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Investigating the Causal Relationship between Export and Economic Growth: A Malaysian Perspective

[1] Diana Nabila Chau Abdullah, [2] Mohd Shahidan Shaari, [3] Nor Ermawati Hussain

[1] Faculty of Business, Economics and Accountancy, Universiti Malaysia Sabah, Malaysia
[2] School of Business Innovation and Technopreneurship, Universiti Malaysia Perlis, Malaysia
[3] School of Social and Economic Development, Universiti Malaysia Terengganu, Malaysia
Corresponding author Mohd Shahidan Shaari: shahidanshaari@unimap.edu.my

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Abstract
Export is perceived to be an important factor of economic growth in numerous countries irrespective of their economic status whether they are developing or developed. Economic growth is also regarded as a determinant of export in various countries. These two issues have attracted researchers to investigate the bidirectional relationship between export and economic growth. However, most of them found a unidirectional relationship. Therefore, this study attempts to prove the existence of a bidirectional relationships between export and economic growth in Malaysia. Annual data on export, GDP, employment and fixed capital formation were collected and analysed from 1984 to 2014. The Vector Autoregressive Model (VAR) was employed and the findings show that there is a bidirectional relationship between export and economic growth in Malaysia. Therefore, a rise in export can boost economic growth and vice versa.
Keywords: Export, Economic Growth, Labour, Capital, VAR.

INTRODUCTION

The issue of economic growth has intrigued numberless researchers to ascertain its determinants. Economic growth is one of the macroeconomic goals for all countries. Thus, formulating the right policies is tremendously important to bear fruit to the country. Some previous studies suggested that increasing the tourism sector can help improve economic growth (Lee & Brahmasrene, 2013; Pablo-Romero & Molina, 2013; Salmani et al., 2014). Some said that economic growth can be enhanced by increasing foreign direct investment (Dilek & Aytac, 2009; John, 2016).

Export is profoundly a primary factor that can lead to economic growth (see, Ozturk, 2012; Saned & Hussain, 2015; Acaravci & Shafiullah et al., 2017). The increase proliferation in exports can result in higher employment (Dizaji & Badri, 2014) whereby numerous job opportunities will be available to people. Apart from that, the escalation of exports also implies a higher international demand for domestic goods and services. This will prompt domestic firms to hire more workers to increase their production to meet the higher demand. Therefore higher

economic growth can ensue from the higher exports. The Cobb-Douglas production function underlines the dependency of inputs, particularly, labour and capital, on output. Therefore, as the employed rises, output can increase in tandem.

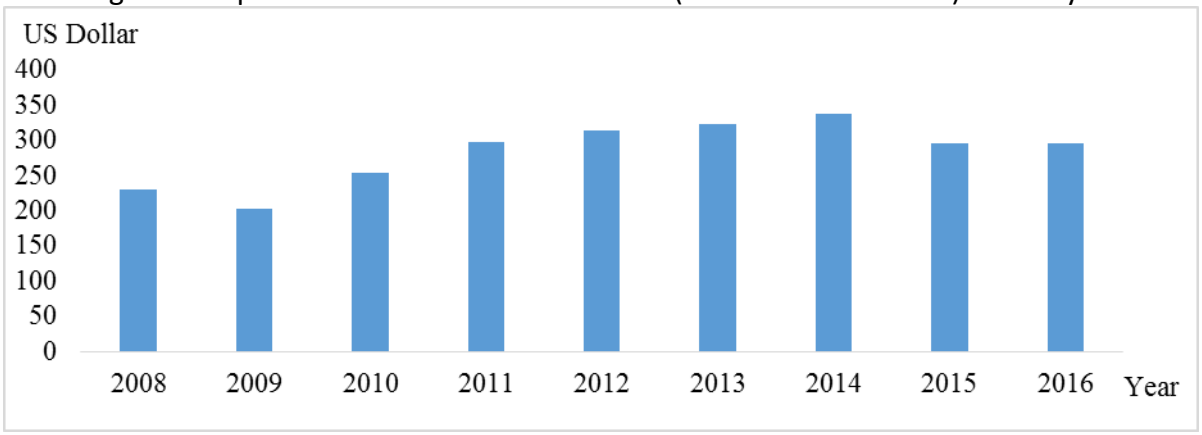
Nevertheless, the question whether export can really help boost economic growth, fuels debate among economists and has been prevalent in the economic discourse. This situation is detrimental to some countries particularly, the uncompetitive firms. When a country starts trading internationally, it entails a reduction in the trade barriers. Consequently, this implies high competition for small firms to secure their positions in the market. If they are not sufficiently competitive, they will be affected. This circumstance may lead to fallacy – that export acts as a catalyst for the economic growth.

In respect to exports, a few studies found the existence of unidirectional relationship running from economic growth to export, suggesting that export does not leave any effect on economic growth but economic can boost export (Konya, 2004; Albeydi et al., 2010; Abbas, 2012; Shihab et al., 2014). Higher economic growth also denotes higher production. This can prompt high competitiveness, causing firms to enjoy competitive advantages. Countries with higher economic growth tend to have better technology and thus they can churn out goods at low costs and sell at low prices. Therefore the demand for domestic goods will hike owing to lower prices. Despite the presence of a few studies that investigated the bidirectional relationship between exports and economic growth, most of them found only a unidirectional relationship between export and economic growth. Nevertheless, the previous studies that found the existence of bidirectional relationships between export and economic growth are still sparse. Hence it is important to investigate the bidirectional relationship between export and economic growth in Malaysia.

Reviews on exports and Gross Domestic Product (GDP) in Malaysia

According to the Economic Complexity Index (2015), Malaysia was ranked 18th in the world, as the largest exporting country in 2015. The highest exporting goods in that year was integrated circuits, followed by petroleum gas. The top exports destination of Malaysia was China, followed by the United States. Figure 1 shows the trends in exports in Malaysia from 2008 to 2016. From the figure, it can be learnt that Malaysia experienced fluctuations in exports. The export worth 199.41 billion USD was recorded in 2008 and it decreased to 157.24 billion USD in 2009. Subsequently, it rose to 198.61 billion USD and 228.09 billion USD in 2010 and 2011, respectively. The export dropped again in 2012 to 227.54 billion USD and recovered in the following year with a total of 228.33 billion USD. The export in 2016 was recorded 189.41 billion USD, which was lower as opposed to the previous year.

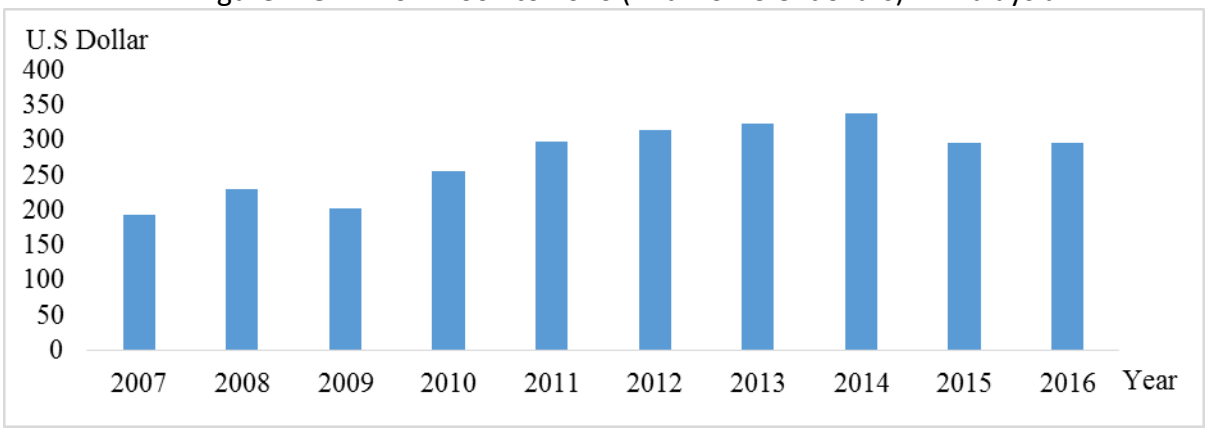
Figure 1: Export of Goods from 2008 to 2016 (in Billion U.S. Dollars) in Malaysia



Source: Trading Economics (2016)

In 2015, Malaysia, a developing country, was predominately dependent on the service sector which account for 54%, while the manufacturing sector captured only 25% of the total GDP (the Department of Statistic Malaysia, 2015). Figure 2 shows the trend in GDP in Malaysia from 2007 to 2015. GDP in Malaysia exhibited an increasing trend over the period. Malaysia recorded the lowest GDP in 2007 with a total of 230.81 USD billion over the period. Malaysia GDP recorded the highest over the period in 2014 with a total of 338.1 USD billion. In 2009, Malaysia was hit by economic recession, causing GDP to drop to 202.26 USD billion. Nevertheless, it recovered in the following year with a total of 255.02 USD billion. GDP remained stagnant in 2016 as it did not show any marked change in GDP compared to the previous year.

Figure2: GDP from 2007 to 2016 (in billion U.S. dollars) in Malaysia



Source: Trading Economics (2016)

LITERATURE REVIEW

The relationship between export and economic growth has been widely discussed by previous studies, naming a few, Abbas (2012), Sunde and Hussain (2017) and Shafiullah et al. (2017). They employed different methods to examine the relationship between the two variables in different countries. However most of them consistently found the same results (Acaravci &

Ozturk, 2012; Chemeda, 2001). A large number of previous studies applied the Multivariate approaches such as Johansen co-integration and Granger causality based on VECM (Chemeda, 2001; Cortés-Jiménez et al., 2009; Elbeydi et al., 2010; Abbas, 2012).

Ramos (2001) employed the Johansen co-integration and Granger causality based on VECM. The study aimed to investigate the relationship between export and economic growth in Portugal from 1865-1998. The findings indicated that there is a bidirectional relationship between export and economic growth in Portugal. Lee and Huang (2002) extended the study by including some controlled variables in their study, namely capital and labour. They used the same method as the method used by Ramos (2001), but the study was conducted in various countries: Hong Kong, Taiwan, Philippines, Korea, and Japan. The findings supported the existence of relationships between exports and economic growth in all the selected countries except Hong Kong.

Elbeydi et al. (2010) also applied the Johansen co-integration and Granger causality based on VECM to examine the relationship between export and economic growth but the study was carried out in Libya. Data on GDP and export from 1980 to 2007 were analysed and the results showed that economic growth does influence export but without feedback. Abbas (2012) extended the study of Elbeydi et al. (2010) by including exchange rate in the model. The same methods, the Johansen co-integration and Granger causality based on VECM, were applied to investigate the same relationship but in a different country, particularly, Pakistan. The data from 1975 to 2010 were analysed and the findings suggested that an increase in export can boost economic growth in Pakistan.

Saaed and Hussain (2015) also employed the Johansen co-integration to investigate the relationship between export and economic growth. The study was done in Tunisia from 1977 to 2012 but used the Pairwise Granger causality instead of Granger causality based on VECM. The results showed that export can affect economic growth but without feedback, implying that a proliferation of export can boost the economy.

Several other studies employed the ARDL approach to investigate the relationship between export and economic growth (Acaravci & Ozturk, 2012; Shafiullah et al., 2017; Sunde & Hussain, 2017). Acaravci and Ozturk (2012) conducted a study in ten transition European countries and analysed data from 1894 to 2008. Their findings were mixed across the ten countries. It was found that there is a bidirectional relationship between export and economic growth in Latvia and Slovak Republic. Hence a rise in export can help boost economic growth and a rise in economic growth can also boost export. It was also found that there is no relationship between export and economic growth in Slovenia, Romania, Lithuania, etc.

Sunde (2017) also investigated the association between export and economic growth but the study was executed in South Africa from 1990 to 2014. The study employed the ARDL approach as well as the Granger causality based on VECM. The results showed that export can have effects on economic growth and vice versa, denoting bidirectional relationship.

Shafiullah et al. (2017) investigated the relationship between export and economic growth in some regions in Australia. The study focused on export in a specific sector, namely, mining and fuels. The ARDL approach was adopted to analyse the quarterly data from 1990 to 2013. The findings disclosed that the exports of mining and fuels can be an important determinant of

economic growth in Australia and of its regions, for instance, New South Wales, Queensland, and Western Australia.

Dao (2014) also focused on exports in a specific sector, which is the manufacturing sector. The study was conducted in upper-middle-income economies. The Ordinary Least Square (OLS) method was employed to examine the relationship between the export and economic growth from 1980 to 1991. The study included capital and labour as controlled variables. The results showed that exports in the manufacturing sectors and exports in other sectors can have an effect on economic growth. However, the effects of export in other sectors are larger than that in the manufacturing sectors.

METHODOLOGY

This study use the annual data on export, GDP, employment and fixed capital formation were collected and analysed from 1984 to 2014. The equation established is as follows:

$$lnGDP_t = \alpha + \beta_1 lnEXP_t + \beta_2 lnK_t + \beta_3 lnL_t + \hat{e}_t \quad (1)$$

where GDP is gross domestic product, EXP is export, K is Capital, L is Labour and ê is stochastic. First, the unit root test was conducted to see the stationary of all variables at level and first differentiation (Seddighi, Lawler & Katos, 2000). The hypothesis for the unit root test is:

H_0 : δ = 0 (unit root exist / not stationary)

H_1 : δ ≠ 0 (unit root test does not exist / stationary)

Augmented Dickey Fuller (ADF) test is used in this test and the method is as follows:

$$\Delta Y_t = \alpha_0 + \sum_{i=1}^{a} \emptyset_1 Y_{t-1} + \sum_{j=1}^{b} \theta_j \Delta Y_{t-1} + \varepsilon_t \quad (2)$$

Without constant and linear trend:

$$\Delta Y_t = \delta Y_{t-1} + \mu_t \quad (3)$$

Constant:

$$\Delta Y_t = \alpha + \delta Y_{t-1} + \mu_t \quad (4)$$

Constant and linear trend:

$$\Delta Y_t = \alpha + \beta T + \delta Y_{t-1} + \mu_t \quad (5)$$

where Y refers to independent and dependent variables, Δ is the first differentiation, ε_t and μ_t is a random error. The Johansen cointegration tests is conducted to see the direct relationship between the variables. And the hypothesis for Johansen cointegration test is:

H_0 : δ = 0 (cointegration does not exist)

$H_1 : \delta \neq 0$ (cointegration exist)

The equation for Johansen cointegration test is as follows:

$$Y_t = \beta_1 + \beta_2 X_t + \mu_t \quad (6)$$

And the residual equation is:

$$\widehat{\mu_t} = Y_t - \widehat{\beta_1} - \widehat{\beta_2} X_t \quad (7)$$

Johansen cointegration test is based on the analysis of Vector Autoregressive (VAR) and VAR analysis is as follows:

$$Y_t = \alpha_1 Y_{t-1} + \cdots + \alpha_p Y_{t-p} + bx_1 + \varepsilon_t \quad (8)$$

where Y_t is stationary vector k. VAR equation can also be written as follows:

$$\Delta Y_t = \prod Y_{t-1} + \sum_{i=1}^{p-1} \Gamma_i \Delta Y_{t-i} + bx_t + \varepsilon_t \quad (9)$$

Next, the granger causality based on VAR test or Wald test is conducted. According to Ali, Hakim & Abdullah (2017), Wald test is conducted to study the causal relationship exists and the equation for Wald test is as follows:

$b_1 = b_2 = \ldots = b_k = 0$ (10)

FINDINGS

Unit Root test results

The results suggest that all the variables tested are not significant at level, suggesting that they have unit root and are not stationary for both intercepts with and without trends. As the variables are tested at firs difference, the results show that the variables have no unit root or are stationary for both intercepts with and without trends. Table 4.1 shows the results of the Unit Root test.

Table 4.1: Unit Root Test

Variables	Intercept		Intercept and Trend	
	Level	First Difference	Level	First Difference
L	-0.066049	-5.860489*	-2.367337	-5.745896*
	(0.9445)	(0.0000)	(0.3879)	(0.0003)
Ex	-1.192385	-4.985524*	-1.841045	-5.095767*
	(0.6644)	(0.0004)	(0.6593)	(0.0015)
K	-0.605433	-4.043664*	-1.750479	-3.957139**
	(0.8550)	(0.0041)	(0.7031)	(0.0221)
GDP	-0.234956	-5.598800*	-2.776467	-5.508851*
	(0.9233)	(0.0001)	(0.2161)	(0.0006)

Note: *, **, *** significant at 1%, 5%, 10% significant level respectively.

Lag Length Selection Test

The Lag Length Selection test was conducted to choose the best lag. There are four approaches that can be used, namely, the Schwarz Information Criterion (SC), Akaike information criterion

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(AIC), Hannan-Quin information criterion (HQ) and Final prediction error criterion (FPE), but AIC is mostly used. Therefore the lag length selected was 3. Then, the Johansen Co-Integration test was performed.

Table 4.2: Lag Selection Test Result

LAG	FPE	AIC	SC	HQ
0	2.30e-07	-3.933585	-3.743270	-3.875404
1	2.68e-10*	-10.70373	-9.752158*	-10.41283*
2	3.14e-10	-10.62520	-8.912365	-10.10157
3	2.97e-10	-10.89399*	-8.419896	-10.13763

Note: *, **, *** are respectively significant to 1%, 5% and 10%

Johansen Co-Integration Test

The Johansen Co-integration approach was applied to see whether there is a co-integration. Table 4.3 shows the results of the Johansen Co-integration. Based on the table, the results indicate that there is no co-integration. It also suggests that there is no long-run relationship between export and economic growth in Malaysia. This is because there is no significant value in the results of the Johansen Co-integration test. Therefore, VAR test is appropriate to be conducted.

Table 4.3: Johansen Co-Integration Test

Rank	Max-Eigen Statistic	Critical Value (Eigen) at 5%	Trace Statistic	Critical Value (Trace) at 5%
None	26.06548	27.58434	40.18800	47.85613
At most 1	9.300781	21.13162	14.12252	29.79707
At most 2	4.336848	14.26460	4.821736	15.49471
At most 3	0.484888	3.841466	0.484888	3.841466

Note: Trace test indicates no cointegration at the 0.05 level
* Denotes rejection of the hypothesis at the 0.05 level
** MacKinnon-Haug-Michelis (1999) p-values

VAR Results

VAR is important to examine the causal relationship between export and economic growth in Malaysia. Table 4.4 shows the results of the VAR test. Based on the table, the results show that export, capital and economic growth do not have any significant effect on labour. Other than that, that there is a significant effect of economic growth on export and it is significant at 10%. A 1% increase in economic growth can cause export to rise by 0.97%. The results also show that labour and capital do not significantly influence export. For the perspective of the effects on economic growth, it was found that export and labour can significantly affect economic growth while capital cannot. In addition, a 1% increase in labour and export can cause economic growth to soar by 0.83% and 0.17%, respectively. The findings also show that export, labour and economic growth do not leave any significant effect on capital.

Table 4.4: VAR Results

Dependent Variable: L	Coefficient	Std. Error	t-Statistic	Prob.
ECT	-0.975924	0.119069	-8.196278	0.0000*
Ex	0.021730	0.030339	0.716233	0.4805
K	0.009180	0.019664	0.466839	0.6447
GDP	-0.026872	0.081269	-0.330650	0.7437
C	0.387953	1.307647	0.296680	0.7692
Dependent Variable: Ex	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
ECT	-0.539560	0.202315	-2.666931	0.0132**
L	-0.691652	0.794003	-0.871095	0.3920
K	-0.144344	0.131129	-1.100777	0.2815
GDP	0.971490	0.541935	1.792631	0.0851***
C	6.351919	8.719936	0.728436	0.4731
Dependent Variable: GDP	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
ECT	-0.408261	0.230434	-1.771702	0.0886***
L	0.826689	0.337615	2.448616	0.0217**
Ex	0.171587	0.086026	1.994605	0.0571***
K	0.035558	0.055757	0.637739	0.5294
C	-8.434422	3.707769	-2.274797	0.0318**
Dependent variable: K	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
ECT	-0.876390	0.161485	-5.427060	0.0000*
L	0.836672	0.977813	0.855657	0.4003
Ex	0.221735	0.249151	0.889966	0.3820
GDP	-0.528605	0.667392	-0.792046	0.4358
C	-8.233684	10.73858	-0.766739	0.4504

Note: *, **, *** significant at 1%, 5%, 10% significant level respectively.

Granger Causality Based on Wald Test Results

Table 4.5 shows the results of Granger Causality based on Wald test. The results show that there is no bidirectional relationship between export and labour. Capital does not influence labour and labour also does not influence capital. Besides, there is a unidirectional relationship from labour to economic growth. Economic growth was found to have an effect on export with feedback. Apart from that economic growth does not Grange cause capital and capital also does not Granger cause economic growth.

Table 4.5: Granger Causality Based on Wald Test Results

Null Hypothesis	Chi-Square
Ex does not Granger cause L	0.512989
L does not Granger cause Ex	0.758806
K does not Granger cause L	0.217938
L does not Granger cause K	0.732148
GDP does not Granger cause L	0.109329
L does not Granger cause GDP	5.995718*
K does not Granger cause Ex	1.211709
Ex does not Granger cause K	0.792039
GDP does not Granger cause Ex	3.213525***
Ex does not Granger cause GDP	3.978450**
GDP does not Granger cause K	0.627338
K does not Granger cause GDP	0.406712

Note: *, **, *** significant at 1%, 5%, 10% significant level respectively.

CONCLUSION

This study aims to investigate the causal relationship between export and economic growth in Malaysia for the period 1984- 2014. The Unit Root test was conducted and the findings indicate that all the variables used are not stationary at level and become stationary at first difference for both intercept with and without trends. Since there is no co-integration among the variables, the VAR approach was favourably applied in this study. The results show that export can boost economic growth with feedback. In order to beef up the evidence of the existence this bidirectional relationship, the Granger causality based on Wald test was subsequently carried out. The results also imply that export plays an important role in determining economic growth and economic growth is also a determinant for export in Malaysia.

These finding are vital to shed some light on the issue of the relationship between export and economic growth. Export was found to be a catalyst for economic growth. Any trade barriers that can threat export should be reduced for the intensification of economic growth. Parallel with that, economic growth also needs to escalate to ensure the proliferation of exports from Malaysia.

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