Economic Growth, Financial Development, and Trade Openness of Leading Countries in ASEAN

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Abstract

The study examines the causal relationship between financial development and economic growth through trade openness for the leading ASEAN countries (Indonesia, the Philippines, Malaysia, Singapore, Thailand, and Vietnam). The study employs a panel data for the period of 25 years spanning from 1995 to 2019 for the six countries, yielding a balanced panel of 150 observations. Fixed effect model (FEM) and random effect model (REM) are used for the panel data, following the Hausman test performed for model selection. The trivariate Granger causality test is also used to check for possible relationship between the variables. The results show that REM is chosen based on the Hausman test result, suggesting that the trade openness has a positive association with growth whereas the financial development is positively, but insignificantly associated with growth. The reason for this is that the financial development and economic growth may be related to each other. The results are, then, further explored and confirmed by the causality test. That is, the financial development and the economic growth, through the trade openness, are found to have bidirectional positive relationships. This implies that there would be shortcomings when ignoring the presence of trade openness, which positively impacts the relationship between finance and growth.

Keywords: ASEAN, Economic Growth, Financial Development, Trade Openness

JEL Classification Code: C23, E44, F43

1. Introduction

The leading ASEAN countries are Indonesia, the Philippines, Malaysia, Singapore, Thailand, and Vietnam - ASEAN-6. The countries have developed quickly in the era of globalization, which has created a mixture of achievements and problems in these countries. One of these achievements is economic growth and development of the financial sector. The link between economic growth and financial development is a broad topic, which has attracted much attention in the literature and empirical evidence because of its impact on development policies (World Bank, 1989).

The basic theory of this relationship first appeared in the study by Schumpeter (1912) and subsequently, McKinnon (1973) and Shaw (1973). Important policy implications from the McKinnon-Shaw models are government restrictions on interest rate caps in the banking system, a compulsory high reserve ratio, and direct credit programs, which block financial development processes and therefore reduce the rate of economic growth. The endogenous growth models have similar conclusions. These models show that financial development has a positive effect on the development of stability (Greenwood & Jovanovic, 1990; Bencivenga & Smith, 1991). In contrast, financial development has been found to negatively affect growth in India (Kumar & Paramanik, 2020).

Empirical evidence shows that there is a positive relationship between financial development and economic growth. King and Levine (1993), using data from the IMF and various financial indicators, conclude that there is a positive relationship between financial indicators and growth and that financial development has a strong correlation with the rate of growth, capital accumulation, and economic efficiency. Rajan and Zingales (1998), then went further by testing whether financial development created conditions for economic growth by examining a reason for such a relationship: financial
development reduces the cost of external financing for companies. Next, Jalilian and Kirkpatrick (2002) examined the relationship between financial development, economic growth, and poverty reduction. Their results support the view that financial sector development policies can contribute to achieving the objectives of poverty alleviation in developing countries and also show that growth is driven by finance. Subsequently, several similar conclusions are also reached for different contexts. In particular, Bong and Premaratne (2019) showed the impact of financial integration on economic growth of Asian countries, whereas Tarig et al. (2020) showed the non-linearly impact of financial development on growth in Pakistan.

However, these findings did not explore a causal relationship between these two factors taking into account trade openness. Although economists have accepted the impact of financial development on economic growth, they do not have the same ideas about the direction of causality that is whether financial development creates economic growth, or that economic growth has created financial development. Instead, the previous studies have shown conflicting results about the nature and direction of the causal relationship between finance and economic growth. The question with the presence of trade openness, therefore, is whether financial development creates economic growth and/or the opposite. This paper answers the question in the context of the six leading countries of the ASEAN bloc.

The existing literature suggests the existence of a relationship between trade openness and financial development, although this topic has not been studied thoroughly. For example, Beck et al. (2003) show that countries with developed financial systems would have high trade openness ratios in the industries which depend on external financing sources, which leads to the conclusion that financing is an important element of commercial structures. Similarly, Svaleryd and Vlachos (2002) found that the financial sector had important implications in the industrial specialization of OECD countries. The current paper would, thus, give further evidence on the possible relationship between trade openness and financial development in the context of Asian-6.

Have open economies grown faster than closed economies? Almost all empirical studies on growth have provided the answers for this question. Strong support of trade liberalization is partly based on the conclusions that the open economy has higher growth rates than the closed economy (Onafowora & Owoye, 1998; Yanikkaya, 2002). This is also due to the failure of the alternative strategies for imported goods, especially in the 1980s, and the excessive expectations on trade liberalization. A logical explanation by Rodrik (1999) was that “The advantages of import substitution policies has been exaggerated in the previous period, today the benefits of openness are often required frequently in documents related policies and the publications of the World Bank and the International Monetary Fund”.

However, the relationship between trade openness and economic growth is still a subject of debate in the literature on growth and development. The studies on growth theory have proposed a complex and unclear relationship between trade restrictions and growth. The literature on endogenous growth was diversified enough to provide another aspect of the economic model, including that trade restrictions can reduce or increase the rate of global growth (Romer, 1990; Grossman & Helpman, 1990; Rivera-Batiz & Romer, 1991a, b; Matsuyama, 1992).

Note that, if trading partner countries are disproportionately to the level of technology and resources, then even if economic integration increases the growth rate worldwide, it can adversely affect each individual country (Grossman & Helpman, 1991a,b; Lucas, 1988; Rivera-Batiz & Xie, 1993; Young, 1991). Conventional trade theory suggests that international trade is related to the reallocation of resources within national borders, as determined by the difference with outside countries. Reallocation of these resources to achieve efficiency will lead to an increase in the total national income. Krugman (1986) claimed there were two other sources of benefits from international trade. First, there may be more products available for consumers. Second, the increased competition will reduce the market power of the company and thus make the equilibrium price lower which will increase consumer surplus. Moreover, the increase in the size of the market allows enterprises to implement economies of scale. Although the size and distribution of the benefits from trade may be controversial, there is a strong consensus of a positive relationship between international trade and national income.

The current paper makes two contributions. Firstly, the study explores the relationship between financial development and economic growth through the lens of trade openness. Secondly, this study applies to the ASEAN-6 group, which are leading countries in ASEAN, but have not yet attracted much attention. The ASEAN-6 group is selected because they are the countries having exalted commercial activities and high economic growth rates. These countries have similarities and certain links in various fields, especially the economic field, which is concretized by the establishment of the ASEAN Economic Community, abbreviated as AEC, in May 12, 2015.

The results show the positive relationship between financial development and economic growth (through trade openness). The remainder of the paper proceeds with a literature review section, followed by methodology and data. The results and discussion section is then presented, and some concluding remarks are given in the final section.
2. Literature Review

The link between financial development and trade openness allows different directions for economic development. On the one hand, if enhanced trade opening leads to an increase in financial development, this can promote economic growth, including finance leading growth through the allocation channel and accumulation. On the other hand, if finance created trade openness, it can promote growth, and trade openness is seen as a growth factor. Trade openness can help economic growth in several ways, for example by increasing the level of a country’s specialization or by positive impacts to innovation and technology development. The possible relationships between the variables are illustrated in Figure 1.

2.1. Financial Development and Economic Growth

Demetriades and Hussein (1996) have examined the causal relationship between financial development and real GDP. They found significant evidence of a bidirectional relationship and some evidence of reverse causality. Luintel and Khan (1999) examined the long-term relationship between financial development and economic growth in the multivariate vector autoregression model (mVAR) when using a sample of ten countries. They found the bidirectional causality relationship between financial development and economic growth in all countries surveyed. Al-Yousif (2002) examined the nature and direction of the relationship between financial development and economic growth, using both time series and panel data from 30 developing countries in the period 1970–1999. The empirical results support strongly the view that financial development and economic growth are mutually causal. Akinboade (1998) examined the causal relationship between financial development and economic growth in the period from 1976 to 1995 in Botswana and found that there is a bidirectional causal relationship between them.

2.2. Trade Openness and Economic Growth

Onafowora and Owoye (1998) conducted a study on how trade liberalization stimulates economic growth in Africa. Their study examined how the changes in economic growth could lead to changes in trade policy, export and investments in 12 countries in Sub-Saharan Africa (SSA). Their results indicate that the trade policy, export, and the investment rate shocks have a significant impact on economic growth in 10 of the 12 countries in group. This suggests that, economic growth in some African countries can be stimulated via a strategy of expanding outward exports. Yanikkaya (2002) studied the relationship between trade openness and economic growth by using panel data of more than 100 observations of developed and developing countries from 1970 to 1997. The study showed that trade liberalization has a relationship with growth, which is consistent with existing literature.

2.3. Trade Openness and Financial Development

Do and Levchenko (2008) found that openness to trade will affect the demand for external financial sources. In addition, increasing trade openness could trigger demand for new financial products. Therefore, the increase of free trade could lead to more supply of complex financial instruments. In such an environment, financial institutions are expected to grow more to provide adequate insurance and risk diversification (Svaleryd & Vlachos, 2002). Moreover, domestic interest groups having current benefits may hinder financial development to prevent higher competition because of new entrants to the market. This group can replace their interests in exchange for the development of the financial sector in a positive way, creating a link between trade and the financial sector (Rajan & Zingales, 2003). The development of financial markets can constitute a competitive advantage for industries relying heavily on external financing source (Beck et al., 2003).

2.4. Trade Openness, Financial Development and Economic Growth

Empirical evidence shows that the trade openness can actually have a positive effect on economic activities (Edwards, 1998; Harrison, 1996). Harrison (1996) used a series of measures to check the relationship between open and growth. Overall results showed that there was a positive association between growth and open trade. The study also showed a positive relationship between openness and financial development. Similarly, Edwards (1998) used a set of comparable data for the 93 countries (panel data from 1960 to 1990) to analyze the robustness of the
relationship between openness and growth of total factor productivity. Edwards (1998) says “Finance, through trade openness affects economic growth”. This supports the claim that ignoring an important variable (in this case trade openness) in the relationship between financial-growth can lead to erroneous conclusions. In other words, the ASEAN-6 countries, if not open their commercial sectors, may not achieve the purpose that promotes growth by implementing policies to strengthen financial deepening. A variant of this conclusion was drawn by Odhiambo (2008), who found that saving is an important variable in the relationship financial-growth in Kenya. Gries et al. (2009) suggest that the relationship between the financial deepening and trade openness can allow many different directions for economic development. Blackburn and Hung (1998) used the endogenous growth model proposed by Romer (1990) to explore the causal relationship between trade openness, economic growth and financial development. In the model, economic growth driven by innovation intermediary goods is also encouraged by expanding the market for new goods, for example, through trade liberalization. Bencivenga and Smith (1998) found a causal relationship between trade openness, economic development and financial deepening from the evidence that not only favorable financial development affected growth, but the extent of the financial activities also depend positively on economic growth.

3. Methodology and Data

This study used a panel data of 150 observations obtained from the World Bank from 1995 to 2019 for six countries including Vietnam, Thailand, Singapore, Indonesia, Malaysia and the Philippines. According to Baltagi (2004), panel data is less likely to incur problems of autocorrelation and multicollinearity as time series data often encountered.

<table>
<thead>
<tr>
<th>Variable name</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \text{GDP}_t )</td>
<td>Logarithm of real GDP per capita for the ( i )-th country in period ( t )</td>
</tr>
<tr>
<td>( \text{TRADE}_t )</td>
<td>Logarithm of the sum of exports plus imports to real GDP for the ( i )-th country in period ( t )</td>
</tr>
<tr>
<td>( \text{DEPTH}_t )</td>
<td>Logarithm of a composite indicator of financial development for the ( i )-th country in period ( t ). The finance proxies: domestic credit to private sector (% GDP), domestic credit provided by financial sector (% GDP) and money supply to GDP</td>
</tr>
<tr>
<td>( \varepsilon_t )</td>
<td>the error term for the ( i )-th country in period ( t )</td>
</tr>
</tbody>
</table>

The model can be written as follows:

\[
\text{GDP}_t = \alpha + \alpha_\text{TRADE}_t + \alpha_\text{DEPTH}_t + \varepsilon_t
\]  

(1)

Ang and McKibbin (2007) developed a composite index of financial development. In this way, the study avoids imbalances when a single financial indicator is used, and problems related to multicollinearity. In the study by Goldsmith (1969), the variable representing financial development has been proposed, as M2 to GDP. Up to now, there is no consensus on the superiority of any individual indicators (Gries et al., 2009).

This paper exploring the relationships between financial development, trade openness and economic growth consists of three main steps. First, the study considered whether each variable has unit root. If the variables have unit root, it should be taken as a differential to increase the model’s accuracy. Then, the study examines the relationships between the variables using both the fixed effect model (FEM) and random effect model (REM). Finally, the study examines the Granger causality relationship between variables, by using the Error Correction Model (ECM) if the existence of a positive relationship in the long term is found between them. If there is no positive relationship, the model of Vector Autoregression (VAR) would be used to test the Granger causality relationship.

3.1. Testing for unit roots in panel data by IPS test (Im et al., 2003)

Many studies skipped unit root test of the data, which is crucial step because the results are not reliable without the test. The study first tested for the stationarity of Economic Growth (GDP), Financial Development (Depth) and Trade Openness (Trade) before running the cointegration and causality test. Building upon these tests, spurious empirical findings are avoided in the later causality analyses. Panel unit root tests are similar but not identical to unit root tests carried out in time series analysis (Sichei, 2008). All panel unit roots begin with the following:

\[
Y_t = \delta Y_{t-1} + \lambda X_t + U_t
\]  

(2)

If \(|\delta| < 1\), \(Y_t\) is weakly (trend) stationary. On the other hand, if \(|\delta| = 1\), \(Y_t\) then contains a unit root. This can be simplified further by subtracting \(Y_{t-1}\) on both sides so that

\[
\Delta Y_t = (\delta - 1)Y_{t-1} + \lambda X_t + U_t
\]  

(3)

Assuming that \(\rho = (\delta - 1)\), our ADF type-model is:

\[
\Delta Y_t = \rho Y_{t-1} + \lambda X_t + \sum_{j=1}^{k} \phi_j \Delta Y_{t-j} + U_t
\]  

(4)
For purposes of testing, there are two natural assumptions: (1) the persistence parameters are common across the cross-sections so that $\rho_i = \rho$; and (2) $\rho_i$ varies with cross-sections.

None of the available panel unit root tests are free from some statistical shortcomings, in terms of size and power properties. The IPS test (Im et al., 2003) was employed for the panel unit root tests to examine the stationarity property of our panel variables.

IPS begins by specifying a separate ADF regression for each cross-section. That is:

$$\Delta y_{it} = \alpha_i Y_{it-1} + \sum_{j=1}^{p_i} \gamma_j \Delta y_{it-j} + X'_{it} \delta + \epsilon_{it}$$

(5)

Where $\Delta y_{it} = y_{it-1}, y_{it}$ ($i = 1, 2, \ldots, n$; $t = 1, 2, \ldots, T$) is the series under investigation for country $i$ over period $t$, $p_i$ is the number of lags in the ADF regression and $\epsilon_{it}$ errors are assumed to be identically and normally distributed random variables for all $i$ and $t$ with zero mean and finite heterogeneous variance $\sigma^2$. Both $\alpha_i$ and $p_i$ in equation (5) are allowed to vary across countries.

The following hypotheses can be made using this procedure:

$H_0$: $\alpha_i = 0$, There is a unit root for some $i$'s.
$H_a$: $\alpha_i < 0$, There is no unit root for at least one $i$.

There are two stages for constructing the $t$-bar statistic which is proposed by Im et al. (2003). At the first stage the average value of the individual ADF $t$ statistic for each of the countries in the sample is calculated which is given by

$$\bar{t}_{it} = \frac{1}{n} \sum_{i=1}^{n} t_{it}(p)$$

(6)

Where $t_{it}(p)$ is the calculated ADF test statistic for country $i$ of the panel ($i = 1, 2, \ldots, n$). The second step is to calculate the standardized $t$-bar statistic which is given by

$$Z_{it} = \frac{\sqrt{n} \left[ \bar{t}_{it} - \frac{1}{n} \sum_{i=1}^{n} E(\bar{t}_{it}(p)) \right]}{\sqrt{\frac{1}{n} \sum_{i=1}^{n} \text{var}(\bar{t}_{it}(p))}}: N(0,1)$$

(7)

The expression for the expected mean, $E(\bar{t}_{it}(p))$ and variance, $\text{var}(\bar{t}_{it}(p))$ of the ADF regression $t$-statistics are provided by IPS for various values of the $T$ and $p$ and differing test equation assumptions. However, Im et al. (2003) indicated that in the presence of cross-sectional dependence, the data can be adjusted by demeaning and that the standardized demeaned $t$-bar statistic converges to the standard normal in the limit.

3.2. Panel Cointegration

This section tackles the first objective of estimating the short and long run relationships between financial development, trade openness, and economic growth in ASEAN-6. Panel cointegration tests are necessary when the variables employed for a study exhibit non-stationary properties (Persyn & Westerlund, 2008). The Pedroni Test is used in this study because it does not impose common-factor restriction. Common-factor restriction has often led to the failure to reject the null hypothesis of no cointegration.

The Pedroni (1999) test of cointegration begins with the regression:

$$y_{it} = \alpha_i + \delta_i t + \beta_1 x_{it1} + \beta_2 x_{it2} + K + \beta_m x_{imat} + e_{it}$$

(8)

where $y$ and $x$ are assumed to be integrated of order 1; the parameters $\alpha_i$ and $\delta_i$ are individual and trends effects which may be set to zero if desired. Under the null hypothesis that there is no cointegration, the residuals would be $I(1)$. The next step is similar to the Engle-Granger cointegration test. An auxiliary regression of the form as seen below is estimated.

$$\Delta e_{it} = \rho \epsilon_{it-1} + \sum_{j=1}^{p_i} \varphi_j \Delta e_{it-j} + \nu_{it}$$

(9)

The Pedroni panel statistics are then constructed from this residual. The main statistics of interest are the within group test statistics. They are estimated as follows:

Panel $\nu$-statistic:

$$T^2 N^3 Z_{VNT} = \frac{T^2 N^3}{\sum_{t=1}^{T} \sum_{i=1}^{n} L_{it}^2 e_{it}^2}$$

(10)

Panel $\rho$-statistic:

$$T \sqrt{N} \left[ \sum_{t=1}^{T} \sum_{i=1}^{n} L_{it}^2 (\epsilon_{it}^2) - \bar{\lambda}_i \right]$$

(11)

Panel $t$-statistic:

$$Z_{VNT} = \sqrt{\frac{T^2 N^3}{\sum_{t=1}^{T} \sum_{i=1}^{n} L_{it}^2 e_{it}^2}} \left[ \sum_{t=1}^{T} \sum_{i=1}^{n} L_{it}^2 (\epsilon_{it}^2) \Delta e_{it}^2 - \bar{\lambda}_i \right]$$

(12)

These are followed by three between group statistics. Pedroni (1999) showed that these standardized statistics are asymptotically normally distributed.
3.3. Testing for Causality

Attention is now turned to the causal relationships between financial development, trade openness, and economic growth in the selected ASEAN-6 countries, which is the second objective of the study. For all other reasons, the study employed a dynamic Granger causality test to examine the causal relationship between financial development, trade openness, and economic growth. The main reason why the Granger causality test is favored among other test procedures is due to its robust response to both large and small samples. The Granger causality test based on error correction model can be expressed as follows:

\[ \text{GDP}_t = \alpha_0 + \sum_{i=1}^{n} \alpha_i \text{GDP}_{t-i} + \sum_{i=1}^{n} \alpha_2 \text{DEPTH}_{t-i} + \alpha_3 \text{EC}_{t-1} + u_t \]  \hspace{1cm} (13)

\[ \text{DEPTH}_t = \beta_0 + \sum_{i=1}^{n} \beta_i \text{GDP}_{t-i} + \sum_{i=1}^{n} \beta_2 \text{DEPTH}_{t-i} + \beta_3 \text{EC}_{t-1} + \epsilon_t \]  \hspace{1cm} (14)

Where GDP and DEPTH are the underlying variables in the causal relationship. EC is the one period lagged error-correction term captured from the cointegration regression. \( u_t, \epsilon_t \) are mutually uncorrelated white noise residuals.

A third variable was introduced into the above model, as it has been detected by past studies that a bivariate framework is unreliable. That is, a new important variable if introduced in a bivariate framework could change the direction of causality and magnitude of the estimate. This important revelation is due to studies such as Caporale and Pittis (1997), and Loizides and Vamvoukas (2005).

The trivariate Granger causality test based on error-correction model can be expressed as follows:

\[ \text{GDP}_t = \gamma_0 + \sum_{i=1}^{m} \gamma_{1i} \text{GDP}_{t-i} + \sum_{i=1}^{m} \gamma_{2i} \text{DEPTH}_{t-i} + \sum_{i=1}^{m} \gamma_{3i} \text{OPEN}_{t-i} + \epsilon_t \]  \hspace{1cm} (15)

\[ \text{OPEN}_t = \omega_0 + \sum_{i=1}^{m} \omega_{1i} \text{GDP}_{t-i} + \sum_{i=1}^{m} \omega_{2i} \text{DEPTH}_{t-i} + \omega_{3i} \text{EC}_{t-i} + \nu_t \]  \hspace{1cm} (16)

Where OPEN is the third crucial variable affecting the relationship between financial development, GDP, and DEPTH. In this case, trade openness is the third crucial variable affecting the relationship between finance and growth. \( \epsilon_t, \mu_t, \nu_t \) are mutually uncorrelated white noise residuals.

The main difference between a bivariate model presented in (13) and (14) and a trivariate model presented in (15)–(17) is the introduction of a third important variable affecting both financial development and economic growth (in this case, trade openness). Based on the model presented in (15)–(17), it is possible that the causal link between financial development and economic growth estimated from (13) and (14) could be due to the omission of the trade openness variable. With the introduction of the trade openness variable, the model can now capture the causal relationship between financial development and economic growth with respect to changes in trade openness.

4. Empirical Results and Discussion

Table 2 shows the descriptive statistics of the balanced panel data of GDP, DEPTH and TRADE in form of natural logarithm.

Using an IPS test, the results showed that all three variables have unit root and they are stationary after retrieving first differences (Table 3).

The Pedroni test (Table 4) showed that no cointegration relationships of the variables in the model exists. This means that the three variables do not have long-term relationships. Thus, the next step in the study is to examine the relationships between variables in the short term by considering the choice between REM and REM.

The results showed that \( p\text{-value} = 0.2646 \) (Table 5), the hypothesis \( H_0 \) is not rejected, implying REM a more suitable model. The implication of using REM instead of FEM is of transnationally characteristic importance in predicting the growth rate of each country in the economic group. Although the countries in a particular group can have similar economic policies, the results will not be the same due to the difference in behavior, institutions, structures and foreign aid.

\[ \text{GDP} = 0.028 + 0.007 \times \text{DEPTH} + 0.139 \times \text{TRADE} + \epsilon_t \]

REM result (Table 6) showed that trade openness has positive and significant impacts on economic growth, which means that if trade openness rises 1%, the real GDP per capita will rise 0.139% (\textit{ceteris paribus}). This finding is consistent with the findings of Yanikggaya’s (2002) finding that trade promotes economic growth, especially in developing countries.

Meanwhile, financial development has a positive but not significant effect on economic growth. However, when there is the presence of trade openness in the model, financial development and economic growth are related to each other. This is consistent with the findings of Edwards (1998) that finance, through trade openness, affects economic growth. Harrison (1996) found that a movement towards an open trade regime in the industrialized countries is associated with higher GDP growth, after accounting for other inputs. This supports the claim that ignoring an important variable (in this
case trade openness) in the relationship between financial-growth can lead to erroneous conclusions. A variant of this conclusion was drawn by Odhiambo (2008), who found that saving is an important variable in the finance-growth relationship in Kenya.

The Granger test (Table 7) illustrates the significant bidirectional causality relationship between financial development and economic growth through trade openness. Gries et al. (2009) suggest that the positive relationship between financial development and trade openness allows positive direction for economic development. This conclusion is consistent with previous studies of Demetriades and Hussein (1996), Akinboade (1998) and Al-Yousif (2002), that there exists a bidirectional causal relationship between financial and growth. Specifically, Edwards (1998) is one of the researchers who soon discovered that financial, through trade openness, created economic growth. In contrary, Harrison (1996) concludes “a positive association between growth and measures to open trade will increase the impact on financial development” and the subsequent conclusions from Odhiambo (2008) continue to consolidate this trend.

Table 2: Descriptive Statistics

<table>
<thead>
<tr>
<th></th>
<th>GDP</th>
<th>DEPTH</th>
<th>TRADE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>8.381074</td>
<td>4.870173</td>
<td>4.39624</td>
</tr>
<tr>
<td>Std.Dev.</td>
<td>1.191803</td>
<td>0.533476</td>
<td>0.745642</td>
</tr>
<tr>
<td>Max</td>
<td>10.85621</td>
<td>5.569984</td>
<td>5.764499</td>
</tr>
<tr>
<td>Min</td>
<td>6.408416</td>
<td>3.512864</td>
<td>2.973903</td>
</tr>
</tbody>
</table>

Note: GDP = ln(real GDP per capita), DEPTH = ln(financial development), TRADE = ln(Trade openness).

Table 3: Unit Root Test

<table>
<thead>
<tr>
<th></th>
<th>Level I(0)</th>
<th>First differences I(1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Var</td>
<td>IPS</td>
<td>P-value</td>
</tr>
<tr>
<td>GDP</td>
<td>4.66</td>
<td>1.0000</td>
</tr>
<tr>
<td>Depth</td>
<td>0.37</td>
<td>0.6430</td>
</tr>
<tr>
<td>Trade</td>
<td>0.14</td>
<td>0.5570</td>
</tr>
</tbody>
</table>

Table 4: Cointegration Test

<table>
<thead>
<tr>
<th>Statistic</th>
<th>Prob.</th>
<th>Weighted statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Panel v-statistic</td>
<td>−0.900955</td>
<td>0.8162</td>
<td>−0.667338</td>
</tr>
<tr>
<td>Panel rho-statistic</td>
<td>1.586550</td>
<td>0.9437</td>
<td>1.358793</td>
</tr>
<tr>
<td>Panel PP-statistic</td>
<td>2.329322</td>
<td>0.9901</td>
<td>1.965602</td>
</tr>
<tr>
<td>Panel ADF-statistic</td>
<td>2.578751</td>
<td>0.9950</td>
<td>2.209491</td>
</tr>
</tbody>
</table>

Table 5: Hausman Test

<table>
<thead>
<tr>
<th></th>
<th>Coefficients</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>DGDP</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>FEM</td>
<td>REM</td>
</tr>
<tr>
<td>DDepth</td>
<td>−0.0214216</td>
<td>0.0068187</td>
</tr>
<tr>
<td>DTrade</td>
<td>0.1270229</td>
<td>0.1390351</td>
</tr>
<tr>
<td>Chi-sq = 2.66</td>
<td>P-value = 0.2646</td>
<td></td>
</tr>
</tbody>
</table>

Note: DGDP, DDepth and DTrade are the first differences of growth, finance and openness.
Table 6: The REM Model

| Var   | Coefficient | Std. Err. | z    | P > |z|
|-------|-------------|-----------|------|-----|--
| DDepth | 0.0068187   | 0.0346714 | 0.20 | 0.844 |
| DTrade | 0.1390351   | 0.0243935 | 5.70 | 0.000 |
| Constant | 0.0277646   | 0.0030614 | 9.07 | 0.000 |
| Wald Chi-sq = 32.61 |            |          |      |    |

Note: DGD, DDepth and DTrade are the first differences of growth, finance and openness.

Table 7: Trivariate Granger Causality Test

<table>
<thead>
<tr>
<th>Dep.Var</th>
<th>Indep.Var</th>
<th>p-value</th>
<th>Granger</th>
</tr>
</thead>
<tbody>
<tr>
<td>DGD</td>
<td>DDepth</td>
<td>0.0887</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>DTrade</td>
<td>0.0196</td>
<td>Yes</td>
</tr>
<tr>
<td>DDepth</td>
<td>DGD</td>
<td>0.0002</td>
<td>Yes</td>
</tr>
<tr>
<td>DTrade</td>
<td>DGD</td>
<td>0.5820</td>
<td>No</td>
</tr>
<tr>
<td>DTrade</td>
<td>DDepth</td>
<td>0.0127</td>
<td>Yes</td>
</tr>
<tr>
<td>DTrade</td>
<td>DGD</td>
<td>0.1229</td>
<td>No</td>
</tr>
</tbody>
</table>

Note: DGD, DDepth and DTrade are the first differences of growth, finance and openness.

5. Conclusions

The study shows the positive bidirectional relationship between financial development and economic growth through trade openness. These results point to a policy implication that can promote economic development amongst the countries. That is, trade openness and financial development between the countries should be promoted.

References


