TESTING THE VALIDITY OF THE TRIPLE DEFICIT HYPOTHESIS IN THE PRESENCE OF TRADE LIBERALISATION EVIDENCE FROM SRI LANKA

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Abstract

Sri Lanka is a classic twin deficits economy characterised by fiscal dominance - high deficits and public debt. This has manifested in a high degree of macroeconomic volatility, evidenced by its frequent balance-of-payments crises and instability. This study assesses the validity of the triple deficit hypothesis in Sri Lanka in the presence of trade liberalisation by investigating the causal association between fiscal deficit, current account deficit, and financial account deficit with a four-variate ARDL framework with Granger causality test for the period 1970-2020. The empirical findings imply that the triple deficit has widened with trade liberalisation. The output of the ARDL bound cointegrating test suggests that there is a long-run relationship between the selected variables, whilst the Granger causality test demonstrates that bidirectional causal associations exist between financial account deficit and fiscal deficit and one-way causal relationships run from fiscal deficit to current account deficit and from financial account deficit to current account deficit.

JEL: *C1, C3, E5, E6, F1, F3, F4, G1*

Keywords*: Trade liberalisation, Current account deficit, financial account deficit, fiscal deficit, fiscal policy*

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INTRODUCTION

Sri Lanka is a curious case to study the triple deficit hypothesis as, according to the Central Bank of Sri Lanka (CBSL) reports, current account deficits (CAD), financial account deficits (FAD), and fiscal deficits (FD) have been there for more than three decades in Sri Lanka. In 1978, with the presumption of rapid economic development, Sri Lanka began to open the financial system following import substitution industrial (ISI) guidelines before 1977 (Herath, 2014). Export expansion is one of the main goals of the change in liberalisation policies of Sri Lanka. Sri Lanka implemented trade liberalisation economic policies in 1978 after following an extreme trade restriction era from 1970 to 1977. However, the expected results of moving the country for free trade in the export and import sectors have become erratic during the last three decades (Herath, 2014).

Trade liberalisation is a mode of trade. Financial sector reforms and export expansion are the main goals of the liberalisation policies of Sri Lanka. The triple deficit, i.e., current account deficit, fiscal deficit, and financial account deficit, are major macro indicators of every economy with globalisation. There is either a direct or indirect impact of trade liberalisation on the triple deficit, and policymakers must concern more on that perspective. To grow external competitiveness, policies should be laid out to create hastened exports and back the country to reap benefits from trade liberalisation policies about specialisation (Chowdhury, 2007).

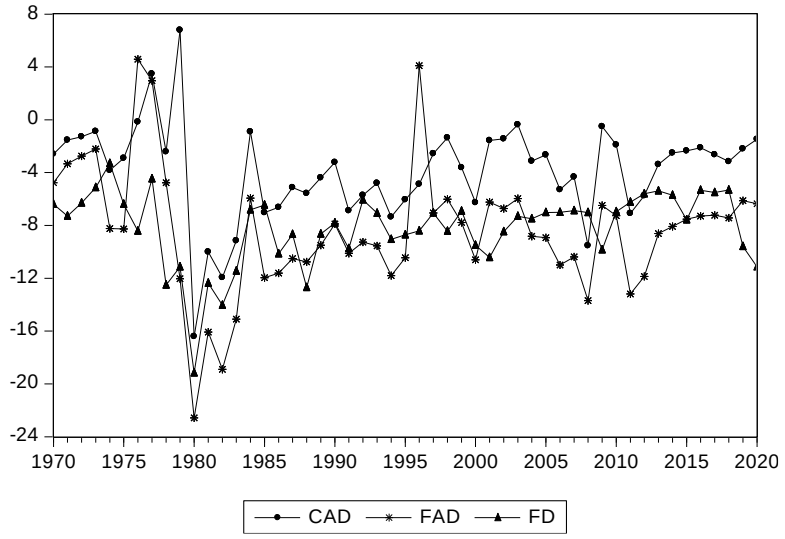
Every movement in macroeconomic variables such as interest rate, exchange rate, and economic growth affects triple deficit directly or indirectly. Exchange rate and interest rate stability are one of the objectives of monetary policy frameworks of most central banks, irrespective of whether an advanced or developing economy. Therefore, exchange rate and interest rate stability are universal as a critical macroeconomic result desired by the policy-making authority, particularly by central banks.

Even current account deficits, financial account deficits, and fiscal deficits, directly and indirectly, affect macroeconomic imbalances through various channels. These three deficits are closely and perhaps even causally related. Sri Lanka has been experiencing these deficits since the fifties. Policymakers must implement a thoroughly disciplined fiscal policy which should assure a severe suppression of fiscal deficits and, simultaneously, build a contributory atmosphere to persuade foreign remittances and foreign direct investment inflow, which would lead to healthy external balances (Chowdhury, 2007).

Since limited trade liberalisation attempts were taken to liberalise the area in the first half of the Sixties, the duration from 1965 to 1970 is considered a partial liberalisation period. During this era, exchange rate policy was used to liberalise global exchange. After the partial liberalisation period, a rigid trade control system was embarked on during the 1970-1977 period under socialist-orientated policies with a wish to further enhance ISI strategy. This duration is considered the most restrictive length period Sri Lanka has ever

had. After 1977, Sri Lanka adopted critical outward-orientated financial rules policies. Since then, numerous restrictive regulations have been eliminated or minimised to make a liberalised financial system (Herath, 2014).

Figure 1: Current Account, Financial Account and Fiscal Balance (% of GDP), 1970-2020



Source: Annual Reports, 1970-2020, Central Bank of Sri Lanka

Figure 1 illustrates a 3.5 % surplus in the current account as a percentage of GDP prior to trade liberalisation. This was due to a sharp, brief recovery in worldwide tea prices, which supported moving the current account right into a surfeit before 1977 (Weerakoon, 2019). Immediately with the open economy and the beginning of remittances and FDI, in 1979 current account showed a surplus of 6.8% of GDP. After that, the current account ended up with a deficit still present. The worst case of the current account was in the 1981 period due to the second oil price shock deteriorating trade balances. The current account deficit implied its most awful execution at more than 16% of GDP in 1981. Due to the global financial crisis and rising international oil prices in 2008, CAD worsened after the new millennium to 9.5% (Weerakoon, 2019).

In 1976, the financial account in balance of payment reported a surplus of 4.6% of GDP due to pre-trade liberalisation, and with that, foreign investment came into the country. The financial account reported a deficit of 22.6% and 13.7% of GDP in 1980 and 2008, mainly due to the second oil price shock and global financial crisis, respectively. For the second time, in 1996 financial account ended up with a surplus of 9.5% of GDP.

By 1980, the government budget deficit had reached as much as 19.2% of GDP, with annual inflation escalating to over 26% due to the second oil price shock. Moreover, the fiscal deficit continued with rising continual spending due to higher defence spending initiated by the fiscal burden from the mid-1980s (Weerakoon, 2019).

Nevertheless, despite the success of accomplishing a more miscellaneous export base, the economy kept on experiencing a high fiscal deficit and current account deficit. Hence, in conjunction, the imbalances that dominated the economy worsened, and the activities in each deficit also coincided more undoubtedly during this period (Weerakoon, 2019) and the outcomes of trade-related policy changes over the past five decades. All trade openness signs imply long-term declining traits throughout the closed economic period of 1960-1977.

CBSL reports showed that the current account deficit, financial account deficit, and fiscal deficits had been more than three decades in Sri Lanka. These deficits took place simultaneously with extreme macroeconomic imbalances and indebtedness. Without a doubt, national income accounting identities ensure that budget deficits should make either an overabundance of private savings over investment or an abundance of imports over exports (Sivarajasingam, 2011). Hence, triple deficits interrelate each other together with other macro variables such as interest rate and exchange rate etc.

Based on the literature, many studies prove a positive cointegration between the current account deficit and the fiscal deficit in Sri Lanka. There is panel data analysis on the triple deficit, including Sri Lanka, but no study examined the effect on the triple deficit in the presence of trade liberalisation. Hence, the primary objective of this study is to examine the triple deficit hypothesis in Sri Lanka in the presence of trade liberalisation. Sub objectives of the study are to examine the short-run and long-run relationship between triple deficits and other variables and the direction of the causal relationship between these triple deficits and other macro variables.

This study distinctively investigates the triple deficit hypothesis in the existence of trade liberalisation for Sri Lanka from 1970 to 2020, including trade openness as a control variable and a structural break. Further, this paper strives to examine the long-run and short-run relationship and causality relationship between these three deficits.

The structure of the paper is as follows. Section two reviews the literature on the triple deficit and other selected macroeconomic variables. The structure of the model and the database development and experimental design is illustrated in section three. Section four presents the results and the discussion. Concluding comments are provided in Section five.

LITERATURE REVIEW

Twin Deficit Hypothesis

Chowdhury and Saleh (2007) analysed the long-term and short-term relationships among the current account deficit, budget deficit, savings and investment gap, and trade openness in Sri Lanka employing the ARDL test. They demonstrated that a twin deficit exists in Sri Lanka, and trade openness positively affects the current account deficit.

Sivarajasingam and Balamurali (2011) examined the relationship between budget (BD) and CAD in Sri Lanka from 1960 to 2010. The findings imply a long-term linkage between BD and CAD, and the causality runs from BD to CAD. Perera and Liyanage (2012) empirically investigated the twin deficit hypothesis using other macro variables such as interest rate and exchange rate in Sri Lanka from 1960 to 2009. They suggested a long-run relationship between BD and CAD and unidirectional causation between twin deficits. Saleh et al. (2005) tested the twin deficit hypothesis in Sri Lanka from 1970 to 2003 using the ARDL model and bounds test for cointegration. They demonstrated that the direction of the causal relationship runs from BD to CAD, and a long-term relationship between BD and CAD supports the Keynesian view.

Some panel studies tested the twin deficit hypothesis for Asian or South Asian countries, including Sri Lanka. Shastri et al. (2017) explored the twin deficit hypothesis for a panel of eight South Asian and Southeast Asian economies from 1985 to 2014. The findings suggested that there is a long-run linkage between BD, CAD, and other variables such as interest rate and exchange rate; however, the traditional direction of causation running from budget balance to interest rates, to exchange rates and then to current account balance is not evidenced by the results. Mumtaz and Munir (2016) investigated the dynamics of the twin deficit in South Asian countries, i.e., Bangladesh, India, Pakistan, and Sri Lanka, from 1981 to 2014. They suggested no long-run relationship exists in all countries and no causation between the CAD, BD, and saving-investment gap except for Bangladesh.

With the emerging macroeconomic uncertainty, Studies of Tang (2014), Kuijs (2006), Bachman (1992), Akbas and Lebe (2016), Shruti et al. (2017), Sen et al. (2014), and Sen and Kaya (2016) are the few empirical studies were concerned financial account deficit. They have examined the rationality of the expansion of the twin deficit hypothesis, called the triple deficit hypothesis. These studies are either time-series-based or panel data analysis (Raji, 2019).

Triple deficit Hypothesis - Time Series Analysis

Studies that test the triple deficit hypothesis on country-by-country based on time series analysis are examined as follows: Bachman (1992), using U.S. data, has demonstrated that twin deficits were valid in the U.S. economy where the fiscal deficit impacts the trade deficit; nonetheless, the triple deficit hypothesis might not be well-founded evidently in this study (Raji, 2019). Kuijs (2006) tested the validity of the triple deficit hypothesis for China during the period from 1980 to 2005. The finding evidenced that growing saving rates account for both budget and trade surplus and that the triple deficit hypothesis applied in opposition to the Chinese financial system and became tagged as “Triplet Surpluses” (Raji, 2019).

Tang (2014), using U.S. quarterly data from 1960 to 2013, suggested that there is a positive co-integrating relationship and the trade deficit Granger-caused a budget deficit

along with the financial account position and thereby, the triple deficit hypothesis is valid in the U.S economy (Raji, 2019).

Raji (2019) suggested that the study's findings imply a bi-directional causality relationship among the candidate variables, i.e. fiscal deficit, current account deficit, and financial account deficit in the long run. Further, the short-term causal linkages of the study results refuse the presence of a causality relationship between fiscal deficits and current account deficits. This disputes the Mundell-Fleming Model, which affirms that the direction of the causal relationship runs from fiscal deficit to current account deficit (Raji, 2019).

Ali and Kakar (2017) investigated the triple deficit hypothesis employing the ARDL model for the period 1980 to 2014 in Pakistan and demonstrated that FD, CAD, and FAD are linearly correlated in the long term. Further, the study evidenced the triple deficit hypothesis in which the causal association accompanied runs directly from the current account to fiscal balance and financial account balance.

Triple deficit Hypothesis - Cross-Section Analysis

If panel data provides a time series on each cross-section unit in a group, this examines revised panel information studies. Shruti et al. (2017) have demonstrated existence of a long-term association between current account balance, budget balance, and private savings gap; that is, fiscal balance and private savings gap positively affect current account balances. S positive causal relationship runs from the savings gap to current account and budget deficits, for that reason, affirming the triple deficit theory (Raji, 2019).

Magoti et al. (2020) explored the significance of the triple deficit hypothesis for East African nations by evaluating the movements of fiscal balance, savings-investment gap, and current account balance using ancillary data during the 2004-2018 periods. A study using the panel ARDL indicated that fiscal balance and savings-investment gap positively affect current account balance for East African countries over the long term (Magoti, 2020). Okafor et al. (2021) examined the Triple Deficit Hypothesis for the countries in Sub-Saharan African (SSA) region from 1990 to 2019, employing a Pooled Mean Group-Autoregressive Distributed Lag (PMG-ARDL). They suggested a bidirectional causal relationship between the current account balance and saving gap and between the current account balance and budget balance, plus a unidirectional causality running from budget balance to the saving gap.

Triple deficit and Other Variables

To understand the triple deficit hypothesis, it is essential to consider the relationship between such deficits and other macroeconomic variables like exchange rate, interest rate, etc. Many studies empirically and theoretically investigated the linkage between the triple deficit and other macro variables. Ersoy (2011) analysed the causal relationship between

the financial account and the current account in Turkey and revealed that the capital inflow influences the current account deficit and that current account sustainability may be achieved through better management of financial accounts in Turkey.

Jayasekara (2014) examined the determinants of FDI for Sri Lanka and demonstrated that exchange rate and FDI have a positive relationship because exchange rate impacts the investment's value as well as the remittance of profits. Wijeweera and Mounter (2008) investigated the long-run relationship between FDI in Sri Lanka with other key macro variables such as exchange rates, interest rates, GDP, and the level of external trade. The results suggested that there is a positive impact of exchange rate depreciation and an increase in the interest rate on FDI in Sri Lanka.

Hassan (2006) employed Co-integration and Error Correction Model using yearly data from 1976 to 2003 to reveal the relationship between CAD and budget surplus, real exchange rate, and other macro variables for Bangladesh. The study inferred that CAD and other variables have short-term and long-term relationships.

Romelli et al. (2014) explore the repercussions of trade openness on the association between current account and real exchange rates for already developed and developing economies for the period 1970-2011. They demonstrated that trade openness positively affects current account and trade balances and with smaller domestic currency depreciation, current account, and trade balances impacted more open economies. Oke and Adigun (2020) examined the ramification of capital inflow (representative of foreign direct investment) and trade openness on current account balance and the results showed that FDI inflow has a detrimental impact on current account balance and a favourable relationship between trade openness and current account balance exists in the short run and long run.

Trade Liberalisation and Other Variables

Some researchers analysed the effect of trade liberalisation on exports and imports and economic performance. Some studies verify that nations that launched liberalisation programs have progressed their export performance, e.g. India (Joshi and Little, 1996); Latin American countries (Bleaney, 1999), and Bangladesh (Ahmed, 2000) while other researchers have found only a weak relationship (e.g. Agosin, 1991; Clarke and Kirkpatrick, 1992; Greenaway and Sapsford, 1994; Shafaedin, 1994, and Jenkins, 1996).

Lopez (2005) has demonstrated that Mexico’s trade liberalisation has a positive impact on the performance of exports and imports to an indistinguishable extent. However, the study found that Mexico’s imports have responded in advance of its exports. Also, the study concludes that discriminatory trade liberalisation policies with the North American Free Trade Agreement (NAFTA) have not drastically affected exports. But there is a noteworthy effect on import growth.

Herath et al. (2013) find excessive growth rates of exports and imports for the pre-trade liberalisation period compared to the post-liberalisation period in Sri Lanka and also that import magnitude has improved more than export magnitude with trade liberalisation in Sri Lanka.

Bevan (1999) has suggested that fiscal deficit has improved post-trade liberalisation, with tariff reductions and quota reductions when the government is a net purchaser of foreign exchange. Shafaeddin (1995) empirically investigated the impact of trade liberalisation on export and GDP growth in the least developed countries. This study demonstrated that even though trade liberalisation has advocated LCDs to expand GDP and exports since the early 1980s, a clear and systematic interrelation between trade liberalisation and Export and GDP growth was not found.

Hussain et al. (2014) suggested that trade liberalisation has a significant positive impact on FDI inflows and the impact of trade openness on FDI has been magnified after the inauguration of a flexible exchange rate system in Pakistan. Li (2004) examined the relationship between trade liberalisation and real exchange rate dynamics in 45 countries, and the results evidenced the real depreciation in the exchange rate with the permanent trade liberalisations.

Finally, there is no plausible consent within the few existing studies concerning the triple deficit and trade liberalisation due to perceived contradictory views of the few countries in which they have been accomplished which might be because of the sample durations of the studies.

Theoretical Framework

The theoretical framework of the triple deficits hypothesis which describes the association between fiscal balance, current account balance, and financial account balance is attained from national account identity through the income-output approach put forward by Mundell and Fleming in 1960. Income-output approach explicates the concept that the equilibrium of the goods market occurs when calculated expenditure (E) matches with the estimated output (Y) per period, i.e., E = Y (Raji, 2019).

Given that,

$$Y = C + S + T \quad (1)$$

$$E = C + I + G + (X - M) \quad (2)$$

where C is consumption, S is saving, T is tax, I is investment, G is government spending, X is export and M is import. Equation (3) is derived by Combining equations (1) and (2), as revealed below:

$$C + S + T = C + I + G + X - M \quad (3)$$

By repositioning equation (3), equation (4) is derived as:

$$(S - I) = (G - T) + (X - M) \quad (4)$$

where (S−I) is the saving-investment gap (saving deficit), (G−T) is the fiscal deficit, and (X−M) is the trade deficit (CAD). Accordingly, equation 4 shows the triple deficit hypothesis, which indicates the negative figures on both sides of the equation (Raji, 2019).

Equation (4) inferred that, for a specified degree of saving rate, the fiscal deficit will crowd out private investment and cause foreign capital inflows into the financial system because of immoderate government debt to finance its spending, which is then rendered into the current account deficit. As per Sakyi and Opoku (2016), the crowding-out effect of private investment leads to an increase in the domestic interest rate, which, successively, headed to an appreciation of the real exchange rate and raises capital inflow (Raji, 2019).

Balance of payment accounting demonstrates the correlation between a current account and a financial account which in turn is called a capital account. The interdependence between these two accounts seizes repercussions of the financial and real sectors to systematic disturbances and their interrelationship throughout the adjustment procedure (Fausten, 1989).

The hindsight balance of payment identity is indicated as BOP = CA+FA ≡ 0, where it is derived by the alternative definition of current or financial account transactions and that could be CA = −F A or F A = −CA.

The Bop current account deficit is funded by the surplus in FA which consists of capital flow differentials or foreign investments as long as the financial account deficit (−FA) in Bop in the case of a floating exchange rate is backed by the surfeit net export (X > M) in the goods market (Raji, 2019).

In accordance with the national income-expenditure linkage, the current account balance is identical to the saving-investment gap or national saving-investment gap (S − I), i.e., CA = S – I. National savings can pervade either at home or abroad and thus, the saving-investment relationship can be depicted as S = Id + If (Id represents domestic investment and If represents foreign investment), where the foreign investment If ≡ CA = −F A. Acquisition of foreign assets (F A < 0) along with proportionate transfers of domestic real resources to foreign users (CA > 0) (Raji, 2019). Thereby

$$(S - I) = CA = -F\,A \quad (5)$$

An equilibrium linkage of the current account can be derived by superseding equation (5) into equation (4), resulting in CA = −F A + BB and the reorganised equation by creating the fiscal balance (BB) as the core of the equation can be shown as:

$$-BB = -CA - FA \quad (6)$$

To an extent, equation 4 is misspecified as the financial variables such as interest rate and exchange rate are left out, and their roles were neglected. notwithstanding the trade liberalisation, and the amusement of trade and policies related to exchange controls, many regulatory measures are in lieu of Sri Lanka. As a result, trade openness ([X+M]/Y) is included in our specification as a surrogate variable to seize the composite impact of the exchange and interest rates (Chowdhury, 2007).

$$(X - M) = (S - I) + (T - G) + \{(X + M) / Y\} \quad (7)$$

Thus, our magnified model is declared in equation 7 and indicates the relationship between triple deficit and Trade openness.

DATA AND METHODOLOGY

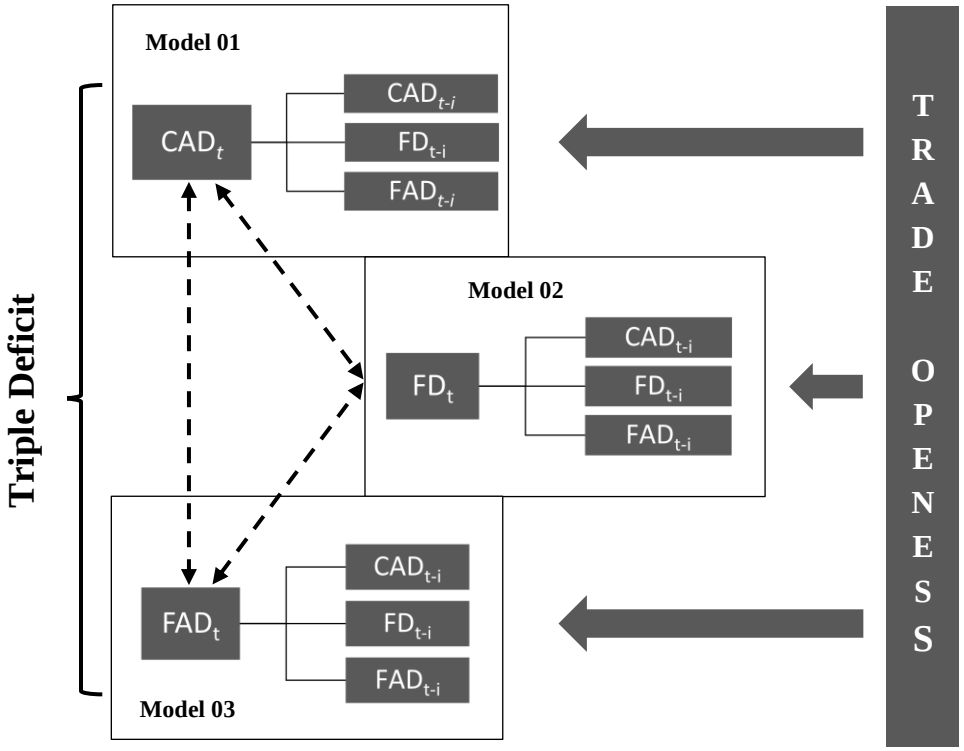
The conceptual framework employed in the study is illustrated in Figure 2 and is based on the theoretical foundations discussed above. Triple deficits consist of current account deficit, financial account deficit and fiscal deficit. The current account is the most vital account of the balance of payments, and according to Revere Bank of Australia's official site, it consists of the trade balance, primary income balance, and secondary income balance. In economic analysis most attention is usually given to the trade balance; thereby current account deficit occurs when a country experiences an outflow of money more on its imports than what it receives for its exports. Some factors which cause the occurrence of a current account deficit in a county are a high level of foreign debt, a high level of imports than exports, exchange rate depreciation etc. Parikh and Stirbu (2004), Herath et al. (2013) and Paulino & Amelia (2002) are some of the studies which examined the relationship between trade liberalisation and current account deficit. Sharma & Mittal (2019) & Romelli et al. (2014) have conducted their studies to examine the linkage between trade openness and current account deficit.

The revenue of the state from taxes and other sources in a specific year and the way of spending it is clearly mentioned in the budget. When the revenues and expenditures are equal, it refers to the budget balance. However, a Fiscal deficit is a situation where government expenditure is greater than its income. The fiscal deficit may arise from economic factors inclusive of a decrease in tax revenue, increase in defence, health expenditure, and interest payments for loans taken which aimed to rapid economic development. On the other side, it may arise due to non-economic factors such as the structure of the political parties, wars, political polarisation, etc. (Altiner, 2019).

The Financial account is one of the core sections in the balance of payments that notes net variability in a country's financial assets and liabilities. Financial account in BOP includes direct investment, portfolio investment, financial derivatives, & reserve assets

etc. (CBSL, Annual report, 2020). Financial account deficit arises due to economic instability, interest rate and exchange rate volatility and inefficiency in the financial market etc. Therefore, a dummy variable was introduced to indicate the belongingness of a given country to sub-Saharan Africa, and to capture growth dynamics, if any, specific to the region.

Figure 2: Conceptual Framework



According to the above literature, it is revealed that there were no studies undertaken to test the triple deficit hypothesis in the Sri Lankan context, which is highlighted in the theoretical framework. However, there are a few studies conducted by Chowdhury and Saleh (2007), and Balamurali and Sivarajasingham (2011) etc. clearly showed that exchange rate and interest rate affect financial account balance (especially FDI) in Sri Lanka. Even though the USD is the most influential currency in the Sri Lankan economy, other currencies like Euro, British Pounds, Japanese Yen, and Australian Dollar also have a considerable impact on the economy.

To eliminate the problem of using only one currency conversion rate and to capture the composite impact of exchange rate and interest rate on the triple deficit, this study used trade openness which is indicated as the common controlling variable for the three models in the conceptual framework. A structural dummy variable is used in this analysis to capture the pre and post impact trade liberalisation on the triple deficit.

A structural dummy variable is used in this analysis to capture the pre and post impact of trade liberalisation on the triple deficit. By using this dummy variable, one of the secondary objectives of examining the impact of trade liberalisation on the triple deficit can be achieved. Table 1 below illustrates the variables used in formulating the model.

Table 1: Operationalisation Table

Variable	Code	Type of Data	Measurement
Current Account Deficit	CAD	Ratio	Current Account Deficit as a % of GDP
Fiscal Deficit	FD	Ratio	Fiscal Deficit as a % of GDP
Financial Account Deficit	FAD	Ratio	Financial Account Deficit as a % of GDP
Trade Openness	TOP/DTOP	Ratio	Total trade as a % of GDP
Structural Dummy	DV	Nominal	Zero up to 1977 and thereafter unity.

Source: Central Bank of Sri Lanka database (1970 – 2020)

Formulation of the Model

Autoregressive Distributed Lag (ARDL) Bounds Co-Integration Technique and Error Correction Model

This section devotes to discovering the empirical courting of the triple deficit hypothesis by applying the autoregressive distributed lag (ARDL) bounds co-integration method to decide the long-term relationships and short-term movements between fiscal, current, and economic account deficits along with a controlling variable (trade openness), which became developed through Pesaran and Shin (1999) and Pesaran et al. (2001).

This model has been selected as it does not require all variables to be integrated into looking at the identical order and it can be carried out whilst the candidate variables are integrated of order one, order zero, or fractionally. Lastly, by applying the ARDL approach, we gain unbiased estimates of the lengthy-run model (Raji, 2019). By embracing this method, the study sets out the empirical ARDL model as:

$$\Delta CAD_t = \gamma + \sum_{i=1}^{n} \alpha_i \, \Delta CAD_{t-i} + \sum_{i=1}^{n} b_i \, \Delta FD_{t-i} + \sum_{i=1}^{n} c_i \, \Delta FAD_{t-i} + \sum_{i=1}^{n} d_i \, \Delta DTOP_{t-i} + \beta_1 CAD_{t-1} + \beta_2 FD_{t-1} + \beta_3 FAD_{t-1} + \beta_4 DTOP_{t-1} + \beta_5 DV_{CA} + \varepsilon_t \quad (8)$$

$$\Delta FD_t = \gamma + \sum_{i=1}^{n} \alpha_i \, \Delta CAD_{t-i} + \sum_{i=1}^{n} b_i \, \Delta FD_{t-i} + \sum_{i=1}^{n} c_i \, \Delta FAD_{t-i} + \beta_1 FD_{t-1} + \beta_2 CAD_{t-1} + \beta_3 FAD_{t-1} + \beta_4 DTOP_{t-1} + \beta_5 DV_{FD} + \varepsilon_t \quad (9)$$

$$\Delta FAD_t = \gamma + \sum_{i=1}^{n} \alpha_i \, \Delta CAD_{t-i} + \sum_{i=1}^{n} b_i \, \Delta FD_{t-i} + \sum_{i=1}^{n} c_i \, \Delta FAD_{t-i} + \sum_{i=1}^{n} d_i \, \Delta DTOP_{t-i} + \beta_1 FAD_{t-1} + \beta_2 FD_{t-1} + \beta_3 CAD_{t-1} + \beta_4 DTOP_{t-1} + \beta_5 DV_{FAD} + \varepsilon_t \quad (10)$$

and β_i, where i = 1,2,3,4,5 is the short-run and long-run parameters of the model respectively; Δ is the first difference operator; t is the period, and ε_t is the error term presumed to be identically and independently distributed.

If the F-statistic is below the lower bound, failure to reject the null hypothesis of no co-integrating relationships while rejecting the null hypothesis of no co-integration when the derived F-statistic is higher than the upper bound. Meantime, if the F-statistic drops between the lower and upper bounds, the test result is indecisive (Raji, 2019).

The outcome of carrying out the ARDL approach with the co-integration technique is to determine the long-run relationships among the variables by using the Bounds F-Test and to estimate the long-and short-run coefficients of the selected variables by using the error correction model (ECM) from the ARDL approach. The error correction version of the ECM models is written by the following equations:

$$\Delta CAD_t = \gamma + \sum_{i=1}^{n} \alpha_i \Delta CAD_{t-i} + \sum_{i=1}^{n} b_i \Delta FD_{t-i} + \sum_{i=1}^{n} c_i \Delta FAD_{t-i} + \sum_{i=1}^{n} d_i \Delta DTOP_{t-i} + \beta_1 DV + \beta_2 ECT_1 + \varepsilon_t \quad (11)$$

$$\Delta FD_t = \gamma + \sum_{i=1}^{n} \alpha_i \Delta CAD_{t-i} + \sum_{i=1}^{n} b_i \Delta FD_{t-i} + \sum_{i=1}^{n} c_i \Delta FAD_{t-i} + \sum_{i=1}^{n} d_i \Delta DTOP_{t-i} + \beta_1 DV + \beta_2 ECT_2 + \varepsilon_t \quad (12)$$

$$\Delta FAD_t = \gamma + \sum_{i=1}^{n} \alpha_i \Delta CAD_{t-i} + \sum_{i=1}^{n} b_i \Delta FD_{t-i} + \sum_{i=1}^{n} c_i \Delta FAD_{t-i} + \sum_{i=1}^{n} d_i \Delta DTOP_{t-i} + \beta_1 DV + \beta_2 ECT_3 + \varepsilon_t \quad (13)$$

Unit Root Test, Descriptive Statistics, and Optimal Lag Structure

Summary statistics are considered to examine and mark out the time-series properties of the fiscal, financial and current account deficits series. In general, more often time series are non-stationary i.e., mean and variance are not constants and are integrated. Until reaching stationarity, a non-stationary time series (X) should be differenced (d) times, and afterwards, the time series is supposed to be integrated of order (d) signified by X_t~ I(d). Thus, to keep away from the problem of contrived regression and the dereliction to rationalise the desirable dynamic specification, this has a look at, carrying out unit roots tests on the selected variables (CBSL). This study conducted an Augmented Dickey-Fuller (ADF) unit root test to identify the stationarity properties of selected variables. To determine the lagged impacts of selected variables on the triple deficit, this study employed the Akaike information criterion (AIC) among other lag order criteria.

Granger Causality Test

Since the model used time series data, assessments of the causation of variables and their directions have emerged as critical and significant activities. Granger (1969) and Sims (1972) evolved a functional structure to consistently examine and perseverance of causal direction. The method depends absolutely on the saying that the past and present could likewise influence the future, but the future cannot influence the past (Granger, 1980). Simply this test is employed to determine the causal relationship between variables under this study.

Accordingly, the Granger causality test examines whether the contemporaneous motions of a variable Y can be solely defined by using the previous values of Y, or including lagged values of another variable X, which can improve the explication of Y. Thus, if coefficients of lagged X's are statistically significant, is said to be Granger-resulting from X, if X allows in speculating Y, or identically.

Studies like Akinlo and Egbetunde (2010), Tang (2014), and Ali and Kakar (2017) have demonstrated that current account, fiscal balance, and financial account in terms of short-term capital inflows can influence one another, and their dereliction could distort the direction of causal relationship within them.

RESULTS AND DISCUSSION

Descriptive Statistics of Data Series

Table 2 indicates the descriptive statistics of the sample data on the selected variables of the analysis. The summary statistics signal that the current account deficit has a mean value of -3.8914 throughout with a median value of -3.1626. The maximum and minimum values are 6.787 and -16.402, respectively.

Table 2: Descriptive Statistics

	CAD	FAD	FD	TOP
Mean	-3.891366	-8.379781	-8.165052	0.636921
Median	-3.162675	-8.241134	-7.311585	0.639712
Maximum	6.787944	4.579015	-3.293930	0.886365
Minimum	-16.40236	-22.58031	-19.15914	0.171775
Std. Dev.	3.682167	4.867686	2.783493	0.147805
Skewness	-0.523926	0.169204	-1.437966	-0.630699
Kurtosis	5.469903	4.843655	6.278536	3.387216
Observations	51	51	51	51

Source: Model Estimate

The mean values of the fiscal deficit and financial account deficit over the period are -8.1650 and -8.3797, respectively, with median values of -7.3115 and -8.2411, respectively. The maximum and minimum values for the financial account are 4.579 and -22.580, respectively, whereas the fiscal balance of maximum value and the minimum value are -3.2939 and -19.159, respectively. With respect to dispersion, it is evidenced by the comparatively high standard deviation values of 3.682, 4.867, and 2.783 for the current account, financial account, and fiscal balance respectively (Table 2).

Evidently, in general, current account deficit, fiscal deficit, and financial account deficit have been increasing and volatile in the country. The mean and median values of the trade openness variable are 0.6369 and 0.6397, respectively, with a low level of dispersion of

0.147 standard deviation values. Further, statics shows that TOP has a maximum value of 0.8863 and a minimum value of 0.1718 (Table 2).

Skewness is a standard measurement of the asymmetry of the distribution of the series around its mean (Raji, 2019). In respect of the skewness of the variables, the threshold is 1 which is generally autocratic. Given that all the variables except FD lie within 1.0 and -1.0, all the distributions of the variables are symmetrical. The Kurtosis is a vital statistic that measures the peakedness or flatness of the distribution of the series. Since all the variables lie within the threshold of 3, it insinuates that all the variables had a high tendency to be normally distributed (Raji, 2019).

Stationarity Test

The findings of the Augmented Dickey-Fuller (ADF) unit root test were carried out to discover the stationarity properties of selected variables in consideration of the intercept without the trend properties (Raji, 2019).

The estimated results revealed that, except for trade openness, all candidate variables are defined by the unit root at level, whilst trade openness showed evidence of stationarity at the first difference, mostly at a 5 per cent significance level. Therefore, all the variables are integrated at order first or at the level which provides justification for the use of the ARDL model (Table 3).

Table 3: Unit Root Test Statistics

Time Series	Order	ADF	
		Statistics	P value
CAD	Level	-5.6528	0.0000
	First Difference	-5.7333	0.0000
FD	Level	-3.9374	0.0036
	First Difference	-3.9428	0.0038
FAD	Level	-3.9216	0.0037
	First Difference	-6.3782	0.0000
TOP	Level	-2.5146	0.1183
	First Difference	-6.5767	0.0000

Source: Model Estimate

ARDL and Error Correction Model (ECM)

Since variables are integrated at order one I(1) and level I(0) processes, ARDL is supported. According to Pesaran et al. (2001), an F-test on equations (11) to (10) would be considered to explore the existence of co-integrating relationships between the postulant variables.

The current account deficit equation (equation 8) indicated an F-statistic of 11.96 which is greater than the upper bound value at 5 per cent and 10 per cent levels of significance. Thus, the null hypothesis of no co-integration between variables can be rejected and there is a long-run relationship between CAD, FD, FAD, DTOP, and DV while the co-integrating vector was explicating CAD (Table 4).

The F-statistic of the fiscal deficit equation (Equation (12)), 3.44 was greater than the upper bound value at the 5 per cent level of significance as well. This implicit that the null hypothesis of no co-integration was rejected. Therefore, there is a long-run relationship between FD, CAD, FAD, DTOP, and DV (Table 4).

In the FAD equation (Equation (13),) the F-statistic of 11.42, was also greater than the upper bound value at the 1 per cent, 5 per cent, and 10 per cent levels of significance. The null hypothesis of no co-integration was rejected, which inferred there is a long-run relationship between FAD, FD, CAD, DTOP, and DV (Table 4).

Table 4: ARDL Bounds Testing Approach to Cointegration

	F-statistic	Critical Values I (0) I (1)	Bound	Error-Correction Term (p-value)
F (CAD | FD, FAD)	11.963	2.56 3.49	5%	-1.132 (0.0000)
F (FD | CAD, FAD)	3.445	2.20 3.49	5%	-0.648 (0.0170)
F (FAD | CAD, FD)	11.422	2.56 3.49	5%	-0.844 (0.0000)

Source: Model Estimate

Since all the equations denied the null hypothesis and concluded that there is a long-run relationship between candidate variables, the error correction (ECM) model is used to capture the short-run adjustment process. The findings of the ARDL model of the present study are consistent with Chowdhury and Saleh (2007), Balamurali and Sivarajasingham (2011), Saleh et al. (2005), and the findings contradicted that of Perera and Liyanage (2012) where results indicate no long-run relationship as they used quarterly data while the present study considers annual data.

The ECM demonstrates how rapidly variables change and return to an equilibrium point, and the coefficient of ECM ought to convey a negative sign and be statistically significant (Chowdhury, 2007). The error correction term (ECTi) was negative and significant at a 5 per cent level of significance (Table 5).

The impact of trade openness on the triple deficit is negative, but the coefficients are big in numbers but statistically insignificant. The reform measures in Sri Lanka did not impact the general trade openness of the economy, and thus the study discover statistically insignificant results which are negative (inferring that trade openness accelerated the triple deficit). The J-curve effect is unexceptional in the short term for any economy including Sri Lanka.

Table 5: Significance of Parameters of Error Correction Models

Variable	CAD	Equation	FD	Equation	FAD	Equation
	Coefficient	P value	Coefficient	P value	Coefficient	P value
Constant	0.914907	0.4791	0.525811	0.6047	3.904115	0.0391
ΔCAD	-0.232964	0.0949	0.119189	0.5966	0.269064	0.0917
ΔFD	-0.443098	0.0136	-0.387805	0.0004	-0.053713	0.7493
ΔFAD	0.491448	0.0000	0.364596	0.0001	-0.004506	0.9848
ΔDTOP	-1.478357	0.4560	-1.576767	0.3020	-2.289293	0.4012
DV	-1.061759	0.4378	-0.635694	0.5534	-4.474226	0.0268
ECT_{t-1}	-1.132800	0.0000	-0.648435	0.0170	-0.843958	0.0000

Source: Model Estimates

The structural dummy variable has a negative effect on each model and expects financial account equation and the negative coefficients of the dummy variable indicate that trade liberalisation has an adverse effect on the triple deficit. In detail, it means the triple deficit has widened after the trade liberalisation period which is clearly indicated in the introduction paragraph.

Granger Causality Test

In the wake of testing the co-integrating relationships between fiscal deficit, current account deficit, financial account deficit and mediating variable of trade openness, the next objective of this study is to be achieved by establishing the Granger causality test which examines the direction of the causal relationships between these variables (Table 6).

To institute the long-run causal relationship among the regressors and regressand, utilising the ECM stated above, the study carried out short-run causality tests based on p-values and verifying the significance of the lagged error-correction terms, ECMt−1 (Raji, 2019).

Table 6: Granger Causality between Current Account Deficit, Capital Account Deficit, and Fiscal Deficit

Variable	t-statistic (P value)			
	CAD	FD	FAD	DTOP
CAD	-	6.96 (0.002)*	12.66 (0.000)*	0.26 (0.771)
FD	1.76 (0.182)***	-	4.77 (0.013)**	1.44 (0.248)
FAD	2.20 (0.122)***	4.29 (0.019)**	-	0.03 (0.965)

Note: *, **, and *** imply statistical significance at the 1%, 5%, and 10% significance levels, respectively.

Source: Model Estimate

There is a long-run causal relationship running from fiscal deficit to current account deficit, which was backed by the adverse and significant error correction terms of all equations, at the 1 per cent significance level of the t-test. Even though the direction of the causal relationship runs only from fiscal deficit to current account deficit, it indicates that twin deficits exist particularly for Sri Lanka in the long term.

Furthermore, a bi-directional long-run causality relationship exists between financial account deficit and fiscal deficit with the backing of negative and significant error correction terms of each equation at a 5 per cent significance level. The fiscal deficit equation indicates a positive short-run causal flow from the financial account deficit to the fiscal deficit with a p-value of 0.013 accompanied by the statistical test of significance of the financial account deficit at a 5 per cent significance level. In the case of contrary causality, as evidenced by the financial account deficit equation, there is a negative short-term causal relationship runs from the fiscal deficit to the financial account deficit with a p-value of 0.019 associated with the statistical test of significance of current account deficit at a 5 per cent significance level (Table 6).

A one-way causal relationship exists between financial account deficit and current account deficit where the direction of causality runs from financial account deficit to current account deficit, backed up by negative and significant error correction terms of equations, 5 per cent significance level of the t-test. The current account deficit equation demonstrates a positive short-run causal flow from financial account deficit to current account deficit with a p-value of 0.00005 affiliated with the joint statistical test of significance of the financial account deficit at a 1 per cent significance level (Table 6).

Further, the direction of causal association running from fiscal deficit to current account deficit, backed up by the negative and significant error correction terms of each equation, at a 5 per cent significance level of the t-test. Studies by Saleh et al. (2005) and Perera and Liyanage (2012) evidenced that causality runs from fiscal deficit to current account deficit. Finally, this implies the extended twin deficit, the so-called triple deficit presence in Sri Lanka.

Moreover, the study undertaken by Raji (2019) reveals that there was a perceptible unidirectional short- and long-run causal relationship from current account deficit to fiscal deficit, from current account deficit to financial account deficit, and from trade openness to triple deficit, which was backed by the p-value linked with the statistical test of significance of triple deficit and trade openness whilst the coefficients of the error-correction terms were negative and statistically significant.

These results were backed by the p-value related to the statistical test of the significance of their corresponding equations and the coefficient of the error-correction terms was negative and statistically significant in each model.

CONCLUSIONS

This paper broadened the well-analysed theoretical insights in international economics i.e. the twin deficits hypothesis by exploring the third deficit of the financial account deficit (FAD) by adding new intuitions to the existing literature on the "triple deficit" hypothesis, to the Sri Lankan economy. The study tested the triple deficit hypothesis in the presence of trade liberalisation in Sri Lanka for the period of 1970-2020, by using ADRL bound co-integration and Granger causality techniques.

The findings indicate that the triple deficit hypothesis exists for Sri Lanka while estimated results using the ARDL bound co-integration test, evidenced that current account deficit, fiscal deficit, and financial account deficit move together in the long run. Further, the findings show structural dummy variable is positive in the short term and the empirical and model findings revealed that trade liberalisation has an impact on the occurrence of the triple deficit. Further, it is evident that although the triple deficit existed prior to introducing trade reforms, this deficit widened significantly during the post-liberalisation era.

Granger causality test results indicate that the direction of the causality relationship runs from fiscal deficit to current account deficit as well as from financial account deficit to current account deficit. Furthermore, there is a bidirectional causal relationship arises between fiscal deficit and financial account deficit in Sri Lanka. All in all, Granger causality test findings also support to prove the existence of a triple deficit in Sri Lanka.

Since the findings prove that trade liberalisation increases the triple deficit in Sri Lanka and enhances external competitiveness, policies should be formulated to harness the benefits of improving export competitiveness (Chowdhury, 2007).

Since the FD has a causal relationship with both CAD and FAD, the Government of Sri Lanka should articulate a fully disciplined fiscal policy to assure the drastic suppression of fiscal deficits and, simultaneously, create a contributory environment to persuade foreign remittances and foreign investment inflow, which would lead to generating healthy external balances (Chowdhury, 2007).

Central Bank of Sri Lanka (CBSL) should also maintain exchange rate stability which can foster the competitiveness of the export sector. According to the current Sri Lankan context, to expedite the external adjustment, CBSL should gradually move to a market-determined and flexible exchange rate (IMF Draft, 2022). The Sri Lankan policymakers should bear in mind developing policies to enhance the market size, trade openness, infrastructure, and political stability and to preserve cheap labour costs with the intention to enhance the FDI inflows into Sri Lanka.

This study reveals a new area of exploring factors causing a triple deficit for Sri Lanka which will be a more policy-based and practical study that gives more insights to policymakers.

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