

The Relationship between Trade Openness and Economic Growth in Laos: Evidence from ARDL Bounds Testing Approach

Phetsamone Phommouny^{1*}, He Shuquan^{1*}

¹School of Economics, Shanghai University, 99 Shangda Road, Baoshan District, Shanghai 200444, China

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*Corresponding author: Phetsamone Phommouny

School of Economics, Shanghai University, 99 Shangda Road, Baoshan District, Shanghai 200444, China

Abstract

Original Research Article

The relationship between trade openness and economic growth, both theoretical and empirical investigations have shown varied results. Broadly speaking, trade openness has both positive and negative impacts on the economy in three major ways: (1) by increasing competition, (2) by increasing export opportunities, and (3) by lowering production costs due to cheaper imported inputs. This paper applies the autoregressive distributed lag (ARDL) bound testing approach to investigate the relationship between trade openness and economic growth in Laos during the period 1990 to 2018. The empirical results show that in the long run trade openness has positive effects on economic growth in Laos. However, in the short run, no positive influence has been observed in economic growth. Other variables such as foreign direct investment, human capital, and labor force also have positive effects on economic growth in the long run. There is only inflation has a negative impact on economic growth in both the short and long run. Laos is a middle-income nation in ASEAN, and thus the government of Laos must enhance trade openness by effectively controlling import levels in order to boost economic growth through international trade.

Keywords: Trade openness, Economic growth, Foreign Direct Investment, ARDL, Laos.

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1. INTRODUCTION

The impact of trade openness on economic growth has become the most debated topic among policymakers and researchers. Since the 1980s, markets for goods and services have increasingly integrated through the removal of trade barriers, with technology helping to cut the cost of trade. This strategy is regarded as the greatest way to generate rapid growth (Brambilla & Porto, 2017). Through imports and exports, countries can sustain economic growth, facilitate the development of productive capacities, and expand employment opportunities (Abdillahi & Manini, 2017). According to the World Bank and World Trade Organization, in 2015, the trade share of global GDP had roughly doubled since 1975, and developing countries increased their share of global exports significantly. From 1990 to 2017, for example, developing countries increased their share of global exports from 16 percent to 30 percent. Countries of ASEAN, particularly Singapore and Vietnam have benefited from trade liberalization and their GDP grew tremendously. However, not all countries have benefited equally. Trade liberalization is likely to create losers as well as winners (Gasiorek *et al.*, 2019).

Concerning the relationship between trade openness and economic growth, both theoretical and empirical investigations have shown varied results. Theoretically, trade openness is a growth engine that increases economic opportunity, creates jobs, and improves people's lives. In addition, trade openness can boost long-term growth by increasing market size, improve productivity and facilitate the diffusion of knowledge and technology from the direct import of high-tech goods (Brambilla & Porto, 2017; Frankel & Romer, 2017). On the other hand, some researchers have demonstrated that the effect of trade openness on economic growth depends on the country's development level and the degree of liberalization (Li *et al.*, 2021; Manni & Afzal, 2012). Furthermore, Van den Berg and Lewer (2015) have shown that trade liberalization can hinder growth in a country that specializes in the production and export of low-quality, and low-tech goods. In the empirical literature, some researchers have found a positive relationship between trade openness and economic growth (Khamphengvong *et al.*, 2017; Tahir & Khan, 2014), while others revealed a negative relationship (Adhikary, 2011; Rigobon & Rodrik, 2005).

Against this background, this study investigates the relationship between trade openness and economic growth in Laos during the period 1990 to 2018. In Laos, trade and economic reforms are divided into three periods. The first period, spanning from 1975 to 1985, was characterized by a centrally controlled closed economy with the highest import tariff rates (Keochaiyom, 2015; Vixathep, 2011). In the second period, from 1986 to 2000, the country shifted towards a market-oriented economy with a reduction in the import duty rate and the number of separate import duty bands, which ranged from 5 percent to 100 percent (Ibid). The third period, which began in 2000, ushered in an open economy (Ibid).

With these reforms, Laos has recorded a remarkable economic success from 1990 to 2018, with a growth rate averaging 7.1 percent and trade openness accounting for 72.6 percent of GDP. This impressive economic performance was attributed mainly to favorable terms of trade, large-scale investments in capital intensive sectors, particularly mining and hydropower, and political stability. However, Laos has had economic volatility in some years, for example in 1998, Laos' GDP grew by only 3.97 percent, and the inflation sparked 84.5 percent. At the same year, the average trade deficit to GDP ratio was 11.3 percent. However, over the period 2005-2018. The economic growth rate and trade performance have reached 8.2 percent and 90 percent, respectively. The recent performance in economic growth and trade raises some questions: was a significant part of the economic growth trade-led? If yes, was trade-led growth a long-run or short-run phenomenon? This study attempts to address these questions. Furthermore, the study tests the hypothesis that trade openness has a positive impact on economic growth in Laos. By using the Autoregressive Distributed Lag (ARDL) Bounds, the study depicts the long-run relationship between trade openness and economic growth.

The rest of the paper is organized as follows. Section 2 provides a brief literature review regarding the linkage between trade openness and economic growth. Section 3 is the methodology. Section 4 is the empirical results and discussion. Finally, Section 5 is the conclusions and recommendations.

2. LITERATURE REVIEW

2.1 Theories linking trade openness and economic growth

The theoretical link between trade openness and economic growth goes back to Adam Smith (1977), who emphasized that a country could increase its wealth by specializing in the production of goods for which it enjoys an absolute advantage (Myint, 1977). From that day to now, researchers have conducted several studies on the relationship between trade openness and economic growth in both developed and developing countries. Hence, in order to facilitate the discussions

that are to follow, it is imperative to shed light on the theoretical linkages between trade openness and economic growth.

There are various theoretical analyses of the link between trade openness and economic growth. Traditional trade theory highlights that the benefits of trade at the level of the country through investments in innovation, specialization, increased productivity, and enhanced resource allocation. This is also evident in the Ricardian-Heckscher-Ohlin theoretical model (Leamer & Levinsohn, 1995). Accordingly, trade can boost the output in the country because the country can allocate resources more efficiently after trade openness, and each country exports goods in which it has a comparative advantage. The theory of international trade suggests that profits from trade can arise from several factors: the increase in international trade globally and the disparity in comparative advantage (Van den Berg & Lewer, 2015).

In the theory of comparative advantage, international trade leads a country to use resources more efficiently because the country can import goods and services, instead of spending a lot of money on domestic production. This shows that imports are as important as exports regarding economic activities. In other words, imports and exports are two inseparable and complementary factors. Therefore, international trade transactions are clearly shown through the trade openness of each country. This indicator shows the value of exports and imports for GDP (Leamer & Levinsohn, 1995; Nguyen & Bui, 2021; Van den Berg & Lewer, 2015). Moreover, Ricardo's theory suggests that trade openness abroad allows a nation to reorient its limited resources to more efficient sectors (Kneller *et al.*, 2008).

The endogenous growth theory suggests that open to international trade increases the level of the country's income, and thus leads to long-term economic growth. For instance, Kneller *et al.*, (2008), demonstrate how trade openness generates spillover effects through foreign direct investment, advanced-level machinery-oriented items, and new skills. Falvey *et al.*, (2012) argued trade openness enhances long-run economic growth in the country if more resources are allocated to the sector producing the accumulation factor such as human capital, and research and development (R&D). Dollar and Kraay (2003) argued that countries that are open to international trade tend to grow faster, create more jobs, and provide higher income to their people. Moreover, opening up to international trade allows the country, and the consumers and firms in that country to buy more goods from more countries (Gasiorek *et al.*, 2019). Additionally, Liu *et al.*, (2013) showed that open to international trade allows economies to capture the benefits of increasing returns and specialization in the country. Likewise, Zahanogo (2016) showed that trade openness provides new market opportunities for

domestic firms, high productivity, and innovation through competition.

Nevertheless, some researchers have theoretically found a negative relationship between trade openness and economic growth. For example, research by SGreenaway (1998), and Kneller *et al.*, (2008) demonstrated that trade openness might reduce economic growth in a nation that specializes in the production of old goods or low-technology goods. Van den Berg and Lewer (2015) indicated that an increase in trade share to GDP may be harmful to growth when a country's exports are highly concentrated on a low-quality product or a few products. Furthermore, McMillan *et al.*, (2014) pointed out that trade openness hinders economic growth through comparative disadvantage in the rise of productivity in specialized sectors, in which the country fails to diversify its trade and production activities to prevent specific product shocks in the economy. Furthermore, Zahonogo (2016) showed that a country with abundant natural resources, unskilled labor, and a relative lack of skilled workers experiences faster autarky economic growth.

2.2 Trade Openness and Economic Growth: Empirical Literature

Several efforts have emerged to empirically evaluate the relationship between trade openness and economic growth and the findings from these studies have been mixed. However, the existing empirical literature does not provide clear evidence on the relationship between trade openness and economic growth. Many research works provide evidence that increasing trade openness has a positive effect on GDP growth. On the other hand, some studies reported that there is a negative or depressing relationship between trade openness and economic growth, or even that it is impossible to identify a clearly defined positive connection.

Keho (2017) applied the autoregressive distributed lag (ARDL) bound testing approach to examine the impact of trade openness on economic growth for Cote d'Ivoire over 1965-2014 and found a positive effect of trade openness on economic growth in both the long- and short-run. Lawal and Ezeuchenne (2017) examined the impact of international trade on economic growth in Nigeria, using data from 1985 to 2015, and found that there is a long-run relationship between international trade and economic growth. In the short run, however, they found that it is insignificant. Further, the Granger causality test showed that economic growth is unidirectional with trade openness but it is independent of imports, exports, and balance of trade. Moyo and Khobai (2018) employed the ARDL bounds test approach and the Pooled Mean Group (PMG) model to estimate the long-run relationship between trade openness and economic growth for 11 SADC countries for the period between 1990 and 2016. The results reveal that trade openness has negative effects on economic growth in the long run.

Zahonogo (2016) investigates how trade openness affects economic growth in 42 countries in Sub-Saharan Africa covering 1980 to 2012, and finds a positive effect of trade openness on economic growth up to some threshold, but above which trade openness causes growth decline. This implies that trade openness does not increase economic growth forever, but up to only a given threshold. Hence, one has to understand what kind of threshold is required for the positive relationship between trade openness and economic growth to stand. Similarly, Kim and Lin (2009) using a threshold regression approach studied the relationship between trade openness and economic growth in 61 countries. Their study shows that this relationship is based on an income-level threshold beyond which more trade openness increases economic growth. Below this income level threshold, more trade openness causes a decline in economic growth.

Yang and Shafiq (2020) used the fixed-effect regression model to investigate the impact of trade openness on economic growth in 20 Asian countries between 2007 and 2018 and found that trade openness has a positive relationship with economic growth. Ozturk and Radouai (2020) employed the ARDL bounds test approach and Granger Causality to examine the dynamic relationship between trade liberalization on economic growth in Morocco over the period from 1960 to 2018. The ARDL results indicated that trade openness has a statistically positive impact on economic growth in both the short run and the long run. Moreover, the Granger Causality results suggested that trade liberalization has positive impact on economic growth.

In more recent work, Esaku (2021) applied ARDL methodology to investigate the relationship between trade openness and economic growth in Uganda, using data covering the period from 1983 to 2019. The empirical results showed that there is a positive and statistically significant relationship between trade openness and economic growth in both the short and long run. Nguyen and Bui (2021) used the fixed-effect panel threshold approach to examine the impact of trade openness (TO) on economic growth in the ASEAN-6 countries (Indonesia, Malaysia, Thailand, Singapore, Philippines, and Vietnam) between 2004 and 2019. They found that trade openness plays an important role in boosting economic growth. Similarly, Nam and Ryu (2024) conducted the fixed effects regression model to investigate the relationship between trade openness and economic growth in the ASEAN countries and found that trade openness positively influences economic growth in the region.

Against this backdrop, it is worth noting that there is limited evidence of linkages between trade openness and economic growth in Laos using the ARDL bounds test. Therefore, this study serves to fill that gap.

3. METHODOLOGY

3.1 ARDL Bounds Test to Cointegration

This study uses the ARDL method to investigate the relationship between trade openness and economic growth in Laos. The ARDL bounds test cointegration was developed by Pesaran *et al.*, (2001). This approach is chosen because of various reasons. First, the ARDL bounds test, as different from the Johansen and Juselius cointegration, is simple and allows the cointegration relationship to be estimated by ordinary least squares (OLS) after the lag order is selected. Second, unlike the VAR/VECM approaches, it does not require all the variables to be integrated in the same order of integration I (1). Variables can be integrated into order one the I (1) or I (0). Third, it is relatively more efficient in small sample sizes, as is the case of this study. Fourth, the error correction method combines the short-run dynamics with long-run equilibrium without losing long-run information.

3.2 Data and Description of Variables

This study uses annual data covering the period from 1990 to 2018. Most of the data are collected from the websites of the Bank of Laos (BoL), the Ministry of Planning and Investment of Laos (MPI), and the World Bank's World Development Indicators database (WB). The choice of the period of the study is related to the availability of data on interest variables such as trade openness and economic growth. This study uses the annual growth rate of gross domestic product (GDP) as a proxy for economic growth, and the ratio of exports plus imports over GDP as a proxy for trade openness (TO). It also included the control variables of foreign direct investment (FDI), human capital (HC), labor force (LF), and inflation (INF) in the study. These control variables are commonly used in growth equations. The description of the variables is presented in Table 1 below.

Table 1: Summary of the variable used for this study

| Variable | Description | Unit | Data source |
|--------------------------|--|------|-------------|
| GDP (dependent variable) | Gross Domestic Product | % | BoL |
| Trade openness (TO) | The sum of exports and imports as a share of GDP | % | WB |
| Human capital (HC) | Gross enrollment ratio in secondary school | | |
| Labor force (LF) | The sum of employed and unemployed persons | | |
| Inflation (INF) | Inflation | | |
| FDI | Foreign Direct Investment | USD | WB, MPI |

3.3 Model

To examine the relationship between trade openness and economic growth in Laos, this paper adapts the empirical model of Esaku (2021). Thus, it postulates that economic growth (GDP) is a function of variables that can be expressed as:

$$GDP = F (TO, FDI, HC, INF, LF) \dots\dots\dots (1)$$

Transform in the multiple regressions can be formulated as below:

$$GDP_t = \beta_0 + \beta_1 TO_t + \beta_2 FDI_t + \beta_3 HC_t + \beta_4 INF_t + \beta_5 LF_t + \varepsilon_t \dots\dots\dots (2)$$

Where GDP: is Gross Domestic Product, TO: is trade openness, FDI: is foreign direct investment, HC: is human capital, INF: is inflation, LF: is labor force, t: is time period, β_0 : is constant term, $\beta_1 - \beta_5$ is regression coefficients, and ε is an error term. All the variable in this study takes the natural logarithm.

Estimation of equation (2) can proceed to express to the ARDL model and the Error Correction model (ECM) as below:

- The ARDL model

$$\Delta \ln GDP_t = \beta_0 + \sum_{i=1}^n \beta_{1i} \Delta \ln TO_{t-i} + \sum_{i=0}^n \beta_{2i} \Delta \ln FDI_{t-i} + \sum_{i=0}^n \beta_{3i} \Delta \ln HC_{t-i} + \sum_{i=0}^n \beta_{4i} \Delta \ln INF_{t-i} + \sum_{i=0}^n \beta_{5i} \Delta \ln LF_{t-i} + \theta_1 \Delta TO_{t-1} + \theta_2 \Delta \ln FDI_{t-1} + \theta_3 \Delta \ln HC_{t-1} + \theta_4 \Delta \ln INF_{t-1} + \theta_5 \Delta \ln LF_{t-1} + \mu_t \dots\dots\dots (3)$$

Where β_0 is the constant term, $\beta_1 - \beta_5$, and $\theta_1 - \theta_5$ are the short-run and long-run coefficients respectively, and μ_t denotes error term.

- The Error Correction model (ECM)

$$\Delta \ln GDP_t = \beta_0 + \sum_{i=1}^n \beta_{1i} \Delta \ln TO_{t-i} + \sum_{i=0}^n \beta_{2i} \Delta \ln FDI_{t-i} + \sum_{i=0}^n \beta_{3i} \Delta \ln HC_{t-i} + \sum_{i=0}^n \beta_{4i} \Delta \ln INF_{t-i} + \sum_{i=0}^n \beta_{5i} \Delta \ln LF_{t-i} + \gamma ECT_{t-1} + \mu_t \dots\dots\dots (4)$$

Where β_0 is a constant term, $\beta_1 - \beta_5$ are regression coefficients, γ is represents the coefficient of the ECT_{t-1} (error correction term) which captures the long-run adjustment to the equilibrium after any deviations, while μ_t is the residual error term.

4. EMPIRICAL RESULTS AND DISCUSSIONS

4.1 Descriptive statistics and correlation matrix

Table 2 provides descriptive statistics and correlations of the variables in this study. As we can see in Table 2, the mean of the annual growth rate of gross domestic product (GDP) is about 1.911 and its highest peak is at 2.116. Similarly, trade openness (TO) averaged 4.214 and reached its maximum at 4.595. Further foreign direct investment (FDI), human capital (HC), inflation (INF), and labor force (LF) have a mean of 4.817, 3.640, 2.012, and 4.061, respectively. The correlation matrix indicates a positive relationship between trade openness and economic growth. However, as this only shows a

simple correlation between them, it is essential to empirically investigate the relationship between trade openness and economic growth. Hence, it is important to

estimate a particular empirical model to test for this relationship.

Table 2: Descriptive statistics and correlations of the variables

| Variables | lnGDP | lnTO | lnFDI | lnHC | lnINF | lnLF |
|---------------------------|--------------------|--------------------|--------------------|--------------------|-------------------|-------|
| Summary statistics | | | | | | |
| Mean | 1.911 | 4.214 | 4.817 | 3.640 | 2.012 | 4.061 |
| Std. dev. | 0.181 | 0.278 | 1.957 | 0.370 | 1.350 | 0.094 |
| Minimum | 1.378 | 3.579 | 1.609 | 2.995 | -1.966 | 3.889 |
| Maximum | 2.116 | 4.595 | 8.096 | 4.219 | 4.830 | 4.184 |
| Observations | 29 | 29 | 29 | 29 | 29 | 29 |
| Correlation matrix | | | | | | |
| lnGDP | 1.000 | | | | | |
| lnTO | 0.384* (0.039) | 1.000 | | | | |
| lnFDI | 0.602* (0.000) | 0.711* (0.000) | 1.000 | | | |
| lnHC | 0.440* (0.016) | 0.871* (0.000) | 0.727* (0.000) | 1.000 | | |
| lnINF | -0.379* (0.042) | -0.407* (0.028) | -0.532* (0.002) | -0.600* (0.000) | 1.000 | |
| lnLF | -0.456* (0.012) | -0.816* (0.000) | -0.836* (0.000) | -0.961* (0.000) | 0.659* (0.000) | 1.000 |

Source: Author's own estimation by using Stata software 17, and * indicates statistical significance at the 5% level.

4.2 Stationarity test

This study performed two-unit root tests for all the variables at levels and first differences with the intercept and trend and established whether the variables are integrated of order one or I (1). The unit root tests used for this study are the augmented Dickey-Fuller

(ADF) test and the Phillips-Perron (PP) test. The results are summarized in Table 3 below. As we can see, some variables are stationary at levels. However, the stationary at first difference shows all the variables are stationary, then these null hypotheses are rejected.

Table 3: Unit Root Tests

| Variable | ADF unit root test | | PP unit root test | | Decision |
|----------|--------------------|------------|-------------------|------------|----------|
| | Level | First Diff | Level | First Diff | |
| LnGDP | -2.426 | -4.880*** | -4.358*** | -9.971*** | I(1) |
| LnTO | -2.283 | -3.868 ** | -1.858 | -3.964*** | I(1) |
| LnFDI | -1.983 | -3.822 ** | -2.096 | -5.281*** | I(1) |
| LnHC | -2.505 | -4.786 *** | -2.291 | -3.421** | I(1) |
| LnINF | -2.829 | -4.933*** | -3.719** | -7.331*** | I(1) |
| LnLF | -1.786 | -4.401*** | -1.999 | -8.025*** | I(1) |

Source: Author's own estimation by using Stata software 17, *, **, *** presents levels of significance at 10 %, 5 %, and 1 %, respectively

4.3 Bound Test Approach to Co-Integration

After establishing that all the variables are integrated of order one or I (1), then the next step is to employ the ARDL approach to cointegration to determine the long-run relationship among GPG, trade openness (TO), foreign direct investment (FDI), human capital (HC), inflation (INF), and labor force (LF). The

results of the ARDL bound test are presented in Table 4 below. As we can see in Table 4, the F-statistics is greater than the critical values at 10%, 5%, and 1%. Therefore, the H0 assumption of absence of cointegration is rejected, implying that there is a long-run relationship among the variables.

Table 4: Results of the ARDL Bounds test

| Function | F-statistics | Critical Values | [I_0] | [I_1] | Co-integration status |
|-------------------------------|--------------|-----------------|----------------------|----------------------|-----------------------|
| GDP= f (TO, FDI, HC, INF, LF) | 9.729 | 10% 5% 1% | 2.26 2.62 3.41 | 3.35 3.79 4.68 | Cointegrated |
| Lag length (1 2 0 0 2) | | | | | |

Source: Author's own estimation by using Stata software 17

4.4 Long Run and Short Run Impact of Trade Openness on Economic Growth

After confirming that there is cointegration, the error correction model (ECM) estimates the long-run

relationship among the variables. Table 5 below reports the estimation results for all the variables.

Table 5: Estimated Long Run and Short Run coefficients

| Dependent Variable: GDP | | |
|--------------------------------|-------------|-------|
| Long-run results | | |
| Regressor | Coefficient | P> t |
| lnTO | 0.520* | 0.078 |
| lnFDI | 0.125* | 0.017 |
| lnHC | 1.172* | 0.025 |
| lnCPI | -0.030 | 0.358 |
| lnIF | 5.041* | 0.032 |
| Short-run results | | |
| Constant | -28.895 | 0.055 |
| Δ lnTO(D1) | 0.567 | 0.237 |
| Δ lnFDI (D1) | -0.070 | 0.226 |
| Δ lnHC (D1) | -0.329 | 0.659 |
| Δ ln INF(D1) | -0.007 | 0.846 |
| Δ lnLF (D1) | -11.131 | 0.084 |
| ECT (-1) | -1.355*** | 0.000 |
| Observations = 27 | | |
| R-squared = 0.7447 | | |
| Adj R-squared = 0.4895 | | |
| Durbin-Watson Statistic= 2.284 | | |
| Breusch-Godfrey LM test= 0.083 | | |

Source: Author's own estimation using Stata software 17, *, **, *** presents significance levels at 10 %, 5 %, and 1 %, respectively.

According to the results illustrated in Table 5 above, the coefficient of trade openness is positive in the long run and short run, while statistically significant only in the long run. According to the result, a 1 percent increase in trade openness leads to about 0.52 percent increase in real GDP in the long run, while it does not influence economic growth (GDP) in the short run. The long-run result supports the findings of Keho (2017), Esaku (2021), and Nguyen and Bui (2021), who found a positive relationship between trade openness and economic growth. The short-run result is consistent with the findings of several studies in the literature (see Lawal and Ezeuchenne, 2017, Moyo and Khobai, 2018 and Van den Berg and Lewer, 2015), who reported an insignificant impact of trade openness on economic growth. In the case of Laos, most families are involved in subsistence farming and are not directly linked to the country's most export products such as electricity, gold, and rubber. For instance, some families may produce rubber, but most of them grow rice, cassava, corn, and sweet potatoes, which are often used for local consumption. Overall, Laos' agriculture production is low and often used for domestic consumption rather than for export.

With regards to the control variables, the coefficient of FDI has a positive and significant impact on GDP in the long run, while it is negative and insignificant in the short run. This suggests that an

increase in FDI by 1 percent increases GDP by 0.12 percent in the in the long-run. Also, the coefficient of human capital (HC) is positive and significant in long-runs, while it is negative and insignificant in the short-run. This suggests that an increase in human capital by 1 percent raises GDP by 1.17 percent in the in the long-run. The coefficient of inflation rate (INF) has a negative and insignificant impact on GDP in both the short and long runs. The coefficient of labor force (LF) has a positive and significant impact on GDP in long-runs, while it is negative in the short-run. The coefficient value of ECT is negative and statistically significant at 1 percent level, which implies that the results support the existence of a long-run relationship between all the variables used in this study. Additionally, it suggests that approximately 1.35 percent of the short-run disequilibrium is corrected in the long run.

According to the robustness, the coefficient of the R-squared value is 0.74, which implies that the independent variables jointly account for about 74 percent of the total variation in economic growth. Then, the remaining 26 percent may be due to other factors such as unstable rainfall. The adjusted coefficient of determination (R²) value of 0.48 implies that the percent of the total variation in GDP is explained by the change in the endogenous variables when the coefficient of determination is adjusted for the degree of freedom. The Durbin-Watson statistic value of 2.28, and the Breusch-

Godfrey LM test value of 0.083 indicate that there is no serial correlation in the estimated model. This implies that the model has no problem.

4.5 Stability Test

To ensure that these results are not driven by any biases, the study conducts one more main diagnostic (stability test) to determine the stability of the coefficients. It carried out a stability test that included the

plots for the cumulative sum of recursive residuals (CUSUM) and the plots for the cumulative sum of squared residuals (CUSUMQ). The results of these tests are shown in Figure 1 below, it can be seen that the plots of CUSUM and CUSUMQ are within the 5 percent significance lines or boundaries, which suggests that the residual variance of the model is somewhat stable, hence also confirming the stability of the model.

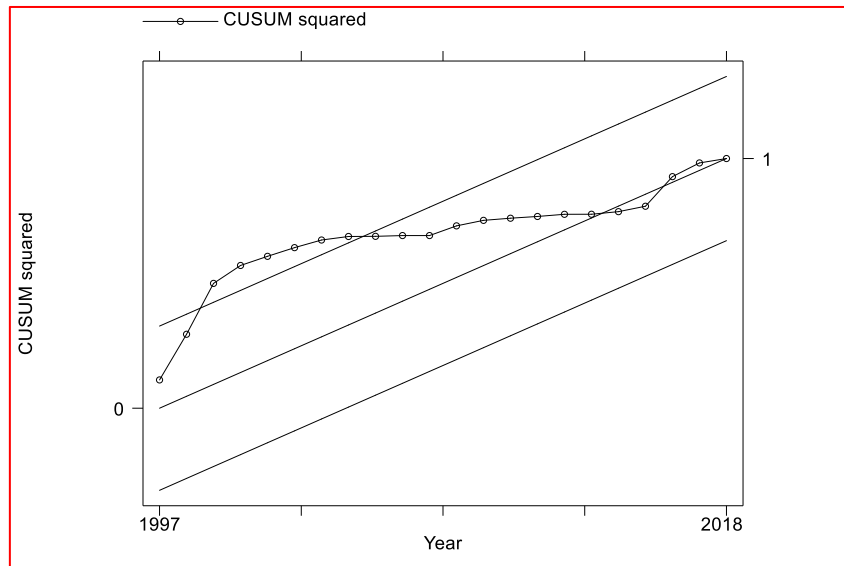


Figure 1: Plots of CUSUM and CUSUMQ

Source: Author's own estimation by using Stata software 17

5. CONCLUSION AND RECOMMENDATIONS

The main objective of this study is to investigate the long-run and short-run impact of trade openness on economic growth in Laos during the period 1990-2018. To accomplish this objective, this study employed the autoregressive distributed lag (ARDL) bound test. The findings of the study indicated that trade openness has positive effects on economic growth in Laos in the long run. However, in the short run, no positive influence has been observed in economic growth. Similarly, variables such as foreign direct investment, human capital, and labor force have positive and statistically significant on economic growth in the long run. While inflation has a negative and insignificant impact on economic growth in both the short and long run.

Since the implementation of new trade and investment policies, it has been evident that trade and foreign direct investment in Laos have grown dramatically, recorded at 7-8% over the last two decades. This has distinguished Laos as the second fastest-growing economy in the ASEAN region. However, the country's trade structure has remained unchanged, dominated by a few primary commodities such as copper, mineral and mineral products, electricity, and agriculture for exports and manufactured products for imports. Hence, in order to maximize the benefits of

trade the government of Laos should diversify the country's production and increase its exports.

In addition, this study recommends that to gain maximum benefits from trade openness, the government of Laos should enhance its regulatory and customs systems to simplify and expedite the process. Furthermore, the government should prioritize efforts to boost exports of Lao products, by supporting local businesses in enhancing product quality and promoting domestic products both domestically and abroad. Also, the government should continue to reform trade laws and policies in line with international laws and local conditions.

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