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ASIAN CURRENCY UNIT AND ASEAN TRADE PROSPECT: AN UNTOLD STORY

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Abstract

Successful regional integration activities in the last two decades have brought East Asia under the limelight of International Economics. Recent literature strongly suggests Asian Currency Unit (ACU) as a potential currency arrangement for East Asian countries. However, high level of heterogeneity among these countries raise question about the feasibility of ACU. This study analyses the feasibility of ACU for ten South East Asian countries, which are commonly known as ASEAN and represent an important portion of East Asian economy. The study has two contributions for ASEAN literature. First, ACU is feasible for the ASEAN countries in terms of increasing intra-ASEAN trade, however, may not be cost effective in terms of achieving the required level of pre-currency union economic convergence among the members. Second, this paper overcomes a major limitation of gravity model (a commonly used trade model) by developing an alternative trade model which captures the possible outcome of a future economic event. Gravity model is an effective tool for analysing trade flows as a result of an existing currency union, however, cannot predict the possible trade enhancement which would be possible with a future currency union. Instead, the Event study model of trade developed in this study forecasts possible trade enhancement of Asian Currency Unit in three steps. First, an existing event has been selected as a benchmark; second, the benchmark is analysed to estimate the possible trade enhancement factor, and finally, the trade enhancement factor has been applied to a hypothetical event of Asian Currency Unit for forecasting the possible outcome of that event. The study successfully predicts the possible positive outcome of Asian Currency Unit in terms of intra-ASEAN trade enhancement, and suggests for quantification of the cost for achieving required level of ASEAN macroeconomic convergence as a pre-condition of the perceived monetary union.

Key Words: ASEAN, Asian Currency Unit (ACU), Currency Union, Trade Integration, Event Study

JEL Classifications: C02, C63, F14, F15, F17, F33

1. Introduction

Economic integration and currency union has been one of the major research topics since the initiation of Mundell's (1961) OCA theory. However, controversy exists over feasibility of common monetary policy around the region, particularly after the economic struggle of the European Union (EU) members. Instead, East Asia is often considered as a potential optimum currency area, which is fuelled by successful regional economic and trade integration in this region in last two decades. Some prominent economists such as Mundell (2003) has proposed for Asian Currency Unit (ACU) and suggested for sorting out a suitable anchor for such common currency (others, for example Shimizutani, 2009; Lee and Koh, 2012). The other group opposed the idea of ACU highlighting strong heterogeneous pattern among East Asian economies (for example, Sato and Zhang, 2006; Bacha, 2008; Nguyen, 2010; Yeh, 2013). These studies, however, highlighted possible costs of a monetary union in East Asia.

Under the light of this debate, the current study analyses the possible intra-regional trade benefit of ASEAN members from the proposed Asian Currency unit. ASEAN is often considered as important part of East Asia in terms of trade. However, in last two decades, ASEAN members showed remarkable progress of regional integration which substantially reflects through their intra- and extra-ASEAN trade enhancement (Thong, 2014). In such situation, how much additional trade creation might be possible for ASEAN members by accepting a common Asian currency is an important policy question. The current study attempts to answer the question in terms of intra-ASEAN trade benefit.

The study does an important methodological improvement in forecasting the trade outcome of a future economic event, such as, a currency union. Existing trade literature typically applies Gravity model as a basic analytical tool for analysing existing trade flows. A major transform of gravity model takes place when Rose (2000) applies two new variables to the model, one is the effect of currency union on trade flows, and other is the response of bilateral trade to bilateral nominal exchange rate volatility. Rose's modified gravity model was

well enough to measure the impact of Euro on EU members' trade during the post-Euro period. However, even after further improvement in the last decade, gravity model is far away to predict the prospect of a future currency union.

This study applies an alternative approach in assessing the possible trade enhancement from a prospective currency union. The contribution of this paper to the literature is threefold. First, event study method is a commonly used technique in Finance to observe the impact of a sudden event. The current study extends the event study model to include trade variables and currency union effects. The performance of the model is compared with the performance of gravity model. Second, the model is further extended to capture the impacts of a future currency union compared with a pre-selected benchmark. Thus the event study model of trade overcomes a major drawback of forecast ability of the gravity model; that is, predicting possible outcome of a future economic event. Finally, in current study, the model assesses the potential trade benefit of the proposed Asian Currency Unit. For this, assumption is made for a hypothetical scenario a common currency in 2012. The results are compared to the actual situation to test whether ACU would offer much trade benefit to ASEAN countries. Thus quantification of potential trade benefit is made possible by using the Event study model.

The Event study model of trade developed in this study consists of two parts, one is benchmark analysis tool and the other is forecasting tool. Numerical simulations of the model show that if ASEAN economic integration can reach to a similar level of economic integration as in the pre-Euro European Union, the Asian Currency Unit would increase intra-ASEAN trade by 21 cent against every dollar of ASEAN GDP. However, the forecast of trade benefit is observed at a range of 11 to 14 cent against every dollar of ASEAN GDP when the benchmark is analysed using gravity approach. Thus the study has two important implications. First, the forecasting tool developed in this study model works well to predict the possible trade outcome of a future economic event ie implementation of Asian Currency Unit, however, the benchmark analysis tool shows tendency to

overestimate compare to parametric model. Second, Asian Currency Unit would be feasible for ASEAN countries in terms of creating additional intra-regional trade benefit, however, may not be cost effective in terms of achieving expected level of pre-currency union economic convergence.

The remainder of the paper is organized as follows. Section 2 reviews the literature relating to the study. Section 3 describes the model and is followed by a description of data and analysis in Section 4. The estimated trade benefit amount is verified using an alternative parametric model in Section 5. The last section concludes the paper.

2. Review of Literature

The success of European economic integration in launching of Euro in 1999 encouraged economists to further investigate the integration potentiality of other regions. A number of regions such as East Asia, the Association of South East Asian Nations (ASEAN), the South Mediterranean countries, the East African Community (EAC) and the Gulf Cooperation Council (GCC) appear as potential candidates for regional economic integration (Bayoumi and Eichengreen, 1997). East Asia, including the ASEAN countries, is often pronounced as highly credible optimum currency area. The issue becomes particularly important following the 1997-98 Asian financial crisis and a fast recovery of most members from that crisis (Madhur, 2002). Almost all members were able to maintain high economic growth in 2000 onwards.

The post-Asian crisis literature brings forward the importance of selecting a proper exchange rate system for Asian countries (Madhur, 2002). East Asian courtiers showed a trend to move towards the flexible exchange rate system to avoid any future financial crisis. However, performance of the flexible exchange rate regime becomes questionable in long-run for increasing volatility in the foreign exchange market (Madhur, 2002). Moreover, retaining monetary autonomy under the free-floating system might be challenging for East Asian countries (Lee, Shin, and Park, 2004).

The concept of Asian Currency Unit (ACU) comes forward as a more realistic goal for East Asian economic integration in recent literature. The Nobel-prize winning economist and a major contributor of OCA theory, Robert Mundell highlights the prospects of a large currency area in Asia (Mundell, 2003). He prioritizes selection of anchor currency in East Asia as more important over assessing the optimality of currency area. He discards the existing literature suggesting currency basket of dollar, euro and yen, mostly because of the high instability of yen-dollar rates. Rather he proposes a cooperative arrangement between China and Japan to form an Asian currency area. Considering the difference between Asia and the European model in term of institutional, economic and political framework, Mundell suggests for an external currency as a possible alternative anchor.

Shimizutani (2009) supports Mundell by introducing a three-step "roadmap" for Asian currency union beginning with a regional cooperation mechanism, followed by introduction of an Asian currency unit (ACU) in the 2020s and incorporation of the Asian common currency in the 2030s. Political alliance within the region was strongly advised for the success of this roadmap. Though Lee and Koh (2012) did not support East Asia wide currency union, they suggested for ASEAN monetary union as a long term policy goal.

Literature suggests additional trade creation as a major benefit of currency union. However, the true potential benefit of ACU in terms of additional trade enhancement is still unexplored. By claiming current East Asian economic integration process as an effective step for unmarked trade liberalization process, Hashmi and Lee (2008) proposed for using initial flexible agreements for currency stabilization, followed by future stiff agreements. The market-driven economic integration in East Asia suffers from limited institutional support in terms of Asia-wide FTAs, financial stabilization mechanism and intraregional exchange rate stabilization. Political and economic divergence also slows down the institutional cooperation. In fact, East Asia differs from other regions in terms of regional integration process from both economic and trade

perspective. Trade integration in East Asia started through the market much before developing formal agreements, while other regions mostly initiated their integration through formal treaties. Strong political bargaining power was achieved through market-oriented integration, which perhaps led stronger economic integration in East Asia (Aminia, Fung and Ng, 2009).

With such strong trade integration, empirical literature fails to support Shimizutani and Mundell's claim for Asian Currency Unit. Instead, Yeh (2013) supports for smaller voluntary currency areas in East Asia instead of forming Asian Currency Unit. In fact, this suggestion is more practical because the success of East Asian economic integration is still limited within trade integration (Thong, 2014).

Though literature identifies trade enhancement as a major benefit of common currency formation, East Asian countries have already achieved substantial trade enhancement with their ongoing integration arrangement. The additional trade benefit over the high cost of forming and maintaining a large currency area is an important policy issue. The issue is further highlighted in literature by showing high level of heterogeneity among East Asian economies (Lee and Azali, 2010). However, existing literature mostly studies East Asia as a whole. In spite of being part of East Asia, ASEAN countries have their own institutional arrangement of regional economic and trade integration. Only few articles extensively focus on ASEAN members for assessing the common currency impact. The current study contributes to the literature by assessing the possible intra-ASEAN trade benefit that would be made possible by introducing the proposed Asian Currency Unit. The next section discusses the methodology of the study.

3. Event Study Model of Trade

3.1 Theoretical Foundation

The foundation of the event study approach is the seminal works of Ashley (1962), Ball and Brown (1968) and Fama et al. (1969). This approach has been adopted by a number of researchers (example) to assess the impact of an event

on stock returns or asset prices or firms' earnings. For example, an event includes the announcement of a merger, a stock split, a legislative act or regulatory ruling. The methodology is based on the assumption that the historical information is sufficient to estimate the effect of new information, and the information is termed an event. According to the literature (for example, Bowman, 1983; Peterson, 1989; Campbell et al., 1997; Mackinlay, 1997; Dasgupta et al., 1998), the event study method proceeds through several steps: (i) Event identification and event window determination; (ii) selection of a sample set of cases to be analysed; (iii) prediction of a "normal" outcome during the event window when the event is absent; (iv) evaluation of the cumulative abnormal outcome (event effect) within the event window; (v) test for statistical significance of the cumulative abnormal outcome.

Traditionally, trade analysis applies the gravity model of trade. However, the Event Study method can be alternatively applied to analyse the impact of an economic event on trade. For example, the trade enhancement factor of Euro implementation for the Euro-members can be estimated using the event study approach, and the results can be verified in gravity framework. Based on the rationale, this paper applies the event study method to forecast the incremental trade intensity in a hypothetical Asian common currency scenario for the ASEAN economies. For this, the model measures the trade enhancement factor from the Euro countries, and then applies that factor to the ASEAN economy. Hence, the implementation of Euro is considered as the event of interest for the analysis, and the event window is defined as ten years prior to the event and ten years after the event. Inclusion of ten year periods before and after the event is suggested by Dasgupta et al. (1998). Following Binder (1998), the event period and one year prior and after the event have been excluded to avoid any bias. Hence pre-Euro period is 1988 to 1997 and post-Euro period is 2001 to 2010. For this study, the ratio of trade over GDP has been termed as trade intensity

(TI). Thus, trade intensity is interpreted as the amount of trade against every dollar of GDP. The Euro model consists of the initial Euro members.[1]

Unlike the gravity model, a major advantage of this method is the model's ability to forecast the impact of a proposed currency union. Methodically this model performs the cross-sectional analysis and the time-series analysis at two different stages, and then combines together, and thus performs as similar to the panel analysis.

In this study, euro is the only choice as the comparing coefficient in spite of its ongoing criticism. Particularly there is no alternative complete economic and monetary union available, which would provide a better benchmark.

3.2 Model Specification

The model is designed with two parts. First, the model analyses the trade enhancement factor of a selected benchmark. Hence, we term this part as benchmark analysis tool. For the current study, implementation of Euro has been selected as a benchmark. Hence the first part of the model (benchmark analysis) is developed focusing the Euro area. The second part of the model is a forecasting tool, which is developed for forecasting the additional trade benefit of a potential currency union. For the current study, the event study model forecast the possible trade benefit of Asian currency Unit for the Southeast Asian (ASEAN) countries.

The benchmark analysis part of the event study model begins by calculating the trade intensity for each of the EU members for the pre- and post-event periods. Following implementation of Euro in 1999, the pre-event period is considered from 1988 to 1997 and the post-event period from 2001 to 2010. The immediate year prior and after the event are excluded to avoid biasness. Hence, the trade intensity for the EU members is calculated as:

$$TI_{it_{pre}} = \frac{Trade_{it_{pre}}}{GDP_{it_{pre}}} \quad \ldots\ldots\ldots (1)$$

[1]A list of the countries is provided in Table 1

$$TI_{it_{post}} = \frac{Trade_{it_{post}}}{GDP_{it_{post}}} \quad \ldots\ldots\ldots (2)$$

Here, *TI* (Trade/GDP) is the trade intensity; *i* (=1, ……, 45) refers to number of country pairs; t_{pre} (=1988 – 1997) is the pre-event period and t_{post} (=2001 – 2010) is the post-event period.[2] A major advantage of using trade intensity is that both trade and GDP are estimated in the same currency, hence the ratio itself neutralizes the effects of any exchange rate changes.

The calculated trade intensities of the pre- and post-event periods are aggregated across time for each of the country-pair events. This process returns the cumulative trade intensity (*CTI*) as follows:

$$CTI_i(E_{pre}) = \sum_{t_{pre}=1988}^{1997} TI_{it_{pre}} \quad \ldots\ldots\ldots (3)$$

$$CTI_i(E_{post}) = \sum_{t_{post}=2001}^{2010} TI_{it_{post}} \quad \ldots\ldots\ldots (4)$$

Here, E_{pre} stands for the per-event periods in the EU and E_{post} stands for the post-event periods in the EU.

The aggregation across time and event is done by calculating the cumulative average of trade intensity (*CATI*) as follows:

$$CATI(E_{pre}) = \frac{1}{N}\sum_{i=1}^{N} CTI_i(E_{pre}) \quad \ldots\ldots\ldots (5)$$

$$CATI(E_{post}) = \frac{1}{N}\sum_{i=1}^{N} CTI_i(E_{post}) \quad \ldots\ldots\ldots (6)$$

where, *N* stands for the number of country pairs (45 in this case).[3]

Finally, the trade enhancement has been calculated from the cumulative average trade intensity (*CATI*) for the pre- and post-event periods:

[2] Here GDP refers to the reporting country's GDP.
[3] For being consistent with Event study literature, unweighted averages are used rather than averages based on country size in terms of trade or GDP.

$$TradeEnhancement = \frac{CATI(E_{post})}{CATI(E_{pre})} \quad \ldots\ldots\ldots (7)$$

The second part of the model is developed for forecasting trade benefit of a potential currency union. This study intends to forecast the trade benefit for ASEAN countries fuelled by Asian Currency Unit. For this, a hypothetical event of currency union is assumed in the year 2012. Hence, the pre-event period is taken as 2001 to 2010. Thus the relation for trade intensity stands as:

$$TI_{it_{pre}} = \frac{Trade_{it_{pre}}}{GDP_{it_{pre}}} \quad \ldots\ldots\ldots (8)$$

Here, the number of country pairs *i* ranges from 1 to 35 and the pre-event period t_{pre} ranges from 2001 – 2010.

Following this, the relationships for cumulative trade intensity (*CTI*) and the cumulative average of trade intensity (*CATI*) are:

$$CTI_i(A_{pre}) = \sum_{t_{pre}=2001}^{2010} TI_{it_{pre}} \quad \ldots\ldots\ldots (9)$$

$$CATI(A_{pre}) = \frac{1}{N}\sum_{i=1}^{N} CTI_i(A_{pre}) \quad \ldots\ldots\ldots (10)$$

A_{pre} stands for the per-event period for ASEAN and *N* is the number of country pairs (35 in this case).

Following the definition of trade enhancement used in this chapter, trade enhancement can be calculated as:

$$TradeEnhancement = \frac{CATI(A_{post})}{CATI(A_{pre})} \quad \ldots\ldots\ldots (11)$$

where, A_{post} stands for the post-event period for ASEAN.

The core hypothesis of this study is to observe the impact of an ASEAN currency union on members' intra-regional trade, provided the level of ASEAN regional integration can achieve the same level as that of the EU. According to this assumption, the trade enhancement of the EU and ASEAN should be equal.

Hence, Equation (7) and Equation (11) must be equal. This relation can be written as:

$$\frac{CATI(A_{post})}{CATI(A_{pre})} = \frac{CATI(E_{post})}{CATI(E_{pre})} \quad \ldots\ldots\ldots (12)$$

After rearranging, Equation (12) becomes:

$$CATI(A_{post}) = \frac{CATI(E_{post})}{CATI(E_{pre})} \times CATI(A_{pre}) \quad \ldots\ldots\ldots (13)$$

Equation (13) returns the amount of cumulative average trade intensity that can be achieved from an ASEAN currency union if the ASEAN level of regional integration reaches a similar level of integration as did the EU.

4. Data Analysis and Results

4.1 Description and sources of data

Table 1: Selected country-pairs of the EU members[4]

Trade								
Austria	**Finland**	**France**	**Germany**	**Greece**	**Ireland**	**Italy**	**Netherlands**	**Portugal**
Finland	France	Germany	Greece	Ireland	Italy	Netherlands	Portugal	Spain
France	Germany	Greece	Ireland	Italy	Netherlands	Portugal	Spain	
Germany	Greece	Ireland	Italy	Netherlands	Portugal	Spain		
Greece	Ireland	Italy	Netherlands	Portugal	Spain			
Ireland	Italy	Netherlands	Portugal	Spain				
Italy	Netherlands	Portugal	Spain					
Netherlands	Portugal	Spain						
Portugal	Spain							
Spain								

Analysis proceeds in two stages. First, a benchmark of trade enhancement factor has been estimated from the EU economy, which refers how much additional trade has been performed by the Euro members following implementation of a

[4] Countries in the 1st row are considered as reporting countries for EU trade

common currency. Second, the estimated trade enhancement factor is applied to ASEAN economy to observe the trade prospect of Asian Currency Unit.

For ASEAN, all 10 members are included. As trade data are not consistently available for all country-pairs of these 10 members, 35 country-pairs are finally selected. These country-pairs are presented in Table 2.

Table 2: Selected country-pairs of ASEAN members[5]

Trade								
Brunei	**Cambodia**	**Indonesia**	**Laos**	**Malaysia**	**Myanmar**	**Philippine**	**Singapore**	**Thailand**
Indonesia	Indonesia	Laos	Malaysia	Myanmar	Philippine	Singapore	Thailand	Vietnam
Malaysia	Malaysia	Malaysia	Singapore	Philippine	Singapore	Thailand	Vietnam	
Philippine	Singapore	Myanmar	Thailand	Singapore	Thailand	Vietnam		
Singapore	Thailand	Philippine	Vietnam	Thailand	Vietnam			
Thailand	Vietnam	Thailand		Vietnam				
		Vietnam						

For the EU, the initial Euro members are selected. Out of the 12 initial members, Belgium and Luxembourg are excluded due to inconsistency in data availability. Hence, a total of 45 country-pairs appear from the remaining 10 members, which are presented in Table 1.

The observation periods for the EU members are selected as 10 years before and 10 years after the implementation of the Euro. To avoid biasness, the immediate years prior and after currency union have been excluded. As the Euro was implemented in 1999, the pre-event period is selected from 1988 to 1997 and the post-event period is selected from 2001 to 2010. The data are collected for ten EU members consisting of Austria, Finland, France, Germany, Greece, Ireland, Italy, Netherlands, Portugal and Spain.

In this study, a hypothetical event of a currency union is assumed for ASEAN in the year 2012. Hence, the pre-event period selected is from 2001 to 2010. Ten ASEAN members include Brunei Darussalam, Cambodia, Indonesia, Laos, Malaysia, Myanmar, the Philippines, Singapore, Thailand and Vietnam.

[5] Countries in the 1st row are considered as reporting countries for ASEAN trade

For each member, the annual data on exports and imports are collected from the IMF *Direction of Trade Statistics (DOTS)* against other partners in the selected country-pairs. A small amount of export and import data are unavailable in the IMF series, which are collected from the UN *COMTRADE* database and adjusted with the IMF series. Data on GDP are collected from the World Bank *World Development Indicator (WDI)* database.

4.2 Benchmark analysis: EU's trade benefit from the Euro

The analysis begins with calculating the trade benefit of Euro members that was fuelled by implementation of Euro. The analysis proceeds at three stages; first, calculation of individual trade intensities, second, calculation of cumulative trade intensities, and finally, calculating the trade enhancement factor. The trade enhancement factor will suggest how much intra- EU trade has increased over 10 year's period of post-Euro era.

4.2.1 Individual Trade Intensities for Euro zone

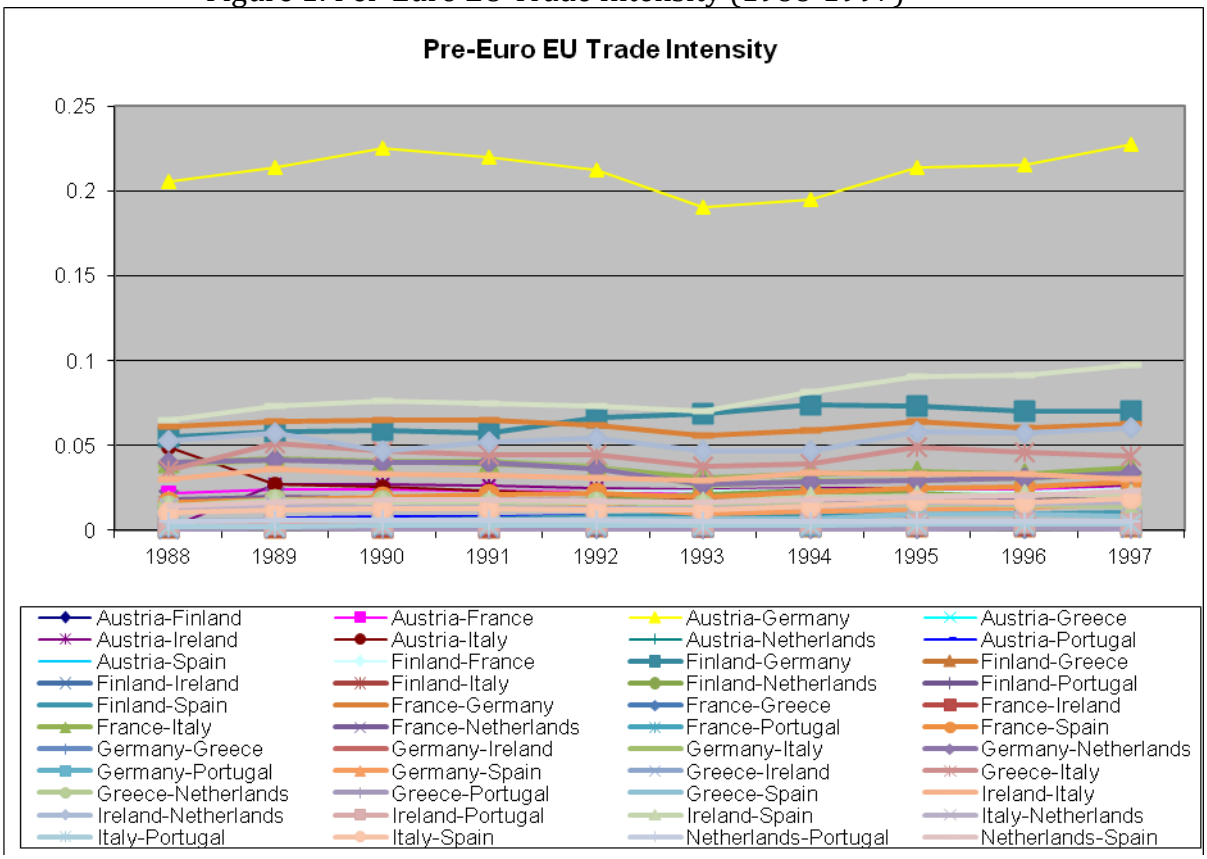
Figure 1 presents the calculated trade intensities of the 45 selected EU country-pairs for the pre-implementation period of the Euro (1988–1997). For most of the pairs, trade intensities are less than 0.05, suggesting that trade of these country-pairs are mostly at or below 5 cents for every dollar of the respective reporting country's GDP.[6] Five country-pairs, namely, Austria-Germany, Finland-Germany, France-Germany, Portugal-Spain and Ireland-Netherlands appear as exceptions.

The trade intensity of the Austria-Germany pair ranges from 0.19 to 0.24 in the pre-Euro period, implying that trade between Austria and Germany is between 19 to 24 cents for every dollar of Austrian GDP. The trade intensity of the Portugal-Spain pair is about 0.07 till 1993, and then the intensity starts to increase and reaches 0.1 in 1997. This result suggests that trade between Portugal and Spain is about 7 cents for every dollar of Portuguese GDP till 1993 and gradually increases to 10 cents in 1997. The trade intensity of the France-

[6] List of reporting countries of the EU is presented in Table 1

Germany pair is about 0.06 till 1991, and then it increases and stays at or slightly above 0.07. This result implies that trade between France and Germany pair is about 6 cents for every dollar of French GDP till 1991, and then increases to about 7 cents.

Figure 1: Per-Euro EU Trade Intensity (1988-1997)



Source: Author's calculation based on data collected from IMF *Direction of Trade Statistics (DOTS), UNCOMTRADE* database and World Bank *World Development Indicator (WDI)* database

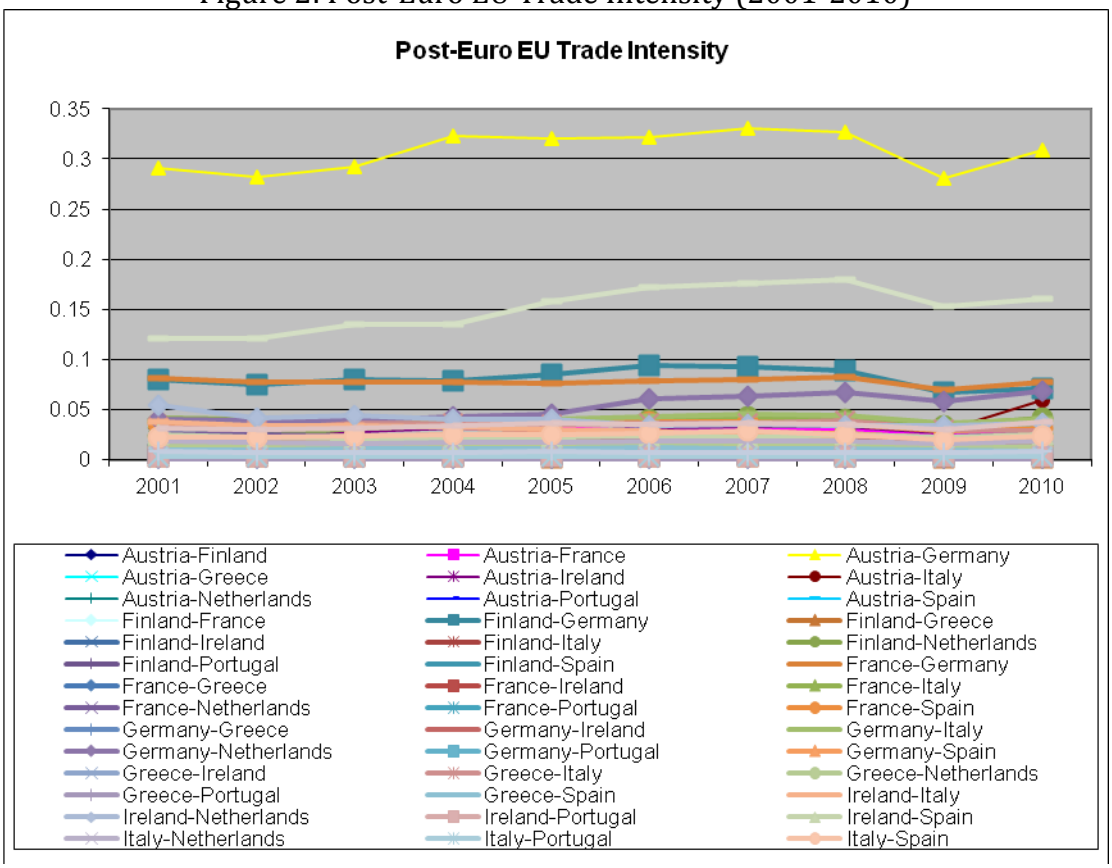
The trade intensity of the Finland-Germany pair varies from 0.056 to 0.066, implying that trade between Finland and Germany varies between 5.6 to 6.6 cents for every dollar of Finish GDP. The trade intensity of the Ireland-Netherlands pair varies from 0.047 to 0.06, suggesting that trade between Ireland and Netherlands varies between 4.7 to 6 cents for every dollar of Irish GDP.

Figure 2 presents the calculated trade intensities of the 45 selected EU country-pairs for the post-implementation period of the Euro (2001–2010). Trade intensities of most of the country-pairs are less than 0.05, implying that their

trade is at or below 5 cents for every dollar of the respective reporting country's GDP. Four exceptions appear in this case, which are Austria-Germany, Portugal-Spain, Finland-Germany, France-Germany and Germany-Netherlands.

The trade intensity of the Austria-Germany pair ranges from 0.28 to 0.33 in the post-Euro period, suggesting that the implementation of the Euro increases trade between Austria and Germany to a range of 28 to 33 cents for every dollar of Austrian GDP. Similarly, the introduction of the Euro increases the trade intensity of the Portugal-Spain pair to a range of 0.12 to 0.18, implying that the post-Euro trade between Portugal and Spain increases to a range of 12 to 18 cents for every dollar of Portuguese GDP.

Figure 2: Post-Euro EU Trade Intensity (2001-2010)



Source: Author's calculation based on data collected from IMF *Direction of Trade Statistics (DOTS), UNCOMTRADE* database and World Bank *World Development Indicator (WDI)* database

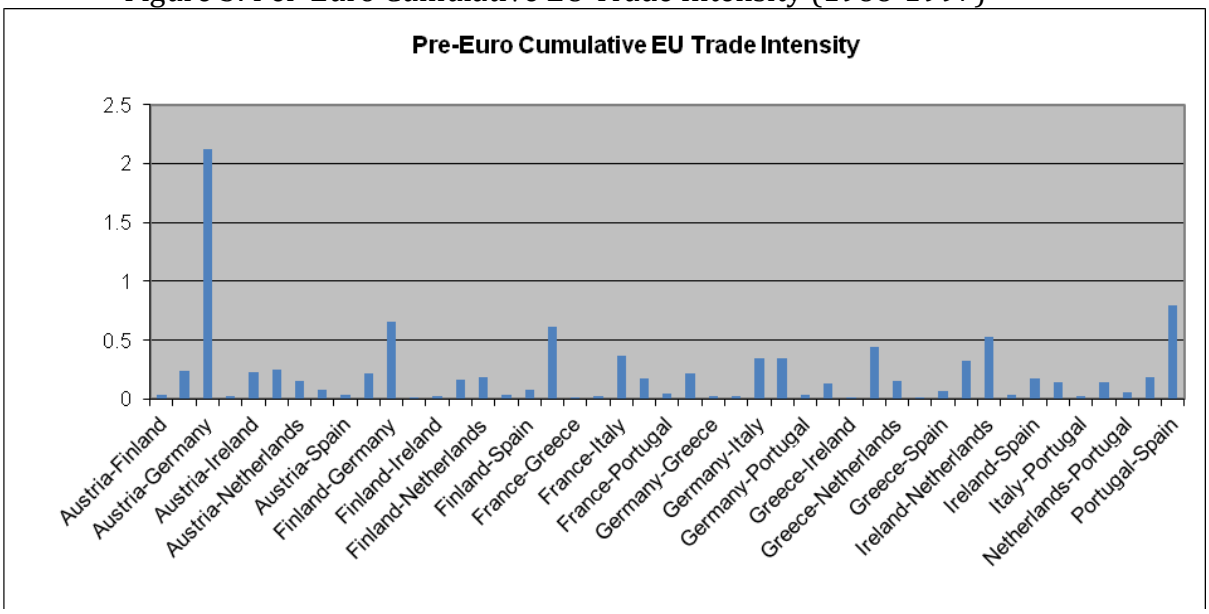
The trade intensity of the Finland-Germany pair ranges from 0.075 to 0.092 and the France-Germany pair ranges from 0.076 to 0.082 in the post-Euro period. This result suggests that the currency union increases trade between Finland

and Germany to a range of 7.5 to 9.2 cents for every dollar of Finish GDP, while trade between France and Germany increases to a range of 7.6 to 8.2 cents for every dollar of French GDP. In the period of 2007 to 2009, the trade intensity of the Germany-Netherlands pair is observed in the range of 0.058 to 0.067, suggesting that their trade increases to a range of 5.8 to 6.7 cents for every dollar of Greek GDP during 2007 to 2009. For most country-pairs, a declining trend of trade intensities is observed in 2009, which revives in 2010.

4.2.2 Cumulative Trade Intensities for Euro zone

Figure 3 presents the cumulative EU trade intensity for each of the 45 country-pairs for the 10 years prior to the currency union. The maximum cumulative trade intensity value of 2.1 is observed for the Austria-Germany pair, which implies that the cumulative trade between Austrian and Germany during the pre-Euro period is 2.1 dollar for every dollar of Austrian GDP.

Figure 3: Per-Euro Cumulative EU Trade Intensity (1988-1997)



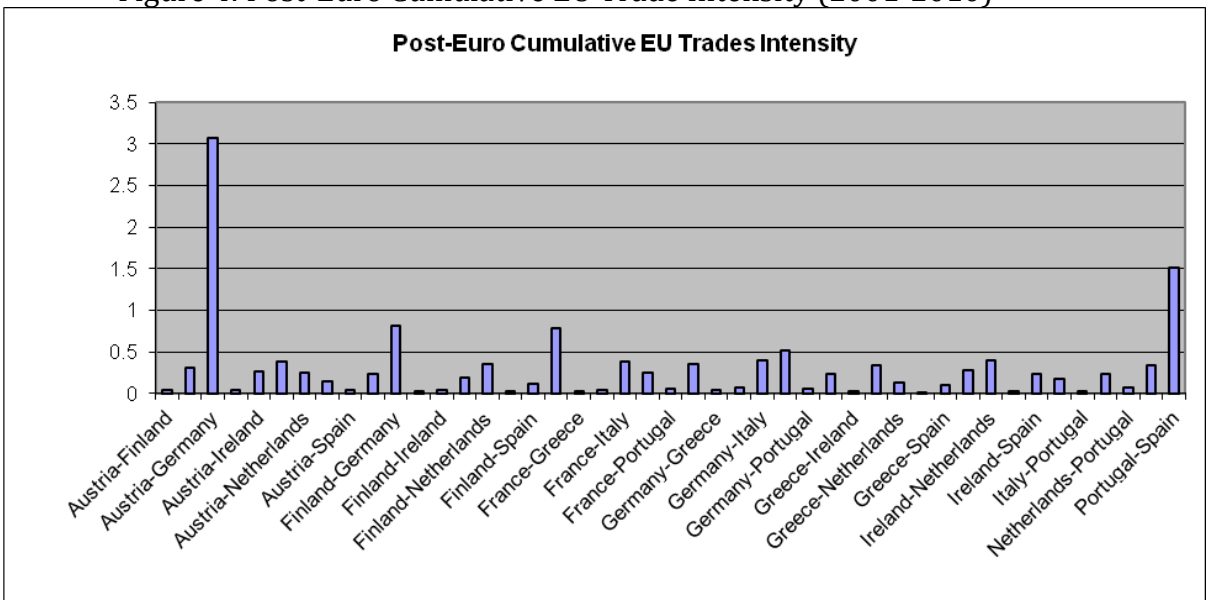
Source: Author's calculation based on data collected from IMF *Direction of Trade Statistics (DOTS), UNCOMTRADE* database and World Bank *World Development Indicator (WDI)* database

The cumulative trade intensities of the Finland-Germany, the France-Germany, the Ireland-Netherlands and the Portugal-Spain pairs vary from 0.5 to 1, implying that the cumulative trade between Finland and Germany, France and Germany, Ireland and Netherlands and Portugal and Spain during the pre-Euro

period are 50 cents to 1 dollar for every dollar of Finish, French, Irish and Portuguese GDP respectively. The cumulative trade intensities of five country-pairs are observed to vary from 0.2 to 0.3. These country-pairs are the France-Italy, the German-Italy, the German-Netherlands, the Greece-Italy and the Ireland-Italy. These ratios imply that the cumulative trade between France and Italy, German and Italy, German and Netherlands, Greece and Italy and Ireland and Italy during the pre-Euro period are 20 to 30 cents for every dollar of French, German, Greek and Irish GDP respectively.

The cumulative trade intensities of 15 country-pairs, namely, Austria-France, Austria-Ireland, Austria-Italy, Austria-Netherland, Finland-France, Finland-Italy, Finland-Netherlands, France-Netherlands, France-Spain, Germany-Spain, Greece-Netherlands, Ireland-Spain, Italy-Netherlands, Italy-Spain and Netherlands-Spain vary from 0.1 to 0.3, meaning that the cumulative trade between these country-pairs during the pre-Euro period are 10 to 30 cents for every dollar of their respective reporter's GDP. For the rest 20 country-pairs, the cumulative trade intensities are observed to be below 0.1, implying that the cumulative trade between these country-pairs during the pre-Euro period are less than 10 cents for every dollar of their respective reporter's GDP.

Figure 4: Post-Euro Cumulative EU Trade Intensity (2001-2010)



Source: Author's calculation based on data collected from IMF *Direction of Trade Statistics (DOTS), UNCOMTRADE* database and World Bank *World Development Indicator (WDI)* database

Figure 4 presents the cumulative trade intensity for each of the 45 EU country-pairs for the 10 years following the currency union. The maximum cumulative trade intensity is 3.08 observed for the Austria-Germany pair, which means that the currency union increases the cumulative trade between Austrian and Germany to 3.08 dollars for every dollar of Austrian GDP. The second highest cumulative trade intensity of 1.51 is observed for the Portugal-Spain pair, which implies that the currency union increases the cumulative Portuguese trade with Spain to 1.51 dollar for every dollar of Portuguese GDP. For three country-pairs, the cumulative trade intensities is observed between 0.5 to 1, implying that the cumulative trade of these country-pairs during the post-Euro period are 50 cents to 1 dollar for every dollar of their respective reporter's GDP. These country-pairs are Finland-Germany, France-Germany and Germany-Netherlands.

The cumulative trade intensities of eight country-pairs, namely, Austria-Italy, Finland- Netherlands, France-Italy, France-Spain, Germany-Italy, Greece-Italy, Ireland-Netherlands and Netherlands-Spain vary from 0.3 to 0.5, implying that the cumulative exports of these country-pairs during the post-Euro period are 30 to 50 cents for every dollar of their respective reporter's GDP. For fifteen country-pairs, the cumulative trade intensities is observed between 0.1 to 0.3, implying that the cumulative trade of these country-pairs during the post-Euro period are 10 to 30 cents for every dollar of their respective reporter's GDP. These country-pairs are Austria-France, Austria-Ireland, Austria-Netherland, Austria-Portugal, Finland-France, Finland-Italy, Finland-Spain, France-Netherlands, German-Spain, Greece-Netherlands, Greece-Spain, Ireland-Italy, Ireland-Spain, Italy-Netherlands and Italy-Spain. For the rest 17 country-pairs, the cumulative trade intensities are observed to be below 0.1, implying that the cumulative trade of these country-pairs during the post-Euro period are less than 10 cents for every dollar of their respective reporter's GDP.

In summary, cumulative trade intensity of the EU country-pairs show substantial trade improvement following implementation of Euro except for trade between Ireland-Italy and Ireland-Netherland. During pre-Euro period, Ireland used to

trade 32 cents with Italy and 53 cents with Netherlands against every dollar of their own GDP. However, the amount reduced to 29 cents for Ireland-Italy trade and to 39 cents for Ireland-Netherland trade during post-Euro period. In general, the Euro is able to remarkably enhance intra-EU trade.

4.2.3 Trade Enhancement for Euro zone

Table 3 presents the calculation of the possible ASEAN trade enhancement from a currency union. The first part of the calculation represents results for benchmark analysis, which is done for the Euro members. The second part of the calculation represents results for forecast of prospective currency union, which is done for ASEAN members.

Table 3: Calculation of possible ASEAN trade enhancement from a Currency Union

	European Union		ASEAN	
	Cumulative Average Trade Intensity (CATI)	Trade Enhancement Factor	Cumulative Average Trade Intensity (CATI)	Possible Trade Enhancement
Pre-Event period	0.223627097	1.342377104	0.6057567712	0.2073972491
Post-Event period	0.300191894		0.81315402	

The benchmark analysis shows the calculation for the trade enhancement factor achieved by the European Union by developing the Euro zone. The cumulative average trade intensities (CATI) for the European Union are calculated as 0.2234 for the pre-Euro period and 0.3002 for the post-Euro period. This result suggests that on average, 22 cents of trade occurs between the EU members for every dollar of their GDP in the 10 years prior to the currency union. On the other hand, an average 30 cents of trade occurs between the EU members for every dollar of their GDP in the 10 years following the currency union. Based on these results, the trade enhancement factor is estimated as 1.3424, implying that the currency union increases the average intra- EU trade by nearly 34 per cent over the 10 years' post-event windows.

Earlier, applying panel approach, Glick and Rose (2002) suggested that bilateral trade almost doubles between a country-pair sharing a common currency However, applying the multilateral-trade-resistance index, Rose and Wincoop (2001) projected 59% for trade enhancement among Euro members. Instead, Nardis and Vicarelli (2003) showed that the Euro increases extra-EMU trade by 6.3% and only a 2.6% increase of intra-EMU trade after immediate implementation of Euro. Those studies were limited to initial impact of Euro on EU trade. The current study observes a relatively longer term effect of Euro on intra-Euro trade, and the result is realistic compare to Glick and Rose (2002) and Rose and Wincoop (2001).

4.3 Calculation of ASEAN trade prospect

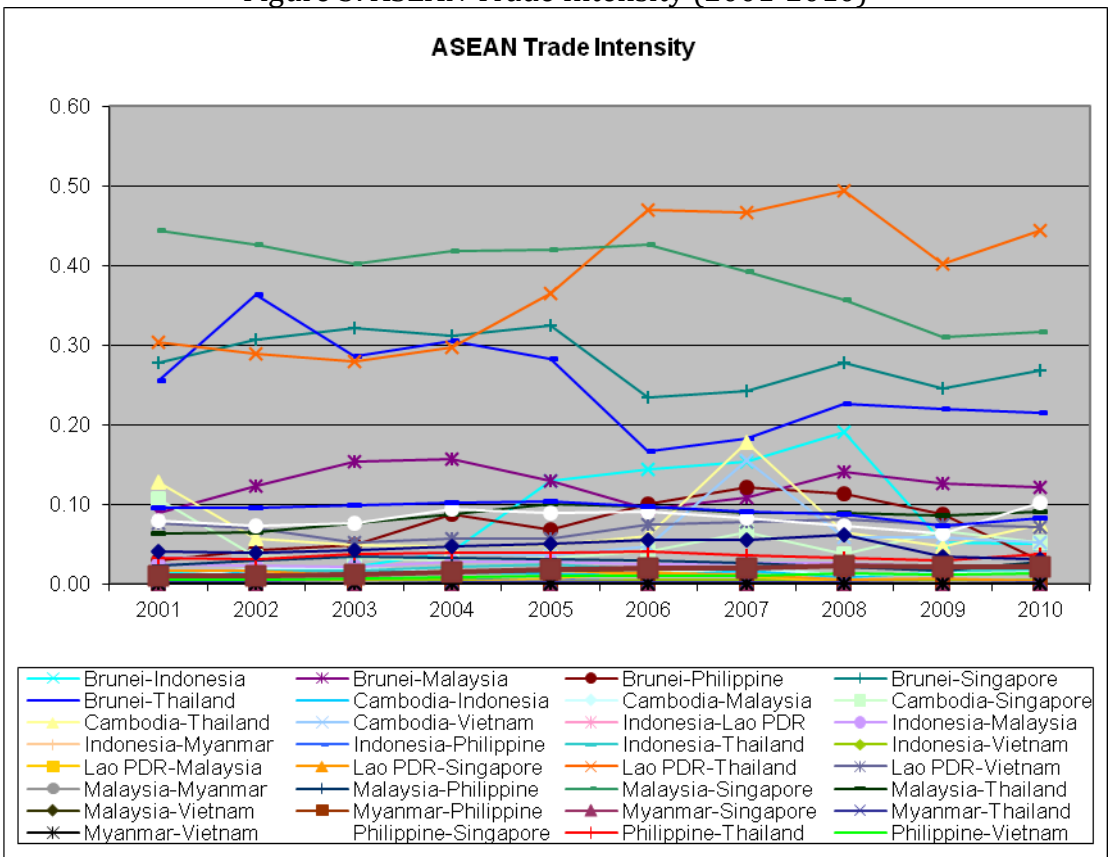
The first part of the analysis reveals that the Euro enhances 35 per cent of intra-EU trade among the initial Euro members. The second part focuses on calculating possible intra-ASEAN trade enhancement if Asian Currency Unit can be implemented. The underlying assumption is that pre-currency union ASEAN members achieve the same level of regional integration of the Euro members before implementation of Euro. The analysis proceeds at three stages; first, calculation of individual trade intensities of ASENA members, second, calculation of cumulative trade intensities, and finally, applying the trade enhancement factor of the Euro model to the ASEAN model for forecasting of possible intra-ASEAN trade enhancement. The result will suggest how much intra-ASEAN trade would increase if the ACU is implemented and provided ASEAN leaders accept the ACU.

4.3.1 Individual Trade Intensities for ASEAN

Figure 3 presents the calculated trade intensities of the 35 selected ASEAN country-pairs from 2001 to 2010. ASEAN trade intensities appear to be more heterogeneous with higher magnitudes than that of the EU. Trade intensity of Laos-Thailand pair is about 0.3 till 2004, increases to 0.49 in 2008 and then reduces to 0.4 in 2009. This result implies that trade between Laos and Thailand is 30 cents for every dollar of Laos's GDP till 2004, increasing to 49 cents in 2008

and then dropping to 32.5 cents in 2009. Trade intensity of the Malaysia-Singapore pair is 0.51 in 2000, which declines to 0.31 in 2009, implying that trade between Malaysian and Singapore is 51 cents for every dollar of Malaysian GDP in 2000, gradually reducing to 31 cents in 2009.

Figure 5: ASEAN Trade Intensity (2001-2010)



Source: Author's calculation based on data collected from IMF *Direction of Trade Statistics (DOTS), UNCOMTRADE* database and World Bank *World Development Indicator (WDI)* database

Trade intensity of the Brunei-Singapore pair varies from 0.18 to 0.325, while trade intensity of the Brunei-Thailand pair varies from 0.166 to 0.363. These results indicate that Brunei trades 18 to 32.5 cents with Singapore and 16.6 to 36.3 cent with Thailand for every dollar of their GDP. Similarly, trade intensity of the Brunei-Malaysia pair varies from 0.085 to 0.157, suggesting that Brunei trades 8.5 to 15.7 cents with Malaysia for every dollar of their GDP. Trade intensity of the Brunei-Indonesia pair is 0.007 in 2000, increases to 0.19 in 2008 and then reduces to 0.051 in 2009. This result implies that trade between

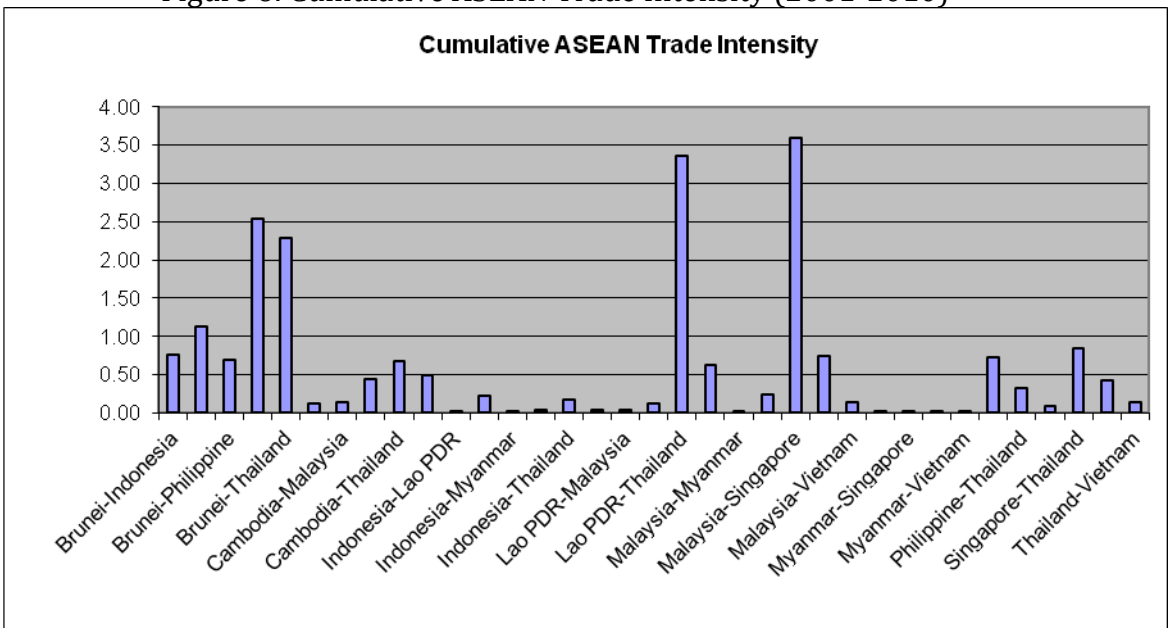
Bruneian and Indonesia is about 0.7 cents for every dollar of Bruneian GDP in 2000, increasing to 19 cents in 2008 and then dropping to 5.1 cents in 2009.

For the Cambodia-Thailand pair, trade intensity is observed to be around 0.05, though peaks are observed in 2001 and 2007 with values of 0.128 and 0.178 respectively. This result implies that trade between Cambodia and Thailand is about 5 cents for every dollar of Cambodian GDP, though peaks of 12.8 cents and 17.8 cents are observed in 2001 and 2007 respectively. For the other country-pairs, trade intensities remain at less than 0.1, indicating that trade between these country-pairs is at or below 10 cents for every dollar of the respective reporting country's GDP.[7]

Among the country-pairs, a common phenomenon is the sharp drop of trade intensities during 2009, followed by substantial improvement in 2010. This shows that ASEAN countries have recovered quickly from the GFC.

4.2.2 Cumulative Trade Intensities for ASEAN

Figure 6: Cumulative ASEAN Trade Intensity (2001-2010)



Source: Author's calculation based on data collected from IMF *Direction of Trade Statistics (DOTS), UNCOMTRADE* database and World Bank *World Development Indicator (WDI)* database

[7] List of reporting countries of ASEAN is presented in Table 2

Figure 6 presents the cumulative trade intensity of each of the 35 ASEAN country-pairs from the year 2001 to 2010. The highest cumulative trade intensity is observed for the Malaysia-Singapore pair with a value of 3.6, followed by Laos-Thailand with 3.36. It means that the cumulative Malaysian trade with Singapore is 3.6 dollars for every dollar of Malaysian GDP, and the cumulative trade between Laos and Thailand is 3.36 dollars for every dollar of Laos GDP.

The cumulative trade intensity of the Brunei-Singapore, the Brunei-Thailand and the Brunei-Malaysia pairs are observed to be 2.54, 2.3 and 1.12 respectively, implying that the cumulative Bruneian trade with Singapore, Thailand and Malaysia are 2.54 dollars, 2.3 dollars and 1.12 dollars respectively for every dollar of Bruneian GDP.

The cumulative trade intensities of seven country-pairs vary from 0.5 to 1, meaning that the cumulative trade of these country-pairs are between 50 cents to 1 dollar for every dollar of respective reporter's GDP. These country-pairs are Brunei-Indonesia, Brunei-Philippine, Cambodia-Thailand, Laos-Vietnam, Malaysia-Thailand, Philippine-Singapore and Singapore-Thailand. For the remaining 23 country-pairs, the cumulative trade intensities are observed to be below 0.5, implying that the cumulative trade between these country-pairs are less than 50 cents for every dollar of their respective reporter's GDP. Next, the average of the cumulative trade intensities is calculated for assessing the possible trade enhancement for ASEAN.

4.3.2 Trade Enhancement for ASEAN

The second part of Table 3 presents the calculation of the possible ASEAN trade enhancement from a currency union. For ASEAN, the cumulative average trade intensity (CATI) from 2001 to 2010 is calculated as 0.6057, suggesting that on average, 61 cents of trade occurs between ASEAN members for every dollar of their GDP from 2001 to 2010. If hypothetically, ASEAN members adopt a common currency in the year 2012 and achieve a trade enhancement factor equal to that of the EU, the cumulative average trade intensity (CATI) in the post-

currency union period appears to be 0.8131. This result suggests that on average, 81 cents of trade would occur between ASEAN members for every dollar of their GDP in the post-currency union period.

From the difference between the pre-event and the post-event cumulative average trade intensities, trade enhancement is calculated as 0.2074, suggesting that the ASEAN currency union would enhance their intra-regional trade by about 21 cents for every dollar of their GDP.

The analysis summarizes two issues on ASEAN regional integration. First, the intra-regional trade patterns of the European Union members are substantially homogeneous in both the pre-Euro and post-Euro observation periods, while notable heterogeneity exists in the case of ASEAN trade patterns. Second, intensity value for ASEAN in terms of trade is much higher than for the European Union, indicating that the currency union could have more impact on ASEAN trade. Particularly, the intra-regional trade benefit of an ASEAN currency union is suggested to be 21 per cent of ASEAN GDP, provided the change in their level of integration is similar to that of the EU. Thus, an ASEAN currency union would be economically feasible if the cost of achieving the desired level of ASEAN integration is less than 21 per cent of ASEAN GDP. However, high level of heterogeneity raises question about the cost effectiveness of the expected macroeconomic correction process among ASEAN members.

5. The Testimony of Gravity

The event study approach of trade, which is developed in this study, is a non-parametric method. In this section, the model efficiency of this approach is justified by re-estimating trade enhancement factor of Euro using Gravity model of trade. In literature, Gravity model is a commonly used parametric model for trade analysis.

Gravity model of trade was first proposed by Tinbergen (1962) and Pöyhönen (1963) in which the trade between two countries is proportional to their product of masses (GDP) and inversely proportional to their distance. Eventually this was

a replication of the gravity model of physics. Though theoretically the distance refers to the economic distance, geographic distance replaces economic distance in practice (Kalirajan, 2008). Following Tinbergen and Pöyhönen, Anderson (1979) and Bergstrand (1985, 1989) show the 'theoretical foundation' of the model. They also derive bilateral trade as a 'function of income and transport costs'.

The standard gravity equation for trade takes the following econometric form:

$$T_{ij} = G^{\beta 1}{}_i . G^{\beta 2}{}_j . D^{\beta 3}{}_{ij} . E_{ij} \quad \ldots\ldots\ldots (3.1)$$

Here T_{ij} is the bilateral trade flows (exports or imports) between country *i* and country *j*, G_i is the economic mass of country *i*, G_j is the economic mass of country *j*, D_{ij} is the geographical distance between the capitals of country *i* and country *j*, and E_{ij} is the error term. The model is augmented with different parameters and policy variables over time (for detail, see Anderson, 2011).

Rose (2000) applies the gravity model of international trade to observe the cross-country variation in international with different currency arrangements. In his study, he shows that the effect of a common currency is larger in magnitude than the elimination of exchange rate volatility but having separate currencies. The distinctive role of gravity approach in evaluating trade effects of regionalism was also supported by Greenaway and Milner (2002). In a similar model, Glick and Rose (2002) applied panel gravity approach to figure out the trade effect of a country after joining or leaving a currency union, rather than calculating the additional amount of trade made possible by common currency members. Instead, Nardis and Vicarelli (2003) investigate the commercial transactional impact of euro adoption among EMU members using a dynamic panel data approach. However, this study stick to static panel approach due to shorter span of observation period inherited within the model.

This study applies the panel gravity approach for estimating the trade enhancement factor of Euro members following the implementation of Euro. The model is as follows:

$$\ln trade_{12t} = \alpha + \beta_1 \ln gdp_1 + \beta_2 \ln gdp_2 + \beta_3 \ln dist_{12} + \beta_4 cu_t + \beta_5 clb_{12} + \beta_6 cl_{12} + \varepsilon_{12t}$$

.. .. (14)

Here, $trade_{12t}$ is the trade variable between country *1* (reporting country) and country *2* (partner country) at time *t* while gdp_{1t} (gdp_{2t}) is a measure of income of country *1*(*2*) at time *t*. $dist_{12}$ is the distance between countries *1* and *2*, α is constant, β (i =1,...,6) are parameters of the equation, and ε_{12t} is a white noise disturbance term. All variables are in logs, meaning the estimated coefficients are interpreted as elasticity. cu_t is a currency union dummy variable. The variable takes on the value of 1 to show the implementation of currency union and 0 otherwise. Clb_{12} is the common land border dummy which is 1 if two countries share the border and 0 otherwise. Cl_{12} is the common language dummy, which is 1 if people of two countries talk in same language and 0 otherwise. The coefficients of standard variables are expected to be as $\beta_1 > 0$, $\beta_2 > 0$ and $\beta_3 < 0$.

Table 4 presents the results of gravity estimation. Estimates for fixed effect estimators and random effect estimators are presented in Column 1 and 2 respectively. The Hausman test supports the FE estimators, indicating to the existence of correlation between the error terms and the regressors (for detail, see Hausman, 1978). Similarly, the serial correlation test rejects the null hypothesis that there is no serial correlation (Drukker, 2003). Results are verified using Hausman-Taylor Model (HTM) and AR (1) FE model (for detail, see Egger, 2002; Hausman and Taylor, 1981). Results for HTM are presented in Column 3 and AR (1) FE model are presented in Column 4.

As the variables are measured in natural logarithms, the estimated coefficients represent elasticity, *i.e*. the coefficients can be interpreted as the percentage change in trade due to a one unit change in each variable. The estimation estimates for the Fixed effect and Random effect variables are found to be generally statistically significant and with the expected sign, though the common language effect is insignificant. The model's ability to explain ASEAN export is moderate except for intra-ASEAN exports, which is remarkably low. A low R^2

value suggests that there is either substantial random disturbance in the country's exports or that omitted variables have substantial influence. The HTM estimates presented in Column 3 and the AR (1) FE estimates presented in Column 3 does not vary much from the Fixed Effect estimates.

Table 4: Estimates from the Panel Gravity Model

	Fixed Effects (1)	Random Effects (2)	Hausman-Taylor Model (HTM) (3)	FE Estimation with AR (1) Disturbance (4)
gdp1	0.525***	0.5791***	0.525***	0.573***
	(0.042)	(0.035)	(0.042)	(0.054)
gdp2	0.453***	0.425***	0.453***	0.368***
	(0.039)	(0.033)	(0.039)	(0.051)
dist	0 (omitted)	-1.258***	-1.273***	0 (omitted)
		(0.223)	(0.263)	
cu	0.215***	0.205***	0.215***	0.171***
	(0.021)	(0.021)	(0.021)	(0.022)
clb	0 (omitted)	0.583*	0.586	0 (omitted)
		(0.307)	(0.361)	
cl	0 (omitted)	0.322	0.225	0 (omitted)
		(0.650)	(0.766)	
_cons	-4.239***	4.477***	4.909**	-3.720***
	(0.344)	(1.704)	(1.989)	(0.239)
Hausman test preference	FE (Prob>chi2 = 0.0374)			
R-sq	0.751	0.843		0.739
No. of observation	1035	1035	1035	1035
F (all coefficient)/ Wald χ^2	1385.21***	4365.77***	4260.98**	637.78***
Serial Correlation Test	Prob > F = 0.0000			

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

Our particular focus for the study goes to β_4, which reflects the trade elasticity caused by a regional common currency implementation. All four models find Euro to have significant effect on intra-regional trade among Euro members; however, the effect estimated by the AR (1) FE model is relatively low compare

to that of other 3 models. Following Rose (2000), impact of Euro on intra-regional trade between the initial Euro members is $e^{0.215}$ or 1.24 for FE and HT model, $e^{0.205}$ or 1.228 for RE model and $e^{0.171}$ or 1.186 for AR (1) FE model. Thus the gravity estimation captures about 18 to 23 per cent intra-regional trade enhancement by the initial Euro members following implementation of Euro. The result is lower compare to the calculated result of the event study method (which was 34 per cent).

5.1 Trade Enhancement for ASEAN using Gravity Coefficient

Now, we forecast the potential intra-ASEAN trade enhancement by applying the gravity panel estimated trade enhancement factor to Equation 13. Similar calculation was performed in Section 4.3; however, the trade enhancement factor was calculated using the benchmark analysis of Event Study model instead of the Gravity model.

Table 4: Calculation of possible ASEAN trade enhancement from a Currency Union using the Gravity estimates

Estimated Model	"CU" coefficient (A)	Estimated trade impact: $e^{(A)}$ (B)	ASEAN Cumulative Average Trade Intensity (CATI) (C)	Estimated ASEAN CATI for post-ACU (Asian Currency Unit) (D = B*C)	Possible Trade Enhancement (E = D - C)
FE/ HTM	0.215	1.240	0.606	0.751	0.145
RE	0.205	1.228	0.606	0.744	0.138
AR (1) FE	0.171	1.186	0.606	0.719	0.113

Table 4 presents the results for calculation of possible ASEAN trade enhancement by implementing Asian Currency Unit (ACU). The Gravity estimates are used for this calculation. Column (A) presents the estimated coefficients of common currency implementation, results are presented for Fixed effect model, Hausman-Taylor model, Random effect model and FE Estimation with AR (1) Disturbances. Column (B) presents the estimated trade impacts, which are calculated as exponential of the estimated coefficients presented in Column (A).[8] Estimated trade impact is 1.24 for both Fixed effect method and

[8] For detail of the process, please see Rose (2000)

Hausman-Taylor method, thus implying that Euro has increased 24 percent of intra-Euro land trade during 2000-2010, following the implementation of Euro. The result of estimated trade impact is 1.228 for Random effect method, indicating to about 23 percent increase of intra-Euro land trade during 2000-2010; and is 1.22 for AR (1) Disturbances method, indicating to 22 percent increase of intra-Euro land trade during the same period. Interestingly, the calculated result of estimated trade impact using the benchmark analysis of Event Study model indicates 34 per cent increase of intra-Euro land trade during 2000-2010. Clearly, Event Study Approach overestimates the benchmark impact compare to the Gravity approach.

Column C to Column E presents the calculation of the possible ASEAN trade enhancement from a currency union. In Column C, the cumulative average trade intensity (CATI) of the ASEAN members from 2001 to 2010 which is calculated in Section 4.3. The calculated CATI is 0.6057, suggesting that on average, 61 cents of trade occurs between ASEAN members for every dollar of their GDP from 2001 to 2010. If hypothetically Asian Currency Unit is adopted in the year 2012, and ASEAN members achieve a trade enhancement factor equal to that of the EU by accepting Asian Currency Unit, the cumulative average trade intensity (CATI) in the post-currency union period appears to be 0.751 according to the Fixed effect method and the Hausman-Taylor method. This result suggests that on average, 75 cents of trade would occur between ASEAN members for every dollar of their GDP in the post-currency union period. This result is presented in Column D.

From the difference between the pre-event and the post-event cumulative average trade intensities, trade enhancement is calculated as 0.145, suggesting that the Asian Currency Unit would enhance ASEAN intra-regional trade by about 14.5 cents for every dollar of their GDP. This result is presented in Column E. With similar calculation, intra-ASEAN trade enhancement due to Asian Currency Unit is calculated as 0.138 using the Random effect estimated coefficient and as 0.113 using the AR (1) Disturbances method estimated

coefficient. Results for these calculations are presented in Column C, D and E respectively.

Clearly a common currency would create additional intra-ASEAN trade; this study establishes the argument by applying two different approaches. The first approach entirely involves Event Study method to analyse the Euro benchmark in calculating the trade enhancement effect of a currency union, then forecasting the intra-ASEAN trade enhancement by applying the benchmark factor. This approach discovers the intra-ASEAN trade benefit of Asian Currency Unit to be 21 per cent of ASEAN GDP, provided their level of regional integration is similar to that of the EU. The second approach uses Gravity model of trade to analyse the Euro benchmark, then uses Event Study method for applying the benchmark factor and forecasting the intra-ASEAN trade enhancement. This approach discovers the intra-ASEAN trade benefit of Asian Currency Unit to be 11 to 14 per cent of ASEAN GDP, depending on the estimation method of coefficients. If the cost for achieving the required level of economic convergence among the ASEAN members is more than 10 per cent of their combined GDP, net intra-regional trade benefit of Asian Currency Unit for the ASEAN members will remain low. Tough Lee and Koh (2012) suggests for ASEAN monetary union (instead of East Asia wide currency union) considering increased symmetry of regional shocks, quantification of the cost for required level of ASEAN macroeconomic convergence is missing in literature.

6. Conclusion

This study develops a new trade forecasting model and applies it to investigate the possible intra-ASEAN trade benefit of the Asian Currency Unit. To do this, the event study approach has been applied in trade analysis, and the European Union is assumed as a benchmark. Most of the previous studies employ the event study approach to analyse the impact of different events related to corporate finance issues. Instead, this study presumes the currency union as an event, and measures the possible trade impact that would occur due to this event. The model has been extended with two parts, one is the benchmark analysis tool for

analysing a selected benchmark, and the other is the forecasting tool to forecast outcome of a future event by applying the estimated benchmark. The results for the benchmark analysis are verified by using traditional gravity approach of trade.

The study observes a substantial level of difference between the European Union and ASEAN in the pattern of movement of their trade intensities, though the intensities of ASEAN members are higher in magnitude than those of the EU. In spite of notable heterogeneity in the movement of trade intensities among the members, the Asian Currency Unit is expected to provide about 21 cents of intra-ASEAN trade benefit for every dollar of their GDP. The gravity approach of benchmark analysis, however, observes the estimated trade benefit between 11 to 14 per cent of ASAEN GDP. Thus the benchmark analysis tool of Event study method shows tendency to overestimate. Instead, the forecasting tool of the model can be used is future research for estimating possible outcome of a future economic event, i.e. currency union, economic integration, trade agreement.

The study has important policy implication for ASEAN leaders. The estimated amount of intra-ASEAN trade benefit is possible from a currency union provided ASEAN members achieve a similar level of regional integration as in the EU for getting desired benefit of Asian Currency Unit. However, the level of macroeconomic heterogeneity is still substantial among ASEAN members (Yeh, 2013). The cost of the correction process of the existing asymmetry and heterogeneity must not offset the estimated trade benefit. Or else, the proposed ACU cannot offer much benefit to ASEAN members at least in terms of intra-regional trade.

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