Relationship between Trade Liberalization and Balance of Trade of Sri Lanka: An Econometric Investigation

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Abstract

This paper examines the relationship between trade liberalization and balance of trade of Sri Lanka. The main objective of this study is to investigate the problem of "To what extent does trade liberalization of the economy influence on trade balance of Sri Lanka?" The secondary data were used to analyze the study problem. The behavior of major variables which are directly related to trade balance and current account balance was analyzed qualitatively and the relationships between variables were analyzed quantitatively. The findings of the study conclude that during the period of 1960 - 1976, the trade deficit has been grown at a rate of 9.04 percent. However, during the trade liberalization period from 1977 to 2007, the trade deficit has been grown only at a rate of 3.46 percent. Further the study revealed that during the two periods, pre and post liberalization period, structural changes have been occurred in balance of trade of Sri Lanka.

Key Words: *Trade Liberalization, Trade Balance, trade policies*

1.Introduction

Trade liberalization i.e. movement towards free trade through the reduction of tariffs and non -tariff barriers (NTBs), is a major motivating force behind globalization. During the last three decades, the trade liberalization increasingly evolved with expectation of rapid economic development in Sri Lanka. One of the major objectives of trade liberalization is to improve the balance of payments of the economy. Thereby it is expected an improvement of balance of trade and current account of a country with liberalization policies. However, the effects of trade liberalization on particularly balance of trade in Sri Lanka have become uneven. As a result some critics of trade liberalization have stated that trade liberalization has worsened the balance of trade account of Sri Lanka. This criticism has been spread without giving much awareness on gains of free trade on improvement of balance of trade of the country. In this context, relationship between trade liberalization and balance of trade account of Sri Lanka is of great importance to analyze and would be more beneficial for the future trade reforms of the country.

Problem Statement

Many researchers have attempted to answer the question of how the trade liberalization contributes on solving

Balance of Payment difficulties of a nation. Researches carried out on trade liberalization have not been able to produce unambiguous results on impacts of trade liberalization on balance of payment. However, limited researches done on trade liberalization have created the issue more complex in the country. Therefore lack of empirical evidences regarding trade liberalization do not permit to take more accurate decisions on improving international trade in the country and this study attempts to fill this gap by finding empirical evidences for relationship between international trade and trade balance of Sri Lanka. Formally, the research problem is expressed as "To what extent does trade liberalization or openness of the economy influence on trade balance of Sri Lanka?" More specifically following research questions will be addressed by the study.

1. What has been the effect of trade liberalization on the trade balance and the current account of the balance of payments of Sri Lanka? Has there been improvement or deterioration?
2. What are the factors significantly affecting the trade balance of Sri Lanka?

Objectives of the Study

The primary objective of the study is to investigate the relationships between the trade liberalization and trade balance of Sri Lanka. Therefore, the study investigates more specifically on the contribution made by the international trade on balance of trade of Sri Lanka.

According to aforementioned objectives, the study has been carried out by formulating a hypothesis. Therefore it is hypothesized that trade liberalization has improved the balance of trade of Sri Lanka.

2. Literature Review

Balance of Payments is an important statistical statement that can be used to formulate economic policies of a country. All countries in the world use a standard format of balance of payment which is introduced by the International Monetary Fund via the *Balance of Payment Manual* (BPM). The balance of payments can be defined as a statistical statement that systematically summarizes for a specific time period, the transactions of a nation, with the rest of the world (Savundranayagam, 2004). The Balance of Payments of a counter enter not only exports and imports of *visible* or *tangible* items but also exports and imports of *invisible* or *intangible* items. Mainly visible transactions include exports and imports of goods like automobiles, foods, computers etc. Invisible items mainly comprised with services like tourism, banking, insurance and shipping etc. Net value of merchandise exports and imports is defined as the trade balance of the Balance of Payments statements of an economy.

Khan and Zahler (1985) examined the effect of trade and financial liberalization on the economies of Argentina, Chile and Uruguay. They found that the volume of trade increased but the current account of the balance of payments went into severe deficit, and that capital flows generated by interest rate differentials were not sufficient to finance the deficits without adjustment as well. Their results imply that the value of imports increased faster than the value of exports but they do not separate the effect of volume and price changes.

According to Ostry and Rose (1992), they have found no statistically

significant relation between tariff changes and the real trade balance of countries. However, they did not consider exports and imports separately or other aspects of liberalization. Also UNCTAD (1999) has studied the effect of trade liberalization on the trade balance for sixteen countries over the period 1970 to 1995 using panel data techniques, and found a significant negative relationship between liberalization and balance of trade variables.

Parikh and Stirbu (2004) have identified that liberalization worsens trade deficits while current account is encouraged by liberalization for the entire period is concerned (1970 – 1999). The study has been carried out by dividing total time frame into three periods. Three separate periods are from 1970 – 79, from 1980 – 89 and from 1990 – 99. Further they have calculated two deficits, trade balance to GDP (TB/GDP) and current account to GDP (CA/GDP) and deficits have been defined as positive observations. For their regression model, they have included timing effect of liberalization and have found significant results. Timing effect (Table 1) of liberalization (LIBTM) is significant as in the period 1970-79, trade balance to GDP deteriorated in the first period, improved in the second period and the impact was not significant in the last period.

Table 1: Multivariate relationship between trade balance, GDP growth, timing of liberalization (Libertm) and liberalization year (Liber)

Dependent	Region	Time Period	Constant	Liber	Libertm
TBGDP	Developing countries	1970 -1979	5.82*** (7.30)	-1.01 (-0.49)	0.19*** (3.74)
	Developing countries	1980 – 1989	1.33*** (3.80)	1.99*** (2.77)	-.43*** (-7.39)
	Developing countries	1990 - 1999	2.71*** (6.53)	0.61 (1.24)	0.05 (1.15)
CAGDP	Developing countries	1970 1979	3.44*** (3.55)	-0.71 (-0.31)	0.12 (1.45)
	Developing countries	1980 – 1989	0.74* (3.33)	1.65*** (3.61)	-0.35*** (-9.49)
	Developing countries	1990 - 1999	2.40*** (7.24)	-1.23*** (-2.95)	0.01 (0.25)

Source: Research findings of Parikh and Stirbu (2004)
Note: ***significant at 1% ** significant at 5% * significant at 10%

Parikh and Stirbu have received region vice ambiguous results on trade deficits and liberalization. For Latin American economies, the direct impact of liberalization is to increase the trade deficits while for African economies liberalization has improved trade balance in bivariate relationship. Also they have received a mixed bag of results at a regional level as the data and number of observations differed (Table 2).

Table 2: Region wise relationships between TBGDP and Liberalization (1970-2000)

Region	Dependent Variable	Constant	Liberalization dummy
Africa	TBGDP	3.78***	-1.09**
	CAGDP	3.24***	-1.71***
Asia	TBGDP	2.30**	0.44
	CAGDP	0.38	0.06
Latin America	TBGDP	2.51**	2.09***
	CAGDP	2.40***	-0.45

Source: Research findings of Parikh and Stirbu (2004)

Note: *** significant at 1% **significant at 5% *significant at 10%

Study of Parikh and Stirbu (2004) did not permit them to reach unambiguous conclusions. For five countries, liberalization has a positive and significant effect while for twelve countries; trade balance tends to worsen with liberalization.

Parikh and Stirbu have examined the relationship of trade balance to GDP and current account to GDP percentage while including control variables namely terms of trade, liberalization, advanced countries' growth rates and interactions of each of the variables with liberalization. They have found that trade balance obviously deteriorates with liberalization. Deterioration in trade balance could impact on economic growth in subsequent periods. Current account balances, however, did not deteriorate with the impact of liberalization.

2. Methodology

The study is mainly based on secondary data. In identifying the impacts of trade liberalization on trade balance, data were collected on a specific time interval before and after the liberalization of international trade in Sri Lanka. The time period selected is from 1960 to 2007. Further to identify the impacts of trade liberalization on trade balance, total time period is divided into two sub periods of before trade liberalization i.e. (1960 to 1976) and after trade liberalization i.e. (1977 to 2007).

Data Collection

Since the study is based on secondary data, basically it uses data published in annual reports of Central Bank of Sri Lanka. In addition to those data researcher uses data published on refereed journal articles and text books to achieve research objectives. Further, since the study is based on time series data, price effects of variables are removed by using GDP deflator of respective years. Therefore, the price effects of Gross Domestic Product, exports, imports, trade balance are divided by GDP deflator to remove the inflationary effects of those variables.

Methods of Data Analysis

Most of the Studies had been carried out on international trade confirming the suitability of applying quantitative statistical techniques to achieve research objectives. Hence, the variables identified in the main objective of the study are tested hypothetically, and quantitative analytical methods are

applied to make accurate and reliable conclusions. Therefore, descriptive statistical techniques, simple and multiple regression analysis are used to assess the degree of relationships among variables concerned. Further to test the structural changes in pre liberalized and post liberalized periods of international trade in the country, a statistical test called Chow test is applied. All the Statistical calculations of the study are done by using MINITAB statistical package.

Specifications of Simple and Multiple Regression Model

The study uses ordinary least square (OLS) method to derive simple and multiple regression models which are used to analyze the impacts of trade liberalization. The study uses simple regression model as far as possible to avoid the complexity of the models. Researchers who have done previous research on trade liberalization had extensively used the simple regression models to assess the causal relationship between related variables. Hence, to examine the effects of trade liberalization on growth and trade balance, following equations are mainly used in the study.

$$TB = f(t)$$
$$TBGDP = (LIBER)$$
$$CAGDP = (LIBER)$$
$$TBGDP = f(LIBER, LIBERTIME)$$
$$CAGDP = f(LIBER, LIBERTIME)$$
$$TB = f(ER, CCP, LIBER, LIBERTIME)$$

Where, LIBER refers to trade liberalization, LIBERTIME refers to liberalization time elapsed, t refers to time, GDP refers to gross domestic product, TB refers to trade balance, TBGDP refers to trade balance to GDP, CAGDP refers to current account balance to GDP, CCP refers to general price level and ER refers to exchange rate of rupees and US$.

Measuring Growth Rate of a Variable

The study uses linear log model in measuring growth rate of annual trade balance of Sri Lanka. The model shown in equation 1 is similar to any other linear regression model and regression coefficients or parameters, β_1 and β_2 are considered as linear. The only difference of the regression model given in equation 1.4 is that dependent variable (regressend) is in the form of logarithm of Y and the independent variable (repressor) is "time". The independent variable that is *time*, takes values of 1, 2, 3, 4...etc. In the formula shown in equation 1.4, only one variable is appearing in the logarithm form. Therefore in econometrics, the model that is explained in equation 1.4 is called *semi log model.*

$$lnY_t = \beta_1 + \beta_2 t + u_t \text{----------} \quad (1)$$

In this particular model as only the independent variable is on logarithmic form it is called ***a log-lin model.*** In a log-lin model the slope coefficient can be written down descriptively as follows.

$$\beta_2 = \frac{\textit{Relative Change in Dependent Variable}}{\textit{Absolute Change in Independen Variable}} \text{---} \quad (2)$$

In equation 2, if numerator is multiplied by 100 it will give the growth rate of dependent variable(Y) for an absolute change in independent variable (X). The product of β_2 of the relevant model and 100 is known as the growth rate of the dependent variable.

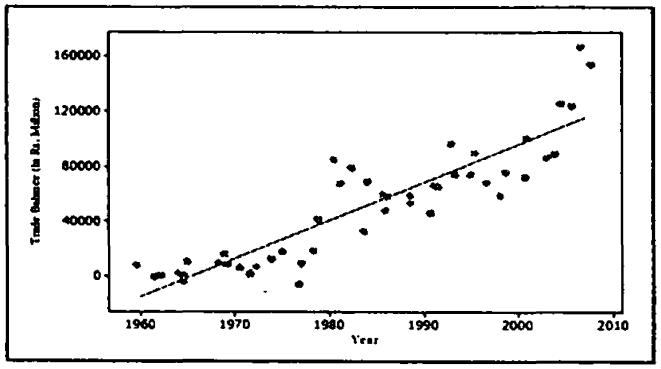
3. Analysis of Data

Behavior of major variables and impacts of trade liberalization on trade balance is analyzed by using graphical presentation method and simple and multiple regression analysis. In this study behavior of major variables which are directly related to trade balance and current account balance is analyzed with use of bar charts and scatter plots. Regression analysis is used to measure direct relationship between variables concerned in the study. In the study, deficits of trade and current accounts are considered as positive values and surpluses as negative values. Particularly trade balance and trade liberalization, current account balance and trade liberalization relationships are examined with the use of regression technique.

Trade Balance and Trade Balance to GDP

It is expected that with trade liberalization, a nation's balance of payment is improved. Hence over the years, trade balance of a country can be changed due to policy implications. In Sri Lanka, changes of balance of trade during the last five decades are shown in Figure 1.

Figure 1: Trade Balance (TB) of Sri Lanka from 1960 to 2007

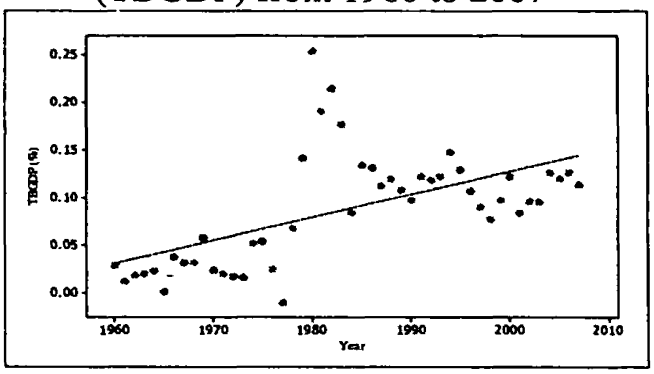


Note: Deficits Positive and Surplus Negative

Figure 1 shows the general behavior of trade balance of Sri Lanka for 1960 – 2007 period. Besides few years, it shows a deficit in trade balance of Sri Lanka over the last five decades. During the closed economic period, maximum absolute value of trade deficit reached is Rs.12,646 million in 1969. After 1977 maximum value of deficit in trade balance reached is Rs. million 165,037 in 2006. General direction of trade balance shows increase of deficit throughout the period concerned. According to the Figure 1, although it shows a slower increase of deficit of trade balance before 1977, after that it shows a rapid increase of the deficit of trade balance. As a whole, Figure 1 shows a continuous increase of balance of trade throughout the last five decades.

Although absolute amount of trade balance over the last five decades increased regularly, relative share of trade balance to GDP has shown a significant difference during the same period. Figure 2 shows trade balance to GDP ratio for last five decades. During the most restricted trade period of the country, 1960-1976, trade balance to GDP ratio has counted a smaller percentage value with compared to the percentage value after 1977. For example before 1977 maximum value reached was 0.057 in 1969 and after 1977 maximum value reached was 0.2536 in 1980. Therefore figure shows a clear difference of the ratio in two periods of before and after trade liberalization. According to the figure 2, ratio of TBGDP has reached its maximum of 0.25 during the initial years of trade liberalization. However after the first half of 1980s it shows a declining trend of trade balance to GDP ratio of the country.

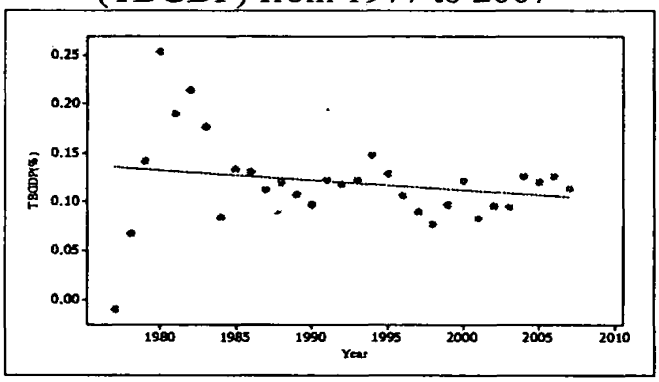
Figure 2: Trade Balance to GDP (TBGDP) from 1960 to 2007



Note: Deficits Positive and Surplus Negative

Figure 2 shows an upward trend of trade balance to GDP ratio during the period from 1960 to 2007. However although overall trend shows an upward trend, several years after trade liberalization, it can be seen a downward trend of the trade balance to GDP ratio. Figure 3 clearly shows the declining trend of trade balance to GDP ratio during the trade liberalization period from 1977 to 2007.

Figure 3: Trade Balance to GDP (TBGDP) from 1977 to 2007

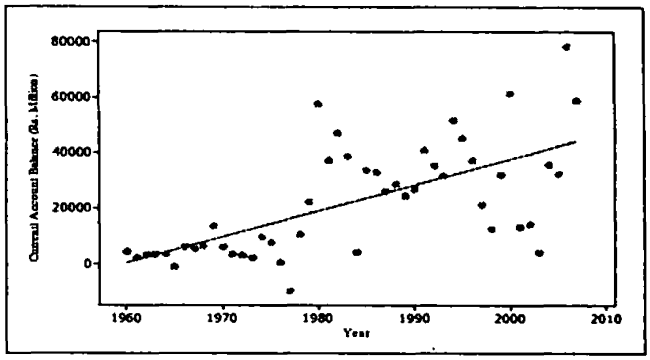


Note: Deficits Positive and Surplus Negative

Current Account Balance and Current Account Balance to GDP

During the last five decades current account balance of Sri Lanka shows a clear cut difference in its behavior. Before trade liberalization, from 1960 to 1976 besides two surplus balances it shows always a deficit in the current account balance. Although it shows minimum fluctuations of current account balance before trade liberalization, after trade liberalization in 1977, current account deficit has fluctuated dramatically.

Figure 4: Current Account Balance from 1960 to 2007



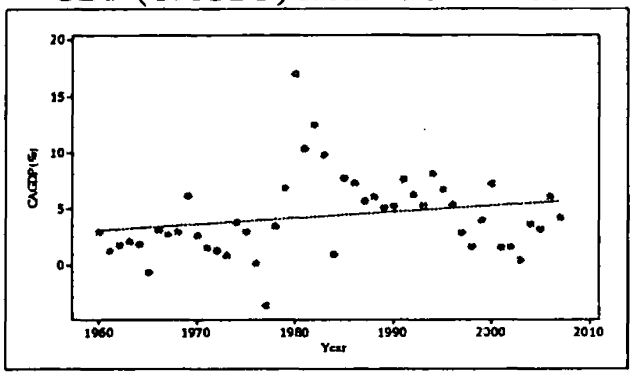
Note: Deficits Positive and Surplus Negative

According to the figure 4, current account balance shows a significant difference between two trade regimes. Before trade liberalization deficit of current account shows a quite stable situation. In 1966 it shows a surplus in current account. Again in 1977 the year which took place trade liberalization has had a current account surplus. After 1977 current account balance has accounted a deficit in the country. Also during the last three decades balance of current account shows a quite irregular pattern making high fluctuations in current account deficit. As a whole current account deficit of the country shows that over the years deficit increase in the country. As a whole the figure shows an upward trend of the current account balance of Sri Lanka

Current account to GDP over the last five decades also shows a clear difference. During the trade restricted

era or closed economic period current account to GDP ratio shows an irregular patter. According to the figure 5, current account to GDP ratio has counted less than five percent during the 1960 to 1976 period except one year. With trade liberalization the ratio has increased dramatically and after few years again it can be seen a downward trend of the variable.

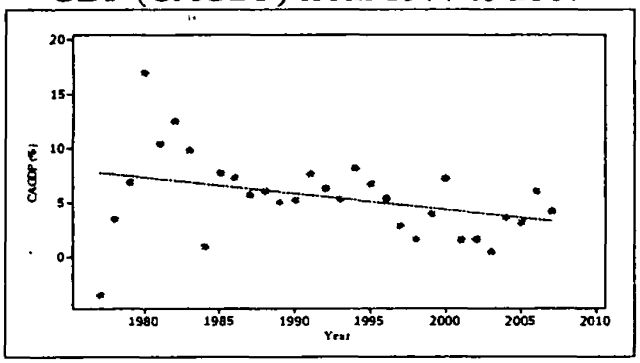
Figure 5: Current Account Balance to GDP (CAGDP) from 1960 to 2007



Note: Deficits Positive and Surplus Negative

Figure 5 shows an upward trend of current account to GDP ratio during the period from 1960 to 2007. Although it shows an upward trend during the last five decades after trade liberalization it can be seen a downward trend of the variable. Figure 6 shows this downward trend of current account to GDP ratio after trade liberalization in 1977.

Figure 6: Current Account Balance to GDP (CAGDP) from 1977 to 2007



Note: Deficits Positive and Surplus Negative

Regression Analysis

Simple regression analysis is used to measure the bivariate relationship exist between trade balance to GDP(TBGDP) versus trade liberalization and current account balance to GDP versus trade liberalization(CAGDP).

The relationship between trade balance to gross domestic product is measured by applying simple regression analysis and the result is summarized in table 3.

Table 3: Trade Balance to Gross Domestic Product (TBGDP) versus Trade Liberalization (LIBER)

Time Period	R	R^2	Intercept	Slope	Individual Parameter Significance		Overall Significance	
					T	P	F	P
1960-2007	0.668	0.446	0.02387 (0.0124)	0.0875 (0.0145)	1.93 6.01	0.060 0.000	36.17	0.000

Note: Standard error of coefficients is given in parentheses

According to the table 3, the correlation coefficient of the regression model is 0.668 and shows a moderate positive relationship between trade balance to GDP and liberalization variable. Coefficient of determination (R^2) of the model gives a moderate value which is equal to 0.466. Intercept of the model is significant at 10 percent level of significance (p-value < 0.10) and slope coefficient is significant at 1 percent level of significant (p-value < 0.01). Overall model is significant at 1 percent level of significance (p-value < 0.01). According to the result appeared in table 3, it shows that trade liberalization has increased the trade balance to GDP (TBGDP) ratio by 0.0875 percent.

Bivariate relationship between current account balance to Gross Domestic Product (CAGDP) is measured by using simple regression analysis and the result is summarized in table 4.

According to the table 4, the correlation coefficient of the model is 0.46 and it suggests a moderate relationship between two variables. Also coefficient of determination (R^2) of the model gives a moderate value which is equal to 0.212. The intercept of the simple regression line is significant at 10 percent level of significant (p-value < 0.10) and slope coefficient is significant at 1 percent level of significant (p-value < 0.01). Also overall model is significant at 1 percent level of significance (p-value < 0.01).

Table 4: Current Account Balance to GDP (CAGDP) versus Liberalization (LIBER)

Time Period	R	R^2	Intercept	Slope	Individual Parameter Significance		Overall Significance	
					T	P	F	P
1960-2007	0.460	0.212	1.7311 (0.8953)		1.93	0.059	12.11	0.001
				3.663 (1.053)	3.48	0.001		

Note: Standard error of coefficients is given in parentheses

increased the current account balance to GDP of the country. According to the value of intercept, current account to GDP has been 1.73 percent during the restricted economic period. The slope coefficient of the simple regression model suggest that trade liberalization has increased the CAGDP ratio by 3.66 percent.

Multiple Regression Analysis

Multiple regression analysis is used to measure the multivariate relationship exist among several variables. In this study determinants of trade balance are used to measure their impacts on trade and current account balance. In multiple regression analysis two explanatory variables are used to measure the variability of dependent variable which is trade balance to GDP. The added two independent variables in multiple regression are trade liberalization dummy and liberalization time elapsed variable.

According to the table 5, coefficient of determination (R^2) of the model is equal to 0.405. As far as the individual coefficients are concerned, only

liberalization dummy variable is significant at 1 percent level of significance (p-value < 0.01). Other two coefficients, constant and coefficient of liberalization time elapsed variable are not significant at 10 percent level of significance of this multiple regression model (p-value > 0.10). However, overall model is significant at 1 percent level of significance (p-value < 0.01).

Table 5: Trade Balance to GDP versus Liberalization and Liberalization Time Elapsed

	Coefficients	R^2	Individual Parameter Significance		Overall Significance	
			T	P	F	P
Constant	0.02621 (0.01664)	0.405	1.58	0.125		
LIBER	0.10800 (0.02496)		4.33	0.000	13.24	0.000
LIBERTIME	-0.000848 (0.0008742)		-0.970	0.339		

Note: Standard error of coefficients is given in parentheses

According to the values of regression coefficients although it shows a positive relationship between trade liberalization and trade balance to GDP, liberalization time and dependent variable, TBGDP, is negatively related. This negative relationship between liberalization time elapsed and trade balance to GDP explains that with trade liberalization every year deficit of trade balance to GDP ratio is decreased by 0.0009 percent.

To measure the impact of trade liberalization on current account balance two independent variables are regressed against the dependent variable and those two independent variables are trade liberalization dummy variable and liberalization time elapsed. The result of the multiple regression of current account balance to GDP, liberalization and liberalization time elapsed is shown in table 6.

Table 6: Current Account Balance to GDP (CAGDP) versus Liberalization (LIBER) and Liberalization Time Elapsed (LIBERTIME)

	Coefficients	R^2	Individual Parameter Significance		Overall Significance	
			T	P	F	P
Constant	1.329 (1.318)	0.195	1.01	0.321		
LIBER	6.440 (1.977)		3.26	0.003	5.37	0.009
LIBERTIME	-0.13723 (0.06925)		-1.98	0.056		

Note: Standard error of coefficients is given in parentheses

According to the table 6, coefficient of determination (R^2) of the model is equal to 0.495. Coefficient of liberalization dummy variable is significant at 1 percent level of significance (p-value < 0.01) while coefficient of liberalization time elapsed variable is significant at 10 percent level of significance (p-value < 0.10). Also overall significance of the model is achieved at 1 percent level of significant (p-value < 0.01). According to the values of regression coefficients although it shows a positive relationship between trade liberalization and current account balance to GDP, liberalization time and dependent variable, CAGDP, is negatively related. This negative relationship between liberalization time elapsed and current account balance to GDP explains that with trade liberalization every year deficit of current account to GDP ratio is decreased by 0.14 percent.

Degree of relationship among trade balance and determinants of trade balance is estimated by using a multiple regression model. Major determinants of trade balance are exchange rate, general price level, trade liberalization and liberalization time elapsed. In the multiple regression model exchange rate, general price level, liberalization dummy variable and liberalization time elapsed are taken as independent or explanatory variables and trade balance is the dependent variable. The result of multiple regression for trade balance versus exchange rate, general price level, liberalization and liberalization time elapsed is summarized in table 7.

Table 7: Determinants of Trade Balance

	Coefficients	R^2	Individual Parameter Significance		Overall Significance	
			T	P	F	P
Constant	-16235 (12369)	0.968	-1.31	0.199		
ER	-2649 (831.4)		-3.19	0.003		
CCP	141.5 (12.52)		11.29	0.000	242.66	0.000
LIBER	40200 (14857)		2.71	0.011		
LIBERTIME	-2636 (1619)		-1.63	0.113		

Note: Standard error of coefficients is given in parentheses

Table 7 shows the simultaneous effect of the variables; exchange rate, general price level, liberalization dummy and liberalization time elapsed on the independent variable which is trade balance. In the multiple regression model four independent variables are regressed. Results of multiple-regression model appeared in table 7 shows that at 5 percent level of significant three independent variables are significant. Coefficients of exchange rate (ER), consumer price index (CCP) are significant at 1 percent level of significant (p-value < 0.01) and liberalization dummy is significant at 5 percent level of significant (p-value <

0.05). However liberalization time elapsed is not a significant variable of the model. As a whole overall significance of the model tested and p-values and F – ratio of the model clearly explain the model's significant at 1 percent significance level (p-value < 0.01). According to the regression result shown in table 7, there is a negative relationship between the trade balance and exchange rate but there are positive relationships between trade balance and general price level and trade balance and liberalization.

4.2.2 Hypothesis Testing For Structural Changes in Trade Balance

Structural changes of trade balance during the pre and post liberalization period are examined by applying Chow Test. In applying chow test to analyze the structural changes of trade balance, growth rates for three different periods are computed by using simple regression analysis. Three different periods used to estimate the growth rates of trade balance are;

Period 1----------From 1960 to 1976

Period 2----------From 1977 to 2007

Period 3----------From 1960 to 2007

Estimated regression models for above three periods are given in equation 8,9,and 10.

For Period 1:

$$\ln TB = 7.60 + 0.0904\,t \quad \text{---- (3)}$$
$$(0.4157) \quad (0.04057)$$

$R^2 = 0.248$ $RSS_1 = 10.0741$ $df = 15$

For Period 2:

$$\ln TB = 10.017 + 0.0346\,t \quad \text{--- (4)}$$
$$(0.2146) \quad (0.006202)$$

$R^2 = 0.526$ $RSS_2 = 2.4205$ $df = 29$

For Period 3:

$$\ln TB = 7.89 + 0.0926\,t \quad \text{-- (5)}$$
$$(0.2102) \quad (0.00742)$$

$R^2 = 0.776$ $RSS_3 = 22.719$ $df = 45$

In applying Chow test, two hypotheses are built up and are given below.

Null Hypothesis (H_0) :
Parameter Stability is there

Alternative Hypothesis (H_1) :
Parameter Stability is not there

The two hypothesis are tested by comparing F calculated value and F table value. F statistic is calculated by using the following equation.

$$F = \frac{[(RSS_R - RSS_{UR})/K]}{RSS_{UR}/(n_1 + n_2 - 2k)}$$

Where
RSS_R = Restricted residual sum of square
RSS_{UR} = Un restricted residual sum of square
K = Number of parameters estimated
n_1 = number of observations of period 1

n_2 = number of observations of period 2

Based on simple regression models, values for each term of formula 11 are given below

K = 2, n_1= 17, n_2 = 31

RSS_3= RSS_R = 22.719

RSS_U=RSS_1 + RSS_2 = 10.0741+2.4205 = 12.4946

$$F_c = \frac{[(RSS_R - RSS_{UR})/K]}{RSS_{UR}/(n_1 + n_2 - 2k)}$$

$$F_c = \frac{[(22.719 - 12.4946)/2]}{12.4946/(48 - 4)}$$

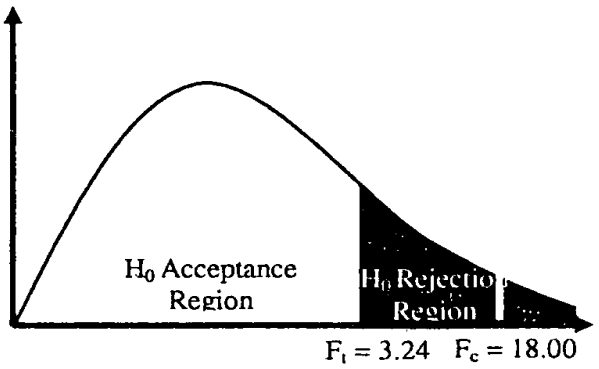
$$F_c = \frac{10.2244/2}{12.4946/44}$$

$$F_c = \frac{5.1122}{0.28397}$$

$$F_c = \underline{18.00272}$$

According to the above calculation calculated F value (F_c) is 18.0027

Figure 7: Region of Rejection and Non – Rejection of Null Hypothesis



With V_1 = 2 and V_2 = 44 and at 5 % level of significance F-table value is equal to 3.24. Since calculated F value (F_c = 18.003) is greater than tabular F value null hypothesis is rejected and alternative hypotheses is accepted at 5 percent level of significance. The decision concludes that structural changes in trade balance have happened during the pre and post liberalization era.

4. Discussion

The study encompassed five decades which belong to two trade regimes, pre and post liberalization period, in Sri Lanka. Findings of the present study are on the relationships between trade liberalization and trade balance of Sri Lanka. Also study investigates the relationships between current account balance and trade liberalization of the country. In measuring the impact of trade liberalization on balance of trade and current account balance, in addition to the liberalization dummy variable another independent variable called liberalization time elapsed were considered in this study. At the initial stage of liberalization deficit of trade and current account balance can be increased. However after that it is expected to decrease both deficits over time. Therefore in the study another important variable were considered in determining the deficits of two account of the balance of payment. That independent variable is liberalization time elapsed. However, except one situation timing effect of liberalization was not a significant variable in determining balance of trade and current account of Sri Lanka. This could be a matter of severe condition of civil war that was aroused time to time in the country. Because civil unrest prevailed during the last three decades has affected considerably on international

trade condition of the country. However scatter plots of trade balance and current account balance after trade liberalization show downward trend or improvement in those two accounts.

In the study behavior of trade balance and current account balance were analyzed by taking annual amounts of balances two accounts or absolute changes and taking their balances as a share of gross domestic product or relative changes. Both two measurements, absolute and relative, shows long term upward trend during the last five decades. However scatter plots show that relative share of trade balance and current account balances after trade liberalization gradually decreased

5. Conclusion

The major hypothesis of the study is to test the relationship between Trade Liberalization and the Trade Balance of Sri Lanka during the pre and post liberalization era. Therefore, the study intended to test whether liberalization has improved or deteriorated the trade balance of the country. The study used the trade balance to GDP to check whether liberalization has improved the trade balance rather than taking absolute amount of the trade balance.

The findings of the study on trade liberalization and trade balance must be interpreted very carefully. When liberalization dummy is used to check the relationship between trade liberalization and trade balance (TBGDP was used against liberalization) it is found that trade liberalization has worsened the trade balance of Sri Lanka. In the study, it reveals that trade liberalization has increased the deficit of trade balance to GDP by 0.0875 percent. This is a marginal increase of the ratio. However, the study used Chow test and analyzed the structural changes of growth of trade balance during two trade regimes. According to the Chow test, it is found that during the two periods, pre trade liberalization period and post liberalization period, structural changes have been occurred in balance of trade of Sri Lanka. Further, it is found that during the trade liberalization period the country's trade balance has been improved. Therefore it is proved that although liberalization itself worsened the trade balance, over the time the trade balance has been improved in Sri Lanka. According to the findings of the study during the period of 1960 -1976 the trade deficit has been grown at the rate of 9.04 percent.. However, during the trade liberalization period from 1977 to 2007, the trade deficit has been grown only at the rate of 3.46 percent.

Also, the study found that trade liberalization has worsened the current account of Sri Lanka. It is found that current account balance obviously deteriorates with liberalization. The result of the study reveals that trade liberalization has increased the current account balance to GDP by 3.66 percent. In this study, timing effect was taken to evaluate the impacts of liberalization on trade balance of the country. In studying trade balance and liberalization relationship, it is found that the liberalization time elapsed variable as a statistically insignificant variable to assess the impacts of trade liberalization in Sri Lanka. Therefore in balance of trade analysis, that variable was not a significant variable to assess liberalization effects. Also, the study revealed that the exchange rate, general price level and liberalization dummy as statistically significant variables in

determining the trade balance of the country. In case of exchange rate to determine the trade balance, it is found that the depreciation of Sri Lankan Rupee has contributed to an improvement in the trade balance of the country.

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