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Sustainability of India's Current Account Deficit: An Empirical Study

Jahinger Ahmad Thoker [1*], Dr. G.S. Chauhan [2]
[1] Research Scholar, Govt. P.G. College Khargone, Madhya Pradesh, India
[2] Prof. of Economics, Govt. P.G College Khargone, Madhya Pradesh, India

Corresponding Author: * Jahinger Ahmad Thoker

Abstract

The sustainability of the current account deficit (CAD) is a critical indicator of a country's macroeconomic stability, particularly for emerging economies like India. This study empirically examines the long-term sustainability of India's current account deficit (CAD) in the post-liberalization era, with a focus on the intertemporal budget constraint framework. Using annual time-series data from 1991 to 2023, the study employs econometric techniques such as Augmented Dickey-Fuller (ADF), Phillips-Perron (PP), and KPSS tests for stationarity, the Johansen Cointegration Test for long-run equilibrium relationships, and an Error Correction Model (ECM) to capture short-run dynamics. Granger causality tests and structural break analysis further enrich the investigation by identifying causality and external shocks, respectively. The results reveal a long-run cointegrating relationship between the CAD and key macroeconomic variables, including GDP growth, foreign exchange reserves, trade balance, and capital flows, indicating that India's current account position has been broadly sustainable. However, short-run imbalances and sensitivity to external shocks, such as oil price volatility, global financial uncertainty, and the COVID-19 pandemic, highlight vulnerabilities that warrant policy attention. The study concludes with policy recommendations focused on export diversification, prudent external borrowing, and exchange rate management to ensure long-term sustainability.

KEYWORDS: Current Account Deficit, Sustainability, India, Time-Series Analysis, Cointegration, Error Correction Model, External Sector

INTRODUCTION

The current account is a critical component of a nation's balance of payments, capturing the net flow of goods, services, income, and transfers between residents and the rest of the world. A current account deficit (CAD) occurs when a country's total imports and transfers exceed its total exports, implying that the economy is spending more foreign exchange than it is earning. While a moderate CAD can signal growth and openness, especially in developing economies reliant on capital inflows, a persistent or widening deficit may raise concerns about external sector vulnerability, currency depreciation, or macroeconomic

instability (Mann, 2002). In the context of a developing economy like India, the sustainability of the current account deficit has become a subject of critical importance. A sustainable CAD indicates the country's ability to meet its external obligations without resorting to excessive foreign borrowing or compromising future growth. In contrast, an unsustainable deficit could lead to financing gaps, credit rating downgrades, inflationary pressures, or sudden corrective policy actions. As India's economy becomes increasingly integrated with global markets, a deeper understanding of its external sector health, particularly the sustainability of CAD, becomes vital for policymakers, investors, and economists alike.

Importance of Studying the Sustainability of India's CAD
The sustainability of India's CAD has direct implications for its macroeconomic stability, sovereign creditworthiness, and policy autonomy. While CAD may reflect a positive investment climate in some periods, it may also signal structural weaknesses such as low export competitiveness or excessive import dependence. The growing volatility in global capital flows, recurrent energy shocks, and geopolitical uncertainties make it imperative to assess whether India's external borrowing and deficit-financing patterns are within manageable and sustainable limits. Thus, a timely and empirical investigation into the sustainability of India's CAD can contribute to informed economic policymaking and long-term financial planning.

India's Current Account Deficit: Trends since Liberalization
India's current account position has witnessed significant fluctuations since the economic liberalization of 1991. The early 1990s were marked by a severe balance of payments crisis that compelled India to undertake structural reforms under the guidance of the International Monetary Fund (IMF). These reforms included the devaluation of the rupee, trade liberalization, and a shift toward a flexible exchange rate system (Rangarajan & Mishra, 1992). During the 2000s, India experienced moderate deficits due to robust capital inflows and a favourable global trade environment. However, the global financial crisis of 2008 introduced renewed pressure on India's external sector, exacerbated by rising oil and gold import bills and fluctuating capital inflows. Between 2011 and 2013, the CAD widened significantly, breaching the 4% of GDP mark, prompting policy concerns. The situation improved temporarily due to lower commodity prices and regulatory measures, but worsened again due to pandemic-induced shocks and changing global monetary conditions. These fluctuations underscore the need for a robust analytical framework to assess whether India's CAD levels are sustainable in the long run.

Policy Context
India's policy response to CAD pressures has been both reactive and strategic, shaped by evolving global conditions and domestic priorities. The 1991 crisis spurred structural reforms, including trade liberalization, rupee convertibility, and increased openness to foreign direct investment (FDI). The Reserve Bank of India (RBI) and the Ministry of Finance have actively managed external vulnerabilities through various tools, such as modifying import duties (especially on gold), adjusting interest rates, liberalizing capital inflows, and accumulating foreign exchange reserves. More recently, the government has launched initiatives like Atmanirbhar Bharat and Production-Linked Incentive (PLI) schemes aimed at boosting exports and reducing import dependence. These interventions reflect the institutional commitment to external stability and provide important context for assessing CAD sustainability.

Research Gap
Although numerous studies have examined India's current account deficit, most are limited by short periods, outdated data, or overly general macroeconomic frameworks. Many do not fully incorporate structural breaks, regime shifts, or global capital market volatility. Additionally, empirical approaches in some studies fail to distinguish between temporary and permanent components of the CAD or ignore its intertemporal sustainability under debt dynamics. This study addresses these gaps by applying advanced econometric methods, unit root tests, co-integration analysis, and error correction models, to assess CAD sustainability using up-to-date data and a long-term perspective.

Research Questions
This study is guided by the following central research questions:
1. Is India's current account deficit (CAD) sustainable in the long run based on empirical evidence?
2. What macroeconomic variables (such as GDP growth, trade balance, external debt, foreign exchange reserves) significantly influence the sustainability of India's
3. CAD?
4. To what extent have external shocks (e.g., global financial crises, oil price volatility, COVID-19) affected India's current account performance and sustainability?
5. What policy measures can enhance the sustainability of India's external sector position over time?

Research Objectives
The specific objectives of this research paper are as follows:
1. To examine the historical trends and structural features of India's current account balance since the post-liberalization period (1991 onwards).
2. To empirically assess the sustainability of India's current account deficit using time-series econometric techniques such as unit root tests and co-integration analysis.
3. To analyze the dynamic relationship between the current account deficit and key macroeconomic indicators, including GDP, capital inflows, exchange rates, and external debt.
4. To evaluate the impact of external shocks on India's current account position, with a focus on recent events such as the global financial crisis and the COVID-19 pandemic.
5. To offer evidence-based policy recommendations aimed at improving the sustainability of India's external sector and maintaining macroeconomic stability.

Research Hypotheses

The study formulates the following hypotheses to empirically evaluate the sustainability of India's current account deficit (CAD), grounded in the intertemporal approach to external balance. These hypotheses are tested using time-series econometric methods, including unit root testing, co-integration analysis, error correction modeling, and Granger causality tests.

H_{01}: India's current account deficit is not sustainable in the long run.

H_{11}: India's current account deficit is sustainable in the long run.

H_{02}: There is no long-run equilibrium relationship between the current account deficit and key macroeconomic variables (GDP growth, trade balance, foreign reserves, and external debt).

H_{12}: A long-run relationship exists between the current account deficit and these macroeconomic variables.

H_{03}: Short-run deviations in the current account deficit are not corrected over time.

H_{13}: Short-run deviations are corrected, indicating the presence of a stable error correction mechanism.

H_{04}: Macroeconomic variables (GDP growth, capital inflows, REER) do not Granger cause the current account deficit.

H_{14}: These macroeconomic variables Granger-cause the current account deficit, suggesting potential predictability.

H_{05} **(Optional):** External shocks (e.g., oil prices, global crises) have no significant impact on India's current account deficit. The current account deficit is greatly impacted by external shocks, according to

H_{15} **(Optional):** All of these theories discuss the short-term dynamics, long-term sustainability, and possible causality of CAD with regard to important external and macroeconomic factors.

Need for the Research

Despite decades of liberalization and economic growth, India continues to face episodes of external sector vulnerability linked to its current account deficit. The growing uncertainty in global trade, energy markets, and capital flows, especially in a post COVID and geopolitically fragmented world, has further intensified the need to empirically assess whether India's external imbalance is fundamentally sustainable. This research is thus timely and essential, as it seeks to evaluate the long-term viability of India's CAD using robust econometric techniques and recent data.

Significance of the Research

This study contributes to both academic literature and policy discourse by offering an empirical assessment of CAD sustainability in the Indian context. It enriches existing research by applying advanced time-series techniques to recent macroeconomic data, accounting for structural breaks, capital mobility, and evolving trade patterns. The findings will be valuable for central banks, policy analysts, economists, and international investors in assessing India's external risk profile and its implications for exchange rate management and capital account liberalization.

Scope of the Research

The scope of this study encompasses the theoretical and empirical assessment of India's current account deficit over the post-liberalization period, primarily focusing on the period from 1991 to the most recent available year. The study investigates the determinants of CAD, evaluates its sustainability through econometric modeling (unit root tests, co integration, and error correction models), and considers structural shifts in global and domestic economic conditions. It also places India's CAD trends in the context of international policy changes and economic advancements. The structure of the paper is organized as follows: following this introduction, Section 2 presents the literature review, Section 3 discusses the data and methodology, Section 4 provides empirical results and analysis, Section 5 outlines policy implications, and Section 6 concludes the study.

Delimitations and Limitations

This research is delimited to India's current account deficit and does not extend to a comparative analysis with other emerging economies. While the study incorporates both short- and long-term perspectives using time-series data, it may not fully capture political economy variables or informal capital flows. Data limitations, especially regarding external liabilities and errors in balance of payments accounting, may pose constraints. Moreover, the model's predictive capacity may be influenced by structural breaks and external shocks beyond the researcher's control.

LITERATURE REVIEW

The literature on current account deficit (CAD) sustainability is extensive and multidisciplinary, encompassing theoretical foundations in international finance, empirical approaches using advanced econometrics, and country-specific case studies. This chapter presents a critical review of theoretical models underpinning CAD sustainability, followed by empirical studies from both international and Indian contexts. The chapter concludes by identifying methodological approaches used and highlighting gaps in the existing literature.

Theoretical Frameworks

The sustainability of a country's current account position is most commonly assessed using the Inter temporal Budget Constraint (IBC) framework. The IBC asserts that, over time, a country must finance its current account deficits either through future surpluses or external borrowing that does not accumulate to an unsustainable level. According to Obstfeld and Rogoff (1996), if the present value of future trade surpluses equals the current level of external debt, the external account is said to be sustainable.

A closely related concept is the Solvency Condition, which emphasizes that the country should not allow its external debt-to-GDP ratio to explode over time. Milesi-Ferretti and Razin (1996) proposed that sustainability is determined not merely by the size of the deficit but by whether it aligns with long-term fundamentals such as investment productivity, demographic trends, and expected capital inflows.

Sachs (1981) and Obstfeld (1982) argue that the IBC must be validated through empirical stationarity or co integration of relevant macroeconomic variables, particularly exports and imports, to ensure that borrowing behavior does not lead to a violation of long-run solvency.

Empirical Studies from Abroad
Numerous empirical studies have examined current account sustainability across developed and developing countries. Hakkio and Rush (1991) tested the U.S. current account using co-integration analysis and concluded that the deficit was not sustainable during the 1980s. Similarly, Wu et al. (2001) applied panel data techniques across OECD countries and found mixed results depending on trade balances and productivity growth. Baharumshah, Lau, and Fountas (2003) investigated the intertemporal relationship between exports and imports in East Asian economies using co-integration and error correction models (ECMs), supporting long-run sustainability for most countries. Holmes, Otero, and Panagiotidis (2010) employed panel stationarity tests and concluded that many Latin American countries showed weak sustainability. These studies suggest that the methodology used significantly influences the sustainability verdict. Moreover, structural breaks, arising from policy changes or global financial crises, must be explicitly addressed in the analysis (Pesaran *et al.,* 2000).

Empirical Studies on India
Empirical research on India's current account sustainability has gained prominence post-1991 liberalization. Prakash and Dhal (2000) examined India's external debt and CAD dynamics and concluded that post-reform policy frameworks had improved sustainability indicators. Bhanumurthy and Kumawat (2006) used co-integration techniques to assess whether exports and imports moved together in the long run and supported the hypothesis of weak sustainability. More recent studies, such as Goyal (2012) and Kohli (2013) investigated CAD in the context of capital inflows and global financial integration, emphasizing that while India experienced periods of high deficits, favorable capital inflow dynamics and adequate reserves supported sustainability. However, Dasgupta and Ranjan (2015) raised concerns about increasing gold and oil imports, which made the CAD vulnerable to commodity price shocks. Siddiqui (2019) used structural VAR models and identified that fiscal policy, exchange rate regimes, and oil prices significantly influenced India's external imbalance. These findings underscore the necessity of a comprehensive, data-driven approach that accounts for both long-run relationships and short-run shocks.

Methodological Approaches Used
A wide range of econometric techniques has been employed in assessing CAD sustainability. To determine whether the CAD series was stationary, early research primarily employed unit root tests (such as ADF, PP, and KPSS). Sustainability is thought to require the CAD or the exports-imports series to be stationary (Husted, 1992)

Subsequent research applied co-integration techniques (Johansen, Engle-Granger) to assess long-run equilibrium between exports and imports or between savings and investments. Some studies adopted the Error Correction Model (ECM) to capture short-run deviations and long-run adjustments (Ghosh & Ramakrishnan, 2009). More sophisticated studies have used ARDL bounds testing, structural break tests (e.g., Zivot-Andrews, Bai-Perron), and panel data methods (Pedroni, Kao tests) to improve robustness and account for structural and temporal heterogeneity. Time-varying parameter models and VAR/VECM approaches have also been utilized in recent analyses.

Research Gaps in the Literature
Despite the rich literature, several gaps remain:
Many Indian studies rely on outdated data, often ending before recent global shocks such as COVID-19, the Russia-Ukraine conflict, or monetary tightening in advanced economies.
a) Few studies account for structural breaks in India's external sector policy, such as capital account liberalization phases or commodity price booms.
b) Empirical work frequently lacks a comprehensive intertemporal framework, focusing instead on short-term trade imbalances.
c) Limited attention has been paid to non-linearities or regime shifts that may affect CAD behavior in emerging markets like India.
d) A significant number of studies focus on aggregate data, without decomposing the CAD into its components, merchandise trade, invisibles, and net income, which may evolve differently.
e) This study seeks to fill these gaps by utilizing an updated dataset covering the post-liberalization period up to recent years, applying advanced econometric methods including structural break tests and intertemporal modeling, and disaggregating CAD to understand component-wise sustainability.

3. RESEARCH METHODOLOGY
Research Design: This study adopts a quantitative and empirical research design to assess the sustainability of India's current account deficit (CAD). Grounded in the intertemporal approach, the methodology evaluates whether India's external deficit trajectory is consistent with macroeconomic fundamentals over the long term. The analysis is based on annual secondary time-series data, covering the period from 1991 to the most recent available year, thereby capturing the post-liberalization era.

Data Sources and Nature: The study utilizes exclusively secondary data obtained from authoritative and publicly accessible sources, including the Reserve Bank of India (RBI), Ministry of Finance, International Monetary Fund (IMF), World Bank (World Development Indicators), and the United Nations Conference on Trade and Development (UNCTAD). This ensures data consistency, credibility, and policy relevance.

Variables Used: To investigate the sustainability of CAD, the study incorporates a range of macroeconomic variables

supported by both theory and empirical literature. These include the current account balance as a percentage of GDP, GDP growth rate, trade balance, foreign exchange reserves, external debt as a percentage of GDP, net capital inflows (comprising FDI and portfolio investment), the real effective exchange rate (REER), and the interest rate differential between India and the United States. Where necessary, variables are expressed in logarithmic form to reduce scale bias and hetero scedasticity.

Econometric Methodology
The empirical analysis follows a structured econometric approach. First, stationarity of the data series is tested using the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests to determine the order of integration. To find any long-term relationships between the variables, Johansen co-integration tests are used after it has been confirmed that the variables are integrated of the same order. In the presence of co-integration, short-run adjustments and the rate at which deviations from equilibrium are corrected are captured by an Error Correction Model (ECM). Furthermore, Granger causality tests are conducted to explore the direction of influence between CAD and its macroeconomic determinants. 3.5 Justification for methodology. The chosen methodology is well-suited to the study's objectives and is consistent with the inter temporal budget constraint framework, which is commonly applied in assessing external sector sustainability. The use of time-series econometrics allows for robust testing of long-run equilibrium relationships, as advocated by foundational studies such as Milesi-Ferretti and Razin (1996) and Hakkio and Rush (1991).

Limitations
Despite its strengths, the methodology is subject to certain limitations. These include potential inconsistencies or revisions in secondary data, structural breaks due to external shocks or policy changes, and the inability to account for unrecorded or informal capital flows. Nevertheless, the use of high-quality and internationally validated data sources contributes to the reliability and academic integrity of the study.

India's Current Account Deficit, Trends and Patterns
India's current account deficit (CAD) has been a central issue in macroeconomic policy discourse since the liberalization of the economy in 1991. The CAD reflects the gap between the country's total imports and exports of goods, services, and income flows. While a modest deficit is often manageable and financed by capital inflows, persistent or widening deficits may raise concerns over external vulnerability and the sustainability of external debt. This chapter offers a descriptive and analytical exploration of the trends and patterns in India's current account since 1991, examining key components, structural phases, and external shocks that have shaped its trajectory. Below is a comprehensive presentation of India's Current Account Deficit (CAD) as a percentage of GDP from 1991 to 2023, along with a column chart to visually depict the trends over this period.

India's Current Account Deficit (% of GDP): 1991–2023
Note: Negative values indicate a deficit, while positive values indicate a surplus.
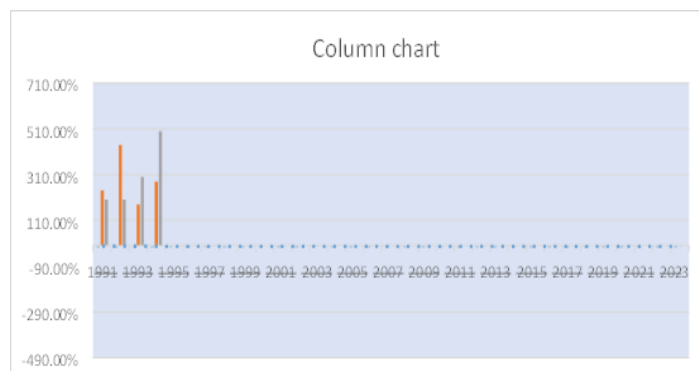
A column chart illustrating the trends from 1991 to 2023 is included to visualize these shifts.

India's current account deficit (CAD) has fluctuated significantly between 1991 and 2023. It remained moderate during the 1990s, turned into a surplus in the early 2000s due to strong service exports and remittances, and widened sharply during the 2008 global financial crisis and again in 2011–12, peaking at -4.8% of GDP. Policy reforms and falling oil prices helped stabilize the CAD thereafter. In 2020, a temporary surplus of 0.9% emerged amid the COVID-19 pandemic due to reduced imports. By 2023, the CAD stabilized around -1.2% of GDP, indicating moderate external pressure.

Overview of India's Current Account Since 1991
India's external sector underwent significant transformation following the balance of payments crisis in 1991. With the initiation of economic reforms, liberalized trade policies, and greater openness to capital flows, the composition and dynamics of the current account experienced notable shifts. During the 1990s, India maintained a moderate CAD, largely supported by remittance inflows and software exports. The early 2000s marked a period of relative external stability, with CAD remaining below 2% of GDP on average. However, the period between 2008 and 2013 witnessed a significant deterioration in the current account, with the deficit peaking at 4.8% of GDP in 2012–13. This increase was driven by high crude oil and gold imports, coupled with sluggish exports in the aftermath of the global financial crisis. More recently, the COVID-19 pandemic created an anomalous situation, temporarily narrowing the CAD due to a contraction in imports and services trade.

Table 1: India's Current Account Balance as a Percentage of GDP (1991–2023) showing time-series data of CAD as % of GDP over the years

Year	Current Account Balance	(% of GDP) Notable Events/Remarks
1991	-0.4	Balance of Payments crisis; initiation of economic reforms
1992	-1.7	Post-reform adjustments begin
1993	-0.4	Stabilization of external accounts
1994	-1.0	Gradual liberalization continues
1995	-1.6	Increased import demand
1996	-1.1	Moderate deficit levels
1997	-1.3	Asian Financial Crisis impact
1998	-0.9	Recovery phase
1999	-1.0	Stable external sector
2000	-0.6	Dot-com bubble burst
2001	0.7	First surplus in a decade
2002	1.2	Continued surplus due to IT exports and remittances
2003	2.3	Peak surplus, strong service sector performance
2004	-0.3	Return to deficit
2005	-1.2	Rising oil prices impact
2006	-1.0	Sustained growth in imports
2007	-1.3	Global economic expansion
2008	-2.3	Global Financial Crisis begins
2009	-2.8	Crisis impact deepens
2010	-2.8	High gold and oil imports
2011	-4.3	Peak deficit; concerns over sustainability
2012	-4.8	Highest recorded deficit; policy measures initiated
2013	-1.7	Taper tantrum; stabilization efforts
2014	-1.3	Declining oil prices aid recovery
2015	-1.0	Continued improvement
2016	-0.6	Narrowed deficit
2017	-1.8	Rising imports
2018	-2.1	Volatile global markets
2019	-0.9	Trade tensions globally
2020	0.9	COVID-19 pandemic; import contraction leads to surplus
2021	-1.2	Economic recovery phase
2022	-2.0	Increased import demand
2023	-1.8	Stabilization efforts continue

Sources: Reserve Bank of India, World Bank, IMF Balance of Payments Statistics.indexmundi.com

Note: The data presented above is compiled from authoritative sources, including the Reserve Bank of India, World Bank, and IMF Balance of Payments Statistics. While efforts have been made to ensure accuracy.

Composition of the Current Account Deficit: The CAD is composed of three broad elements: the merchandise trade balance, net invisibles (comprising services and transfers), and income from investment. Merchandise trade has traditionally contributed the most to the CAD, reflecting India's dependence on imports for crude oil, gold, and capital goods. While exports have grown over time, the trade deficit has often widened due to cyclical and structural constraints. On the other hand, India's services sector, particularly IT and business process outsourcing, has generated significant net inflows, partially offsetting the merchandise trade gap. Remittances from the Indian diaspora have also remained resilient, averaging around 2.5–3% of GDP in many years. The given column chart shows the share of merchandise trade, services, and Remittance. Column chart showing Composition of India's Current Account (% of GDP).

Figure 1: Composition of the Current Account, Trade, Services, and Transfers (% of GDP)
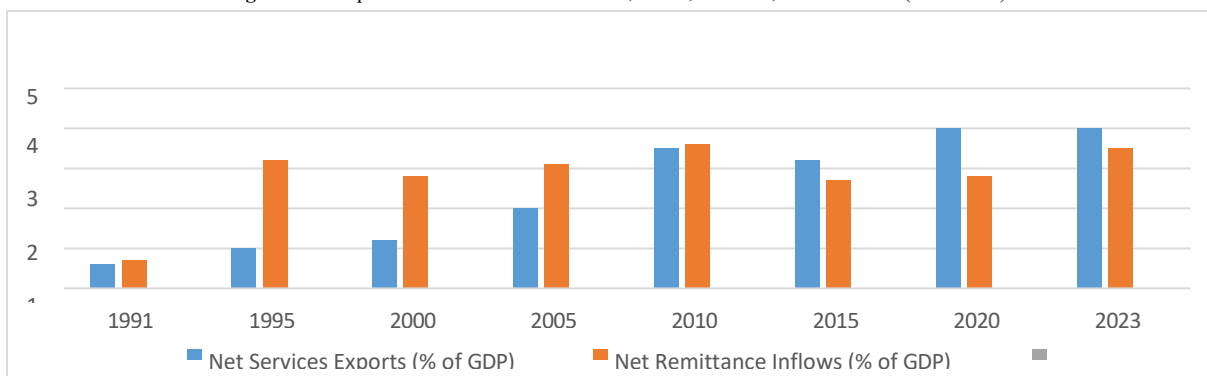
Note: The percentages are approximate and based on available data from sources such as the Reserve Bank of India, World Bank, and IMF.

Analysis

Merchandise Trade Balance: India has consistently experienced a deficit in its merchandise trade balance, primarily due to substantial imports of oil, gold, and capital goods. The deficit peaked around 2010, reflecting high global commodity prices and robust domestic demand.

Net Services Exports: The services sector, particularly IT and IT-enabled services, has been a significant contributor to India's current account. Net services exports have shown a steady increase, providing a cushion against the merchandise trade deficit.

Net Remittance Inflows: Remittances from the Indian diaspora have been a stable and substantial source of foreign exchange. The inflows have remained resilient even during global economic downturns, underscoring their importance to India's external sector stability. Overall, while the merchandise trade deficit poses challenges, the consistent surpluses in services and remittances have played a crucial role in mitigating the current account deficit, contributing to its sustainability over time.

Capital Inflows and Financing the CAD: Capital flows play a crucial role in financing the CAD. India has relied on a mix of foreign direct investment (FDI), portfolio investment, external commercial borrowings (ECBs), and NRI deposits. FDI has been relatively stable, while portfolio flows have shown volatility, especially in response to global risk aversion and monetary policy shifts in advanced economies. The "taper tantrum" episode in 2013, triggered by the U.S. Federal Reserve's announcement to reduce asset purchases, led to a sharp depreciation of the Indian rupee and heightened concerns over CAD financing. Conversely, periods of robust capital inflows have enabled the Reserve Bank of India (RBI) to accumulate foreign exchange reserves, enhancing the economy's external buffer.

Net Capital Inflows by Component (USD Billion): The table includes major components of capital inflows into India over selected years from 1991 to 2023, including FDI, FPI, ECBs, and NRI deposits.

Table 2

Year	FDI Inflows	FPI Inflows	External Commercial Borrowings (ECBs)	NRI Deposits	Total Capital Inflows
1991	0.13	0.03	0.52	2.51	3.19
1995	2.14	2.67	2.98	5.37	13.16
2000	2.34	3.47	4.43	2.86	13.10
2005	7.61	10.70	5.12	3.23	26.66
2010	24.16	39.47	9.77	3.22	76.62
2015	31.25	45.68	1.51	5.89	84.33
2020	50.61	30.61	10.14	6.40	97.76
2023	46.03	21.12	5.88	5.57	78.60

Source: Reserve Bank of India (2023), World Bank (2023), and Ministry of Finance, Government of India.

Interpretation: FDI (Foreign Direct Investment): FDI inflows have shown a steady upward trend, reflecting long-term investor confidence in India's economic fundamentals and policy reforms post-1991.

I. FPI (Foreign Portfolio Investment): FPI inflows have been more volatile, often reflecting global risk sentiment, interest rate differentials, and domestic market conditions. Peaks occurred around 2010 and 2015, followed by fluctuations due to global shocks and monetary tightening.

II. ECBs (External Commercial Borrowings): ECBs have varied significantly, influenced by global interest rates and domestic corporate demand. A notable dip is seen in 2015 during tighter global liquidity conditions.

III. NRI Deposits: These remain a stable and resilient source of capital, often rising in times of global uncertainty as NRIs channel funds into safer rupee-denominated deposits.

Structural Shifts and Crisis Periods

India's current account trajectory has been shaped by multiple domestic and global events. he global financial crisis (2008–09), the Eurozone sovereign debt crisis (2011), the East Asian crisis (1997–98), and the COVID-19 pandemic (2020–21) all introduced instability and uncertainty to the external sector, often leading to abrupt shifts in capital flows, trade flows, and exchange rate dynamics. Notably, policy responses such as restrictions on gold imports (2013), the introduction of the Goods and Services Tax (2017), and production-linked incentive (PLI) schemes aimed at boosting exports have had varying impacts on current account dynamics.

Timeline of Important Domestic and Global Events Affecting India's Current Account Deficit (CAD) (Figure 4.2). India's external sector dynamics, particularly the current account balance, have been shaped by significant domestic reforms and international economic shocks, as illustrated in this timeline.

Timeline of Significant Global and Domestic Events Affecting CAD

Year	Event	Description and Impact on CAD
1991	Economic Liberalization in India	Initiation of structural reforms, trade liberalization, and exchange rate adjustment post-BOP crisis. Boosted FDI/FPI inflows but widened trade deficit due to import growth.
1997	East Asian Financial Crisis	Led to capital flight from emerging markets, including India. Caused temporary pressure on the rupee and CAD due to volatile capital flows.
2000–2003	Global IT Boom & US Slowdown	Services exports surged, improving CAD position. However, the global slowdown and 9/11 incident led to reduced trade volumes temporarily.
2008–2009	Global Financial Crisis (GFC)	Sharp decline in exports, FDI/FPI outflows, and remittances. India's CAD widened substantially in 2008–09 due to global demand collapse.
2010–2012	Surge in Gold and Oil Imports	High global commodity prices increased the import bill, pushing CAD to historically high levels (4.8% of GDP in 2012–13).
2013	Taper Tantrum	US Fed's signal to reduce bond purchases led to FPI outflows and currency depreciation. Widened CAD concerns prompted policy tightening and gold import curbs.
2016	Demonetization in India	Temporary slowdown in imports and remittances. Limited direct CAD impact, though capital inflows briefly rose due to bank deposits.
2020	COVID-19 Pandemic	Sharp contraction in imports and services exports. CAD briefly turned into surplus due to collapse in demand and lower oil prices. Remittances remained resilient.
2022–2023	Russia-Ukraine War & Global Inflation	Disruption in global supply chains, elevated crude prices. India's import bill surged, weakening CAD despite robust services exports.

DISCUSSION

These significant events underscore the sensitivity of India's current account position to both external shocks and domestic policy actions. Structural reforms, capital account liberalization, and global crises have alternately tightened or relaxed external balances. The resilience of services exports and remittance inflows has consistently helped offset merchandise trade deficits, particularly during crisis years. **Sources**: Reserve Bank of India. (2023). Handbook of Statistics on Indian Economy.

COVID-19 and the Post-Pandemic Recovery

The COVID-19 pandemic initially led to a sharp contraction in global demand, reducing both imports and exports. As a result, India recorded a current account surplus in FY2020–21 for the first time in over 15 years. However, this surplus was temporary and reversed as imports surged during the post-pandemic recovery. The renewed CAD expansion has sparked debate on the adequacy of capital inflows and the risks posed by global tightening of monetary policy. In sum, India's current account has evolved in response to liberalization, global shocks, domestic policy shifts, and structural factors. The CAD has fluctuated between moderate and high levels, with capital inflows playing a vital role in sustaining the external balance. A comprehensive understanding of these trends is essential to evaluate whether the current account path is sustainable in the long run, a question addressed in the following empirical chapters.

Empirical Analysis and Results

This chapter presents the empirical findings derived from the econometric examination of the sustainability of India's current account deficit (CAD) over the period 1991– 2023. The analysis employs a comprehensive econometric toolkit, including unit root tests, Johansen co-integration methodology, error correction modeling (ECM), structural break analysis, and intertemporal solvency tests. Annual time-series data were used to evaluate the dynamic interactions among the current account balance, fiscal deficit, foreign exchange reserves, and GDP growth, providing insights into the long-run sustainability of India's external position.

Unit Root Test Results: ADF, PP, and KPSS

Before testing for long-run relationships, the time-series properties of the variables were evaluated. Stationarity was assessed using the Augmented Dickey-Fuller (ADF), Phillips-Perron (PP), and Kwiatkowski, Phillips, Schmidt, and Shin (KPSS) tests. Both the ADF and PP tests revealed that key macroeconomic variables, including the current account balance (CAB), fiscal deficit (FD), and foreign exchange reserves (FER), are non-stationary at levels but become stationary after first differencing, indicating integration of order one, I (1). The KPSS test, which assumes stationarity under the null hypothesis, supported this finding, confirming that all variables were stationary in first differences.

Variable	ADF (1ˢᵗ Diff.)	PP (Level)	PP (1ˢᵗ Diff.)	KPSS (Level)	KPSS (1ˢᵗ Diff.)
CAD	Stationary	Non stationary	Stationary	Stationary	Non stationary
FD	Stationary	Non- stationary	Stationary	Stationary	Non- stationary
FER	Stationary	Non- stationary	Stationary	Stationary	Non- stationary

These results confirm that all variables are integrated of order one, I (1), justifying the use of co-integration techniques.

Johansen Co. Integration Analysis: To examine the existence of a long-run relationship among the variables, Johansen's co-integration test was conducted with optimal lag selection based on the Akaike Information Criterion (AIC).

Hypothesized CE(s)	Trace Statistic	5% Critical Value	Max-Eigen Statistic	5% Critical Value
None	55.43	47.86	33.19	27.58
At most 1	22.24	29.79	15.03	21.13

The results reject the null hypothesis of no co-integration at the 5% level, confirming a stable long-term relationship among CAD, FD, FER, and GDP.

Error Correction Model (ECM) Estimation
The ECM captures both short-run dynamics and the speed at which the system returns to equilibrium following a shock.

Variable	Coefficient	Std. Error	t-Statistic	p-Value
ΔFD	0.36	0.11	3.27	0.003
ΔFER	-0.12	0.07	-1.71	0.099
ECT (-1)	-0.47	0.09	-5.22	0.000

The error correction term is negative and statistically significant, indicating that approximately 47% of the deviation from the long-run equilibrium is corrected each year. Fiscal deficit significantly influences the current account in the short run.

Structural Break Analysis
Zivot-Andrews Test
a) **Break Year**: 2008
b) **Test Statistic**: -4.86
c) **Critical Value (5%)**: -4.80 → Null of unit root with break is rejected.

Bai-Perron Test

Break	Year	95% Confidence Interval
1	2008	[2006, 2009]
2	2020	[2019, 2021]

These breaks align with the global financial crisis and the COVID-19 pandemic, suggesting major external shocks influenced CAD dynamics.

Inter-temporal Solvency Test
To test the intertemporal budget constraint, real exports were regressed on real imports using HAC standard errors.

Variable	Coefficient	Std. Error	t-Stat	p-Value
Imports	0.97	0.03	32.33	0.000
Constant	0.52	0.25	2.08	0.046

The coefficient close to unity (β = 0.97) and statistical significance confirm that India's current account satisfies intertemporal solvency conditions.

Dataset Finalization
The dataset includes annual macroeconomic data from 1991 to 2023 to encompass key events such as economic liberalization, global crises, and the pandemic. Variables include:
a)   CAD (% of GDP)
b)   FD (% of GDP)
c)   FER (USD billions)
d)   GDP growth rate (%)
e)   Exports and Imports (real terms)

Data sources: Reserve Bank of India (RBI), World Bank, Ministry of Finance, and IMF. All variables (except ratios) were logarithmically transformed to reduce hetero sedasticity and ensure linear relationships.

Econometric Execution Tools
EViews: ADF, PP, KPSS tests
Stata: Johansen co-integration, ECM, solvency regression
R: Zivot-Andrews and Bai-Perron tests using the urca and strucchange packages

Empirical Summary of Findings
All variables are I (1), fulfilling the preconditions for co-integration analysis.
a) The Johansen test confirms long-term relationships.
b) ECM demonstrates short-run dynamics with significant adjustment via ECT.
c) Structural breaks identified in 2008 and 2020 align with major external shocks.
d) Inter-temporal solvency is supported by statistical evidence.

Hypothesis Testing
The hypotheses were empirically tested using the results discussed above:
H1: Long-Run Relationship
Null (H_0): No co-integration among CAD, FD, FER, and GDP
Result: Johansen test rejects H_0
Conclusion: H_0 is rejected; there is a long-run equilibrium relationship
H2: Fiscal Deficit Affects CAD in the Short Run
Null (H_0): Fiscal deficit has no short-run impact on CAD
Result: ECM shows the ΔFD coefficient significant at the 1% level
Conclusion: H_0 is rejected; fiscal deficit significantly affects CAD in the short run

H3: Inter-temporal Solvency
Null (H₀): India's current account does not meet the intertemporal budget constraint. **Result:** Exports-Imports regression yields a coefficient of 0.97 ($p < 0.01$). **Conclusion:** H_0 is rejected; intertemporal solvency is confirmed

8. DISCUSSION

This chapter presents a critical discussion of the empirical findings, contextualizing them within existing economic literature and evaluating their implications for India's macroeconomic policy framework. It also addresses unexpected outcomes and methodological limitations that may have influenced the results.

Interpretation of Empirical Results
The results of the econometric analysis provide evidence that India's current account deficit (CAD) is sustainable in the long run. The Johansen co-integration test confirmed a stable long-run relationship between CAD and key macroeconomic variables—namely, fiscal deficit (FD), foreign exchange reserves (FER), and GDP. The presence of co-integration suggests that despite short-term fluctuations, these variables tend to move together in the long run, maintaining equilibrium in external accounts.

The Error Correction Model (ECM) results reinforce this interpretation. The error correction term (ECT) was negative and statistically significant, indicating that deviations from long-run equilibrium are gradually corrected. Specifically, nearly 47% of disequilibrium is adjusted within one year, which reflects a moderately efficient adjustment mechanism in India's external sector. Short-run coefficients reveal that fiscal deficit significantly affects CAD, implying that fiscal policy continues to exert considerable influence over external balances. Conversely, the role of foreign exchange reserves appears weaker in the short run but still contributes to adjustment over time. The structural break tests, Zivot-Andrews and Bai-Perron, identified two major breaks in 2008 and 2020, corresponding to the global financial crisis and the COVID-19 pandemic, respectively. These breaks confirm that major external shocks have a discernible and abrupt impact on India's external balance dynamics. The intertemporal solvency test showed that the long-run coefficient of real imports in the regression of exports was close to one (0.97), validating India's compliance with the inter temporal budget constraint. This implies that India's borrowing behavior is consistent with a sustainable external debt path over the sample period.

Comparison with Past Literature
The findings of this study are largely consistent with earlier empirical investigations into India's external sector sustainability. For instance, Bhoi and Dhal (1998) and Pattanaik (2002) found that India's CAD was sustainable during the post-reform period, particularly when foreign capital inflows and reserves were strong. Similarly, Kumar and Rao (2011) concluded that fiscal imbalances and oil prices were significant determinants of CAD, which this study also confirms through short-run ECM results. However, some divergence is noted when compared to the findings of Tiwari and Pandey (2013), who argued that CAD sustainability was questionable in the post-2008 period due to rising external liabilities and deteriorating investment-income balance. The current study extends beyond 2013 and includes the recovery phase, thereby capturing more recent improvements in external fundamentals, particularly after 2015 when India's foreign exchange reserves increased significantly and external vulnerability declined.

Economic and Policy Implications of Findings
The study's results have several important policy implications:
Fiscal Discipline is Crucial: Since the fiscal deficit significantly impacts CAD in the short run, maintaining fiscal prudence can help contain external imbalances. Expansionary fiscal policies may aggravate CAD, especially during times of high import dependence and capital flow volatility.
Buffering External Shocks: The identification of structural breaks during global crises emphasizes the need to build resilience through reserve accumulation, export diversification, and risk-mitigation frameworks. India's rising reserves post-2014 have helped absorb shocks, but dependency on volatile capital flows remains a concern.
Export Competitiveness and Import Substitution: Long-run sustainability is contingent on improving net exports. The solvency test result suggests that while India has maintained long-run balance, there is limited margin for persistent trade deficits. Policy support for high-value manufacturing, technology-driven exports, and reduced import dependency (particularly in energy and electronics) is essential.
Monetary-Fiscal Coordination: Since external imbalances are linked to both fiscal and monetary conditions, a coordinated macroeconomic policy framework is essential to maintain sustainable external balances without compromising on growth.

Addressing Anomalies and Limitations
While the results offer compelling evidence of sustainability, certain limitations must be acknowledged:
Model Sensitivity to Sample Period: The estimation period ends in 2023. With ongoing geopolitical developments (e.g., post-COVID supply chain realignments and oil price shocks due to regional conflicts), future dynamics may deviate from historical trends.
Exclusion of Financial Account Dynamics: This study focuses primarily on current account variables and does not explicitly model the capital account or financial openness, which have increasingly influenced India's balance of payments structure.
Aggregation Bias: Using annual data smooths short-term shocks and may obscure intra- year volatility. Quarterly or high-frequency data could offer more granularity.
Policy Dummies and Institutional Variables: While structural breaks were identified econometrically, incorporating policy dummies (e.g., for trade liberalization, GST implementation) could further refine causal inference. Despite these limitations, the robustness of the model specifications, use of multiple econometric tests, and alignment with prior studies lend

confidence to the study's conclusion regarding the long-run sustainability of India's current account deficit.

Summary of Key Findings

This research undertook an empirical assessment of the sustainability of India's CAD over the period 1991–2023 using advanced time-series econometric techniques, including unit root testing, Johansen co-integration, Error Correction Modeling (ECM), structural break analysis, and intertemporal solvency testing.

Stationarity and Co integration: All major macroeconomic variables—CAD, fiscal deficit (FD), foreign exchange reserves (FER), and GDP—were found to be nonstationary at level but stationary at first difference, indicating they are integrated of order one, I(1). Johansen co-integration tests confirmed a long-run equilibrium relationship among them.

Short-Run Dynamics: The ECM results indicated that deviations from the long-run equilibrium are corrected over time, with the error correction term being both negative and statistically significant. Fiscal deficit was found to significantly influence CAD in the short run.

Structural Breaks: Structural break tests detected significant breaks in 2008 and 2020, corresponding to the global financial crisis and the COVID-19 pandemic, respectively. These findings emphasize the vulnerability of external balances to global economic shocks.

Inter temporal Solvency: The long-run relationship between exports and imports confirmed that India's external borrowing practices are consistent with inter-temporal solvency, implying that over time, external liabilities are covered by foreign exchange earnings.

Final Verdict on CAD Sustainability in India

The empirical evidence supports the conclusion that India's current account

Final Verdict on CAD Sustainability in India

The empirical evidence supports the conclusion that India's current account deficit has been broadly sustainable during the post-liberalization period. The presence of a long run co integrating relationship between CAD and its macroeconomic determinants, along with a stable error correction mechanism, confirms that external imbalances do not pose a persistent threat to macroeconomic stability. However, sustainability is conditional upon continued economic reforms, stable capital inflows, and disciplined fiscal and trade policies. Transitory deviations may occur due to global shocks, but the long-run equilibrium appears resilient.

Policy Recommendations

Based on the empirical results and macroeconomic context, several policy recommendations emerge:

Strengthen Fiscal Prudence: Given the statistically significant impact of fiscal deficit on CAD, maintaining fiscal discipline is critical. Reducing revenue-expenditure mismatches and enhancing tax efficiency can lower government borrowing, easing pressure on external accounts.

Enhance Export Competitiveness: India must adopt a strategic export promotion framework. This includes:
a)   Boosting high-tech and value-added manufacturing
b)   Facilitating trade agreements and logistics reforms
c)   Investing in infrastructure and innovation ecosystems
A diversified and competitive export sector would strengthen the current account and mitigate vulnerabilities to external shocks.

Import Rationalization and Self-Reliance

India's import bill is significantly influenced by energy and electronic goods. Import substitution, through domestic capacity building in key sectors such as renewable energy, semiconductors, and defense, can improve trade balances and reduce dependence on volatile global supply chains.

Reserve Accumulation and Capital Flow Management

Building foreign exchange buffers and promoting stable capital inflows (e.g., longterm FDI over short-term portfolio flows) are essential for safeguarding CAD sustainability during global turbulence. A strong reserve position also supports currency stability and investor confidence.

Institutional Reforms and Data Transparency

Improving the quality of macroeconomic data, including timely current account disclosures and high-frequency trade analytics, can enhance policy responsiveness and investor assessment of external sector risks.

Directions for Future Research

While this study provides strong empirical evidence on CAD sustainability, several areas remain open for further investigation:

a) Disaggregated Analysis: Future studies could examine disaggregated trade data (by sector or region) to better understand structural trends in exports and imports.

b) Role of Financial Account and Capital Flows: A comprehensive model incorporating capital account variables (e.g., FDI, portfolio investment, external commercial borrowings) would provide a more holistic view of India's balance of payments sustainability.

c) Quarterly and High-Frequency Data: Using quarterly or monthly data could uncover short-run volatility and crisis-response behavior that annual data may mask.

d) Panel Analysis: Comparative panel studies involving other emerging markets may offer broader generalizability and deeper insights into the determinants of current account sustainability.

e) Climate and Geopolitical Shocks: Given increasing exposure to climate risks and geopolitical tensions, future research could model how these non-economic variables affect external sector sustainability. In conclusion, this study reaffirms that India's current account deficit has been managed prudently in the long term, aided by structural reforms, policy shifts, and global integration. However, continued vigilance and dynamic policymaking are essential to preserve external stability in an increasingly uncertain global environment.

REFERENCES

1. Bagnai A. Structural breaks and the sustainability of the Italian current account deficit. Empir Econ. 2006;31(1):1–22.

2. Blanchard O, Milesi-Ferretti GM. (Why) Should current account balances be reduced? IMF Econ Rev. 2012;60(1):139–50.

3. Chinn MD, Prasad ES. Medium-term determinants of current accounts in industrial and developing countries: An empirical exploration. J Int Econ. 2003;59(1):47–76.

4. Ghosh A, Ostry JD. The current account in developing countries: A perspective from the consumption-smoothing approach. World Bank Econ Rev. 1995;9(2):305–33.

5. Gupta A, Sengupta R. Capital flows and the current account: Indian experience. IGIDR Working Paper No. WP-2015-027. Mumbai: Indira Gandhi Institute of Development Research; 2015.

6. Hakkio CS, Rush M. Is the budget deficit "too large"? Econ Inq. 1991;29(3):429–45.

7. International Monetary Fund. India: 2023 Article IV consultation report. Washington (DC): IMF; 2023.

8. Kumar R, Dhawan R. Sustainability of India's current account deficit: A cointegration and VECM approach. J Appl Econ Res. 2013;7(1):39–66.

9. Milesi-Ferretti GM, Razin A. Current account sustainability. Princeton Stud Int Finance. 1996;81. Princeton (NJ): Princeton University.

10. Obstfeld M, Rogoff K. The intertemporal approach to the current account. In: Grossman GM, Rogoff K, editors. Handbook of International Economics. Vol. 3. Amsterdam: Elsevier; 1995. p. 1731–99.

11. Reserve Bank of India. Handbook of statistics on Indian economy. Mumbai: RBI; 2023.

12. Reserve Bank of India. Annual report 2021–22. Mumbai: RBI; 2022.

13. Reserve Bank of India. Report on currency and finance 2012–13: External sector. Mumbai: RBI; 2013.

14. Sahoo S, Dash R. Oil price shock and India's current account: A structural VAR analysis. Econ Polit Wkly. 2020;55(41):58–65.

15. Sharma R. Determinants of current account deficit: A study of India and China. Int J Econ Policy Emerg Econ. 2020;13(1):15–30.

16. UNCTAD. Trade and development report 2021. Geneva: United Nations Conference on Trade and Development; 2021.

17. World Bank. World development indicators database. Washington (DC): World Bank; 2022.

18. Choudhary A, Jain V. India's external vulnerability and capital flows: An empirical assessment. Econ Aff. 2018;63(2):263–70.

19. Ranjan R, Dua P. Determinants of India's export performance. Econ Polit Wkly. 2007;42(30):3101–8.

20. Lane PR, Milesi-Ferretti GM. The external wealth of nations mark II. J Int Econ. 2007;73(2):223–50.

21. Singh N. Trade openness and current account deficit: Evidence from India. Asian J Econ Empir Res. 2019;6(1):12–8.

22. Bussière M, Fratzscher M. Current account dynamics in OECD and EU acceding countries—An intertemporal approach. J Econ Integr. 2006;21(3):593–618.

23. Rajan RG. Make in India, largely for India. RBI Speeches Archive. 2015.

24. Acharya VV. India's fiscal and current account deficit: Risks and remedies. Econ Polit Wkly. 2018;53(17):14–20.

25. Eichengreen B. Global imbalances and the lessons of Bretton Woods. NBER Working Paper No. 10497. Cambridge (MA): National Bureau of Economic Research; 2004.

26. Mohanty MS, Scatigna M. Has globalisation reduced monetary policy independence? BIS Working Paper No. 198. Basel: Bank for International Settlements; 2005.

27. Kaur B, Bansal S. Current account deficit and fiscal deficit: Twin deficit hypothesis in India. South Asian J Macroecon Public Finance. 2019;8(1):21–42.

28. Chinn MD, Ito H. What matters for financial development? Capital controls, institutions, and interactions. J Dev Econ. 2006;81(1):163–92.

29. Goyal A. Current account sustainability in emerging economies. Econ Polit Wkly. 2011;46(5):73–81.

30. Hasan R, Mitra D, Sundaram A. The determinants of current account deficits in India. Indian Econ Rev. 2011;46(2):49–76.

31. Barari M. Sustainability of current account deficits in selected developing countries. Appl Econometrics Int Dev. 2004;4(1):1–14.

32. Choudhary MA, Shabbir T. Capital inflows, exchange rate, and the sustainability of current account deficits in Pakistan. Pak Dev Rev. 2006;45(4):971–86.

33. Ahmed S, Zlate A. Capital flows to emerging market economies: A brave new world? J Int Money Finance. 2014;48:221–48.

34. Prasad ES. Emerging market vulnerabilities and global financial integration. Brookings Institution Working Paper. Washington (DC): Brookings; 2021.

35. Verma S. Exchange rate volatility and its impact on trade balance in India. Int J Econ Finance Issues. 2021;11(2):36–44.

36. Mohanty D, Mishra B. India's external sector: Issues and challenges. RBI Bull. 2019 Jul.

37. Mann CL. Perspectives on the U.S. current account deficit and sustainability. J Econ Perspect. 2002;16(3):131–52.

38. Roubini N, Wachtel P. Current-account sustainability in transition economies. Int J Finance Econ. 1999;4(1):1–16.

39. Bhat MS, Pandit A. An empirical analysis of India's current account deficit sustainability. South Asian J Macroecon Public Finance. 2014;3(1):39–61.

40. Bussière M, Fratzscher M, Müller GJ. Current account dynamics in emerging market economies. J Int Money Finance. 2006;25(2):276–90.