

# AN EMPIRICAL ANALYSIS OF THE TWIN DEFICIT HYPOTHESIS: THE CASE OF SRI LANKA

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## *Abstract*

Prolonged fiscal deficit is one of the leading causes behind many economic disruptions in a country, including current account imbalances. Hence, the purpose of this study is to examine the existence of the Twin Deficit Hypothesis (TDH) in Sri Lanka from 1977 to 2020 and to test the validity of Keynesian and Ricardian views in the Sri Lankan context. Using Autoregressive Distributed Lag (ARDL) model, the study found a short-run and long-run relationship between budget and current account deficit. The empirical results support the Keynesian proposition, thus revealing unidirectional causation from the budget deficit to the current account deficit in Sri Lanka. Further, the study found that the short-run relationship between budget deficit and current account deficit is smaller than the long-run effect. Accordingly, Sri Lanka could reduce the current account imbalances using appropriate fiscal reforms designed to reduce the fiscal deficit.

*JEL:* E60, E62, F32

*Keywords:* Budget deficit, Current account deficit, Twin Deficit Hypothesis, ARDL, Sri Lanka

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## **INTRODUCTION**

Current account balance records and presents a country's transactions with the rest of the world, including the trade balance, net earnings on cross-border investment and net current transfers. It also can be interpreted as the reflection of the net change in national assets, which shows a nation's borrowing and lending to the rest of the world (Leszczuk and Pojar, 2016). The current account balance reflects the competitiveness in the external trade, and simultaneously it will determine the external macroeconomic position and stability (Perera and Liyanage, 2011).

A budget deficit which arises when the government revenue is less than the expenditures, is not always nasty for an economy as it helps to promote growth and can be used as a revival strategy in a crisis (Kalugalla et al., 2020). However, this budget deficit is assumed to negatively impact the current account, thus creating a current account deficit (Milne, 1977). This phenomenon is named the twin deficit hypothesis. This hypothesis is particularly established mainly through the Mundell-Fleming model and Keynesian absorption theory (Perera and Liyanage, 2011; Saleh, Nair and Agalewatte, 2005).

Accordingly, Keynesian absorption theory suggests that increasing budget deficit increases consumers' disposable income, thus creating upward pressure on consumer spending. The increase in disposable income encourages consumers to demand more imports leading to a current account deficit (Saleh, Nair and Agalewatte, 2005). As stated in the Mundell-Fleming model, the increase in budget deficit creates a demand for borrowing thus, increases the market interest rate. The increase in interest rate will create capital inflows to the country given that the country adopts free capital movement policies and ultimately appreciates the domestic currency. Accordingly, the appreciated domestic currency would discourage exports and encourage imports to create a current account deficit (Perera and Liyanage, 2011).

In contrast, the Ricardian Equivalence Hypothesis (REH) explains that there is no direct relationship between the current account deficit and the budget deficit. It reveals that the budget deficit does not impact the real interest rate and the current account deficit (Barro, 1974). In sum, there is a solid theoretical dilemma behind the relationship between the budget deficit and the current account deficit.

In the late 1970s, many emerging and developing economies experienced a large budget deficit, relying heavily on external borrowings, leading to significant current account imbalances (Baharumshah, Ismail, and Lau. 2009). This observation led the discussion on the twin deficit hypothesis and its importance in policy making.

Accordingly, there has been much research in this area for the last four decades, trying to emphasise the twin deficit problem, the issue related to the budget deficit and the current account deficit. Like many other developing countries, Sri Lanka also has experienced a continuous budget deficit and a current account deficit. However, these continuous

dual deficits have only been tested few occasions using the twin deficit hypothesis (i.e: Colombage, 1991; Saleh, Nair and Agalewatte, 2005; Perera and Liyanage, 2011). In Sri Lanka, the current account deficit has been identified as a significant problem for decades, creating many macroeconomic issues. The downward pressure on the rupee value, which occurs through the current account deficit, has led to the deterioration of the foreign exchange reserve position and imposition of heavy trade restrictions on imports which obstructs pure liberalisation and continuous dependency on external borrowings (International Monetary Fund, 2015).

Hence, it is vital to identify the twin deficit hypothesis in the context of Sri Lanka and to generate insights for policy directions. Accordingly, this study attempts to understand the relationship between the budget deficit and the current account deficit by revisiting the twin deficit hypothesis. Further, this study attempts to address two research questions namely, (i) is there a short run and/or long run relationship between the budget deficit and the current account deficit? (ii) if a relationship exists, is it bidirectional or unidirectional?

This study provides policy implications by examining the relationship between the budget deficit and the current account deficit. Thus, it provides a significant cause of external borrowing, which burdens future generations. At the same time, it allows a country to achieve external macroeconomic stability, which results in stability in exchange rates and robust sovereign ratings. Further, it minimises policymakers' efforts to maintain foreign exchange reserves to manage unexpected current account imbalances.

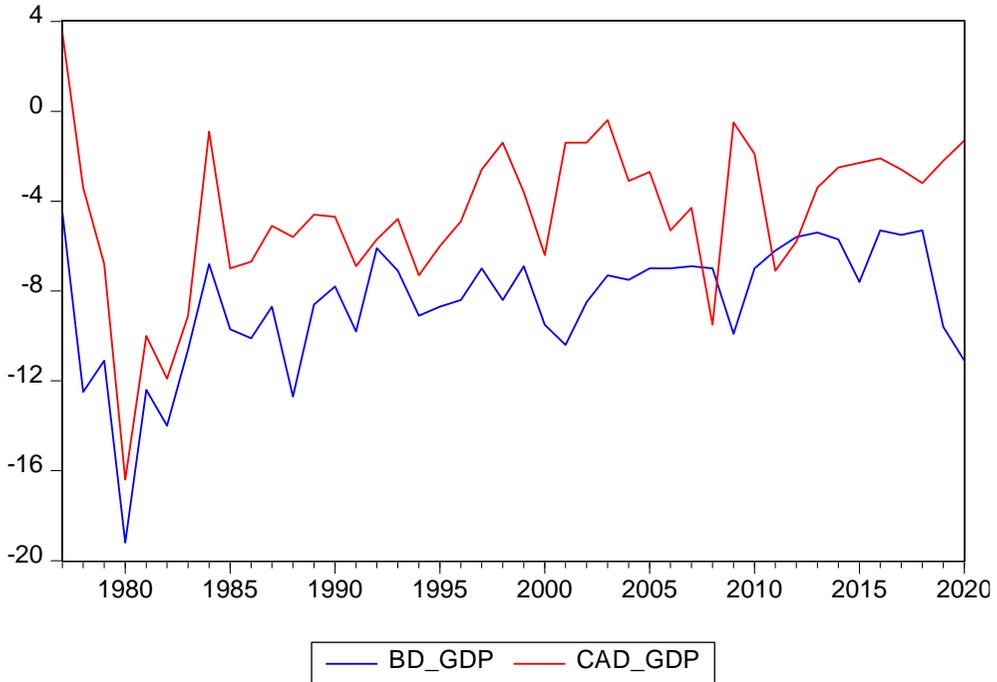
### **An Overview of the Sri Lankan Economy**

Sri Lanka is a developing nation in South Asia, with a GDP of USD 84.0 billion in 2019. Having transitioned from the low-income country status to the lower middle-income country status in 1997, Sri Lanka progressed through a challenging period undergoing the civil war and Tsunami disaster. However, after ending the 30-year civil war in 2009, Sri Lanka showed the potential to become the next wonder in Asia. Though in 2019, the country was promoted to the upper middle-income category after attaining a GDP per capita of USD 3852, the country could only maintain an average of 5% economic growth from 2009 until 2019 (CBSL, 2019).

Nevertheless, the Covid-19 Pandemic that hampered economic activities across all sectors in 2020 caused -3.6% year-on-year GDP growth and USD 3,682 per capita GDP, which costs its position in the upper middle-income category. The country's SME sector, which plays a significant role in the economy, has been the backbone of it with a contribution of 52% towards the GDP, represents 75% of total enterprises and engages 45% of the total employment (National Policy Framework, 2018). Nevertheless, the country could not achieve a positive external trade balance through the decades. Though in 2019, the overall balance of payment (BOP) was USD 376.6 million, the current account balance (which represents a significant portion of BOP) was -1,808.1 USD

million. Figure 1 shows the current account deficit and the budget deficit (as a percentage of GDP) in Sri Lanka from 1977 to 2020.

**Figure 1: Budget surplus/deficit and current account surplus/deficit in Sri Lanka: 1977–2020**



During these four decades, the Sri Lankan government could not achieve a budget surplus, and the deficit was -8.5% of the GDP on average from 1977 to 2020. After liberalising the economy in 1977, only the same year, Sri Lanka could attain a positive current account balance of 3.5% of the GDP. After that, the country experienced only negative current account balances until 2020. The figure shows that the budget deficit and current account balance have had the same pattern until 1987, which clearly illustrates the twin deficit hypothesis. However, after 1987 the two variables have shown inconclusive patterns until 2020.

**REVIEW OF LITERATURE**

**Theoretical Underpinnings of the Twin Deficit Hypothesis**

The Keynesian open-economy model confirms the positive relationship between budget deficit and the current account balance using the Investment-Savings approach. Accordingly, National Income (Y) is a function of consumption expenditure (C), investment expenditure (I), government expenditure (G) and net exports (NX).

$$Y = C + I + G + NX \dots\dots\dots (1)$$

Alternatively,  $Y$  can also be computed by using the sum of consumption, savings, and tax.

$$Y = C + S + T \dots\dots\dots (2)$$

Substituting (2) in (1),

$$C + I + G + NX = C + S + T$$

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

According to equation 3, net exports equal saving investment gap plus budget deficit or surplus. Thus, it suggests that having a negative public savings (budget deficit) will cause a reduction in the net exports (current account balance) (Saleh, Nair and Agalewatte, 2005).

The Keynesian proposition and the Ricardian equivalence hypothesis have been used in theoretical research into the relationship between changes in fiscal policy and the trade balance. The Mundell-Fleming model assumes budget deficits have a statistically significant effect on current account deficits, primarily via interest and exchange rate channels (Kearney and Monadjemi, 1990).

One of the main preconditions for an economy of a country to prosper is the ability to maintain manageable budget deficits. As per Salvatore (2006), the budget deficits contribute to the current account deficits. Increased budget deficits pressurize interest rates, capital inflows, and currency appreciation. High current account deficits are recognised to tend to jeopardise external stability, as well as macroeconomic stability. Budget deficits, including current account deficits, are therefore perceived to be significant macroeconomic issues in any economy.

Scholars, including policymakers, have paid close attention to the relationship between budget deficits and current account deficits, along with their significance. As per the Keynesian model, the central point of the twin deficit theory is that lower government tax revenues, which raises the budget deficit, leads to higher spending by taxpayers, whose spending power, therefore, has expanded and demands more imports (Imimole, 2017).

However, as the Ricardian Equivalence Hypothesis explains, the actual interest rates, the amount of expenditure, and the current account balance are all unaffected by changes in taxation and budget deficits. The current tax cut or, on the other hand, the rise in government spending has little impact on the balance of current consumption and investment because reasonable agents expect the existing tax cuts to become a financial burden within future periods. As a result, they will raise their savings to cover potentially increased taxes. The fall in public savings would be offset by a rise in private savings of the same magnitude. Savings only at the national level would be unaffected. As a result, the current account deficit is unaffected by the budget deficit (Olanipekun, 2012).

## **Empirical Evidence**

For the past four decades, economists have focused on issues such as fiscal deficits, public debt, and the current account balance. The sharp rise in the fiscal and current account deficits, dubbed the "twin deficit phenomenon," has prompted several academics to consider whether there is a connection between the two (Parikh and Rao, 2004). The association between budget deficits and current account deficits has been studied extensively in empirical research. Most of the empirical studies above examined the relationship between twin deficits in developed countries. Only a few empirical studies on developing countries have been conducted. Despite many studies examining the twin deficit hypothesis under different contexts, those have provided controversial arguments. Studies such as Darrat (1988), Piersanti (2000) and Abell (1990) have found that the budget deficit causes a trade deficit, thus supporting the existence of the Keynesian hypothesis. In contrast, studies such as Miller and Russek (1989) and Evans (1988) confirm the inexistence of a relationship between budget deficit and trade deficit.

Alkswani (2000) studied the link between Saudi Arabia's budget and trade deficits. This analysis found the parameters between twin deficits by utilising the error correction model description and the Johansen co-integration process.

Also, it is visible that the increased budget deficits cause the interest rate to rise. The exchange rate appreciates when the interest rates rise. As a result, exports become more costly whilst imports become less expensive, resulting in a trade deficit (Saleh, Nair and Agalewatte, 2005).

Like many other developing countries, Sri Lanka has been dealing with current account and budget deficits since the 1950s. As per the literature during the period 1957–1960, successive budget deficits, including subsequent current account deficits, led to a significant depletion of foreign currency reserves, resulting in a severe foreign exchange issue for the nation that lasted until the 1977 economic reforestation (Premaratne, 1983).

Saleh, Nair and Agalewatte (2005) used the ARDL model, and a recent co-integration test known as the bounds test to calculate the long-term dynamics between the budget deficit and the current account deficit in Sri Lanka. In the case of Sri Lanka from 1970 to 2003, the empirical findings corroborate the Keynesian point of view that there is a clear correlation between the budgetary deficits and the current account deficit. This empirical study reveals that causality runs in one direction, from the budget deficit to the current account deficit. As a result, a larger budget deficit results in a larger current account deficit. Thus, the empirical findings of the research indicate that any policy interventions aimed at reducing the budget deficit may also significantly decrease Sri Lanka's current account deficit. The empirical study demonstrates the economic situation in Sri Lanka between 1970 and 2003; expanded public spending and reduced revenue culminated in large fiscal deficits (Saleh, Nair and Agalewatte, 2005).

**DATA AND METHODOLOGY**

This study aims to investigate the existence of the twin deficit hypothesis in the Sri Lankan context. Accordingly, the paper's focus is to test whether there is an impact from the budget deficit (BD) on the current account deficit (CAD) in Sri Lanka. The study uses annual data from 1977 to 2020 from Central Bank Annual reports. Since the country liberalised the economy in 1977, the data ranged from 1977 to 2020. The two variables (BD and CAD) were taken as a GDP ratio to avoid extreme absolute values differences. Also, many previous studies have taken these two variables as a ratio of GDP (Such as Saleh, Nair and Agalewatte, (2005) and Perera and Liyanage, (2011)). Like many other studies such as Khalid and Guan (1999), Miller and Russek (1989), Mukhtar et al. (2007) and Saleh, Nair and Agalewatte (2005), this study uses only BD and CAD to measure one-to-one relationship. It is worth notifying that this study employs the Autoregressive Distributed Lag (ARDL) model to examine the relationship between BD and CAD. The Granger-Causality test will be used to determine the direction of causality.

Using Autoregressive Distributed Lag (ARDL) approach to cointegration allows for identifying the cointegrating vector(s) which will not generate through Johansen and Juselius cointegration test. So ARDL provides a single long-run relationship equation for each underlying variable. Hence, in the ARDL, endogeneity is less problematic (Nkoro and Uko, 2016). ARDL (p, q) model,

$$CAD_t = \gamma_i + \sum_{i=1}^p \delta_i CAD_{t-1} + \sum_{i=1}^q \beta_i BD_{t-i} + \varepsilon_{it} \dots\dots\dots (4)$$

where  $CAD_t$  is a vector and the variables in  $(X^i)$  are allowed to be purely I(0) or I(1) or cointegrated,  $\beta$  and  $\delta$  are coefficients;  $\gamma$  is constant;  $i=1, \dots, k$ ;  $p$  and  $q$  are optimal lag orders;  $\varepsilon_{it}$  is error term (Saleh, Nair and Agalewatte, 2005).

Accordingly, bound test for cointegration is carried to check whether the variables are cointegrated. Here F-bound statistic is compared against Lower Critical Bound (LCB) and the Upper Critical Bound (UCB). From the bound test, if the variables are cointegrated, both short-run (using ARDL) and long-run (using VECM) models will be specified.

*If  $F_{Bounds} > UCB \Rightarrow CAD_t$  is cointegrated with  $BD_t$*

*If  $F_{Bounds} < LCB \Rightarrow CAD_t$  is not cointegrated with  $BD_t$*

*If  $LCB \leq F_{Bounds} \leq UCB \Rightarrow$  Result is inconclusive*

VECM model

$$\Delta CAD_t = \beta_0 + \sum_{i=1}^p \beta_{1i} \Delta CAD_{t-i} + \sum_{i=1}^q \beta_{2i} \Delta BD_{t-i} + \delta ECT_{t-1} + \varepsilon_{it} \dots\dots\dots (5)$$

$\delta$  = speed of adjustment parameter

$ECT$  = Error Correction Term

As the study uses time series data, it is necessary to examine the stationarity property of the data. Thus, we use Augmented Dickey-Fuller (ADF) to test the stationarity condition of the data series. If a variable is non-stationary, the data series must be differenced until it reaches stationarity.

However, to run an ARDL, the model should be a combination of variables with I(0) and I(1) order of integration.

To examine the direction of causality between BD and CAD, Granger-Causality test is used. The test involves with the following.

If current account deficit (CAD) ‘Granger-Causes’ budget deficit (BD),

$$CAD_t = \sum_{i=1}^p \alpha_i CAD_{t-i} + \sum_{j=1}^q \beta_j BD_{t-j} + U_{1t} \dots\dots\dots (6)$$

If budget deficit (BD) ‘Granger-Causes’ current account deficit (CAD),

$$BD_t = \sum_{i=1}^p \alpha_i BD_{t-i} + \sum_{j=1}^q \beta_j CAD_{t-j} + U_{1t} \dots\dots\dots (7)$$

**RESULTS AND DISCUSSION**

The stationarity properties of the variables are tested using ADF, and the results are shown in Table 1. Accordingly, budget deficit (ratio to GDP) and current account deficit (ratio to GDP) are stationary at levels. Therefore, it fulfils a prerequisite to apply ARDL to the model.

**Table 1: Unit roots test for the variables using ADF**

Variable		Test Statistic	Order of Integration
BD (% GDP)	Level	-3.94**	I(0)
CAD (% GDP)	Level	-4.44**	I(0)

Note: \*\* Denotes rejection of the hypothesis at the 0.05 level.

Source: Compiled based on Central Bank data

Table 2 presents findings for the short–run relationship between the current account deficit and the budget deficit using the ARDL approach.

Accordingly, the appropriate lag length of the short-run model is  $CAD_{t-1}$  and  $BD_t$ . Lag 1 of CAD has a significant positive impact at a 5% significance level. Further, the budget deficit also has a significant positive impact at a 1% significance level. A 1% change in the budget deficit will change CAD by 0.6% in the same direction.

To determine the long-run relationship between variables, the bound test for cointegration (Bound F-statistic) is used. If the F-stat of the joint significance of level variables falls outside the band, a conclusive decision can be made (Nkoro and Uko, 2016). Suppose the F-stat is less than the lower critical value. In that case, there is no cointegration among

underlying variables (assuming all variables are  $I(0)$ ). If the F-stat is greater than the upper critical value, there is a cointegration among underlying variables (assuming all variables are  $I(1)$ ). Accordingly, the F-stat in the study is greater than the upper bound critical value; hence, we can conclude that the variables are correlated. Thus, it can be concluded that there is a long-run relationship between budget deficit and current account deficit at a 1% significance level.

**Table 2: Short-run ARDL model**

Variable	Coefficient	Prob.
Dependent variable: CAD		
CAD_GDP (-1)	0.27**	0.0249
BD_GDP	0.61***	0.0001
Constant	1.82	0.1651
R-squared	0.4372	
Prob(F-statistic)	0.0000	
Akaike info criterion	4.7437	

Note: \*\*, \*\*\* denotes rejection of the hypothesis at 0.05 and 0.01 levels respectively.

Source: Compiled by author

**Table 3: Bound test for co-integration ( $F_{bound}$ )**

Test Statistic	Value	Significance	Lower	Upper
F-statistic	15.12180***	10%	3.02	3.51
K	1	5%	3.62	4.16
		2.5%	4.18	4.79
		1%	4.94	5.58

Note: \*\*\* Denotes rejection of the hypothesis at the 0.01 level.

Source: Compiled based on Central Bank data

Estimated long-run coefficients are given in Table 4. According to that, the budget deficit has a positive and significant impact on the current account deficit in the long run at a 1% significance level. Thus, a 1% change in the budget deficit (ratio to GDP) will change the current account deficit (ratio to GDP) by 0.84% in the same direction. The computation of the error correction term is denoted at the bottom of Table 3, which is the long-run equation's residual value. Compared to the short-run impact of BD on CAD (see Table 2), the magnitude of the long-run impact of BD on CAD is higher.

**Table 4: Estimated long-run coefficients**

Variable	Coefficient	Prob.
BD_GDP	0.84***	0.0002
Constant	2.50	0.1881

EC = CAD\_GDP - (0.8469×BD\_GDP + 2.5024)

Note: \*\*\* Denotes rejection of the hypothesis at the 0.01 level.

Source: Compiled based on Central Bank data

As shown in Table 5, the coefficient of the error correction regression is negative and significant at a 1% significance level. It expresses the long-run reversion to equilibrium or speed of adjustment parameter. The adjustment parameter value is 0.728. This means the reversion to long-run equilibrium is at an adjustment speed of 72.8 %. Also, the R-squared (coefficient of determination) is 0.53, which confirms that the long-run ARDL error correction model has good explanatory power.

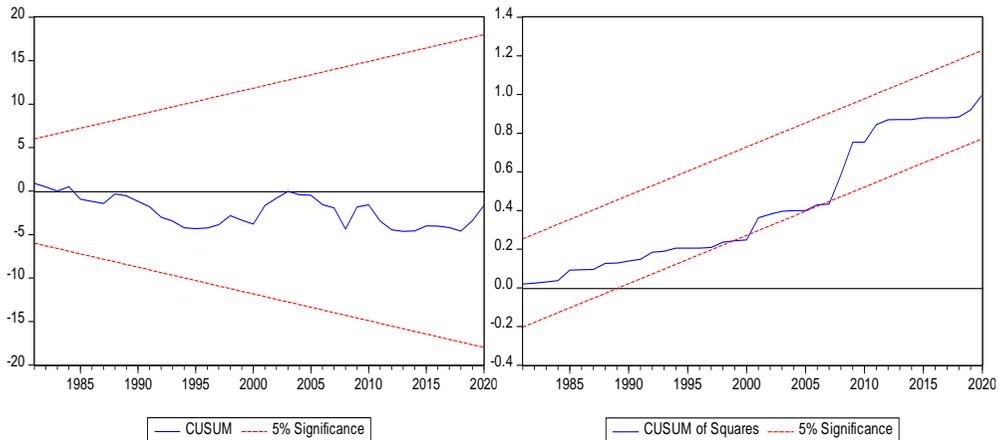
**Table 5: ARDL error correction regression**

Variable	Coefficient	Prob.
Dependent variable: CAD		
CointEq(-1)	-0.7280***	0.0000
R-squared	0.5309	
Akaike info criterion (AIC)	4.6506	

Note: \*\*\* Denotes rejection of the hypothesis at the 0.01 level.

Source: Compiled based on Central Bank data

**Figure 2: CUSUM test and CUSUM of squares test**

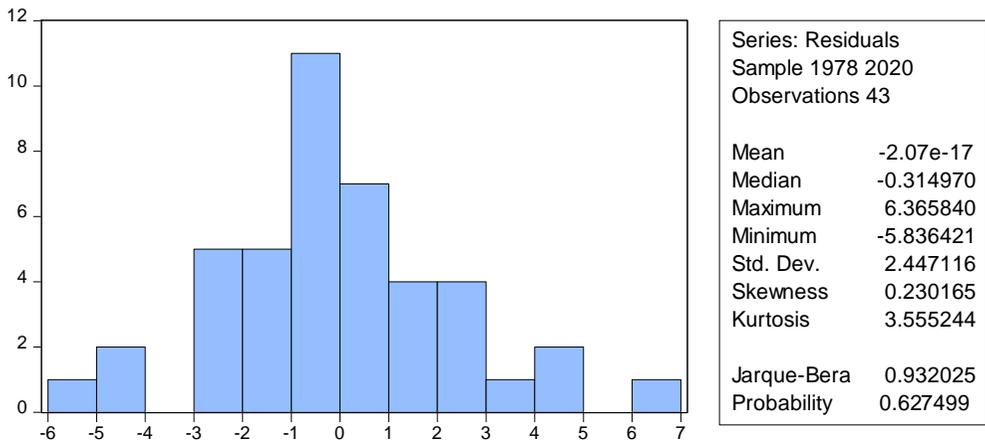


The stability of the long-run relationship between CAD and BD of the ARDL model is tested using CUSUM and CUSUM of squares tests. As illustrated in Figure 2, the CUSUM and CUSUM squares statistics lie within the critical bound at a 5% significance level ratifying the stability of the model. So, it reveals that the current account deficit may be stable if the budget deficit variations are considered.

The study uses Jarque-Bera (JB) test to test the normality. As per the output shown in Figure 3, the JB statistic is higher than the 5% significance level. Hence, it fails to reject the null hypothesis (H0: residuals are normally distributed). So, the residuals of the performed ARDL model are normally distributed.

The serial correlation problem is tested using the Breusch-Godfrey serial correlation LM test. It was found that the model is free from serial correlation problems at a 5% significance level. Also, the Breusch-Pagan-Godfrey test statistic indicates that the model is homoscedastic at a 5% significance level (Table 6).

**Figure 3: Normality of residuals**



**Table 6: Serial correlation LM test heteroskedasticity test**

Breusch-Godfrey serial correlation LM test	Prob. F (2,38)	0.6811
	Prob. Chi-Square (2)	0.6504
Heteroskedasticity test: Breusch-Pagan-Godfrey	Prob. F (2,40)	0.3250
	Prob. Chi-Square (2)	0.3089

Source: Compiled by author

Table 7 shows the results of the Granger causality hypothesis. This analysis aims to examine the direction of causality between BD and CAD. Granger causality results show a causal effect from BD to CAD at a 5% significance level. At the same time, no causation is observed from CAD to BD. Therefore, the causal effect is unidirectional, and the effect

created by the budget deficit is on the current account deficit. Hence, it confirms the existence of the twin deficit hypothesis in Sri Lanka. The same results are seen in previous studies such as Saleh, Nair and Agalewatte (2005) and Perera and Liyanage (2011).

**Table 7: Granger causality test results**

Null Hypothesis	F-Statistic	Prob.
BD_GDP does not Granger cause CAD_GDP	3.8192	0.0311**
CAD_GDP does not Granger cause BD_GDP	0.6795	0.5131

Note: \*\* Denotes rejection of the hypothesis at the 0.05 level.

Source: Compiled based on Central Bank data

## CONCLUSION AND POLICY RECOMMENDATIONS

Fiscal imbalances are found as one of the primary reasons behind many economic disturbances in a country (Perera and Liyanage, 2011). Hence, discussing and identifying issues created through sustained budget deficits is important. Accordingly, this study aims to examine the relationship between budget deficits and current account deficits to test the validity of Keynesian and Ricardian views in the Sri Lankan context. According to the Keynesian proposition, budget deficit-induced imports (as it induces domestic consumption) lead to current account deficit. On the other hand, the Ricardian equivalence hypothesis rejects the Keynesian view. Thus, there is a theoretical debate behind this phenomenon.

In order to examine the relationship between budget deficits and current account deficits, the study used the ARDL approach. The study found that there is a short-run and long-run relationship between budget deficit and current account deficit during the period of 1977 to 2020. The empirical results support the Keynesian proposition, thus revealing unidirectional causation from the budget deficit to the current account deficit in Sri Lanka. The same results have been seen in the previous studies related to Sri Lanka, such as Saleh, Nair and Agalewatte (2005) and Perera and Liyanage (2011). Further, the study found that the short-run relationship between budget deficit and current account deficit is smaller than the long-run effect. In sum, the current account deficit can be controlled by reducing the fiscal deficit in Sri Lanka.

It reveals that in Sri Lanka, the continuous budget deficit forced governments to borrow heavily from foreign markets, thus creating negative effects on government debt, interest payments, foreign currency reserve position, exchange rate and eventually on current account balance. Therefore, there is a strong need to take appropriate policy measures to tackle these fiscal issues and reduce current account imbalances. Hence, Sri Lanka needs to address the structural weaknesses in the expenditure structure. The loss-making state-owned enterprises (SOE) and the welfare-oriented policies have been a massive problem

in the country for decades and need much attention. Moreover, government institutions must be improved, minimising the existing bureaucracies to deliver an efficient and productive civil service. In conclusion, the Sri Lankan government should undertake revenue-based fiscal consolidations to reduce the public debt burden, especially by rationalising the tax system towards a fair and effective tax administration, thus reducing its impact on current account imbalances.

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