THE IMPACT OF CURRENCY DEPRECIATION AND TRADE LIBERRALZATION ON TRADE BALANCE OF SRI LANKA

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Abstract

This study examines the impact of trade liberalization and currency depreciation on the trade balance of Sri Lanka. Using the bounds testing ARDL approach for co-integration, which is more suitable for small finite sample cases, we found that there was a long run co-integrating relationship between the trade balance and its determinants; particularly the Trade Openness and Real Exchange Rate. Our findings suggest that 1% increase in trade openness leads to 0.48% deterioration, while 1 % depreciation of local currency leads to 0.45% improvement in the Trade Balance Ratio of Sri Lanka given all else remaining unchanged. These findings solve the fundamental dilemma, why Sri Lanka's Trade Balance continued to deteriorate; despite of substantial currency devaluations/depreciations allowed during past five decades. Our findings conclude that a more powerful negative impact arising from trade openness fully offset the positive impact arising from currency depreciation; thereby leading the Trade Balance into deficit, eventually in the long run. Accordingly, we found trade liberalization and devaluation are counter-cyclical as policy tools.

Keywords: – Trade Liberalization, Trade Balance, Bounds Testing, ARDL, Sri Lanka JEL classification: C22; C51; F14

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INTRODUCTION

Trade Liberalization refers to the removal or reduction of artificial barriers to trade goods and services among nations. This includes the reduction or removal of tariff (import duties and surcharges) and non-tariff barriers (licensing, quotas, rules of origin, exchange restrictions). Trade liberalization on the one hand encourages countries to be specialized in producing the goods and services, for which they have comparative advantages. On the other hand the removal of barriers would result affordably low prices for consumers. Moreover, trade liberalization exposes local producers for greater competition emerging from other nations. This would stimulate to increase production efficiency, cost reduction or provide an incentive for an industry to move resources into new ventures, not vulnerable to competition. Trade Liberalization enables economies of scale and greater specialization, particularly for small economies, having geographical limitations in very own country.

Sometimes, Trade Liberalization might be threatening the balance of an economy. Some industries may grow faster, some might be sluggish or collapse; thereby causing structural unemployment. Trade Liberalization can often be painful to less developed countries, having a great deal of infant industries that cannot compete against foreign competition. On the top of all, Trade Liberalization may create or worsen the existing trade imbalances among nations.

The effect of Trade Liberalization on the trade balance is theoretically indeterminate. The Elasticity Approach suggests the effect will depend on the price elasticity of demand for imports and exports, as well as the extent to which the liberalization causes to change the relative price of export and import. Though the relative prices could be enormously changed due to tariff reduction under Trade Liberalization, it does not assure improvement in trade balance unless Marshall-learner (ML) condition; together with its assumptions is satisfied. Nevertheless, 'Trade Openness' is a broader concept beyond reduction of tariffs, which involves removal of non-tariff barriers and exchange controls as well. Hence, the Elasticity approach alone does not suffice to conclude whether openness improves or worsens the trade balance. The Absorption Approach to the balance of payments by Sydney Alexander (Haberler, 1976) suggests the effect of liberalization will depend on how real income is affected in relation to real absorption. A reduction in import duties will shift expenditure to imported goods, thereby raising foreign exchange outflows; but a reduction in export duties does the opposite. Yet, the balance of payments will not improve if the propensity to absorb is greater than unity.

Given this theoretical ambiguity, the impact of trade openness on the trade balance becomes an empirical issue. 'Trade Openness' has become an important policy variable for developing countries for the last few decades, its impact on trade balance has recently received a great deal of attention from researchers and policy makers alike; as

many developing countries continue to embark on Trade Liberalization entering into bilateral, regional, and multilateral trade agreements. This process was further encouraged by the World Bank and World Trade Organization (WTO)

The objectives of this study are as follows: (a) To examine whether long-run level relationship exists between trade balance of Sri Lanka and its determinants using recent bound testing techniques (b) To estimate the short-run and long-run elasticity of trade openness and to exchange rate with respect to the trade balance using ARDL and EC models (c) To evaluate trade openness and to exchange rate devaluation as policy tools to rectify the persistent balance of trade problem in Sri Lanka.

The remainder of this paper is organized as follows: beginning with a brief literature review on 'Trade Openness' and balance of trade nexus, it subsequently presents theoretical and econometric specification of the model, Then, it discusses the empirical results, and finally, concludes the findings and presents policy recommendations.

BRIEF LITERATURE REVIEW

Ostry and Rose (1992) using five different data sets (including one for developing countries) found no statistically significant effect of tariff changes on the real trade balance. Lutz and Singer (1994) addressed the question of the effect of Trade Liberalization on a country's term

of trade, based on a sample of 91 countries for 1968-88 including both LDCs and industrialized countries. Their study conclude that liberalization is likely to lead to the deterioration of the term of 'trade,' if Trade Liberalization was aimed at raising the size of the tradable sector, either in absolute or relative terms. Santos-Paulino (2004) using dynamic panel data and time series/cross-section analysis on the trade balance and the current account balance of twenty two developing countries from Latin America, Africa, East Asia and South Asia; where significant trade reforms had been undertaken since the mid-1970s. It has been found that liberalization has worsened the balance of trade and the balance of payments; because imports have increased more rapidly than exports. Using Bounds Testing Approach and Auto-Regressive Distributed Lags (ARDL) model, Klasra (2011) tested the existence of long run equilibrium relationship between the determinants of growth during the period 1975–2004 for Pakistan and Turkey. The results concluded that there is bi-directional causal relationship between 'Trade Openness' and exports for Pakistan in the short run. Moreover, they found that openness-growth nexus holds true for Pakistan, and growth-driven exports hypothesis receives empirical support for Turkey in the long run. Allaro (2012) examined the impact of Trade Liberalization on the Ethiopia's trade balance, using the data over the period 1974 to 2009; and found evidence to substantiate the fact that Trade Liberalization led to deteriorate the trade balance due to speedy increase in imports. Islam (2004) applied the Bounds Test to determine the existence of a level relationship between government sizes, openness, terms of trade volatility, and external risk using time

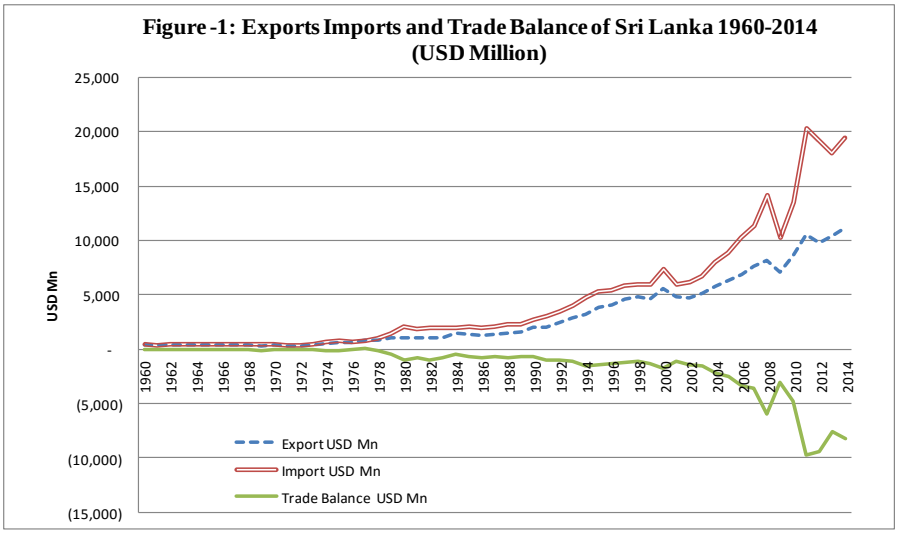
series data from Australia, Canada, England, Norway, Sweden, and the US. Bounds Test results revealed that the existence of a long run relationship in the US and Canada; but not in any of the other countries.

Among the studies pertaining to Sri Lanka, Chowdhury and Saleh (2007) examined the long-run and short-run relationships between the current account deficit, budget deficit, savings and investment gap and 'Trade Openness' in Sri Lanka using the Auto-Regressive Distributive Lagged (ARDL) Approach. They found that 'Trade Openness' has a positive effect on the current account deficit, but is statistically insignificant. The result is not surprising, because the current account balance includes private remittances from abroad; which is exogenous to openness but helps in great deal to smooth the current account deficit in Sri Lanka. Weliwita and Tsujii (2000) examined the responsiveness of Sri Lanka's trade deficit to currency devaluation during the post liberalization period. The findings revealed that devaluation of Sri Lankan rupee turned the trade deficit bad to worse, because trade volumes were not responsive to the changes in real exchange rates. De Silva and Zhu (2004) examined the effect of devaluation of rupee on the trade balance and GDP using VAR and ECM, supplemented by Variance Decomposition and Impulse Response Analysis. Their findings based on aggregate annual data for 1977-1997, revealed that the new exchange rate policy after 1977 has improved the trade balance, but has failed to stimulate real output at least in the short run.

BRIEF OVERVIEW OF BALANCE OF TRADE BEHAVIOUR IN SRI LANKA

A couple of fundamental macroeconomic problems that Sri Lanka has been facing since the 1950s is the declining terms of trade and widening trade gap. When the earnings from the traditional agricultural exports of tea, rubber, and coconut had been weakening in the international marketplace in the early 1960s, governments responded to this situation by introducing tight regulations over foreign exchange. Imports and exports were strongly regulated. This trend had been accelerated from 1970 to1977, when a coalition headed by the Sri Lanka Freedom Party imposed direct controls over international trade, especially on imports. After its electoral victory in 1977, the United National Party (UNP) government made enormous effort to liberalize the economy and encouraged private enterprise, welcomed foreign direct investment (FDI) and slackened import controls in a platform called ‘Open Economic Policies.’ This is unambiguously accepted as the historic turning point in trade linearization in Sri Lanka. Following liberalization, Sri Lanka's economy became more diverse in the 1970s and 1980s. In 1986 textiles and garments surpassed tea for the first time as the country's ‘single largest export.’ Nevertheless, the performance of the traditional agricultural exports remained essential to the country's economic sustainability, while remittances from Sri Lankans working overseas, foreign aids, and tourism became the other important sources of foreign exchange.

From economic viewpoint, one of the most important benefits associated with trade openness is the achievement of a faster economic growth and development (Winters, 2004). The economic intuition behind this statement is that less developed countries require acquiring a huge amount of resources and exploring market opportunities for domestically produced goods and services from advanced economies. However, while Sri Lanka benefitted from Open Market Policies in many different ways, its trade balance continued to deteriorate year by year after introducing the 'Open Economy' in 1977



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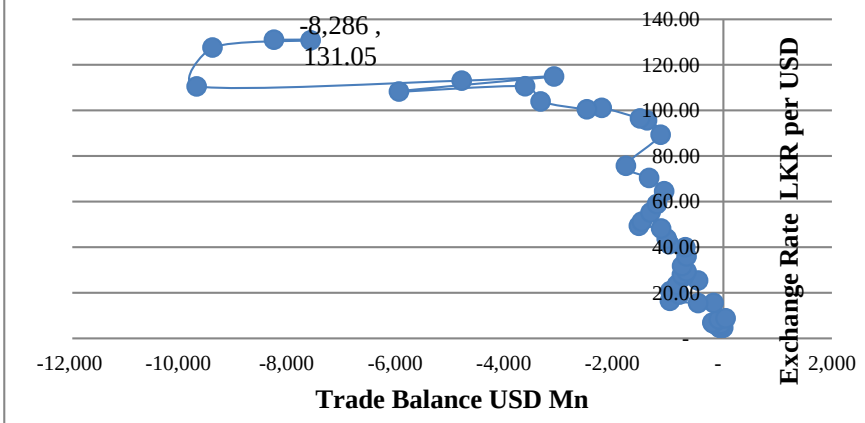
As shown in Figure-1, starting from US Dollar 41 Million surplus in 1977, the trade balance reported historic lowest downturn of US Dollar 9,710 Million by 2011, which is almost equal to the entire export earnings of the country for that year. After three years later in 2014, it has very marginally improved to US Dollar -8,285 Million which is still as high as 74% of the total export earnings.

A careful study into the scatter plot depicted in Figure-2 would reveal that Sri Lanka's trade balance and exchange rate behaviour is totally opposite to what is expected in 'Economic Theory.' Economic theory postulates that trade balance should improve while exchange rate continues to depreciate/devaluate given ML condition is satisfied. Nevertheless, in Sri Lankan context the opposite seems true as illustrated in Figure-2.

Figure-2, Scatter plot Nominal Exchange Rate vs. Trade Balance of Sri Lanka 1960-2014



In this context, despite the studies so far done, we suspect that there could be countercyclical effects between Trade Liberalization and exchange devaluation on trade balance which offset the impact of each other. As such, we attempt to answer the empirical question 'why the trade balance of Sri Lanka continued to deteriorate despite substantial currency devaluations/depreciations during past five decades.'

METHODOLOGY

Model

This study employs the standard "Two County" trade model as stipulated by many studies in literature **(see** Rose and Yellen (1989); Rose (1990); Bahmani-Oskooee (1991); Shirvani and Wilbratte (1997); and Wilson (1999)) with a slight modification to incorporate the 'Trade Openness.' The standard two country trade model assumes that the demand for imports by domestic residents *(D_m)* depends on the domestic income *(y)* and the relative price of imported goods to the domestically produced goods *(rp_m)* both expressed in home country currency terms. Additionally, we assume that the trade balance is affected by the degree of trade openness (*top*) of that economy. The supper script *f* denotes the foreign counterpart of the analogous variables. Thus, the initial equations can be given as:

Import demand

$$D_m = D_m(y, rp_m, top) \quad (1)$$

$$D^f_m = D^f_m(y^f, rp^f_m, top^f) \quad (2)$$

$$rp_m = e.p^f_x/p = (e.p^f/p).(p^f_x/p^f) = q.rp^f_x \quad (3)$$

$$q = e.p^f/p \text{ (real exchange rate)} \quad (4)$$

(*e*- nominal exchange rate – the domestic currency price of foreign exchange)

Analogously,

$rp^f_m=(p_x/p^f.e)= (p/p^f.e).(p_x/p)=(1/q).rp_x$ (5)

$rp^f_m=rp_x/q$

export supply

$S_x = S_x(rp_x, top)$

$S^f_x= S^f_x (rp^f_x,top^f)$ (6)

Equilibrium condition

$D_m=S^f_x$ and $D^f_m=S_x$ (7)

TB = Real Trade balance of the domestic country

$TB=rp_x.S_x - rp_m.D_m$ (8)

$TB= rp_x.D^f_m - q.rp^f_x.D_m$

$TB= rp_x. D^f_m(y^f,rp^f_m,top^f) - q.rp^f_x. D_m(y, rp_m, top)$

$TB= rp_x. D^f_m(y^f, rp_x/q,top^f) - q.rp^f_x. D_m(y, q.rp^f_x, top)$ (9)

Assume, no tariffs on exports, and no taxes or subsidies on domestically trading goods; thus domestic price must be equal to export price in any country; it means always $rp_x = rp^f_x =1$ in equation 9; so equation becomes

$TB= D^f_m(y^f, 1/q,top^f) - q.D_m(y, q, top)$ (10)

Now TB is a function of

$TB=TB(y^f, y, q, top,top^f)$

Applying small country argument, we could ignore the impact of foreign country's 'Trade Openness' on the trade balance of the domestic country, because a small country would demand (import) or supply (export) a negligibly small volume which could be exchangeable irrespective of the degree of trade openness of the rest of the world. Hence, we can reasonably omit (top^f) from the above function. Thus TB can be expressed as:

$$TB=TB(y^f, y, q, top) \quad (11)$$

This study applies the Bounds Testing Method, which *i* widely known as the Autoregressive Distributed Lagged (ARDL) co-integration procedure developed by Pesaran and Smith (2001) to analyse the long-run relationships and dynamic interactions among the variables of interest. ARDL procedure is more appropriate for this analysis due to following reasons. Firstly, the Bounds Testing procedure does not require the pre-testing of the variables in the model for unit roots. The bounds testing procedure is applicable irrespective of whether the regresses are integrated I(0), I(1) or mutually co-integrated, as long as they are not co-integrated I(2). Secondly, the bounds testing procedure is relatively more efficient in small or finite sample data, where the number of observations by nature is small as in our case. Thirdly, both short-run and long-run parameters can be estimated simultaneously. Furthermore, as opposed to other multivariate co-integration techniques such as Johansen and Juselius (1990), the Bounds Test procedure is simple because the co-integration relationship can be estimated using OLS; once the lag order of the model is defined by a suitable information criterion.

Now we rewrite the functional relationship denoted in Eq(11) as follows for notational convenience of the ARDL model.

$$TB = f(GDP, GDPW, REX, TOP, OIL, T) \quad (12)$$

TB is the ratio of real exports to real imports both measured in USD millions. Measuring TB as a ratio of exports to imports deserves at least three advantages. It becomes unit less, non-negative allowing for log transformation, and is normalized to one when trade is balanced.

GDP is Gross Domestic Product of home country and GDPW is the sum of GDPs of the top 20 export destinations of Sri Lanka[1].

REX is the real exchange defined in terms of domestic currency price for one unit of US dollar. (Same as defined in Eq-4)

TOP is the sum of real exports and imports defined as a percentage of GDP which is a proxy variable, representing the degree of Trade Openness. Though it is subject to some limitations, this is the conventional measure used to measure Trade Openness in many empirical studies[2]. Many researchers use GDP in trade openness index to normalize cross-sectional heterogeneity, depending on country size which is not relevant to a single country case like ours. In our study, taking total trade as a percentage of GDP at least produces a

[1] U.S.A.,U.K., India, Italy, Belgium, Germany, Russia, U.A.E., Japan, Iran, France, Netherlands, Canada, Turkey, Australia, China, Syria, Hong-Kong, Mexico, Singapore, Switzerland. These countries account for 80.77% of Sri Lanka's total exports

[2] See Islam(2004), Allaro (2012), Dritsaki (2013), Yanikkaya, H. (2003), Narampanawa, A. (2011), Bowdler, C and Nunziata, L (2006),

comparable measure for Trade Openness over time. Nevertheless, this measure as a proxy for Trade Openness is not free from errors. GDP includes government expenditure (G) which is exogenously determined, especially for country like Sri Lanka that had been undergoing three decades of civil war. Thus, any abnormal increase in G might erroneously means to suggest a reduction of Trade Openness, as GDP appears in the denominator.

Also we included OIL dummy to capture world oil price hike in 1973 and a time (T) dummy for de-trending data.

The equation (12) was then transformed to an Auto-Regressive Distributed Lag model (ARDL) to identify the existence of a long-run co-integration relationship. TB, GDP, REX, TOP were considered endogenous and GDPW and dummy variables were taken as exogenous variables. The ln notation stands for natural logarithm and e_t for the error term which is white noise.

$$lnTB_t = \beta_{0TB} + \beta_{1TB}T_t + \beta_{2TB}OIL_t + \beta_{3TB}lnGDPW_t + \sum_{i=1}^{n} \alpha_{1TB}\, lnTB_{t-i} + \sum_{i=0}^{n} \alpha_{2TB}\, lnGDP_{t-i} + \sum_{i=0}^{n} \alpha_{3TB}\, lnREX_{t-i} + \sum_{i=0}^{n} \alpha_{4TB}\, lnTOP_{t-i} + \varepsilon_{TBt} \quad (13)$$

$$lnGDP_t = \beta_{0GDP} + \beta_{1GDP}T_t + \beta_{2GDP}OIL_t + \beta_{3GDP}lnGDPW_t + \sum_{i=1}^{n} \alpha_{1GDP}\, lnGDP_{t-i} + \sum_{i=0}^{n} \alpha_{2GDP}\, lnTB_{t-i} + \sum_{i=0}^{n} \alpha_{3GDP}\, lnREX_{t-i} + \sum_{i=0}^{n} \alpha_{4GDP}\, lnTOP_{t-i} + \varepsilon_{GDPt} \quad (14)$$

$$lnREX_t = \beta_{0REX} + \beta_{1REX}T_t + \beta_{2REX}OIL_t + \beta_{3REX}lnGDPW_t + \sum_{i=1}^{n} \alpha_{1REX}\, lnREX_{t-i} + \sum_{i=0}^{n} \alpha_{2REX}\, lnGDP_{t-i} + \sum_{i=0}^{n} \alpha_{3REX}\, lnTB_{t-i} + \sum_{i=0}^{n} \alpha_{4REX}\, lnTOP_{t-i} + \varepsilon_{REXt} \quad (15)$$

$$lnTOP_t = \beta_{0TOP} + \beta_{1TOP}T_t + \beta_{2TOP}OIL_t + \beta_{3TOP}lnGDPW_t + \sum_{i=1}^{n} \alpha_{1TOP}\, lnTOP_{t-i} + \sum_{i=0}^{n} \alpha_{2TOP}\, lnGDP_{t-i} + \sum_{i=0}^{n} \alpha_{3TOP}\, lnREX_{t-i} + \sum_{i=0}^{n} \alpha_{4TOP}\, lnTB_{t-i} + \varepsilon_{TOPt} \quad (16)$$

Hypotheses

In equation 13, where real trade balance is the dependent variable $f_{TB}(TB|GDP, REX, TOP)$ the null hypothesis of no cointegration amongst the variables is $H_0: \propto_{1TB} = \propto_{2TB} = \propto_{3TB} = \propto_{4TB} = 0$ against the alternative hypothesis $H_1: \propto_{1TB} \neq \propto_{2TB} \neq \propto_{3TB} \neq \propto_{4TB} \neq 0$.

In equation 14, where GDP is the dependent variable, $f_{GDP}(GDP|TB, REX, TOP)$ the null hypothesis of no cointegration is $H_0: \propto_{1GDP} = \propto_{2GDP} = \propto_{3GDP} = \propto_{4GDP} = 0$ against the alternative hypothesis $H_1: \propto_{1GDP} \neq \propto_{2GDP} \neq \propto_{3GDP} \neq \propto_{4GDP} \neq 0$.

In equation 15, where REX is the dependent variable, $f_{REX}(REX|TB, GDP, TOP)$ the null hypothesis of no cointegration is $H_0: \propto_{1REX} = \propto_{2REX} = \propto_{3REX} = \propto_{4REX} = 0$ against the alternative hypothesis $H_1: \propto_{1REX} \neq \propto_{2REX} \neq \propto_{3REX} \neq \propto_{4REX} \neq 0$.

Similarly in equation 16, where TOP is the dependent variable, $f_{TOP}(TOP|TB, GDP, REX)$ the null hypothesis of no cointegration is $H_0: \propto_{1TOP} = \propto_{2TOP} = \propto_{3TOP} = \propto_{4TOP} = 0$ against the alternative hypothesis $H_1: \propto_{1TOP} \neq \propto_{2TOP} \neq \propto_{3TOP} \neq \propto_{4TOP} \neq 0$.

Data

This study uses annual data1960-2014 from two sources. GDPW is from author's calculation with GDP data from International Financial Statistics (IFS). All the other data are from the Annual Reports of the Central Bank of Sri Lanka. GDP and export import data series were rebased to 2005 constant price using relevant price indices.

EMPIRICAL RESULTS

The ARDL bounds test developed by Pesaran et al. (2001) can be used to establish the short-run and long-run relationships, irrespective of whether they are purely I(0), purely I(1), or mutually co-integrated. Nevertheless, this procedure requires the variables under consideration are not integrated at an order higher than one. In the presence of I(2) variables, the model crashes because the critical values provided by Pesaran et al. (2001) are no longer valid. Therefore, it is of crucial importance to test the order of integration of all variables and to verify none of them are of I(2). To test the null hypothesis of unit root against the alternative of stationary, we performed Augmented Dickey–Fuller (ADF) test for both "intercept only" and "intercept with liner trend" methods but reported only the latter for brevity. The latter is more

reliable, as all the variables are trending over time and we have no valid statistical reason to avoid intercept.

As per the ADF test results reported in Table-1, all the variables were found I(1) in levels, but I(0) in first difference and more importantly, no evidences were detected for I(2). Hence, the variables are qualified to be used in bounds testing.

Table-1: Augmented Dickey-Fuller Unit Root Test (Intercept and Trend)

Variable	Level		First Differenced	
	t-statistic	Probability	t-statistic	Probability
lnGDP	-2.070 (5)	0.5478	-5.707(0)***	0.0001
lnTB	-1.831 (0)	0.6745	-8.581 (0)***	0.0000
lnTOP	-2.631 (0)	0.2689	-3.763 (10)**	0.0296
lnGDPW	-2.396 (1)	0.3771	-5.733 (1)***	0.0001
lnREX	-0.826 (2)	0.9558	-5.265 (1)***	0.0004

For ADF test within brackets are lag length selected by AIC

*** Significant at 1% level

** Significant at 5% level

In the bounds testing approach to ARDL, *F*-statistic is used to test the existence of long-run relationship. The *F*-stat used for this procedure, however, does not follow standard F-distribution. Thus, the Pesaran *et al*. (1996) computed two sets of critical values for any given conventional significance level. One set assumes that all variables are integrated order I(0), and the other set assumes that they all are integrated order I(1). If the calculated *F*-statistics exceeds, the upper bound critical value, then the H_0 of no co-integration will be rejected favouring the alternative that co-integration among the variables. On the other hand, if the calculated *F*-statistic is less than the lower bound

critical value, then H_0 of no co-integration among the variables cannot be rejected. If *F*-statistic falls within the bounds, then the test result is inconclusive and existence of long-run relationship is indeterminate.

Table-2 shows the Result of Bound Testing for Co-integration in ARDL Model**.** The results indicate that the null hypothesis of no co-integration cannot be rejected for the models defined by Eq(14), Eq(15) and Eq(16). It reveals that the calculated F-statistic exceeds the upper bound critical value at 5% significant level only for model defined by Eq(13), leading to the concussion that there exists only one long run co-integrating relationship where TB appears being the dependent variable.

Table-2 Result of Bound Testing for Cointegration in ARDL Model using Akaike Information Criterion

ARDL Model	ARDL Lag Length	F-Statistics	Presence of Cointegration
$F_{TB}(TB\|TOP, GDP, REX)$	1,2,2,1	6.6842**	YES
$F_{TOP}(TOP\|TB, GDP, REX,)$	1,0,2,1	1.6558*	NO
$F_{GDP}(GDP\|TOP, TB, REX)$	2,0,1,2	5.0474*	NO
$F_{REX}(REX\|GDP, TOP, TB)$	1,1,2,1	1.8186*	NO

** Above the 95% Upper bound critical value

* Below the 95% Lower bound critical value

Note: The critical value bounds are computed by stochastic simulations using 20000 replications. For this analysis 95% critical bounds are 5.0376-6.2037

Having established the co-integrating relationship, the long run coefficients for Eq(13) was estimated using ARDL (1,2,2,1) selected based on Akaike Information Criterion. The estimated long run coefficients are reported in Table-3

Table-3, The Estimated Long-run Coefficients

Regressor	Coefficient	Standard Error	T-Ratio	Prob
C	-16.3545	22.6664	-0.7215	0.4760
T	-0.0362	0.07406	-0.4899	0.6280
OIL	0.1966	0.17643	1.1141	0.2740
lnTOP	-0.4803 **	0.2281	-2.1055	0.0430
lnGDP	1.0655	1.4900	0.7151	0.4800
lnGDPW	0.0664	1.1923	0.0556	0.9560
lnREX	0.4596***	0.1015	4.5240	0.0000

As shown in Table-3, all the variables take expected sign but only the Trade Openness (TOT) and Real Exchange Rate (REX) are significant in explaining long run variations in the Trade Balance (TB). The estimated coefficient for REX shows highly significant long run impact of Real Exchange Rate on the Trade Balance. The estimated coefficient indicates that 1 % depreciation of local currency leads to 0.45% improvement in the Trade Balance Ratio of Sri Lanka, given all else being equal. On contrary the Trade Openness is negatively significant at 5% level indicating that 1% increase in Trade Openness leads to deteriorate the Trade Balance Ratio by 0.48%. The underlining economic intuition is that the nature of Trade Openness in Sri Lanka can be regarded as more supportive to imports than to exports. These findings solve our basic puzzle that why Sri Lanka's Trade Balance continuous to deteriorate in long term despite of substantial currency depreciation. It is proven in our findings that relatively a more powerful negative impact arising from Trade Openness fully offset the positive impact arising from currency depreciation ultimately leading the Trade Balance into deficit in the long run.

Table-4, Error Correction Representation ARDL(1,2,2,1) selected based on Akaike Information Criterion
Dependent variable is △lnLTB

Regressor	Coefficient	Standard Error	T-Ratio	Prob
△lnTOP	-0.07473	0.17983	-0.4156	0.680
△lnTOP1	0.44084	0.17988	2.4507	0.020
△lnGDP	-0.23013	1.01890	-0.2259	0.823
△lnGDP1	-2.23960	1.00130	-2.2368	0.032
△lnREX	-0.07579	0.15949	-0.4752	0.638
△T	-0.02230	0.04366	-0.5108	0.613
△OIL	0.12080	0.10365	1.1654	0.252
△lnGDPW	0.04078	0.73425	0.0555	0.956
ECM(-1)	-0.61456	0.14476	-4.2453	0.000

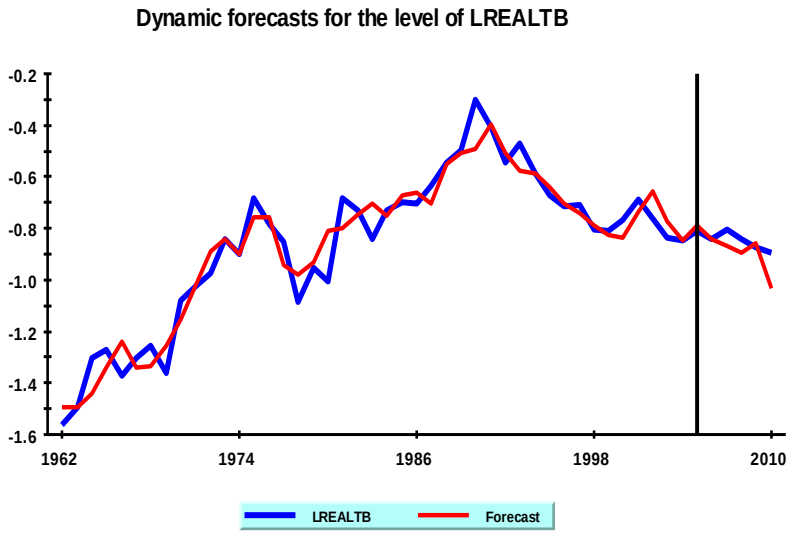
Notes, $\triangle lnLTB = lnTB - lnTB_{t-1}$
$\triangle lnTOP = lnTOP - TOP_{t-1}$
$\triangle lnTOP1 = lnTOP_{t-1} - lnTOP_{t-2}$
$\triangle lnLGDP = lnGDP - lnGDP_{t-1}$
$\triangle lnLGDP1 = lnGDP_{t-1} - lnGDP_{t-2}$
$\triangle lnLREX = lnREX - lnREX_{t-1}$
$\triangle T = T - T_{t-1}$
$\triangle OIL = OIL - OIL_{t-1}$
$\triangle lnLGDPW = lnGDPW - lnGDPW_{t-1}$

R-Squared	0.54956
R-Bar-Squared	0.37520
S.E. of Regression	0.091253
F-Stat. F(9,34)	4.2025[.001]
Residual Sum of Squares	0.25814
DW-statistic	2.3615

The results of the Error Correction Model (ECM) denotes the short-run dynamics associated with the long run relationships are given in Table-4. The short run dynamics tabulated in Table-4 suggest neither Real Exchange Rate nor Trade Openness has significant influence on the Trade Balance in the short run. However, the Error Correction Term (ECM) estimated -0.61456 (0.000) is highly significant and negative in sign indicating fairly a higher speed of adjustment towards equilibrium after a short run shock. It is estimated approximately 61% of disequilibria from the previous year would converge back to long run equilibrium in the current year.

Figure-3 depicts the dynamic forecast for the long run path of Real Trade Balance while Figure-4 and Figure-5 respectively depict the plot of cumulative sum of recursive residuals (CUSUM) and the plot of cumulative sum of squares recursive residuals (CUSUMQ).

Figure-3



Both CUSUM and CUSUMQ moving within critical bounds at 5% significant level illustrate the model stability for the sample period.

Figure-4

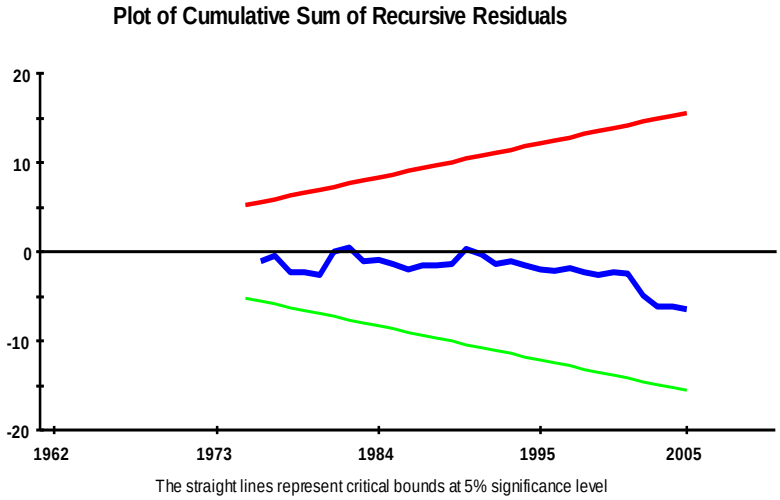
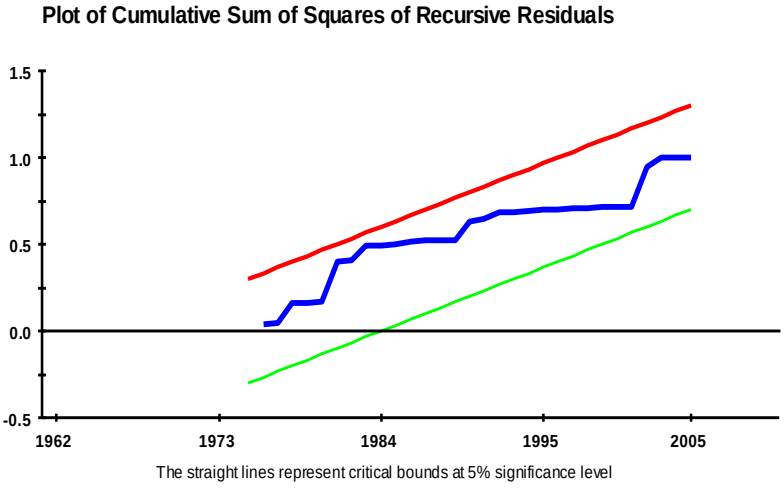


Figure-5



CONCLUSION

Employing the Bound Testing (ARDL) approach, this study examined the short run and long run relationship between 'Trade Openness' and the 'Trade Balance' of Sri Lanka. The Bounds test reveals that there is a long run co-integrating relationship between the variables of interest, predominantly the Trade Openness and Real Exchange Rate. Our findings suggest that 1% increase in trade openness leads to 0.48% deterioration while 1 % depreciation of local currency leads to 0.45% improvement in the Trade Balance Ratio of Sri Lanka, given all else remaining unchanged. These findings solve our basic dilemma, why Sri Lanka's Trade Balance continued to deteriorate, despite the substantial currency depreciation allowed during last few decades. It is proven that relatively a more powerful negative impact arising from Trade Openness fully offset the positive impact arising from currency depreciation; thereby leading the Trade Balance into deficit eventually in the long run. Therefore, devaluating currency and liberalizing trade are countercyclical policies offsetting the impact of each other. It leads to the policy recommendation that government must allow further depreciation of local currency if liberalizing trade any longer, in order to prevent TB going bad to worse.

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