

# Revisiting the Twin Deficit Hypothesis in South Asia: Crowding-Out Effects and Capital Flow Dynamics

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## Article

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**Title Page**

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## **Revisiting the Twin Deficit Hypothesis in South Asia: Crowding-Out Effects and Capital Flow Dynamics**

### **Abstract**

Does the “Twin Deficit Hypothesis” hold in South Asian countries, and what roles do “crowding-out effects” and “capital flow dynamics” play? This study investigates four research questions and the five key hypotheses. By using secondary panel data on five South Asian economies from 1990 to 2025 with fixed effects and Driscoll-Kraay estimators, our analysis reveals three key findings that challenge conventional wisdom. First, the TDH is not a universal truth but a phenomenon that only emerged after the Global Financial Crisis. Second, the crowding-out channel does not operate in this region, as fiscal deficits do not affect private credit and interest rates. Third, capital flows, rather than fiscal policy, influence the external balance. Remittances directly improve the current account, while FDI both strengthens the current account and enhances the effect of fiscal policy on external balances. These findings indicate that, in South Asia, capital flows, rather than fiscal transmission, are the primary drivers of the external balance.

**Keywords:** Twin Deficit Hypothesis, Crowding-Out Effect, Capital Flow Dynamics, South Asia, Fiscal Deficit, Current Account.

**JEL Classification:** F32, F41, E62, O53

## 1. Introduction

In macroeconomics, the Twin Deficit Hypothesis (TDH) indicates a relationship between fiscal imbalances and external vulnerabilities, suggesting that government budget deficits can lead to current account deficits through multiple transmission channels (Gurbanov et al., 2025; Kulkarni & Dubey, 2025; Liu & Ren, 2024). Empirical evidence from various global contexts demonstrates complex dynamics which are affected by factors such as capital flows, fiscal institutions, and economic openness (Badinger et al., 2017; Afonso et al., 2018). A recent empirical evidence from G7 economies confirms that fiscal expansions can worsen external balances, although this relationship is influenced by interest rates and exchange rate movements (Bano et al., 2025). The role of fiscal institutions appears vital for economic stability; strict fiscal rules can considerably reduce the twin deficit effect, especially in emerging markets and during post-crisis periods (Afonso et al., 2018). The openness of an economy and the persistence of fiscal shocks also play an important part, as they influence the extent of crowding-out effects on investment and subsequent trade balance impacts (Corsetti & Müller, 2005, 2006). Structural changes, such as shifts in exchange rate regimes, are also significant, with varying effects observed across different historical periods (Kim, 2023). These findings highlight the importance of fiscal discipline and policy coordination in maintaining macroeconomic stability, especially in developing economies vulnerable to external shocks.

South Asia presents an intriguing case for studying the TDH. Despite its substantial economic potential, the region remains one of the least integrated globally. Historical disagreements, territorial disputes, and mutual mistrust among countries have slowed progress towards deeper economic cooperation and sustainability (Young, 2022). The South Asian Association for Regional Cooperation (SAARC) and initiatives such as the South Asian Free Trade Area (SAFTA) have been established to promote regional integration, yet their impact has been limited (Islam, 2012; Young, 2022). The economic landscape of the region is characterised by varied macroeconomic performance; however, its fiscal consolidation and management of the external balance are crucial priorities because South Asian economies depend heavily on remittances to maintain external stability (Ahmad & Alam, 2024; Jayasuriya & Maskay, 2010). Structural barriers between neighbouring countries, such as high tariff walls, quotas, political embargoes, and limited intra-regional trade, obstruct economic integration (Kabir, 2014).

Nonetheless, there is widespread agreement on the need for improved policy coordination and regional cooperation to address macroeconomic vulnerabilities and promote economic resilience (Dasgupta & Maskay, 2003; Kumar, 2009). The large population and market size of this region have significant growth potential, which can be unlocked through better investment climates and stronger policy credibility (Jha, 2013; Khan, 2014). Overcoming these challenges requires a collective effort to enhance institutional capacity and implement effective regional policy frameworks (Islam, 2012; Kabir, 2014). Persistent fiscal imbalances and external vulnerabilities remain ongoing issues, and the twin deficits phenomenon illustrates this relationship, where fiscal deficits exacerbate current account deficits by 0.45% (Bano et al., 2025). For macroeconomic stability, policy coordination and structural reforms are essential to improve fiscal discipline and ensure current account sustainability (Liang, 2025; Kitamura, 2025; Munir et al., 2025).

The fiscal and current account issues in South Asia are complex; evidence is inconclusive, and the causal relationships among them are uncertain. The hypothesis proposes a relationship between these deficits, but empirical results differ across various contexts and periods. For instance, while some studies confirm the TDH in countries like Pakistan and Sri Lanka, others identify reverse causality or no significant relationship in India and Nepal (Ravinthirakumaran

et al., 2016; Shastri, 2019). The role of transmission channels and mediating mechanisms, such as exchange rates and interest rates, complicates the understanding of TDH (Shastri, 2019). The crowding-out effect, whereby government spending may reduce private investment, is another key aspect, concerning capital flow dynamics and external adjustments (Baharumshah et al., 2009). Nonlinear relationships and threshold effects are evident, with fiscal deficits affecting current accounts more during crises, highlighting the importance of context-specific policy effectiveness (Khah & Ahmad, 2024).

Moreover, methodological issues such as endogeneity and data limitations impede clear conclusions, necessitating advanced econometric methods to address them (Khah & Ahmad, 2024; Liu & Ren, 2024). Variations across countries and periods, alongside institutional factors and policy implementation challenges, emphasise the complexity of achieving policy coherence and effective coordination (Chaoneka, 2014; Mumtaz & Munir, 2016). The ongoing theoretical and empirical debates on TDH in South Asia underline the need for nuanced policies that account for the diverse economic conditions of the region and external constraints (Bird et al., 2019; Mumtaz & Munir, 2016).

To address unresolved issues in the literature, this study formulates four research questions. First, does the Twin Deficit Hypothesis hold in South Asia, and is the relationship between the fiscal and current account balances positive and significant? Second, do fiscal deficits crowd out private sector activity through credit constraints or interest rate increases in South Asia? Third, how do capital flows, particularly FDI and remittances, moderate the fiscal-current account relationship? Fourth, do FDI and remittances directly improve the current account balance in South Asia? Based on theoretical foundations and empirical evidence, we test the following hypotheses: H<sub>1</sub>: Fiscal balance positively influences the current account balance in South Asia; H<sub>2a</sub>: Fiscal deficit reduces private credit in South Asia; H<sub>2b</sub>: Fiscal deficit raises interest rates in South Asia; H<sub>3a</sub>: FDI moderates the fiscal-CAB relationship in South Asia; H<sub>3b</sub>: Remittances moderate the fiscal-CAB relationship in South Asia; H<sub>4</sub>: Remittances positively influence the current account balance in South Asia; and H<sub>5</sub>: FDI positively impacts the current account balance in South Asia.

Existing literature on South Asian economies highlights several important research gaps. Research into crowding-out mechanisms, capital flow management, and the integration of analytical frameworks is still limited. The asymmetric effects of capital flows on economic growth and sustainability have been examined, but findings are inconclusive (Enga et al., 2015; Umar & Yousuf, 2022). Further investigation into the crowding-out effects of FDI on domestic private investment and the role of remittances in fiscal-external linkages is needed (Diwakar, 2025). Additionally, research questions often focus on how capital flows influence economic growth, income inequality, and sustainability, with hypotheses based on theories such as the TDH and the portfolio choice framework (Mosharraf & Amin, 2022; Khan, 2014).

Empirical methods such as ARDL models and Granger causality tests are employed to identify causal relationships and transmission channels. However, methodological issues persist, in addressing asymmetric effects and the influence of institutional quality (Enga et al., 2015; Hasan et al., 2023; Umar & Yousuf, 2022). These studies seek to bridge theoretical and empirical gaps, enhance understanding of transmission channels, and strengthen the evidence base for policy development (Mohammad & Khan, 2024; Naqvi & Noman, 2022). Ultimately, improving understanding of fiscal-external linkages and their broader economic effects for South Asian economies demands an integrated analytical approach.

This study has three main contributions to the existing literature based on fiscal imbalances and current account issues. First, it provides comprehensive evidence on the TDH, crowding-out, and capital flow dynamics within a unified analytical framework. In contrast to previous studies that examine these channels separately, this research combines them to provide a more complete understanding of fiscal-external linkages in South Asia. Second, it presents new evidence on capital flow moderation, demonstrating that FDI enhances the fiscal-current account relationship while remittances do not moderate it. Third, it is the first study to test both credit and interest rate crowding-out channels in South Asia simultaneously, offering a more complete picture of fiscal transmission mechanisms. These contributions expand existing knowledge and strengthen the empirical basis for policy development in the region.

We employ rigorous panel data econometric methods to test our hypotheses. Fixed effects estimation with clustered standard errors and Driscoll-Kraay standard errors are used to ensure robust inference against serial correlation and heteroskedasticity. Diagnostic testing, model validation, and sensitivity analyses confirm the robustness of our results across different model specifications and variable constructions. Our findings indicate that capital flows, especially FDI and remittances, are the primary drivers of external balance adjustment in South Asia, while the crowding-out channel is unconfirmed.

The rest of this paper is organised as follows. Section 2 reviews the literature and formulates the hypotheses. Section 3 outlines the methodology. Section 4 presents the results. Section 5 discusses the findings, and Section 6 concludes with policy implications.

## **2. Literature Review and Hypotheses Development**

### **2.1 Theory and Conceptual Framework**

The Twin Deficit Hypothesis (TDH) provides the main theoretical foundation that proposes an association between fiscal deficits and current account deficits, suggesting that an increase in government budget deficits can lead to a decline in the current account balance. This hypothesis is supported by various theoretical frameworks that explain how fiscal policy affects the external sector. The Keynesian absorption approach emphasises the role of aggregate demand in determining external balances. When government expenditure rises, domestic demand grows, resulting in higher imports and a deteriorated trade balance. On the other hand, the Mundell-Fleming model illustrates how fiscal policy influences “exchange rates” and “interest rates” in an open economy, offering another mechanism through which fiscal deficits impact current accounts (Bird et al., 2019). Moreover, the national income accounting identity also underpins this relationship by showing how government borrowing affects the saving-investment balance, which, in turn, affects external borrowing and current account dynamics (Truman, 2005).

Empirical studies indicate that fiscal expansions can deteriorate external balances; however, the relationship is complex and affected by factors such as exchange rate regimes, interest rates, and fiscal rules. Effective policies and strict fiscal rules can lessen the impact of fiscal deficits on current accounts (Badinger et al., 2017). Evidence from countries like Kenya and North Macedonia suggests that fiscal deficits can lead to higher interest rates and currency appreciation, leading to worse current account deficits (Beqiri, 2023). Nonetheless, the relationship is not always consistent, as structural changes and economic contexts can modify these dynamics (Kim, 2023). Overall, while the TDH offers a useful conceptual framework for analysing deficit linkages, its empirical implications depend on various mediating factors and policy instruments. This necessitates a nuanced approach to fiscal and external adjustment strategies (Baharumshah et al., 2013; Mellini & Silva, 2022).

Other theories, such as Ricardian equivalence, which argues that government budget deficits do not influence the current account balance due to offsetting private savings, provide an alternative viewpoint. Studies on the Euro Area show diverse results depending on the methodology and period analysed, with some evidence supports Ricardian equivalence, while other findings endorse the Keynesian twin deficits hypothesis (Forte & Magazzino, 2015). Research on India and Sri Lanka supports the twin deficits hypothesis, emphasising an asymmetric and nonlinear relationship between fiscal and external balances (Bhat & Sharma, 2018; Bhavan, 2025). Moreover, fiscal sustainability theory suggests that the connection between fiscal and external balances depends on the sustainability of public debt. Structural breaks and regime shifts complicate these relationships, as economic shocks and policy changes can lead to nonlinear adjustments in public debt dynamics (Jawadi & Sousa, 2013).

On the other hand, the significance of institutional quality and policy effectiveness cannot be exaggerated. Fiscal rules and governance frameworks can either lessen or heighten the influence of fiscal policy on external balances. Financial development and capital mobility affect how fiscal policy is transmitted, with different impacts on economic growth and external vulnerability (Fontana, 2009). The political economy surrounding fiscal policies also plays a vital role; political constraints and policy signals influence credibility and the effectiveness of fiscal measures. These theories suggest that the relationship between fiscal and external balances may not be straightforward but instead depends on institutional, structural, and economic conditions. This highlights the potential for nonlinear or conditional effects, which we incorporate into our empirical framework.

## 2.2 Hypotheses Development

### 2.2.1 The Twin Deficit Puzzle: Does Fiscal Balance Improve Current Account Balance?

The TDH indicates a direct relationship between fiscal deficits and current account deficits. This idea is grounded in national income accounting identities and Keynesian economic theory, which argue that fiscal deficits boost aggregate demand, leading to higher imports and worsening the trade balance (Bano et al., 2025; Bird et al., 2019). Studies in South Asia present mixed results. In Pakistan and Sri Lanka, fiscal deficits lead to current account deficits, whereas in India and Nepal, the causality runs in the opposite direction (Ravinthirakumaran et al., 2016). Furthermore, panel data analysis across larger Asian regions supports the TDH, suggesting that fiscal deficits can both directly and indirectly influence current account balances (Evan & Zubaidi, 2006; Lau & Baharumshah, 2008). However, the relationship is complex and influenced by interest rates, exchange rates, and structural economic factors (Shastri, 2019; Shastri et al., 2017). Endogeneity and causality issues complicate the empirical evidence, with some studies using instrumental variables to address these challenges (Liu & Ren, 2024). Policy implications indicate that fiscal consolidation could assist with external adjustment, but coordinated policy actions are necessary to handle the complex dynamics of the twin deficits (Baharumshah et al., 2013; Bano et al., 2025; Perera & Liyanage, 2012; Shastri, 2019).

H<sub>1</sub>: An improvement in fiscal balance is associated with an improvement in the current account balance in South Asia.

### 2.2.2 Does Fiscal Deficit Crowd Out Private Credit?

Government borrowing from domestic banks often reduces credit availability for the private sector, as banks prioritise lending to the government due to perceived lower risk and higher returns. In oil-dependent countries, a 1% increase in government borrowing leads to a 0.22%

decrease in private sector credit, indicating a crowding-out effect through the credit channel rather than the interest rate channel (Anyanwu et al., 2018). In Kenya, increased bank holdings of government securities significantly reduce private-sector credit (Kungu et al., 2025). In developing countries, government borrowing can significantly reduce private credit, demonstrating the crowding-out effect (Emran & Farazi, 2009). However, the impact of fiscal deficits on private investment varies based on institutional quality and governance. Good governance can mitigate the negative effects of public debt on private investment (Nguyen, 2022). In Sri Lanka, despite considerable government borrowing, no crowding-out effect was observed, likely due to accommodating monetary policies and external financing sources (Cooray, 2019; Priyadarshane & Dayaratna-Banda, 2013). Policymakers are advised to manage fiscal deficits prudently and explore alternative financing sources to prevent adverse effects on private sector credit and investment (Graham et al., 2013; Kabir, 2014).

H<sub>2a</sub>: Fiscal deficits crowd out private sector credit through the credit channel in South Asia.

### 2.2.3 Does Fiscal Deficit Raise Interest Rates?

Classical economic theories suggest that increasing budget deficits lead to higher interest rates due to increased government borrowing, which competes with private investment for available funds, resulting in the crowding out of private sector investment. Evidence from studies is mixed and depends on the context (Laubach, 2004). Some research shows that deficits raise interest rates, while others highlight factors such as global capital flows and accommodative monetary policy as mitigating influences. In emerging markets such as those in South Asia, the link between deficits and interest rates is often stronger due to higher risk premiums and less developed financial markets. Credibility in monetary policy can reduce the crowding-out effect by controlling inflation risks and stabilising interest rates (Ndou & Gumata, 2023). Conversely, monetary tightening can exacerbate the decline in capital formation caused by positive government debt shocks (Ndou & Gumata, 2023). Studies employing cointegration and error-correction models find that fiscal deficits can raise long-term interest rates, supporting the crowding-out hypothesis (Miller & Russek, 1991). Therefore, while fiscal deficits may increase interest rates in South Asia, the extent of this effect depends on the interaction between fiscal and monetary policies, global economic conditions, and the features of the financial markets.

H<sub>2b</sub>: Fiscal deficits crowd out private investment by raising interest rates in South Asia.

### 2.2.4 Does FDI Amplify the Fiscal-Current Account Link?

Foreign Direct Investment (FDI) plays a crucial role in managing the relationship between fiscal and current account balances in South Asia. FDI is an important source of external financing, accounting for a significant share of capital inflows (Tran & Dinh, 2014). However, the impact of FDI on the current account can be complicated. While FDI inflows can improve the trade balance through increased productivity and competitiveness, they may also lead to current account deficits due to profit repatriation and higher import levels (Ali et al., 2019; Rekha, 2024; Diwakar, 2025). In South Asia, factors such as market size, labour productivity, and infrastructure significantly influence FDI inflows, which, in turn, affect the fiscal-CAB relationship (Beloucif et al., 2020). The role of FDI in technology transfer and integration into global value chains can support structural transformation, enhancing the export capacity (Gayratovich, 2025). Nonetheless, volatility in FDI introduces risks to macroeconomic stability, emphasising the need for stable policies and a conducive investment climate (Siklar & Kocaman, 2018).

273 H<sub>3a</sub>: FDI moderates the relationship between fiscal balance and current account balance in  
274 South Asia.

#### 275 2.2.5 Do Remittances Mitigate the Fiscal-Current Account Link?

276 Remittances are essential for balancing the relationship between the fiscal and current account  
277 by serving as a stabilising force during fiscal shocks and economic downturns (Beaton et al.,  
278 2017, 2018; Brown, 2006; Emam, 2024). Remittances also contribute to building foreign  
279 exchange reserves, which are vital for maintaining economic stability during fiscal shocks  
280 (Emam, 2024). However, their impact on the trade balance and imports can be complex. Large  
281 inflows can lead to an appreciation of the real effective exchange rate, which may cause Dutch  
282 Disease effects and premature deindustrialisation (Uddin, 2015). Despite these challenges,  
283 remittances tend to be less volatile than other foreign currency inflows and generally do not  
284 move in line with business cycle fluctuations (De et al., 2019). The interaction between  
285 remittances and fiscal policy suggests that remittances can substitute for external borrowing,  
286 acting as a cushion against fiscal shocks and promoting financial inclusion (Beaton et al., 2017;  
287 Brown, 2006). Policymakers should consider these dynamics when developing  
288 macroeconomic policies to fully harness the stabilising potential of remittances within the  
289 fiscal-CAB relationship in South Asia.

290 H<sub>3b</sub>: Remittances moderate the relationship between fiscal balance and current account balance  
291 in South Asia.

#### 292 2.2.6 Do Remittances Improve the Current Account Balance?

293 Remittances benefit South Asia's current account balance by providing a stable source of  
294 foreign currency inflows that support the balance of payments and enhance import capacity.  
295 They stimulate economic growth through increased GDP per capita, higher household  
296 consumption, and facilitated gross capital formation (Rahman & Anjum, 2023; Uddin,  
297 2015). Remittances are essential for financing current account deficits, offering a steady flow  
298 of foreign currency that covers import costs and reduces external vulnerabilities (Mousa et al.,  
299 2018). This inflow stabilises foreign reserves and exchange rates, which are crucial for  
300 maintaining a sustainable current account balance (Zaidi, 2023). As a counter-cyclical  
301 stabiliser, remittances tend to increase during economic downturns, providing a buffer against  
302 macroeconomic volatility (Nica, 2014). They also support the cointegration of exports and  
303 imports, encouraging current account sustainability and a quicker adjustment towards long-  
304 term equilibrium (Hassan & Holmes, 2016). Indirectly, remittances foster economic  
305 development by enhancing human capital and increasing funds within the banking system,  
306 which can be utilised for investment and growth (Cooray, 2019; Dutta & Saikia, 2022; Khadim  
307 & Mehmood, 2016).

308 H<sub>4</sub>: Remittances exert a statistically significant positive influence on current account balance  
309 in South Asia.

#### 310 2.2.7 Does FDI Improve the Current Account Balance?

311 The relationship between FDI and the current account balance in South Asia is complex and  
312 multi-dimensional. FDI can improve the CAB through export-oriented investments that boost  
313 trade. In Bangladesh, FDI notably increases exports, potentially strengthening the CAB by  
314 raising foreign exchange earnings (Ullah & Yasmeen, 2014). FDI also promotes technology  
315 transfer and productivity gains, enhancing export competitiveness and expanding the export

base (Jensen, 2002; Li et al., 2025). However, the overall impact of FDI on the CAB is not always positive. In some developing countries, FDI has been linked to current account deficits due to profit repatriation and higher imports resulting from FDI inflows (Aimon et al., 2020; Değer & Ay, 2013; Wairooy & Endraswati, 2023). While FDI can drive capital accumulation and economic growth, it also presents risks such as increased dependence on foreign capital and possible negative effects on the CAB if not managed properly (Emako et al., 2023; Nguyen, 2022). The influence of FDI on the exchange rate and balance of payments is significant; it helps generate capital account surpluses but can lead to current account deficits if not offset by export growth (Shidore et al., 2024).

H<sub>5</sub>: FDI enhances the current account balance through export-oriented investment and productivity gains in South Asia.

### 3. Methodology

#### 3.1 Conceptual Foundation and Empirical Framework

Twin Deficit Hypothesis relies on the Keynesian absorption approach and the Mundell-Fleming model, both of which explain how fiscal policy impacts the external sector through aggregate demand, interest rates, and exchange rate mechanisms. The national income accounting identity further supports this framework by demonstrating how government borrowing affects the saving-investment balance and, consequently, influences external borrowing and current account movements. The overall functional relationship can be expressed as follows:

$$CAB = f(\text{Fiscal Balance}, \text{Private Credit}, \text{Interest Rate}, \text{FDI}, \text{Remittances}, \text{Trade Openness}, \text{GDP per Capita}, \text{Debt Service})$$

The baseline econometric specification in natural logarithms is:

$$\ln CAB_{it} = \alpha_0 + \alpha_1 \ln \text{Fiscal Balance}_{it} + \alpha_2 \ln \text{Private Credit}_{it} + \alpha_3 \ln \text{Interest Rate}_{it} + \alpha_4 \ln \text{FDI}_{it} + \alpha_5 \ln \text{Remittances}_{it} + \alpha_6 \ln \text{Trade Openness}_{it} + \alpha_7 \ln \text{GDP per Capita}_{it} + \alpha_8 \ln \text{Debt Service}_{it} + \alpha_9 \text{COVID}_{it} + \mu_i + \varepsilon_{it}$$

The model includes interaction terms to examine how capital flow is influenced. The fiscal-FDI interaction assesses whether FDI enhances the relationship between the fiscal and current accounts, while the fiscal-remittance interaction investigates if remittances diminish this link. The COVID dummy captures effects during the crisis period.

#### 3.2 Data and Variable Construction

We use annual panel data for five South Asian economies: Bangladesh, Bhutan, India, Nepal, and Sri Lanka. The sample period runs from 1990 to 2025, selected to maximise data availability for the primary variable. The final sample consists of an unbalanced panel with up to 32 years of data for each country. All data are obtained from the World Development Indicators database of the World Bank. The dependent variable is the current account balance, expressed as a percentage of GDP. Table 1 shows variable definitions, their theoretical bases, and data sources.

Table 1: Variable Construction and Measurement

| Variable | Symbol | Definition | Unit |
|----------|--------|------------|------|
|----------|--------|------------|------|

|                           |                    |                                                             |                   |
|---------------------------|--------------------|-------------------------------------------------------------|-------------------|
| Current Account Balance   | cab_gdp            | External balance of goods, services, income, and transfers  | Percentage of GDP |
| Fiscal Balance            | fiscal_balance_gdp | Government net lending/borrowing                            | Percentage of GDP |
| Domestic Credit           | private_credit_gdp | Credit to private sector by financial corporations          | Percentage of GDP |
| Real Interest Rate        | interest_rate      | Lending interest rate adjusted for inflation (GDP deflator) | Percentage        |
| Foreign Direct Investment | fdi_gdp            | Net FDI inflows                                             | Percentage of GDP |
| Remittances               | remit_gdp          | Personal transfers + compensation of employees              | Percentage of GDP |
| Trade Openness            | trade_gdp          | Exports + Imports of goods and services                     | Percentage of GDP |
| GDP per Capita            | ln_gdp             | GDP per capita (constant 2015 USD) - log transformed        | Natural log       |
| Debt Service              | debt_gni           | Principal repayments + interest paid on external debt       | Percentage of GNI |
| COVID Dummy               | covid              | Crisis period indicator (2020-2021)                         | 0/1 (Binary)      |

Note: All macroeconomic variables are expressed in percentage form except ln\_gdp (log-transformed). COVID is a binary shock variable coded as 1 for 2020-2021 and 0 otherwise. The WDI codes allow for full replication.

We create a fiscal deficit variable by taking the negative of the fiscal balance to directly examine the crowding-out channel. Two interaction terms are generated to explore the moderation effect of capital flows. The fiscal-FDI interaction is calculated as the product of the fiscal balance and FDI inflows. The fiscal-remittance interaction is the product of the fiscal balance and remittances. A COVID dummy equals one for the years 2020 and 2021, and zero otherwise. All continuous variables, except the interaction terms, are converted into natural logarithms. This transformation helps interpret elasticity, reduces skewness, and alleviates heteroskedasticity. Observations with missing values are addressed through listwise deletion, which is suitable given the relatively few missing observations per variable. The log transformation of GDP per capita is justified because this variable is strictly positive. No other variables need special treatment for zero or negative values as they are expressed in percentages and stay positive throughout the sample period.

### 3.3 Econometric Approach

#### 3.3.1 Cross-Sectional Dependence and Slope Heterogeneity

(i) Given the close economic and policy ties across South Asian economies, cross-sectional dependence is anticipated within the panel structure. Countries in the region share common trade patterns, exposure to international commodity price fluctuations, and susceptibility to global financial shocks. To address this, we employ Pesaran's CD test, which is appropriate for panels with a relatively small cross-sectional dimension. The test statistic is:

$$CD = \sqrt{\frac{2T}{N(N-1)}} \times \left( \sum_{i=1}^{N-1} \sum_{j=i+1}^N \hat{\rho}_{ij} \right)$$

where  $\rho_{ij}$  is the sample estimate of the pairwise correlation of residuals between units  $i$  and  $j$ ,  $T$  is the time dimension, and  $N$  is the number of cross-sectional units. The null hypothesis is cross-sectional independence.

(ii) Slope heterogeneity is assessed using Pesaran and Yamagata's delta test. South Asian economies vary significantly in institutional quality, financial development, and policy frameworks, rendering the assumption of homogeneous slopes unrealistic. The delta test statistic is:

$$\Delta = \sqrt{N} \left( \frac{N^{-1} \tilde{S} - k}{\sqrt{2k}} \right)$$

where  $\tilde{S}$  is the Swamy statistic of slope heterogeneity,  $k$  is the number of regressors, and the adjustment accounts for small sample properties. The null hypothesis is slope homogeneity.

### 3.3.2 Unit Root and Cointegration Analysis

Given the probable cross-sectional dependence among South Asian economies, we employ the Im-Pesaran-Shin panel unit root test to evaluate the variables' integration properties. This test accounts for heterogeneous autoregressive coefficients across panels and is appropriate for unbalanced panels. The IPS test statistic is calculated based on the average of individual ADF t-statistics.

$$\bar{t} = \frac{1}{N} \sum_{i=1}^N t_i$$

where  $t_i$  is the ADF t-statistic for each cross-sectional unit. The null hypothesis is that all panels contain a unit root. We then analyse long-term relationships using the Westerlund panel cointegration test. This method employs four error correction-based statistics, including two group-mean tests and two panel tests. Bootstrapped critical values account for cross-sectional dependence. Since the cross-sectional dimension remains relatively small ( $N = 5$ ) and common stochastic trends may persist across countries, we interpret the results as conditional long-term associations rather than strict equilibrium relationships.

### 3.3.3 Diagnostic Tests

Several diagnostic tests support our estimation method. The Variance Inflation Factor test checks for multicollinearity among independent variables. A VIF value above 10 indicates problematic multicollinearity. The Wooldridge test detects first-order serial correlation in panel data. The Modified Wald test identifies groupwise heteroskedasticity in fixed effects regression models. The Pesaran CD test examines cross-sectional dependence. The results of these tests guide our choice of estimator.

### 3.4 Estimation Approach and Robustness Checks

413 We use multiple estimation methods because the data exhibit a small cross-sectional size,  
414 cross-sectional dependence, and serial correlation. The study therefore applies fixed effects  
415 with clustered standard errors, fixed effects with Driscoll-Kraay standard errors, and conducts  
416 robustness checks with different sample periods.

#### 417 3.4.1 Fixed Effects with Clustered Standard Errors

418 We initially analyse the fixed effects estimator with clustered standard errors. This approach  
419 accounts for time-invariant country-specific heterogeneity and allows for correlation of errors  
420 within each country. The specification is:

$$\begin{aligned} 421 \text{CAB}_{it} = & \alpha_0 + \beta_1 \text{Fiscal Balance}_{it} + \beta_2 \text{Private Credit}_{it} + \beta_3 \text{Interest Rate}_{it} + \beta_4 \text{FDI}_{it} + \beta_5 \\ 422 & \text{Remittances}_{it} + \beta_6 \text{Trade Openness}_{it} + \beta_7 \text{GDP per Capita}_{it} + \beta_8 \text{Debt Service}_{it} + \beta_9 \text{COVID}_{it} + \\ 423 & \mu_i + \varepsilon_{it} \end{aligned}$$

424 We evaluate five progressive specifications. Model 1 tests the baseline TDH with fiscal balance  
425 and basic controls. Model 2 adds crowding-out variables. Model 3 incorporates capital flow  
426 variables. Model 4 introduces interactions between fiscal balance and both FDI and remittances.  
427 Model 5 employs Driscoll-Kraay standard errors, which are robust to serial correlation and  
428 heteroskedasticity.

#### 429 3.4.2 Fixed Effects with Driscoll-Kraay Standard Errors

430 We use the fixed effects estimator with Driscoll-Kraay standard errors as our primary  
431 specification because it addresses cross-sectional dependence, heteroskedasticity, and serial  
432 correlation. This nonparametric covariance estimator remains reliable despite these issues and  
433 does not require many cross-sections. The specification mirrors the fixed effects model, but  
434 standard errors are computed using the Driscoll-Kraay method with a lag length of two,  
435 determined by the cube root rule.

#### 436 3.4.3 Robustness Checks

437 We conduct two robustness checks to confirm the stability of our results across different sample  
438 periods. Firstly, we re-estimate the main model excluding the COVID-19 period by narrowing  
439 the sample to years up to 2019. This evaluates whether pandemic effects influence the results.  
440 Secondly, we re-estimate the model focusing on the post-Global Financial Crisis period by  
441 restricting the sample to years from 2010 onwards. This investigates whether the relationships  
442 have shifted over time. Additionally, we perform mechanism tests to verify the crowding-out  
443 channel. These tests assess whether fiscal deficits reduce private credit and whether fiscal  
444 deficits increase interest rates, using fixed effects with clustered standard errors.

#### 445 3.5 Endogeneity and Interpretation

446 We address potential endogeneity using several complementary strategies. First, the fixed  
447 effects estimator controls for country-specific factors that do not change over time. Second, the  
448 Driscoll-Kraay standard errors account for cross-sectional dependence, which may arise from  
449 common shocks affecting multiple countries simultaneously. Third, we compare results across  
450 three different model specifications to evaluate consistency. Despite these measures, we do not  
451 claim causality. All results represent conditional associations rather than definitive causal  
452 relationships. The small cross-sectional sample of five countries limits the use of instrumental  
453 variable or dynamic panel methods, which generally require larger N. We openly acknowledge

this limitation and interpret our findings accordingly. The results should be seen as evidence of associations that are robust across various specifications and sample periods.

## 4. Result

### 4.1 Descriptive Statistics

Table 2 presents summary statistics for all variables. The mean current account balance is negative at 3.5% of GDP, confirming persistent external deficits across South Asian economies. The fiscal balance also shows a mean deficit of 3.2% of GDP, suggesting that government expenditures generally exceeded revenues during the sample period. Remittances account for nearly 7% of GDP, highlighting their importance as a source of foreign exchange. Private credit displays significant variation among countries, ranging from 4.3% to over 100% of GDP. The relatively high standard deviations indicate notable heterogeneity across the five countries and over time.

Table 2: Descriptive Statistics

| Variable       | Obs | Mean  | Std. Dev. | Min    | Max    |
|----------------|-----|-------|-----------|--------|--------|
| CAB            | 161 | -3.51 | 6.92      | -33.91 | 10.04  |
| Fiscal Balance | 129 | -3.21 | 3.31      | -13.38 | 7.02   |
| Private Credit | 174 | 35.45 | 19.12     | 4.29   | 103.65 |
| Interest Rate  | 124 | 5.64  | 3.90      | -13.64 | 13.74  |
| FDI            | 165 | 0.82  | 0.82      | -0.64  | 5.88   |
| Remittance     | 156 | 6.90  | 6.79      | 0.23   | 27.63  |
| Trade          | 174 | 52.34 | 22.63     | 15.51  | 108.16 |
| ln GDP         | 180 | 7.15  | 0.66      | 6.05   | 8.41   |
| Debt Service   | 175 | 2.60  | 1.60      | 0.67   | 8.03   |

Note: This table reports summary statistics (mean, standard deviation, minimum, and maximum) for all variables across the full sample. These statistics provide an overview of the data distribution and help identify potential outliers.

### 4.2 Correlation and Multicollinearity Diagnostics

Table 3 shows the pairwise correlations between the current account balance and the variance inflation factors. Remittances have the strongest positive correlation with the current account balance (CAB). Trade openness, debt service, and GDP per capita display strong negative correlations. All variance inflation factors are below five, with an average of 2.06, confirming that multicollinearity is not a major concern for South Asian economies.

Table 3: Correlation Matrix and Multicollinearity Diagnostics

| Variable       | Correlation with CAB | VIF  | Interpretation                               |
|----------------|----------------------|------|----------------------------------------------|
| Fiscal Balance | -0.054               | 1.62 | Weak negative relation, no multicollinearity |
| Private Credit | -0.220***            | 1.58 | Significant negative correlation, safe VIF   |

|                |           |      |                                                             |
|----------------|-----------|------|-------------------------------------------------------------|
| Interest Rate  | -0.182*   | 1.32 | Weak negative correlation, very low collinearity            |
| FDI            | 0.031     | 1.22 | No meaningful correlation, very stable                      |
| Remittance     | 0.311***  | 1.54 | Strong positive link, low collinearity                      |
| Trade Openness | -0.588*** | 2.84 | Strong negative relation, moderate but acceptable VIF       |
| ln GDP         | -0.412*** | 4.13 | Strong macro relationship, highest VIF but acceptable (<10) |
| Debt Service   | -0.471*** | 2.20 | Strong negative relation, low-moderate VIF                  |

Note: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.10$ . This table presents pairwise Pearson correlation coefficients between each independent variable and the current account balance (CAB).

### 4.3 Panel Diagnostics and Unit Root Tests

Table 4 presents the results of the panel diagnostic tests. The Wooldridge test rejects the null hypothesis of no first-order serial correlation, indicating that the error terms are correlated over time within panel units. The Modified Wald test rejects the null hypothesis of homoskedasticity, confirming the presence of heteroskedasticity across panel units. In contrast, the Pesaran CD test fails to reject the null hypothesis of cross-sectional independence, implying that the error terms are not systematically correlated across cross-sectional units. Overall, the diagnostic results reveal the presence of serial correlation and heteroskedasticity but no evidence of cross-sectional dependence, thus justifying the use of Driscoll-Kraay standard errors to obtain robust and reliable statistical inference.

Table 4: Panel Diagnostic

| Test                          | Statistic         | p-value | Result      |
|-------------------------------|-------------------|---------|-------------|
| Wooldridge Serial Correlation | $F = 30.07$       | 0.0119  | Present     |
| Heteroskedasticity            | $\chi^2 = 719.38$ | 0.0000  | Present     |
| Pesaran CD Test               | $z = -0.744$      | 0.4568  | Not present |

Note: The Wooldridge test detects serial correlation; the Modified Wald test detects heteroskedasticity; the Pesaran CD test detects cross-sectional dependence.

Table 5 presents the Im-Pesaran-Shin unit root tests. The current account balance, fiscal balance, interest rate, and FDI are stationary at levels. On the other hand, private credit, remittances, trade openness, and GDP per capita are non-stationary. The mixed integration orders support our use of estimators that do not require all variables to be integrated of the same order.

Table 5: Panel Unit Root Test (IPS)

| Variable       | Z-stat | p-value | Order |
|----------------|--------|---------|-------|
| CAB            | -3.45  | 0.0003  | I(0)  |
| Fiscal Balance | -2.19  | 0.014   | I(0)  |
| Private Credit | 2.53   | 0.994   | I(1)  |
| Interest Rate  | -4.81  | 0.000   | I(0)  |
| FDI            | -3.63  | 0.0001  | I(0)  |

|            |       |       |      |
|------------|-------|-------|------|
| Remittance | -0.23 | 0.407 | I(1) |
| Trade      | -0.70 | 0.239 | I(1) |
| ln GDP     | 5.74  | 1.000 | I(1) |

Note: The Im-Pesaran-Shin (IPS) test examines whether variables contain a unit root (non-stationary). I(0) indicates stationarity; I(1) indicates non-stationarity.

#### 4.4 Main Regression Results

Table 6 presents the main regression results across five different specifications, employing a structured modelling approach to explore the Twin Deficit Hypothesis (TDH), the crowding-out mechanism, and the influence of capital flows in South Asia. Model 1 offers a straightforward test of the Twin Deficit Hypothesis. The coefficient for the fiscal balance is positive but not statistically significant. Model 2 includes crowding-out variables. The coefficient for the fiscal balance increases and becomes marginally significant, indicating that adding credit and interest rate variables enhances the connection between the fiscal and current accounts. However, private credit and the interest rate are not statistically significant, providing limited support for the crowding-out channel.

Table 6. Main Regression Results: Baseline, Transmission, and Moderation Analysis (M1- M5)

| Variables                      | M1<br>Baseline<br>TDH | M2<br>Crowding-out<br>Channel | M3<br>Capital Flow<br>Channel | M4<br>Integrated<br>Model | M5<br>Preferred<br>Model |
|--------------------------------|-----------------------|-------------------------------|-------------------------------|---------------------------|--------------------------|
| Fiscal Balance                 | 0.634                 | 0.732*                        | 0.377                         | 0.132                     | 0.132                    |
| Private Credit                 | —                     | -0.202                        | —                             | -0.180                    | -0.180                   |
| Interest Rate                  | —                     | 0.264                         | —                             | 0.183                     | 0.183                    |
| FDI                            | —                     | —                             | 1.758**                       | 1.141                     | 1.141                    |
| Remittance                     | —                     | —                             | 0.601                         | 0.544                     | 0.544**                  |
| Fiscal Balance ×<br>FDI        | —                     | —                             | —                             | 0.481*                    | 0.481**                  |
| Fiscal Balance ×<br>Remittance | —                     | —                             | —                             | -0.073                    | -0.073                   |
| Trade Openness                 | -0.010                | 0.125                         | -0.087                        | 0.075                     | 0.075                    |
| ln(GDP per<br>capita)          | -0.930                | 0.690                         | -3.110                        | 0.070                     | 0.070                    |
| External Debt                  | -0.490                | -0.514                        | -0.378                        | -0.368                    | -0.368                   |
| COVID                          | 0.173                 | 4.233                         | 0.064                         | 2.887                     | 2.887*                   |
| Country Fixed<br>Effects       | Yes                   | Yes                           | Yes                           | Yes                       | Yes                      |
| Observations                   | 108                   | 80                            | 108                           | 80                        | 80                       |
| Within R <sup>2</sup>          | 0.096                 | 0.311                         | 0.193                         | 0.438                     | 0.438                    |
| Standard Errors                | Clustered             | Clustered                     | Clustered                     | Clustered                 | Driscoll-<br>Kraay       |

Note: This table displays the key empirical results. Models M1-M4 employ Fixed Effects with clustered standard errors, whilst Model M5 utilises Driscoll-Kraay standard errors.

Model 3 incorporates capital flow variables. FDI has a positive and statistically significant effect on the current account balance. Remittances are positive but not statistically significant. This suggests that FDI directly improves the current account in South Asia. Model 4 introduces

interactions between the fiscal balance and both FDI and remittances. The fiscal-FDI interaction is positive and marginally significant, implying that FDI strengthens the connection between the fiscal position and the current account. The fiscal-remittance interaction is negative but not statistically significant. The direct effect of FDI remains positive but becomes insignificant when the interaction is included.

Model 5, our preferred specification with Driscoll-Kraay standard errors, shows that remittances positively and significantly influence the current account balance. A 1 percentage point rise in remittances as a share of GDP correlates with a 0.54 percentage point improvement in the current account balance. The fiscal-FDI interaction remains positive and significant, confirming that FDI amplifies the effect of the fiscal balance on the current account. The COVID dummy is positive and marginally significant, indicating that the pandemic period was linked to an improvement in the current account, likely due to decreased imports and resilient remittance inflows. The fiscal balance itself remains insignificant in this model. The number of observations drops from 108 in M1 and M3 to 80 in M2, M4, and M5 because data on private credit and interest rates are unavailable for all country-year observations.

#### 4.5 Crowding-Out Mechanism Tests

Table 7 examines the two crowding-out channels. The fiscal deficit does not significantly affect private credit, as the coefficient is positive rather than negative, contradicting the crowding-out hypothesis. Similarly, the fiscal deficit does not notably influence interest rates. Remittances, however, substantially increase both private credit and interest rates, implying that remittance inflows promote financial deepening. These findings confirm that the crowding-out channel was not active in South Asia during the period studied. Overall, the evidence suggests that fiscal deficits do not influence external balances through either the credit or interest-rate channels.

Table 7: Crowding Out Tests

| Variable       | Private Credit | Interest Rate |
|----------------|----------------|---------------|
| Fiscal Deficit | 1.593          | -0.032        |
| FDI            | 0.29           | 0.09          |
| Remittance     | 2.31***        | 0.68***       |
| Trade          | 0.04           | -0.11**       |
| GDP            | 18.26***       | -0.85         |
| Debt Service   | 0.16           | 0.42          |

Note: These tests examine whether fiscal deficits crowd out private sector activity. Column (1) tests whether fiscal deficits reduce private credit. Column (2) tests whether fiscal deficits raise interest rates. Both are necessary conditions for the crowding-out channel to operate.

#### 4.6 Robustness Checks

Table 8 examines whether the results remain consistent across different sample periods. The pre-COVID period shows similar patterns to the overall sample. The fiscal-FDI interaction remains marginally significant. In the post-GFC period, several key changes occur. The fiscal

balance turns negative and becomes statistically significant, providing strong support for the Twin Deficit Hypothesis in the post-2010 period. Both FDI and remittances display larger positive coefficients, with their significance increasing. The fiscal-FDI interaction remains positive and marginally significant. These findings suggest that the TDH is period-dependent, being more evident in the post-GFC period when capital flows have become more prominent.

Table 8: Robustness Test

| Variable                   | Pre-COVID | Post-GFC |
|----------------------------|-----------|----------|
| Fiscal Balance             | 0.14      | -0.34**  |
| Private Credit             | -0.26     | 0.10     |
| Interest Rate              | 0.19      | -0.15*   |
| FDI                        | 1.06      | 2.07**   |
| Remittance                 | 0.45      | 1.41**   |
| Fiscal $\times$ FDI        | 0.45*     | 0.27*    |
| Fiscal $\times$ Remittance | -0.07     | -0.01    |

Note: These robustness checks test whether results are stable across different sample periods. R1 (Pre-COVID): Excludes the COVID-19 period ( $\leq 2019$ ) to test if results are driven by pandemic effects. And R2 (Post-GFC): Focuses on the post-Global Financial Crisis period ( $\geq 2010$ ) to test if relationships have changed over time.

#### 4.7 Summary of Hypothesis Testing

Table 9 summarises the empirical findings for the proposed hypotheses. The results indicate weak or mixed support for the Twin Deficit Hypothesis ( $H_1$ ), while the traditional crowding-out channels through private credit ( $H_{2a}$ ) and interest rates ( $H_{2b}$ ) are not supported. The moderating effect of FDI ( $H_{3a}$ ) receives partial support, whereas the moderating role of remittances ( $H_{3b}$ ) is not supported. Remittances show a strong positive relationship with the current account ( $H_4$ ), while the direct effect of FDI ( $H_5$ ) is only partially supported. Overall, the findings suggest that capital flows, particularly remittances and the moderating influence of FDI, are more significant than the traditional crowding-out mechanism in explaining the external balance adjustment in South Asia.

Table 9: Hypothesis Testing

| Hypothesis | Description             | Result               |
|------------|-------------------------|----------------------|
| $H_1$      | Twin Deficit Hypothesis | Weak / Mixed Support |
| $H_{2a}$   | Credit Channel          | Not Supported        |
| $H_{2b}$   | Interest Rate Channel   | Not Supported        |
| $H_{3a}$   | FDI Moderation          | Partially Supported  |
| $H_{3b}$   | Remittance Moderation   | Not Supported        |
| $H_4$      | Remittance to CAB       | Strongly Supported   |
| $H_5$      | FDI to CAB              | Strongly Supported   |

Note: Final results highlight capital flow channels (FDI and remittances) as the dominant drivers of external balance adjustment in South Asia.

## 5. Discussion

The key finding of this study is that capital flows, particularly remittances, a strong positive impact across all models, and FDI, are the main factors influencing the current account balance in South Asia. This supports the counter-cyclical pattern of remittances documented by Beaton et al. (2017, 2018) and confirms that remittances provide a stable source of foreign exchange, thereby improving external balances. The effect is significant where “a one percentage point increase in remittances relative to GDP raises the current account by 0.54 percentage points, indicating that policies promoting remittance channels can significantly enhance external stability”. One important point is that FDI has a substantial positive impact, particularly after the GFC, when it improves the current account by over two percentage points. This finding is supported by Tran and Dinh (2014), who argue that FDI enhances the trade balance through increased productivity and export competitiveness.

Another important finding is the positive and significant interaction between fiscal policy and FDI. FDI strengthens the effect of fiscal balance on the current account, suggesting that countries with higher FDI inflows exhibit a stronger positive relationship between fiscal and current account improvements. When fiscal policy is well-managed, FDI contributes more effectively to export-led growth, which benefits the current account. This finding broadens the existing literature by demonstrating that FDI not only directly improves current accounts but also boosts the effectiveness of fiscal policy.

Therefore, the crowding-out channel is not supported by our findings. Fiscal deficits do not significantly impact private credit or interest rates, corroborating the results of Sri Lanka by Priyadarshane and Dayaratna-Banda (2013) and Cooray (2019). The findings can be interpreted in three ways. Firstly, accommodative monetary policies might have offset the crowding-out effect. Secondly, South Asian financial markets could have excess liquidity that absorbs government borrowing without reducing credit to the private sector. Thirdly, external sources of finance may complement domestic borrowing. The absence of crowding-out suggests that fiscal transmission operates through other channels in South Asia, such as aggregate demand or exchange rate mechanisms.

The Twin Deficit Hypothesis shows weak support in the full sample but strong support in the post-GFC period. During this period, the fiscal balance turns negative and becomes statistically significant, indicating that fiscal improvements help reduce current account deficits. This period-specific finding aligns with Kim (2023), who identified that structural changes influence TDH dynamics. The GFC may have increased awareness of fiscal vulnerabilities, making fiscal consolidation more effective in improving external balances. The positive COVID coefficient indicates that the pandemic period was associated with improvements in the current account. This probably results from a significant decrease in imports due to economic contraction, combined with steady remittance inflows. South Asian economies experienced current account improvements during the pandemic despite output declines, consistent with findings by Ahmad and Alam (2024) on post-pandemic fiscal resilience.

## 6. Conclusion and Policy Implications

This study re-examines the Twin Deficit Hypothesis in South Asia by including mechanisms of crowding-out and capital flow dynamics within a comprehensive empirical framework. Our results reveal a unique pattern that questions traditional beliefs about fiscal-external linkages in the region. The Twin Deficit Hypothesis shows weak support across the entire sample but is strongly supported during the post-Global Financial Crisis period, indicating that the relationship between fiscal deficits and current account balances depends on the period rather than being universally consistent. More critically, our findings highlight that capital flows, especially remittances and foreign direct investment, play a dominant role in external balance adjustments. The crowding-out mechanism is not confirmed, as fiscal deficits do not significantly impact private credit or interest rates. These findings shift the focus from fiscal transmission channels to capital flow dynamics as the key factors influencing external balance outcomes in South Asia.

This study has three key contributions to South Asian economies. First, it provides the first comprehensive empirical test of the TDH, crowding-out, and capital flow moderation in South Asia; second, it demonstrates that FDI enhances the fiscal-CAB relationship, whereas remittances do not act as a moderator; third, it is the first to examine both credit and interest rate crowding-out channels in South Asia simultaneously.

Several policy recommendations arise from our findings. First, South Asian governments should enhance formal remittance channels by reducing transaction costs and increasing financial inclusion. Second, policymakers should promote export-oriented FDI that supplements foreign exchange rather than relies on import-heavy investments. While FDI benefits current accounts, it can also amplify fiscal impacts, making it vital to focus on productive FDI. Third, maintaining fiscal discipline remains crucial, especially after the GFC. Sustaining strong fiscal positions will reduce external vulnerability during crises. Fourth, monetary policy should stay accommodative to support private credit growth, as crowding-out does not seem to be a significant issue in the region.

Future research could expand this analysis to other developing regions to see if capital flow dominance is a more widespread pattern. Comparative studies with other small, renewable-dominant economies could also offer valuable insights. The role of institutional quality in influencing the fiscal-CAB relationship warrants further exploration. Finally, this paper presents a puzzle for future research: why do remittances directly stabilise current accounts without affecting the fiscal impact, while FDI strengthens the link between the fiscal and current account?

660 **Statements and Declarations**

661 Data Availability

662 The raw panel data are publicly available from the World Development Indicators (WDI) and the  
663 Worldwide Governance Indicators (WGI). The cleaned dataset, construction codebook, and replication  
664 scripts are available from the corresponding author upon reasonable request.

665 Competing Interests

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669 Data Availability

670 The data used in this study are publicly available from the World Development Indicators (WDI)  
671 databases.

672 Ethics Approval

673 Not applicable. This study used secondary aggregate data and did not involve human or animal  
674 subjects.

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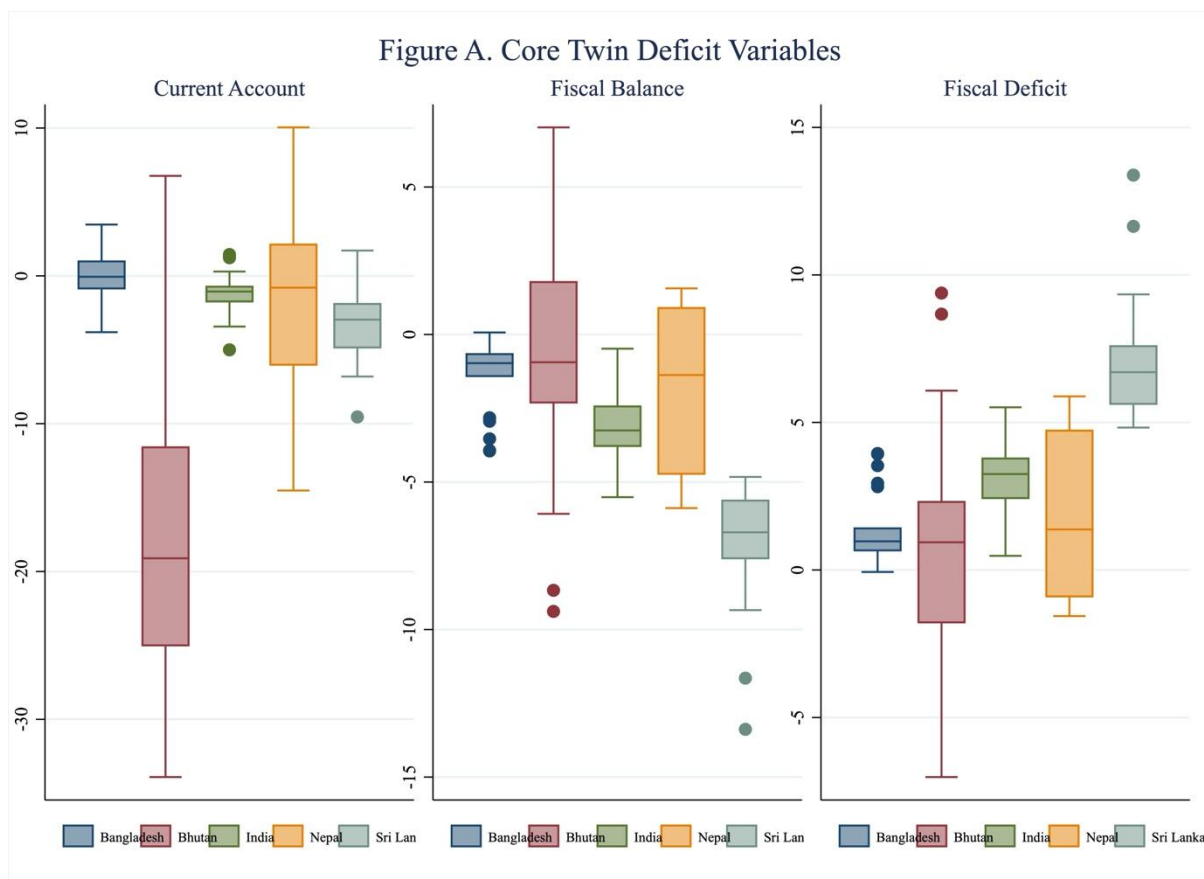


Figure A: Core Twin Deficit Variables, 1990-2025

Figure A illustrates the distribution of current account balances, fiscal balances, and fiscal deficits among the selected South Asian countries. The pattern indicates clear differences among nations. Bhutan exhibits significant variation in its current account, while Bangladesh and India appear more stable. Fiscal balances also vary across countries, with Sri Lanka showing a comparatively weaker position. These patterns emphasise the importance of analysing the twin deficit relationship within a panel framework.

Source: Author's calculations based on World Bank WDI.

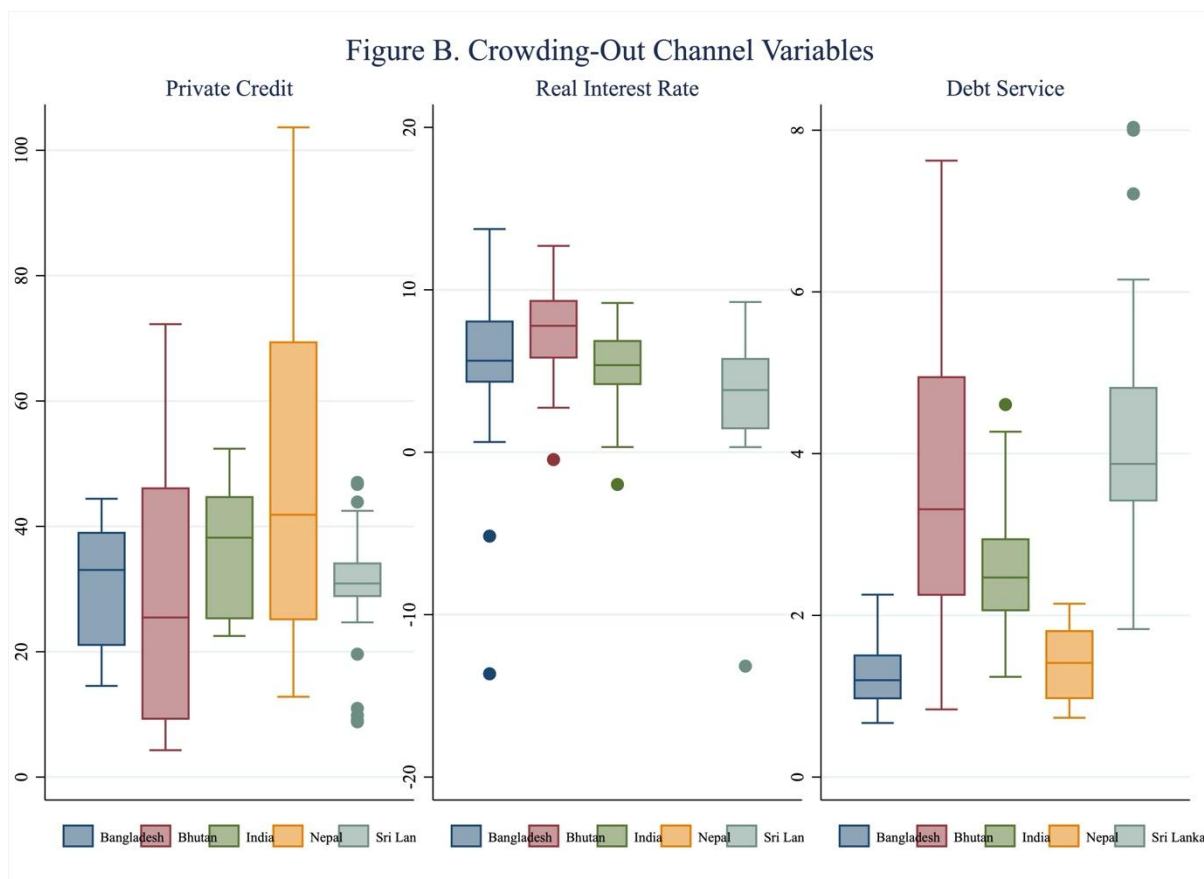


Figure B: Crowding-Out Channel Variables, 1990-2025

Figure B shows the main crowding-out indicators: private credit, real interest rate, and debt service. Private credit varies significantly, especially in Nepal and Bhutan. Real interest rates mostly remain positive, though some negative values indicate periods of macroeconomic stress. Debt service is more spread out in Bhutan and Sri Lanka. This suggests that fiscal pressure may affect the external balance through credit conditions, interest rates, and debt obligations.

Source: Author's calculations based on World Bank WDI.

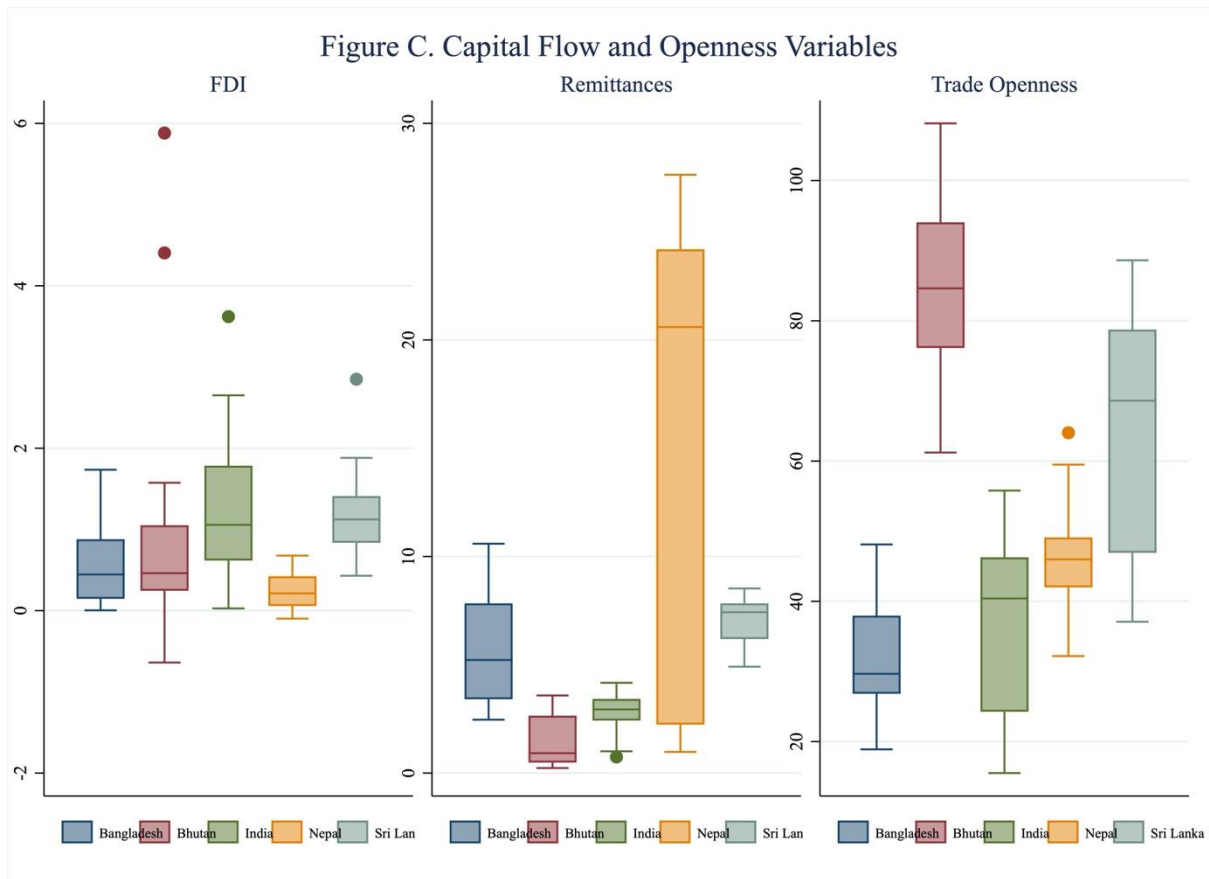


Figure C: Capital Flow and Openness Variables, 1990-2025

Figure C illustrates the distribution of FDI, remittances, and trade openness. FDI remains relatively modest in most countries, although some outliers show temporary rises. Remittances are particularly significant for Nepal, where the distribution is considerably higher than in other countries. Trade openness also varies across the region, with Bhutan and Sri Lanka exhibiting higher levels. These differences support the inclusion of capital flows and trade openness in the model.

Source: Author's calculations based on World Bank WDI.



Figure D: Interaction and Income Variables, 1990-2025

Figure D presents the interaction terms between fiscal balance and capital flows, along with log GDP per capita. The interaction variables vary across countries, suggesting that the impact of fiscal balance on the current account may depend on FDI and remittance inflows. Nepal exhibits a notably wide distribution in the fiscal balance-remittance interaction. The income variable also indicates structural differences among the countries.

Source: Author's calculations based on World Bank WDI.

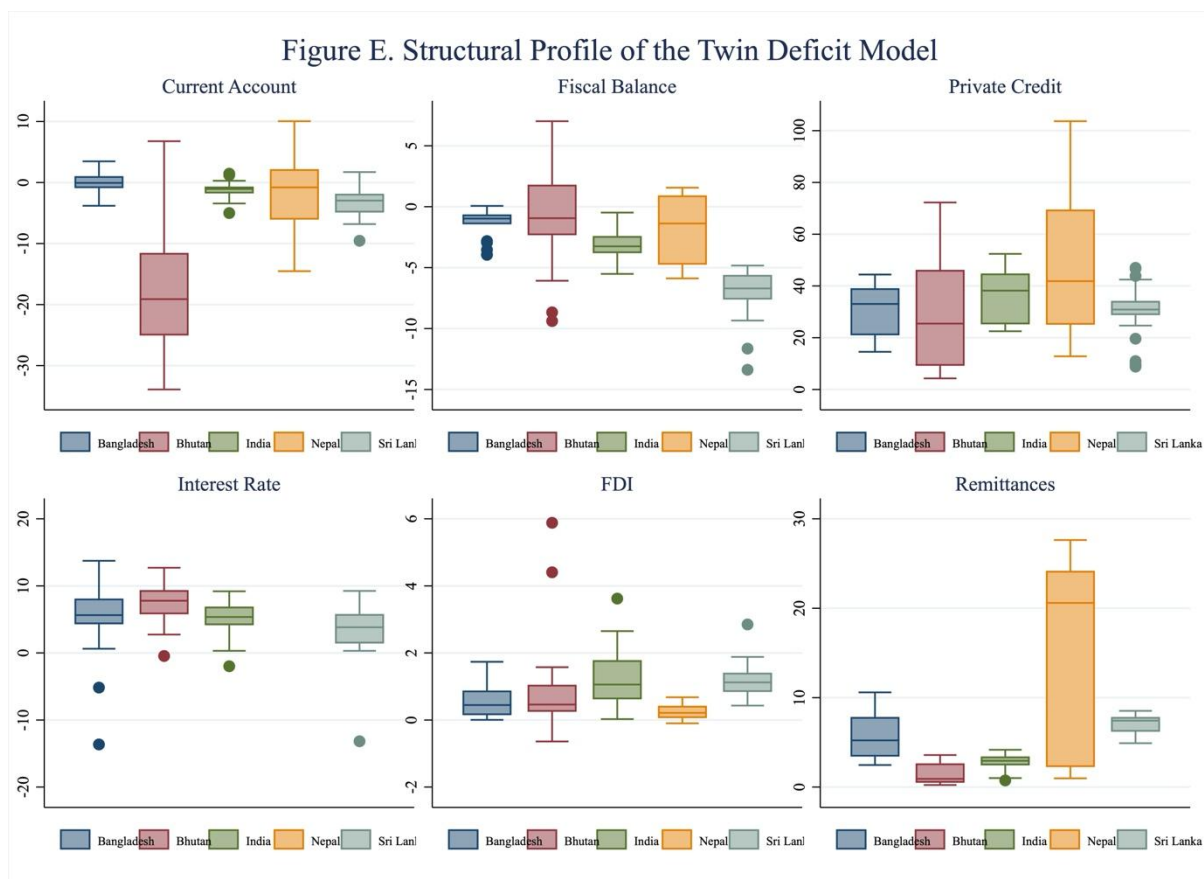


Figure E: Structural Profile of the Twin Deficit Model, 1990-2025

Figure E provides an overall view of the key variables used in the empirical model. The figure shows notable cross-country differences in fiscal balance, current account balance, credit, interest rate, FDI, and remittances. Bhutan exhibits large external account movements, Sri Lanka has weaker fiscal outcomes, and Nepal stands out because of remittance dependence. These differences highlight the importance of controlling for country-specific characteristics.

Source: Author's calculations based on World Bank WDI.

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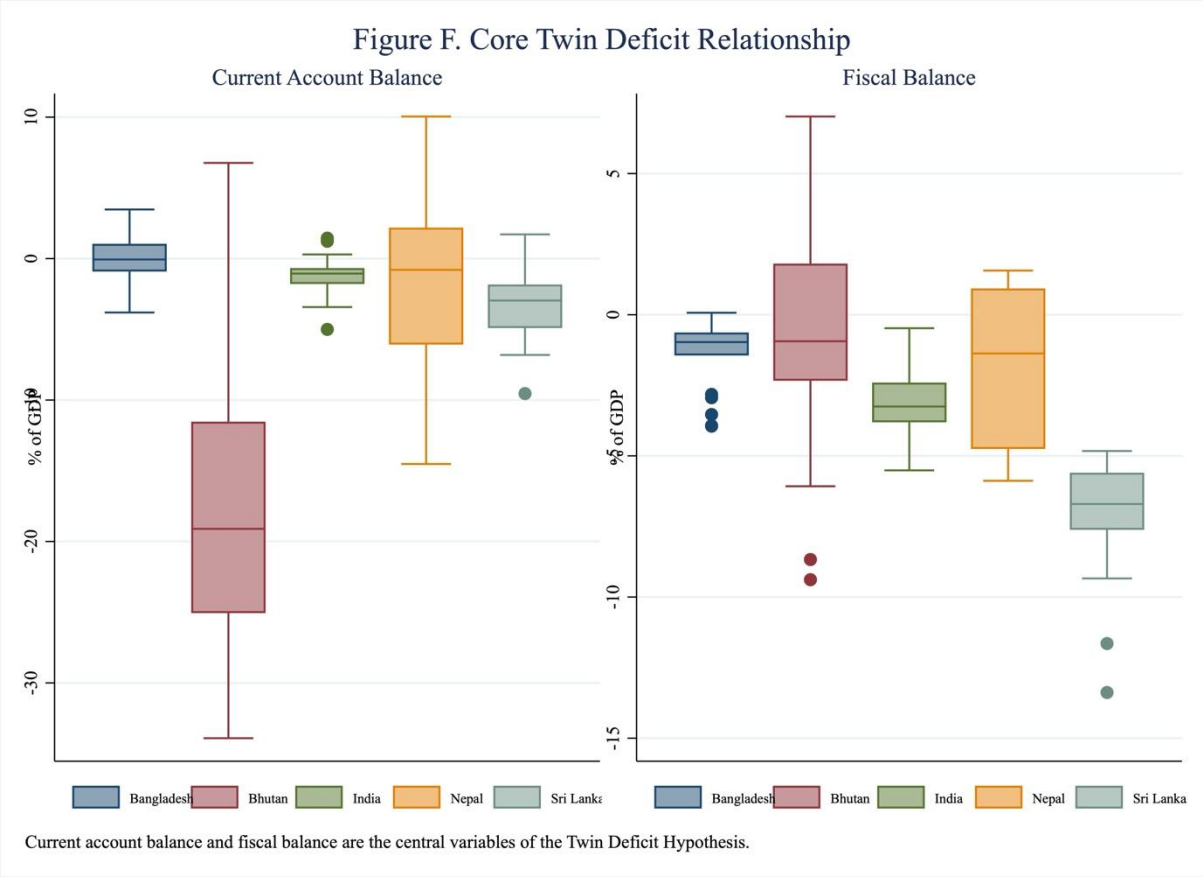


Figure F: Core Twin Deficit Relationship, 1990-2025

Figure F highlights the two main variables of the twin deficit hypothesis: current account balance and fiscal balance. The distributions demonstrate that fiscal and external positions differ significantly among countries. Some economies with weaker fiscal positions also display greater external imbalances, although the pattern is not consistent across all nations. This figure provides the fundamental basis for testing the twin deficit hypothesis using econometric methods.

Source: Author's calculations based on World Bank WDI.

## Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [11.BriefREADME.docx](#)
- [8.Finalanalysisdataset.docx](#)
- [9.Variabledocumentation.docx](#)
- [7.DoandResults.docx](#)
- [10.Analysiscode.do](#)
- [04.Rawdata.xlsx](#)