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# Impact of Trade Openness on Economic Growth in Sri Lanka

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**Abstract:** Whether trade openness has a positive impact on economic growth is still open for debate. A group of researchers found in their study that it has a positive impact on the economy, whereas another group found that it has no effect or there is a negative impact. Therefore, this study examines the impact of Trade Openness on Economic Growth of Sri Lanka, over the period from 1990 to 2018, in a multivariate framework including trade openness, labour force, population, inflation and Fixed Direct Investment as repressors. Secondary data used for this study are from various sources such as the Central Bank of Sri Lanka and World Development Indicators (WDI). To test the stationarity of the data, the Augments Dickey-Fuller (ADF) (Dickey and Fuller, 19810) was used, and it uses the Auto Regressive Distributed Lag Bounds test for co-integration. The results of this study show that Trade Openness, which was the main variable, has a positive relationship with the Gross Domestic Product in Sri Lanka in the short run while a negative relationship is indicated in the long run.

**Keywords:** Economic growth, Trade openness, Sri Lanka

## Introduction

There have been done several studies on trade openness and economic growth. But the controversial is continuing over the last few decades, whether the trade openness is a blessing for economic growth, or it is negatively affecting the economic growth. In 1990s, the Washington Consensus, a set of 10 major development policy, recommendations from Washington based institutions, such as the International Monetary Fund (IMF) and the World Bank (WB) regarded trade openness as essential to the achieve higher economic growth. Paudel & Perera (2009) found that in the long run, labour force and trade openness have a positive impact on economic growth of Sri Lanka. Gimhani K.W.K & Francis S.J. (2016) implies that trade openness has a positive impact on economic growth in Sri Lanka. Keho (2017) showed that trade openness has positive effects on economic growth both in the short and long run.

As well as Malefane M.R. & Odhlambo N.M. (2018) found that trade openness has a positive and significant impact on economic growth and also Herath H.M.S.P. (2008) confirm a significant positive relationship between trade liberalization and economic growth in Sri Lanka. When those studies presenting a positive relationship Mizan A.N. (2019), suggested that trade openness has no effects on economic growth and there is a unidirectional relation found from Export to GDP to import while Aslam A.L.M. (2017) found that the trade openness negatively and significantly had the long run relationship with the economic growth.

When consider about Sri Lanka, Sri Lankan government liberalized its economy in the later part of 1977. After the liberalization, the geographical border of Sri Lanka which had been opened to enter other countries into Sri Lanka for economical purpose. Because of this reason Sri Lanka had to face positive and negative experiences. Figure 1

shows the GDP and Trade openness trend from 1990-2018 in Sri Lanka.

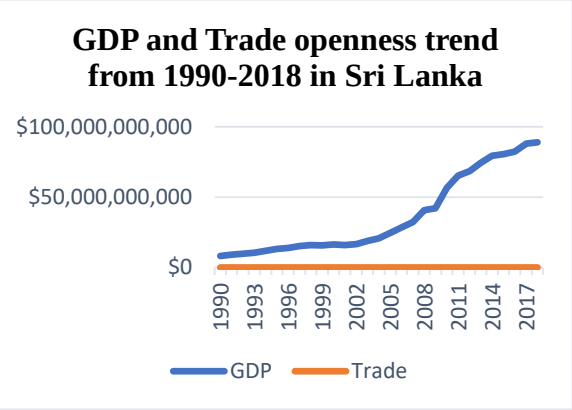


Figure 1: GDP and Trade Openness trend from 1990-2018 in Sri Lanka
Source: Made by author

Against this background, the purpose of the current study is to examine the impact of trade openness and economic growth in Sri Lanka over the period 1990-2018. This study employs trade openness, inflation, population, labor force, fixed direct investment as the independent variables and Gross domestic Product as the dependent variable. The current study also takes into account the short-run and long-run impact of trade openness on economic growth using the autoregressive distributed lag (ARDL) bounds testing approach. The empirical findings of this study also add to the existing body of literature on openness and economic growth in Sri Lanka and to make policy changes.

This paper is organized into five sections. After the introduction, section 2 provides the reviews literature on trade openness and economic growth. Section 3 discusses the methodology used and the empirical results for the study is presented in section 4. Section 5 presents the conclusion of the study.

**Objective**

Primary objective

To examine how trade openness impacts the economic growth in Sri Lanka in short run.

Secondary objective

To examine how trade openness impacts the economic growth in Sri Lanka in long run.

**Methodology**

This research analysis is based on a multiple linear regression model, in which Gross Domestic Product is the dependent variable and 5 other independent variables where trade openness is the main independent variable. This study uses annual data covering the 1990 to 2018 and data were extracted from well-established data source of World Bank. In this research, data has been collected from the World Data indicators. A time series econometric method is employed for the study. The regression which was built using some selected variables following a study conducted by Paudel & Perera (2009) is shown below.

$$LGDP_t = \alpha_0 + \alpha_1 LTO_t + \alpha_2 LPOP_t + \alpha_3 LLF_t + \alpha_4 LINF_t + \alpha_5 LFDI_t + \mu_t$$

Where, LGDP, LTO, LPOP, LLF, LINF and LFDI denote respectively logarithm of Gross Domestic Product, logarithm of Trade Openness, logarithm of Population, logarithm of labor force, logarithm of inflation and logarithm of Foreign Direct Investment. $\mu_t$ is a white noise error term, t =1, 2, T.

Trade Openness is the proportion of the total value of exports and imports of a country's good and services to the total GDP.

$$\text{Trade Openness} = \frac{Import+Export}{GDP}$$

Population is the total number of people of the country. Labor force is the total number of labor force in the country. Inflation is the current inflation of the country and FDI is the foreign direct investment.

The empirical investigation involves following steps. The first step examines the stationarity of the variables using unit root tests. The second step tests the presence of long run and short run relationship. As the first step of the estimation, ADF and PP unit root tests were adopted to test the stationery property of data. When series are stationary at I (0) and I(1) Autoregressive Distributed Lag (ARDL) model which was developed by Pesaran et al. (2001) can be employed to find out the long run and short run adjustment. The advantages of this method beyond other traditional methods are clearly specified in the econometric literature. The ARDL co-integration bound testing procedure is shown by following equation.

$$\Delta LGDP_t = \rho_0 + \vartheta LZ_{t-1} + \sum_{i=1}^{p} n_i \Delta LGDP_{t-i} + \sum_{i=0}^{p} \pi_i \Delta LZ_{t-i} + \epsilon_t$$

Where, $\vartheta = [\vartheta_1, \dots, \vartheta_6]$ refers to the long run coefficients;

$LZ_{t-1}$= $LGDP_{t-i}, LTO_{t-i}, LPOP_{t-i}, LLF_{t-i}, LINF_{t-i}, LFDI_{t-i}$

is the vector of explanatory variables with one lag; $n_i$ and $\pi_i$= $[\pi_{1i} \dots \pi_{3i}]$ refers to the short run dynamic coefficients.

$LZ_{t-1}$= $\Delta LGDP_{t-i}, \Delta LTO_{t-i}, \Delta LPOP_{t-i}, \Delta LLF_{t-i}, \Delta LINF_{t-i}, \Delta LFDI_{t-i}$

denotes the vector of explanatory variables with lag $i$ and $\epsilon_t$ is the white noise error term. The error correction version of ARDL model is shown in following equation as a transformation equation of above equation.

$$\Delta LGDP_t = \beta_0 + \sum_{i=1}^{p} n_i \Delta LGDP_{t-i} + \sum_{i=0}^{p} \pi_i \Delta LZ_{t-i} + \gamma ETC_{t-1} + \epsilon_t$$

Where $\gamma$ is speed of adjustment which should be statistically significant and should have a negative sign. $\epsilon_t$ is a pure random error term. The first stage of the estimation bound testing procedure is employed in order to investigate the existence of long run relationship. Meanwhile as this methodology considers both short run and long run relationships it facilitates policy making to attain expected changes of the economy through these variables.

## Results and Discussion

In order to confirm the visual pattern between Trade Openness and Gross Domestic Product, the Confidential Ellipse is used. The following graph shows the Confidential Ellipse between the variables.

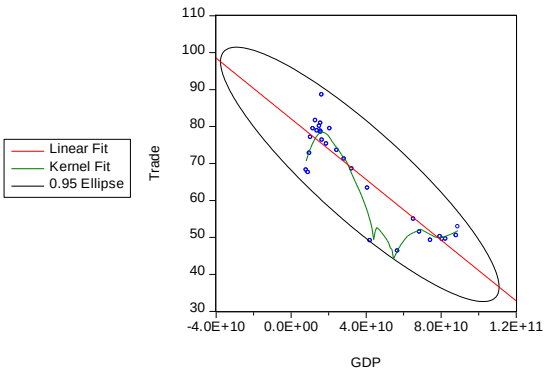


Figure 2: Confidential Ellipse between the variables

Based on the figure 2, it is confirmed that the Trade Openness and Gross Domestic Product are negatively correlated among them at 95% confidential level over the sample period for 1990-2018, since the regression line between the Trade Openness and Gross Domestic Product shows a negative relationship.

The descriptive statistics is the summary of all variables, which consists of Mean, Median, Maximum value, Minimum value, skewness and etc. Descriptive statistics can also be used to find the hidden features of the variables. To measure the dispersion of the data, standard deviation has been used. The skewness value has been introduce to the shape of the bell curve. Jarque bera probability value has been described to test whether the data is normally distributed or not. The following table 1 shows the descriptive statistics of the variables.

Table 1: Descriptive statistics

| | GDP | TRADE | POPULATION | LABOUR_FORCE | INFLATION | FDI |
|---|---|---|---|---|---|---|
| **Mean** | 3.66E+10 | 67.06213 | 19421225 | 7958380. | 9.355182 | 473.0683 |
| **Median** | 2.07E+10 | 71.26118 | 19387153 | 8129521. | 9.214160 | 272.0000 |
| **Maximum** | 8.89E+10 | 88.63644 | 21670000 | 8622275. | 22.79926 | 1610.544 |
| **Minimum** | 8.03E+09 | 46.36389 | 17325773 | 7018310. | 0.649042 | 43.35140 |
| **Std. Dev.** | 2.87E+10 | 13.28496 | 1224750. | 500746.9 | 4.802910 | 417.0819 |
| **Skewness** | 0.719233 | -0.295760 | 0.093060 | -0.584112 | 0.871421 | 1.072599 |
| **Kurtosis** | 1.877533 | 1.547736 | 1.962269 | 1.916301 | 4.133541 | 3.355753 |
| **Jarque-Bera** | 4.022679 | 2.971254 | 1.343095 | 3.068139 | 5.222918 | 5.713530 |
| **Probability** | 0.133809 | 0.226360 | 0.510917 | 0.215656 | 0.073427 | 0.057454 |
| **Observations** | 29 | 29 | 29 | 29 | 29 | 29 |

For the descriptive statistics analysis, the raw data has been taken into account. In this data set there are 29 observations of the period from 1990 – 2018. In the descriptive statistics GDP's mean is 36 billion US$ and the median is 20 million US$. The maximum value of GDP is 88 billion US$, in contrast the minimum value is 8 billion US$.

Moving on the Trade Openness, mean is 67.06 and the median is 71.26. The maximum value of Trade Openness is 88.63 and the minimum value is 46.36. After liberalizing the economy in Sri Lanka, the trade openness is less volatile, which is proved by the standard deviation of the trade openness and GDP. Since the Trade Openness has less standard deviation compared to GDP. According to the results, it denotes that there is a negative relationship.

In terms of population, the mean of the population is 19 million. The median is also 19 million. Moving on to the labor force, the mean is 7 million and the median is 8 million. The maximum value is 8.6 million while the minimum value is 7 million. In terms of inflation, the mean is 9.35 and the median is 9.25. The maximum value is 22.79 while the minimum is 0.64. In terms of Fixed Direct Investment, the mean is 473.06 and the median is 272. The highest value is 1610.54 while the minimum value is 43.35.

As mentioned in the research method, in order to test the integrated order of the variables, this study examines the stationarity of the variables by using Augmented Dickey Fuller unit root testing approach. The following table shows the co-integration position of the each variable.

Table 2: Stationarity of variables

| | **Augmented dickey fuller** | | | | | |
|---|---|---|---|---|---|---|
| | **level** | | | **1st difference** | | |
| **Varible** | **intercept** | **intercept and trend** | **none** | **intercept** | **intercept and trend** | **none** |
| **l_GDP** | 0.9996 | 0.8583 | 1 | 0.0165 | 0.0202 | 0.4358 |
| **l_Inflation** | | 0.0093 | 0.309 | 0 | 0 | 0 |
| **l_Trade** | 0.8383 | 0.4494 | 0.4233 | 0.0015 | 0.0071 | 0.0001 |
| **l_Labour force** | 0.8232 | 0.3956 | 0.966 | 0.0001 | 0.0004 | 0 |
| **l_pop** | 0.8222 | 0.4001 | 0.321 | 0.0221 | 0.0011 | 0 |

According to the results of ADF test, LINF is stationary at level while the other variables of the model are stationary at 1st difference implying that variables are stationary at combination of I(0) and I(1). Thus, series are of different integrating orders, so that it is suggested to proceed with ARDL model. According to the lag length automatic selection following Akaike Information Criterion (AIC) the best model is ARDL (2, 3, 3, 2, 3, 3) for the analysis.

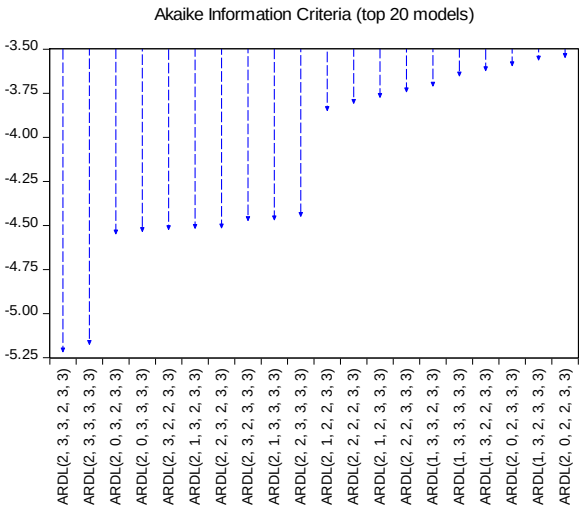


Figure 3: Akaike Information Criteria

As a pre-requisite for accurate estimations, diagnostic tests were employed and results are given in following table.

Table 3: The results of Diagnostic Tests

| **Test** | **Probability** |
|---|---|
| **Ramsey RESET test** | 0.2504 |
| **Heteroskedasticity test (BPG)** | 0.4675 |

Results of above mentioned diagnostic tests confirm that there is no specification error in the estimated model and disturbance term in the equation is homoscedastic, respectively. Meanwhile, recursive estimates CUSUM plot lies within the upper and lower critical bound at 5% significant level so that it ensures the stability of parameters.

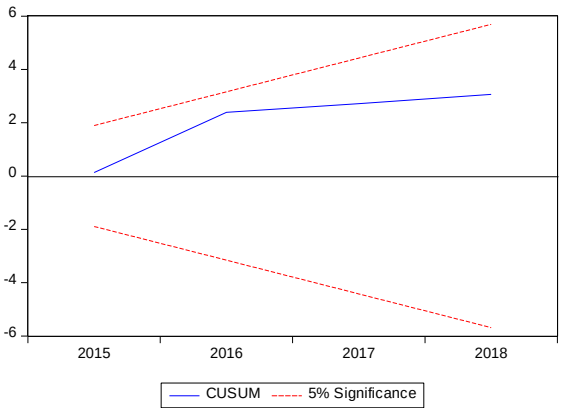


Figure 4: CUSUM plot

As the next step of estimation Bound test was conducted.

Table 4: F- Test for the existence of a long run relationship

| **F-Bound test** | **95% Level of Confidence** | | **90% Level of Confidence** | |
|---|---|---|---|---|
| **F-Statistics** | **Lower Bound** | **Upper Bound** | **Lower Bound** | **Upper Bound** |
| 22.903 | 2.62 | 3.79 | 2.26 | 3.35 |

The results of bounds test show that F-statistic is 22.90 which exceeds the critical value of upper bound, 3.79 ensuring the presence of long run relationship.

Table 5: Results of ARDL (2, 3, 3, 2, 3, 3) Model
Dependent Variable: LGDP

| **Panel A: Long-run Coefficient Estimates** | | | | | | |
|---|---|---|---|---|---|---|
| **Constant** | **LTO** | **LPOP** | **LLF** | **LINF** | LFDI | $R^2$ |
| | -1.289** | 4.088 | -2.211* | -1.0157 | 0.051 | 0.988 |
| | (0.02) | (0.38) | (0.06) | (0.16) | (0.58) | |
| **Panel B: Short run Coefficient Estimates** | | | | | | |
| **Lag Order** | **ΔLGDP** | **Δ*LTO*** | **ΔLPOP** | **ΔLLF** | **ΔLINF** | **ΔLFDI** |
| 0 | | 1.008*** | -0.879 | 3.668*** | 0.143*** | -0.097*** |
| | | (0.0001) | (0.76) | (0.0004) | (0.0001) | (0.0004) |
| 1 | -0.9044*** | 0.017 | 51.848*** | 3.630*** | -0.327*** | -0.106*** |
| | (0.0005) | (0.794) | (0.0003) | (0.0003) | (0.0001) | (0.0008) |
| 2 | | 0.287** | 22.645*** | | -0.196*** | -0.171*** |
| | | (0.011) | (0.001) | | (0.0001) | (0.0003) |
| **Panel C: Error Correction Representation** | | | | | | |
| ETC(-1) | -0.586*** | | | | | |
| | (0.0001) | | | | | |

Note: probability values are given in parenthesis, *, **, *** show significant at 1%, 5% and 10% level respectively.

According to the results, the explanatory variable explained approximately 98 percent of the variation in GDP in Sri Lanka.

The independent variables which are trade openness and labour force are significant implying that these two variables affect the dependent variable, Gross Domestic Product in the long run. In line with one of the objectives of the study, trade openness negatively affects the GDP in the long run. Further this findings consistent with the findings of Aslam A.L.M. (2017).

Results of short run relationship and long run adjustment coefficients are represented in panel B and C respectively. With regard to short run relationship, labor force, inflation and FDI has positive and significant relationship with GDP in short run.

Accordingly, as expected, ETC (-1) carries a negative sign, which is highly significant, indicating that there should be an adjustment towards steady state line in the

long run equilibrium at the speed of 58.6 % one period after the exogenous shocks.

## Conclusion

The results of this study have shown that trade openness, which was the main variable, has a short run and long run relationship with GDP in Sri Lanka. Trade openness and labor force have statistically significant relationship with GDP. This finding is consistent with Aslam A.L.M. (2017) who investigated the dynamics of trade openness in Sri Lanka. Therefore, this study conclude the reasons for having the negative relationship between the trade openness and gross domestic product that the import costing are greater than the export earnings. Therefore, this study advice to the government of Sri Lanka that the exports have to be increased rather than increasing the imports.

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