

# Is Trade an Engine of Growth? VEC-Granger Causality Evidence from ASEAN Countries

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## Abstract

This paper investigates the causal relationship between foreign trade, economic growth, and private bank investment in ASEAN<sup>2</sup> countries applying the Error Correction Model and VEC Granger causality/Wald Exogeneity tests. Of nine ASEAN countries, the VEC Granger causality/Wald Exogeneity results found net export (NX) Granger caused the economic growth (GDP) of Malaysia, Philippine, Singapore, Thailand, Cambodia, and Vietnam confirming the hypothesis that trade is an engine of economic growth. On the other hand, economic growth Granger caused/promoted trade in Indonesian and Thailand. Private bank credit Granger caused GDP in Philippine and Vietnam.

The paper suggests policy prescriptions

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**Keywords:** Trade, Economic growth, Vector Error correction, Granger Causality, ASIAN Countries

## 1 Introduction

There are two views on economic growth and trade. One group of economists believe in the classical view that ‘trade is an engine of growth’. Trade is beneficial

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<sup>2</sup> ASEAN is the Association of Southeast Asian Nations comprising of ten Southeast Asian states. They are Brunei, Indonesian, Malaysia, Myanmar, Philippine, Singapore, Thailand, Cambodia, Vietnam, and Laos. Lack of data Laos is excluded.

for both nations based on Adam Smith's absolute cost advantage and David Ricardo's comparative cost advantage. According to this group of economists, international trade provides several advantages. (i) International trade provides large markets by opening up the opportunities of global market to the entrepreneurs of the developing nations. (ii) International trade also provides the latest technology readily available to the businesses operating in these countries. (iii) It results in increased competition both in the domestic and global markets. To compete with their global counterparts, the domestic entrepreneurs try to be more efficient and this in turn ensures efficient utilization of available resources and low cost of production. (iv) An opening of trade also brings in a host of related opportunities, such as cultural change in consumption pattern, for the countries that are involved in international trade. (v) An increase in exports means increase in employment in export sector industries which, in turn, increase income and GDP. (vi) Reallocating resources from less productive sectors to such sector as exports industry and exports growth promotes GDP growth (Ben-David and Loewy, 1998). Lastly, exports support foreign exchange earnings which, in turn, assist importing capital goods.

The other group of economists is of the views the trade has negative impact on the economic growth of less developed countries (LDC). According to them, the gains from trade are mostly enjoyed by developed nations of the world. Liberalization of trade policies, reduction of tariffs and globalization have adversely affected the industrial setups of the less developed and developing economies. As an aftermath of liberalization, majority of the infant industries in these nations have closed their operations. Many other industries that used to operate under government protection found it very difficult to compete with their global counterparts. Second, as the LDC supply raw material, they do not strong bargaining power. So, the terms of international trade are mostly in favor of rich and developed nations. Third, international trade opening up the opportunities of increased consumption of conspicuous goods for the economies elite class, not available before, eats up domestic saving and investment.

Based on two above views, this paper empirically examined the causal relation as well as the direction of causality between trade and economic growth applying the Vector Error Correction (VEC) and the VEC Granger Causality/Block Exogeneity Wald Tests in the South East Asian countries.

South East Asian countries provide good ground for testing the hypothesis whether trade promotes economic growth or the other way. Because of (i) the level of economic growth and the volume of trade are not the same. Some of these nations are in the categories of developed nations and some are not. (ii) The level of economic and political stability are also different among these countries.

The paper is organized as: the survey of literature will be discussed in Section 2. Data and the methodology are described in Section 3. Empirical results and policy prescriptions are presented in Section 4. Conclusions are provided in Section 5.

## **2 Survey of Literature**

Haisao (1987) examined the causal relation between export and economic growth in four Asian countries: Hongkong, South Korea, Singapor, and Taiwan. He found no causal relation between trade and economic growth except for Hongkong. His Sm test found bidirectional causality.

Josheski and Lazarov (2002) examined 208 regions and found that the ratio of trade volume (sum of export and import) to GDP has positive impact on economic growth.

Awokuse (2005), Balassa (1978a; 1988b), Buffie (1992) found that the import of capital and intermediate goods stimulated domestic growth.

Cross-country studies by Balassa (1988) and Moschos (1989) found supports for export led growth i.e. positive association between exports and economic growth. Islam (1998) causality test found that export expansion led economic growth in two-third of fifteen Asian countries. Similarly, studies such as Grabowski et al (1990), Sharma et al (1991) found support in favor of exports led to economic growth (ELG).

On the other hand, studies of Yamada (1998), Boltho (1996) and Afxentiou and Serletis (1991) found contrary results. They found evidences in support of growth-led exports, i.e. economic growth led trade-growth. The result is collaborated by Kwan and Cots Mitis (1991). Using the Granger causality test to Chines growth and foreign trade, they found economic growth granger caused trade-growth

Awokuse (2005); Giles and Williams (2000); Hatemi (2002) and found bi-directional causality between exports and economic growth. Shan and sum (1998) used VAR in exploring causal relation and found no causal relation between economic growth and export. Similarly, Jung and Marshal (1985) found no causal relation between the growth and trade openness.

The short survey of literature found, first, no evidence of studies for ASEAN countries. Second, there was no evidence of studies that incorporated net export (NX), that is, export minus import.

### 3.1. Data

Time series data for gross domestic product (GDP), net export which is exports minus imports (NX), and private bank credit (PBKCREDT) during 1970-2015<sup>3</sup> are obtained from the World Bank publication, International Financial Statistics. All series are annual.

The descriptive statistics for all variables are provided in Table 1. In Appendix.

### 3.2. Methodology

As the exogeneity among variables, foreign trade, economic growth and financial growth, are indeterminate, based on Sim (1980), this paper applied Vector Error Correction. As the VEC required stationarity and the cointegration test of the series, this paper applied augmented Dickey-Fuller (ADF) test, Phillip Parron (PP) test, the Dicky Fuller (DF) Unit Root with Break test, and Johansen (1991 and 1995a) cointegration test.

#### 3.2.1. Unit Root Tests

Since the publication of Nelson and Plosser (1982), it is widely recognized that most time series macroeconomic variables contain unit root i.e. variable  $X_t \sim I(1)$ . So, this paper, first, examines the existence of unit root for variables: GDP, NX, and PBKCRDT using the augmented Dickey-Fuller (ADF) test, Phillip Parron (PP) test, and the Dicky Fuller (DF) Unit Root with Break test. In the following equation, the null hypothesis,  $\alpha=0$  is tested against the alternative hypothesis,  $\alpha<0$ :

$$\Delta y_t = \alpha_0 + \beta t + \gamma y_{t-1} + \sum_i^k \lambda_i \Delta y_{t-1} + \varepsilon_t \quad (1)$$

Schwarz Bayesian Criterion (SBC) will be used to determine the lag length or K. The results of ADF and PP test are presented in the empirical section.

#### 3.2. 2. Structural Break Test

The issue of testing the presence of unit root gained further momentum when Parron (1989) emphasized the importance of structural break while testing the unit root test. The structural break test is needed because the most macroeconomic series suffers some kind of shock i.e. structural break. So, the unit root test is not enough. Parron (1989) argued that conventional unit root tests have low power to reject the null hypothesis of nonstationarity when there is a structural break in the series. To overcome this problem, Parron (1989) modified the augmented Dickey Fuller (ADF) test by adding dummy variables to account for structural breaks at

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<sup>3</sup> All countries don't have data series starting from 1970 and ending at 2015. The variation of year, if any, is mentioned

known points in time. Zivot and Andrews (1992) suggested that structural breaks in the series may be endogenous and they extended Parron's methodology to allow for the endogenous estimation of the break date. We employ the following two alternative models proposed by Zivot and Andrews (hereafter ZA) to examine the presence of unit root with structural break in the GDP, NX and PBKCREDT series:

$$\text{Model C: } \Delta \text{GDP}_t = \mu + \phi \text{DU}_t(\lambda) + \beta t + \gamma \text{DT}_t(\lambda) + \alpha \Delta \text{NX}_{t-1} + \sum_j \Delta \text{PBKCREDT}_{t,j} + \varepsilon_t \quad (2)$$

where  $\text{GDP}_t$ ,  $\text{DU}_t$  and  $\text{DT}_t$  are indicator variables for mean shift and trend shift for the possible structural break-date ( $TB$ ) and they are described as following:

$$\text{DT}_t = \begin{cases} t - TB & \text{if } t > TB \\ 0 & \text{otherwise} \end{cases}$$

The null hypothesis of unit root ( $\alpha=0$ ) can be tested against stationary with structural breaks ( $\alpha<0$ ) in Equations 1 and 2. Every time points are considered as a potential structural break date in the ZA unit root test and the break date is determined according to minimum one-sided t-statistic. Results of Zivot-Andrew test are provided in Table 3.

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### 3.2.3. Cointegration Test

Having established that the variables are non-stationary I(1), there raises the possibility that they are co-integrated. Consequently, the co-integration properties of the variables are examined. It is, thus, necessary to determine whether there is at least one linear combination of these variables that is I(0). To investigate multivariate cointegration, this paper applies Johansen (1991 and 1995) VAR based Trace and Maximum Eigenvalue tests. Johansen (1991 and 1995a) cointegration is a VAR test and written in general form as:

$$\Delta Y_t = \pi Y_t - 1 + \sum_{i=1}^{p-1} \tau_i \Delta Y_t - i + \beta X_t + \varepsilon_t \quad (3)$$

$$\text{Where } \Pi = \sum_{i=1}^p \beta_i - I \quad \text{and} \quad \tau = - \sum_{j=i+1}^p \beta_j$$

Based on Granger's theorem, if the coefficient matrix  $\Pi$  has reduced rank  $r < k$ , then there exists  $k \times r$  matrices  $\alpha$  and  $\beta$  each rank  $r$  such that  $\Pi = \alpha\beta'$  and  $\beta'yt$  is  $I(0)$ .  $r$  is the number of cointegrating relations (the cointegrating rank) and each column of  $\beta$  is the cointegrating vector. The null hypothesis is that number of cointegration:

$$H_0 : r=0, H_a : r=1$$

### 3.2.4 Vector Error Correction and Unrestricted VAR

Finally, this paper uses model for direction of causality. VEC is applied when series are found cointegrated tested by Johansen (1991 and 1995) VAR based Trace and Maximum Eigenvalue tests. Unrestricted VAR is employed to determine the direction of causality if the series are not cointegrated.

In terms of three variables, GDP, NX, and PBKCREDIT, VECM can be written and estimated from:

$$\Delta GDP_t = \sum \alpha_1 \Delta GDP_{t-1} + \sum \beta_1 \Delta NX_{t-1} + \sum \gamma_1 \Delta PBKCREDIT_{t-1} + \lambda_1 (GDP_{t-1} - NX_{t-1} - PBKCREDIT_{t-1}) + u_t \quad (4)$$

$$\Delta NX_t = \sum \alpha_2 \Delta NX_{t-1} + \sum \beta_2 \Delta GDP_{t-1} + \sum \gamma_2 \Delta PBKCREDIT_{t-1} + \lambda_2 (NX_{t-1} - GDP_{t-1} - PBKCREDIT_{t-1}) + u_t \quad (5)$$

$$\Delta PBKCREDIT_t = \sum \alpha_3 \Delta PBKCREDIT_{t-1} + \sum \beta_3 \Delta GDP_{t-1} + \sum \gamma_3 \Delta NX_{t-1} + \lambda_3 (PBKCREDIT_{t-1} - NX_{t-1} - GDP_{t-1}) + u_t \quad (6)$$

Where  $\lambda_1$ ,  $\lambda_2$ , and  $\lambda_3$  are the coefficients of error correction term (ECT) for  $(GDP_{t-1} - NX_{t-1} - PBKCREDIT_{t-1})$ ,  $(NX_{t-1} - GDP_{t-1} - PBKCREDIT_{t-1})$ , and  $(PBKCREDIT_{t-1} - NX_{t-1} - GDP_{t-1})$  respectively.

The null hypothesis, now that NX does not Granger cause GDP given PBKCREDIT,  $H_0 (\alpha_1 = \lambda_1 = 0)$ . That is, there are two sources of causation for economic growth, GDP, either through the lagged terms of  $\Delta NX_{t-1}$  or through the lagged Error correction term, i.e. the lagged cointegrating vector.

In the Error Correction Model, the causality inference is obtained through the significance of  $\lambda_i$ . That is, the null hypothesis that NX and PBKCREDIT do not Granger cause GDP is rejected if  $\lambda_i$ , (the coefficient of error correction term) is statistically significant even if  $\sum \beta_i$  and  $\sum \gamma_i$  (from 4, 5, and 6) are not jointly significant.

Granger causality direction is obtained from VEC estimates applying Granger Causality/block exogeneity - tests.

## 4 Empirical Results

Results of unit root test for variables, GDP, NX, and PBKCREDT are provided in Table 1 and Table 2. Results of Johansen cointegration test for GDP, NX, and PBKCREDT are provide in Table 3. Result of VEC model is presented in Table 4.

Table 1: Results of Unit Root Test of Augment Dicky-Fuller and Phillip Parron

Country	Variables	Augment Dicky Fuller Test $\Delta y_t = \alpha_0 + \beta t + \gamma y_{t-1} + \sum_i^k \lambda_i \Delta y_{t-1} + \varepsilon_t$		Phillip Parron (intercept and Trend)	
		Level	1 <sup>st</sup> difference	Level	1 <sup>st</sup> difference
Brunei	GDP	-3.47***	-5.36*	-2.74	-5.21*
	NX	0.63	-4.58*	0.63	-4.58*
	PBKCRDT	-2.53	-4.24**	-2.56	-5.74*
Indonesia	GDP	1.23	-4.76*	0.89	-4.69*
	NX	-2.24	-6.17*	-2.37	-6.98*
	PBKCRDT	-2.18	-4.29*	-1.87	-4.22**
Malaysia	GDP	0.51	-6.91*	0.71	-6.91*
	NX	-1.82	-4.98*	-1.60	-4.98*
	PBKCRDT	-1.35	-5.73*	-1.65	-5.72*
Myanmar	GDP	0.30	-6.90*	11.47	-6.90*
	NX	-1.22	-7.05*	-1.34	-4.67*
	PBKCRDT	-2.74	-5.21*	-1.79	-8.06*
Philippine	GDP	4.01	-3.67**	4.04	-3.69**
	NX	-2.33	-6.79*	-2.41	-6.79*
	PBKCRDT	-2.79	-4.61*	-2.27	-4.52*
Singapore	GDP	2.82	-1.90	0.03	-6.85*
	NX	-2.26	-1.90	0.22	-13.64*
	PBKCRDT	-2.28	-7.08*	-2.54	-7.08*
Thailand	GDP	-1.76	-5.45*	-1.78	-5.45*
	NX	-2.57	-5.80*	-2.52	-6.46*
	PBKCRDT	-1.99	-3.68**	-1.99	-3.70**
Cambodia	GDP	-1.32	-2.87	-0.84	-2.94
	NX	-2.28	-3.94**	-2.14	-4.95*
	PBKCRDT	1.84	-3.73**	2.07	-3.73**
Vietnam	GDP	1.29	-3.13	1.00	-2.23
	NX	-3.96**	-3.97**	-2.25	-2.73
	PBKCRDT	-1.91	-3.88**	-1.91	-3.86**

\*= Significant at 1 percent level, \*\* = Significant at 5 percent level, and \*\*\* = Significant at 10 percent level.

Results of unit root test for stationarity of series show all series are stationary at first difference except for GDP series of Cambodia and Vietnam.

Table 2: DF Unit Root with Break Test and Zivot-Andrew Unit Root with structural Break Test

Country	Variables	DF Unit Root with Break Test		Zivot-Andrew Unit Root test with a structural Break	
		Level	1 <sup>st</sup> difference	Statistics	Break year
Brunei	GDP	-4.42	-5.39**	-5.08**	1992
	NX	-3.30	-5.19**	-3.38	2005
	PBKCRDT	-8.42*	-4.38	-3.69	2005
Indonesia	GDP	-1.98	-5.63*	-1.22	2007
	NX	-4.14	-6.92*	-4.39**	1981
	PBKCRDT	-11.15*	-14.09*	-7.00*	1999
Malaysia	GDP	-1.03	-8.60*	-0.22	2004
	NX	-5.98*	-7.98*	-6.009*	1998
	PBKCRDT	-3.58	-6.94*	-5.22**	1996
Myanmar	GDP	-1.31	-8.37*	-1.31	1989
	NX	-5.95*	-7.98*	-6.00*	1998
	PBKCRDT	-4.82	-6.77*	-5.22*	1996
Philippine	GDP	1.12	-4.39**	0.67	1984
	NX	-2.71	-7.57*	-3.07	2006
	PBKCRDT	-3.55	-4.52*	-3.60	1995
Singapore	GDP	-1.69	-6.32*	-1.58	1999
	NX	-7.79*	-7.37*	-4.56*	2000
	PBKCRDT	-5.36**	-6.94*	-5.22**	1996
Thailand	GDP	-2.52	-6.66*	-3.05	1982
	NX	-5.11**	-7.94*	-6.43*	1998
	PBKCRDT	-3.72	-8.45*	-3.61	1999
Cambodia	GDP	-4.04	-3.03	-2.92	2010
	NX	-7.96*	-5.57**	-4.11	2008
	PBKCRDT	-3.58	-5.53**	-0.93	2011
Vietnam	GDP	-1.87	-4.36	-1.24	2001
	NX	-6.57*	-12.40*	-9.93*	2007
	PBKCRDT	-4.08	-6.12*		

\*= Significant at 1 percent level, \*\* = Significant at 5 percent level, and \*\*\* = Significant at 10 percent level.



Results of unit root with break test and unit root with structural break test show, in Table 2, that all series suffer from structural break. Results also show the all series for all countries are stationary at first difference except for the GDP of Vietnam and Cambodia and the private bank credit (PBKCRDT) of Brunei.

Table 3: Results of Johansen Co-integration Tests

<b>Country</b>	<i>Johansen Trace Test</i> <i>Series: GDP NX PBKCREDT</i>			<i>Johansen Maximum Eigen value Test</i> <i>Series: GDP NX PBKCREDT</i>		
	Hypothesized No of CE (S)	Trace Statistics	Critical Value	Hypothesized No of CE (S)	Max-Eigenvalue Statistics	Critical Value
Brunei	R=0	59.53*	29.79	R=0	48.18*	21.13
	R=1	15.89	15.91	R=1	13.34	14.26
	R=2	3.68	3.84	R=2	0.08	3.84
Indonesia	R=0	59.53*	29.79	R=0	43.63*	21.13
	R=1	15.40	15.79	R=1	12.20	14.26
	R=2	3.68	3.84	R=2	3.68	3.84
Malaysia	R=0	45.82**	42.91	R=0	33.21*	25.82
	R=1	12.60	25.87	R=1	8.89	19.38
	R=2	3.71	12.51	R=2	3.71	12.51
Philippine	R=0	32.68**	29.79	R=0	18.15	21.13
	R=1	14.50	15.49	R=1	8.42	14.26
	R=2	6.08**	3.84	R=2	6.08**	3.84
Singapore	R=0	38.06*	29.79	R=0	26.94*	21.13
	R=1	11.12	15.49	R=1	6.36	14.26
	R=2	4.75	3.84	R=2	4.75	3.84
Thailand	R=0	64.52*	29.79	R=0	42.58*	21.13
	R=1	21.94*	15.49	R=1	19.39*	14.26
	R=2	2.55	3.84	R=2	2.55	3.84
Cambodia	R=0	38.83*	28.79	R=0	26.28*	21.13
	R=1	12.53	15.49	R=1	11.37	14.26
	R=2	1.15	3.84	R=2	1.15	3.84
Vietnam	R=0	33.38**	29.79	R=0	21.77**	21.13
	R=1	11.60	15.49	R=1	9.63	14.26
	R=2	1.96	3.84	R=2	1.96	3.84

\*= Significant at 1 percent level, \*\* = Significant at 5 percent level, and \*\*\* = Significant at 10 percent level.

Results of both Trace test and Eigen value test, in Table 3, shows that all series for GDP, NX, and PBKCRDT are cointegrated for all countries. The rejection of null hypothesis of no cointegration provides strong support for conintegration.

Table 4: Results of Vector Error Correction Model

Countries	VEC Equation	Coefficient of ECT ()	R <sup>2</sup>	F-statistics
Brunei	D(GDP)	-054 (-2.02)*	0.85	5.77
	D(NX)	0.76 (1.01)	0.91	33.04
	D(PBKCRDT)	-0000(-1.40)	0.81	4.45
Indonesia	D(GDP)	-0.01(-3.44)*	0.55	5.77
	D(NX)	-0.003(-1.66)	0.29	1.51
	D(PBKCRDT)	-0.000(-1.12)	0.78	13.21
Malaysia	D(GDP)	-0.20(-3.70)*	-.47	5.78
	D(NX)	0.000(0.60)	0.20	1.36
	D(PBKCRDT)	-0.000(-2.37)*	0.26	1.97
Philippine	D(GDP)	0.008(0.80)	0.61	8.55
	D(NX)	-0.01(-2.7)*	0.17	1.86
	D(PBKCRDT)	-0.000(-1.53)	0.21	1.49
Singapore	D(GDP)	-0.18(-4.54)*	0.65	7.89
	D(NX)	-0.12(-2.43)*	0.34	2.22
	D(PBKCRDT)	-0.000(-2.09)	0.48	3.91
Thailand	D(GDP)	-0.12(-3.10)*	0.38	3.39
	D(NX)	-0.16 (4.2)*	0.45	4.49
	D(PBKCRDT)	0.000(0.70)	0.61	8.37
Cambodia	D(GDP)	-0.012(-0.91)	0.68	3.36
	D(NX)	-0.02(-2.71)*	0.62	2.83
	D(PBKCRDT)	-0.000(-1.90)	0.72	4.57
Vietnam	D(GDP)	-.05(-5.58)*	0.67	48.65
	D(NX)	-0.12(-1.53)	0.44	1.66
	D(PBKCRDT)	0.000(2.17)	0.56	1.87

\*= Significant at 1 percent level, \*\* = Significant at 5 percent level, and \*\*\* = Significant at 10 percent level.

Results of the error correction model, reported in Table 4, shows that the coefficient of the ECT for GDP was negative, as expected in the VEC model, and the coefficient of ECT was significant for Brunei, Indonesia, Malaysia, Singapore, Thailand, and Vietnam.

The coefficients of the ECT associated with net export (NX) and PBKCRDT were negative and consistent for Philippine, Cambodia, Thailand, and Singapore and the coefficients were also significant.

The significance of the ECT suggests that there was short term dynamics. If the series are deviated from long run equilibrium, the variables will come back to equilibrium. The amount of time needed to restore equilibrium for variables can be determined by (1/coefficient).

Table 5: VEC Granger Causality/Block Exogeneity Wald Test

		Dependent variables			
		Chai <sup>2</sup> Statistics			
	Independent variables	D(GDP)	D(NX)	D(PBKCRDT)	Causality direction
Brunei	D(GDP)		1.05	4.63***	GDP→PBKCRDT
	D(NX)	0.68		0.54	
	D(PBKCRDT)	0.20	13.65*		PBKCRDT→NX
Indonesia	D(GDP)		4.70***	60.48*	GDP→NX GDP→PBKCRDT
	D(NX)	2.50		3.76	
	D(PBKCRDT)	0.66	4.12		
Malaysia	D(GDP)		1.14	4.48***	GDP→PBKCRDT
	D(NX)	5.27**		0.45	NX→GDP
	D(PBKCRDT)	1.52	4.52***		PBKCRDT→NX
Philippine	D(GDP)		2.59	3.07	
	D(NX)	4.59***			NX→GDP
	D(PBKCRDT)	8.66**	0.78	0.88	PBKCRDT→GDP
Singapore	D(GDP)		2.73	18.19*	GDP→PBKCRDT
	D(NX)	22.83*		9.89*	NX→GDP NX→PBKCRDT
	D(PBKCRDT)	2.43	0.63		
Thailand	D(GDP)		15.36*	8.45**	GDP→NX GDP→PBKCRDT
	D(NX)	8.09*		8.36**	NX→GDP NX→PBKCRDT
	D(PBKCRDT)	2.31	6.87**		PBKCRDT→NX
Cambodia	D(GDP)		3.61	9.34*	GDP→PBKCRDT
	D(NX)	6.38**		4.99***	NX→GDP NX→PBKCRDT
	D(PBKCRDT)	0.25	6.48**		PBKCRDT→NX
Vietnam	D(GDP)		1.33	4.22	
	D(NX)	10.53*		7.12**	NX→GDP NX→PBKCRDT
	D(PBKCRDT)	17.68*	0.76		PBKCRDT→GDP

Results of vector error correction Granger causality tests, in Table 5, showed that NX Granger caused the economic growth (GDP) for Malaysia, Philippine, Singapore, Thailand, Cambodia, and Vietnam.

The causation of economic growth through the net exports in six countries out of nine ASEAN countries during the period of study supports the hypothesis that trade is the engine of growth.

Results of vector error correction/Granger causality tests show that GDP Granger caused the NX of Indonesia and Thailand. That is, GDP promotes trade of these countries.

Bidirectional Granger causality between NX and GDP was found only in Thailand.

Private bank credit (PBKCRDT) Granger caused GDP in Philippine and Vietnam. On the other hand, PBKCRDT was found to Granger cause NX in Brunei, Malaysia, Thailand, and Cambodia.

#### **4.1 Policy Prescriptions**

The government of six countries where net export promotes economic growth should lay emphasis on promoting and protecting the industries that support export. The government should protect and support the export-import oriented industries of the country.

The government of the countries where bank credit promoted economic growth should undertake policies to provide incentive and encouragement to the local financial institutions for providing adequate credits to meet the growing needs of the export-import industries.

## **5 Conclusions**

As the exogeneity among foreign trade, economic growth and financial growth are indeterminate, based on Sim (1980) this paper applied Vector Error Correction (VEC). As the VEC required stationarity of series and the cointegration in the series, this paper applied ADF, PP, Dicky Fuller and Zivot-Andrew break tests. Results of the test showed that all series stationary at first difference. Results of Break test (The Dicky Fuller and Zivot-Andrew) shows that the series had break at level.

Johansen cointegration test was applied found that the series were cointegrated for all countries.

Results of the VEC found the coefficient of the ECT for GDP was negative was significant for Brunei, Indonesia, Malaysia, Singapore, Thailand, and Vietnam. The significance of the ECT suggests that there was short term dynamics. If the series are deviated from long run equilibrium, the variables will come back to equilibrium. The amount of time needed to restore equilibrium for variables is determined by  $(1/\text{coefficient})$ .

The coefficients of the ECT associated with net export (NX) and PBKCRDT were negative and significant for Philippine, Cambodia, Thailand, and Singapore.

Results of the VEC Granger Causality/Block Exogeneity Wald Test found that NX Granger caused the GDP growth in six of the nine ASEAN countries (Malaysia, Philippine, Singapore, Thailand, Cambodia, and Vietnam) confirming the hypothesis that trade is an engine of economic growth.

Results of the VEC/Granger causality tests also found that GDP Granger caused the NX of Indonesia and Thailand. That is, GDP promotes trade of these countries.

Bidirectional Granger causality between NX and GDP was found only in Thailand.

Private bank credit (PBKCRDT) Granger caused GDP in Philippine and Vietnam. The paper provides policy prescription that the government of Malaysia, Philippine, Singapore, Thailand, Cambodia, and Vietnam should protect and support the export-import oriented industries where NX promotes economic growth of the country.

The government of Philippine and Vietnam should undertake policies to provide incentive to the local financial institutions for providing the adequate credit to import-export industries where bank credit promotes economic growth and trade.

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