

Lubna, Mahfuza Maliha; Saha, Sanjoy Kumar

Article

Justification of the twin deficit hypothesis in Bangladesh

International Trade, Politics and Development (ITPD)

Provided in Cooperation with:

Department of International Commerce, Finance, and Investment, Kyung Hee University

Suggested Citation: Lubna, Mahfuza Maliha; Saha, Sanjoy Kumar (2024) : Justification of the twin deficit hypothesis in Bangladesh, International Trade, Politics and Development (ITPD), ISSN 2632-122X, Emerald, Leeds, Vol. 8, Iss. 2, pp. 96-116, <https://doi.org/10.1108/ITPD-04-2023-0009>

This Version is available at:

<https://hdl.handle.net/10419/319592>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.



<https://creativecommons.org/licenses/by/4.0/>

Justification of the twin deficit hypothesis in Bangladesh

Mahfuza Maliha Lubna and Sanjoy Kumar Saha

Department of Economics, Mawlana Bhashani Science and Technology University, Tangail, Bangladesh

Abstract

Purpose – In light of Bangladesh's economy, the goal of this study is to examine the “Twin Deficit Hypothesis (TDH),” which refers to a link between the budget deficit and the current account deficit. This study used yearly time series data from 1980 to 2020 to investigate the phenomena.

Design/methodology/approach – A multivariate autoregressive distributive lag (ARDL) model has been presented for empirical investigation, with the ARDL bound test investigating the co-integration between the inadequacies. As some of the variables in the bound test lack co-integration, the study adds a multivariate vector autoregressive (VAR) model later on.

Findings – With evidence of the result, the study supports the validation of twin deficit hypothesis in Bangladesh economy since both current account deficit and fiscal deficit affects each other significantly whereas Granger causality test confirms that fiscal deficit causes current account deficit but not the other way around.

Practical implications – The government should maintain a restrictive monetary policy in order to stabilize the current account deficit.

Originality/value – The novelty of this study is the incorporation of inflation, real exchange rate and GDP per capital to TDH that together form the basis for a macroeconomic snapshot of the economy.

Keywords ARDL, Bangladesh, Budget deficit, Current account deficit, Granger-causality test

Paper type Research paper

1. Introduction

Modern economic theory has proposed the “Twin Deficit Hypothesis (TDH),” which refers to a country's current account and budget deficits occurring at the same time. The link between budget and current account balances has been studied extensively in the empirical literature. Few economists believe that a big current account deficit is connected to a huge budget deficit. The notion goes that government tax cuts, which lower government revenue and raise the deficit leading a higher consumption as people spend their extra cash. Increased spending reduces the country's savings rate, forcing it to borrow more money from abroad.

Bangladesh has had a persistent budget deficit since independence, and the amount continues to rise to this day. However, with the budget deficit, analysts have seen an unexpected swelling in the current account deficit trend. This tendency prompted economists to examine the situation more closely. The Mundell-Fleming model, which underpins the twin deficits theory, was first suggested in 1962, (Mundell, 1963; Fleming, 1962a). The Mundell-Fleming model is based on the fact that, a rise in the budget deficit will result in an upward shift in the interest rate and the country's currency rate. The appreciation of the home currency, on the other hand, will boost imports and result in a current account deficit.

JEL Classification — C32, F0, F30, H1, H62

© Mahfuza Maliha Lubna and Sanjoy Kumar Saha. Published in *International Trade, Politics and Development*. Published by Emerald Publishing Limited. This article is published under the Creative Commons Attribution (CC BY4.0) license. Anyone may reproduce, distribute, translate and create derivative works of this article (for both commercial and non-commercial purposes), subject to full attribution to the original publication and authors. The full terms of this license may be seen at <http://creativecommons.org/licences/by/4.0/legalcode>



Bangladesh has been running a budget deficit of 3.34% on average since 1980, with a rising tendency in merchandise deficits. For the last four decades, the current account deficit account has ranged from 5% of GDP to 3.5% of GDP, while the budget deficit account has ranged from 0.52% to 7% of GDP (Figure 1).

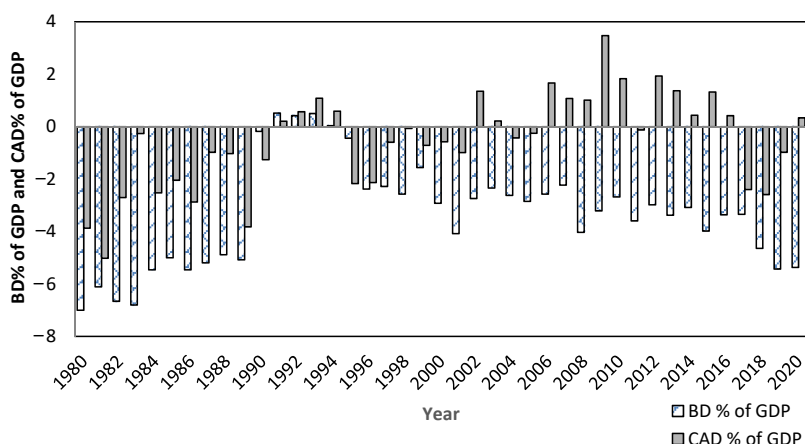
This twining phenomenon has piqued the interest of economists, who are trying to figure out if there is any underlying link between the deficits. As a result, the study's goal is to prove the assertion from Bangladesh's standpoint. We cannot, however, do a co-integration test with solely budget and current account deficits, as this may create specification bias in model estimation (Usman, 2022).

In order to eliminate any bias in the model, the study includes the real interest rate, per capita GDP, and inflation rate (Hassan, 2006). Higher interest rates benefit the current account because savings become more appealing, cutting net disposable income. This reduces consumer expenditure and, as a result, imports spending. High interest rates, on the other hand, lower inflation by making exports more competitive and so benefiting the current account. A higher pace of economic growth, on the other hand, will result in higher levels of consumption spending, which will eventually lead to a current account deficit.

The main objectives of the study are, firstly empirically evaluate if there are any interdependencies between the Budget and Current Account deficits using an Autoregressive Distributed Lag (ARDL) model. Secondly if any interdependence is found, an attempt will be made to determine the direction and kind of causality, i.e. whether it is unidirectional or bidirectional.

In this regard, the study uses an ARDL bound testing approach to acknowledge the existing short run and long run co-integration. When other variables are held exogenous, the test results confirm both long run and short run associations between the deficiencies, but this is not the case when real interest rate, inflation rate, and per capita GDP are held endogenous. A multivariate vector autoregressive (VAR) approach is used to examine the relationship between the variables in order to further research the issue. Following that, certain short-run diagnostic tests such as the CUSUM test and the CUSUM of Sq. test were used to declare that the models were stable and devoid of heteroskedasticity and auto-correlation. Finally, to determine the direction of causality, the Granger causality test is utilized.

This portion of the study tries to justify the hypothesis by displaying the current situations of the selected variables: budget deficit, current account deficit, inflation rate, real interest rate, and per capita GDP.



Source(s): Figure by authors

Figure 1.
Budget deficit and
current account deficit
over the years

Figure 1 will figure out what is going on with Bangladesh's budget. This figure deconstructs the budget deficit statistics utilized in this analysis, which spans the years 1980 through 2020. The graphical illustration above shows that the government budget is always in deficit. Between 1991 and 1994, the budget had a surplus, albeit it was a small one. The sharp increase of budget in these periods was triggered by the enhancement of revenue when VAT was introduced and started working as a revenue machine. In 1980 (about -7), the lowest value or biggest fiscal deficit was recorded, while in 1991, the lowest deficit or surplus was recorded (about 0.52). In 1990–1991 and 1994–1995, a significant movement can also be seen from fiscal deficit to surplus. During this time, Bangladesh attracted significant foreign direct investment in the telecommunications and banking sectors. As a result, reliance on customs duty diminished. In 1982, there was an external shock in the form of a drop in the international price of oil. The trend, however, reversed in the opposite manner in 1995, with the deficiency continuing to climb. The Asian crisis was a big external shock to the Bangladesh economy, and a few domestic shocks such as currency depreciation and reduction of foreign currency earnings from the ready-made garments sector put significant strain on the economy, affecting the current account balance directly. The remittance flow and the gradual structural transformation of the economy from agriculture to mid-level industry-based are driving the upward shift in CAD.

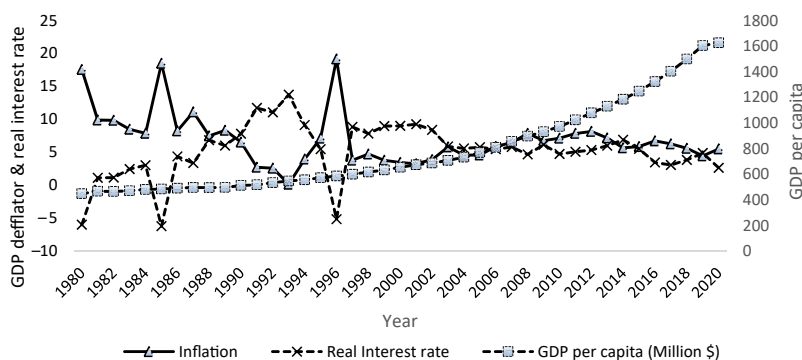
Unlike the budget deficit, the current account deficit is not constantly on the deficit, but rather a good balance between surplus and deficit. The time stamps are shown on the horizontal axis, while the annual current account balance, measured in millions of dollars and represented as a percentage of GDP, is shown on the vertical axis.

The current account balance was at its lowest point in 1981, when it was about -5% of GDP and at its greatest point in 2009, when it was around +3.5% of GDP. When we look at the data more closely, we can observe that the CA balance swings on a regular basis. After a period of deficit balance, there is a surplus time stamp, followed by a deficit time period. We may view a cycle of current account balance in this way. The deficit balance dominates in the following time periods; from 1980 to 1990, from 1995 to 2001, from 2004 to 2005, and finally from 2017 to 2019. And the surplus time periods are from 1991 to 1994, from 2002 to 2003, from 2006 to 2016, and finally in 2020.

In 1993, the inflation rate was 0.16%, and it peaked in 1996 at 19.1%. In reality, the years with the highest inflation rates were 1980, 1985, and 1996. In 1996, two general elections were held in Bangladesh. The first was held on February 15th, and was boycotted by the majority of Bangladesh's political parties. Political unrest swept the country, followed by a stalemate in the economy that slowed import and export, hampered transactions in banks and other financial institutions, and prevented food and other daily necessities from being carried from one place to another. As a result, massive economic devastation pushed the economy backward. It may also state that inflation in Bangladesh was quite unstable and fluctuated a lot in the early years of the country's economy, but it has become rather steady in recent years (from 1997 to the present).

Figure 2 attempts to depict the trend of real interest rates in Bangladesh over the last 41 years. The series began with a negative interest rate valuation, which is defined as a rate at which a household's money will be worth more rather than less in the future, causing individuals to hoard money rather than spend or invest it. We may also state that negative interest rates were not a one-time occurrence; the economy experienced a similar position in 1985 and 1996. For the rest of the time period, it remained positive. In 1993, the interest rate reached the height of 13.74%, while in 1981 the interest rate was as low as 1.13%. From 1981 to 1993, the interest rate gradually increased and from 2003 to 2020, the rate remained relatively flat.

We may deduce from the graph that Bangladesh's economy is gradually expanding, with no signs of a drop in the country's overall production. The country's budgetary deficit action



Source(s): Figure by authors

Figure 2.
Trend of Inflation,
interest rate and GDP
per capita of the last
40 years

can be explained as one of the reasons for this swift and stable development. The development of third world nations is accelerated by a deficit budget based on the Keynesian model, in which development spending exceeds tax and non-tax receipts. The lowest value of output production was around 447.70m US dollars in 1980, while the greatest value was over 1625.68m US dollars in 2020.

The remaining paper is organized in the following manner. The twin deficits' analytical framework is presented in Section 2. The third section provides an outline of Bangladesh's budget and current account deficits from 1980 to 2020. The fourth section focuses on the literature review. The research approach used in this study is outlined in Section 5. The data description and empirical findings are presented in Section 6. Section 7 concludes with a summary and policy suggestions.

2. Theoretical back ground

The twin deficit mechanism was theoretically described using the Keynesian income-expenditure method. Domestic absorption, and hence domestic income, will grow as the budget deficit rises. When domestic income rises, imports rise as well, eventually reducing the trade surplus. As a result, the deficits in the public and private sectors become twins.

Furthermore, according to the Keynesian open economy model, a rise in the budget deficit will result in an elevation in aggregate demand and domestic real interest rates. Soaring interest rates will result in a net influx of capital and a strengthening of the domestic currency.

Tang (2015) claims that pragmatic settings in the literature are typically based on a spur-of-the-moment request, without a thorough theoretical justification may artificially confirm the Twin Deficit Hypothesis. Following this line of thought this paper uses the theoretical framework obtained from the Keynesian method. We need to look at a country's output function to comprehend the theoretical foundation. The total output function, according to the Keynesian concept equals to,

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

Where, C = Consumption

I = Investment

G = Government purchases of goods and services

NX = Net trade balance

We may use an alternative technique to determine total output by combining savings and taxation.

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

When we combine [equations \(1\) and \(2\)](#), we obtain

$$\begin{aligned} C + S + T &= C + I + G + (X - M) \\ \Rightarrow S + T &= I + G + (X - M) \\ \Rightarrow (X - M) &= (S - I) + (T - G) \end{aligned} \quad (3)$$

That concludes the current account balance equals the budget balance and savings-investment gap in the t period,

$$\Rightarrow CAB_t = (S_t - I_t) + B \quad (4)$$

According to [Equation \(4\)](#), a negative BB can be compensated for by an expansion in private savings or a decrease in either domestic investment or exports. The TDH emphasizes that the latter adjustment reaction leads the trade balance to decline. As the fiscal balances and trade balances of Bangladesh are negative over the long period, we can rewrite the CAB_t and BB_t as the current account deficit (CAD_t) and the budget deficit (BD_t),

$$CAD_t = (S_t - I_t) + BD_t \quad (5)$$

There is a large theoretical body of work dedicated to understanding the simultaneity of current account deficits and budget deficit and its interconnections with other major macroeconomic indicators. According to proponents of the Keynesian school of thinking, there is a strong correlation between the budget deficit and the current account deficit. According to proponents of the Keynesian theory, a rise in the budget deficit will lead to a rise in domestic absorption and, in turn, an increase in imports and the resulting current account imbalance.

A theoretical analysis reveals that the relationship between CAD and BD is intricate and complex. One theory is that BD triggers CAD, also known as TDH ([Fleming, 1962b](#); [Mundell, 1963](#); [Diamond, 1965](#); [Masson and Knight, 1986](#); [Sachs, 1982](#)). One possible explanation for TDH dynamics is the Feldstein Chain ([Feldstein, 1986](#)). On the other hand, there is a direction of causation between the two, with CAD being the cause of BD ([Laursen and Metzler, 1950](#); [Bispham, 1975](#)). The Ricardian Equivalence Hypothesis provides a third dimension by demonstrating that there is no directionality to causality ([Polak, 1957](#); [Johnson, 1976](#); [Barro, 1989](#)). Not only that, but it's also been noted in the literature that surpluses, like deficits, tend to be intertwined ([Bluedorn and Leigh, 2011](#)). The Ricardian equivalence, the first approach denies that there is not any relationship among both deficits. Both terms are not interrelated to each other, because people think rationally, they know that increase in taxes is not on permanent basis it is just for short time period. That is why they save the money which is received due to reduction in taxes, for the payment of higher taxes imposed by the government in future. There would not be effect on national savings. So, there would be effect of budget deficit on current account deficit ([Thomas and Abderrezak, 1988](#)).

On the opposite side of Ricardian equivalence hypothesis (REH), the Keynesian economic theory assures the existence of long run positive relation among two of deficits. Particularly, the swot of both deficit hypotheses assures that negative fiscal account balance cause for negativity in current accounts. Similarly, the surplus in budget account balance leads a proficiency in current accounts. Due to the budget deficit the government becomes borrower ([Alkswani, 2002](#)).

2.1 Empirical evidence of twin deficit hypothesis

In theory, it appears that no particular dimension is proven for the interdependence of the BD and CAD; nevertheless, empirical research uncovers more than three dimensions; and most of the time, empirical literature leans in favor of TDH.

In order to test the twin deficits hypothesis for the chosen African oil-producing countries, [Eregba et al. \(2022\)](#) used the Dynamic Fixed Effect and the Augmented Mean Group procedures, both of which are subject to cross-sectional dependence. A bidirectional link between the fiscal and current account deficits is also supported by a granger causality result based on panel data. This means these nations need structural reforms to increase national savings and broaden their export base. It is also crucial that temporary increases in oil prices are not treated as permanent ones, since this would make it impossible to develop a strong fiscal norm and framework for regulating surplus crude oil prices for stabilization purposes while also smoothing demand.

According to [Dogan and Saykal \(2022\)](#), the Turkish economy from 2010 to 2019 did not support the twin deficit hypothesis. Inflation is caused by budget deficits and current account deficits, according to the findings of Impact-Response analysis and Granger causality analysis. Budget and current account deficits are common in developing countries like Turkey due to inadequate infrastructure and shallow economic depth. Inflation in the Turkish economy has grown chronic as a result of these macroeconomic imbalances.

Indicative of the twin divergence hypothesis, [Mallick et al. \(2021\)](#) confirmed the unequal adjustment between current account deficits and budget deficits. The empirical findings support the interaction between these deficits is asymmetrical, with the upward and downward movement of fiscal deficits having a significant impact on India's current account deficits in both the short and long run. The current account sustainability, balance of payments, currency rate, bonds, and financial markets are all harmed by the asymmetric lead-lag relationship between current account deficits and fiscal deficits.

Validation of the twin-deficit hypothesis for the Nigerian economy is supported by the results of the NARDL model obtained by [Ayinde et al. \(2021\)](#), which were obtained using a granger causality test. Due to the existence of long-run equilibrium, it was determined that the twin deficits were primarily driven by the degrees of financial and trade openness in Nigeria, with no evidence of any significant shock effects of the twin deficits being able to be traced to any of the macroeconomic fundamentals.

[Navaratnam et al. \(2016\)](#) found conflicting results when testing the direction of causality for the SAARC countries using cointegration analysis, error correction modeling, and the Granger causality test inside a vector autoregression framework. Results showed that a budget deficit leads to a current account deficit in Pakistan and Sri Lanka, but the opposite is true in India and Nepal. For Bangladesh, the short-term direction of causality is determined to be straight from current account deficit to budget deficit.

[Banday and Aneja \(2019\)](#) examined the Keynesian proposition of twin deficit for the period 1985–2016 in the Chinese economy. The empirical test backed up the theoretical framework, but larger growth shocks and extensive interest rate and exchange rate volatility cause the deficits to differ.

[Murshed and Nijhum \(2019\)](#) aimed to view the underlying scenario in Bangladesh. Pairwise Granger causality analysis was used to investigate the long-term causal linkages using yearly data from 1980 to 2017 and the findings implied that the budget and trade deficit act like distant cousin rather than behave like twins. [Arora and Mukherjee's \(2020\)](#) emphasized on financial liberalization to derive the trade impact in the manufacturing industry of Indian economy. The importance of financial inclusion was mentioned by [Sethy and Goyari \(2022\)](#). Moreover, economic circumstances are largely driven by globalization and institutional quality ([Sehrawat and Giri, 2019](#)).

[Shastri \(2019\)](#) employed a multivariate framework that included real interest rate, real exchange rate alongside with the real gross domestic product to prevent the potential of false conclusions induced by the removal of any key variables. With the use of the ARDL model for both time series and panel data, the study added to the twin deficit literature on key South Asian nations, indicating a long-term bidirectional link.

[Litsios and Pilbeam \(2017\)](#) reviewed a statistical relationship between the federal and the trade balances in Greece, Portugal, and Spain using the ARDL technique. All of the nation's exhibits a high correlation, showing that fiscal frugality can assist reduce current account deficits.

[Shastri et al. \(2017\)](#) scrutinized the hypothesis using panel data from eight countries in South and Southeast Asia, which have a historical record of persistent fiscal and trade deficits. The findings of the first- and second-generation panel co-integration tests show that a long-run link exists.

The results of [Ravinthirakumaran et al. \(2016\)](#) study on the relevance of the twin deficit theory in five South Asian countries (Pakistan, Sri Lanka, India, Nepal, and Bangladesh) were mixed. Budget deficits create current account deficits in Pakistan and Sri Lanka, but India and Nepal demonstrated a reverse causality, but Bangladesh shows only unidirectional causation in the short run.

[Alam et al. \(2014\)](#) explored the hypothesis using granger causality, using Bangladesh as an example from 1973 to 2012. For the time being, the empirical outcome supported co-integration, but not in the long run. Rather, the data show that the dependency is linked to other macroeconomic factors in general.

[Roy and Gupta \(2013\)](#) using a granger causality technique aimed to evaluate the occurrence of twin deficit in Bangladesh using yearly data from 1972 to 2012. He has the chance to discover bidirectional causality, but the causality does not hold up over the long run. In reality, the long-run co-integration is influenced by other variables and their overall macroeconomic performance.

According to [Perera and Liyanage \(2012\)](#), a long-term fiscal deficit contributed to current account imbalances in the Sri Lankan economy. He used multivariate empirical technique to investigate the twin deficit hypothesis as it interacts with important financial factors utilizing both annual and quarterly data in order to identify unidirectional causality between twin deficits.

[Saeed and Khan \(2012\)](#) used yearly data for 36 years to investigate the validity of the hypothesis in Pakistan. The analysis confirmed the concept by rejecting the Ricardian equivalency hypothesis.

[Baharumshah et al. \(2006\)](#), with the use of granger causality investigated the hypothesis in the ASEAN nations (Indonesia, Malaysia, Philippines, and Thailand) and finds a long-run link between the fiscal and the current account deficits. However, the direction of causation varies from nation to country. Malaysia and the Philippines have a bidirectional relationship; Thailand has a unidirectional association from budget deficit to current account deficit, whereas Indonesia has the reverse relationship.

[Hassan \(2006\)](#) investigated the behavior of Bangladesh's current account deficit and its factors. The budget deficit was included as one of the factors, and it has a substantial influence on current account imbalances.

[Alkswani \(2002\)](#) investigated the theory in a petroleum-based economy, using Saudi Arabia as an example and yearly data from 1977 to 1999. The Saudi economy is unique in that oil export money is its primary source of income. Though the Ricardian equivalence rejected the existence of any relationship, the Keynesian perspective maintains a positive interrelation between budget and trade deficits, but the causation is inverted.

[Normandin \(1999\)](#) claimed that there is a bi-directional causal link between the twin deficits in the Canadian and the US economies. Unlike the Ricardian Equivalence Hypothesis, this states that any budget deficit does not produce twin deficits.

Islam (1998) inspected the twin deficit theory in the setting of Brazil between 1973 and 1991. His findings also supported the idea that budget and trade deficits are paralleled.

From 1979 to 1985, Abell (1990) used multivariate time series analysis to investigate the relationship between government budget deficits and merchandise trade deficits. The idea that budget deficits affect trade deficits indirectly rather than directly is supported by a vector autoregressive model.

Dey and Tareque (2021) proposed a multivariate model for the Bangladeshi economy, taking interest rate, currency rate, governance indicator, and trade deficit, alongside current and budget deficits as variable. In both the short and long run, ARDL bound testing suggested a unidirectional causality from budget deficit to current account deficit.

Although an extensive number of studies have covered the twin Deficit issues from different economic perspectives, there is very little evidence whether the hypothesis still holds for Bangladesh economy. The studies that are done in the past do not include the present scenario of the budget deficit and current account deficit where the deficit tends to grow stronger. So, this study examines the validity of this hypothesis in case of Bangladesh economy.

This study adds inflation, real exchange rate, and GDP per capital to TDH, which together form the basis for a macroeconomic portrait of the country. Because Bangladesh is a developing country and BD and CAD are common economic phenomena, the whole macroeconomic situation is heavily influenced by the ups and downs of these two essential indicators. In contrast to earlier research, this one included three important macroeconomic indicators (inflation, interest rate, and GDP per capita) as control variables that may affect the types of deficits and attempted to assess their relationship in both the long and short run.

3. Research design

3.1 Methodology and data source

Secondary data is introduced in this paper since it is more precise and dependable, as well as saving the researcher time. This study attempts to include yearly data sets of the following variables Current Account Deficit (CAD), Budget Deficit (BD), Real Interest Rate (RR), Inflation Rate (INF), and per capita Gross Domestic Product (lnGDP) over the time period 1980 to 2020. The World Development Indicators (WDI) and the Bangladesh Ministry of Finance provides secondary data. Table 1 provides the data source along with data measurement.

3.2 Research model

The behavior of two variables, private saving and domestic investment, can explain the variation of CAD_t . To begin with, household real disposable income (y) and real interest rate

Variables	Description	Measurement unit	Source of data
CAD	Current Account Deficit	Percentage of GDP	WDI (2021)
BD	Budget Deficit	Percentage of GDP	Ministry of Finance, Bangladesh
lnGDP	GDP per capita (\$)	ln of GDP per capita	WDI (2021)
RR	Real Interest Rate	Lending interest rate adjusted for Inflation	WDI (2021)
INF	Inflation	GDP deflator	WDI (2021)
Source(s): Table by authors			

Table 1.
Descriptive variables

(r) have a positive impression on private savings, while inflation (INF) has a negative impact. Second, the real interest rate (r) has a negative impact on investment (I), but the consequences of inflation are difficult to pinpoint. Inflation has a higher influence in the long term, although there may be occasional deviations from the general trend in the short run. So we can dissect the above model as,

$$CAD_t = [S_t^p(y, r, INF) - I_t(r)] - BD_t \quad (6)$$

We choose per capita GDP as a proxy variable for aggregate household income because household income (y) indicates broad economic performance. As a result, the [equation \(6\)](#) may be expressed econometrically as,

$$CAD_t = \alpha_0 + \alpha_1 GDP_t + \alpha_2 RR_t + \alpha_3 INF_t + \alpha_4 BD_t + \varepsilon_t \quad (7)$$

Where,

CAD_t = Current account deficit for t period

BD_t = Budget deficit for t period

GDP_t = per capita GDP for t period

RR_t = Real interest rate for t period

INF_t = inflation rate for t period

ε_t = Random error term

The following equations is an unconstrained error correction formulation of the ARDL model for [equation \(7\)](#)

$$\begin{aligned} \Delta CAD_t = & \alpha_0 + \sum_{i=1}^p \alpha_{1i} \Delta CAD_{t-i} + \sum_{i=1}^q \alpha_{2i} \Delta BD_{t-i} + \sum_{i=1}^r \alpha_{3i} \Delta \ln GDP_{t-i} + \sum_{i=1}^n \alpha_{4i} \Delta RR_{t-i} \\ & + \sum_{i=1}^m \alpha_{5i} \Delta INF_{t-i} + \delta_1 CAD_{t-1} + \delta_2 BD_{t-1} + \delta_3 \ln GDP_{t-1} + \delta_4 RR_{t-1} + \delta_5 INF_{t-1} + \varepsilon_t \end{aligned} \quad (8)$$

$$\begin{aligned} \Delta BD_t = & \alpha_0 + \sum_{i=1}^p \alpha_{1i} \Delta CAD_{t-i} + \sum_{i=1}^q \alpha_{2i} \Delta BD_{t-i} + \sum_{i=1}^r \alpha_{3i} \Delta \ln GDP_{t-i} + \sum_{i=1}^n \alpha_{4i} \Delta RR_{t-i} \\ & + \sum_{i=1}^m \alpha_{5i} \Delta INF_{t-i} + \delta_1 CAD_{t-1} + \delta_2 BD_{t-1} + \delta_3 \ln GDP_{t-1} + \delta_4 RR_{t-1} + \delta_5 INF_{t-1} + \varepsilon_t \end{aligned} \quad (9)$$

$$\begin{aligned} \Delta GDP_t = & \alpha_0 + \sum_{i=1}^p \alpha_{1i} \Delta CAD_{t-i} + \sum_{i=1}^q \alpha_{2i} \Delta BD_{t-i} + \sum_{i=1}^r \alpha_{3i} \Delta \ln GDP_{t-i} + \sum_{i=1}^n \alpha_{4i} \Delta RR_{t-i} \\ & + \sum_{i=1}^m \alpha_{5i} \Delta INF_{t-i} + \delta_1 CAD_{t-1} + \delta_2 BD_{t-1} + \delta_3 \ln GDP_{t-1} + \delta_4 RR_{t-1} + \delta_5 INF_{t-1} + \varepsilon_t \end{aligned} \quad (10)$$

$$\begin{aligned}\Delta RR_t = & \alpha_0 + \sum_{i=1}^p \alpha_{1i} \Delta CAD_{t-i} + \sum_{i=1}^q \alpha_{2i} \Delta BD_{t-i} + \sum_{i=1}^r \alpha_{3i} \Delta \ln GDP_{t-i} + \sum_{i=1}^n \alpha_{4i} \Delta RR_{t-i} \\ & + \sum_{i=1}^m \alpha_{5i} \Delta INF_{t-i} + \delta_1 CAD_{t-1} + \delta_2 BD_{t-1} + \delta_3 \ln GDP_{t-1} + \delta_4 RR_{t-1} + \delta_5 INF_{t-1} + \varepsilon_t\end{aligned}\quad (11)$$

$$\begin{aligned}\Delta INF_t = & \alpha_0 + \sum_{i=1}^p \alpha_{1i} \Delta CAD_{t-i} + \sum_{i=1}^q \alpha_{2i} \Delta BD_{t-i} + \sum_{i=1}^r \alpha_{3i} \Delta \ln GDP_{t-i} + \sum_{i=1}^n \alpha_{4i} \Delta RR_{t-i} \\ & + \sum_{i=1}^m \alpha_{5i} \Delta INF_{t-i} + \delta_1 CAD_{t-1} + \delta_2 BD_{t-1} + \delta_3 \ln GDP_{t-1} + \delta_4 RR_{t-1} + \delta_5 INF_{t-1} + \varepsilon_t\end{aligned}\quad (12)$$

The presence of a long-run relationship is tested using the F test, which states the null [1] and alternative hypotheses [2].

In bound testing approach, co-integration is based on the results of F value. When the estimated F -value exceeds the upper bound, the null hypothesis is rejected, indicating that co-integration exists; however, when the F -value falls between the upper and lower bound values, the result is regarded un-decidable. If the F -value is less than the lower bound, we accept the null hypothesis and can only estimate the short run relationship. The following is the error correction model for short-run relationship estimation:

$$\begin{aligned}\Delta CAD_t = & \alpha_0 + \sum_{i=1}^p \alpha_{1i} \Delta CAD_{t-i} + \sum_{i=1}^q \alpha_{2i} \Delta BD_{t-i} + \sum_{i=1}^r \alpha_{3i} \ln GDP_{t-i} + \sum_{i=1}^n \alpha_{4i} RR_{t-i} \\ & + \sum_{i=1}^m \alpha_{5i} INF_{t-i} + \eta ECT_{t-i} + \varepsilon_t\end{aligned}\quad (13)$$

$$\begin{aligned}\Delta BD_t = & \alpha_0 + \sum_{i=1}^p \alpha_{1i} \Delta CAD_{t-i} + \sum_{i=1}^q \alpha_{2i} \Delta BD_{t-i} + \sum_{i=1}^r \alpha_{3i} \ln GDP_{t-i} + \sum_{i=1}^n \alpha_{4i} RR_{t-i} \\ & + \sum_{i=1}^m \alpha_{5i} INF_{t-i} + \eta ECT_{t-i} + \varepsilon_t\end{aligned}\quad (14)$$

$$\begin{aligned}\Delta GDP_t = & \alpha_0 + \sum_{i=1}^p \alpha_{1i} \Delta CAD_{t-i} + \sum_{i=1}^q \alpha_{2i} \Delta BD_{t-i} + \sum_{i=1}^r \alpha_{3i} \ln GDP_{t-i} + \sum_{i=1}^n \alpha_{4i} RR_{t-i} \\ & + \sum_{i=1}^m \alpha_{5i} INF_{t-i} + \eta ECT_{t-i} + \varepsilon_t\end{aligned}\quad (15)$$

$$\begin{aligned}\Delta RR_t = & \alpha_0 + \sum_{i=1}^p \alpha_{1i} \Delta CAD_{t-i} + \sum_{i=1}^q \alpha_{2i} \Delta BD_{t-i} + \sum_{i=1}^r \alpha_{3i} \ln GDP_{t-i} + \sum_{i=1}^n \alpha_{4i} RR_{t-i} \\ & + \sum_{i=1}^m \alpha_{5i} INF_{t-i} + \eta ECT_{t-i} + \varepsilon_t\end{aligned}\quad (16)$$

$$\begin{aligned}\Delta INF_t = & \alpha_0 + \sum_{i=1}^p \alpha_{1i} \Delta CAD_{t-i} + \sum_{i=1}^q \alpha_{2i} \Delta BD_{t-i} + \sum_{i=1}^r \alpha_{3i} \ln GDP_{t-i} + \sum_{i=1}^n \alpha_{4i} RR_{t-i} \\ & + \sum_{i=1}^m \alpha_{5i} INF_{t-i} + \eta ECT_{t-i} + \varepsilon_t\end{aligned}\quad (17)$$

3.3 Instruments

This section will discuss which kind of test will be utilized to check for co-integration between fiscal and current account deficits in this section. If there is any co-integration between the variables using ARDL Bound testing because the autoregressive distributive lag strategy can be used. The bound test will help us determine if co-integration is short-run, long-run, or non-existent. We cannot conduct the test directly since we do not know if the data is stationary or not. To begin, each variable is examined for the presence of a unit root test.

3.4 Descriptive statistics

Table 2 depicts the descriptive statistics. However, the mean value of fiscal deficit for the corresponding period is \$3.34bn. The implication is that there was indeed fiscal deficit in Bangladesh for the period under review. The corresponding mean values for inflation suggests that the Bangladesh economy is suffering from which is higher than developing nations average of 5.9. On the other hand, Bangladesh is observing an inspiring RR which is suitable to promote investment. Negative mean value of CAD and BD provide the evidence of persistent fiscal and current account deficit. The study used log (ln) value for solely per capita GDP because it is measured in millions of dollars and is difficult to deal with. To make our calculations easier, we use ln of per capita GDP (lnGDP). Note that additional variables such as the inflation rate (INF) and real interest rate (RR) are both measured in percentages of per capita GDP, and the budget deficit (BD) and current account deficit (CAD) are also measured in percentages of per capita GDP.

3.5 Unit root test

To conduct time series analysis stationarity of the data is necessary. Because presence of stationarity indicates that basic statistical traits are unaffected by time. The empirical analysis is carried out using a variety of econometric approaches, with a focus on 41 years of yearly time series data; this is necessary to solve the non-stationary issue [3]. Most extensively used statistical tests that are accessible for pointing out the stationary property of time series data are Augmented Dickey-Fuller, subsequently ADF test.

The data stability condition is considered with the use of both the result of the Augmented Dickey Fuller (ADF) tests as presented in Table 3. The unit-root test indicates that the variables are a mix of I(0) and I(1). Specifically, CAD, INF and RR are stationary at levels while all other variables are stationary at order 1, that is, I(1). In accordance with the analytical structure of the data generating process (DGP), the autoregressive distributed lag (ARDL) model is amenable to a mix of I(0) and I(1) series such as that that exists in this analysis where the variables included in the model for estimation are a mix of unit-root and non-unit-root variables see Table 3

The unit root test of the ADF test is shown in Table 3. We may deduce from the results that the majority of the variables are stationary, but others are non-stationary (BD, lnGDP), implying the presence of a unit root. However, when the variables are differentiated at first order, i.e. I(1), the series is found to be stationary. This means that the Null Hypotheses (H_0) is rejected in their initial differences in the ADF test.

Variables	Average	Median	Maximum	Minimum	Std. Dev	Observation
CAD	-0.52	-0.26	3.47	-5.02	1.80	41
BD	-3.34	-3.21	0.52	-0.71	2.00	41
INF	6.95	6.47	19.14	0.15	3.93	41
RR	5.19	5.51	13.74	-6.21	4.14	41
lnGDP	6.59	6.48	7.39	6.10	0.39	41

Table 2.
Descriptive statistics

Source(s): Table by authors

Augmented dickey fuller test			Remarks	International Trade, Politics and Development
Variables	Intercept	Trend and intercept		
<i>At Level, I(0)</i>				
CAD	−3.305**	−3.676**	Stationary	107
BD	−2.169	−1.911	Not Stationary	
INF	−5.041*	−5.129*	Stationary	
RR	−4.439*	−4.240*	Stationary	
lnGDP	6.763	−0.207	Not Stationary	
<i>First difference, I(1)</i>				
CAD	−7.053*	−7.063*	Stationary	Table 3. Unit root tests
BD	−6.273*	−6.477*	Stationary	
INF	−9.938*	−9.822*	Stationary	
RR	−9.288*	−9.292*	Stationary	
lnGDP	−2.606***	−6.210*	Stationary	
Note(s): *, **, *** indicate significance level of 10%, 5% and 1% respectively				
Source(s): Table by authors				

Table 3.
Unit root test

3.6 The ARDL bound testing approach to Co-integration

After declaring the series stationary, we use the bounds testing technique of co-integration established by [Pesaran et al. \(2001\)](#) to determine the appearance of co-integrating relations. The fundamental advantage of employing this strategy is that it may be used regardless of whether the explanatory variables are entirely I(0), mainly I(1), or mixed in integrated order. ARDL bound testing will be performed at the first difference, despite the fact that the variables are integrated in mixed order.

[Table 4](#) shows the output of the bound test findings. Firstly, we consider CAD as dependent variable $F_{CAD} (CAD | BD, INF, RR, lnGDP)$. Here the f -statistics is 17.376 which are

Dependent variables	F -statistics	Outcomes
$F_{CAD} (CAD BD, INF, RR, lnGDP)_{(2, 2, 0, 1, 1)}$	17.376	Co-integrated
$F_{BD} (BD CAD, INF, RR, lnGDP)_{(2, 0, 0, 2, 2)}$	9.932	Co-integrated
$F_{INF} (INF CAD, BD, RR, lnGDP)_{(1, 0, 1, 1, 2)}$	3.140	Inconclusive
$F_{RR} (RR CAD, BD, INF, lnGDP)_{(1, 0, 0, 1, 2)}$	3.285	Inconclusive
$F_{lnGDP} (lnGDP CAD, BD, INF, RR)_{(2, 0, 2, 2, 2)}$	3.260	Inconclusive

Critical bounds values		
Level of significance	Lower bound I(0)	Upper bound I(1)
10%	2.45	3.52
5%	2.86	4.01
2.5%	3.25	4.49
1%	3.74	5.06

Note(s): Null Hypothesis (H_0): Co-integration does not exist among the series

Alternative Hypothesis (H_1): Absence of co-integration

Selection Criteria: Based on the value of F -statistic we can conclude the following conclusion

The null hypothesis is declined if the computed F -value surpasses the upper bound, indicating that co-integration occurs and the long-term relationship can be inferred

If the F -value is slighter than the lower bound, we cannot refuse the null hypothesis and can only estimate the short run relationship

If the F -value stands between upper and lower bound values the result is considered un-decidable

Source(s): Table by authors

Table 4.
Bounds test for the
presence of co-
integration

greater than the upper bound at 1%, so we can reject the null hypothesis. In second equation $F_{BD} (BD | CAD, INF, RR, \ln GDP)$, BD is held as dependent variable. F -statistics of the second equation suggests that co-integration exists at 1% because the F -value is 9.932 that is higher than the upper bound and we can reject the null hypothesis. The rest of the equations hold INF, RR, $\ln GDP$ dependent variable and the F -values are 3.140, 3.285 and 3.260 respectively. All of these value falls under the category of decision criteria mention above indicating no long-run co-integration and the outcome is considered as inconclusive.

We concluded from the aforementioned co-integration test that both CAD and BD have long run co-integration with the independent variables, and that we can measure both the short run and long run coefficients, as well as see how each independent variable affects the related dependent variable.

The twin deficit hypothesis, suggesting a significant correlation between fiscal and current account deficits, has sparked extensive debate and empirical scrutiny. [Ganchev \(2010\)](#) unearthed evidence of mutual causality between these deficits in Bulgaria, potentially holding true in the long term. [Banday and Aneja \(2017\)](#) identified a bidirectional link in India, aligning with Keynesian theory. Conversely, [Anoruo and Ramchander \(1998\)](#) contested the concept across five developing Asian nations, proposing that trade deficits might drive fiscal deficits. [Ramu \(2017\)](#) reinforced the twin deficit theory in India, utilizing the vector error correction method to reveal a long-term positive relationship. These studies underscore the intricate and context-dependent nature of fiscal and current account deficit interactions. [Banday and Aneja \(2019\)](#) identified long-term cointegration among the variables, affirming the Keynesian hypothesis in the Chinese economy. The Granger causality test results endorse the twin deficit hypothesis. Our findings indicate that a negative shock to the budget deficit diminishes the current account balance, while a positive shock to the budget deficit augments the current account balance. Nevertheless, increased growth shocks and significant fluctuations in interest and exchange rates contribute to the divergence of deficits. [Dash et al. \(2022\)](#) corroborates the twin deficit hypothesis and propose a reverse causality from the current account balance to the fiscal balance. These findings carry significant policy implications for India, emphasizing the necessity of maintaining lower current account and fiscal deficits in the long term.

[Tables 5 and 6](#) show the long run and the short run coefficients calculated with the ARDL model. Only the per capita GDP was transformed using log transformation. At a 5% significance level, for each 1% point that increases the BD, the CAD increases 0.3725% points in the long term. However, in the short run at a 1% significance level, CAD increases to 0.04944% points when BD rises by 1% points. The coefficient of INF demonstrates that a 1% point rise in the variables generates a 0.0903% point rise of CAD in the long run which is consistent with [Alam et al. \(2020\)](#) and 0.1777% deficit in the current account in the long term due to 1% point rise in RR but the estimation found to be insignificant. In the long and short term, each percentage point rise in GDP decreases CAD by about -3.036 and -43.011% points. The ECT value validates the integrity of the long-run connection since the error correction term is negative and statistically significant at the 5% level. When there is

Table 5.
Long-run coefficient
estimates

Dependent variable: CAD		Dependent variable: BD	
Variables	Coefficient (<i>p</i> -value)	Variables	Coefficient (<i>p</i> -value)
BD	0.3725821 (0.050)	CAD	0.2111914 (0.043)
INF	0.090316 (0.043)	INF	-0.2149863 (0.234)
RR	0.1776284 (0.205)	RR	-0.0924317 (0.643)
$\ln GDP$	-3.036628 (0.031)	$\ln GDP$	-15.47544 (0.055)

Source(s): Table by authors

disequilibrium in the system, the ECT coefficient suggests that it can be adjusted back to long-run equilibrium at an average pace of 1.868. Therefore, the result of Table 5 confirms the validity of twin deficit hypothesis which is in line with Ayinde *et al.* (2021) and Dey and Tareque (2021).

We can describe the coefficient similarly by holding BD as dependent variables. Only the CAD and GDP have significant effect in the long run. And finally, the ECT coefficient suggests that it can be adjusted back to long-run equilibrium at an average pace of 1.357.

The study incorporates the crucial macroeconomic indicators: inflation, real exchange rate and GDP per capita to address the overall macroeconomic situation while analyzing the models' deficit scenarios because the role of these indicators is an integral part of explaining the development outcome and failure of a country like Bangladesh.

3.7 Serial correlation and heteroskedasticity test

Post-estimation diagnostic techniques such as the serial correlation test and the Heteroskedasticity test are used to check for stability.

The results of the serial correlation and Heteroskedasticity tests are shown in Table 7. The Breusch-Godfrey serial correlation LM test claims that both models are devoid of serial correlation. Heteroscedasticity is measured using the Autoregressive Conditional Heteroskedasticity (ARCH) method. We also discover that both models have *p*-values of 0.4705 and 0.6143, indicating that the null hypothesis is not rejected and the data are homoscedastic.

Figures 3 and 4 demonstrate the CUSUM and CUSUM-square tests for current account and budget deficits, respectively. Stability is observed in both CAD and BD models.

3.8 Optimum lag selection criterion

In order to use any sophisticated econometric approaches, optimal lag selection criteria are used to pick the suitable lag. The outcome is presented in Table 8. We have elected AIC

Dependent variable: CAD			Dependent variable: BD		
Variables	Lag order 0	1	Variables	Lag order 0	1
ΔCAD	–	–0.2546 (0.102)	ΔCAD	–	–
ΔBD	0.04944 (0.010)	–0.2529 (0.159)	ΔBD	–	–0.07298 (0.652)
ΔINF	–	–	ΔINF	–	–
ΔRR	–	0.144621 (0.013)	ΔRR	–0.2704 (0.287)	0.040687 (0.416)
ΔGDP	–	–43.011 (0.015)	ΔlnGDP	27.3691 (0.078)	–10.7713 (0.539)
ECT _{t-1}	–1.8683 (0.000)		ECT _{t-1}	–1.357705 (0.00)	

Source(s): Table by authors

Table 6.
Short-run coefficient
estimates

	Dependent variable: CAD	Dependent variable: BD
Adjusted <i>R</i> -squared	0.4261	0.4560
Breusch-Godfrey Serial Correlation LM ^a	0.771 (0.3246)	0.023 (0.87830)
Heteroskedasticity test: ARCH ^b	0.521 (0.4705)	0.254 (0.6143)

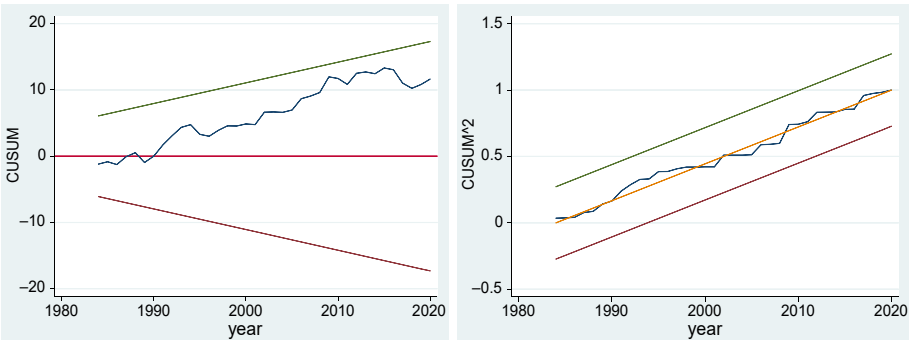
Note(s): ^aNull Hypothesis (H_0): No serial correlation, Alternative Hypothesis (H_1): Serial correlation

^bNull Hypothesis (H_0): data is Homoscedastic. Alternative Hypothesis (H_1): data is Heteroscedastic

Source(s): Table by authors

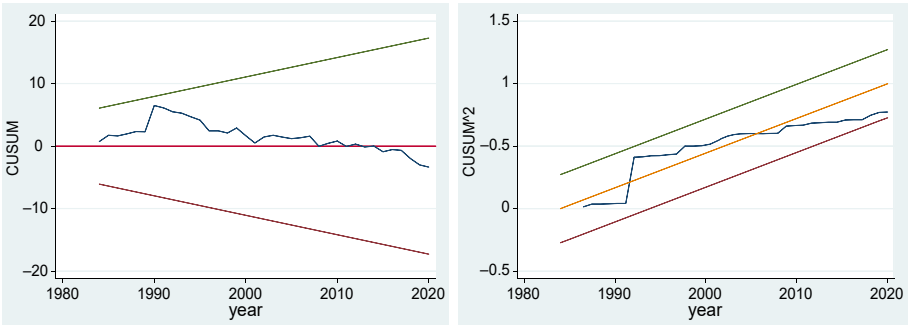
Table 7.
Diagnostic tests

Figure 3.
CUSUM and CUSUM-square test of CAD test at 5% level of significance



Source(s): Figure by authors

Figure 4.
CUSUM and CUSUM-square test of BD test at 5% level of significance



Source(s): Figure by authors

Table 8.
Optimum lag selection criterion

Lag	LogL	LR	FPE	AIC	HQIC	SBIC
0	-165.058	NA	0.008724	9.44765	9.52442	9.66759*
1	-125.518	79.079	0.003951	8.63991	9.10049*	9.95951
2	-96.8952	57.246	0.003518*	9.04824	9.28301	10.8579
3	-82.9194	27.952	0.008187	9.05108	10.2793	12.57
4	-57.8683	50.102*	0.013576	8.43862*	10.6603	13.6668

Note(s): * indicates 10% level of significance
Source(s): Table by authors

criteria from the table below. According to AIC; lower the value better is the model. In the table we see that the lowest value is 8.438 which belong to lag 4. So, the optimum lag for this model is 4. Lag 4 is the best solution for lag length and is best fitting for ARDL approach.

3.9 Vector auto-regression (VAR) model

From ARDL bound testing the test result found to be inconclusive when INF, RR and lnGDP are considered as dependent variable and confirms non-existence of cointegration. That is why the study includes unrestricted vector autoregression model (VAR) to investigate the relations.

Table 9 shows the test results, and the coefficient can be used to explain the influence of other factors on each variable. In this case, the inflation rate is significantly related to the lag in the current account deficit, which can be explained by 94%. The lagged variable of per capita GDP, on the other hand, has a significance of about 48%. Aside from that; no other variables have an effect.

3.10 Pairwise Granger causality test

Both VAR and ARDL model indicates the presence of co-integration or causal relation but not their direction of the causality. The Pairwise Granger's Causality Test is used to determine if two variables have a forecasting connection. There might be a unidirectional, bidirectional, or no causal relationship at all between the variables.

3.11 FMOLS results

We employ FMOLS as a robustness check to gauge the impact of varying modeling assumptions on the results. Our empirical models utilize the Fully Modified Ordinary Least Squares (FMOLS) approach developed by Phillips and Hansen (1990). This model accounts for potential serial correlation over an extended time period and addresses endogeneity concerns. FMOLS, being a semi-parametric model, demonstrates robustness to endogeneity and serial correlation issues, providing consistent and efficient estimates even in the absence of a cointegration relation (Phillips, 1995). Despite the strengths of the FMOLS method, we acknowledge the possibility of lingering endogeneity associated with the electrification rate. Therefore, we exercise caution in attributing causal effects of the electrification rate to economic growth in our interpretation of the results.

To corroborate the long-term relationship identified through the ARDL methodology, the FMOLS approach was employed. The outcomes of the FMOLS analysis are presented in Table 10. The findings exhibit an Adjusted R-squared value of 0.996199 and 0.972399. This indicates that the collective influence of the independent variables—namely BD, INF, RR, lnGDP—accounts for 99% and CAD, INF, RR and lnGDP account for 97% of the variations observed in the dependent variable within this model. This model effectively explains 5% of the fluctuations in the dependent variable.

The study reveals that all independent variables exhibit statistical significance. In the long term, a 1% rise in BD is associated with a 12% upturn in CAD, while a 1% rise in the CAD corresponds to a 22% rise in BD of the economy. Furthermore, a 1% escalation in

Lagged variables	CAD	BD	Variables INF	RR	lnGDP
C	0.2715721 (0.485)	0.8220163 (0.019)	−0.5919414 (0.609)	0.8073482 (0.453)	0.0089488 (0.016)
CAD(−1)	−0.2853575 (0.046)	−0.0033017 (0.980)	−0.9423281 (0.027)	0.7165516 (0.070)	−0.0006423 (0.639)
BD(−1)	−0.2666256 (0.028)	−0.1639733 (0.298)	0.4718627 (0.364)	−0.4649474 (0.337)	0.0000157 (0.993)
INF (−1)	0.6135692 (0.020)	0.0970193 (0.682)	−0.5269666 (0.500)	0.7988036 (0.272)	−0.0045099 (0.073)
RR(−1)	0.8309809 (0.003)	0.1491216 (0.554)	−0.0878217 (0.916)	0.4266733 (0.581)	−0.0046837 (0.080)
lnGDP(−1)	3.590413 (0.830)	2.677643 (0.071)	−17.41036 (0.726)	28.95006 (0.530)	0.4797915 (0.003)

Source(s): Table by authors

Table 9.
Vector auto-
regression model

inflation, reflecting budget deficit, is connected to a 2% boost in the economy while decrease current account deficit by 23%. The utilization of FMOLS reinforces the robustness of these findings, adding credibility to the statistical relationships observed.

4. Conclusions

This paper employs a new approach to justify the twin deficit hypothesis in Bangladesh’s economy. The study initially tries to comprehend the co-integration of the budget deficit and the current account deficit using the ARDL model. In order to justify the existence of twin deficit, the study has taken into account few control variables: real interest rates, inflation rates, and GDP per capita. The ARDL bound testing findings confirms the long run relationship among the series during the study period. The long-term empirical results show that both the budget and current account deficits affect each other positively and significantly. However, in the short run, there is no evidence of a substantial correlation between the deficiencies.

After determining the correlation, causality among the variables is determined by pairwise Granger causality test which indicates that there is unidirectional causality from budget deficit to the current account deficit. The remaining variables only have causal relationship to CAD but not the other way. Higher inflation deteriorates CAD and GDP per capita reduces both BD and CAD. However, there is no evidence of a causal relationship caused by the current account deficit to other factors.

The article is able to prove the validity of the twin deficit theory in case of Bangladesh. In order to build the economy and maintain sustainable economic development, a developing country must have more government revenue than spending. The deficit budget, on the other hand, may make imports more costly cause imports to reduce and thus widen the trade deficit. A current account deficit is not always neither good nor bad, but it can have certain repercussions. A persistent current account deficit can lead to excessive spending rather than investment, an inflated currency, and falling foreign assets. To counteract these implications, the government must address both of the deficits properly. The government may take few preventive measures to avoid occurring two deficits: to begin, devalue our home currency, which will result in increased exports as it become more affordable. Second, by pursuing a contractionary monetary policy, a higher interest rate will be achieved. The cost of debt will rise as interest rates rise, leaving consumers with less money to spend on consumption, resulting in the low import. A high interest rate, on the other hand, might lead to an appreciation of the native currency and a worsening of the current account balance, thus the government must find a balance between the interest rate and the exchange rate. Since both the current account deficit and budget deficit are persistent phenomena for Bangladesh economy, the duration of the study period should be longer. Then more interesting results should be found. Moreover, prevalence of missing may cause the regression results biased.

Table 10.
Fully modified least
squares (FMOLS)

Dependent variable: CAD		Dependent variable: BD	
Variables	Coefficient (<i>p</i> -value)	Variables	Coefficient (<i>p</i> -value)
BD	0.1225821 (0.050)	CAD	0.2211914 (0.043)
INF	0.020314 (0.043)	INF	−0.2319863 (0.234)
RR	0.01326284 (0.205)	RR	−0.1224317 (0.643)
lnGDP	−3.036628 (0.031)	lnGDP	−15.47544 (0.055)
<i>R</i> -squared	0.996717	<i>R</i> -squared	0.956715
Adjusted <i>R</i> -squared	0.996199	Adjusted <i>R</i> -squared	0.972399

Source(s): Table by authors

In a developing country like Bangladesh, financial depth can be a concerning issue. Addition of financial depth to the model can be a good option to justify the macroeconomic consequence of the economy.

Further research on the Twin Deficit Hypothesis (TDH) in Bangladesh's economy may involve: Incorporating recent data beyond 2020 to assess the evolution of twin deficits and their temporal relationship; Analyzing the sectoral composition of the budget and current account deficits to pinpoint the sectors contributing most to the deficits and their interaction; Identification of Structural Shifts: Investigating potential structural breaks or alterations in the relationship between the budget deficit and current account deficit across different economic periods or regimes.

Notes

1. Null Hypothesis; $H_0: \delta_1 = \delta_2 = \delta_3 = \delta_4 = \delta_5 = 0$, proposing no co-integration.
2. Alternative Hypothesis; $H_1: \delta_1 \neq \delta_2 \neq \delta_3 \neq \delta_4 \neq \delta_5 \neq 0$, proposing the existence of co-integration.
3. "A time series is considered to be stationary if its mean, variance, and auto-covariance (at various delays) do not change regardless of when we measure it" (Gujarati, 1995).

References

- Abell, J.D. (1990), "Twin deficits during the 1980s: an empirical investigation", *Journal of Macroeconomics*, Vol. 12 No. 1, pp. 81-96, doi: [10.1016/0164-0704\(90\)90057-h](https://doi.org/10.1016/0164-0704(90)90057-h).
- Alam, K.J., Ghosh, B.C., Islam, S. and Hossain, E. (2014), "Empirical analysis of twins' deficits in Bangladesh", *Journal of Humanities and Social Science*, Vol. 19 No. 1, pp. 65-72, doi: [10.9790/0837-191126572](https://doi.org/10.9790/0837-191126572).
- Alam, M.M., Sadekin, M.N. and Saha, S.K. (2020), "The impact of macroeconomic variables on the budget deficit in Bangladesh: an econometric analysis", *South Asian Journal of Business Studies*, Vol. 11 No. 2, pp. 216-234, doi: [10.1108/sajbs-05-2020-0141](https://doi.org/10.1108/sajbs-05-2020-0141).
- Alkswani, M.A. (2002), "The twin deficits phenomenon in petroleum economy: evidence from Saudi Arabia", *Seventh Annual Conference of the Economic Research Forum: Trends and Prospects for Growth*, Amman.
- Anoruo, E. and Ramchander, S. (1998), "Current account and fiscal deficits: evidence from five developing economies of Asia", *Journal of Asian Economics*, Vol. 9 No. 3, pp. 487-501, doi: [10.1016/s1049-0078\(99\)80099-2](https://doi.org/10.1016/s1049-0078(99)80099-2).
- Arora, P.K. and Mukherjee, J. (2020), "The nexus between financial development and trade performance: empirical evidence from India in the presence of endogenous structural breaks", *Journal of Financial Economic Policy*, Vol. 12 No. 2, pp. 279-291, doi: [10.1108/jfep-04-2019-0067](https://doi.org/10.1108/jfep-04-2019-0067).
- Ayinde, T., Ogunsiji, M. and Kaosarat, I. (2021), "Twin deficit hypothesis and macroeconomic fundamentals: new evidence from Nigeria", *Quarterly Journal of Econometrics Research*, Vol. 7 No. 1, pp. 1-12, doi: [10.18488/journal.88.2021.71.1.12](https://doi.org/10.18488/journal.88.2021.71.1.12).
- Baharumshah, A.Z., Lau, E. and Khalid, A.M. (2006), "Testing twin deficits hypothesis using VARs and variance decomposition", *Journal of the Asia Pacific Economy*, Vol. 11 No. 3, pp. 331-354, doi: [10.1080/13547860600764245](https://doi.org/10.1080/13547860600764245).
- Banday, U.J. and Aneja, R. (2017), "Does fiscal deficit affect current account deficit in India? An econometric analysis", *Review of Market Integration*, Vol. 9 No. 3, pp. 155-174, doi: [10.1177/0974929217744462](https://doi.org/10.1177/0974929217744462).
- Banday, U.J. and Aneja, R. (2019), "Twin deficit hypothesis and reverse causality: a case study of China", *Palgrave Communications*, Vol. 5 No. 1, 93, doi: [10.1057/s41599-019-0304-z](https://doi.org/10.1057/s41599-019-0304-z).
- Barro, R.J. (1989), "The Ricardian approach to budget deficits", *Journal of Economic Perspectives*, Vol. 3 No. 2, pp. 37-54, doi: [10.1257/jep.3.2.37](https://doi.org/10.1257/jep.3.2.37).

- Bispham, J.A. (1975), "The new cambridge and 'monetarist' criticisms of 'conventional' economic policy making", *National Institute Economic Review*, Vol. 74 No. 1, pp. 39-55, doi: [10.1177/002795017507400104](https://doi.org/10.1177/002795017507400104).
- Bluedorn, J. and Leigh, D. (2011), "Revisiting the twin deficits hypothesis: the effect of fiscal consolidation on the current account", *IMF Economic Review*, Vol. 59 No. 4, pp. 582-602, doi: [10.1057/imfer.2011.21](https://doi.org/10.1057/imfer.2011.21).
- Dash, U., Sahoo, M. and Babu, M.S. (2022), "Dynamic relationship between fiscal deficit and current account deficit in India: multivariate cointegration and causality analysis", *International Journal of Public Policy*, Vol. 16 Nos 2/3/4, p. 106, doi: [10.1504/ijpp.2022.10049344](https://doi.org/10.1504/ijpp.2022.10049344).
- Dey, S.R. and Tareque, M. (2021), "Twin deficits hypothesis in Bangladesh: an empirical investigation", *International Journal of Emerging Markets*, Vol. 17 No. 9, pp. 2350-2379, doi: [10.1108/ijoem-06-2020-0628](https://doi.org/10.1108/ijoem-06-2020-0628).
- Diamond, P.A. (1965), "National debt in a neoclassical growth model", *The American Economic Review*, Vol. 55 No. 5, pp. 1126-1150.
- Dogan, B. and Saykal, B. (2022), "Relationship between the twin deficit hypothesis and the inflation: case of Turkey (2010-2019)", *International Journal of Business and Social Science Research*, Vol. 3 No. 3, pp. 8-25, doi: [10.47742/ijbssr.v3n3p2](https://doi.org/10.47742/ijbssr.v3n3p2).
- Eregha, P.B., Aworinde, O.B. and Vo, X.V. (2022), "Modeling twin deficit hypothesis with oil price volatility in African oil-producing countries", *Resources Policy*, Vol. 75, 102512, doi: [10.1016/j.resourpol.2021.102512](https://doi.org/10.1016/j.resourpol.2021.102512).
- Feldstein, M.S. (1986), "The budget deficit and the dollar", in Fischer, S. (Ed.), *NBER Macroeconomics Annual*, MIT Press.
- Fleming, J.M. (1962a), "Domestic financial policies under fixed and under floating exchange rate", *Staff Paper International Monetary Fund*, Vol. 10, pp. 369-380.
- Fleming, J.M. (1962b), "Domestic financial policies under fixed and under floating exchange rates", *IMF Economic Review*, Vol. 9 No. 3, pp. 369-380.
- Ganchev, G.T. (2010), "The twin deficit hypothesis: the case of Bulgaria", *Financial Theory and Practice*, Vol. 34, pp. 357-377.
- Gujarati, D.N. (1995), *Basic Econometrics*, 3rd ed., McGraw-Hill, New York.
- Hassan, K. (2006), "Determinants of current account deficit in developing countries: the case of Bangladesh", *Studies in Business and Economics*, Vol. 12 No. 1, pp. 5-23, doi: [10.29117/sbe.2006.0012](https://doi.org/10.29117/sbe.2006.0012).
- Islam, F.M. (1998), "Brazil's twin deficits: an empirical examination", *Atlantic Economic Journal*, Vol. 26 No. 2, pp. 121-128, doi: [10.1007/bf02299354](https://doi.org/10.1007/bf02299354).
- Johnson, H.G. (1976), "The monetary approach to balance-of-payments theory", in Frenkel, J.A. and Johnson, H.G. (Eds), *The Monetary Approach to the Balance of Payments*, Routledge: Taylor and Francis Group, London and New York.
- Laursen, S. and Metzler, L.A. (1950), "Flexible exchange rates and the theory of employment", *The Review of Economics and Statistics*, Vol. 32 No. 4, pp. 281-299, doi: [10.2307/1925577](https://doi.org/10.2307/1925577).
- Litsios, I. and Pilbeam, K. (2017), "An empirical analysis of the nexus between investment, fiscal balances and current account balances in Greece, Portugal and Spain", *Economic Modelling*, Vol. 63, pp. 143-152, doi: [10.1016/j.econmod.2017.02.003](https://doi.org/10.1016/j.econmod.2017.02.003).
- Mallick, L., Behera, S.R. and Murthy, R.V.R. (2021), "Does the twin deficit hypothesis exist in India? Empirical evidence from an asymmetric non-linear cointegration approach", *The Journal of Economic Asymmetries*, Vol. 24, e00219, doi: [10.1016/j.jeca.2021.e00219](https://doi.org/10.1016/j.jeca.2021.e00219).
- Masson, P.R. and Knight, M. (1986), "International Transmission of Fiscal Policies in Major Industrial Countries/Transmision Internacional de la politica fiscal de los grandes paises industriales", *IMF Economic Review*, Vol. 33 No. 3, pp. 387-438, doi: [10.2307/3867250](https://doi.org/10.2307/3867250).

- Mundell, R.A. (1963), "Capital mobility and stabilization policy under fixed and flexible exchange rates", *The Canadian Journal of Economics and Political Science*, Vol. 29 No. 4, pp. 475-485, doi: [10.2307/139336](https://doi.org/10.2307/139336).
- Murshed, M. and Nijhum, N.K. (2019), "The fiscal and current account imbalances: an empirical analysis of the twin deficits hypothesis in Bangladesh", MPRA Paper No. 97115.
- Navaratnam, R. Selvanathan, S. and Selvanathan, E.S. (2016), "The twin deficits hypothesis in the SAARC countries: an empirical investigation", *Journal of the Asia Pacific Economy*, Vol. 21 No. 1, pp. 77-90, doi: [10.1080/13547860.2015.1053592](https://doi.org/10.1080/13547860.2015.1053592).
- Normandin, M. (1999), "Budget deficit persistence and the twin deficits hypothesis", *Journal of International Economics*, Vol. 49 No. 1, pp. 171-193, doi: [10.1016/s0022-1996\(98\)00058-0](https://doi.org/10.1016/s0022-1996(98)00058-0).
- Perera, A. and Liyanage, E. (2012), "An empirical investigation of the twin deficit hypothesis: evidence from Sri Lanka", *Staff Studies*, Vol. 41 No. 1, p. 41, doi: [10.4038/ss.v41i1.4683](https://doi.org/10.4038/ss.v41i1.4683).
- Pesaran, M.H., Shin, Y. and Smith, R.J. (2001), "Bounds testing approaches to the analysis of level relationships", *Journal of Applied Econometrics*, Vol. 16 No. 3, pp. 289-326, doi: [10.1002/jae.616](https://doi.org/10.1002/jae.616).
- Phillips, P.C.B. (1995), "Fully modified Least squares and vector autoregression", *Econometrica*, Vol. 63 No. 5, p. 1023, doi: [10.2307/2171721](https://doi.org/10.2307/2171721).
- Phillips, P.C.B. and Hansen, B.E. (1990), "Statistical inference in instrumental variables regression with I(1) processes", *The Review of Economic Studies*, Vol. 57 No. 1, pp. 99-125, doi: [10.2307/2297545](https://doi.org/10.2307/2297545).
- Polak, J.J. (1957), "Monetary analysis of income formation and payments problems", *IMF Economic Review*, Vol. 6 No. 1, pp. 1-50, doi: [10.2307/3866128](https://doi.org/10.2307/3866128).
- Ramu, A. (2017), "Twin deficits' hypothesis", *Foreign Trade Review*, Vol. 52 No. 1, pp. 15-29, doi: [10.1177/0015732516650825](https://doi.org/10.1177/0015732516650825).
- Ravinthirakumaran, N., Selvanathan, S. and Selvanathan, A.E. (2016), "The twin deficits hypothesis in the SAARC countries: an empirical investigation", *Journal of the Asia Pacific Economy*, Vol. 21 No. 1, pp. 77-90, doi: [10.1080/13547860.2015.1053592](https://doi.org/10.1080/13547860.2015.1053592).
- Roy, A. and Gupta, S.D. (2013), "An empirical investigation of budget and trade deficits: the case of Bangladesh", *International Journal of Economics and Financial Issues*, Vol. 3 No. 3, pp. 570-579.
- Sachs, J. (1982), "The current account in the macroeconomic adjustment process", *The Scandinavian Journal of Economics*, Vol. 84 No. 2, pp. 147-159, doi: [10.2307/3439631](https://doi.org/10.2307/3439631).
- Saeed, S. and Khan, M.A. (2012), "Twin deficits hypothesis: the case of Pakistan 1972-2008", *Academic Research International*, Vol. 3 No. 2, p. 155.
- Sehrawat, M. and Giri, A.K. (2019), "Globalization, role of institutions and economic performance in Indian economy: empirical evidence", *Journal of Financial Economic Policy*, Vol. 11 No. 1, pp. 82-100, doi: [10.1108/JFEP-03-2018-0052](https://doi.org/10.1108/JFEP-03-2018-0052).
- Sethy, S. and Goyari, P. (2022), "Financial Inclusion and Financial Stability nexus revisited in South Asian countries: evidence from a new multidimensional financial inclusion index", *Journal of Financial Economic Policy*, Vol. 14 No. 5, pp. 674-693, doi: [10.1108/jfep-07-2021-0195](https://doi.org/10.1108/jfep-07-2021-0195).
- Shastri, S. (2019), "Re-examining the twin deficit hypothesis for major South Asian economies: some insights into the transmission mechanism", *Indian Growth and Development Review*, Vol. 12 No. 3, pp. 265-287, doi: [10.1108/igdr-11-2018-0124](https://doi.org/10.1108/igdr-11-2018-0124).
- Shastri, S., Giri, A.K. and Mohapatra, G. (2017), "An empirical investigation of the twin deficit hypothesis: panel evidence from selected Asian economies", *Journal of Economic Research*, Vol. 22, pp. 1-22.
- Tang, T.C. (2015), "General equilibrium perspective on twin deficits hypothesis: an empirical study with US results", *Global Economic Review*, Vol. 44 No. 2, pp. 184-201, doi: [10.1080/1226508x.2015.1015041](https://doi.org/10.1080/1226508x.2015.1015041).

Thomas, L. and Abderrezak, A. (1988), "Anticipated future budget deficits and the term structure of interest rates", *Southern Economic Journal*, Vol. 55 No. 1, pp. 150-161, doi: [10.2307/1058863](https://doi.org/10.2307/1058863).

Usman, M. (2022), "Dynamisms of twin deficit and Pakistan: empirical analysis", *Turkish Online Journal of Qualitative Inquiry*, Vol. 12 No. 10, pp. 4916-4926.

World Development Indicators (2021), World Bank, Washington.

Corresponding author

Sanjoy Kumar Saha can be contacted at: saha.sk2021@mbstu.ac.bd