression models have been tested.

Comparing the (constant proportional) rate of growth of both ASEAN intra-trade with other ASEAN members and ASEAN total trade ($ASEAN_{TT}$) with non-ASEAN members may throw some light on the behavior of the two variables over time. These growth rates may be used calculated using the regressions Gujarati, 1993 and Pokorny, 1987):

$$(ASEAN_{TT})_t = (ASEAN)_0 \, e^{g_1 t}$$

or : $Ln(ASEAN_{TT})_t = a + g_1 t + \mu_{1t}$ (1)

and $(ASEAN_{IT})_t = (ASEAN_{IT})_0 \, e^{g_2 t}$

or : $Ln(ASEAN_{IT})_t = a + g_2 t + \mu_{2t}$ (2)

g_1 and g_2 represent the proportional (constant) rate of growth , i.e

$$g_1 = \{(d(ASEAN_{TT})/dt)(1/(ASEAN_{TT}))\}$$

and $$g_2 = \{(d(ASEAN_{IT})/dt)(1/(ASEAN_{IT}))\}$$

If ASEAN intra-trade with other ASEAN members grows faster than ASEAN trade with non – ASEAN countries, we would expect $g_1 < g_2$.

The behavior of the share of ASEAN intra-trade with other members of the ASEAN to ASEAN total trade over time may also give an indication as to whether intra-trade grows faster than trade. This behavior can be tested using the regression model:

$$(ASEAN_{IT} / ASEAN_{TT})_t = a + ht + \mu_{3t}$$ (3)

If the coefficient "h" is positive and statistically significant, this would indicate that intra-trade grows faster than total trade.

Tables 4-1 to 4-4 give the regression results for the five original member countries of ASEAN, for which the null hypothesis of no cointegration could not be rejected. These results are based on quarterly data for the periodrelate to the period 1980 (Q1) to 2004 (Q3).

The results in Table 4-1 would seem to suggest that:

- Indonesia's intra- trade with all ASEAN members grew at a constant proportional rate of approximately 1.84 percent per quarter while Indonesia's total trade with non-ASEAN members grew at a rate of only 1.42 percent per quarter during the period 1980-2004.
- The share of Indonesia's intra-trade with ASEAN countries to its total trade with non-ASEAN members has been increasing over time since 1980. The regression results suggest that this share increased by approximately 0.65 percent per quarter during the period 1980-2004.

The results in Table 4-2 would seem to suggest that:

- Malaysia's total intra- trade with all ASEAN members grew at a constant proportional rate of approximately 2.83 percent per quarter while Malaysia's total trade with non-ASEAN members grew at a rate of 2.7 percent per quarter during the period 1980-2004.
- The share of Malaysia's intra-trade with ASEAN countries to its total trade with non-ASEAN members has been increasing over time since 1980. The regression results suggest that this share increased by approximately 0.41 percent per quarter during the period 1980-2004.

The results in Table 4-3 would seem to suggest that:

- Philippines' intra- trade with all ASEAN members grew at a constant proportional rate of approximately 3.38 percent per quarter while its total trade with non-ASEAN members grew at a rate of only 2.35 percent per quarter during the period 1980-2004.

- The share of Philippines' intra-trade with ASEAN countries to its total trade with non-ASEAN members has been increasing over time since 1980. The regression results suggest that this share increased by approximately 1 percent per quarter during the period 1980-2004.

The results in Table 4-4 would seem to suggest that:

- Singapore intra- trade with ASEAN members grew at a lower rate than its total trade with non-ASEAN members. While Singapore's total trade grew at a constant proportional rate of approximately 4.27 per cent per quarter during the period 1980 - 2004, its intra-trade with ASEAN members grew at only 2.4 percent per quarter during the same period.
- The share of Singapore's intra-trade with the ASEAN members did not enjoy any significant increase since 1980.

The results in Table 4-5 would seem to suggest that:

- Thailand's intra- trade with all ASEAN members grew at a constant proportional rate of approximately 3.17 percent per quarter while its total trade with non-ASEAN members grew at a rate of only 2.49 percent per quarter during the period 1980-2004.
- The share of Thailand's intra-trade with ASEAN countries to its total trade with non-ASEAN members has been increasing over time since 1980. The regression results suggest that this share increased by approximately 0.23 percent per quarter during the period 1980-2004.

The results of regression analysis suggest that the postulates of the theory of customs unions gradually become increasingly more relevant to Philippines and Thailand trade with other members of ASEAN. However, the past growth of Singapore intra-trade with ASEAN members suggests that its economic integration with the other four ASEAN members is not likely to increase its economic welfare if the current path of intra-trade growth continues.

Table 4-1
Regression Results of Relationship between Indonesia Intra-Trade with Meber Countries of ASEAN ($INDN_{IT}$) and Indonesia Total Trade with with non- member Countries of ASEAN ($INDN_{TT}$)

(1) $Ln\ (INDN_{TT})_t = 8.775\ +\ 0.0142\ t$
$(202.1)\quad(19.1)$
$R^{-2} = 0.788\quad F = 363.4\quad DW = 1.435$

(2) $Ln\ (INDN_{IT})_t = 6.590\ +\ 0.0184\ t$
$(94.4)\quad(15.2)$
$R^{-2} = 0.701\quad F = 231.6\quad DW = 1.543$

(3) $(INDN_{IT}\ /\ INDN_{TT})_t = 0.1263\ +\ 0.0065\ t$
$(40.5)\quad(4.631)$
$R^{-2} = 0.173\quad F = 21.4\quad DW = 1.732$

Table 4-2
Regression Results of Relationship between Malaysia Intra-Trade with Meber Countries of ASEAN ($MALAY_{IT}$) and Malaysia Total Trade with with non- member Countries of ASEAN ($MALAY_{TT}$)

(1) $Ln\ (MALAY_{TT})_t = 8.1683\ +\ 0.0270\ t$
$(189.5)\quad(36.1)$
$R^{-2} = 0.930\quad F = 1300.5\quad DW = 1.6904$

(2) $Ln\ (MALAY_{IT})_t = 6.9084\ +\ 0.0283\ t$
$(156.4)\quad(36.9)$
$R^{-2} = 0.933\quad F = 1361\quad DW = 1.543$

(3) $(MALAY_{TT}/\ MALAY_{IT})_t = 0.2839\ +\ 0.0041$
$(47.2)\quad(3.9045)$
$R^{-2} = 0.127\quad F = 15.2\quad DW = 1.6066$

Table 4-3
Regression Results of Relationship between Philippines Intra-Trade with Meber Countries of ASEAN (Philip$_{IT}$) and Philippines Total Trade with with non- member Countries of ASEAN (Philip$_{TT}$)

(1) $\text{Ln (Philip}_{TT})_t = 7.5668 + 0.0235\, t$
  $(154.3) \quad (27.7)$
  $R^{-2} = 0.887 \quad F = 767.7 \quad DW = 1.2945$

(2) $\text{Ln (Philip}_{IT})_t = 4.8908 + 0.0338\, t$
  $(82.7) \quad (32.9)$
  $R^{-2} = 0.917 \quad F = 1084.8 \quad DW = 1.543$

(3) $(\text{Philip}_{IT} / \text{Philip}_{TT})_t = 0.0584 + 0.00987\, t$
  $(21.5) \quad (41.9)$
  $R^{-2} = 0.668 \quad F = 198.1 \quad DW = 1.4374$

Table 4-4
Regression Results of Relationship between Singapore Intra-Trade with Meber Countries of ASEAN (SINGAP$_T$) and SingaporeTotal Trade with with non- member Countries of ASEAN (SINGAP$_T$)

(1) $\text{Ln (SINGAp}_{TT})_t = 8.854 + 0.0427\, t$
  $(55.7) \quad (31.7)$
  $R^{-2} = 0.911 \quad F = 1003.2 \quad DW = 1.619$

(2) $\text{Ln (SINGAP}_{IT})_t = 7.760 + .0240\, t$
  $(158.2) \quad (28.2)$
  $R^{-2} = 0.890 \quad F = 798.0 \quad Dw = 1.436$

(3) $(\text{SINGAP}_{IT} / \text{SINGAp}_{TT})_t = 0.3447 + 0.00083\, t$
  $(27.6) \quad (0.3822)$
  $R^{-2} = -.0088 \quad F = 0.146 \quad DW = 1.6066$

Table 4-5
Regression Results of Relationship between Thailand Intra-Trade with Meber Countries of ASEAN (Thail$_{IT}$) and Thailand Total Trade with with non- member Countries of ASEAN (Thail$_{TT}$)

(1) $\text{Ln (Thail}_{TT})_t = 7.4385 + 0.0249\, t$
  $(108.9) \quad (21.0)$
  $R^{-2} = 0.818 \quad F = 441.1 \quad DW = 1.435$

(2) $\text{Ln (Thail}_{IT})_t = 5.9578 + 0.03174\, t$
  $(115.1) \quad (35.3)$
  $R^{-2} = 0.927 \quad F = 1248.0 \quad DW = 1.543$

(3) $(\text{Thail}_{IT} / \text{Thail}_{TT})_t = 0.2149 + 0.0023\, t$
  $(19.9) \quad (12.4)$
  $R^{-2} = 0.609 \quad F = 154.2 \quad DW = 1.732$

Conclusions:

The main conclusions of this paper may be summarized in the following:
1. The LR tests based on maximal eigenvalue of the stochastic matrix and the trace of the stochastic matrix suggest that the null hypothesis of no cointegration cannot be rejected for each ASEAN member intra-trade with all other ASEAN members.. Thus, there is no evidence

of long-term relationship between intra-trade of each ASEAN member and its total trade with non-ASEAN countries.

2. The Philippines and Thailand intra-trade with ASEAN members   grew much faster than their total trade with non-ASEAN countries during the period 1980-2004.

3. Indonesia and Malaysia intra-trade with ASEAN members grew at a slightly higher rate than their total trade with non-ASEAN countries during the period 1980-2004.

4. Singapore intra-trade with ASEAN members grew at a much lower rate than its total trade with non-ASEAN countries during the period 1980-2004.

5. The results of regression analysis suggest that the postulates of the theory of customs unions gradually become increasingly more relevant to Philippines and Thailand trade with other members of ASEAN. However, the past growth of Singapore intra-trade with ASEAN members suggests that its economic integration with the other four ASEAN members is not likely to increase its economic welfare if the current path of intra-trade growth continues.

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