Export Geographical Diversification and Economic Growth Among ASEAN Countries

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ABSTRACT

The study investigated the relationship of export geographical diversification and economic growth among ASEAN countries for the period 1980-2014. With a sample of 5 countries- Indonesia, Malaysia, Philippines, Singapore and Thailand- the study computed for the geographical diversification of countries using the Herfindahl index. Using time series analysis, with Vector Autoregressive (VAR) analysis and Granger causality tests, the relationship of the two variables among ASEAN countries were tested.

The results showed a generally decreasing trend of HHI values of all 5 countries. Results of the analysis of the relationship showed a bidirectional relationship for Malaysia and a unidirectional relationship from export geographical diversification to economic growth in the case of Philippines. For countries Indonesia, Singapore and Thailand, results showed no causality which indicates that the variables are independent for these countries. Based on the results, the study recommendeds the followng: (1) formulation and implementation of appropriate strategies to improve export structure and improve economies for Malaysia and Philppines; and (2) diversification of export structure in terms of market destinations for Philippines to improve its economy.

Keywords: ASEAN, Export geographical Diversification, Herfindahl index

INTRODUCTION

BACKGORUND OF THE STUDY

Export diversification is defined as the change in the composition of a country's existing product mix or export destination (Ali *et al*., 1991). It also refers to the spread of production over many sectors (Berthelemy and Chauvin, 2000). In a simpler definition, it is the changing of a country's export structure. Exports are diversified in two main areas: product and geography. Product diversification is attained by changing or expanding the existing basket of exported commodities. Meanwhile, geographic diversification is an expansion in the set of markets entered. Geographic diversification in some way can be viewed as another international diversification strategy to some degrees and could be defined as expansion across borders of global regions and countries into different geographic locations or markets (Hill *et al*. 1992). By diversifying export portfolios, developing countries can potentially access a more stable revenue stream than of concentrating in just a few products or markets. Demand shocks are usually and perfectly correlated across sectors and countries, so diversified economies have scope to offset income losses in one area with potential gains, or at least stability in another (Shepherd, 2009).

Recognizing the potential of export diversification, it tend to become a policy objective on countries. The ASEAN region is one of the brightest spots in the global economy. In 2015, the

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region's GDP per capita accounted to US$3,867. The member states' GDP per capita varied widely with Singapore and Brunei Darussalam reaching US$50,000 and US$30,000, respectively while the remaining member states ranges from US$1,198 to US$9,600 (AEC Chartbook, 2016).

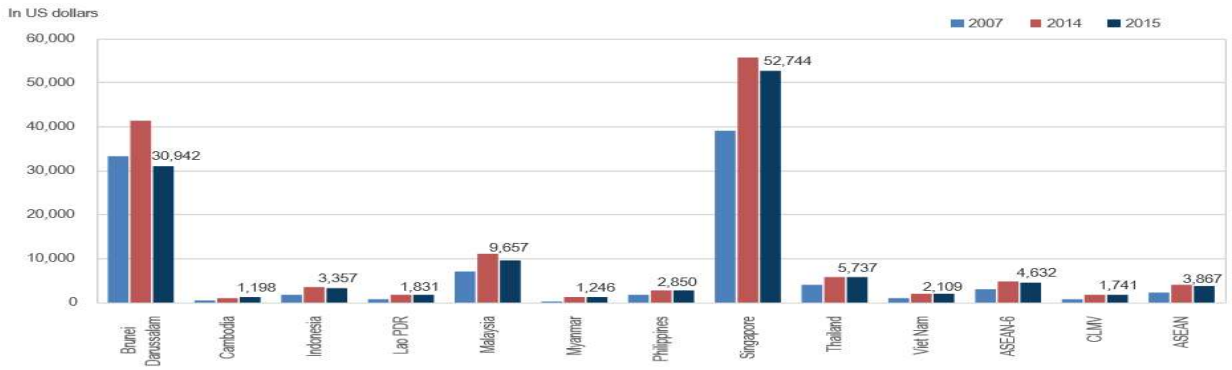

Figure 1. ASEAN Member States' GDP per capita at current prices in 2015.
Source: ASEAN Secretariat as cited in the ASEAN Economic Chartbook 2016.

The ASEAN region is also one of the major players in the global trading and is a fast expanding trade bloc in Asia with a growing economic influence. Its total trade in goods stood at US$2.3 trillion, accounting for 7.6% share of the world's total trade however, fell by 10% from US$2,529 billion in 2014 to US$2,270 billion in 2015. In the same year, the top three exported commodities, mineral fuels/oils and their related products, electrical-related products and nuclears-related equipment/appliances, constituted almost 50% of the region's total trade (ASEAN Economic Community Chartbook, 2016).

There are two classifications in terms of market destination in the ASEAN region: the intra-ASEAN and extra-ASEAN. Intra-ASEAN refers to trade between countries within the region while extra-ASEAN refers to between the member states and countries' outside the region. In 2015, both intra-ASEAN and extra-ASEAN trade in goods fell by 10% with US$ 544 billion and US$ 1,726 respectively. In terms of exports of goods by destination, LAO PDR exported most of its products within the region while Cambodia, Vietnam and Philippines exported around 90% of their commodities outside ASEAN as shown in the Figure 2.

Figure 2. ASEAN member states' exports of goods by destination in 2015.
Source: ASEAN Secretariat as cited in the ASEAN Economic Chartbook 2016.

Export diversification has suddenly moved back to center stage in development concerns, because of the new urgency of using exports to regain lost growth momentum and because of the need to reduce income volatility for countries with large populations living in poverty (Newfarmer *et al.*, 2009). Export diversification is not only about product diversification, but also about expanding

the number of markets that a country exports to. A high level of dependence of domestic exports on a narrow number of trading partners make countries vulnerable to future instability in the domestic market. Hence, countries could reduce dependence on a few sources of demand through geographic diversification which might then mitigate future risks. These risks include economic risks like volatility and instability in foreign exchange earning which have adverse macroeconomic effects on growth, employment, investment planning, import and export capacity, foreign exchange cash flow, inflation, and debt repayment. Also, secular and unpredictable declining terms of trade trends which exacerbate short run effects need to be mitigated. (Samen, 2010). Being able to reduce vulnerability and mitigate risks, countries are then able to achieve allocative efficiency with stable export earnings.

RATIONALE OF THE STUDY

Export diversification along with export development (expansion) has become an important issue for development economics literature since 1950s and today it is being widely researched by development economists. The concentration of countries' exports in a limited number of market destinations for a country's exports exposes the country to different risks. Countries with a concentrated export structure frequently suffer from export instability and is exposed to different type of outer risks that arise as a result of the inelastic and unstable demand from global markets. These countries experience slowdown of growth rates and terms of trade deterioration when negative commodity shocks hit world prices. Moreover, governments in low-income countries has expressed concerns about the vulnerability that arises from export concentration. Volatility in export prices, sudden closure of export markets triggered by regulatory changes, entry of new competitors, supply shocks at home, all of these things, which are part of the normal course of event on international markets, take on a threatening dimension when exports are concentrated (Cadot *et al.,* 2011).

With the face of global politics and international trade changing so quickly, pivoting and committing to do business with new markets could help in reducing vulnerability of global economic shocks and constraints to achieve allocative efficiency and sustainable export earnings. Geographical diversification is implemented to ensure a stable and balanced export of goods, given demand and supply fluctuations in foreign markets. Diversification of exports geographically is expected to contribute to the output growth of developing countries through several channels, such as decreasing export instability by reducing the dependence on a limited number of market destinations creating spill-over effects and increase productivity growth, making countries less vulnerable to sector-specific adverse shocks and making it easier to channel positive terms-of-trade shocks into growth. Moreover, geographically diversifying where you export — meaning selling into or investing in several different markets at the same time — allows exporters to spread out their risks and opportunities (edc.trade).

Hesse (2008) and Kadyrova (2011) investigated the relationship of export diversification, measuring export products, and economic growth. Both studies found a positive relationship between the two. Studies in export geographic diversification, so far, has focused on its determinants (Boehe *et al.*, 2016) and Shepherd (2010). There are also studies that compared the effects of export product diversification and geographic diversification (Rondeau and Roudaut, 2015). Farshbaf (2014) has also studied the relationship of geographic diversification on business cycle volatility. Given these vast literature regarding export diversification, little attention is given towards the role of geographic diversification on countries' growth. This study is conducted to contribute to the existing literature by investigating the relationship of geographic diversification and economic growth.

The ASEAN region is quickly emerging as a main participant in the global value chains which in turn will further cement its role and position in the global trade. Significant progress and accomplishments of the ASEAN region were made possible through developing concrete initiatives and putting in place key policies, as well as regulatory frameworks and fundamentals necessary

for the member states to collectively move forward as an economic community. Since most of the member countries belong to the low middle to upper middle income classification, also known as developing countries, investigating the relationship of export diversification on the countries' growth could help in creating concrete initiatives to further improve ASEAN's trade structure and thereafter, would lead to the region's progress. Hence, this study is conducted.

OBJECTIVES OF THE STUDY

The general objective of the study is to examine the relationship of export geographical diversification and economic growth among ASEAN countries. Specifically, the study aims:

1. To measure export diversification among ASEAN countries using the Herfindahl index;
2. To present the trends of economic growth and export geographical diversification of ASEAN countries; and
3. To examine the relationship of geographical diversification of exports and economic growth among ASEAN countries.

SIGNIFICANCE OF THE STUDY

Expanding international trade has been an important avenue for growth in many developing countries. Moreover, export diversification is seen by many as an important channel through which trade fuels economic growth: by facilitating improvements in productivity, by capturing economies of scale, and by curbing volatility (Brenton *at al.,* 2009). Excessive geographical concentration of exports, or a low diversity of trading partners, results in potentially dangerous dependence on few receiving markets and increased income volatility (Bacchetta *et al.,* 2009). Moreover, the lack of diversification of products and markets impedes growth and creates multiple-macro-economic challenges. If exports are not diversified, any shock affecting the destination markets is directly transmitted to trading partners. Export diversification aims at mitigating risks, as well as expands export opportunities.

The analysis of the relationship of a country's growth and the geographical diversification of its exports in the ASEAN countries could help both policy makers and researchers. For policy makers, examining and realizing an existence of a positive relationship, if there is, between geographical diversification of exports and economic growth in the ASEAN region will allow the emergence of new policies, as well as improvement of the existing policies that will enhance the trade structure of the region. Market friendly interventions can help countries grow more and reap the benefits of trade liberalization. While for researchers, results of this study tend to give insights and additional knowledge of how export geographical diversifications affect countries' growth in the ASEAN region. This study is another expansion of the literature and could be beneficial for future researches, especially in the ASEAN region.

SCOPE AND LIMITATION

The study focused on the analysis of the relationship of geographical diversification of exports on a country's growth. Due to unavailability of data, the subjects of the study are limited to the ASEAN countries: Indonesia, Malaysia, Philippines, Singapore and Thailand. The study used annual data within the period of 1980 to 2015. The study employed real GDP per capita growth as a proxy to measure economic growth of countries, which is adopted in the methodology used by Hesse (2008).

METHODOLOGY

THEORETICAL FRAMEWORK

Export-led growth hypothesis

Proponents of international trade theory argue that trade between countries promote economic growth. The idea behind this hypothesis is that the increase in exports would increase the economic advance of the country. The openness to foreign markets has several benefits amongst which are the knowledge and technology spill-overs. It is a common policy to countries who tend to support export-led-growth hypothesis to improve their exports to achieve growth. There are two known strategies of improving exports, specialization and diversification.

Specialization. David Ricardo's concept of comparative advantage suggests that through opening trade countries would achieve gains (Alhajhoj, 2007). His model suggests an export-led growth type of framework, where each country can optimize its profits through specializing in the production of a single product. The specialization in activities in which a country has comparative advantage can lead to greater allocative efficiency. Through exchange, each of the countries would benefit from the better quality of the traded goods and also realize profits due to the weak competition in the chosen product or service of specialization. This way both nations would be better off (Borisova, 2013). The trade theory argues that the more a country becomes involved in international markets, the more specialized it becomes (Ali *et al.,* 1991). Studies, such as Alhajhoj (2007) confirmed the export provoked growth in Saudi Arabia from 1970 to 2005. Thornton (1996) has also found empirical evidence for the causality of exports towards growth for Mexico in the years between 1895 and 1992.

Diversification. However, there are also studies which supported diversification of country exports. It is also often argued that it is not only the level of exports that leads to growth, but what also matters is the degree of diversification of such exports or of the export base. A modified gravity model motivated by Feenstra and Kee (2008), gives evidence that export diversity increases country productivity. Hence trade diversification across products could determine crisis outcomes to the extent that the crisis had a stronger impact on less productive firms or sectors. With regards to trading partners, diversifying across multiple countries could lower the average distance that goods travel while also diversifying export demand shocks (Neto and Romeu, 2011). A high level of dependence of domestic exports on a narrow number of business partners risks future instability in the domestic market (Vahalik, 2015). Moreover, lack of diversification may increase exposure to adverse external shocks and vulnerability to macroeconomic instability. (Papageorgiou and Spatafora, 2012). Proponents that highlighted the prevalence of the diversification aspect as a major contributor to growth includes Romer (1990) and Acemoglu and Zilibotti (1997).

Growth-led exports

On the other hand, the proponents of neoclassical trade theory supporting growth-led exports suggest a causal relationship from country's endowments and productivity towards export. Once the country has satisfied its national market, it would export the excess goods, as also it would export a country-specific good, which is rare or scarce in other countries (Borisova, 2013).

After a country has increased its development levels from within its borders and has satisfied its demand on the domestic markets, it can start exporting some of its excess products on foreign markets. Melitz (2003) argues that only high-productivity firms can start exporting as they face higher entrance costs to new markets in comparison to locally operating firms. In order to establish a firm on the local market, one faces some amount of entry costs. When one wants to found a firm, which would operate on international markets, he/she faces not only the locally based entry costs, but also additional amount of costs related to trade permissions, open currency

accounts, transport costs etc. Thus, only firms with high productivity can survive in the trade sector as only they will be able to cover the additional costs. The channel from internally promoted growth to increase in productivity and exports can be an example of the growth-led hypothesis. Empirical support of Growth-led exports was found by Hsiao (1987) for the case of Hong Kong from 1966 to 1982 and Ramos (2001) for the case of Portugal (1865 – 1998) (Borisova, 2013).

Herfindahl Index of Export Concentration: A Measure of Export Geographical Diversification

This study used the Herfindahl Index of export concentration as a measure of export geographical diversification since it is the most commonly used measure of export concentration in recent economic literature (Hesse (2008) and Kadyrova (2011)).

The Herfindahl Index is originally a measure of the size of the firm relative to the industry they belong to. It indicates the amount of competition among firms so it is the measure of industrial concentration. The index summarizes the market control concentration by the biggest firm in the industry and how oligopolistic the industry is. The value of the index ranges from 0 to 1. The higher the Herfindahl index is, the lower the competition is in the industry. Thus, the big portion of the market is controlled by small number of firms. As employed in the study, the Herfindahl index of country *j* is computed as:

$$HHI_j = \sum_{i=1}^{N} \left(\frac{x_i}{X_j}\right)^2 \quad (1)$$

where: x_i= is the total export value to trade partner *i* from country *j*; and

X_j= total exports of country *j*

Export geographical diversification is measured by using an index that measures concentration, which is the opposite of diversification. A Herfindahl index close to zero implies that the exports of that are country are not concentrated in a narrow range of products thus, the export structure of the country is well diversified (Kadyrova, 2011). Table 1 shows the concentration degrees of the Herfindahl index scores.

Table 1. Herfindahl index score and their concentration degrees.

HHI	Concentration Degree
≤0.01	Highly diversified
0.01-0.15	Unconcentrated/diversified
0.15-0.25	Moderately concentrated
≥0.25	Highly concentrated

Source: U.S. Department of Justice/ Federal Trade Commission, 2010.

Conceptual Framework

This study determined how export geographical diversification affect the economic growth of ASEAN countries. Figure 6 shows the possible relationship between export geographical diversification and economic growth on ASEAN countries. First is the unidirectional relationship from export geographical diversification to economic growth. Second is possible unidirectional relationship from economic growth to export geographical diversification. Lastly, a bi-directional causality might run from export geographical diversification to economic growth and vice versa. It is also possible that the two variables may be independent with each other and that there is no relationship exists between them.

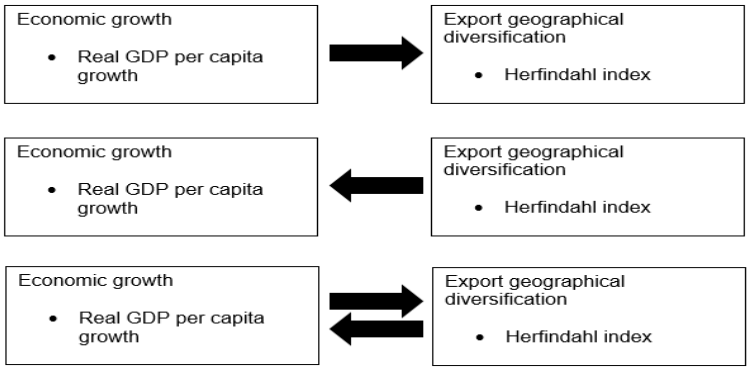

Figure 3. The possible relationship between export geographical diversification and real GDP per capita on ASEAN countries.

Variables

- **Economic Growth (EG)**

  To measure economic growth, the study adopted the strategy of Hesse (2008) which used real GDP per capita growth as a proxy for economic growth.

- **Export geographical diversification (HHI)**

  To measure export geographical diversification, the study used the Herfindahl index of export concentration. As export concentration is the opposite of export diversification, low concentration index will indicate high diversification (Hesse, 2008).

Data Sources

This study employed time series data for the period 1980-2014. Gathered from the World Bank is the real GDP per capita growth at constant prices of the selected ASEAN countries, and data for country exports by trading partner is gathered from the UNComtrade.

Statistical Method

The analysis between the relationship of export geographical diversification and economic growth is composed of three phases. Phase I shows the measurement of export geographical diversification using the Herfindahl index. Phase II presents the trend analysis of the variables involved. Phase III presents the regression results of testing the relationship of the two variables.

Phase I. Measuring Export Geographical Diversification using the Herfindahl Index

Export geographical diversification of countries is measured using the Herfindahl index of export concentration. Herfindahl index is computed for each year from 1980 to 2014 for each countries based on the gathered data of country exports by trading partners. A Herfindahl index close to zero means less concentration. This implies that the countries' exports are diversified in a wide range of markets.

Phase II. Trends Analysis

Descriptive statistics with graphical presentations will be used to show the trends and movements of the ASEAN countries' economic growth and export geographical diversification from 1980 to 2014.

Phase III. Relationship of Export Geographical Diversification and Economic Growth

In the analysis of the relationship of export geographical diversification and economic growth, time series analysis is employed in the study.

Time Series Analysis

Time series is a collection of observations collected at equal space and discrete time intervals. The two main goals of time series analysis is identifying the nature of the phenomenon based on the sequence of observations and forecasting. Both of these require that the pattern of observed time series data is identified and more or less described formally. It can be interpreted and integrated with other data once the pattern is established, and the results can be used in some investigative phenomena. The study employed time series analysis to investigate the relationship of export geographical diversification and economic growth.

A. Stationarity Test

The first step in time series analysis is to test whether the series is stationary or not. Stationarity is a critical assumption in time series analysis. Initially testing for the stationarity of the series could avoid spurious results due to violation of some assumptions.

A stochastic process Y_t is covariance stationary if it satisfies the following assumptions:

(1) $E(Y_t) = \mu$

(2) $Var\ (Y_t) = \sigma^2$

(3) $Cov\ (Y_t, Y_{t-k}) = \sigma^k$

Conditions (1) and (2) above imply that the means and variances are constant over time while condition (3) above means that the covariance between observations depend only on how far apart they are, and not on the time of occurrence (Danao, 2002). If one assumption is not satisfied, the time series analysis cannot be employed because it may lead to false regression.

A.1. Unit Root Test

Testing for the presence of a unit root in the series is the first step of time series analysis. Unit root test is considered as a test for stationarity. The study employed Augmented Dickey-Fuller (ADF) test if there exists a nit root in the series. Presence of unit root implies non-stationarity. The specification for ADF is;

$$\Delta y_t = \beta_1 + \beta_2 + \beta_3 + \delta\, y_{t-1} + \alpha_i \Sigma\, \Delta\, y_{t-1} + \mathcal{E}_t \qquad (4)$$

where ε_t is a pure white noise error term. The error term is assumed to be independent and identically distributed. If the ADF test failed to reject the null hypothesis, then there exists a unit root in the series which implies nonstationarity. In this case, differencing process is necessary to achieve stationarity.

B. Differencing

In case of non-stationarity, differencing is employed to detrend the data and control autocorrelation by subtracting each datum in a series from its predecessor. After all variables are differenced and become stationary, the method then proceeds to VAR analysis.

C. Vector Autoregressive (VAR) Model

The Vector autoregressive (VAR) model provides information about the forecasting ability of a variable. It is an econometric model used to capture evolution and interdependence of multiple time series. All variables in a VAR are treated symmetrically by allowing the time paths of a variable to be affected by current and past realizations of the other variables in model (Enders, 1995).

Basically, Var (p) is an autoregressive (AR) model with at least two time series having (*p)* as the number of lags and is expressed as:

$$y_t = A_0 + A_1 y_{t-1} + \cdots + A_p y_{t-p} + \varepsilon_t \tag{5}$$

where:

y_t= (nx1) vector containing each of the variables in VAR

A_0= (nx1) vector of intercept terms

A_1= (nx1) matrix (for every *i*=1….p), and

ε_t= (nx1) vector of error terms satisfying the equation (5) with the following assumptions:

1. E(ε_t)=0; the error has mean 0,
2. E($\varepsilon_t \varepsilon_{t-k}$)=$\Omega$; the contemporaneous covariance matrix of error term is Ω (a nxn positive definite matrix), and
3. E($\varepsilon_t \varepsilon_{t-k}$)=0; for any non-zero k, there is no correlation across time; in particular there is no serial correlation in individual error terms

For the variables measuring economic growth and export geographical diversification, EG and HHI, these variables are presented in a VAR form as:

$$\begin{bmatrix} EG_t \\ HHI_t \end{bmatrix} = \begin{bmatrix} A_{10} \\ A_{20} \end{bmatrix} + \begin{bmatrix} A_{11}{}^{(1)} & A_{12}{}^{(1)} \\ A_{21}{}^{(1)} & A_{22}{}^{(1)} \end{bmatrix} \begin{bmatrix} EG_{t-1} \\ HHI_{t-1} \end{bmatrix} + \cdots$$

$$+ \begin{bmatrix} A_{11}{}^{(p)} & A_{12}{}^{(p)} \\ A_{21}{}^{(p)} & A_{22}{}^{(p)} \end{bmatrix} \begin{bmatrix} EG_{t-p} \\ HHI_{t-p} \end{bmatrix} + \begin{bmatrix} \varepsilon_{1t} \\ \varepsilon_{2t} \end{bmatrix} \tag{6}$$

where:

EG_t= real GDP per capita growth observed over time period t;

HHI_t = Herfindahl index over time period t;

p= lag length

A_{ij}= coefficients of the variables associated to the VAR

A_{i0}= the parameters representing intercept terms

ε_{1t}, ε_{2t} *and* ε_{3t}= white noise or disturbance terms

D. Lag Order Determination

It is necessary to determine the appropriate lag order to have an appropriate set of variables to include in the VAR model. In the study, we employ the methods Akaike Information Criterion (AIC) and Schwarz Bayesian Criterion (SBC) to determine lag order. Both AIC and SBC have the main aim of identifying the good models even if they differ in their exact definition of a good model. In this case, the model that will yield the lowest AIC and SBC value will be chosen.

The AIC and SBC are given by the following equations:

$$\text{AIC} = T\log|\Sigma| + 2N \quad (7)$$

$$\text{SBC} = T\log|\Sigma| + Nlog\ (T) \quad (8)$$

where:

$|\Sigma|$= determinant of the variance/covariance matrix of the residuals
N= total number of parameters estimated in all equation; and
T= number of usable observations

E. Granger Causality Test

A causality test is conducted using Granger approach in VAR model. Granger causality is a technique for determining whether a time series is useful in forecasting another time. The approach is based on the idea that the past can cause the future, but the future cannot cause the past. It is more on "X cause Y", if the past values of X can be used to predict Y, better than the past values of Y itself (www.eviews.com). Granger causality can be tested by using a standard F-test on lagged values of X, together with lagged values of Y. It generates to statistical significant values of X to the explanation of future Y; this would mean that X Granger cause Y (Chimobi, 2009).

Estimation Procedure

Trends of economic growth and export geographical diversification of ASEAN countries over time was generated using Microsoft Excel 2013. For the VAR analysis, the study used the software EViews Version 8 to do the estimation and statistical analysis for the study**.**

RESULTS AND DISCUSSION

Vector Autoregressive (VAR) Analysis

After determining the stationarity attributes of the series, we then proceed to Vector Autoregressive (VAR) analysis. VAR is a simultaneous system of equations that examines the economic inter-relationship of variables.

The study considers modeling the relationship of EG and HHI among ASEAN countries Indonesia, Malaysia, Philippines, Singapore and Thailand. Tables 6 presents the VAR estimation outputs and the standard error of the variables EG and HHI for ASEAN countries. All variables are tested at 10% level for each country.

In the case of Indonesia, Table 6 shows that the current values of EG is significantly affected by its past values. The current values of HHI is also significantly affected by its past values. The results of the VAR estimation showed no significant relationship between the variable EG and HHI. This result is in line with the study of Rondeau and Roudaut (2015) although with different sample and methodology.

For Malaysia, results showed that the current values of EG and HHI are not affected by their previous values. It also showed that the current values of HHI is affected by the previous 3-year values of EG. This result is consistent with the neoclassical trade theory of growth-led exports in which exports are induced by the country's growth. This is supported by the studies of Hsiao

(1984) and Ramos (2001). On the other hand, it also showed that the current values of EG is significantly affected by the 2-year prior values of HHI. This is consistent with the export-led growth hypothesis under export specialization.

In Philippines, the results of the VAR (1) model estimation showed that the current values of EG and HHI are significantly affected by their own previous values. Results showed that the current values of EG is also affected by the past values of HHI negatively. This is consistent with the export-led growth hypothesis under export diversification. This is in line with the study of Pacheco and Pierola (2007) in which they also found a significant relationship between export diversification and economic growth, and that geographical diversification is more important in developing countries than product diversification. Moreover, it also showed that the current values of EG is affected positively by the past values of HHI. This is in line with the growth-led exports of the neoclassical trade theory supported by Hsiao (1984) and Ramos (2001).

For Singapore, results showed that the current values of HHI is significantly affected by its own past values. Current values of EG is neither affected by its own past values nor the past values of HHI. While in the case of Thailand, it showed that the current values of EG and HHI is significantly affected by its own previous values.

It is important to note that the study employed annual observations of the variables EG and HHI. Thus, from the estimates of these variables, the expected effect of a variable to another is felt after one year for countries Indonesia, Singapore and Thailand, after 2 years for Philippines and after 3 years for Malaysia. Results which showed significant effects between the two variables, specifically for the case of Malaysia and Philippines, is in line with the theories export-led growth hypothesis and neoclassical trade theory of growth-led exports.

Table 6. Estimation for unrestricted VAR models of ASEAN countries.

VAR Model	Indonesia		Malaysia		Philippines		Singapore		Thailand	
	EG	HHI	EG	HHI	EG	HHI	EG	HHI	EG	HHI
EG(-1)	0.266*	-0.001^{ns}	0.253^{ns}	-0.0001^{ns}	0.36*	0.001*	0.0189^{ns}	-0.0001^{ns}	0.505*	0.000^{ns}
	(0.170)	(0.0006)	(0.213)	(0.002)	(0.162)	(0.001)	(0.177)	(0.0002)	(0.168)	(0.0002)
EG(-2)	-	-	-0.085^{ns}	0.0001^{ns}	-	-	-	-	-	-
			(0.186)	(0.001)						
EG(-3)	-	-	0.142^{ns}	-0.004*	-	-	-	-	-	-
			(0.182)	(0.001)						
HHI(-1)	-0.0423^{ns}	0.952*	3.468^{ns}	-0.049^{ns}	-36.149*	1.02*	34.054^{ns}	0.923*	-8.153^{ns}	-0.551*
	(7.536)	(0.0266)	(25.775)	(0.176)	(14.916)	(0.054)	(58.150)	(0.064)	(124.482)	(0.158)
HHI(-2)	-	-	68.571*	-0.02^{ns}	-	-	-	-	-	-
			(25.328)	(0.173)						
HHI(-3)	-	-	-6.937^{ns}	-0.197^{ns}	-	-	-	-	-	-
			(29.140)	(0.199)						
C	2.442*	0.002^{ns}	2.540*	0.0131*	6.167*	-0.006^{ns}	1.318^{ns}	0.007*	2.075*	0.0002^{ns}
	(1.367)	(0.005)	(1.232)	(0.008)	(2.357)	(0.009)	(4.699)	(0.005)	(0.976)	(0.001)
Log likelihood	-89.3972	102.5766	-80.3685	74.1892	-81.9599	109.0894	-95.0440	136.7634	-81.0582	131.8437
Akaike AIC	5.4351	-5.8574	5.6367	-4.3348	4.9976	-6.2406	5.7673	-7.8684	5.3786	-7.9277
Schwarz SC	5.5698	-5.7228	5.9605	-4.0110	5.1323	-6.1059	5.9020	-7.7338	5.6077	-7.6987

** Significant at 10% level* *^{ns}Not significant at 10% level* *( ) Standard error estimate*

C. Granger Causality Test

The relationship between economic growth and export geographical diversification was further examined by performing causality tests. It indicates the direction of causal relationship between EG and HHI. Table 7 shows the results of the Granger causality test of VAR estimation among ASEAN countries which were tested at 10% significance level.

Table 7 shows that there exists a bidirectional relationship between GDP per capita growth and HHI in Malaysia. The causality that exists from EG to HHI is in line with the neoclassical trade theory of growth-led exports, while the causality that runs from HHI to EG is in line with export-led growth hypothesis. A unidirectional relationship, from HHI to GDP, exists in Philippines. This implies that the past values of HHI can be used to forecast the future value of EG. The result is in line with the export-led growth hypothesis with export diversification. This indicates that export geographical diversification significantly affects economic growth in the Philippines. While the estimation for the rest of the countries, Indonesia, Singapore and Thailand showed no significant causality direction for any of the variables. This implies that none of the past values of any of the variables is important for predicting any other variable. These countries might not be too dependent on exports to induce their growths.

Table 7. Granger causality test results for ASEAN countries.

	Null Hypothesis:	Obs	F-Statistic	Prob.
Indonesia	HHI does not Granger Cause EG	34	0.000	0.996^{ns}
	EG does not Granger Cause HHI		1.062	0.311 ^{ns}
Malaysia				
	HHI does not Granger Cause EG	31	2.467	0.087*
	EG does not Granger Cause HHI		4.128	0.017*
Philippines				
	HHI does not Granger Cause EG	34	5.87355	0.0214*
	EG does not Granger Cause HHI		2.46651	0.1264 ^{ns}
Singapore				
	HHI does not Granger Cause EG	33	0.43073	0.6543 ^{ns}
	EG does not Granger Cause HHI		1.51326	0.2377 ^{ns}
Thailand				
	HHI does not Granger Cause EG	32	0.00429	0.9482 ^{ns}
	EG does not Granger Cause HHI		0.03394	0.8551 ^{ns}

*Significant at 10% level ^{ns}Not significant at 10% level

SUMMARY, CONCLUSION and RECOMMENDATION

Summary and Conclusion

This paper investigated the relationship between export geographical diversification and economic growth on ASEAN countries using time series data from 1980-2014. The study employed the Herfindahl index of export concentration as a measure of the variable export geographical diversification, and real GDP per capita growth as the measure of economic growth. Standard time series procedures were conducted first to examine the relationship of the two variables. The stationarity of variables are first inspected using the Augmented Dickey-Fuller (ADF) test. Using Eviews package version 8, unrestricted Vector Autoregressive (VAR) analysis was employed to investigate the linkage between the variables and estimate the parameters of VAR equation. Finally, to determine the direction and magnitude of the relationship, the study employed Granger causality test.

Important results of the VAR model estimation for ASEAN countries are summarized and shown in Table 8.The VAR results showed that only Malaysia and Philippines showed significant relationship between the variables EG and HHI. An inverse relationship from EG to HHI is shown for the case of

Malaysia, while a positive relationship is showed in the Philippines. From HHI to EG, a direct relationship is shown in Malaysia while an inverse relationship is shown in the Philippines.

Table 8. Summary of important results of the VAR model.

Country	HHI	EG
Indonesia	EG is not significantly related to HHI	HHI is not significantly related to EG
Malaysia	EG is inversely related with HHI	HHI is directly related with EG
Philippines	EG is directly related to HHI	HHI is inversely related to EG
Singapore	EG is not significantly related to HHI	HHI is not significantly related to EG
Thailand	EG is not significantly related to HHI	HHI is not significantly related to EG

Table 9 shows the summary of important results of the Granger causality test in ASEAN countries. The indicated that for Malaysia, there exists a bidirectional relationship between the variable EG and HHI. On the other hand, the Philippines has showed a unidirectional relationship from HHI to EG. However, for the rest of the countries, Indonesia, Singapore and Thailand, results revealed no existing relationship between the two variables in these countries.

Table 9. Summary of the important results of the Granger causality test.

Country	HHI	EG
Indonesia	No causality	No causality
Malaysia	EG Granger-causes HHI	HHI Granger-causes EG
Philippines	HHI Granger-causes EG	No causality
Singapore	No causality	No causality
Thailand	No causality	No causality

Recommendations

Based on the results of the study, the following recommendations are suggested:

1. Since Malaysia and Philippines revealed an existing relationship between the variables, policy makers should focus on formulating and implementing appropriate strategies to further improve their export structure to further improve their economies. To strengthen export diversification within these countries, improving and creating free trade agreements (FTAs) with existing partners is suggested.
2. For the case of the Philippines of having a unidirectional relationship from HHI to EG, diversifying their export structure in terms of market destinations could help in improving the economy by

providing a wider source of demand for their export commodities which could help mitigate external risks.

Areas for Further Research

The following areas are suggested for further research:

1. The study can be extended by investigating the factors that could significantly affect the export geographical diversification of countries. This is helpful especially in the case of the Philippines where a unidirectional relationship is showed.
2. The study could be further improved by using other econometric methods of estimation, i.e. GMM estimation that could also be used to investigate the relationship of the variables which might lead for more efficient and robust results. Inclusion of other variables and adding country samples is helpful in determining the relationship between export diversification and economic growth.

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