Success of ASEAN Regional Integration on Intra-regional Trade: A Comparative Study with EU's Trade Integration

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This article applies the "out-of-sample" approach to assess the success of ASEAN intra-regional trade integration. While the potential trade for ASEAN is projected from the gravity model which is structured for the Euro-members, the integration success is estimated from the ratio of actual trade to potential trade. The success ratio for ASEAN members is estimated to be positive, and the value varies from 1.56 to 8.71 for the period of 2003 to 2008. In addition, the gap between actual trade and potential trade is found to be increasing. This study thus provides the first empirical evidence on the assessment of the success of regional integration on intra-regional trade using the "out-of-sample" approach and "integration success ratio".

1. Introduction

For the last two decades, regional integration and currency union had been in the list of mostly researched topics in international economics and finance. A number of studies are conducted on the possibilities of the success of the monetary policy and currency integration by the European Union (EU) during the first half of this period, while the second half is covered by number of studies on estimation of initial success of Euro and assessment of possibility for the economic and monetary integration of other regions including East Asia, ASEAN, South Mediterranean countries, East Africa Community (EAC) etc. Among those, East Asia and ASEAN are considered as a highly credible candidate for a currency union after EU (Bayoumi and Eichengreen, 1997). Madhur (2002) emphasizes on cost and benefit analysis of ASEAN monetary and currency union.

The idea of regional cooperation was initiated with European Coal and Steel Community (ECSC) in 1951. Belgium, West Germany, Luxembourg, France, Italy and the Netherlands were members of the ECSC, who formed the European Atomic Energy Community (EURATOM) and the European Economic Community (EEC) for further integration. These three communities were combined together to form a single Commission in 1967, governed

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by the European Parliament, which ultimately transformed into the European Union through the Maastricht Treaty. Beside intra-regional economy and policy integration, the EU negotiates major trade and aid agreements with other countries and develops Common Foreign and Security Policy for its members. This integration results a Single Market by end of 1992 through removing all trade barriers. In the same year, an economic and monetary union (EMU) was establish and a single European currency was introduce among the members, which was managed by the European Central Bank (ECB). In 1999, Euro was launched as the single currency as a successful outcome of regional economic integration, and ECB was provided with the authority to develop the comprehensive monetary policy throughout the Euro area. In January 2002, twelve of the EU members replaced their national currencies by Euro notes and coins, which increased to twenty five by the year 2004.

Integration of European monetary policy and currency has been estimated as highly successful. Rose (2000), and Glick and Rose (2002) have estimated this impact to describe the benefit of regional integration and currency union. Frankel and Rose (2002), Nardis and Vicarelli (2003) and Berger and Nitsch (2008) estimated the impact of common currency on trade, while Darku (2009) estimated the feasibility monetary union for East African Community. This paper aims to estimate the success of ASEAN regional integration in their intra-regional trade.

The Association of Southeast Asian Nations (ASEAN) was formed in 1967 with five nations, namely, Indonesia, Malaysia, Philippines, Singapore, and Thailand. Later on, Brunei Darussalam, Vietnam, Laos, Myanmar and Cambodia joined the association. The total area of the ASEAN region is 4.44 million square kilometers with a current population of about 584 million. The objectives of the Association are to accelerate regional economic, social and cultural development and to establish peace and stability through justice amongst its member nations. In 2008, total regional GDP for ASEAN was USD 1.5 trillion, with per capita regional GDP of USD 2,580.6 and regional GDP growth of 4.4%. The highest GDP for a participating member was Indonesia (USD 511 billion), followed by Thailand (USD 273 billion) and Malaysia (USD 222 billion). The highest per capita GDP was achieved by Singapore ($ 36,046), followed by Brunei Darussalam ($ 35,622) and Malaysia ($ 7,969). Out of the ten member countries, seven members achieved per capita GDP higher than $ 1000, while four members attained 6% or higher GDP growth rate. Lao PDR attained the

highest GDP growth in the region (8.4%). Total ASEAN trade for the year was about USD 1.7 trillion (ASEAN Secretariat, 2008[a], ASEAN Secretariat, 2008[b]).

ASEAN has made significant progress in developing intra-regional economic relationships. The Preferential Trading Arrangement (PTA), the Enhanced PTA Program and the ASEAN Free Trade Area (AFTA) are remarkable examples of the economic cooperation. AFTA was introduced in 1992 with the objective to develop a regional competitive advantage including the economic efficiency and productivity of its member nations. AFTA removed tariff and non-tariff barriers within the region. As a result, exports among ASEAN countries increased from 43.26 billion USD in 1993 to almost 80 billion USD in 1996. The average yearly growth was 28.3 percent. ASEAN intra-regional trade increased from 20 percent to almost 25 percent of total regional trade (ASEAN Secretariat, 2009). Besides AFTA, ASEAN members have developed some free trade areas outside the region. These areas include ASEAN - Republic of Korea Free Trade Area, ASEAN - Japan Free Trade Area, ASEAN - India Free Trade Area, ASEAN - China Free Trade Area and ASEAN - Australia New Zealand Free Trade Area.

The vision of ASEAN leaders reflects the aspiration for greater regional cooperation. Establishment of powerful regional cooperation is attainable through strong economic harmonization among the members. Successful harmonization results in a monetary policy that provides a stronger base for economic integration. EU is considered as the example of most successful regional economic integration, while ASEAN is considered to have high prospect for future successful regional cooperation. This paper aims to asses the success of intra-ASEAN trade integration due to this regional cooperation on the basis of success of European Union trade integration. The analysis would focus on three main questions: 1) how much trade would occur among ASEAN members if their trade elasticity with respect to economic and geographic variables were same as those achieved in the Euro-model (This amount has been considered as potential trade)? 2) What is the pattern of the gap between actual trade and potential trade? 3) What is the growth potentiality for ASEAN intra-regional trade?

This paper uses gravity model to measure the pattern of intra-regional trade enhancement through regional economic integration for EU and to apply it for ASEAN. This process provides better opportunity to measure the success of ASEAN's regional integration of intra-

regional trade, considering their process of regional cooperation and integration as similar to EU. Like EU, ASEAN start their journey with an objective of fostering regional economic, social and cultural development, proceed through intra-regional trade agreements to reduce trade barriers and reach at the stage of expanding extra-regional trade agreements with major trade partners. In addition, estimation of their success level at this stage would provide scope for further study on their journey towards currency union and its impact on trade integration.

From the methodological viewpoint, this study is different from previous works, because it estimates the currency union impact of EU's intra-regional trade and applies it to the ASEAN economy to calculate the potential trade with the current regional economic condition. To our knowledge, this "out-of-sample" method of measuring potential trade is only used by Pastore, Ferragina and Giovannetti (2009). They use this method to compare the parallel integration process of EU with Mediterranean countries and Central and Eastern European countries. As they estimate the two parallel regional integration process, they ignores the currency union impact in their model. Instead, in this paper, currency union impact plays an important role to compare the success of ASEAN's regional integration on trade with the similar success for EU. Besides, this paper measures the ratio of actual trade to potential trade to define the integration success of intra-ASEAN trade, while Pastore, Ferragina and Giovannetti (2009) does the reverse to find the trade gap.

The paper is organized as follows. Section 2 reviews the existing literature followed by the analytical framework in Section 3. Section 4 presents the data sources and analyzes the empirical findings. Concluding remarks are given in the final section.

2. Literature Review

The importance on apposite exchange rate regimes for Asian countries after the 1997 Asian financial crisis has initiated the necessity of regional economic integration for East Asia. This realization instigated the trend among ASEAN members to move towards the flexible exchange rate regime, which performed well as a shock absorber in the post-crisis situation (Madhur, 2002). Conversely, Lee, Shin, and Park (2004) suspect the long run success of flexible exchange rate due to increasing volatility in the foreign exchange market. A number of literatures explore possibility of forming currency union in East Asia to deal with the problem of currency volatility. The proposed formation is mostly confined with either introduction of currency basket or currency pegging. Williamson (1999) and Dornbusch and

Park (1999) argue that East Asian countries can stabilize their competitiveness in export by pegging their currencies to a currency basket consisting the US dollar, euro and Yen. McKibbin and Le (2004) supports the concept while analyzing the performance of several exchange-rate arrangements under different shocks and its impact on output and inflation variability. Plummer and Wignaraja (2007) and Kwan (2001) emphasize the exchange-rate management of Japanese Yen from the perspective of institutional/political economy. In contrast, Alesina and Barro (2002) and McKinnon (2003) propose the adoption of the US dollar as a common currency. Kawai (2002) describes US dollar as the *de facto* or *de jure* anchors in East Asia. Candelon, Piplack and Straetmans (2008) and Dungey, *et al* (2004) explains the presence of contagion at higher level of integration as a positive force for monetary union. Supported by relevant literature, Kim, Kose and Plummer (2002) categorizes the contagion into different types and argues that all these contagion have impact in crisis situation. He includes bilateral real integration as just one of these many categories. Either the currency basket or the pegged currency, it is the result of a long procedure of regional economic and social coordination. The regional economic coordination normally begins with the formation of free trade agreements and ends with the adoption of a common currency (Madhur,S., 2002). ASEAN is at the beginning of this process, and ratifying the free trade agreements within the members and outside the region. Success of these agreements would describe their path in the future.

According to the optimal currency area (OCA) theory, 'symmetry of shocks across countries', 'trade and financial integration', and 'labor mobility and wage flexibility' are among the important criteria to be considered for a regional currency union (Lee, Shin, and Park, 2004). Bayoumi and Eichengreen (1997) mention East Asia as the most 'plausible candidate' for a currency union after the Euro area. Dutta (2002) explains the 2006 consensus between China, Japan and Korea as a significant step on the way to development of the Asian Economic Community. Numerous study includes trade and financial linkages and similarity of business cycle to assess the aptness of a currency union in East Asia (Kumakura, 2006, Lee, Shin, and Park, 2004 and Wang, 2004). Besides, a number of literature mentions the co-integration of financial market as an effective step towards creating regional market (Click and Plummer, 2005, Candelon, Piplack and Straetmans, 2008). Increased co-movement has been observed among these stock markets during the 'boom and bust'. Kawai (2005) proposes for more formal institutional mechanisms for trade and investment facilitation among East Asian members to meet their increased economic integration. He describes the

East Asian regional integration under multilateral liberalization framework and open regionalism. Initially in mid-1980s, Japanese FDI flow to East Asian economies played vital role to this economy. He mentions that, including Japan, the intra-regional trade was 35% of total East Asian trade in 1980, which increased to 54% in 2003. Excluding Japan, the intra-regional trade increased from 22% to 44% over the same period. Though this amount is above the intra-regional trade of North American Free Trade Area (46%), it is still lower than the intra-regional trade of EU-15 (64%). Besides, he estimates the intra-East Asian trade intensity index as 2.2 (including or excluding Japan) in 2003, which amounts 1.7 for EU and 2.5 for NAFTA. This implies high degree of East Asian regional integration through trade, which is comparable to EU and NAFTA. Rana (2006) re-estimates the measures of East Asian trade integration for 1980 to 2005, which is not as optimistic as of Kawai (2005). He finds an increase of 32.2% to 38.2% intra-regional trade between ASEAN+3 during the period, which is lower than NAFTA (45%) and EU-25 (66.2%). Including Hong Kong, China and Taipei, China, this amount increased to 54.5%. After adjustment for country or region's relative size, trade intensity index appears steady at 2 since 1990. Besides, the major inconsistency for Asian indicators with the OCA literature is identified as politics, which is even stronger for ASEAN (Bayoumi and Eichengreen, 1999, Bayoumi, Eichengreen, and Mauro, 1999 and Nicolas, 1999). Based on study on symmetry of supply and demand shocks and speeds of adjustment, Tang (2006) supports the OCA for small subgroups than Asian monetary union. Kim (2007) explores in-depth of empirical nature of macroeconomic shocks by using quarterly data (instead of annual data) for ASEAN-4, China, Japan and Korea. He uses three alternative VAR models of output-price space and concludes about the heterogeneity of nature of these shocks among these seven countries.

Diverse opinion exists about ASEAN regional economic integration in literature (Sally and Sen, 2005; Sally, 2006; Sen, 2006). The strength and credibility of FTAs developed by ASEAN or its individual members is under question, while the negotiations mentioned to be WTO consistent. Besides goods, Sen (2006) explores ASEAN's opportunity in services, investment, trade facilitation, regulatory cooperation and dispute settlement. Though, internal political and social complexities among ASEAN members are considered as important factors against effective and successful FTAs. Sally (2006) and Sally and Sen (2005) concern about the possibility for other ASEAN members to misinterpret Singapore's FTA strength, which would in tern lead to development of weak and market distorting FTAs. Even by providing better indication of FTAs, Thailand suffers from complication in process and lacks

of level of policy direction. Some major reasons behind weak and partial FTAs developed by individual ASEAN members are identified as insignificant trade with some individual FTA partners, exclusion of some product areas, incompetent way of handling trade barriers, weaker service commitment and complex and restrictive rules of origin. Lack of combination at rules of origin for FTAs for individual ASEAN members, ASEAN+3 and collective ASEAN FTAs is also shown as to enhance the complexity. The ultimate result is suspected to increasing administrative and other costs rather than creating additional trade (Sally & Sen, 2005). In contrast, Kose, Kim and Plummer (2003) find reasonably high cross-correlation of output, one of the key macroeconomic Variable, for most ASEAN countries. High correlation of macroeconomic variables over time for a currency group is considered as the symmetry of economic structure to support OCA symmetry criterion (Plummer and Wignaraja 2007). Rana (2006) describes the increasing intra-regional trade as a source of increasing economic symmetry.

Pe´ridy (2005) conducts an excellent survey on Euro-Mediterranean partnership and its trade impact and indicates about the ASEAN trade prospect with northern countries. This section of the paper reviews the necessity and possibility of regional integration of individual ASEAN members, ASEAN as a whole and East Asia consisting ASEAN+3. Some important factors involved with the success of ASEAN regional economic integration has also been explored from different literature.

Unlike previous studies based on the symmetry of shocks using standard VAR and structural VAR model (Kim, 2007), this work extends the empirical scope by applying the recently developed empirical technique of Pastore, Ferragina and Giovannetti (2009). This paper uses their concept of gravity technique implementation in an “out-of-sample” method to estimate different coefficients of gravity variable of the intra-EU trade model, and applies these coefficients to ASEAN model to compare the current intra-ASEAN trade integration with potential trade of an EU-like ASEAN trade environment. In addition, an attempt has been taken to measure the integration success of intra-ASEAN trade from the ratio of actual trade and potential trade, which has not been used before to our knowledge.

3. Analytical Framework

3.1. The gravity model specification

Tinbergen (1962) and Pöyhönen (1963) successfully use a gravity model in estimating the trade between two countries as proportional to their product of masses (GDP) and inversely proportional to their distance. Anderson (1979) and Bergstrand (1985, 1989) show the 'theoretical foundation' of the model, while others strengthen the foundation from different perspective (Helpman and Krugman, 1985, Deardorff, 1998, Anderson and Wincoop, 2003, Eaton and Kortum, 2002, and Kimura and Lee, 2006). Rose (2000) and Glick and Rose (2002) successfully implements the gravity model to estimate the regional integration and currency union impact on trade.

This paper attempts to estimate the coefficients of a gravity model of intra-EU trade and applies those into trade equations between four ASEAN members (Singapore, Malaysia, Indonesia and Thailand) to calculate the potential trade relative to the intra-EU trade integration for the period of 2003 to 2008. Further, the actual trade volume is compared to the estimated potential trade amount to assess the current situation of ASEAN intra-regional trade creation against the EU-equivalent trade integration.

The general idea about gravity model of trade comes from the gravity theory in physics, which expresses the gravity force between two physical bodies as proportional to their mass and inversely proportional to their distance. This gravity theory is commonly applied in different frameworks to analyze trade flows. In international trade, exporting and importing countries replace the physical bodies, while sizes of economies are considered as masses. Larger economies are considered as tendency towards larger trade volume. Distance is considered as a negative force towards trade, which includes different costs and delays due to detachment.

The gravity model analyzes the trade gap between two countries based on trade enhancing elements (GDP) and trade resistance factors (distance), which can be considered as a "natural benchmark" (Pastore, Ferragina and Giovannetti, 2009). Use of time invariant parameters and dummy coefficients in the panel data provides the opportunity to acquire additional country specific information. This paper uses the following gravity specification to obtain the estimates of intra-EU trade creation during their process of economic integration:

$$Y_{ijt} = \alpha_{ij} + \beta_1 GDP_{it} + \beta_2 GDP_{jt} + \beta_3 DIST_{ij} + \beta_4 CU + \beta_5 CLB + \beta_6 CL + U_{ijt} \ldots\ldots (1)$$

where Y_{ijt} is the trade variable between country i (reporting country) and country j (trade partner) at time t; GDP_{it} (GDP_{jt}) is a measure of income of country i (j) at time t; t is the period of 1994 to 2008, $DIST_{ij}$ is the geographical distance in Km between the capital city of country i and of country j; β_i ($i = 1 \ldots\ldots 6$) are parameters of the equation, and U_{ijt} is a white noise disturbance term. All variables are in logs so the estimated coefficients are interpreted as elasticity. The list of EU members included in the model is provided in appendix 2. *CU* is the currency union dummy, which takes the value of 1 if both countries use the same regional currency and 0 otherwise. *CLB* is a dummy used for common land border. Its value takes 1, if the two countries share a common land border and 0 otherwise. *CL* represents the common language, which takes a value of 1 if the trade partners speak the same language and 0 otherwise.

The coefficient of standard variables are expected to be as, $\beta_1 > 0$, $\beta_2 > 0$ and $\beta_3 < 0$. If the income level of local country (GDP_{it}) increases, the purchasing power of local country will increase. It will result in increase in reporting country's import, trade partner's export and overall trade. Similarly, increase in the target country's income level (GDP_{jt}) will result in increase in reporting country's export, trade partner's import and overall trade. Distance causes negative impact on bilateral trade. Besides geographical remoteness, distance refers to "surface" of host markets, level of trade costs and presence of home biasness (Pastore, Ferragina and Giovannetti, 2009). Common currency dummy captures the currency union impact, while common land border and common language dummy captures the impact of culture, language, communication, information exchangeability and home biasness.

Pastore, Ferragina and Giovannetti (2009) split the variable, total GDP, into two different variables - total population and per capita GDP. They separately emphasize the relation between per capita income growth, economic development and trade and the relation between higher population, domestic market, self-sufficiency and trade. Instead, this paper sticks to using total GDP as mass of the country for two reasons. Firstly, distribution of population is not similar among all ASEAN members. For example, Singapore has very high per capita GDP with low population compared to Indonesia. Secondly, pattern of population distribution among EU members is different than ASEAN members; hence there exists possibility of mismatch of the model for two different regions.

Hausman's specification test (Hausman, 1978) will be performed to examine the existence of correlation between the error terms and the regressors. If the correlation does not exist, fixed effect approach will be applied. Otherwise, random effect approach will be applied (Baltagi, 2002 and Gujarati, 2004).

3.1.1. Panel estimators

This paper estimates the coefficients using both fixed effect (FE) model and random effect (RE) model. Similar to least square dummy variable (LSDV) model, fixed effect model considers a complex structure of error term (v_{ijt}), which consists a white noise term (ε_{ijt}), and a dependent term (ν_{ijt}), which depends on the "unobserved country-level effect". Hence we get, $v_{ijt} = \varepsilon_{ijt} + \nu_{ijt}$; where $\varepsilon_{ijt} \sim IID(0,\sigma^2_{\varepsilon})$. Under this assumption, equation (1) becomes:

$$X_{ijt} = Z_{ij}\beta + v_{ijt} \ldots \ldots \ldots (2)$$

Here, Z represents the matrix of independent variable and β represents the vector of coefficients. Though both models eliminate the time-invariant effects, unlike LSDV, FE estimates every bilateral trade by taking the difference of every variable from its mean. Hence, the relation becomes:

$$(X_{ijt} - \bar{X}_{ij}) = (Z_{ijt} - \bar{Z}_{ij})\beta + (\varepsilon_{ijt} - \bar{\varepsilon}_{ij}) \ldots \ldots \ldots (3)$$

Here, the time invariant dummies are captured by the bilateral constant term. As the model only deals with the change in observations of specific bilateral trade relations, Fe is also called within group estimator.

The RE model considers the error terms correlated with random effect. Hence the model becomes:

$$(X_{ijt} - \vartheta\bar{X}_{ij}) = (1 - \vartheta)\alpha + (Z_{ijt} - \vartheta\bar{Z}_{ij})\beta + \{(1 - \vartheta)\nu_{ijt} + (\varepsilon_{ijt} - \vartheta\bar{\varepsilon}_{ij}) \ldots \ldots \ldots (4)$$

3.2. Trade projection approach

The estimated coefficients of gravity model relative to the intra-EU trade model are applied to the similar specification of intra-ASEAN trade model. Pastore, Ferragina and Giovannetti (2009) consider these estimated parameters as "benchmark" to compare the potential integration between the Europe Agreements (EAs) and the Mediterranean Association

Agreements (MAAs). This work uses a similar benchmark to assess the success of ASEAN intra-regional trade integration in compare to EU-equivalent intra-regional trade integration. In this process, the out-of-sample projection approach provides better scope to estimate the actual integration impact of a specific group of countries (EU members) and to apply the impact to a different group (ASEAN members).

Alternatively, in-sample approach and large-sample approach have the potential for this projection. Though, in-sample projection approach lacks of scope to identify the 'untapped' trade from misspecification of the model (Egger, 2002). Large-sample projection approach provides information about degree of integration of the world instead of any particular region[3]. Hence the approach fails to provide specific information about intra-EU trade integration.

An attempt is taken estimate the success of intra-ASEAN trade integration from the ratio of actual trade and potential trade. The analogy used here is reverse to the analogy used by Pastore, Ferragina and Giovannetti (2009). As the projected potential trade is the amount of trade which would be made possible if ASEAN can achieve the intra-regional trade integration edjactly similar to the EU, ratio between actual trade and potential trade would indicate the level of intra-ASEAN trade integration compare to intra-EU trade integration. The measure of integration success can be expressed in following relation:

$$Integration\ success = \frac{ActualTrade}{PotentialTrade} \quad \ldots\ \ldots\ \ldots\ (5)$$

If the success ratio is higher than 1, intra-ASEAN trade integration would be mentioned to be at successful level compare to intra-EU trade integration. If the measure is at unity, they have just reached the success level, and otherwise, ASEAN is yet to reach the level of success.

4. Data Sources and Empirical Analysis

Trade data for both EU members and ASEAN members comes from the United Nation (UN) trade database, while country GDP is collected from the OECD database. Distance between countries is calculated based on the country location provided by the CIA World Fact-book. For calculation of intra-EU trade integration, data period ranges from 1994 to 2008, while the ASEAN potential trade projection period ranges from 2003 to 2008. Instead of total trade,

[3] Pastore, Ferragina and Giovannetti (2009) discuss in detail

trade data has been collected as exports and imports. As the concern about the currency union impacts is included in this work, ten initial Euro-members are selected for the intra-EU model (Country list is provided to appendix 2). Belgium and Luxembourg is excluded from the model due to data complexity. For projection of ASEAN intra-regional trade integration, four ASEAN members have been selected, namely, Singapore, Indonesia, Malaysia and Thailand. Information about common language and common land border has been collected from the CIA World Fact-book.

4.1. Intra-EU trade integration

The gravity model of intra-EU trade integration provides the elasticity of different variables. The result of the model is provided in the table below:

Table 1: Estimates from the Panel Gravity Model

	(1) Fixed effects ("within")	(2) Random effects GLS
GDP_i	0.339457***	0.4897235***
	(0.0361712)	(0.0284964)
GDP_j	0.6246267***	0.5223718***
	(0.034448)	(0.027901)
$DIST_{ij}$		-1.223414***
		(0.1475334)
CU	0.0982665***	0.0904316***
	(0.0133028)	(0.014187)
CLB		0.6912718***
		(0.202777)
CL		0.0112732
		(0.4305189)
α_{ij}	-4.214295***	-12.63262***
	(0.1187131)	(1.10638)
R-sq: within	0.8886	0.8856
R-sq: between	0.803	0.8762
R-sq: overall	0.7693	0.8752
corr(u_i, Xb)	0.6555	0

σu	1.084002	0.3604128
σe	0.12343687	0.12343687
ρ	0.98719928	0.89501663
F (all ui=0)	179.72***	
RE of ui		Gaussian
F (all coefficient)	1629.13***	4841.6***
Hausman test	7.26	
Number of observations	660	660
Number of groups	44	44
Observations per group	15	15

Note: ***, ** and * denote 1%, 5% and 10% level of significance respectively.

Table 3 shows the estimates of fixed effect and random effect model. As between estimator does not consider time-varying factors, the estimates have been ignored in this work. Standard errors are presented in the parentheses. Though both models supports the efficiency of estimators, the Hauseman test can not reject (Prob > chi2 = 0.0641) the null hypothesis that the coefficients of FE model in column (1) and the coefficients of RE model in column (2) are equal. Hence the estimates of RE model are more consistence than the FE model. The R^2 value also supports the selection RE estimates.

Major variables are found significant and the signs are as expected. Coefficients for GDP are positive for both reporting country and partner country, while coefficient for distance between them is negative. This finding is symmetric to the theory that higher GDP increases trade, while higher distance creates resistance. All these coefficients are significant at 1% level. Both currency union dummy and common land border dummy are found significant at 1% level, while the common language dummy is found insignificant.

As this model estimates the variables in natural logarithm, the coefficients of variables estimate the elasticity. According to the definition of elasticity, estimated coefficients can be interpreted as percentage change of trade due change in different variable. Firstly, 1% change in reporting country's GDP would change 0.4897235% trade

between reporting country and partner country; while 1% change in partner country's GDP would change 0.5223718% trade between them. Change in both GDP and trade would occur in same direction. Secondly, 1% change in distance between reporting country and partner country would change 1.223414% trade between reporting country and partner country in the reverse direction. Beside these major variables, dummy variables show some significant impact in the Euro-model. Members sharing a common regional currency trades 0.0904316% more than members not sharing a common regional currency. Besides, members sharing a common land border trade 0.6912718% more than members not sharing a common land border.

These interpretations lead to the following model for the ASEAN members to calculate the potential trade if they are having similar intra-regional trade integration success to the EU members:

$$Y_{ijt} = -12.63262 + 0.4897235\ GDP_{it} + 0.5223718\ GDP_{jt} - 1.223414\ DIST_{ij} + 0.0904316\ CU + 0.6912718\ CLB \ldots\ldots\ldots (6)$$

As common language dummy (CL) is found insignificant, it has been dropped from the ASEAN trade model shown in equation (6).

4.2. Intra-ASEAN trade integration

Major objective of this paper is to assess the success of intra-ASEAN trade integration. The methodological view of this assessment is to estimate the potential trade which would be made possible if ASEAN has the similar level of intra-regional trade integration to EU, and to compare this potential trade to the actual amount of intra-ASEAN trade. If the ratio of actual trade to potential trade is higher than 1, the process of intra-regional trade integration would be interpreted as a successful ongoing process. Otherwise the process is yet to reach its level of success.

The potential trade is projected by applying equation (5) to Singapore, Malaysia, Indonesia and Thailand for the period of 2003 to 2008. Potential trade is estimated from two points of view, one is for the impact of regional integration and the other is for the impact of currency union, by varying the value of currency union dummy. Potential trade with regional integration assumes the dummy value equal to "0", while potential trade with currency union assumes the dummy value equal to "1".

Figure 1 in appendix 1 presents the potential trade with regional integration, potential trade with currency union and actual trade four selected ASEAN members. From these figures, three major findings are significant. Firstly, actual bilateral trade among these four members is higher than the estimated potential trade throughout the period. Secondly, for all selected country pairs, increasing rate of actual trade is much higher than the increasing rate of potential trade. Thirdly, impact of currency union on potential trade is insignificant except for Singapore - Thailand pair.

Micro-level observation of country pairs from figure 1 provide detailed idea about the pattern of success in the trade integration process. Trade pattern between Singapore - Indonesia, Singapore – Malaysia, Singapore – Thailand and Malaysia – Thailand look similar. Difference between actual trade and potential trade for all four country pairs are quite high in 2003, which increase over time. This difference is quite similar for Indonesia – Thailand as well, though there is a reduction in the difference (break) in between 2005-2006. Difference between actual and potential trade is found quite low for Indonesia – Malaysia pair during 2003-2004, which increases at a high rate afterward. These observations are summarized in the following table 2:

Table 2: Integration success = Actual trade / Potential trade

Period	Singapore-Indonesia	Singapore-Malaysia	Singapore-Thailand	Indonesia-Malaysia	Indonesia-Thailand	Malaysia-Thailand
2003	7.98	6.07	3.19	1.56	2.71	4.62
2004	8.38	6.20	3.44	1.46	3.75	5.74
2005	8.58	6.22	3.65	2.01	4.05	6.00
2006	8.64	6.32	3.72	2.19	3.29	5.95
2007	8.11	5.83	3.27	2.91	3.57	5.29
2008	8.71	5.60	3.53	3.27	4.25	5.09

Source: Authors' calculation

Table 2 shows that all country pairs are enjoying the success of intra-ASEAN trade integration, while Singapore – Indonesia pair is enjoying the maximum success. Indonesia – Malaysia pair was at the initial stage of success in 2003, though they have speeded up their success rate afterward. This success story is more clearly depicted in figure 2 of appendix 1. This figure shows that all country pairs are enjoying the high level of success, which is even upward except for Singapore-Malaysia and Malaysia-Thailand pair for the period of 2006-2008.

5. Conclusions

This paper estimates the success of ASEAN regional integration in terms of intra-regional trade. This assessment comes from the comparison with a benchmark created from intra-EU trade integration. This benchmark is obtained from a gravity model structured for the Euro-members.

The estimates of coefficient of the gravity model are considered as standard value of elasticity for an intra-regional trade integration model. These standard values are applied to intra-ASEAN trade model, which provides the amount of potential trade which would be made possible if ASEAN members have intra-regional trade integration similar to the EU members. The success of intra-ASEAN trade integration is estimated from the ratio of actual trade between four ASEAN members to the projected potential trade among these members.

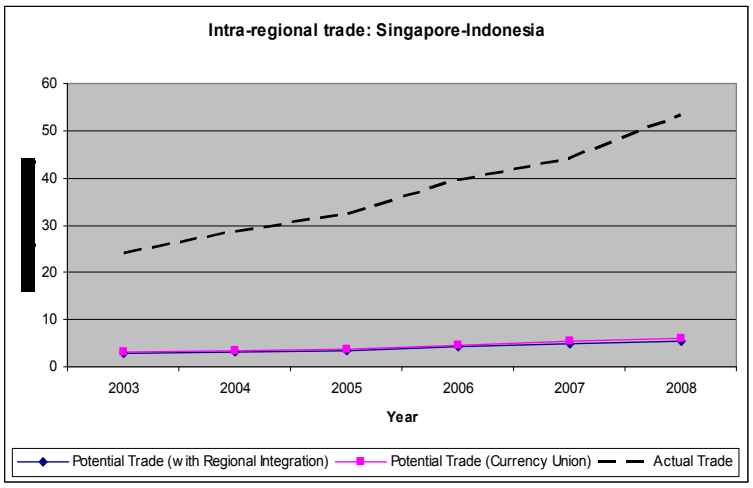
The estimation shows that the actual trade between the country pairs are higher than the estimated potential trade, which means that the success of intra-regional trade integration for all four ASEAN members are positive. Besides, the success ratio in moving upward, that is the gap between actual trade and potential trade is increasing every year for most of the country pairs. Hence, growth potentiality exists for ASEAN intra-regional trade in their current process of regional integration. Another important finding of this work is that the common currency implementation does not make any significant difference in intra-ASEAN trade creation at this stage of integration.

This paper attempts to provide some important information for the ASEAN policy makers. ASEAN has achieved the initial success of intra-regional trade enhancement through their regional cooperation. The success rate is still upward, which indicates to the prospect of achieving further success. Besides, ASEAN is not yet found ready to move towards currency union. This finding complements with Madhur (2002) that ASEAN is at the initial phase of regional cooperation, which comprise the economic integration through different trade agreements. Though currency union is the ultimate goal of this integration, setting the time frame to reach the goal is equally important at policy concern. This study endeavors to provide a base for forecasting the time frame. When the forecast would show a downward move of the success rate, ASEAN would be considered to reach at a closer period for moving towards a common currency. In addition, successful implementation of the method of

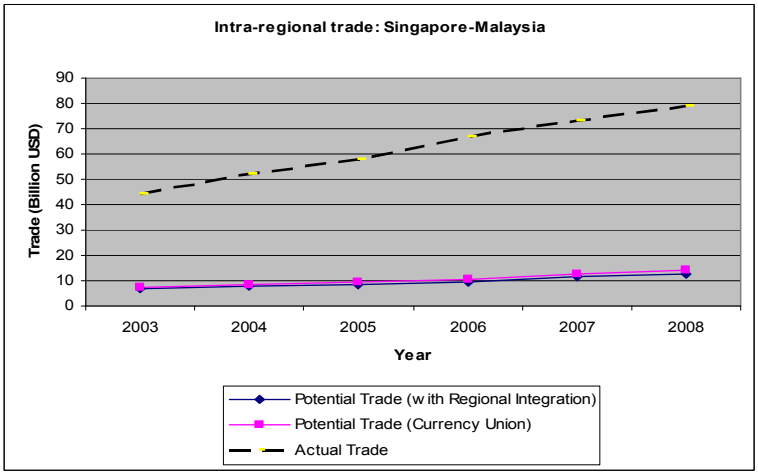
integration success estimation would open the opportunity for other prospective regions to estimate their success of regional cooperation at intra-regional trade integration.

Appendix 1

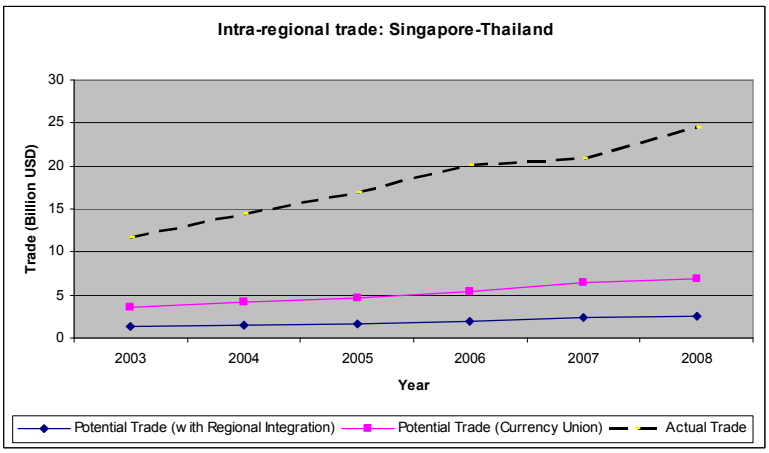
Figure 1: Potential trade versus actual trade



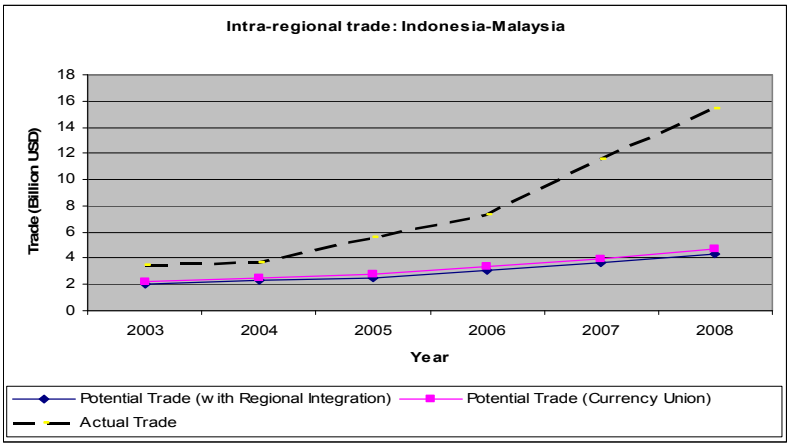
Singapore-Indonesia



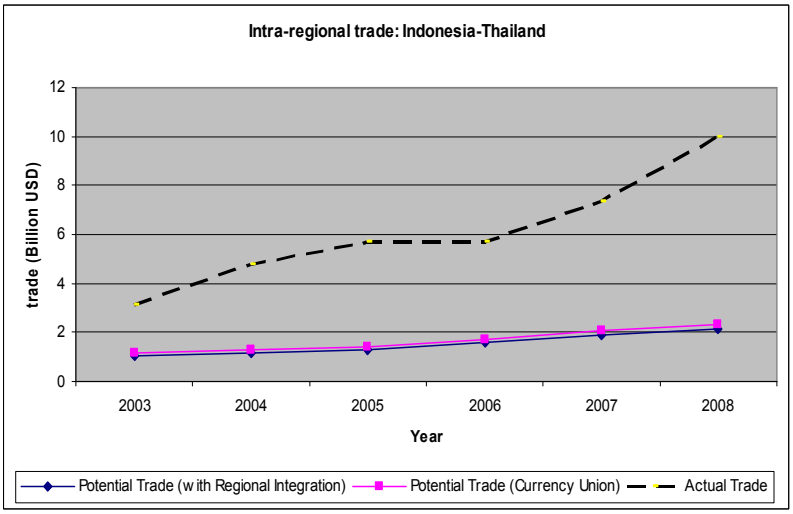
Singapore-Malaysia



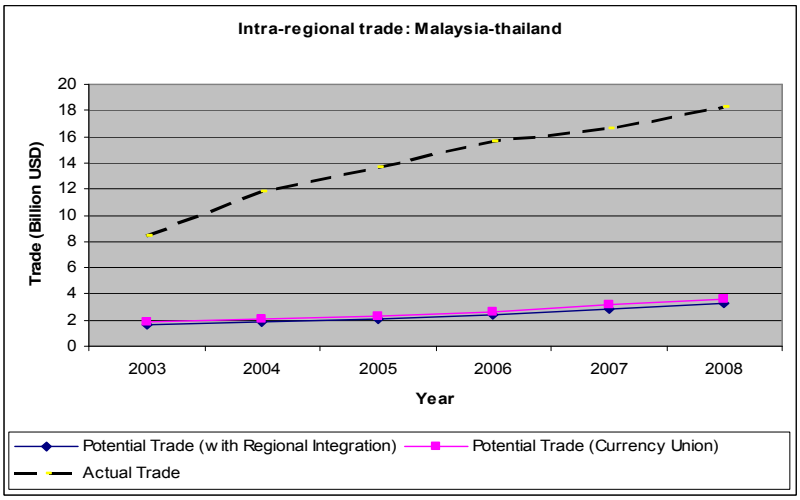
Singapore-Thailand



Indonesia-Malaysia

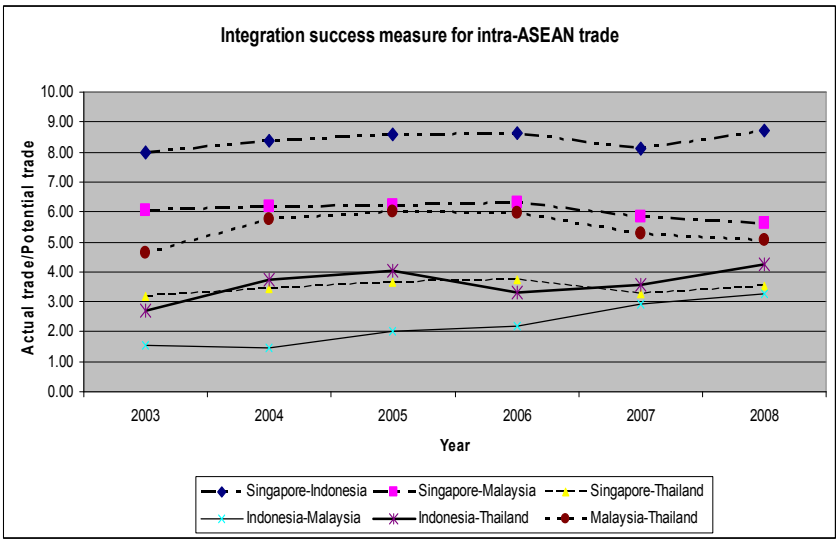


Indonesia-Thailand



Malaysia-Thailand

Figure 2: Integration success measure of intra-ASEAN trade



Appendix 2

List of countries considered for the study:

ASEAN members:

Singapore

Malaysia

Indonesia

Thailand

European Union (EU) members:

Austria

Finland

France

Germany

Greece

Ireland

Italy

Netherlands

Portugal

Spain

Information about ASEAN has been retrieved from the following sources:

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