

IMPACT OF EXPORT, IMPORT AND GROWTH: EVIDENCE USING ECONOMETRIC ANALYSIS IN MALAYSIA

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Abstract: *The study was conducted to obtain information on the relationship between export, import and economic growth in Malaysia. The annual data obtained from the World Bank which contains data from 1980 to 2016. The methods used to achieve this purpose are Philips Perron, Johansen Cointegration Test as well as Granger Causality Test. The unit root Test which economic growth and export series, as well as imports, became stationary when running the first difference. There was a cointegration relationship between economic growth, exports and even imports. Results also indicated that there was a short-term causal effect between GDP and import in the short term and two-way links found between GDP and imports. Compared to the two-way relationship between GDP and imports, we find that the relationship only occurs from the direction of GDP to export. It is significant to know the relationship status between these three series. Among the suggestions that are considered beneficial is to have a good policy and aim to continue if we want economic growth to be enhanced. The results provide evidence that imports as a source of economic growth in Malaysia*

Keywords: *Economic Growth, Export, Import, Johansen Cointegration Test, & Granger Causality Test*

Introduction

The economic improvement theory is a study conducted by most researchers and is the primary focus of the research. It is also often associated with a variety of factors and is considered very important to help the country's economic growth. Factors that can be summarized here are expenditure on consumption, government spending, imports, exports and other factors that have a bearing on. Piazzolo (1996), states that the traditional growth theory based on Solow (1956) and Denilson (1962) shows that the determination of output is dependent on stock capital levels, labour rates, and technology. Exposures determined exogenously from economic

growth are the result of the introduction of exogenous economic growth rates. Long-term economic developments at the same time influenced by other factors such as savings, investment as well as institutional frameworks. At this moment the new theory of growth focuses on (i) technological change (ii) trade policy (iii) the role of government as well (iv) human capital development.

The study has the objective of studying the relationship between Exports, Imports as well as Economic Growth. It is vital in our efforts to understand whether there is a massive impact on economic growth.

Literature Review

Causality Between Export, Import and Economic Growth

Studies on economic growth are focused on theoretical and empirical aspects. Many studies have been done to investigate the factors that determine economic growth. The previous study has attempted to link economic growth with determinants or sources using different cases, methodologies as well as data that are also different.

The results of Pedroni's Panel Cointegration Test prove that there is a long-term relationship between exports, imports, gross capital formation, and economic growth in BRICS. Also, bilateral ties are also found between export and economic growth, as well as confirm economic growth to exports and exports to economic growth. The study recommends that more focus is placed on the focus of the strategy of promoting exports to reduce current account deficits. (Rani & Kumar, 2018)

According to Bakari & Krit, (2017), using a Vector Error Correction Model and Granger Causality Test, it can be concluded that exports have a positive impact on economic growth. However, imports have a negative impact on economic growth. On the other hand, the study by using the Granger Causality test found that there was unidirectional causality between imports to economic growth. Also, the results of the Granger Causality Test show that there is no link between exports and GDP. Bakari (2017) found that in the long run domestic investment and exports had a negative impact on economic growth.

On the other hand, Imports had a positive impact on economic growth. Analysts also showed that only imports contributed to economic growth. It requires action on economic reforms to be implemented.

The results of the causality of the leverage bootstrap simulation causality Test done by Tang (2013) show that export and output growth are two-way links in nature. However, causal results suggest that economic growth and exports have bilateral relations. The methods used also provide a conclusion that the relationship between exports and economic growth is unstable from time to time. It has led to a policy initiative to encourage exports may not always be successful to stimulate the country's economy. It is desirable for the government to create a balanced policy so that these problems can be addressed.

Tong (1995) examines the relationship between economic growth and imports, and as a result of the findings found that imports will contribute to the economy at different times in different ways and as a whole, there is a positive relationship between imports and economic growth. Frankel and Romer (1999) in their study of data for some countries find that higher trade will contribute to the economy after taking into account the impact of growth on trade. On the other hand, Humpage (2000) finds that economic growth is not low with import. Economy and

imports have a positive correlation with the linking in both directions. Countries with good growth tend to have high imports as well as countries with wide trade openings affecting faster economic growth.

Moyo & Mapfumo (2015) stated that using that there was a direct link between Gross Domestic Product and imports. It also found unidirectional causality running from imports to Gross Domestic Product during the short run. The test using Johansen cointegration found no long-term evidence between the two variables. In Malaysia, Kogid, M., et al (2011) has used data from 1970 to 2007 to study economic growth and import. Engle-Granger test application and Johansen's cointegration test shows no long-term relationship between economic growth and imports. To study and examine causality between variables, Granger tests, and Toda-Yamamoto tests have been used. The results of both tests suggest two-way links between economic growth and imports. This study implies that Malaysia's import is very significant to help improve economic growth.

Islam., et al (2012), examines the relationship between import relations in 62 countries and the results obtained indicate that the direction is dependent on income levels. He uses the Autoregressive Distributed Lag (ADRL) model with the Granger causal test, also obtaining evidence that rich countries such as South Africa support that import affects growth while low-income countries show bidirectional causality.

Data and Methodology

This study uses annual time series data from 1980 to 2016 which were obtained from the World Bank. Such data include Gross Domestic Product (GDP), Export(EX)and Import (IM). All data transformed into logarithmic form. For the analysis, this study applies the Unit Root Test, to deal with the stationary or non-stationary problem. Unit root tests in this study conducted by using Philip Perron, and KPSS test.

After determining the integration level for all the variables involved, a cointegration test can be made to test the existence of cointegration between LGDP LEX and LIM by using Johansen Cointegration Test. In order to support the hypothesis that LGDP and LIM are cointegrated, the cointegration vector must be at level 1.

If series are integrated of order one, that is, stationary in the first difference. In this scenario, it is assumed that variables are stationary in first difference, that is they are I (1) series (integrated of order one). Performing a cointegration test is necessary to establish a long run relationship. Two prominent cointegration test for I (1) series are Engle-Granger Cointegration test and Johansen cointegration test.

In the case of no cointegration, VAR model also can be used. Then, one directly proceeds to Granger causality tests to establish causal links between the variables. The regression equation form for VAR is as follows:

$$\Delta \ln GDP_t = \alpha_1 + \sum_{i=0}^n \beta_1 \Delta \ln GDP_{t-i} + \sum_{i=0}^n \beta_2 \Delta \ln EX_{t-i} + \sum_{i=0}^n \beta_3 \Delta \ln IM_{t-i} \quad (1)$$

with $\varepsilon_{it} \sim iid(0, \sigma_{\varepsilon_i}^2)$ and $cov(e_y, e_z)=0$

In VAR, the cointegration rank shows the number of cointegrating vectors. For instance, a rank of two indicates that two linearly independent combinations of the non-stationary variables will be stationary.

Cointegration Test

In case, when there is cointegration in our study, we can identify that there is a long-run relationship between all variables to examine the long-run relationship between all variables. Consider the following levels of VAR, with three variables

$$\ln GDP_t = \sigma_1 + \sum_{i=1}^k \beta_i \ln GDP_{t-i} + \sum_{j=1}^k \phi_j \ln EX_{t-j} + \sum_{m=1}^k \varphi_m \ln IM_{t-m} + u_{1t} \quad (2)$$

$$\ln EX_t = a + \sum_{i=1}^k \beta_i \ln GDP_{t-i} + \sum_{j=1}^k \phi_j \ln EX_{t-j} + \sum_{m=1}^k \varphi_m \ln IM_{t-m} + u_{2t} \quad (3)$$

$$\ln IM_t = d + \sum_{i=1}^k \beta_i \ln GDP_{t-i} + \sum_{j=1}^k \phi_j \ln EX_{t-j} + \sum_{m=1}^k \varphi_m \ln IM_{t-m} + u_{3t} \quad (4)$$

The dependent variable is a function of its lagged values and the lag values of other variables in the model.

Note: VAR must be specified in level. Hence VAR in differences is a mis-specification.

Next, to obtain specification for Vector Error Correction Model, In this case, the difference in VAR is applied.

$$\Delta \ln GDP_t = \sigma + \sum_{i=1}^{k-1} \beta_i \Delta \ln GDP_{t-i} + \sum_{j=1}^{k-1} \phi_j \Delta \ln EX_{t-j} + \sum_{m=1}^{k-1} \varphi_m \Delta \ln IM_{t-m} + \lambda_1 ECT_{t-1} + u_{1t} \quad (5)$$

$$\Delta \ln EX_t = a + \sum_{i=1}^{k-1} \beta_i \Delta \ln GDP_{t-i} + \sum_{j=1}^{k-1} \phi_j \Delta \ln EX_{t-j} + \sum_{m=1}^{k-1} \varphi_m \Delta \ln IM_{t-m} + \lambda_1 ECT_{t-1} + u_{2t} \quad (6)$$

$$\Delta \ln IM_t = \vartheta + \sum_{i=1}^{k-1} \beta_i \Delta \ln GDP_{t-i} + \sum_{j=1}^{k-1} \phi_j \Delta \ln EX_{t-j} + \sum_{m=1}^{k-1} \varphi_m \Delta \ln IM_{t-m} + \lambda_1 ECT_{t-1} + u_{3t} \quad (7)$$

Notes:

K-1 = the lag length is reduced by 1.

$\beta_i, \phi_j, \varphi_m$ = Short run dynamic coefficients of the model's adjustment long-run equilibrium.

λ_i = speed of adjustment parameter with a negative sign.

ECT_{t-1} = the error correction term is the lagged value of the residual obtained from the cointegration regression of the dependent variable on the regressors. Contains long-run information derived from the long-run cointegrating relationship.

u_{it} = residuals (stochastic error terms often called impulses, or innovation or shocks).

Granger Causality Test

Granger causality is a statistical hypothesis of causal influence based on prediction via vector autoregression. According to Granger causality, if X_1 "Granger-causes" (or "G-causes") X_2 , then past values of X_1 should contain information that helps predict X_2 above and beyond the information contained in the past values of X_2 alone. In other words, a time series X_1 is said to Granger-cause Y if it can be shown, usually through a series of t-tests and F-tests on lagged values of X_1 (and with lagged values of X_2 also included), that those X_1 values provide statistically significant information about future values of X_2 .

A critical issue in testing for Granger causality is the specification of the data generating process underlying the observed time series. The standard Granger test is valid only if the variables are stationary and do not share a common stochastic trend. In a setting where the variables are non-stationary, as is the case with most economic time series, Engle and Granger (1987) argue that conventional Granger causality tests could provide misleading results. One must, therefore, investigate the stationarity properties of the data before applying tests for causality in the Granger's sense. If our time series is stationary, the test is performed using the level values. If the variables are non-stationary, then the test is done using first (or higher) differences. The number of lags to be included is chosen using an information criterion, the Schwarz information criterion.

The 3-ways Causality Test

1. Regressors' and ECT t-statistics: if statistically significant, short run, long-run and strong causal effects are inferred
2. Granger/Wald Causality test on lagged explanatory variables:
H₀: lagged coefficient(s) = 0
H₁: lagged coefficient(s) ≠ 0
Decision criteria: Reject the null hypothesis if the prob-value of the Chi² statistic is ≤ 0.05
3. Pairwise Granger Causality test on the direction of causality:
H₀: no Granger causality
H₁: null hypothesis is not true
Decision criteria: Reject the null hypothesis if the prob-value of the F-statistic is ≤ 0.05

To answer the question on causality in this research we apply equation (5), (6) and 7 to test for Granger Causality.

Empirical Results

The results of the unit root tests based on Philip Perron and KPSS show in Table 1. Based on the Philip Perron and KPSS tests, all the variables, LGDP, LEX and LIM are stationary at first difference. We can specify that the order of integration is I (1) after taking the first difference.

Table 1: Unit Root Test

| Variable | PP | | | KPSS | | |
|----------|--------|----------------|----|-------|----------------|----|
| | LOG | | | LOG | | |
| | Level | 1st Difference | | Level | 1st Difference | |
| GDP | -1.130 | -4.882 | ** | 0.722 | 0.186 | ** |
| EX | -1.700 | -5.076 | ** | 0.694 | 0.422 | ** |
| IM | -1.516 | -4.350 | ** | 0.690 | 0.242 | ** |

Note: The ** denotes significance at the 5% level

Table 2: Johansen Cointegration Test

| HO | Maximum eigenvalue | Critical value | |
|-----|--------------------|----------------|------------------|
| | | 95% level | Trace statistics |
| r=0 | 28.344** | 21.132 | 32.286** |
| r≤1 | 8.250 | 14.265 | 9.942 |

Note: r indicates the number of cointegrating vectors. The (**) indicate rejection at the 95% critical value

Table 2 shows that the result of Cointegration Test. The results show that both Maximum Eigen Statistic and Trace Statistic are presence in Malaysia economy at 5 percent levels among the three variables. It means that the long-run equilibrium relationship between export, Import and GDP do exist.

At the null hypothesis, the Trace Statistic value is 32.286, which is higher than the Critical Value (Trace) 29.797 significance at 5 per cent level. On the other hand, for the Trace Statistic based on the rank $r \leq 1$, the values are lower than Critical Value (Trace), which has exceeded the significance level. At the rank $r \leq 1$, the Trace Statistic value is 9.942 lower than Critical Value (Trace) of 15.495 significance at 5 per cent level.

The Max-Eigen Statistic, as the value in rank $r = 0$ is 28.344 higher than the Critical Value (Eigen) of 21.132 confirm the result that the relationship between variables in the long-run at 5 percent significance level. Also, for the Max-Eigen Statistic from the rank $r \leq 1$, the values are lower than Critical Value (Eigen), it is also has exceeded the significance level, the Max-Eigen statistic value is 8.250 lower than Critical Value (Eigen) of 14.265 significance at 5 per cent level.

Granger/Wald Causality Test

Since the Cointegration Test cannot be used to determine the direction of the relationship between the variables, the Granger/Wald Causality test is conducted to determine whether the correlation for Granger Causality applied for all variables. If the Prob.value is smaller than the critical value 0.05, it means that there is granger cause between the variables.

Table 3: Granger Wald Causality Test

| Null Hypothesis | Obs. | Chi-Square | Prob. |
|--|------|------------|--------|
| Export (EX) does not Granger cause GDP | 32 | 1.680 | 0.642 |
| GDP does not Granger cause Export | 32 | 13.046*** | 0.0045 |
| Import (IM) does not Granger cause GDP | 32 | 8.317** | 0.040 |
| GDP does not Granger cause Import (IM) | 32 | 9.525** | 0.023 |
| Import (IM) does not Granger cause Export (EX) | 32 | 7.172* | 0.067 |
| Export (EX) does not Granger cause Import (IM) | 32 | 2.060 | 0.560 |

Note: ***, ** and * denote statistical significance at the 1%, 5% and 10% level, respectively

From the Granger causality test results in Table 3, it shows Granger Causality does not exist among export to GDP. For the correlation between export and GDP, the result shows that the export does not Granger cause to GDP as the significance level is exceeded (P-value = 0.642, Chi-Square = 1.680). The result also found that GDP is granger cause to export at the significance level of 1 percent (P-value = 0.0045, Chi-Square = 13.046). Therefore, as the correlation between export and GDP, export does not Granger cause to GDP, but GDP is a granger cause for export. On the other hand, there is bidirectional causal relationship running from import to the GDP as well as from the GDP to the import.

Conclusion

Institutions are crucial to helping the economy to operate more efficiently. Too many sources do not make better economic growth. So, it is imperative that we have good governance and managing the resources well. The findings of this study indicate that based on the situation in Malaysia, imports have an essential role and essential to driving economic growth, especially in the short term. In this case, more emphasis should be given when drafting the policy for the long term. The findings also conclude that the institution is vital in order to achieve sustainable economic growth.

As a suggestion, the Malaysian government needs to protect so that entrepreneurs, for instance, can have the ability to achieve the economies of scale. All planning needs to be examined as best as possible to provide exposure to the people regarding any technology comes from developed countries so that the people can cope the technology as best as possible.

In conclusion, the significant implications of the study's findings are that in Malaysia during the observed period, economic growth has been heavily influenced by imports, as well as imports that are heavily influenced by economic growth. On the other hands, the economic growth is seen to give impact and significantly influenced the export. These findings may be necessary for the future of future economic growth. However, the benefit of specialization and technological advancement may not be equally applicable to everyone, and it may worsen the economic situation of some people.

Recommendation for Future Research

This study has been conducted using at the aggregate level. A disaggregate analysis in future hopefully can provide useful information, and another useful extension of this research would be to include other relevant variables in equations which can help us to know further other factors that can affect economic growth.

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