Determinants of Current Account Deficits in Sierra Leone: The Bound Testing Approach

Abu Bakarr Tarawalie, Thomas Ferenkeh Marah

Department of Economics and Commerce, University of Sierra Leone, Freetown, Sierra Leone
Email: tarawalieabu@yahoo.com

Abstract

This paper investigates the determinants of current account deficit in Sierra Leone, within the framework of the Auto Regressive Distributed Lag (ARDL) bound testing approach with annual time series data from 1980 to 2020. The unit root results reveal that the variables constitute both I(0) and I(1) series, while the bound test confirms the existence of cointegration. The results confirm that budget deficit, external debt and real exchange rate are the main drivers of current account deficit in the long run. Intuitively, the result reveals that budget deficit is positively associated with current account deficit, which confirms the validity of the twin deficit hypothesis. The result also suggests a positive relationship between external debt and current account deficit, denoting that the accumulation of debt leads to a worsening of the current account deficit. The findings also indicate a positive relationship between real exchange rate and current account deficit. This result is consistent with the Mundell-Flemming model, which predicts that an appreciation in the real exchange rate can adversely affect a country's competitiveness position, leading to a worsening of the current account deficit. The short run result indicates that any disequilibrium in the model is corrected at the 65% adjustment speed annually. Also, the finding shows that, the coefficient of lagged current account deficit and budget deficit are the main determinants of current account deficit. The diagnostic result suggests that the explanatory variables account for 73% of the variations in current account deficit. Thus, the government should broaden the tax base and reinforce the implementation of an efficient tax administration system that could tackle tax evasion and tax avoidance, in order to enhance domestic revenue mobilization.

Keywords

ARDL, Annual Data, Current Account Deficit, Sierra Leone

1. Introduction

The determinants and dynamics of current account imbalances constitute an important topic in open economy macroeconomics. The current account is an important indicator of a country's economic performance, and a component of the balance of payments, which covers all transactions in goods, services, income flows and current transfers between the domestic economy and the rest of the world. The evolution of the current account provides information on the international competitiveness of an economy. There is a general consensus in the literature that current account balance sustainability is crucial for macroeconomic policy changes and decisions. The literature suggests that, countries use the current account balance as an important macroeconomic indicator to gauge the viability of the economy, as it reflects the stance of other important economic variables including savings, investment and the budget balance. Most developing countries, including Sierra Leone are typified by persistent current account deficit. Large and persistent current account deficits are considered to be the symptom of macroeconomic imbalances that have important implications on long-term economic progress. Studies have shown that, current account deficit is as a result of fiscal profligacy of the authorities leading to a decline in national savings, as well as financial regulation failures causing large and possibly spiteful expansions in credit volume (Blanchard and Milesi-Feretti, 2011). Large and persistent current account deficit may cause economic and currency crisis, burgeoning external debt, reduction in international reserves and makes a country less competitive in the global economy (Deistaings et al., 2013).

The theoretical paradigm on the determinants of current account is largely dominated by three models. The absorption approach suggests that current account balance is the difference between income and absorption, or the difference between savings and investment. The theory posits that, if absorption exceeds income, i.e. an economy spends more than it produces, then it must import from other countries for its excess consumption and spending, resulting in a current account deficit. However, if income exceeds absorption, i.e. an economy spends less than it produces, then the economy will record a current account surplus. On the other hand, the elasticity approach emphasizes the role of the exchange rate and trade flows in the current account adjustments (Goldstein & Khan, 1985). This approach is premised on the analysis of price elasticity of demand for imports and exports, with respect to changes in exchange rate. The elasticities approach examines how changing relative prices of domestic goods and foreign goods resulting from a change in the exchange rate will affect the balance of trade of a country. Furthermore, the Intertemporal Model focuses on international flows of assets needed to finance imbalances between national saving and investment. According to the intertemporal approach, the current account deficit is the outcome of forward-looking dynamic saving and investment decisions driven by expectations of productivity growth, government spending, interest rates, and several other factors. If national savings exceeds investment expenditures, then the country has a current account surplus. However, a country will

record a current account deficit if investment exceeds national savings. Within this framework, the current account balance behaves as a buffer against transitory shocks in productivity or demand (Sachs, 1981; Obstfeld & Rogoff, 1995, 1996; Ghosh, 1995; Razin, 1995).

The empirical studies have identified several determinants of the current account deficit. The empirical findings by Kueh (2015), Brissimis et al. (2010) and Bollano and Ibrahimaj (2015), confirm the presence of the "twin deficit hypothesis", that is, fiscal deficit is a key determinants of current account deficit. Another school of thought suggests that current account deficit is largely influenced by macroeconomic variables including inflation and exchange rate. Researchers in this category include Chen et al. (2012), Gossé and Serranito, (2014). Others suggest that economic growth is a major determinant of current account deficit, including Madura (2008), Sadiku et al. (2015). The study by Barnes et al. (2010) and Kayikçi (2012) shows that current account deficit is largely influenced by foreign direct investment flows.

Sierra Leone's external sector performance has been characterised by persistent current account deficit (including official transfers), largely due to its high degree of import dependence. The current account deficit (as a percent of GDP) averaged −4.5 percent between 1980 and 1985 (see Figure 1), partly attributed to the huge public expenditure on imports following the hosting of the Organization of African Unity (OAU) Summit, coupled with the massive drop in diamond export. However, following the adoption of the Structural Adjustment Programme, the country maintained a positive current account balance, with a surplus of 10.7 percent of GDP in 1986. During the war period (1991-2000), the country's current account deficit averaged −6.1 percent of GDP. The war period significantly hampered economic activities, which affected the agriculture, mining and transport sectors, and caused disruption to the production and supply of basic goods and services. Furthermore, the war period was typified by high inflation and persistent exchange rate depreciation, which resulted to increased capital outflow. These factors reduced the international competitiveness of the
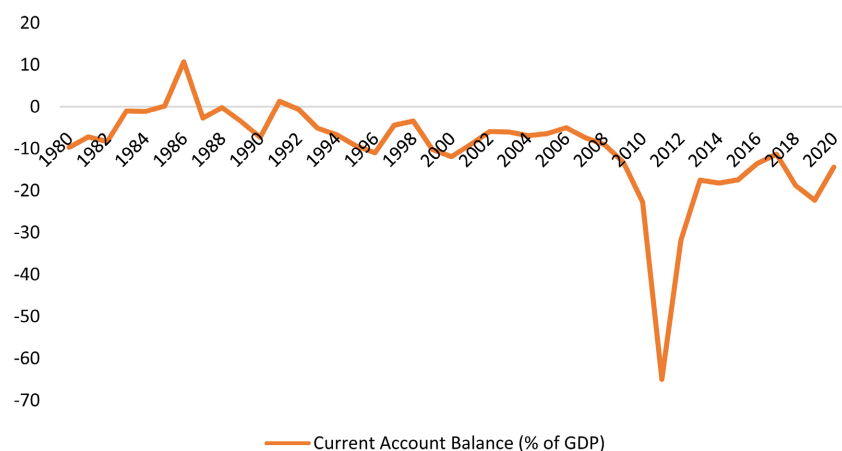

Figure 1. Current account balances (% of GDP). Sources: World Development Indicator (WDI) database.

country, and coupled with trade sanction, exacerbated Sierra Leone's current account deficit position. Following the end of the civil war in 2000, the government implemented an economic recovery and rehabilitation programme to boost growth, sustain peace and maintain broad macroeconomic stability. As a result, economic activities increased in the mining, agricultural, transport sectors, which resulted to positive economic growth. Also, inflationary pressure eased whilst the exchange rate witnessed relative stability. In tandem with these positive developments, the current account deficit as a percent of GDP, decreased from 9.3 percent in 2001 to 6.1 percent in 2003, and further declined to a deficit of 5.0 percent in 2006.

However, the country witnessed its worst external sector performance following a significant deterioration in the current account balance, from a deficit of 5.0 percent of GDP in 2006 to a deficit of 65 percent in 2011. The surge in the current account deficit in 2010 and 2011 was largely explained by increased investment activity in public and private infrastructure, expansion of mining and construction activities combined with the hike in the international prices of fuel and food. Furthermore, the outbreak of the Ebola disease and the decline in the international price of iron ore between 2014 and 2015, had a significant impact on the country's current account position. This period also coincided with the shutdown of two (2) mining companies, shortage in the supply of foreign exchange and significant depreciation of the domestic currency (leones). During this period, current account deficit averaged 17.8 percent of GDP, due to the decline in iron ore export, increased import bill on food and pharmaceuticals, and a fall in transfers. The current account deficit narrowed to 14.4 percent of GDP in 2020 from 22.3 percent in 2019, on account of a sharp increase in transfers combined with the decrease in payments for services.

Large and persistent current account deficits constitute a cause for concern for Sierra Leone, especially when sustainability issues are raised and thus the economic prospect of the country is being challenged. Against this background, identifying the main drivers of the current account deficit is of utmost importance to policy makers. The main purpose of this paper is to investigate the determinants of current account deficits in Sierra Leone. To achieve this objective, the paper utilizes the bound testing approach with annual time series data for the period 1980 to 2020. This estimation technique bodes well in situations where the variables are of I(0) and I(1) which gives an efficient and realistic estimates (Nkoro & Uko, 2016). Despite the plethora of empirical literature on the determinants of current account deficit, to the best of our knowledge, this paper is the first country-specific study to investigate the determinants of current account deficit in Sierra Leone. This study contributes to the growing literature on the drivers of current account deficit. In particular, this paper provides an empirical exploration of the determinants of current account deficit in a country typified by large and persistent current account deficit. An understanding of the main drivers of current account deficit in Sierra Leone will help policy makers to formulate and implement adequate macroeconomic policy measures in order to

achieve sustainable level of current account balance. The structure of the paper is organized as follows: Section two articulates the empirical findings on the main determinants of current account deficit, while section three provides the methodology. Section four discusses the results, while section five presents the conclusion and policy recommendations.

2. Literature Review

There exists an extensive literature on determinants of current account deficit, albeit with mixed results. Seyoum (2020) empirically investigates the determinants of current account deficits in Ethiopia using annual time series data from 1975 to 2016. Result from the Autoregressive Distributed Lag (ARDL) model, reveals that net foreign asset, real effective exchange rate, terms of trade and real GDP are found to have a negative impact on current account deficit, while government budget balance positively affected current account deficit in the long run. Behera and Yadav (2019) examine the determinants of current account deficit (CAD) in India. The study utilizes the Johansen's vector error correction model (VECM) and Granger non-causality test. The findings indicate that the widening of current account deficit is due to fall in household financial savings and corporate investments. Furthermore, Eita et al. (2019) investigate the determinants of the current account balance in Namibia, using the ARDL model with annual time series data from 1980 to 2016. The results indicate that current account balance is determined by fiscal balance, investment, foreign direct investment, exchange rate, real exchange rate, population, real GDP and interest rate. Kurniadi and Aimon (2018), investigate the causality between current account balance and macroeconomic variables in Indonesia, using the Vector Autoregression (VAR) approach with quarterly data from 2005q1 to 2015q4. The findings show that macroeconomic variables have no causality relationship with current account balance. Das (2016) empirically investigates the determinants of current account imbalance for a sample of developed, emerging and developing countries using dynamic panel GMM techniques and panel data from 1980 to 2011. The study reveals that current account balance is positively correlated with net foreign assets, trade openness and exchange rate stability and negatively associated with commodity price, real GDP growth and real effective exchange rate for the developed countries. While, among emerging countries, current account balance is positively correlated with commodity price, real GDP growth, trade openness and de jure capital openness; but negatively correlated with net foreign asset and exchange rate. For the same year, Sadikua et al. (2015) investigate the potential determinants of current account positions in FYROM for both, the short run and long run dynamics covering the period from 1998q1 to 2013q4. Results from the ARDL approach suggest that, financial development, fiscal balance and terms of trade are positively correlated with the current account balance, while openness to international trade is negatively correlated with the current account balance.

Yurdakul and Cevher (2015) investigate the causality relationship between current account deficit and macroeconomic aggregates in Turkey. The study uses quarterly data from 2003q1 to 2014q2, and employs the conditional and partial Granger causality test. The results illustrate that real effective exchange rate, growth rate, energy import, and openness were the main determinants of current account deficit in Turkey during the study period. Also, Oshota and Badejo (2015) examine the determinant of current account balance for West African countries, using the panel ARDL model. Both Pooled Mean Group (PMG) and Dynamic Fixed-Effect (DFE) were used with panel data from 1980 to 2012. The results indicate that in the long-run, GDP per capital, investment, money supply positively impact current account balance, while the real effective exchange rate has a negative impact on CAB. Furthermore, Bollano and Ibrahimaj (2015) empirically investigate the determinants of current accounts for a sample of 11 Central and East European Countries outside the Euro area. The study employs a panel VAR model with fixed effects, using quarterly data over the period 2005q1 to 2014q4. The results show that domestic GDP, the fiscal deficit, and the real effective exchange rate are key determinants of the current accounts of these countries.

Tarawalie (2014) examines the short and long run relationships between budget and current account deficits in Sierra Leone employing the bounds test approach and Toda Yamamoto causality analysis, with data from 1980 to 2012. The long run results show that budget deficit, real GDP and political instability have positive impact on current account deficit, while the short run findings reveal that budget deficit and war dummy were the most significant variables influencing current account deficit. Venkata (2014), employs the VECM and Johansen Cointegration technique to identify the short run as well as long run determinants of the current account deficits in India. The empirical finding establishes a significant long run equilibrium relationship between current account deficit and investment, savings & openness of the Indian economy. Yang (2011) examines both the long-run and short-run determinants of current account balances for eight selected emerging Asian economies over the period 1980-2009, within the framework of the VAR methodology. The results indicate that initial stocks of net foreign assets and trade openness are important in explaining the long-run behaviours of current accounts, but have less important roles in interpreting the short-run variations in current accounts in most of the selected economies. Ketenci and Uz (2010) assess the major determinants of the current account in the new members of the EU. The study uses the bounds testing ARDL approach with quarterly data from 1995q1 to 2008q3. The result validates the twin deficit phenomenon. Also, the empirical evidence suggests that private savings, investment and real exchange rate are key variables causing changes in the current account in the long-run as well as in the short-run.

The study by Kwalingana and Nkuna (2009) investigates the long run and short-run determinants of current account deficit in Malawi, using annual data from 1980 to 2006 and employing the Johansen maximum likelihood technique.

The empirical results suggest that openness, terms of trade, external debt accumulation, and current account liberalization are the key determinants of current account deficit. In addition, Kariuki (2009) examines the determinants of the current account balance in Kenya using the intertemporal approach for the period 1970 to 2006. The result shows that the terms of trade, fiscal balance, real exchange rate and economic growth are the main determinants of current account balance. Morsy (2009) explores the main determinants of the medium-term current account balance for 28 oil-exporting countries using dynamic panel estimation techniques with data from 1970-2006 period. The results reveal that factors that matter in determining the equilibrium current account balance of oil-exporting counties are the fiscal balance, the oil balance, oil wealth, age dependency, and the degree of maturity in oil production. Aristovnik (2007) used a dynamic panel-regression technique to characterize the properties of current account variations across selected Middle East and North African countries (MENA) economies between 1971 and 2005. The results indicate that investment, government expenditure and foreign interest rates have a negative effect on the current account balance.

Gulzar et al. (2007) utilize cointegration and error correction techniques in estimating the long and short run behavioural relationship between current account balance and difference economic variables in Pakistan during the period 1972 and 2005. The empirical results advocate that there exists a significant relationship between the current account balance and the balance of trade, domestic saving, total consumption and workers' remittances. Craigwell and Samaroo (1997), examine the current account behaviour of two Caribbean developing countries, Trinidad and Tobago and Barbados using cointegration theory and error correction models (ECM) over the period 1967 to 1991. They find that the important explanatory variables of current account are the exchange rate, the budget surplus, the level of foreign income and lagged current account.

3. Model Specification and Data

Following a review of the theoretical and empirical literature, the empirical model for this study is akin to the research work of Seyoum (2020), Calderon et al. (2002) and, Chinn and Prasad (2003). For the purpose of investigating the determinants of current account deficit in Sierra Leone, the study utilizes the Autoregressive Distributed Lag (ARDL) model or bounds testing approach developed by Pesaran and Pesara (1997). The ARDL approach is a dynamic heterogeneous model, which provides the framework for the variables in the model to be lagged and difference. The ARDL model is also applicable in situations where the variables are of I(0) and I(1) , since it gives realistic and efficient estimates (Nkoro and Uko, 2016).

The empirical model for this study is given as follow;

$$CB_t = \gamma_0 + \gamma_1 \ln Y_t + \gamma_2 \ln cpi_t + \gamma_3 BD_t + \gamma_4 \ln ED_t + \gamma_5 \ln RER_t + \gamma_6 \ln OP_t + \varepsilon_t \quad (1)$$

where CB is current account balance (% of GDP), Y is real GDP growth rate,

CPI is consumer price index (proxy for inflation rate), BD is budget balance (% of GDP), ED is external debt (% of GDP), RER is real effective exchange rate (trade weighted exchange rate); OP is openness of the economy (ratio of export plus import to GDP), ε is a white noise process and t is the time period.

The ARDL approach involves two critical steps. The first step is to examine the existence of a long-run relationship among all the variables, and the second step is to estimate both the long-run and short-run coefficients. It is however worthy to note that, the study will proceed to perform the second step only if the first step establishes the existence of a cointegration relationship. Thus, in order to perform the ADRL bound test of cointegration, the study estimates an unrestricted ARDL model, which is specified as follows:

$$
\begin{aligned}
\Delta \mathrm{CB}_t = {} & \delta_0 + \sum_{i=1}^p \alpha_1 \Delta \mathrm{CB}_{t-1} + \sum_{i=1}^q \alpha_2 \Delta \ln Y_{t-1} + \sum_{i=1}^q \alpha_3 \Delta \ln \mathrm{cpi}_{t-1} \\
& + \sum_{i=1}^q \alpha_4 \Delta \mathrm{BD}_{t-1} + \sum_{i=1}^q \alpha_5 \Delta \ln \mathrm{ED}_{t-1} + \sum_{i=1}^q \alpha_6 \Delta \ln \mathrm{RER}_{t-1} \\
& + \sum_{i=1}^q \alpha_7 \Delta \ln \mathrm{OP}_{t-1} + \beta_1 \mathrm{CB}_{t-1} + \beta_2 \ln Y_{t-1} + \beta_3 \ln \mathrm{cpi}_{t-1} \\
& + \beta_4 \mathrm{BD}_{t-1} + \beta_5 \ln \mathrm{ED}_{t-1} + \beta_6 \ln \mathrm{RER}_{t-1} + \beta_7 \ln \mathrm{OP}_{t-1} + \mu_t
\end{aligned} \tag{2}
$$

where Δ is the difference operator, p and q are the maximum lag for the dependent and independent variables, respectively, the $\alpha_i\ (i = 1, 2, \cdots, 7)$ represent the short-run coefficients, $\beta_i\ (i = 1, 2, \cdots, 7)$ are the long-run coefficients, μ is the error term, and all other variables are as defined earlier.

In order to perform the cointegration test using the ARDL bound testing approach, we test the long-run coefficients by specifying the null hypothesis of no cointegration, against the alternative hypothesis of cointegration. The technique uses the F-statistics to test for joint significance of the $\beta_i\ (i = 1, 2, \cdots, 7)$. Thus, the hypotheses are specified in the form:

$$
H_0 : \beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6 = \beta_7 = 0
$$

$$
H_1 : \beta_1 \neq \beta_2 \neq \beta_3 \neq \beta_4 \neq \beta_5 \neq \beta_6 \neq \beta_7 \neq 0
$$

Once we have specified the null and alternative hypotheses, we then proceed to compute the F-statistics, which is used to test the significance of lagged levels of the variables, in order to determine the existence of cointegration. In the bound testing approach, the calculated F-statistic is compared with the critical values provided by Pesaran and Pesaran (1997). Two sets of critical values are reported in Pesaran and Pesaran (1997)—the lower and upper critical values. The rule of thumb is that, if the F-statistics is greater than the upper bound value, then the null hypothesis of no cointegration is rejected, and we conclude that there is cointegration, i.e. there is a long run relationship. However, if the F-statistics is below the lower critical value, then the null hypothesis of no cointegration cannot be rejected. Therefore, we conclude there is no cointegration, i.e. there is no long run relationship.

Thus, once cointegration relationship is ascertained, then the error correction estimates of the ARDL model are obtained. In this situation, the study proceeds to re-specify Equation (2) into an error correction model, in the form:

$$\Delta CB_t = \delta_0 + \sum_{i=1}^{p} \alpha_1 \Delta CB_{t-1} + \sum_{i=1}^{q} \alpha_2 \Delta \ln Y_{t-1} + \sum_{i=1}^{q} \alpha_3 \Delta \ln cpi_{t-1}$$
$$+ \sum_{i=1}^{q} \alpha_4 \Delta BD_{t-1} + \sum_{i=1}^{q} \alpha_5 \Delta \ln ED_{t-1} + \sum_{i=1}^{q} \alpha_6 \Delta \ln RER_{t-1} \qquad (3)$$
$$+ \sum_{i=1}^{q} \alpha_7 \Delta \ln OP_{t-1} + \delta Ect_{t-1} + \mu_t$$

where Ect is the error correction term, which measures the speed of adjustment and covers all the long-run information that was lost in the original estimation process; δ is the coefficient of the error correction term, which is expected to be negative and statistically significant to further confirm the existence of a cointegrating relationship; $\alpha_i (i = 1, 2, \cdots, 7)$ are the short run coefficients.

Data and diagnostic tests

For the purpose of econometric analysis, the study employs annual time series data for the period 1980 to 2020. Variables used in the model estimation include current account balance (% of GDP), real GDP growth rate, consumer price index (proxy for inflation rate), budget balance (% of GDP), external debt (% of GDP), real effective exchange rate (trade weighted exchange rate); and openness of the economy (defined as ratio of export plus import to GDP). Data were obtained from the Bank of Sierra Leone database, and the International Financial Statistics Yearbook of the IMF, 2021. To test for the stability of the model, the study utilizes both the cumulative sum of recursive residuals (CUSUM) and cumulative sum of squares of recursive residuals (CUSUMSQ).

4. Presentation and Discussion of Results

4.1. Unit Root Test Results

Before the estimation of the empirical models, the study performs the unit root test in order to establish the univariate characteristics of the variables. The study conducts the unit root test using both the Augmented Dicky Fuller (ADF) and Phillip Perron test statistics. The result of the unit root test is presented in Table 1. The results suggest that CB, Y, cpi and BD are I(1) variables. This result indicates that the variables are non-stationary in levels, but are stationary in their first difference. However, ED and RER are stationary in levels, i.e. they are characterised as I(0) variables. Thus, there is no evidence of I(2) variable, which also suggest that it is appropriate to use ARDL.

Table 1. ADF and PP unit root tests (intercept and trend).

Variables	Levels		First difference		Order of Integration
	ADF	PP	ADF	PP	
CB	−1.82	−1.429	−4.56*	−4.41*	I(1)
Y	−1.23	−1.29	5.43*	−5.52*	I(1)
Cpi	−2.12	−1.44	−3.49**	−4.72*	I(1)
BD	−1.48	−1.37	−4.55*	−4.91*	I(1)
ED	−3.54**	−4.12*	-	-	I(0)
RER	−5.62*	−4.95*	-	-	I(0)

4.2. Cointegration Test (Bound Test)

The unit root tests reveal that the variables constitute both I(0) and I(1) series, hence the study proceeds to perform a bound testing for cointegration to ascertain whether there is a long run relationship amongst the variables. To perform the bound testing approach to cointegration, the study estimates Equation (2), using a lag length of 2 based on the Akaike Information Criterion (AIC) and the Schwarz Bayesian criterion (SBC).

The rationale for the ARDL bound testing approach is to test the null and alternative hypothesis using the F-statistics against the Pesaran values. Thus, if the result shows that the F-statistics is larger than the upper critical bound values at the 1% or 5%, then we reject the null hypothesis of no cointegration, and confirms the existence of cointegration amongst the variables, indicating there is a long run relationship. On the other hand, if the result of the F-statistics is below the lower bound value at the 1% or 5%, then we accept the null hypothesis, and conclude there is no cointegration. The F-statistic and critical bounds values for testing the null of no cointegrating relationship are reported in Table 2. The result shows that the F-statistics is 5.764, which is greater than the upper bound values at both the 1% and 5%. The study therefore confirms the existence of cointegration, which indicate there is a long run relationship among the variables included in the study.

4.3. Long Run Analysis

The bound test indicates the existence of cointegration, hence the study proceeds to estimate a long run relationship. The long run regression result is presented in Table 3. The findings show that budget deficit, external debt and real exchange rate are the main drivers of current account deficit in Sierra Leone. The result reveals that budget deficit is positively associated with current account deficit. Intuitively, a percentage point increase in budget deficit leads to a 0.45 percentage point increase in current account deficit. The result confirms the validity of the twin deficit hypothesis. This result is consistent with the findings of Tarawalie (2014), and Onafowora and Owoye (2006). The result also suggests a positive relationship between external debt and current account deficit. This implies that the accumulation of debt has led to the worsening of the current account over

Table 2. Bound test result.

Test Statistics	Value	Significance	I(0)	I(1)
F-statistics	5.764	10%	1.99	2.94
K	5	5%	2.27	3.28
		1%	3.02	4.51
Asymptotic: n = 1000				

Source: Authors computation.

Table 3. Long run regression result.

Variables	Coefficient	Std. Error	t-Statistic	p-value
C	0.6425	0.2134	3.0110	0.015
lnY	−0.3771	0.2034	−1.8540	0.125
Lncpi	0.0352	0.0198	1.7778	0.179
BD	0.4523	0.1572	2.8772	0.031
lnED	0.2873	0.0872	3.2947	0.005
lnRER	0.1845	0.0675	2.7333	0.042

Source: Authors' calculation.

time. Thus, a 1% increase in total external debt leads to 0.29 percentage point rise in the current account deficit. The result bodes well with the empirical work of Kwalingana and Nkuna (2009) and Aristovnik, (2006). The findings also indicate a positive relationship between real exchange rate and current account deficit. An appreciation of the real exchange rate, leads to a worsening of the current account deficit. This result is consistent with the Mundell-Flemming model, which predicts that an appreciation in the real exchange rate can adversely affect a country's competitiveness position, leading to a worsening of the current account deficit.

4.4. ARDL Short Run Results

The result of the short run ARDL model is presented in Table 4. The result suggests that the error correction term is negative and statistically significant, which further reinforces the existence of a long-run relation among the variables. The result indicates that any disequilibrium in the model is corrected at the 65% adjustment speed annually, which depicts a high speed of adjustment. The finding shows that, the coefficient of lagged current account deficit is positive and statistically significant which shows the current account deficit persistence. Furthermore, the result reveals that budget deficit has a positive impact on current account deficit, a finding that reinforces the twin deficit hypothesis, as evident in the long run regression result. The diagnostic result suggests that 73% of the variations in current account deficit is explained by the explanatory variables, while the Durbin Watson value of 1.96 indicates the absence of any first-order serial correlation

4.5. Stability Test

The study conducts the stability test with a view to validate the stability of the regression coefficients, using both the cumulative sum (CUSUM) and the cumulative sum of square (CUSUMSQ). The results are presented in Figure 2 and Figure 3, respectively. The results confirm the stability of the model, given that the CUSUM and CUSUMSQ lie within the 5% critical band.

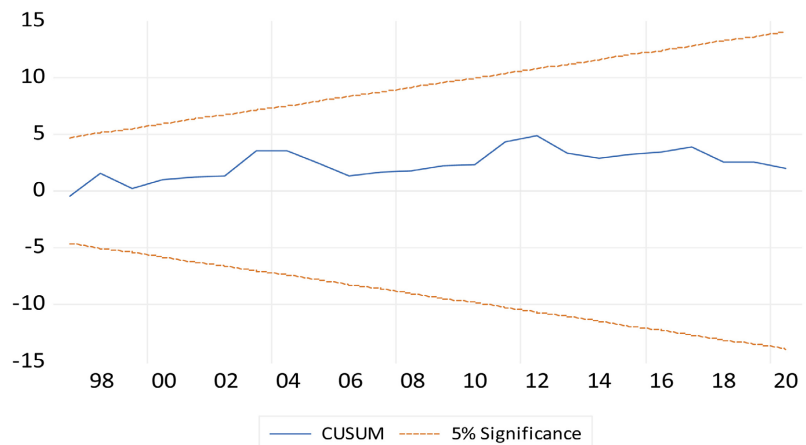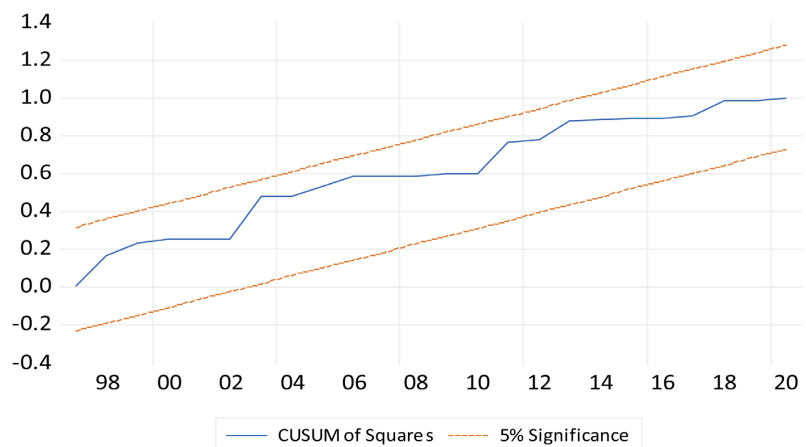**Figure 2.** Result of CUSUM test.

Figure 3. Result of CUSUMSQ test.

Table 4. ARDL short run results (2, 1, 0, 1, 2, 0).

Coefficient	Std. Error	t-Statistic	p-Value
0.4921	0.1374	3.5815	0.003
0.2102	0.1421	1.4792	0.231
0.3002	0.0786	3.8193	0.001
0.1092	0.0934	1.1692	0.420
−0.6502	0.1421	−4.5757	0.000
R-squared	0.731		
Adjusted R-squared	0.701		
F-statistics	12.26152		
Prob(F-statistics)	0.0000		
Durbin-Watson Stat	1.9624		

5. Conclusion

The objective of this paper was to investigate the determinants of current account deficit in Sierra Leone. The study utilized the auto regressive distributed

lag (ARDL) bound testing approach with annual time series data from 1980 to 2020. The unit root results revealed that the variables constituted both I(0) and I(1) series, while the bound test confirmed the existence of cointegration. The result showed that budget deficit, external debt and real exchange rate were the main determinants of current account deficit in the long run. Specifically, the findings showed that budget deficit had a positive impact on current account deficit, a result which confirmed the validity of the twin deficit hypothesis. The result also revealed a positive relationship between external debt and current account deficit, i.e. the accumulation of external debt led to a worsening of the current account deficit. Furthermore, a positive relationship was established between real exchange rate and current account deficit. This result bodes well with the Mundell-Flemming model, which predicts that an appreciation in the real exchange rate can adversely affect a country's competitiveness position, leading to a worsening of the current account deficit. The short run result found that any disequilibrium in the model is corrected at the 65% adjustment speed annually. Also, the finding showed that the coefficient of lagged current account deficit and budget deficit were the main determinants of current account deficit in the short run. The diagnostic result suggested that 73% of the variations in current account deficit was explained by the explanatory variables. Based on the findings, the study proffer the following policy recommendations: the government should broaden the tax base and reinforce the implementation of an efficient tax administration system that could tackle tax evasion and tax avoidance, in order to enhance domestic revenue mobilization; furthermore, the government is urge to develop a robust debt management strategic policies, with a view to keep external debt levels within sustainable limits and also cultivate an economic culture of transparency, in the issue of debt management and contract negotiation; and there is a need to maintain a more competitive exchange rate devoid of excessive fluctuation, in order to enhance the international competitiveness of the domestic economy, hence improving the current account balance.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

Aristovnik, A. (2007). *Short- and Medium-Term Determinants of Current Account Balances in Middle East and North Africa Countries*. The William Davidson Institute Working paper No. 862, The University of Michigan.
https://doi.org/10.2139/ssrn.988171

Barnes, S., Lawson, J., & Radziwill, A. (2010). *Current Account Imbalances in the Southern Euro Area*. IMF Working Paper, Vol. 10/139.
https://doi.org/10.5089/9781455201228.001

Behera, H. K., & Yadav, I. S. (2019). Explaining India's Current Account Deficit: A Time Series Perspective. *Journal of Asian Business and Economic Studies, 26,* 117-138.

https://doi.org/10.1108/JABES-11-2018-0089

Blanchard, O., & Milesi-Ferretti, G. M. (2011). *Why Should Current Account Balances Be Reduced?* IMF Staff Discussion Note No. 11/03.
https://doi.org/10.5089/9781462384860.006

Bollano, J., & Ibrahimaj, D. (2015). *Current Account Determinants in Central Eastern European Countries.* Graduate Institute of International and Development Studies, International Economics Department Working Paper Series, Working Paper No. HEIDWP0022-2015.

Brissimis, S. N., Hondroyiannis, G., Papazoglou, C., Tsaveas, T. N., & Vasardani, A. M. (2010). *Current Account Determinants and External Sustainability in Periods of Structural Change.* ECB Working Paper No. 1243.
https://doi.org/10.2139/ssrn.4166852

Calderon, C., Chong, A., & Loayza, N. (2002). Determinants of Current Account Deficits in Developing Countries. *Contributions to Macroeconomics, 2,* 1021-1021.
https://doi.org/10.2202/1534-6005.1021

Chen, R., Milesi-Ferretti, G.-M., & Tressel, T. (2012). *External Imbalances in the Euro Area.* IMF Working Papers, Vol. 12. https://doi.org/10.5089/9781475524673.001

Chinn, M. D., & Prasad, E. S. (2003). Medium-Term Determinants of Current Accounts in Industrial and Developing Countries: An Empirical Exploration. *Journal of International Economics, 59,* 47-76. https://doi.org/10.1016/S0022-1996(02)00089-2

Craigwell, R. C., & Samaroo, S. (1997). Dynamic Modelling of the Current Accounts: Evidence from the Caribbean. *International Economic Journal, 11,* 39-50.
https://doi.org/10.1080/10168739700080025

Das, D. K. (2016). Determinants of Current Account Imbalance in the Global Economy: A Dynamic Panel Analysis. *Journal of Economic Structure, 5,* Article No. 8.
https://doi.org/10.1186/s40008-016-0039-6

Deistaings, N. N., Mohamed, M. S., & Gideon, M. (2013). Is Kenya's CA Sustainable? A Stationarity and Cointegration Approach. *European Scientific Journal, 9,* 171-190.

Eita, J. H., Manuel, V., & Naimhwaka, E. (2019). Macroeconomic Variables and Current Account Balance in an Open Economy: Evidence from Namibia. *Journal for Studies in Economics and Econometrics, 43,* 55-70.
https://doi.org/10.1080/10800379.2019.12097348

Ghosh, A. (1995). International Capital Mobility amongst the Major Industrialised Countries: Too Little or Too Much? *The Economic Journal, 105,* 107-128.
https://doi.org/10.2307/2235322

Goldstein, M., & Khan, M. S. (1985) Income and Price Effects in Foreign Trade. In R. W. Jones, & P. B. Kenen (Eds.), *Handbook of International Economics* (Vol. 2, pp. 1041-1105). Elsevier Science Publications.
https://doi.org/10.1016/S1573-4404(85)02011-1

Gossé, J.-B., & Serranito, F. (2014) Long-Run Determinants of Current Accounts in OECD Countries: Lessons for Intra-European Imbalances. *Economic Modelling, 38,* 451-462. https://doi.org/10.1016/j.econmod.2014.01.008

Gulzar, S., Hui, X. F., & Wang, Y. J. (2007). The Current Account Balance of Pakistan 1972-2005: A Cointegration Analysis. *Information Technology Journal, 6,* 664-671.
https://doi.org/10.3923/itj.2007.664.671

Kariuki, G. M. (2009). *Determinants of Current Account in Kenya: The Intertemporal Approach.* KIPPRA Discussion Paper No. 93.

Kayikçi, F. (2012). Determinants of the Current Account Balance in Turkey: Vector Auto

Regression (VAR) Approach. *African Journal of Business and Management, 6,* 5725-5736. https://doi.org/10.5897/AJBM11.1788

Ketenci, N., & Uz, I. (2010). *Current Account and Relative Prices: Cointegration in the Presence of Structural Breaks in Emerging Economies.* Munich Personal RePEc Archive (MPRA) Paper, No. 27467.

Kueh, S. H. J. (2015). *Essays on Current Account Imbalances in European Countries.* Theses and Dissertations Paper 887.

Kurniadi, A. P., & Aimon, H. (2018). Determinants of the Current Account Balance in Indonesia. In *International Conferences on Educational, Social Sciences and Technology* (pp. 178-186).

Kwalingana, S., & Nkuna, O. (2009). *The Determinants of Current Account Imbalances in Malawi.* Munich Personal RePEc Archive (MPRA) Paper, No. 14694.

Madura, J. (2008). *International Financial Management* (9th ed.). Florida Atlantic University.

Morsy, H. (2009). *Current Account Determinants for Oil-Exporting Countries.* IMF Working Paper WP/09/28. https://doi.org/10.5089/9781451871753.001

Nkoro, E., & Uko, A. K. (2016). Autoregressive Distributed Lag (ARDL) Cointegration Technique: Application and Interpretation. *Journal of Statistical and Econometric Methods, 5,* 63-91.

Obstfeld, M., & Rogoff, K. (1995). The Intertemporal Approach to the Current Account. In G. Grossman, & K. Rogoff (Eds.), *Handbook of International Economics,* Vol. 3, North Holland. https://doi.org/10.3386/w4893

Onafowora, O. A., & Owoye, O. (2006). An Empirical Investigation of Budget and Trade Deficits: The Case of Nigeria. *The Journal of Developing Areas, 39,* 153-174. https://doi.org/10.1353/jda.2006.0009

Oshota, O., & Badej, A. A. (2015). What Drives Current Account Balance in West Africa States: Evidence from Panel ARDL. *Journal of International and Global Economic Studies, December, 8,* 91-105.

Pesaran, M. H., & Pesraran, B. (1997). *Working with Microfit 4.0: Interactive Econometric Analysis.* Oxford University Press.

Razin, A. (1995). The Dynamic-Optimizing Approach to the Current Account: Theory and Evidence. In P. Kenen (Ed.), *Understanding Interdependence: The Macro-Economics of the Open Economy.* Princeton. https://doi.org/10.1515/9780691231136-008

Sachs, J. (1981). The Current Account and Macroeconomic Adjustment in the 1970s. *Brookings Papers on Economic Activity, 1,* 201-282. https://doi.org/10.2307/2534399

Sadikua, L., Fetahi-Vehapia, M. F., Sadikub, M., & Berisha, N. (2015). The Persistence and Determinants of Current Account Deficit of FYROM: An Empirical Analysis. *Procedia Economics and Finance, 33,* 90-102. https://doi.org/10.1016/S2212-5671(15)01696-2

Seyoum, W. (2020). Determinants of Current Account Deficit: Empirical Evidence from Ethiopia. *Research Journal of Finance and Accounting, 11,* 56-65.

Tarawalie, A. B. (2014). Fiscal Deficits and Current Account Imbalances: Evidence from Sierra Leone. *International Journal of Business and Social Sciences, 5,* No. 8.

Venkata, S. S. (2014). On the Estimation of the Determinants of the Current Account Deficits: A Case of Indian Economy. *Applied Econometrics and International Development, 14.*

Yang, L (2011). An Empirical Analysis of Current Account Determinants in Emerging Asian Economies. Cardiff Economics Working Papers.

http://carbsecon.com/wp/E2011_10.pdf

Yurdakul, F., & Cevher, E. (2015). Determinants of Current Account Deficit in Turkey: The Conditional and Partial Granger Causality Approach. *Procedia Economics and Finance, 26*, 92-100. https://doi.org/10.1016/S2212-5671(15)00884-9