



IMPACT OF TRADE OPENNESS ON ECONOMIC GROWTH: THE LONG RUN AND SHORT RUN ANALYSIS OF SRI LANKA

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AUTHOR'S CONTRIBUTION

The sole author designed, analyzed, interpreted and prepared the manuscript.

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ABSTRACT

Trade openness has a positive impact on economic growth, this debate is still open. Some researchers [1, 2] found in their study that it has a positive impact on the economy. Some researchers [3], Muller G. & Goldbach C., 2019 found it has no effects, or negative impact. Since, this study examines the impact of Trade Openness on Economic Growth in Sri Lanka, over the period from 1990 – 2018, in a multivariate framework including Trade openness, Labor force, Population, Inflation and Fixed Direct Investment as representatives. Secondary data is used for the study. The data are from various sources such as the Central Bank of Sri Lanka and World Development Indicators (WDI). To test for stationarity of the data, the augmented Dickey-Fuller (ADF) (Dickey and Fuller, 1981) was used. It uses the Auto Regressive Distributed Lag Bounds test to cointegration. The results of this study shows that Trade Openness, which was the main variable, has a positive relationship in the short run while a negative relationship in the long run with Gross Domestic Product in Sri Lanka.

Keywords: Economic growth; trade openness; Sri Lanka.

1. INTRODUCTION

There have been several studies on trade openness and economic growth. But the controversy 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 the 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 achieve higher economic growth. Paudel & Perera [1] found that in the long run, labor force and trade openness have a positive impact on economic growth

of Sri Lanka. Gimhani & Francis [2] implies that trade openness has a positive impact on economic growth in Sri Lanka. Keho [4] showed that trade openness has positive effects on economic growth both in the short and long run.

Malefane & Odhlambo [5] found that trade openness has a positive and significant impact on economic growth and also Herath (2008) confirmed a significant positive relationship between trade liberalization and economic growth in Sri Lanka. When those studies presented a positive relationship Mizan [6], 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 [3] found

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that the trade openness negatively and significantly had the long run relationship with the economic growth.

When considering Sri Lanka, the 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 other countries entered into Sri Lanka for economical purposes. Because of this reason Sri Lanka had to face positive and negative experiences. Fig. 1 shows the GDP and Trade openness trend from 1990-2018 in Sri Lanka.

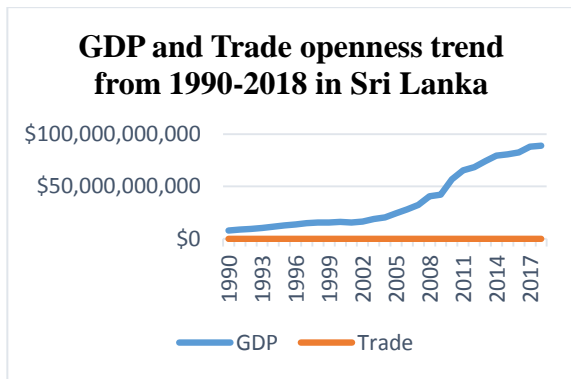


Fig. 1. GDP and Trade Openness trend from 1990-2018 in Sri Lanka

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.

2. LITRETURE REVIEW

Many researchers have examined the relationship between trade openness and economic growth. But the

results are controversial. By looking to the past studies we can identify this controversially. The influence of foreign debt, trade openness, and labor force in co-integration was investigated by Paudel R.M. and Perera N. [1]. It looked at the data from 1950 to 2006. The dependent variable in the model is real gross domestic product (GDPR), which is used as a proxy for economic growth in this study. Foreign debt (FD), labor force (LF), and real total trade, i.e. trade openness, are the independent variables (RT). Economic growth, foreign debt, trade openness, and labor force all have a co-integration relationship, according to the study. Furthermore, the findings imply that labor force, trade openness, and foreign debt have a favorable impact on Sri Lanka's economic growth in the long run.

From 1977 to 2015, Gimhani K.W.K. and Francis S.J. investigate the relationship between trade openness and economic growth in Sri Lanka. The study relies on secondary data. The data comes from a variety of places, including the Sri Lankan Central Bank and UNCTAD (United Nations Conference on Trade and Development) reports. The dependent variable in this study is Gross Domestic Product. As independent variables, trade openness, gross capital creation, and inflation are used. The Johansen Co-integration test is responsible for the long-term appearance of the selective stationary variable estimates. The term "causality" is used to describe the relationship between two or more variables. The study's regression model is estimated and explained using the Ordinary Least Square method (OLS). According to this study, trade openness has a favorable impact on Sri Lanka's economic growth. However, the difference isn't statistically significant.

Using annual time series data from 1975 to 2014, Aslam A.L.M. [3] investigated the trade openness dynamics of economic growth in Sri Lanka. The following variables were utilized as variables in this study: gross domestic product, which was used as a proxy for economic growth, trade openness, and money supply. The Johansen co-integration technique was used to evaluate the long run relationship between the variables, while the VECM technique was used to assess the short run behavior of trade openness. Both methodologies indicated that trade openness had a negative and significant long-run association with economic growth in this study. While, the lag values of the trade openness in short run period, jointly had not impacted on the economic growth over the sample period.

Muller, G. and Goldbach, C. (2019) looked at the impact of trade openness on the economy of 15 developing nations in South Asia, Southeast Asia, and

Africa. The panel data study was conducted during a 20-year period, from 1998 to 2017. For the purposes of this study, the trade openness index, FDI, unemployment, official exchange rate, and population were used as explanatory variables. According to the results of the fixed effects model, trade openness has no impact on economic growth. In addition, the Granger Causality test was used to determine whether export, import, and economic growth are related. There is a one-way relationship between exports and GDP, as well as GDP and imports.

Using pooled OLS regression and panel data approaches, Dao A. T. [7] statistically evaluated the link between trade openness and economic growth for 71 developing and developed nations from 1980 to 2009. The findings revealed that trade liberalization has a favorable and considerable impact on economic growth; in fact, a one standard deviation rise in trade openness would result in a 0.24 percentage-point increase in growth rate.

Trade openness has both short and long-term favorable benefits on economic growth, according to Yaya K. [8]. Furthermore, they show that trade openness and capital development have a favorable and significant complementary relationship in fostering economic growth. To demonstrate this, they used a multivariate framework using capital stock, labor, and trade openness as regressors to investigate the influence of trade openness on economic development in Cote d'Ivoire from 1965 to 2014. To assess co-integration, it employs the Autoregressive Distributed Lag Bounds test, as well as the Toda and Yamamoto Granger causality tests.

Malefane, M. R., and Odhiambo, N.M. [5] investigated the impact of trade openness on South African economic growth. The dynamic influence of trade openness on economic growth was investigated using the autoregressive distributed lag (ARDL) bound testing approach in this study. This research used four trade openness proxies, each of which addressed a distinct component of trade openness. The ratio of exports + imports to gross domestic product is the first indicator of trade openness (GDP). The ratio of exports to GDP is the second proxy, while the ratio of imports to GDP is the third proxy. The final proxy is a trade openness index that takes into account the country's size and location. This study indicated that when the ratio of total trade to GDP is used as a proxy, trade openness has a positive and significant impact on economic growth, but not when the other three proxies are utilized. However, the study indicated that trade openness has a beneficial impact on economic growth in the short run when the first three proxies of openness are

used, but not when the trade openness index is utilized.

Between 1980 and 2016, Khobai H. et al. [9] examined the long-term link between trade openness and economic growth in Ghana and Nigeria. This study used the Autoregressive distributed lag (ARDL) model to look at the long-term association between the variables. The study's findings revealed that the factors in both countries have a long-term link. The findings also revealed that in Ghana, trade openness has a positive and significant impact on economic growth at the 1% level, whereas in Nigeria, trade openness has a negative but negligible impact on economic growth.

3. 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 sources 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 [1] is shown below.

$$LGDP_t = \alpha_0 + \alpha_1 LTO_t + \alpha_2 LPOP_t + \alpha_3 LLLF_t + \alpha_4 LINFL_t + \alpha_5 LFDI_t + \mu_t$$

Where, LGDP, LTO, LPOP, LLLF, LINFL 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. μ_t is a white noise error term, $t=1, 2, \dots, T$.

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

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

Population is the total number of people in 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 relationships. 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. [1] 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 cointegration bound testing procedure is shown by the 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, $\vartheta = [\vartheta_1, \dots, \vartheta_4]$ refers to the long run coefficients;

$LZ_{t-1} = [LGDP_{t-1}, LTO_{t-1}, LPOP_{t-1}, LLF_{t-1}, LINF_{t-1}, LFDI_{t-1}]$ 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.

$LZ_{t-1} = [\Delta LGDP_{t-1}, \Delta LTO_{t-1}, \Delta LPOP_{t-1}, \Delta LLF_{t-1}, \Delta LINF_{t-1}, \Delta LFDI_{t-1}]$ denotes the vector of explanatory variables with lag i and ϵ_t is the white noise error term. The error correction version of the ARDL model is shown in the following equation as a transformation of the 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 γ is speed of adjustment which should be statistically significant and should have a negative sign. ϵ_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 a 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.

4. 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.

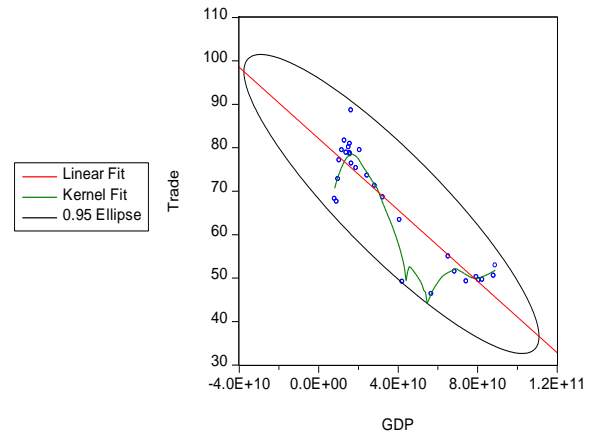


Fig. 2. Confidential Ellipse between the variables

Based on the figure 2, it is confirmed that the Trade Openness and Gross Domestic Product are negatively correlated among them at 95% confidence 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 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 introduced 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 each variable.

According to the results of the 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 the 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.

As a prerequisite for accurate estimations, diagnostic tests were employed and results are given in the following table.

Table 2. Stationary of variables

Variable	Augmented dickey fuller					
	Level			1st difference		
	Intercept	Intercept and trend	None	Intercept	Intercept and trend	None
I_GDP	0.9996	0.8583	1	0.0165	0.0202	0.4358
I_Inflation		0.0093	0.309	0	0	0
I_Trade	0.8383	0.4494	0.4233	0.0015	0.0071	0.0001
I_Labour force	0.8232	0.3956	0.966	0.0001	0.0004	0
I_pop	0.8222	0.4001	0.321	0.0221	0.0011	0

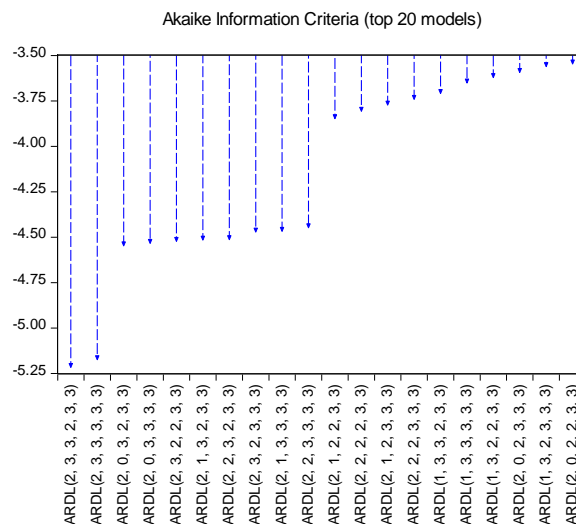


Fig. 3. Akaike information criteria

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 CUSUM plot lies within the upper and lower critical bound at 5% significance level so that it ensures the stability of parameters.

As the next step of estimation, a Bound test was conducted.

The results of the 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.

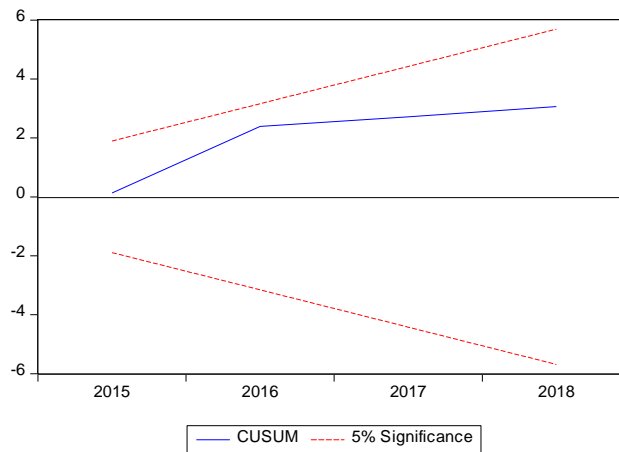


Fig. 4. CUSUM plot

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

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

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** (0.02)	4.088 (0.38)	-2.211* (0.06)	-1.0157 (0.16)	0.051 (0.58)	0.988
Panel B: Short run Coefficient Estimates						
Lag Order	ΔLGDP	ΔLTO	ΔLPOP	ΔLLF	ΔLINF	ΔLFDI
0		1.008*** (0.0001)	-0.879 (0.76)	3.668*** (0.0004)	0.143*** (0.0001)	-0.097*** (0.0004)
1	-0.9044*** (0.0005)	0.017 (0.794)	51.848*** (0.0003)	3.630*** (0.0003)	-0.327*** (0.0001)	-0.106*** (0.0008)
2		0.287** (0.011)	22.645*** (0.001)		-0.196*** (0.0001)	-0.171*** (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 labor 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 these findings are consistent with the findings of Aslam A.L.M. [3]

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

5. 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 a statistically significant relationship with GDP. This finding is consistent with Aslam A.L.M. [3] who investigated the dynamics of trade openness in Sri Lanka. Therefore, this study concludes that the reasons for having the negative relationship between the trade openness and gross domestic product are that the import costs are greater than the export earnings. Therefore, this study advises the government of Sri Lanka that the exports have to be increased rather than increasing the imports.

COMPETING INTERESTS

Author has declared that no competing interests exist.

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