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Review Paper

ASEAN4 prospective of export-led economic growth

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This paper validates the evidence of Export-Led-Growth Hypothesis through a modified Cobb Douglas production model towards the selected developing of Association of South East Asian Nations (ASEAN4) namely Malaysia, Indonesia, Philippines and Thailand. The motivation of this study is derived from the successfull implemention of agreement on the Common Effective Preferential Tariff (CEPT) scheme for the ASEAN Free Trade Area (AFTA) that aims to reduce tariff and non tariff barrier for the trade activities among ASEAN member countries.With the reduction of tarrif, the amount of export for ASEAN4 countries has progressed further. This paper formulates a dynamic econometric model for real gross domestic product (GDP), export (X), import (M), capital (CP), labor (LL) and exchange rates (EXR) besides employing recent time-series econometric techniques known as Bound test or ARDL approach. The findings reveal that the Export-Led-Growth Hypothesis has contributed significantly to the four countries tested in the long run. Nevertheless, the evidence of the importance for capital and labor was varried for the countries tested. Besides the estimated coefficients of the variables used in this paper such as exchange rate (EXR), Asian Financial Crisis 1997-1998 (DUM1) and Global Recession 2007-2008 (DUM2) also differ across the tested countries.

Keywords: ARDL, export led growth, CEPT, ASEAN4

INTRODUCTION

The idea of export expansion as a major determinant of economic growth has seen a recurrance of interest by many policy makers especially from developing countries.This idea has gained further attention as a result of the spectacular economic success by several East Asian countries. The Export Led Growth Hyphothesis (ELGH) postulates that export expansion is one of the main determinants of growth. It holds that the overall growth of countries can be generated not only by increasing the amounts of labor and capital within the economy, but also by expanding exports. According to its advocates, exports can perform as an “engine of growth” (Medina-Smith, 2001). Besides, the failure of import substitution (IS) strategy that had been adopted by developing countries has sparked the interest of the nation policy makers to consider export activities as a path to industrialization and instrument that are useful in boosting economic growth (Krugman and Obstfled, 2006). During the past 30 years, in accordance with export promotion strategy, ELGH is among the interesting studies conducted by many researchers especially in, numerious empirical studies of causation of exports. Studies on economic growth have been conducted on the economies of developing countries using either cross-section or time serries analysis.Nevertheless, the empirical evidence has been rather mixed. While some studies support a causal linkage between export and economic growth (Ghatak et al., 1997; Rahman and Mustafa, 1997; Mah, 2005), others failed to support the existence of a significant relationship between the two variables (Edwards, 1993; Shan et al., 1998; Richards, 2001). The more recent studies found out that there exist nonlinearity relationship between export and growth (Awokuse, 2008; Lim et al., 2010).

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Table 1: Summary of CEPT Acceleration

	The first six members		Vietnam	Laos& Myanmar	Cambodia
	Fast Track	**Normal Track**			
Original Plan (1992)	2003*	2008**			
AEM Meeting (1994)	2000	2003	2006	2008	
Bold Measures (1998)	2000	2002	2003	2005	2010
Zero Tariff Rate (1999)	2010			2015	

Note: ** for tariffs over 20 per cent; Source: ASEAN website

Meanwhile, ASEAN was established on the 8th August 1967 in Bangkok, Thailand, with the signing of the Bangkok Declaration. The ASEAN nations came together with three main objectives in mind: to promote the economic, social and cultural development of the region through cooperative programs; to safeguard the political and economic stability of the region against big power rivalry; and to serve as a forum for the resolution of intra-regional differences. ASEAN now comprises ten member countries: Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand and Viet Nam. The ASEAN Free Trade Area (AFTA) was established in January 1992 to eliminate the tariff barriers among the Southeast Asian countries with a view to integrate the ASEAN economies into a single production base and create regional market. In January 1992, ASEAN economic cooperation took a significant step forward as the ASEAN heads of government signed the Framework Agreement on enhancing ASEAN Economic Cooperation, which provided the basis for the establishment of the ASEAN Free Trade Area and Economic Cooperation. The AFTA Agreement is to phase down intra-regional tariffs to 0-5 per cent, initially over a period of 15 years starting 1st January 1993. The Agreement on the Common Effective Preferential Tariff (CEPT) scheme for the ASEAN Free Trade Area requires that tariff levied on a wide range products traded within the region reduced to no more than five per cent. Quantitative restrictions and other non-tariff barriers are also to be eliminated. Under the CEPT scheme, each ASEAN member country must independently allocate goods that are subjected to tariffs to one of four lists. The names of the lists are: Inclusion List (IL), Temporary Exclusion List (TEL), Sensitive List (SL) and General Exception List (GEL). The schedules for tariff rate reductions are also determined by the nature of the goods; manufactured and processed agricultural products are subject to earlier rate reductions, not the non the-processed agricultural products.

In this respect, this study is focusing on four major economies in ASEAN countries including Malaysia, Indonesia, Thailand and Singapore also known as ASEAN4. Although ASEAN4 have differences in various factors such as size, resources and economic development, they are linked by some common factors. ASEAN4 is excersing market based economies and relying heavily with export. AFTA is developed in order to integrate economy by promoting export among partner countries. AFTA4 has benefited coutries by cost reduction on duties, seeking priority on services and trade facilitation and encouraging support in terms of technical cooperation.It is hope from AFTA, these countries will participate in activities of exporting business.

The objectives

Given the significance of export towards the countries' growth, the main purpose of this study is to examine individually the validity of ELGH on Malaysia, Thailand, Indonesia and Philippines (ASEAN4) as the result of the implementation of the CEPT scheme. Studying the validity of this theory is important for the ASEAN4 countries because it will help the policymakers of the country to make and implement strategic planning in regards to their export promtion activities in order to regard the country's economic growth.

Table 1 shows that when Vietnam, Laos PDR, and Myanmar joined ASEAN, separate CEPT datelines were set for them in view of their economic structures. However, in the wake of the Asian financial crisis in 1997, the original 6 countries agreed to advance the implementation of the AFTA schedule by one year from 2003 to 2002. The IL contains goods on which each country agrees to reduce tariff rates within ten years to 0-5%. The IL is also subdivided into two tracks, the Fast Track and the Normal Track. Under the Fast Track, tariff rates above 20 per cent are scheduled to be reduced to 0-5 per cent by 1st January 2003 while tariff rates below 20 per cent are scheduled to be reduced to 0-5 per cent.

Table 2 shows the share value of export of the main ASEAN4 countries with the percentage based on world export of goods and services from 1980 to 2010. Indonesia for example received an export value of US$ 2.6 billion in earlier 1980 which is the highest compared to the other ASEAN4 countries followed by Malaysia, Thailand and Philippines. The export activity in the original ASEAN4 countries has increased tremendously over time since most of the countries has managed to reduce their tariff between 0 to 5% as planned by

Table 2: Export of Goods and Services for ASEAN4 (US Million)

Year	PLP (Philippines)	% world	THD (Thailand)	% world	MYS (Malaysia)	% world	IND (Indonesia)	% world
1980	7235	0.30	7939	0.33	14098	0.59	26664	1.12
1985	6864	0.30	9100	0.39	17185	0.74	19389	0.84
1990	11430	0.26	29230	0.68	32665	0.76	28982	0.68
1995	26948	0.42	70292	1.11	83369	1.31	53185	0.84
2000	40724	0.51	81762	1.03	112370	1.42	67621	0.85
2005	44788	0.35	129261	1.00	161384	1.25	99922	0.77
2010	64843	0.34	227908	1.20	231714	1.22	174840	0.92

Sources: UNCTAD and IMF

Common Effective Preferential Tariff agrement (CEPT scheme) in ASEAN and the increase in trading activity with WTO member countries. Based on the range of data given, there were at least two major shocks occurred that affect the export level in ASEAN region namely Asian Financial crisis 1997-1998 and Global Financial Crisis 2008-2009. In order to protect the economy from badly hurt due to this recessions, ASEAN countries especially Malaysia and Thailand are implementing diversification policy to enrich their economy by exploring various economic sectors.

Nevertheless, previous studies found mix evidence export led growth hypothesis for most countries tested. Given the ambiguity of the results of previous studies, this study is useful in order to further research on ELGH evidence for the country tested. In this paper, we follow the linearity relationship between export and growth for ASEAN4 countries. Although the nonlinearity relationship is more concreate, but in the case of ASEAN countries where most of their countries depending on export as the main driver of growth, we believed that the export is the one that causes growth for these nation. Besides, this paper able to fill in the literature gap in terms of more advance technique applications named as Bound test as well as more recent time serries data range from 1980 to 2011.

Empirical studies review

The degree to which export brings about growth in an economy has been debated in the literature. Some past empirical studies have reported a significant and positive relationship between export and growth, others documented growth-led exports and still others have given an account of no significant relatonship between export and economic growth. In this part, we will discuss few studies done by researchers in their research in selected ASEAN countries. Ekanayake (1999) analyzed for a causal relationship between GDP and exports in eight developing Asian countries using annual data from 1960 to 1967. He tested for unit roots in the series with ADF test, followed by Johansan Juselius and causality test. The author found that in Indonesia, a bidirectional causality between economic growth and export occured in both short run and the long run. This result is contradicted with the study done by Rahman and Mustafa (1997) that stated Indonesia experienced unidirectional causality from growth to exports both in short run and long run. In Malaysia, Khalafalla and Webb (2001) examine the relationships between exports and economic growth in Malaysia using quaterly data from first quater of 1965 until fourth quater of 1996. By using cointegration and Granger causality test, they found that ELGH was valid for both full sample and import substitution period. This evidence of ELGH for Malaysia is also similar from study conducted by Keong et al. (2003). The authors examined the relationship between exports and growth by using two-stage least squares technique and found that the ELGH is valid for Malaysian economy. In other studies, Reinhardt (2000) and Mahadevan (2007) have similar opinion with orthodox school that supports export led growth hypotheses in Malaysia. Zulkornain et. al (2005) applied a more comprehensive sample period (1960-2001) and bound testing approach in examining the relationship between growth and exports for Malaysia. It is found that cointegration relationship exists between exports and economic growth in long run which is accordance to Ghatak and Price (1997). The results of ARDL indicates exports and labour force have positive impact on economic growth while imports, exchange rate and the proxy of the financial crisis, have negative influence on growth.Vohra (2001) find that exports have a positive and significant impact on economic growth by using data from 1973-1993 of India, Pakistan, Philiphines, Malaysia and Thailand. The results indicate that it is important to pursue liberal and free market policy in Malaysia, Philiphines and Thailand. Empirical evidence on Thailand tends to reject the ELGH but the more recent studies show that the theory is valid (Jiranyakul, 2011).

In the case of the Philippines, empirical results on the studies of the ELGH are also mixed, but some literature cited that exports have been the major engine of economic growth in the Philippines. For example, Ahmad et al. (1997) found out that there is an evidence of causality running from the output to economic growth for Philippines. The author examined the cointegration and causality between exports and economic growth of the five members of the ASEAN countries from 1987-1993.More recent studies of ELGH done by Shiok and Chong (2013) in ASEAN5 countries by using nonparametric approach reveal that the causal effect of export and GDP is in the nonlinear form in the case of Thailand and Philippines.

Based on previous findings that have been discussed, different methodologies, selection of variables and period of time undertaken with different countries had yield different results of research. Due to this situation, there is a need to reinvestiagate export led growth hypothesis (ELGH) in ASEAN4 countries and we will adopt Bound testing approach not only for estimating the long run relationship between exports and economic growth but also to explore the relationship between labor (LL), capital (CP), exchange rate (EXR) and import (M) on economic growth for ASEAN4.

METHODOLOGY

Based on standard Cobb Douglas production function which consist of labor (LL) and capital (CP), we introduce few additional variables such as export (X), import (M), and exchange rate (EXR) as one of the determining variables for output growth (GDP) for ASEAN4 countries. The selection of the variables mentioned above also followed the previous work done by Choong et al. (2005). In this paper, gross domestic product is represented by the production function as below:

$$GDP_{it} = f(CP_{it} , LL_{it} , X_{it} , M_{it} , EXR_{it}) \text{ ---------- (1)}$$

where at period t and country I, GDP refer to gross domestic product, LL is labor, CP is capital, E is export, M is import and EXR is exchange rate between Malaysia and US end of period. To test the stationarity of each variable, we use the log form of the variables. Log transformation can reduce the problem of heteroscedasticity because it compresses the scale in which the variables are measured, thereby reducing a tenfold difference between two values to twofold difference (Gujarati, 1995). The new model will be as follows:

$$LnGDP = \alpha_0 + \beta 1LnX_{it} + \beta 2LnM_{it} + \beta 3LnCP_{it} + \beta 4LnLL_{it} + \beta 5LnEXR_{it} + v_{it} + u_{it} \text{ ---------- (2)}$$

where LnGDP is log form for gross domestic product, LnX is log form for export, LnM is log form for import, LnCP is the log for capital LnLL is the log form of labor and LnEXR is log form for exchange rates.

In this study, the short and long-run dynamic relationships between economic growth and FDI are estimated by using the newly proposed ARDL bound testing approach which was initially introduced by Pesaran et al. (1996). The ARDL has numerous advantages. Firstly, unlike the most widely method used for testing cointegration, the ARDL approach can be applied regardless of the stationarity properties of the variables in the samples and allows for inferences on long-run estimates, which is not possible under the alternative cointegration procedures. In other words, this procedure can be applied irrespective of whether the series are I(0), I(1), or fractionally integrated (Pesaran and Pesaran 1997); and Bahmani-Oskooee and Ng, 2002), thus avoids problems resulting from non-stationary time series data (Laurenceson and Chai, 2003). Secondly, the ARDL model takes sufficient numbers of lags to capture the data generating process in a general-to-specific modelling framework (Laurenceson and Chai, 2003). It estimates $(p+1)^k$ number of regressions in order to obtain optimal lag-length for each variables, where p is the maximum lag to be used, k is the number of variables in the equation. Finally, the ARDL approach provides robust results for a smaller sample size of cointegration analysis. Since the sample size of our study is 32, this provides more motivation for the study to adopt this model.

Model of growth for ASEAN4

Let the long run relationship between the six variables in log linear form be given as follows:

$$LNGDPt = \alpha + \beta 1LNCAPt\text{-}1 + \beta 2LNLABt\text{-}1 + \beta 3LNXt\text{-}1 + \beta 4LNMt\text{-}1 + \beta 5LnEXRt\text{-}1 + \varepsilon \text{ ----------(3)}$$

(Long Run Estimates)

Equation 4 basically incorpates the short run dynamics into the adjustment process.

$$\Delta LNGDP_t = \alpha + \sum_{i=1}^{v} \sigma_i \Delta LNGDP_{t\text{-}i} + \sum_{i=0}^{s} \beta_i \Delta LNCAP_{t\text{-}i} + \sum_{i=0}^{r} \epsilon_i \Delta LNLAB_{t\text{-}i} + \sum_{i=0}^{q} \in_i \Delta LNX_{t\text{-}i} + \sum_{i=0}^{t} \theta_i \Delta LNM_{t\text{-}i} + \sum_{i=0}^{w} \pi_i \Delta LNEXR_{t\text{-}i} + \gamma_1 DUM1 + \gamma_1 DUM2 + d\varepsilon_{t\text{-}i} + u_t \text{-------(4)}$$

(Short Run Estimates)

Finally, we transform the model into Bound testing approach.

$$\Delta LNGDP_t = \alpha + \beta_0 LNGDP_{t\text{-}1} + \beta_1 LNCAP_{t\text{-}1} + \beta_2 LNLAB_{t\text{-}1} + \beta_3 LNX_{t\text{-}1} + \beta_4 LNM_{t\text{-}1} + \beta_5 LNEXR_{t\text{-}1} + \sum_{i=1}^{v} \sigma_i \Delta LNGDP_{t\text{-}i} + \sum_{j=0}^{s} \beta_j \Delta LNCAP_{t\text{-}j} + \sum_{k=0}^{r} \epsilon_k \Delta LNLAB_{t\text{-}k} + \sum_{l=0}^{q} \in_l \Delta LNX_{t\text{-}l} + \sum_{m=0}^{t} \theta_m \Delta LNM_{t\text{-}m} + \sum_{n=0}^{w} \pi_n \Delta LNEXR_{t\text{-}n} + \gamma_1 DUM1 + \gamma_1 DUM2 + u_t \text{ ---------- (5)}$$

where Δ is the first-difference operator, u_t is a white-noise disturbance term and all variables are expressed in natural logarithms with the symbol of Ln. The above final model also can be viewed as an ARDL of order, (v s r q t w). The model indicates that economic growth in terms of real GDP (GDP) per capita tends to be influenced and explained by its past values besides the other explanatory variables such as export (X), import (M), capital (CP), exchange rate (EXR) and labor (LL). For the final model, we also captured the two major crises that occurred from the past 30 years by using dummy variables. DUM1 is the proxy for Asian Financial crisis 1997-1998 while DUM2 is the proxy for Global Financial Crisis 2007-2008.

The structural lags are determined by using minimum Schwarz Bayesian criterion (SIC) due to small sample size. From the estimation of UECMs, the long-run elasticities are the coefficients of the one lagged explanatory variable (multiplied by a negative sign) divided by the coefficient of the one lagged dependent variable (Bardsen, 1989). For example based on the final model above, the long-run GDP, X, M, CP, LL and EXR elasticities are (β_1 / β_0), (β_2 / β_0), (β_3 / β_0), (β_4 / β_0), and (β_5 / β_0) respectively. The short-run effects are captured by the coefficients of the first-differenced variables. After regression of Equation (5), the Wald test (F-statistic) was computed to differentiate the long-run relationship between the concerned variables. The Wald test can be carried out by imposing restrictions on the estimated long-run coefficients of economic growth, export, import, capital, labor and exchange rate.

The null and alternative hypotheses are as follows:

- H_0 : $\beta_0 = \beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = 0$ (no long-run relationship)
- Against the alternative hypothesis
- H_1 : $\beta_0 \neq \beta_1 \neq \beta_2 \neq \beta_3 \neq \beta_4 \neq \beta_5 \neq 0$ (a long-run relationship exists)

For a small sample size study ranging from 30 to 80 observations, Narayan (2004) has tabulated two sets of appropriate critical values. One set assumes all variables are I(1) and another assumes that they are all I(0). This provides a bound covering all possible classifications of the variables into I(1) and I(0) or even fractionally integrated. If the F-statistic falls below the bound level, the null hypothesis cannot be rejected. On the other hand, if the F-statistic lies exceed upper bound level, the null hypothesis is rejected, which indicated the existence of cointegration. If however, it falls within the band, the result is inconclusive.

The main aim of this model is to verify individually the export led growth evidence for ASEAN4 countries by detecting the positive relationship between export and growth. Furthermore, the model will also test if labor and capital are positively associated with level of growth while the import and exchange rates are negatively correlated with the GDP.

Sources of data

The data used in this research paper includes real GDP, real exports, real imports, capital, labor force and exchange rate series (GDP, X, M, CP, LL and EXR) are collected from various sources such as International Financial Statistical Database from International Monetary Fund (IMF), World Development Indicators and Global Development Finance 2011 from World Bank and UNCTADSTAT database from United Nations Conference on Trade and Development (UNCTAD) that can be accessed freely from the internet. The sample data used is annual data starting from 1980 up to 2011, comprising 32 years which included several important events such as the period of the Asian financial crisis erupted from 1997 to 1998, and global recession period from 2007 to 2008. All of the dependent and explanatory variables, except for labor, were deflated by the consumer price index (CPI), whereby the year 1995 was treated as the base year (1995 = 100). Furthermore, all of the series were transformed into log form. Log transformation can reduce the problem of heteroskedasticity because it compresses the scale in which the variables are measured, thereby reducing a tenfold difference between two values to a twofold difference (Gujarati,1995).

RESULTS AND ANALYSIS

The analysis begins with testing the unit root for all variables used in this study. Unit root test such as Dickey-Fuller/augmented Dickey-Fuller (ADF) and the Phillip Perron (PP) test are applied to determine the order of integration of the variables. These tests are performed by using Eview8. Table 3 below represents the result of the unit root test. Based on DF and ADF, we found out most of the country's variables are not stationary at I (0) at level for both no trend and with trend except for Malaysia and Thailand labor force (LAB) where it is stationary at I (0) at level with trend with 10% and 1% significant level respectively. Besides, Philippine's exchange rate (EXR) and Indonesia's import (M) is also found to be significant at 10% level.

Detecting long run relationship

Before we proceed with ARDL testing, we first tested for the existence of long run relationship between the dependent variable and independent variables by using Microfit 4.1. Tables 4 below illustrates the result of F-statistics by setting the lag order equal to 2. The critical value is based on restricted intercept with no trend as suggested by Narayan (2004). We used Narayan critical value table because our data comprised 32 years of

Table 3: Results of Unit Root tests

Model		Variable	ADF test statistic		PP test statistic	
			Intercept	Trend and intercept	Intercept	Trend and intercept
Malaysia	**Level**	LNGDP	-0.904 (0)	-1.548 (0)	-0.961 (2)	-1.636 (3)
		LNCAP	-1.355 (0)	-1.850 (0)	-5.124 (0)***	-5.051 (0)***
		LNLAB	0.560 (0)	-3.450 (0)*	-4.714 (0)***	-4.693 (0)***
		LNX	-0.929 (0)	-0.710 (0)	-0.898 (2)	-0.710 (0)
		LNM	-0.978 (0)	-0.950 (0)	-0.978 (0)	-1.191 (1)
		LNEXR	-1.696 (0)	-1.736 (0)	-1.667 (2)	-1.736 (0)
	First difference	LNGDP	-6.367 (0)***	-6.376 (0)***	-6.342 (2)***	-6.355 (2)***
		LNCAP	-5.124 (0)***	-5.051 (0)***	-5.121 (2)***	-5.048 (2)***
		LNLAB	-4.714 (0)***	-4.693 (0)***	-4.714 (0)***	-4.650 (1)***
		LNX	-4.669 (0)***	-4.828 (0)***	-4.653 (3)***	-4.830 (6)***
		LNM	-4.068 (0)***	-4.047 (0)**	-4.089 (2)***	-4.065 (2)**
		LNEXR	-5.939 (0)***	-6.020 (0)***	-5.964 (3)***	-6.097 (4)***
Indonesia	**Level**	LNGDP	-0.525 (0)	-2.019 (1)	-0.961 (2)	-1.636 (3)
		LNCAP	-1.348 (1)	-2.142 (1)	-1.355 (0)	-1.945 (1)
		LNLAB	-2.087 (1)	-1.279 (0)	0.503 (2)	-3.524 (4)*
		LNX	-0.303 (0)	-2.742 (0)	-0.898 (2)	-0.710 (0)
		LNM	-0.329 (2)	-3.365 (0)*	-0.978 (0)	-1.191 (1)
		LNEXR	-1.511 (0)	-1.175 (0)	-1.667 (2)	-1.736 (0)
	First difference	LNGDP	-4.187 (0)***	-4.096 (0)**	-6.342 (2)***	-6.355 (2)***
		LNCAP	-4.001 (0)***	-3.927 (0)**	-5.121 (2)***	-5.048 (2)***
		LNLAB	-5.794 (0)***	-6.354 (0)***	-4.714 (0)***	-4.650 (1)***
		LNX	-7.139 (0)***	-7.011 (0)***	-4.653 (3)***	-4.830 (6)***
		LNM	-7.947 (0)***	-5.453 (1)***	-4.089 (2)***	-4.065 (2)**
		LNEXR	-4.599 (0)***	-4.789 (0)***	-5.964 (3)***	-6.097 (4)***
Thailand	**Level**	LNGDP	-2.238 (0)	-0.635 (0)	-1.877 (2)	-0.965 (2)
		LNCAP	-1.722 (0)	-1.625 (0)	-1.722 (0)	-1.762 (1)
		LNLAB	-21.032 (0)***	-6.063 (6)***	-12.294 (4)***	-32.591 (4)***
		LNX	-1.532 (0)	-0.395 (0)	-1.385 (3)	-0.697 (3)
		LNM	-0.878 (0)	-1.375 (0)	-0.872 (2)	-1.488 (1)
		LNEXR	-2.068 (0)	-2.190 (0)	-1.960 (2)	-2.179 (3)
	First difference	LNGDP	-3.054 (0)**	-3.426 (0)*	-3.012 (4)**	-3.351 (11)*
		LNCAP	-4.396 (0)***	-4.386 (0)***	-4.404 (1)***	-4.369 (2)***
		LNLAB	-145.74 (0)***	-147.54 (0)***	-100.518 (4)***	-111.990 (4)***
		LNX	-4.494 (0)***	-4.744 (0)***	-4.592 (3)***	-4.735 (2)***
		LNM	-4.945 (0)***	-4.915 (0)***	-4.947 (1)***	-4.907 (2)***
		LNEXR	-7.081 (0)***	-7.102 (0)***	-7.136 (1)***	-7.102 (0)***
Philippines	**Level**	LNGDP	3.659 (5)	-1.217 (5)	2.830 (7)	-1.479 (18)
		LNCAP	-0.703 (0)	-3.699 (1)**	-0.721 (4)	-1.802 (10)
		LNLAB	-1.491 (0)	-1.776 (0)	-3.441 (13)**	-1.579 (4)
		LNX	-2.469 (0)	0.235 (0)	-2.469 (0)	0.713 (3)
		LNM	-2.260 (0)	0.265 (0)	-2.109 (2)	0.169 (1)
		LNEXR	-2.904 (0)*	-1.826 (0)	-4.738 (0)***	-5.490 (0)***
	First difference	LNGDP	-3.155 (0)**	-6.986 (4)***	-3.012 (4)**	-3.351 (11)*
		LNCAP	-4.057 (0)***	-4.128 (0)**	-3.870 (8)***	-4.058 (10)**
		LNLAB	-5.702 (0)***	-5.955 (0)***	-5.718 (3)***	-10.220 (14)***
		LNX	-4.563 (0)***	-5.544 (0)***	-4.648 (3)***	-5.548 (1)***
		LNM	-4.011 (0)***	-4.761 (0)***	-4.072 (3)***	-4.751 (1)***
		LNEXR	-3.043 (2)*	-1.778 (2)	-4.737 (1)***	-5.490 (0)***

Note: 1. ***, ** and * are 1%, 5% and 10% of significant levels, respectively. 2. The optimal lag length is selected automatically using the Schwarz information criteria for ADF test and the bandwidth had been selected by using the Newey–West method for the PP test. 3. Number in parentheses is standard errors

Table 4: Results of ARDL tests for co-integration

Model	maximum lag	SIC (Lag order)	F Statistic
Malaysia	2	(2,0,1,0,0,1)	7.523***
Indonesia	2	(1,1,0,0,2,2)	4.510**
Thailand	2	(1,1,1,0,1,0)	6.312***
Philippines	2	(2,2,2,2,0,1)	5.501**
Critical Values for *F*-statistics#		**Lower I(0)**	**Upper I(1)**
1%		3.976	5.691
k = 6	5%	2.794	4.148
10%		2.334	3.515

Note: # k is number of variables (IV), critical values for the bounds test: case III: unrestricted intercept and no trend based on Narayan (2004). *, **, and *** represent 10%, 5% and 1% level of significance, respectively.

observations and it is between the ranges of 30 to 80 as it was suggested by this author. Based on the result below, the computed F-statistics is found to be significant at 1% level for Malaysia and Thailand which larger than the critical value at I (1) which are 5.691 (restricted intercept with no trend). The evidence of long run relationship is also detected for Indonesia (4.510 > 4.148) and Philippines (5.501 > 4.148), as their F-statistic is larger than the critical value at 5% significant level. This implies that the null hypothesis of no cointegration cannot be accepted at the 5% significant level or better. This condition has proven the existence of long run relationship between the variables which indicated of a steady-state long run relationship among economic growth, exports, imports, labor capital, and real exchange rates. Therefore, the ECM version of the ARDL model is an efficient way in determining the long run relationship among the variables for all ASEAN4 countries tested.

Error correction model (Ecm) and long run coefficient estimates

After detecting the long run relationship, we estimated both ECM and long run model from equation (5) and the maximum order of lag chosen are 2 as suggested by Pesaran and Shin (1999) and Narayan (2004). The lag length that minimizes Schwarz Bayesian criterion is selected. Before we analyzed the results, it is important to check the robustness of the models by adopting several diagnostic tests such as Breusch-Godfrey serial correlation LM test, ARCH test, Jacque-Bera normality test and Ramsey RESET specification test. This test can be viewed from Table 5a and Table 5b. All the test for all countries used in this study reveal that the model has the desired econometric properties, namely, it has a correct functional form and the model's residuals are serially uncorrelated, normally distributed and homoscedastic given that the probability value of the t-test are all above than 10% significant value. Therefore, the result derived from this analysis is considered free from bias and fit to explain the objectives of this paper. Now let us investigate thoroughly the result of long run and short run for the countries tested one by one. We display the result by using two tables. Table 5a will reveal the result for Thailand and Philippines while Table 5b will reveal the results for Malaysia and Indonesia. The long run coefficients derived from this table is more superior compared to the long run coefficient or elasticities derived from E-views software. Meanwhile the dynamic short run causality among the variables tested are obtained by restricting the coefficient of the variables with its lags equal to zero by using the Wald test. If the null hypothesis of no causality is rejected, then we can conclude that selected variables used in this model (Granger) can cause the economic growth. Although we had included all the result in the table, our focus for the explanations will be the long run coefficient as it represents the relationship between the variable more concretely than the short run coefficient.

Thailand

The estimated coefficients of the long run relationship between economic growth (GDP) and export (X) and capital (CP) are significant at 1% while import (M) is significant at 5% level only. Exchange rate (EXR) and labor (LL) are found to be insignificant and therefore are not able to determine the level of real GDP of the country. Thailand's export (X) and capital (CP) are found to have a positive relationship with the GDP with estimated elasticities of 0.41, and 0.36 respectively. This shows that a 1% increase in export (X) and capital (CP) will result in 0.41%, and 0.36% increase in the country's GDP. The detection of positive relationship between X and GDP validate the idea of export led growth for Thailand and this result matched the finding of Jiranyakul (2011), who

Table 5a: Analysis of ECM and Long Run Model

Error Correction Model		Long Run Coefficient		Error Correction Model		Long Run Coefficient	
Thailand/ ARDL(1,0,1,1,0,1)				**Philippines/ ARDL(2,2,0,2,1,2)**			
Dependent variable: D(LGDP)	Coefficient (Standard Error)	Dependent variable: LGDP	Coefficient (Standard Error)	Dependent variable: D(LGDP)	Coefficient (Standard Error)	Dependent variable: LGDP	Coefficient (Standard Error)
Constant	**-3.932** (1.404)**	Constant	**-12.152** (4.196)	Constant	**-9.258** (1.255)	Constant	**-25.040** (2.213)
ECT_{t-1}	**-0.323** (0.084)***	LX	**0.419** (0.131)***	ECT_{t-1}	**-0.369** (0.038)***	LX	**0.362** (0.086)***
$D(LGDP)_{t-1}$		LM	**-0.265** (0.153)**	$D(LGDP)_{t-1}$	**0.436** (0.091)***	LM	**-0.254** (0.066)***
D(LX)	**0.200** (0.042)***	LCP	**0.376** (0.075)***	D(LX)	**0.212** (0.040)***	LCP	**0.416** (0.053)***
$D(LX)_{t-1}$		LEXR	**-0.054** (0.555)	$D(LX)_{t-1}$	**-0.130** (0.018)***	LEXR	**-0.228** (0.043)***
D(LM)	**-0.190** (0.042)***	LL	**0.021** (0.295)	D(LM)	**-0.316** (0.407)***	LL	**1.187** (0.214)***
$D(LM)_{t-1}$		DUM1	**-0.056**** (0.399)	$D(LM)_{t-1}$		DUM1	**-0.019** (0.018)
D(LCP)	**0.277** (0.032)***	DUM2	**-0.020** (0.033)	D(LCP)	**0.154** (0.026)***	DUM2	**-0.090** (0.026)***
$D(LCP)_{t-1}$				$D(LCP)_{t-1}$	**-0.061** (0.017)***		
D(LEXR)	**-0.017** (0.018)			D(LEXR)	**-0.008** (0.017)		
$D(LEXR)_{t-1}$				$D(LEXR)_{t-1}$			
D(LL)	**0.335** (0.175)*			D(LL)	**-0.013** (0.101)		
$D(LL)_{t-1}$				$D(LL)_{t-1}$	**-0.221** (0.842)		
DDUM1	**-0.018** (0.018)*			DDUM1	**-0.007** (0.007)		
DDUM2	**-0.006** (0.009)			DDUM2	**-0.033** (0.008)***		
Diagnostic Checking (LM Version)				**Diagnostic Checking (LM Version)**			
Serial Correlation[a]				Serial Correlation[a]			
0.506 (0.477)				0.154 (0.223)			
Functional Form[b]				Functional Form[b]			
0.005 (0.942)				1.487 (0.223)			
Normality[c]				Normality[c]			
0.062 (0.969)				1.251 (0.535)			
Heteroscedasticity				Heteroscedasticity			
1.369 (0.242)[d]				0.014 (0.903)[d]			

Note: Dependent variable is D(LGDP) or LGDP. (*),(**),(***) indicate significant at 10%,5% and 1% significant level respectively. [a] Langrange multiplier test of residual; [b]Ramsey's RESET test using the square of the fitted values; [c]Based on a test of skwness and kurtosis of residuals; [d]Based on the regression of squared residuals on squared fitted values

Table 5b: Analysis of ECM and Long Run Model

Error Correction Model		Long Run Coefficient		Error Correction Model		Long Run Coefficient	
Malaysia/ ARDL(2,0,0,0,1,1)				**Indonesia/ ARDL(1,0,2,1,2,0)**			
Dependent variable: D(LGDP)	Coefficient (Standard Error)	Dependent variable: LGDP	Coefficient (Standard Error)	Dependent variable: D(LGDP)	Coefficient (Standard Error)	Dependent variable: LGDP	Coefficient (Standard Error)
Constant	**-0.752** (1.110)	Constant	**-0.884** (1.297)	Constant	**-10.228** (4.350)	Constant	**-20.679** (5.696)
ECT_{t-1}	**-0.850** (0.067)***	LX	**0.344** (0.079)***	ECT_{t-1}	**-0.494** (0.178)**	LX	**0.378** (0.149)**
$D(LGDP)_{t-1}$	**-0.126** (0.053)**	LM	**-0.137** (0.089)	$D(LGDP)_{t-1}$		LM	**-0.183** (0.152)
D(LX)	**0.292** (0.062)***	LCP	**0.139** (0.043)***	D(LX)	**-0.090** (0.073)	LCP	**0.246** (0.094)**
$D(LX)_{t-1}$		LEXR	**-0.323** (0.477)***	$D(LX)_{t-1}$		LEXR	**-0.129** (0.083)
D(LM)	**-0.117** (0.072)	LL	1.101 (0.122)***	D(LM)	**0.031** (0.074)	LL	**0.750** (0.452)
$D(LM)_{t-1}$		DUM1	**-0.050** (0.198)**	$D(LM)_{t-1}$	**-0.086** (0.034)**	DUM1	**-0.042** (0.278)
D(LCP)	**0.118** (0.034)***	DUM2	**0.008** (0.134)	D(LCP)	**0.240** (0.049)***	DUM2	**-0.047** (-0.029)*
$D(LCP)_{t-1}$				$D(LCP)_{t-1}$			
D(LEXR)	**-0.025** (0.038)			D(LEXR)	**-0.004** (0.398)		
$D(LEXR)_{t-1}$				$D(LEXR)_{t-1}$	**0.092** (0.425)**		
D(LL)	**0.070** (0.155)*			D(LL)	**0.371** (0.261)		
$D(LL)_{t-1}$				$D(LL)_{t-1}$			
DDUM1	**-0.009** (0.016)			DDUM1	**-0.020** (0.033)		
DDUM2	**-0.850** (0.011)			DDUM2	**-0.023** (0.013)*		
Diagnostic Checking (LM Version)				**Diagnostic Checking (LM Version)**			
Serial Correlation[a] 1.191 (0.275)				Serial Correlation[a] 0.381 (0.537)			
Functional Form[b] 0.008 (0.977)				Functional Form[b] 1.185 (0.276)			
Normality[c] 1.267 (0.531)				Normality[c] 2.384 (0.304)			
Heteroscedasticity 0.092 (0.760)[d]				Heteroscedasticity 1.029 (0.310)[d]			

Note: Dependent variable is D(LGDP) or LGDP. (*),(**),(***) indicate significant at 10%,5% and 1% significant level respectively. [a] Langrange multiplier test of residual; [b]Ramsey's RESET test using the square of the fitted values; [c]Based on a test of skwness and kurtosis of residuals; [d]Based on the regression of squared residuals on squared fitted values

also adopted the testing by using bound test. This result has opposed previous studies done by Bahmanee-Oskooee and Alse (1993), Amed and Hamhiran (1995) and Wong (2008) where most of them adopting Johansan-Juselius cointegration analysis. Imports (M) have a negative impact on GDP where 1% increase in M will decrease the GDP by 0.26%. The reason for this evidence is due to heavy reliance of the import substitution of the input towards the production in the local market in Thailand. Reducing the import of the input can disrupt the production process and reduce the income for the country. Next, beside M, DUM1 which captured Asian Financial crisis in 1997-1998 also found to have a negative relationship with the GDP. This means that the crisis has slowed down the economy of Thailand. The existence of cointegrating relations suggests that one can estimate the coefficient of an error-correction term (ECT). The coefficient of -0.323 which is significant at 1% level reflect that any deviation from the long run equilibrium will be corrected or in other words will be converged back in the long run equilibrium for the country. Based on error correction model, all variables are found to be significant and correctly signed except for DUM2 which is not significant at any levels.

Philippines

Next, the estimated coefficients of the long run relationship between Philippine's economic growth (GDP) and export (X), import (M), exchange rate (EXR), labor (LL) capital (CP) and DUM2 are all significant at 1% level. Export-led growth hypothesis for Philippines is considered valid here as Philippines's export (X) is found to have a positive relationship with the real GDP with estimated elasticities of 0.36. This shows that a 1% increase in export (X) will result in 0.36% increase of the country's GDP. This evidence is consistent from previous report by the Asian Development Bank (ADB) in 2005 that found the Philippines has benefited from the export growth in the neighboring nations. In addition, the Institute for Management Development (IMD) World Development Competitiveness Yearbook 2003 identifies export among the key positive factors of the country's competitiveness. The Philippines has become one of the more competitive exporters of electronic components and other technological products. Besides, the capital and labor are also having positive relationship with Philippines' real GDP. A 1% increase in these variables will lead to 0.41% and 1.18% increase in real GDP respectively. Import, exchange rate and DUM 2 are found to have negative correlation with GDP. Specifically, in 1% increase in these variables will be resulting in a decrease of 0.25%, 0.22% and 0.09% in the country's real GDP respectively. Besides, based on the error correction model analysis, the negative significant ECT suggest that more than 0.36 of the disequilibrium caused by the previous shock will be corrected in the current year and converges back to the long run equilibrium for the country. Based on error correction model, all variables are found to be significant and correctly signed except for DUM1 which is not significant at any level.

Malaysia

Based on Table 5b, the estimated coefficients of the long run relationship between economic growth (GDP) and the independent variables are significant at 1% level except for import (M) which is significant at 10% level only. The result showed that the export (X), capital (CP) and labor (LL) have a positive relationship with the GDP with estimated elasticities of 0.34, 0.13 and 1.10 respectively. This shows that a 1% increase in export (X), capital (CP) and labor (LL) will result in 0.34 %, 0.13% and 1.10% increase in the country's GDP. The detection of positive relation between X and GDP confirms the idea of export led growth for Malaysia. As anticipated, imports (M) have a negative impact on GDP where an increase in import might lead to a decrease in international reserve of the country, thereby slowing down the economic growth or GDP. Over the sample period studied, a 1% increase in M will decrease the GDP by 0.13%. Next, beside M, exchange rate (EXR) is also found to have a negative relationship with the GDP and this finding was inconsistent with the previous studies that a positive relationship should be observed between exchange rate (domestic price of US currency, RM/USD) and economic growth or GDP. In other words, the depreciation of the exchange rate will slow down the economic growth. Previously, the devaluation policy perhaps can improvethe competitiveness of the export (X) in international market in order to stimulate the economic performance. Somehow, this method also could potentially make country worse off in more recent scenario. Asian financial crisis which captured by DUM1 is also found to be one of the determinants for Malaysia's real GDP. The negative sign proved that for every 1% increase in DUM1, Asian financial crisis can decrease Malaysia GDP by 0.05%. Based on error correction model analysis, all explanatory variables are statistically significant at 1%, 5% and 10% significant levels except for exchange rate (EXR) and labor (LL). This mean that export (X), import (M) and capital (CP) can granger caused the economic growth. Besides, the significant ECT suggest that more than 0.84 of the disequilibrium caused by the previous shock will be corrected in the current year and converged back to the long run equilibrium for the country. As a summary, based on the findings of the short run causality test, we concluded that the hypothesis of export-led growth is still valid in the Malaysian economy as there appeared to be a positive

relationship and short run causality running from the exports to growth. This study is consistent with the previous studies done by Shah and Yusoff (1990), Ghatak and Price (1997), Khalafalla and Webb (2001), and Choong et. al. (2005)

Indonesia

There are only three significant variables namely export (X), capital (CP) and DUM1 that are able to influence the level of GDP for Indonesia in the long run with the corrected sign. Other variables are found to be insignificant and therefore unable to influence the level of GDP. As 1% increase in X and CP, there will be 0.37%, ad 0.24% increase for Indonesia's real GDP while as 1% increase in DUM2, there will be 0.05% decrease in real GDP. DUM2 which also captured the recent global financial crisis is significant at only 10% level represent a weak influence towards Indonesia's real growth. The positive effect of export towards growth for Indonesia in this paper has proven the export led growth hypothesis which was supported by previous studies such as Ram (1987), and Bahmani-Oskooee et al. (1991). Based on the short run analysis, the negative significant ECT suggests that more than 0.49 of the disequilibrium caused by the previous shock will be corrected in the current year and converges back to the long run equilibrium for the country. The error correction model revealed that most variables are not significant and contradict expected sign except for labor (LL).

Conclusion

Empirical evidence linking exports to economic growth has been mixed and inconclusive. Much works argued that the differences in outcomes may be due to different levels of temporal aggregation, methodologies, model misspecification, and omitted variables. This paper indeed has put forward empirical evidence on these issues. This research paper has tried to reinvestigate individually the validity of export led growth hypothesis for ASEAN4 countries and how it is connected with the progression on CEPT scheme. By adopting a more recent econometric technique known as Bound test, we proposed our model to investigate the lead of trade and development theory to justify the hypothesis of export led growth. This paper extends the study made by the previous paper (Ghatak and Price, 1997; Keong et al. (2003) and Zulkornain et. al (2005) by including more relevant determining variables such as labor (LL), capital (CP), exchange rate (EXR), import (M) and export (X). In summary, the result shows that X,LL, and CP has positive impacts on economic growth while M, and EXR has negative impact on growth. Moreover, we also found that the hypothesis of export led growth for Malaysia, Indonesia, Thailand and Philippines are supported in both short run and long run. As for policy recommendation, since export (X) seems to be one of the major determinants for the growth of ASEAN4 countries, the governments should implement effective macroeconomic policies in stabilizing its trade balance , liberalizing the countries trade and attracting export-oriented foreign direct investment into the country. Besides, the governments should ensure there is enough supply of labor and capital in the market given that it would lead to a higher level of economic growth. Last but not least, the governments should monitor carefully their exchange rates policy in order to maintain the health of the economies as any movement in the exchange rates may produce undesirable impact towards the economy growth.

Finally, comparing this study finding with past studies address the issues of trade and economic growth such as Elsadig (2012) that his results confirm that the exports and imports had a very significant role in achieving higher GDP contribution that is produced by these economies through using huge inputs to produce output. Thanks to FDI that is helped the manufacturing sector to become the engine of economic growth instead of agricultural sector when economic structural transformation took place at these economies in 1980s. Moreover, the study finds that the impact of exports and imports is positive with insignificant contribution to total factor productivity (TFP) growth that is considered as the technological progress of these countries. Elsadig's findings are in line with the findings of the studies undertaken by Mahadevan (2007) and Robert and David (1999), both state that TFP growth has no significant effect on imports or exports growth in some of these countries such as (Japan, Korea and Malaysia). Conversely, their findings should be placed in the accurate concept that exports and imports have no significant contribution to the TFP of these countries, and further it is not the TFP that has no significant effect on exports or imports growth either. In fact, it is the quality of exports and imports that creates the deference and determines the TFP contribution. Or what is so called learning by doing and in this study, is the learning by exporting and importing. At this point, is the trade spillover effects concept that should be considered?

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