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The Export-Led and Import-Led Growth Hypothesis Test in Malaysia, Indonesia and Singapore

∗Mohd Shahrol Nizam Mt Nor, Norimah Rambeli
Faculty of Management & Economics University Pendidikan Sultan Idris, Perak, Malaysia
Email: *shahrol2014upsi@gmail.com, norimah@fpe.upsi.edu.my
Corresponding Author: Mohd Shahrol Nizam Mt Nor

Abstract: There are various discussions on the hypothesis of export-led growth, but due to different methods, the results are controversial. Nonetheless, this research aims to examine the short-run and long-run relationships between exports, imports, services, and economic growth of Malaysia, Indonesia and Singapore in the time range from January 2010 to December 2021. The dynamic analysis approach utilized in this study is the Vector Error Correction Model (VECM) to investigate whether Malaysia, Indonesia and Singapore are export-led growth (ELGH) or import-led growth hypothesis (ILGH) during the selected period. The findings indicate that, in addition to imports and economic growth, both countries show that there is a bilateral relationship between exports and economic growth in the short-run and long run. Thus, international trade is the engine of rapid growth, where the hypothesis of export-oriented growth and the hypothesis of import-oriented growth are reasonable. Therefore, the policymakers should ease the trade barrier to encourage trade liberalization and foreign investment, besides controlling the trade services.

Keywords: *Gross Domestic Product (GDP), Export-led growth hypothesis (ELGH), import-led growth hypothesis (ILGH), Vector Error Correction Model (VECM)*

1. Introduction

Economic growth is defined as the expansion of a nation's economy over a specified amount of time. Economic growth is measured by the term Gross Domestic Product (GDP), and it refers to the entire amount of goods and services that are produced within an economy and is the standard method for determining the size of an economy. The rate of economic expansion can be evaluated either in nominal or real terms, which is divided by the Consumer Price Index (CPI). The rise in the dollar worth of production over a period is what economists mean when they talk about nominal economic growth. Therefore, this encompasses shifts not just in the quantity of products and services produced, but also in the prices of those goods and services. Whenever economists discuss growth in the economy, they typically refer to "real" economic growth, which refers to increases in the volume produced alone and eliminates the impact of fluctuating prices. This is due to the fact that, when compared to other moments in time, it more accurately depicts how much production a country is capable of at any one moment.

Moreover, economic growth is crucial because it aids in the alleviation of poverty. When the experiences of a wide variety of developing nations are compared, researchers constantly find compelling evidence that rapid and sustained economic expansion is the single most essential approach to eliminating global poverty. According to a common estimate derived from this international research, a rise of 10 percentage points in a nation's median income will result in a decrease of between 20 and 30 percentage points in the country's poverty rate. Other than that, economic growth is the primary driver of job creation. Growth in the economy creates work opportunities, which results in an increased demand for labor, which is the primary and frequently the only asset that the poor own.

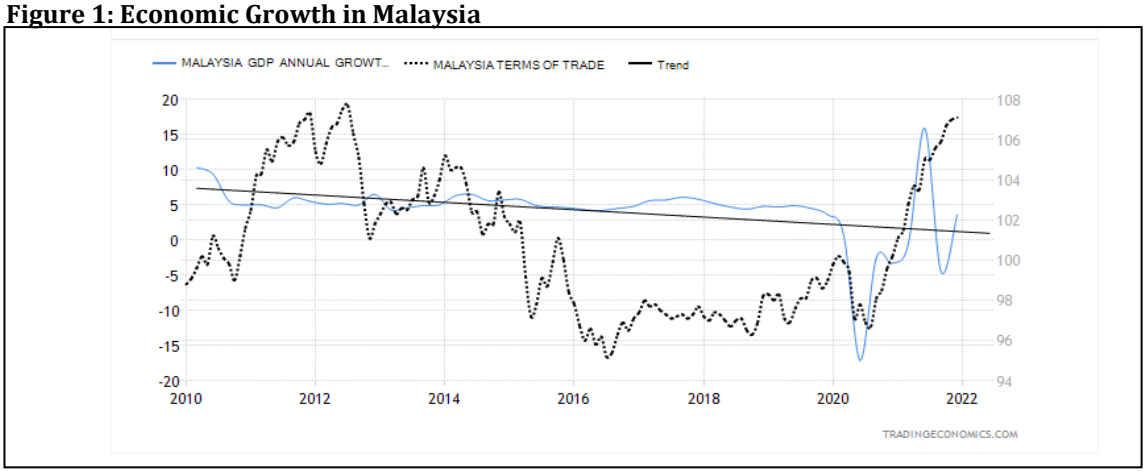
The government in Malaysia plays a very essential part in the overall effort to raise the value of GDP. The power of the economy can be increased by the implementation of certain policies by the government (Hussain et al., 2019). When a nation has a larger value of GDP, it is able to entice a greater number of investors to invest their money in that nation rather than in ours (Mayorova, 2019). To put it another way, the amount of capital that enters a country is directly correlated to its level of economic development. Therefore, the government should work to increase exports, cut the amount of goods it imports, invest in the growth of its human capital and take other steps that would be beneficial to the economy. The value of a country's gross domestic product will be affected regardless of whether the country uses a fixed exchange rate regime or a flexible exchange rate regime. However, the expansion of a nation's economy is driven not only by increases in its stock of capital goods and

its labor force, but also by its trade, which includes both exports and imports as well as investment, financing, which is money supply M3, and the provision of services. All of these are important contributors to economic growth.

Based on the preceding section regarding the dependence of economic growth on exports and the argument of the positive or negative influence that investment has on economic growth. Aside from that, it is unclear which elements exerted a significant amount of effect on the expansion of the economy and whether or not the relationship between exports, imports, trade services and economic growth is positive or negative and whether or not it is short-run or long-term. For the next example, this is a summary of the problems associated with the variables that are of interest to investigate.

Trade and Economic Growth in Malaysia

Figure 1: Economic Growth in Malaysia



Based on the percentage of the GDP Annual Growth that comes from exports and imports, Figure 1 depicts the time period ranging from January 2010 to December 2021. Malaysia has an open economy and has a wealth of resources, all of which contribute to the country's rapid economic growth and development. In the 2010s, there was very little correlation between imports and exports, which indicates that both contribute to economic growth as measured by the Annual Growth. According to the findings of Noor and Rambeli (2018), there is a short-term causation association between imports and GDP, while exports have a positive effect on economic growth.

Trade and Economic Growth in Indonesia

Figure 2: Economic Growth in Indonesia

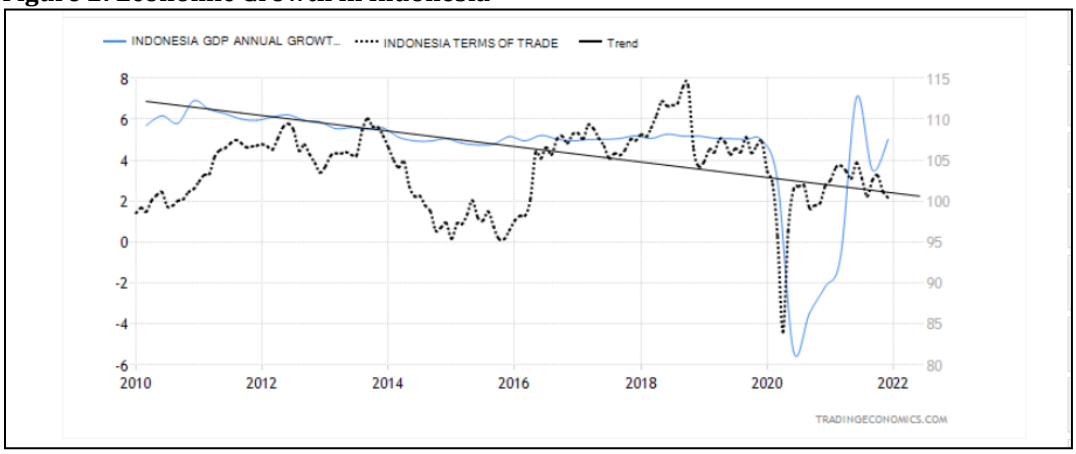
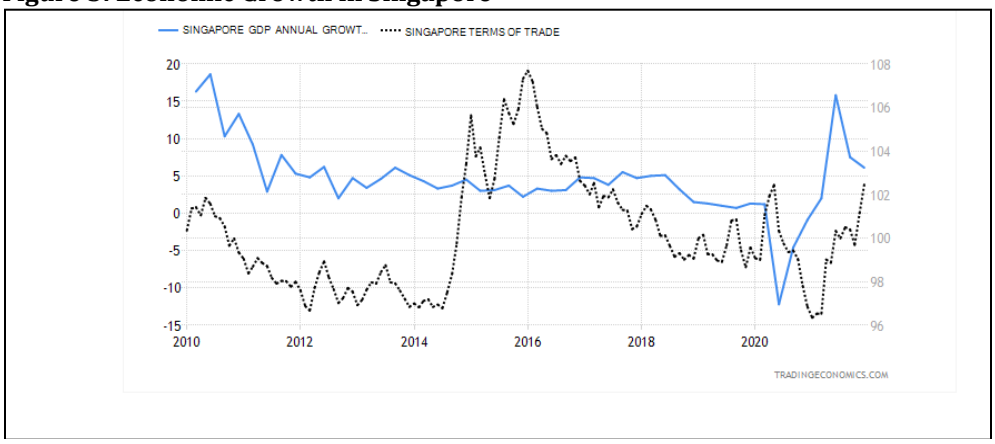


Figure 2 illustrates the percentage of GDP Annual Growth of Indonesia attributable to exports and imports for the period spanning January 2010 to December 2021. The Indonesian economy is the largest in Southeast Asia and the sixteenth largest in the world, with a GDP of around USD940.9 billion every year (2016). In 2014, the services industry was the largest employer in Indonesia, employing 45 percent of the population (compared to only a third in 1990). This is followed by the agriculture sector, which employs 34% of local workers (down from 56% in 1990), and the industry sector, which employs 21% of local workers (including manufacturing) (having become more prominent in recent years). Significant economic differences exist between Indonesia and its Asian neighbors, such as Singapore and Thailand. In particular, Indonesia's economy is mostly dominated by local activity as opposed to exports, which served to cushion it during the 2008 to 2009 global financial crisis.

Trade and Economic Growth in Singapore

Figure 3: Economic Growth in Singapore

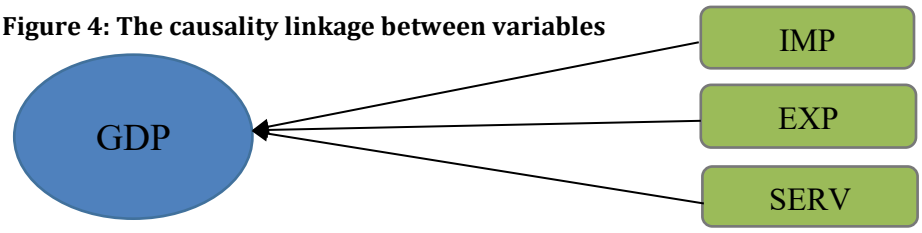


Malaysia is Singapore's closest neighboring country, yet their development paths have not always coincided. Despite having fewer natural resources than Malaysia, Singapore is a highly developed free-market economy with exceptional economic success. After gaining independence from Malaya in 1965, Singapore became self-sufficient, with imports exceeding exports for the purpose of importing intermediate items for domestic manufacturing. Thangavelu and Rajaguru (2004) found that imports have a large causal effect on productivity growth. Figure 3 depicts the trade and GDP Annual Growth in Singapore from January 2010 to December 2021. Exports and imports are significant to GDP. Singapore's emphasis on economic growth transformed it from an underdeveloped nation to one of the nations with the quickest industrialization, bolstering the confidence of international investors. The ELGH is supported for Singapore based on the empirical findings of Tan et al. (2007), which indicate that Singapore's financial depth led to economic growth from 1968 to 1997.

Conceptual Framework

The monthly data on imports, exports, trade services and economic growth of Malaysia, Indonesia and Singapore are the focus of this study's primary investigation question. The conceptual framework for this research, which includes the causality linkage between variables such as Gross Domestic Product (GDP), imports (IMP), exports (EXP) and services (SERV), as well as the foundation for the methodology of this study

Figure 4: The causality linkage between variables



According to Figure 4, the GDP is the dependent variable, whereas EXP, IMP and SERV are independent variables. This distinction may be seen by looking at the graph. In the range of 2010 to 2021, it displays the

monthly GDP, which represents the month-on-month national output of the country (Malaysia, Indonesia and Singapore). At the same time, the independent factors have a particularly powerful impact on the rate of economic growth. The direction of the arrows makes it abundantly clear that there is a correlation between the variables. This correlation is supported by the findings of previous research, specifically export-led growth (Kalaitzi & Cleeve, 2017; Rani & Kumar, 2018), growth-led export (Tuffour, 2010), import-led growth (Mohd Noor & Rambeli, 2018; Bakari, 2018), and growth-led import (Ebrahimi, 2017) from the various analytical approaches such as VECM.

Theoretical Framework

The Gross Domestic Product (GDP) or economic growth is an essential indicator since it provides data on the size of the economy as well as the performance of the economy. The pace of expansion of the real gross domestic product is frequently used as a measure of the state of the economy as a whole. An increase in real GDP is generally seen as evidence that the economy is performing well and should be regarded in these terms. Employment is likely to be expanding when real GDP is growing substantially. This is because corporations hire more workers for their factories and individuals have more money in their pockets when real GDP is growing. When the Gross Domestic Product (GDP) falls, as it did in many nations during the most recent global economic crisis, employment typically falls as well.

The idea that expanded trade liberalization in today's modern and globalized world will boost economic growth is one that has frequently been used to support the relationship between increased trade and improved economic growth. The purpose of this study is to investigate the most fundamental relationship that exists between the quantity of a nation's trade activity, which is a subset of globalization and an indicator of trade liberalization and the factors that influence productivity in terms of how they affect economic growth.

2. Review of Literature

The Relationship between Imports and Economic Growth

Imports are generally defined as goods and services purchased from foreign economies for domestic consumption, production, or investment purposes (Sukirno, 2006). From the perspective of the Heckscher–Ohlin Theory, international trade enables countries to obtain products that can be produced more efficiently abroad, allowing resources to be allocated more effectively and enhancing economic welfare. Imam (2013) further describes imports as the consumption of commodities originating from foreign countries by domestic economic agents.

Despite the benefits associated with international trade, several studies have highlighted the potential adverse effects of excessive import dependence on economic performance. Saputra (2015) argued that a high volume of imports may contribute to lower gross domestic product (GDP), suggesting the existence of a negative relationship between imports and economic growth. Similar findings were reported by Turay (2019), whose investigation of export–import dynamics revealed that exports positively influenced economic growth, whereas imports exerted a negative effect on economic performance. These findings imply that although imports may satisfy domestic demand, excessive reliance on imported products can weaken domestic production activities.

Evidence from previous empirical studies also supports the existence of a negative association between imports and economic growth. Using an Error Correction Model (ECM), Sulaiman and Saad (2009) found that imports negatively affected Malaysia’s economic growth. Comparable results were obtained by Bakari and Krit (2017) in Mauritania, where imports were shown to hinder long-term economic expansion. Likewise, Kumar et al. (2020), employing panel ARDL and ECM techniques to analyze Bangladesh, India, Pakistan and Sri Lanka between 1991 and 2017, reported that imports reduced GDP growth across South Asian economies.

Although many studies have identified adverse effects of imports on economic growth, the nature of the relationship may vary across countries and periods. For instance, Moyo and Mapfumo (2015) demonstrated a unidirectional causal relationship running from imports to economic growth in Zimbabwe using Granger causality analysis. Meanwhile, Pedroni’s cointegration approach provided evidence of a long-run relationship

between imports and economic growth, suggesting that imports remain an important determinant of economic performance despite their generally negative contribution.

Various econometric approaches have been employed to investigate the impact of trade activities on economic growth. Awokuse (2008) applied Granger causality and impulse response analyses to evaluate the relationship between trade expansion and economic performance, while Shandre et al (2006) utilized a Vector Error Correction Model (VECM) to examine the experiences of nine major Asian economies. Collectively, these studies indicate that imports constitute an important component of international trade, although their influence on economic growth depends largely on the structure and competitiveness of the domestic economy.

The Relationship between Exports and Economic Growth

The export-led growth hypothesis (ELGH) posits that export expansion serves as a primary engine of economic growth by stimulating production, employment, investment and technological advancement (Mediana-Smith, 2001). Under this framework, increased participation in international markets is expected to improve economic performance by enlarging market opportunities and enhancing resource utilization.

A substantial body of empirical evidence supports the proposition that exports contribute positively to economic growth. In Nigeria, Chimobi et al. (2010) examined the relationship between exports, domestic demand, and economic growth through cointegration and Granger causality analyses. Their findings indicated that economic growth plays an important role in influencing both exports and domestic demand. Similarly, Tsen (2007) investigated several Middle Eastern countries, including Bahrain, Iran, Oman, Qatar, Saudi Arabia, Syria and Jordan and reported that economic growth was closely linked to exports, domestic consumption and investment activities.

Research conducted in Malaysia has also provided support for the export-led growth hypothesis. Choong et al. (2003), using a two-stage least squares estimation technique, found that exports exerted a positive influence on economic growth in both the short run and the long run. Subsequently, Choong et al. (2005) employed the bounds testing approach proposed by Pesaran et al. (2001) and confirmed the existence of a cointegrated relationship between exports and GDP, further validating the ELGH in the Malaysian context.

Additional evidence from other countries reinforces the importance of exports as a driver of economic performance. Rangasamy (2008), focusing on South Africa, identified a unidirectional Granger causality running from exports to economic growth. Likewise, Ullah et al. (2009) re-examined the ELGH in Pakistan using time-series data from 1970 to 2008 and concluded that export expansion contributed significantly to economic development. In Libya, Elbeydi et al. (2010) documented a long-run bidirectional relationship between exports and economic growth, suggesting that export promotion strategies can enhance national income and economic development.

However, not all empirical studies have produced consistent findings. Pazim (2009), employing panel data analysis across three countries, found no evidence of a long-run cointegration relationship between exports and economic growth despite identifying non-stationary behavior in GDP and export series. Similarly, Albiman & Suleiman (2016) reported that exports, imports, domestic investment and economic growth in Malaysia were not cointegrated in the long run. Nevertheless, their findings indicated that exports remained an important determinant of economic growth in the short run.

Overall, the existing literature generally supports the view that export expansion contributes positively to economic growth, although the strength and direction of the relationship may differ according to economic structure, institutional conditions and methodological approaches.

The Relationship between Services and Economic Growth

The services sector has become increasingly important in contemporary economies due to its contribution to trade, productivity and income generation. According to the World Bank (2022), net services are measured as the difference between exports and imports of services. As economies become more integrated through globalization, service-related activities play a vital role in facilitating economic transactions and supporting overall development.

Theoretical explanations linking services and economic growth are largely rooted in international trade and growth theories. Grossman and Helpman (2015) argued that globalization promotes economic growth through several channels. First, international interactions facilitate the transfer of knowledge and innovation, allowing countries to improve products, production methods and technological capabilities. Second, larger international markets provide greater opportunities for firms to commercialize innovations and generate returns from productive activities. Third, global market integration influences the allocation of resources through changes in input and output prices, thereby affecting overall economic performance.

The World Bank (2018) emphasized that international trade in services contributes significantly to poverty reduction and economic prosperity. Countries that participate actively in global trade tend to experience higher productivity growth, increased innovation, improved employment opportunities and greater income levels. These arguments are consistent with traditional international trade theories, which suggest that trade promotes specialization, efficiency and optimal resource allocation (Zahonogo, 2016).

The positive contribution of international trade to economic growth is also reflected in the classical theories developed by Ricardo as well as Heckscher-Ohlin (Leamer & Levinsohn, 1995). These theories propose that countries benefit by specializing in activities where they possess comparative advantages while importing products and services that can be produced more efficiently elsewhere. Consequently, international economic interactions have become an essential feature of modern economic systems.

The relationship between trade openness and economic growth can also be explained through the neoclassical growth framework derived from Solow's (1957) model. This perspective suggests that trade openness may influence long-run economic growth if it facilitates technological progress and productivity improvements. However, empirical evidence regarding the trade-growth nexus remains inconclusive, with findings often varying according to the sample period, econometric methodology, and country characteristics examined.

Several empirical studies have highlighted the heterogeneous nature of this relationship. Kim and Lin (2009), together with Kim et al. (2011), identified threshold effects in which trade openness contributes positively to economic growth only after a certain level of income has been achieved. Similarly, Sakyi et al. (2011) and Herzer (2013) observed that the growth-enhancing effects of trade tend to be stronger in higher-income economies. These findings suggest that the benefits derived from trade and services may depend on a country's stage of development.

Using advanced estimation techniques such as Dynamic Ordinary Least Squares (DOLS) and the Generalized Method of Moments (GMM), Gries and Redlin (2020) found evidence supporting a positive long-run relationship between trade globalization and economic growth. Nevertheless, their results also demonstrated that the relationship is nonlinear and varies across countries with different levels of openness and economic development. Therefore, while the services sector and international trade generally contribute to economic growth, their effects may differ depending on economic conditions and institutional capacities.

3. Methodology

The Vector Error Correction Model (VECM) will be utilized in this investigation into the connection that exists between the gross domestic product (GDP), import (IMP), export (EXP) and services (SERV) in three countries, which are Malaysia, Indonesia and Singapore. The discussion in this chapter is divided into several parts, which include data, model specification, and empirical methods. Initially, the time series of data is put through the unit root test in order to determine whether or not the first difference is stationary across all variables. Next, the Augmented Dickey-Fuller (ADF) test is carried out in order to determine whether or not the unit root exists. The time series data will also be used to estimate the Vector Autoregression (VAR) model in order to choose the optimal lag within the constraints of the lag length requirement. Subsequently, the Johansen (1988) cointegration test is employed to examine the existence of a long-run equilibrium relationship among variables integrated of order one, I(1). Once the cointegration relationship has been established, further analyses are conducted using the Error Correction Term (ECT), Error Correction Model (ECM), and Wald tests within the Vector Error Correction Model (VECM) framework to evaluate both the short-run dynamics and long-run causal relationships among the variables.

Data Collection

Data on Malaysia, Indonesia and Singapore's Gross Domestic Products (GDP), imports, exports and services over a monthly time frame were compiled for the purposes of analysis using a variety of government sources, including CEIC Data and Trading Economics among others. The currency exchange rates for the Malaysian ringgit, Indonesian rupiah, and Singaporean dollar are RM/USD, IDR/USD, and SGD/USD, respectively. The consumer price index (CPI) is also collected from the resources and it is used to deflate the data from the nominal form into the real form. The main purpose is to measure the real terms after inflation has been adjusted for. All of the variables have been transformed into logarithms so that they can be standardized after the CPI was applied to the data.

Model Specification

This study aims to examine Malaysia, Indonesia and Singapore to determine whether their hypothesis are Import-led Growth, Growth-led Import, Export-led Growth, Growth-led Export, Services-led Growth and Growth-led Services in the range from January 2010 to December 2021. The model is based on the international trade theory, where trade (exports and imports) contributes to rapid growth. Moreover, the model is inspired by the model of Fannoun and Hassouneh (2019) to identify the causal relationship between imports (IMP), exports (EXP), services (SERV) and economic growth (GDP). The model specification of Malaysia is as follows:

$$GDP_t = \beta_0 + \beta_1 IMP_t + \beta_2 EXP_t + \varepsilon_t \quad (1)$$

In addition, a number of academics asserted that services play an essential role in influencing the expansion of the economy through international commerce. As a result, the model has been extended to include a monthly timeframe and incorporate real-world forms of the variables that make up Gross Domestic Product (GDP), imports and exports, as well as services. The model is outlined in the following way:

$$GDP_t = \beta_0 + \beta_1 IMP_t + \beta_2 EXP_t + \beta_3 SERV_t + \varepsilon_t \quad (2)$$

Where,

GDP_t	= Gross Domestic Product for year t
IMP	= Real imports for year t
EXP	= Real exports for year t
SERV	= Real services for year t
β_0	= Coefficient for the determination variables
$\beta_1, \beta_2, \beta_3$	= Parameter
t	= Period from 2010 to 2021
ε	= Error term

Unit Root Test

The unit root test plays an extremely important role in determining the degree to which each variable is integrated. In theory, the Augmented Dicky-Fuller (ADF) test that was developed by Dickey and Fuller (1979) and the PP test that was developed by Phillips and Perron (1981) are two different tests (1988).

Vector Autoregression (VAR)

The statistical model known as vector autoregression (VAR) is used to investigate the nature of the connection that exists between the variables. It was most commonly used for modelling multivariate time series because of the fact that a variable is not only influenced by its own previous time but also associated with the previous times of other variables. Thus, the Johansen Juselius Cointegration test will make use of this test to predict the lag length of the test.

Johansen Juselius Cointegration Test (JJ)

After the selection of optimal lag according to AIC, the Johansen Juselius Cointegration test is performed to verify the presence of a long-run association between the variables (Johansen, 1995). Johansen and Juselius (1990) commenced the Johansen Juselius Cointegration test and also analyzed whether there is a cointegration

between the variables since there are more variables in the model. Gonzalo (1994) argued that the Johansen–Juselius (JJ) cointegration test provides more reliable estimators than the two-step Engle–Granger cointegration approach developed by Engle and Granger (1987). This is because the JJ test incorporates unit root properties, accommodates multivariate systems and captures the dynamic structure of cointegrating relationships, thereby producing more robust and efficient estimates (Gonzalo, 1994).

Error Correction Term (ECT)

When verifying a cause-and-effect relationship across time, an error correction term (ECT) is applied. In reality, the presence of ECT indicates that the cointegration connection between time series is not perfectly balanced (Engle & Granger, 1987). What this means is that it provides a rough estimate of how quickly the dependent variables will respond to the new conditions imposed by the variation in the independent variables (Enders, 1995). In theory, if certain factors are ignored in ECT, the resulting specification and results will be off (Engle & Granger, 1987). According to Engle and Granger (1987), a VECM should be used to investigate both the short- and long-run relationship between variables if all variables are found to be cointegrated and stationary in the first difference.

Error Correction Model (ECM)

The error correction model (ECM) belongs to the class of multivariate models that are utilized the most frequently in practice for the purpose of locating instances of short-run cointegration. The ECM can be used well for estimating both short-term and long-term associations, at least in theory. The existence of the ECM can be inferred from the presence of a correlation between two or more variables. To be more precise, the significance in the model indicated that the model has a high degree of robustness. Estimation of the ECM is often carried out after the ECT has been determined and the processes that need to be carried out in the ECM are divided into two categories: before and after treatment. A step called the step needs to remove the probability that exceeds the 0.5 value in the least square estimation, which comes before the step called the parsimonious step. The following is a breakdown of the monthly estimates for the general model from 2010 through 2021:

Malaysia

$$lnMSIAGDP_t = \alpha_0 + \alpha_1 lnMSIAIMP_t + lnMSIAEXP_t + lnMSIASERV_t$$

Indonesia

$$lnINDGDP_t = \alpha_0 + \alpha_1 lnINDIMP_t + lnMSIAEXP_t + lnINDSERV_t$$

Singapore

$$lnSGGDP_t = \alpha_0 + \alpha_1 lnSGIMP_t + lnSGEXP_t + lnSGSERV_t$$

For the Error Correction Model of variables with the number of systems for Malaysia, Indonesia and Singapore: One cointegrating relation

Malaysia

$$\Delta MSIAGDP_t = \eta_1 + \sum_{i=t}^{MSIAGDP} \alpha_i \Delta msiagdp_{t-i} + \sum_{i=t}^{MSIAIMP} \beta_i \Delta msiaimp_{t-i} + \sum_{i=t}^{MSIAEXP} \gamma_i \Delta msia\exp_{t-i} + \sum_{i=t}^{MSIASERV} \delta_i \Delta msiaserv_{t-i} + \delta ECT_{t-1} + \Omega_{1t}$$

$$\Delta MSIAIMP_t = \eta_2 + \sum_{i=t}^{MSIAGDP} \alpha_i \Delta msiagdp_{t-i} + \sum_{i=t}^{MSIAIMP} \beta_i \Delta msiaimp_{t-i} + \sum_{i=t}^{MSIAEXP} \gamma_i \Delta msia\exp_{t-i} + \sum_{i=t}^{MSIASERV} \delta_i \Delta msiaserv_{t-i} + \delta ECT_{t-1} + \Omega_{1t}$$

$$\Delta MSIAEXP_t = \eta_3 + \sum_{i=t}^{MSIAGDP} \alpha_i \Delta msiagdp_{t-i} + \sum_{i=t}^{MSIAIMP} \beta_i \Delta msiaimp_{t-i} + \sum_{i=t}^{MSIAEXP} \gamma_i \Delta msia\exp_{t-i} + \sum_{i=t}^{MSIASERV} \delta_i \Delta msiaserv_{t-i} + \delta ECT_{t-1} + \Omega_{1t}$$

$$\Delta MSIASERV_t = \eta_4 + \sum_{i=t}^{MSIAGDP} \alpha_i \Delta msiagdp_{t-i} + \sum_{i=t}^{MSIAIMP} \beta_i \Delta msiaimp_{t-i} + \sum_{i=t}^{MSIAEXP} \gamma_i \Delta msia\exp_{t-i} + \sum_{i=t}^{MSIASERV} \delta_i \Delta msiaserv_{t-i} + \delta ECT_{t-1} + \Omega_{1t}$$

Indonesia

$$\Delta IDNIMP_t = \eta_2 + \sum_{i=t}^{IDNGDP} \alpha_i \Delta indgdp_{t-i} + \sum_{i=t}^{IDNIMP} \beta_i \Delta idnimp_{t-i} + \sum_{i=t}^{IDNEXP} \gamma_i \Delta idn\exp + \sum_{i=t}^{IDNSERV} \delta_i \Delta idnserv_{t-i} + \delta ECT_{t-1} + \Omega_{1t}$$

$$\Delta IDNGDP_t = \eta_1 + \sum_{i=t}^{IDNGDP} \alpha_i \Delta indgdp_{t-i} + \sum_{i=t}^{IDNIMP} \beta_i \Delta idnimp_{t-i} + \sum_{i=t}^{IDNEXP} \gamma_i \Delta idn\exp + \sum_{i=t}^{IDNSERV} \delta_i \Delta idnserv_{t-i} + \delta ECT_{t-1} + \Omega_{1t}$$

$$\Delta IDNEXP_t = \eta_3 + \sum_{i=t}^{IDNGDP} \alpha_i \Delta indgdp_{t-i} + \sum_{i=t}^{IDNIMP} \beta_i \Delta idnimp_{t-i} + \sum_{i=t}^{IDNEXP} \gamma_i \Delta idn\exp + \sum_{i=t}^{IDNSERV} \delta_i \Delta idnserv_{t-i} + \delta ECT_{t-1} + \Omega_{1t}$$

$$\Delta IDNSERV_t = \eta_4 + \sum_{i=t}^{IDNGDP} \alpha_i \Delta indgdp_{t-i} + \sum_{i=t}^{IDNIMP} \beta_i \Delta idnimp_{t-i} + \sum_{i=t}^{IDNEXP} \gamma_i \Delta idn\exp + \sum_{i=t}^{IDNSERV} \delta_i \Delta idnserv_{t-i} + \delta ECT_{t-1} + \Omega_{1t}$$

Singapore

$$\Delta SGGDP_t = \eta_1 + \sum_{i=t}^{SGGDP} \alpha_i \Delta sggdp_{t-i} + \sum_{i=t}^{SGIMP} \beta_i \Delta sgimp_{t-i} + \sum_{i=t}^{SGEXP} \gamma_i \Delta sg\exp + \sum_{i=t}^{SGSERV} \delta_i \Delta sgserv_{t-i} + \delta ECT_{t-1} + \Omega_{1t}$$

$$\Delta SGIMP_t = \eta_2 + \sum_{i=t}^{SGGDP} \alpha_i \Delta sggdp_{t-i} + \sum_{i=t}^{SGIMP} \beta_i \Delta sgimp_{t-i} + \sum_{i=t}^{SGEXP} \gamma_i \Delta sg\exp + \sum_{i=t}^{SGSERV} \delta_i \Delta sgserv_{t-i} + \delta ECT_{t-1} + \Omega_{1t}$$

$$\Delta SGEXP_t = \eta_3 + \sum_{i=t}^{SGGDP} \alpha_i \Delta sggdp_{t-i} + \sum_{i=t}^{SGIMP} \beta_i \Delta sgimp_{t-i} + \sum_{i=t}^{SGEXP} \gamma_i \Delta sg\exp + \sum_{i=t}^{SGSERV} \delta_i \Delta sgserv_{t-i} + \delta ECT_{t-1} + \Omega_{1t}$$

$$\Delta SGSERV_t = \eta_4 + \sum_{i=t}^{SGGDP} \alpha_i \Delta sggdp_{t-i} + \sum_{i=t}^{SGIMP} \beta_i \Delta sgimp_{t-i} + \sum_{i=t}^{SGEXP} \gamma_i \Delta sg\exp + \sum_{i=t}^{SGSERV} \delta_i \Delta sgserv_{t-i} + \delta ECT_{t-1} + \Omega_{1t}$$

Granger Causality (Wald test) in Vector Error Correction Model (VECM)

The precise idea of causation that pertains to time series analysis is referred to by the phrase Granger causality. To put it another way, if the historical data that includes both X and Y can make more accurate projections than the historical data that includes only Y, then the variable X demonstrates Granger causality to the variable Y. (Granger, 1969). If both the X and Y variables are stationary at the first-difference level, as in cointegration at the integration level, then the model ought to include a period of error correction before carrying out the Wald test. This is because the cointegration in the integration level is an example of this. The ECT is the disequilibrium function in the cointegration association, as stated by Engle and Granger (1987). This function displays the movement of the dependent variable in addition to the movement of the other independent variables.

4. Empirical Results

Unit Root Test

Malaysia

The Augmented Dickey–Fuller (ADF) test was conducted at both the level and first-difference forms to determine the stationarity properties of the variables in Malaysia. The significance of the p-values was evaluated based on the critical values and probability estimates developed by MacKinnon (1996), which were used to determine whether the null hypothesis of a unit root should be accepted or rejected. The results report that the Gross Domestic Product (GDP), exports (EXP), imports (IMP), and services (SERV) are non-stationary at the level form which accepted the null hypothesis of the unit root test because the t-statistic of each variable is greater than the critical value. For instance, the data series of GDP for Malaysia shows the value of the ADF test statistic at the level form is greater than the critical value, -2.068473, which is greater than the critical value of -3.480038 for a trend without trend at lag length 12. At the level with the trend, the GDP value of -2.063702 is also greater than the -4.028496 of the critical value. While for none, the GDP value of 0.792378 is greater than the critical value of -2.581951 as well. According to the significance level in level form, the three types of unit root test for level form, such as without trend, with trend and none of the GDP data series were not significant at values of 0.2578, 0.5608, 0.8828, respectively, at the uniform lag length, 12.

At the same time, the first difference of each variable successfully rejected the null hypothesis and was statistically significant at the 95% and 99% significance levels. For instance, the first different probability value of GDP data series without trend, with trend and zero mean are all significant at 99% under a uniform lag length

of 12. In addition, the GDP of Malaysia at the first difference in the value of -6.049096 is smaller than the critical value -3.478547 without trend. With the trend, the t-statistic of -6.017841 is less than -4.026429 at 1% of the critical value. The ADF t-value for each variable is less than 5% and 1% of the critical value, hence the time series data are stationary at the first difference. For example, at first, the differences in the data series of exports (EXP) and imports (IMP), the t-statistics with trend are -11.51210 (EXP) and -12.59244 (IMP), respectively, less than 5% critical value for -3.442006.

Indonesia

The results of the ADF test, including the level form and the first difference in Malaysia. The significance of the p-value is obtained from MacKinnon (1996) to examine the probability of the series, whether to accept or reject the null hypothesis. The results report that the Gross Domestic Product (GDP), exports (EXP), imports (IMP), and services (SERV) are non-stationary at the level form, which accepted the null hypothesis of the unit root test because the t-statistic of each variable is greater than the critical value. For instance, the data series of GDP for Indonesia shows the value of the ADF test statistic at the level form is greater than the critical value,-1.950906, which is greater than the critical value of 3.480038 for a trend without trend at lag length 12. At the level with the trend, the GDP value of -1.704884 is also greater than the -4.028496 of the critical value. While for none, the GDP value of -0.094613 is greater than the critical value of -2.582465 as well. According to the significance level in level form, the three types of unit root test for level form, such as without trend, with trend, and none of the GDP data series, were not significant at values of 0.3083, 0.7439, and 0.6493, respectively, at the uniform lag length, 12. At the same time, the first difference of each variable successfully rejected the null hypothesis and was statistically significant at the 95% and 99% significance levels. For instance, the first different probability value of GDP data series without trend, with trend and zero mean are all significant at 99% under a uniform lag length of 12. In addition, the GDP of Indonesia at the first difference in the value of -3.045919 is smaller than -2.883239, the critical value without trend. With the trend, the t-statistic of -3.132094 is less than -3.028496 at 1% of the critical value. The ADF t-value for each variable is less than 5% and 1% of the critical value, hence the time series data are stationary at the first difference. For example, at first, the difference in the data series of exports (EXP), the t-statistic with trend is -6.197942 (EXP), less than 5% critical value for -2.883753.

Singapore

The results of the ADF test, including the level form and the first difference, in Singapore. The significance of the p-value is obtained from MacKinnon (1996) to examine the probability of the series, whether to accept or reject the null hypothesis. The results report that the Gross Domestic Product (GDP), exports (EXP), imports (IMP), and services (SERV) are non-stationary at the level form, which rejected the null hypothesis of the unit root test because the t-statistic of each variable is less than the critical value. For instance, the data series of GDP for Singapore shows the value of the ADF test statistic at the level form is greater than the critical value -24.63075, which is less than the critical value of -3.477487 for a trend without trend at lag length 12. At the level with the trend, the GDP value of 5.805226 is also less than the -4.023975 of the critical value. While for none, the GDP value of 2.445140 is greater than the critical value of -2.581584 as well. According to the significance level in level form, the three types of unit root test for level form, such as without trend, with trend, and none of the GDP data series, were not significant at values of 0.0000, 0.0000, 0.9966, respectively, at the uniform lag length, 12.

At the same time, the first difference of each variable successfully rejected the null hypothesis and was statistically significant at the 95% and 99% significance levels. For instance, the first different probability value of GDP data series without trend, with trend and zero mean are all significant at 99% under a uniform lag length of 12. In addition, the GDP of Singapore at the first difference in the value of -19.47733 is smaller than the critical value -3.477487 without trend. With the trend, the t-statistic of -20.59417 is less than -4.024935 at 1% of critical value. The ADF t-value for each variable is less than 5% and 1% of the critical value, hence the time series data are stationary at the first difference. For example, at first, the differences in the data series of exports (EXP) and imports (IMP), the t-statistics with trend are -7.873906 (EXP) and -6.858334 (IMP), respectively, less than 5% critical value for -3.442955 and -3.442474.

Vector Autoregression (VAR)

Malaysia
The system recommended a lag of 12 for Malaysia. The optimal lag length for Malaysia is supported by the minimum of AIC values of -51.00192*. To run the succeeding tests, the lag 12 will be -1, becoming lag 11.

Indonesia
The system recommended a lag of 12 for Indonesia. The optimal lag length is supported by the minimum of AIC values of -47.01056*. To run the succeeding tests, the lag 12 will be -1, becoming lag 11.

Singapore
The system recommended a lag of 12 for Singapore. The optimal lag length is supported by the minimum of AIC values of -36.40026*. To run the succeeding tests, the lag 12 will be -1, becoming lag 11.

Johansen Juselius Cointegration (JJ)

Malaysia
Malaysia's Trace Test and Maximum Eigen Value exceed the critical value at 5% significant level, rejecting the null hypothesis and accepting the alternative hypothesis of more than one cointegration vector. The trace statistic and eigenvalues are greater than the significant level 5% and 1%, respectively, which are 65.01833 and 40.74466. The test of the alternative hypothesis (r>1) is also accepted, where 24.27367 and 16.26930 did not exceed the critical values of 5% and 1%. So, the result specified there is one long-run relationship in Malaysia.

Indonesia
Indonesia's Trace Test and Maximum Eigen Value exceed the critical value at 5% significant level, rejecting the null hypothesis and accepting the alternative hypothesis of more than one cointegration vector. The trace statistic and eigenvalues are greater than the significant level 5% and 1%, respectively, which are 58.59030 and 32.98293. The test of the alternative hypothesis (r>1) is also rejected, where 25.60737 and 11.94822 did not exceed the critical values of 5% and 1%. So, the result specified there is one long-run relationship in Indonesia.

Singapore
Singapore's Trace Test and Maximum Eigen Value exceed the critical value at 5% significant level, rejecting the null hypothesis and accepting the alternative hypothesis of more than one cointegration vector. The trace statistic and eigenvalues are greater than the significant level 5% and 1%, respectively, which are 60.46479 and 32.25583. The test of the alternative hypothesis (r>1) is also rejected, where 28.20896 and 18.84517 did not exceed the critical values of 5% and 1%. So, the result specified there is one long-run relationship in Singapore.

Error Correction Term (ECT)

Malaysia
*ECT(-1) = 96.82335 + 1.000000*GDP(-1) + 155.2061*IMPORT(-1) + 182.9418* EXPORT(-1) - 338.3871*SERVICES(-1)*

The above cointegration equation shows that Malaysia's GDP is positively correlated with exports (EXP) and imports (IMP), while GDP is negatively correlated with services (SERV). This means that, in the long run, Malaysia's economic growth will be influenced by the services.

Indonesia
*ECT(-1) = -5.694576 + 1.000000*GDP(-1) - 4.788358*IMPORT(-1) - 2.364808* EXPORT(-1) + 7.159004*SERVICES (-1)*

The above cointegration equation shows that Indonesia's GDP is positively correlated with services (SERV), while GDP is negatively correlated with imports (IMP) and exports (EXP). This means that in the long run, the economic growth of Indonesia will be affected by the import and export.

Singapore

*ECT(-1) = 3.272492 + 1.000000*GDP(-1) - 2.732443*IMPORT(-1) + 0.420255* EXPORT(-1) + 0.337932*SERVICES (-1)*

The above cointegration equation shows that Singapore's GDP is positively correlated with exports (EXP) and services (SERV), while GDP is negatively correlated with imports (IMP). This means that in the long run, the economic growth of Singapore will be affected by the imports.

Error Correction Model (ECM)

Malaysia

GDP: For the ECM output of the Gross Domestic Product (GDP) system in Malaysia, the coefficient result of Malaysia imports (MSIAIMP) shows a mixed result of negative and positive signs for the relationship between imports and GDP. But according to the significance level, Malaysia's imports are more negatively influencing GDP with 95% significant level at variable D(IMPORTS (-1)). Other than that, referring to the coefficient of export, there is a positive and negative relationship on Malaysia's GDP according to the significance level and the coefficient, which negatively influences GDP in the short-term. Thence, for the independent variables, EXP, IMP and SERV have a negative relationship with the dependent variable, GDP, in the short-term, with at least 99% significance level. While the ECT coefficient is a negative sign and significant to bear the brunt of adjusting the economic shock distortion to the GDP system.

Import: Referring to the analysis results in the Malaysian IMP system, SERV has a significant negative impact on IMP in the short-term. Even though the GDP and EXP coefficients show that the variable has a positive effect on imports (IMP). Also, the ECT is significant for the long-run adjustment with a negative sign.

Export: The Malaysian EXP system, the imports variable (MSIAIMP), shows ambiguous results on its impact on exports (EXP), which is negative, and the significance level is significant with a negative sign, as 99% significance level. Similar to the services variable (SERV), the coefficients indicate a negative relationship with EXP, which is 99% significant in the negative sign. Therefore, these results show a negative short-run relationship of GDP, IMP and SERV with EXP at least at the 0.01 significance level. But the ECT coefficient has a correct sign and has a high level of significance to adjust to the disequilibrium in the long-run.

Services: Based on the analysis results in the Malaysia SERV system, IMP and EXP have a significant negative impact on SERV in the short-term. Even though the GDP coefficient shows that the GDP variable has a positive effect on imports (SERV). Also, the ECT is significant for the long-run adjustment with a negative sign.

Indonesia

GDP: For the ECM output of the Gross Domestic Product (GDP) system in Indonesia, the coefficient result of Indonesia imports (IMP) shows a negative sign for the relationship between imports and GDP at 90% significant level. Other than that, referring to the coefficient of export, there is also a negative relationship with Malaysia's GDP. According to the significance level and the coefficient, it is negatively influencing GDP in the short-term. Thence, the independent variables of services (SERV) have a positive relationship with the dependent variable, GDP, in the short-term, with at least 95% significance level. While the ECT coefficient is a positive sign and not significant enough to bear the brunt of adjusting the economic shock distortion to the GDP system.

Import: Referring to the analysis results in the Indonesia IMP system, EXP has a significant negative impact on IMP in the short-term at D(EXPORT(-4)) at 95% significant level. Even though the GDP coefficient shows that the variable has a positive effect on imports (IMP). Also, the ECT is significant for the long-run adjustment with a negative sign.

Export: The Indonesia EXP system, the imports variable (IMP), shows ambiguous results on its impact on exports (EXP), which is negative, and the significance level is significant with a negative sign, as 99% significance level at D(IMPORT (2)). Meanwhile, the GDP and SERV coefficients indicate a positive relationship with EXP. Therefore, these results show a negative short-run relationship of IMP with EXP at least at the 0.01 significance level. But the ECT coefficient has a correct sign and has a high level of significance to adjust to the disequilibrium in the long-run.

Services: Analysis results in Indonesia SERV system, IMP and EXP have a significant negative impact on SERV in the short-term. Even though the GDP coefficient shows that the GDP variable has a positive effect on imports (SERV). Also, the ECT is significant for the long-run adjustment with a negative sign.

Singapore

GDP: For the ECM output of the Gross Domestic Product (GDP) system in Singapore, the coefficient result of Singapore imports (IMP) shows a negative sign for the relationship between imports and GDP at D(IMPORT(-1)). Other than that, referring to the coefficient of export, there is also a negative relationship with Singapore's GDP at the significant level and the coefficient is negatively influencing GDP in the short term. While the ECT coefficient is a negative sign and significant to bear the brunt of adjusting the economic shock distortion to the GDP system.

Import: Referring to the analysis results in Singapore IMP system, EXP and GDP have a significant negative impact on IMP in the short-term at D(EXPORT(-2)) and D(GDP(-7)) at 99% significant level. Even though the SERV coefficient shows that the variable has a positive effect on imports (IMP). Also, the ECT is not significant for the long-run adjustment with a positive sign.

Export: The Singapore EXP system, the variables of GDP, IMP and SERV show ambiguous results on their impact on exports (EXP), which are positive. Therefore, these results show a positive short-run relationship of IMP with GDP, IMP and SERV at least at 90% significance level. But the ECT coefficient has a correct sign and has a high level of significance to adjust to the disequilibrium in the long-run.

Services: Based on the analysis results in the Singapore SERV system, IMP and EXP have a significant negative impact on SERV in the short-term. Even though the GDP coefficient shows that the GDP variable has a positive effect on imports (SERV). It means that GDP has a positive short-run relationship with SERV. Also, the ECT is not significant for the long-run adjustment with a positive sign.

Wald test in Vector Error Correction Model (VECM)

Malaysia

Table 1: Wald test in VECM before Parsimonious of Malaysia

Endogenous Variables	Exogenous Variables				
	ECT R=1 (t-1)	$\Delta msiagdp_t$	$\Delta msiaimp_t$	$\Delta msia\exp_t$	$\Delta msiaserv_t$
$\Delta msiagdp_t$	-0.001737 (0.7385)	-	1.214897 (0.2899)	1.287517 (0.2457)	1.252538 (0.2705)
$\Delta msiaimp_t$	-0.066789 (0.0002)***	2.638440 (0.0060)***	-	1.863452 (0.0558)**	1.845560 (0.0586)**
$\Delta msia\exp_t$	0.039807 (0.0264)**	2.703298 (0.0049)***	1.202561 (0.2979)	-	1.208107 (0.2943)
$\Delta msiaserv_t$	-0.012152 (0.4483)	2.714138 (0.0048)***	1.189587 (0.3066)	1.192547 (0.3046)	-

Table 2: Wald test in VECM after Parsimonious of Malaysia

Endogenous Variables	Exogenous Variables				
	ECT R=1 (t-1)	$\Delta msiagdp_t$	$\Delta msiaimp_t$	$\Delta msia\exp_t$	$\Delta msiaserv_t$
$\Delta msiagdp_t$	-0.000469 (0.9210)	-	1.703648 (0.1270)	0.805481 (0.4932)	1.209537 (0.3070)
$\Delta msiaimp_t$	-0.055713 (0.0006)***	2.638440 (0.0060)***	-	1.863452 (0.0558)**	1.845560 (0.0586)**
$\Delta msia\exp_t$	0.042432 (0.0040)***	6.172566 (0.0000)***	1.561293 (0.1654)	-	3.762749 (0.0019)***
$\Delta msiaserv_t$	-0.008824 (0.5404)	6.790617 (0.0000)***	1.820937 (0.1145)	1.944143 (0.0927)*	-

Refer to Tables 1 and 2, focus on the long run causality, it can be seen that the coefficient of ECT in the endogenous variables of Malaysia's exports, imports and services are significant at 5% and 1% with the correct sign in the before and after parsimonious, which achieve the criteria. The intuition behind this means that when the imbalance occurs, such as economic shocks in the EXP and IMP equation system, they will be returned to normal balance in the long run by the coefficient adjustment (ECT). Thus, in the short run, the exports are adjusted by 29% and 21% of the past year's deviation from equilibrium. On the other hand, the imports are -0.066789 and -0.055713, which means the economic disturbance caused by the imbalances will be adjusted in the system by 6% and 5%.

Practically, the larger the coefficient value on the ECT, the faster the speed of adjustment in disequilibrium. For instance, the speed of imbalance adjustment in the services system is slower due to the lower ECT value (-0.008824). Moreover, there is a positive feedback linkage between export and economic growth and import and economic growth in the short-run and long-run after parsimony. It is clear from the results that there is validity in the ELG and GLE hypothesis (Choong et al., 2005; Tan et al., 2007; Sulaiman & Md Saad, 2009; Kalaitzi & Cleeve, 2017) and ILG also GLI hypothesis as well (Bakari, 2018). In the services, the ECT indicates that the services exist in the long-run relationship and positively impact Malaysia's imports. It is assumed that the movement of services may determine the amount of imports. In addition, the exports also present the unidirectional relationship to imports, which means that in international trade, exports are necessary for the expansion of imports (Rani & Kumar, 2018).

Indonesia

Table 3: Wald test in VECM before Parsimonious of Indonesia

Endogenous Variables	Exogenous Variables				
	ECT R=1 (t-1)	$\Delta idngdp_t$	$\Delta idnimp_t$	$\Delta idn\exp_t$	$\Delta idnserv_t$
$\Delta idngdp_t$	0.000265 (0.9434)	-	1.766913 (0.0761)*	0.969950 (0.4813)	1.367891 (0.2069)
$\Delta idnimp_t$	-0.043695 (0.1792)	2.479937 (0.0107)***	-	1.094493 (0.3781)	0.999870 (0.4552)
$\Delta idn\exp_t$	-2.029682 (0.0000)***	2.352776 (0.0153)**	2.083725 (0.0324)**	-	2.295253 (0.0180)**
$\Delta idnserv_t$	-0.554018 (0.0000)***	3.162796 (0.0015)***	1.547132 (0.1338)	2.102097 (0.0308)**	-

Table 4: Wald test in VECM after Parsimonious of Indonesia

Endogenous Variables	Exogenous Variables				
	ECT R=1 (t-1)	$\Delta idngdp_t$	$\Delta idnimp_t$	$\Delta idn\exp_t$	$\Delta idnserv_t$
$\Delta idngdp_t$	0.001564 (0.5925)	-	1.570001 (0.1759)	1.435106 (0.2092)	1.569200 (0.1761)
$\Delta idnimp_t$	-0.029178 (0.3074)	5.078900 (0.0001)***	-	4.382546 (0.0012)***	2.264490 (0.0675)*
$\Delta idn\exp_t$	-1.993686 (0.0000)***	5.122509 (0.0004)***	2.209311 (0.0219)**	-	2.524055 (0.0089)***
$\Delta idnserv_t$	-0.518005 (0.0000)***	7.344820 (0.0000)***	1.698458 (0.0892)*	2.413388 (0.0122)**	-

According to Tables 3 and 4, the long-run causality significance was only significant in the endogenous variables of Indonesia's GDP, with a positive sign in the ECT coefficient. It implies that due to any disturbance in the GDP system, a difference from equilibrium will happen, and the GDP system will become unstable. For the short-run causality in Table 4.33, there is a bilateral linkage between exports and GDP with a significant level of 0.01, indicating the ELG and GLE hypothesis (Al-Yousif, 1999; Michelis & Zestos, 2004; Tan et al., 2007; Tang & Lai, 2011). Other than that, the presence of a short-run bilateral relationship between imports and economic growth (Bakari, 2018; Moyo & Mapfumo, 2015), which shows the vitality of imports to economic growth (Noor & Rambeli, 2018). Furthermore, the imports unilaterally influence the exports with 99% significant, which can be explained as the import is a crucial source for export in the aspect of raw materials as the factor of exported goods production (Hassouneh & Fannoun, 2019). Other than that, the services have a positive feedback direction with economic growth. Conclusively, there is strong temporal causality in Indonesia among exports, imports, services and economic growth, as well as the paper of Albiman & Suleiman (2016) shows statistically significant results for the short-run causality between variables. While the world pandemic outbreak substantially disturbs the economic growth, exports, and imports with a 0.01 significant level, it has the least impact on exchange rates with the 90% significant.

Singapore

Table 5: Wald test in VECM before Parsimonious of Singapore

Endogenous Variable	Exogenous Variables				
	ECT R=1 (t-1)	$\Delta sggdp_t$	$\Delta sgimp_t$	$\Delta sg\exp_t$	$\Delta sgserv_t$
$\Delta sggdp_t$	-0.000410 (0.6157)	-	3.290145 (0.0009)***	16.64447 (0.0000)***	9.203526 (0.0000)***
$\Delta sgimp_t$	0.000308 (0.9007)	2.479937 (0.0107)**	-	1.094493 (0.3781)	0.999870 (0.4552)
$\Delta sg\exp_t$	1.494800 (0.0000)***	2.352776 (0.0153)**	2.083725 (0.0324)**	-	2.295253 (0.0180)**
$\Delta sgserv_t$	1.278885 (0.0000)***	3.162796 (0.0015)**	1.547132 (0.1338)	2.102097 (0.0308)**	-

Table 6: Wald test in VECM after Parsimonious of Singapore

Endogenous Variable	Exogenous Variables				
	ECT R=1 (t-1)	$\Delta sggdp_t$	$\Delta sgimp_t$	$\Delta sg\exp_t$	$\Delta sgserv_t$
$\Delta sggdp_t$	-0.000643 (0.3833)	-	3.290145 (0.0009)***	16.64447 (0.0000)***	9.203526 (0.0000)***
$\Delta sgimp_t$	0.001313 (0.5417)	9.191627 (0.0000)***	-	2.829089 (0.0137)**	3.258939 (0.0037)***
$\Delta sg\exp_t$	1.484032 (0.0000)***	2.352776 (2.352776)	2.083725 (0.0324)**	-	2.295253 (0.0180)**

$\Delta sgserv_t$	1.281406 (0.0000)***	3.761556 (0.0130)**	1.224980 (0.2978)	1.224980 (0.2978)	-

Refer to Tables 5 and 6, focus on the long run causality, it can be seen that the coefficient of ECT in the endogenous variables of Singapore's exports, imports and services are significant at 1% with the correct sign in both before and after parsimony, which achieves the criteria. The intuition behind this means that when the imbalance occurs, such as economic shocks in the EXP and IMP equation system, they will be returned to normal balance in the long run by the coefficient adjustment (ECT). Thus, in the short run, the exports are adjusted by 29% and 21% of the past year's deviation from equilibrium. On the other hand, the imports are 1.494800 and 1.484032, which means the economic disturbance caused by the imbalances will be adjusted in the system by both 15%.

Practically, the larger the coefficient value on the ECT, the faster the speed of adjustment in disequilibrium. For instance, the speed of imbalance adjustment in the services system is slower due to the lower ECT value (1.281406). Moreover, there is a positive feedback linkage between export and economic growth and import and economic growth in the short-run and long-run after parsimony. It is clear from the results that there is validity in the ELG and GLE hypothesis (Choong et al., 2005; Tan et al., 2007; Sulaiman & Md Saad, 2009; Kalaitzi & Cleeve, 2017), and ILG also GLI hypothesis as well (Bakari, 2018). In the services, the ECT indicates that the services exist in the long-run relationship and positively impact Malaysia's imports. It is assumed that the movement of services may determine the amount of imports. In addition, the exports also present the unidirectional relationship to imports, which means that in international trade, exports are necessary for the expansion of imports (Rani & Kumar, 2018).

Summary of Findings

Malaysia, Indonesia and Singapore met the research questions and objectives about export (import)-led growth and growth-led export based on the results of the analysis of both contexts using the parsimonious method (import). In the first section, the export (EXP) and import (IMP) of Malaysia, Indonesia and Singapore have a short-term bilateral relationship with economic growth (GDP). These findings are consistent with numerous empirical studies conducted in Asian countries, particularly Malaysia and Singapore, which also reported a positive relationship between the variables under investigation (Tan et al., 2007; Tang & Lai, 2011; Albiman Md & Suleiman, 2016; Mohd Noor & Ramli, 2018). Consequently, both countries are equipped with ELGH and ILGH, as well as GLE and GLI, because export-dependent nations are seeing tremendous growth. Despite this, there is limited evidence of a long-term link between factors in Malaysia. The ECT of Singapore demonstrates an unstable response to long-term economic imbalance. Consequently, there is no long-term organization in Singapore.

The short-term relationship between Singapore, Malaysia and Indonesia is superior to the long-term relationship, which does not exist. The results indicate that the unidirectional link between imports and exports is reasonable due to the moderate services. Singapore frequently monitors exchange rate fluctuations to ensure price stability, as greater price stability and low inflation may increase imports. For the international commerce theory, export is causal to import growth in Malaysia (Rani & Kumar, 2018), whereas import is statistically significant to export growth in Indonesia (Fannoun & Hassouneh, 2019). With the importance of the exchange rate in developing economies, it is undeniable that the services deserve to have a favorable impact on economic growth (Stracca, Mileva & Habib, 2016).

Based on the significance level of the ECT coefficient for Malaysia, Indonesia and Singapore, it can be concluded that Malaysia's economy adjusts to disturbance shocks more quickly than Singapore's but more slowly than Indonesia. Referring to the equivalent ECT, for example the speed of adjustment through Malaysia's import system (98%) is greater than Singapore's import system (36%), although Singapore's exports (25%) are faster than Malaysia's (24%). As a result of a shared cause, ECT is robust in the three nations, and its exports and imports contribute positively to long-term economic growth.

5. Conclusion and Recommendations

Since the t-statistic of each variable is greater than the critical value, the unit root test concludes that the time series for both countries is non-stationary at the level form, with no significance in the probability value. However, although initially distinct, the results are stationary and all variables are significant between 95% and 99% of the time. The Augmented Dickey-Fuller (ADF) t-value for each variable is below 5% of the critical value; hence, the time series data are stationary at the first difference of intercept, intercept with trend, and none (pure random walk). In order to determine the best lag length, Vector Autoregression (VAR) is applied to all variables in this study. The optimal latency for both countries selected by the Akaike Information Criterion was reported to be 12. (AIC). Consequently, both nations conducted the Johansen Juselius Cointegration Test (JJ) and found evidence of cointegration.

Following the VECM, the results have been separated into two sections: one cointegration model and two cointegration models. In the initial section of the VECM results, there are short-run and long-run relationships between variables in Malaysia and Indonesia, but just a short-run link in Singapore. The export-led growth and import-led growth hypotheses are nevertheless supported for both nations. In contrast, the second segment yields more robust results than the first. The VECM illustrates the short-run and long-run effects of exports, imports, and the exchange rate on Malaysia's economic growth. In contrast, Singapore's economic growth has only been influenced in the short-term by the exchange rate. Despite the long-term association between exports and imports and Singapore's economic growth, there is a short-term dynamic relationship between these variables. In addition, the objectives were met by confirming the short-run and long-run existence of the export (import)-led growth and growth-led export (import) hypotheses. In addition, the exchange rate had a beneficial bilateral effect on the economic growth of Malaysia, Indonesia, and Singapore.

In conclusion, this study accomplished nearly all of its objectives. This study identifies the effects and relationships of exports, imports and services that influence the short-and long-term economic growth of Malaysia, Indonesia and Singapore.

Policy Implication and Recommendations

Malaysia should increase trade liberalization by further facilitating and expanding market access by resolving tariffs and non-tariff measures in order to become an open economy. The Free Commerce Agreement (FTA) is effective in promoting trade, investment and economic development as well as maintaining Malaysian exporters' competitiveness. Malaysia managed to do well in external commerce despite the pandemic, with the greatest monthly exports in December 2020. (Ministry of International Trade and Industry, 2021). It is thought that the recent signing of the Regional Comprehensive Economic Partnership (RCEP) will increase market access and aid in expanding exports. As reported imports are required for Malaysian exports, Malaysia possesses a plethora of resources. The government may rely on Heckscher-Ohlin's theory of comparative advantage to import scarce and expensive-to-produce goods while utilizing local forces of plenty to sell abroad. To curb imports, the government should simultaneously apply higher effective tariff rates on dangerous items. Singapore, on the other hand, is one of the most open trade economies in history due to the high amount of duty-free products exported to the country. The results indicate that Singapore's exports and imports are interdependent. For social and environmental reasons, the government should eliminate taxes on imported raw materials and intermediate goods such as technologies and capital goods, while restricting dangerous products such as non-medical chewing gum and tobacco products. Since 1989, Singapore has also been a member of the Asian Pacific Economic Cooperation (APEC). This free trade policy has been implemented by Singapore to decrease trade barriers throughout the Asia-Pacific region. In 2020, China, Malaysia, and the United States will be Singapore's top three trading partners, while Singapore's imports from Malaysia will exceed its exports to Malaysia (Department of Statistics Singapore, 2021).

Imports have contributed to Singapore's economic growth as a result of a stable exchange rate that facilitates cheaper imports for consumers and businesses. In spite of the circuit breaker announced for April 7, 2020, Singapore has faced a more severe recession than during the previous crises. Singapore's monetary policy has been tasked with facilitating the economic recovery. Singapore's controlled exchange rate against a trade-weighted currency basket allows the currency to float but remain steady (Monetary Authority of Singapore, 2020). As the exchange rate decreases, the liquidity in the banking system is purposefully enhanced to reduce

higher funding costs and fund foreign currency liquidity (Monetary Authority of Singapore, 2020). During the uncertainty of this epidemic, Malaysia maintains a flexible exchange rate regime for the ringgit based on the strength of demand and supply, as the exchange rate has historically served as a shock-adjustment mechanism for long-term disequilibrium. A flexible exchange rate regime makes Malaysia susceptible to exchange rate volatility (Hashim et al., 2019). Despite the fact that a flexible exchange rate indirectly stimulates commerce, it made Malaysia's economy fragile, resulting in a severe drop during the global financial crisis of 2008. Since the exchange rate is significant for export-dependent nations, it indirectly influences international trade and investment between nations. In order to avoid foreign exchange market volatility. In the midst of a pandemic, the Malaysian central bank must control the movement of the exchange rate by ensuring liquidity on the foreign exchange market to prevent disruptions to local economic activity, such as trade and investment (Bank Negara Malaysia, 2020).

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