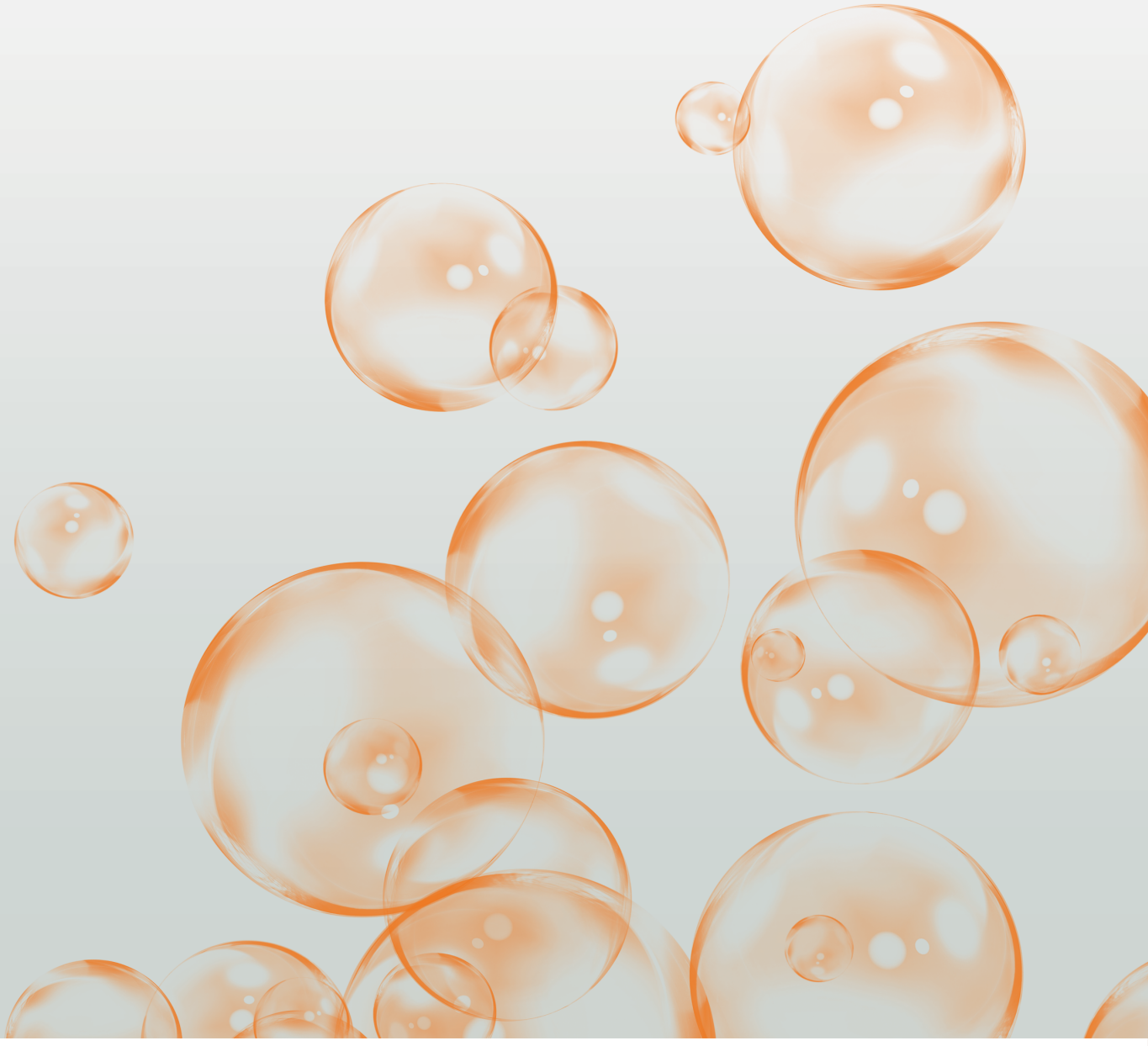
India and the Digital Economy

A Sub-national Competitiveness Analysis

Editors: Zhang Xuyao Rohanshi Vaid



Lee Kuan Yew School of Public Policy
Asia Competitiveness Institute

NUS National University of Singapore

India and the Digital Economy: A Sub-national Competitiveness Analysis

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About ACI

The Asia Competitiveness Institute (ACI) was established in August 2006 as a research centre at the Lee Kuan Yew School of Public Policy (LKYSPP), National University of Singapore (NUS). It aims to build intellectual leadership and network for understanding and developing competitiveness and sustainable growth in Asia. ACI seeks to contribute to the enhancement of inclusive growth, living standards, and institutional governance through competitiveness research on sub-national economies in Asia. It identifies mitigating issues and challenges for potential public policy interventions through close collaboration with regional governments, business corporations, policy think tanks, and academics. ACI's three key research pillars include (i) sub-national economies level competitiveness analysis, (ii) emerging sustainable development landscape in 16 Asia economies, and (iii) Asia's long-term growth strategies and public policy analysis.

ACI's value propositions may be encapsulated in its acronym:
Analytical inputs to initiate policies for policy-makers and business leaders in Asia
Capacity building to enable others through improvement in productivity and efficiency
Intellectual leadership to create pragmatic models of competitiveness and inclusive growth

Vision and Mission

- ACI's over-arching vision is to build up its research credibility with policy impact, contributing as a professional, world-class think-tank.
- ACI's mission is to establish our niche as a leading policy think-tank by identifying development trends, opportunities, and challenges among Asian economies and business corporations.
- ACI endeavours to articulate sound recommendations, promote discussion, and shape research agenda in the arena of public policy amongst Asian governments.
- ACI undertakes evidence-based analysis of public policy issues and decisions, in order to provide assessment of their effectiveness as well as economic and societal impact.

Preface

2022 was a special year for India as the country marked its 75^{th} year of independence. The country has achieved significant progress in various fields, especially in its digital economy. India has become one of the largest and fastest-growing digital markets, with more than 800 million internet users. The government's *Digital India* initiative has played a critical role in shaping the country's digital economy. Some of its major achievements include the world's largest biometric identification system, *Aadhaar*, and fast-payments system, *Unified Payments Interface* (*UPI*). India is on its path to achieve its goal of becoming a USD 1 trillion digital economy by 2025, which is expected to create millions of jobs and drive economic growth.

India also emerged as the world's fifth-largest economy based on nominal GDP in 2022. Unlike the global economy, the Indian economy staged a full recovery and bounced back to its pre-pandemic growth trajectory in FY2022-23. Facilitated by the near-universal vaccination coverage, a strong rebound in private consumption, capital formation, and contact-based services supported the economy's rapid growth. Based on the economic outlook, the International Monetary Fund (IMF) forecasted India to be the fastest-growing economy in 2022 and 2023. However, certain downside risks to the economy, including the widening Current Account Deficit (CAD) and shrinking exports, persist.

The research undertaken by the Asia Competitiveness Institute (ACI) on sub-national competitiveness in India makes a significant contribution towards understanding the existing vast heterogeneity of India's 36 sub-national economies. Furthermore, the book also presents an analysis of the digital competitiveness of the sub-national economies and deep dives into the digital payments landscape across the country. Policymakers can leverage the rich insights found in the book to enact targeted policy measures.

I am confident that the book will contribute to the holistic understanding of competitiveness at the sub-national level and provide an intellectual platform for the development of relevant policy interventions.

Professor Paul Cheung
Director, Asia Competitiveness Institute
Lee Kuan Yew School of Public Policy
National University of Singapore

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Executive Summary

Global uncertainties continued to prevail in 2022, primarily due to the Russia-Ukraine conflict and a subsequent rise in commodity prices. The persistent policy rate hike and inflation dampened the post-pandemic recovery of both advanced and emerging market economies. The Indian economy, however, showcased a full recovery and reached its pre-pandemic growth path by the end of the Fiscal Year (FY) 2022-23. Nonetheless, the economy continued to face several challenges including rising inflation, the depreciating rupee, the widening Current Account Deficit, and declining exports. That said, India is projected to be the fastest-growing major economy with a growth rate of 6.8% in FY2022-23. The resilience of the economy is driven by a strong rebound in private consumption and production activity and a subsequent increase in capacity utilisation. The near-universal vaccination coverage played a huge role in facilitating the recovery in consumption and several industries as well as services sectors.

In this edition, *India and the Digital Economy: A Sub-national Competitiveness Analysis*, we undertake a comprehensive competitiveness analysis of the 36 Indian sub-national economies. Based on our results, Maharashtra remains the most competitive sub-national economy over the last decade. However, the sub-national economy still has some room left to improve dimensions such as the social sectors, the standard of living, and technological infrastructure. On the other hand, Tripura was the bottom-most sub-national economy this year due to its weak performance across several spheres, particularly economic growth, fiscal balance, infrastructure, and inflation.

The Western region continues to host the most competitive sub-national economies, including Maharashtra. The region stays the most business-friendly and continues to attract huge investments across major industries. Furthermore, its openness to trade and high export turnover make it an attractive destination for foreign direct investment. Nonetheless, the inadequacy of the health infrastructure is still persistent in the region.

Meanwhile, a majority of bottom-performing sub-national economies are from the Eastern region. The Eastern region, on the other hand, performs relatively better than other regions in terms of health and educational infrastructure. Additionally, the region experiences lower inflationary pressures than the rest of the country, which in turn supports its relatively higher economic growth. However, the lack of physical infrastructure makes it a less attractive destination for domestic as well as foreign companies. The difference in the competitiveness of the two regions is reflective of the vast regional disparities across the country.

Furthermore, the book presents an analysis of the digital competitiveness of the Indian sub-national economies. We also deep dive into the evolution of digital payments across the sub-national economies.

India's digital surge, underpinned by the government's Digital India initiative, catapulted the country's digital economy to a new level. The Digital India programme aims to transform India into a digitally enabled knowledge-based economy. While the programme contributed significantly to India's overall digital competitiveness, we find dis-

crepancies in the growth trajectories of different sub-national economies. Digital competitiveness, we argue, closely tracks the competitiveness of these economies as the Western and Southern regions perform better than the North-eastern and Eastern regions.

Turning the focus to the area of the digital economy, which showcased sizeable growth across the country, we study India's digital payments ecosystem. The study revealed a weak relationship between the digital competitiveness of a sub-national economy and the value of digital transactions it records. Bihar and Odisha are two notable examples. Pushed by the pandemic, their regional Bank Sakhi programmes were largely responsible for the exemplary growth in digital transactions. We believe that these findings are driven by deep-seated regional disparities and recommend using the region-specific approach to rein in the digital divide in the country.

Acknowledgements

ACI at the Lee Kuan Yew School of Public Policy (LKYSPP) has been conducting the annual analysis of competitiveness of India at the sub-national and regional level for the last 10 years. This year's annual competitiveness *"India and the Digital Economy: A sub-national Competitiveness Analysis"* is led by Dr Zhang Xuyao and Rohanshi Vaid and supported by Dr Ammu George and Shubhangi Gupta.

In this book, we have updated previous sub-national and regional competitiveness studies with the latest available data. Our comprehensive approach to measuring competitiveness takes into account different factors that collectively shape the ability of a nation or region to achieve substantial and inclusive economic development over a sustained period of time. In addition, we apply a novel approach to assigning weights in the form of Shapley values to test the robustness of the findings. Furthermore, we study the digital competitiveness of the Indian sub-national economies and deep dive into India's digital payments boom.

This book would not have been possible without the support of our research and administrative colleagues. In particular, we would like to extend our sincere thanks to a competent and dedicated administrative team at ACI, including Cai Jiao Tracy, Po Lai Yin Lyne, Nur Atiqah Binte Rahmat, and Dewi Jelina Ayu Binte Johari.

We also note, with great appreciation, the contributions from ACI Director Professor Paul Cheung and the research staff – Dr Xie Taojun, Dr Banh Thi Hang, Dr Liu Jingting, Dr Lucas Shen, Dr Zhang Chi, Bima Satria, Fan Litianqi, Ge Yixuan, Li Jingwei, Ng Wee Yang, Ulrike Sengstschmid, Tan Faith, Tan Kway Guan and Yan Bowen.

We place on record our appreciation for the encouragement of Professor Danny Quah (Dean), Professor Khong Yuen Foong (Vice Dean, Research and Development), Kadir Suzaina (Vice Dean, Academic Affairs), Francesco Mancini (Vice Dean, Executive Education), and other colleagues in the Lee Kuan Yew School of Public Policy, NUS, for making this project possible.

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List of Abbreviations

ACI	Asia Competitiveness Institute
ADB	Asian Development Bank
AePS	Aadhaar-enabled payment system
AMC	Ahmedabad Municipal Corporation
ASEAN	Association of Southeast Asian Nations
ATM	Automated Teller Machine
BC (program)	Bank Correspondent (program)
BHIM-UPI	Bharat Interface for Money-Unified Payments Interface
CAD	Current Account Deficit
CII	Confederation of Indian Industry
CMIE	Centre for Monitoring Indian Economy
CoE	Centre of Excellence
COVID-19	Coronavirus Disease 2019
DBT	Direct Benefits Transfer
ESDM	Electronic System Design and Manufacturing
FBMC	Financial Businesses and Manpower Conditions
FDI	Foreign Direct Investment
FMCG	Fast-Moving Consumer Goods
FRAND	Fair Reasonable and Non-Discriminatory
GB	Giga Bytes
GCI	Global Competitiveness Index
GDP	Gross Domestic Product
GIS	Government and Institutional Setting
GRDP	Gross Regional Domestic Product
GSDP	Gross State Domestic Product
GVA	Gross Value-Added
HP	Himachal Pradesh
ICT	Information and Communication Technology
IIP	Index of Industrial Production
IMD	International Institute for Management and Development
IMF	International Monetary Fund
IT	Information Technology
ITeS	Information Technology enabled Services
JAM (Trinity)	Jan Dhan-Aadhaar-Mobile Trinity
KYC	Know Your Customer
LKYSPP	Lee Kuan Yew School of Public Policy
MS	Macroeconomic Stability
MOSPI	Ministry of Statistics and Programme Implementation
NSE	National Stock Exchange
NPCI	National Payments Corporation of India

NUS	National University of Singapore
PIB	Press Information Bureau
PMGKY	Pradhaan Mantri Garib Kalyan Yojana
PMJDY	Pradhaan Mantri Jan Dhan Yojana
P2P	Peer to Peer (Payment)
P2M	Peer to Merchant (Payment)
QLID	Quality of Life and Infrastructure Development
RBI	Reserve Bank of India
SIDBI	Small Industries Development Bank of India
SSI	Small Scale Industries
TPAP	Third-Party Application Providers
TVET	Technical Education & Vocational Training
UIDAI	Unique Identification Authority of India
UN	United Nations
UNCTAD	United Nations Conference on Trade and Development
UNESCO	United Nations Educational, Scientific and Cultural Organization
UPI	Unified Payments Interface
US$	United States Dollar
WCY	World Competitiveness Yearbook
WEF	World Economic Forum
WEO	World Economic Outlook
WHO	World Health Organization
YoY	Year on Year

Chapter 1
Introduction

Rohanshi Vaid

1.1 Introduction and Motivation

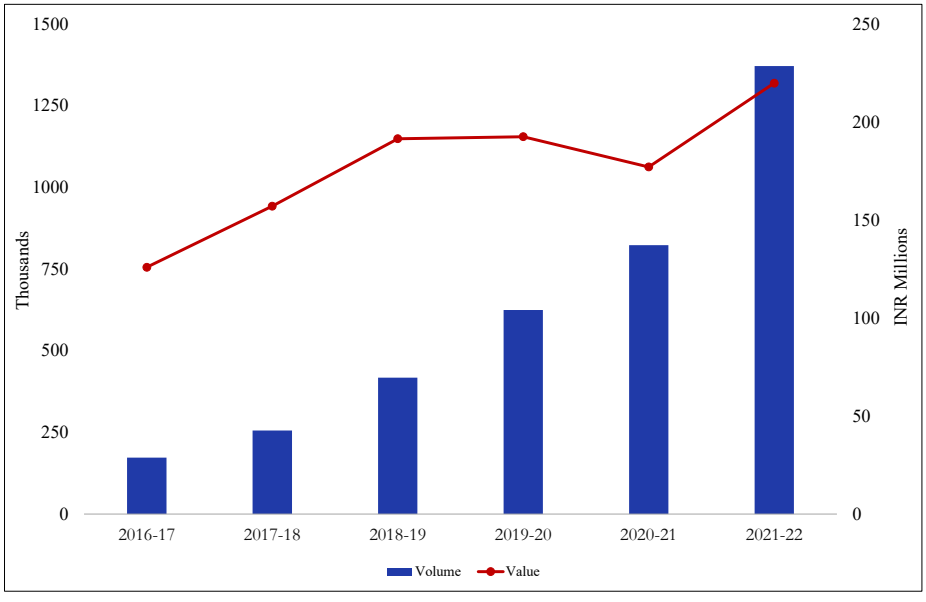
India has witnessed remarkable success in the adoption of digital payments. The country's digital payments system has undergone a dynamic change in the last couple of years. Driven by government initiatives and technological advancements, the transition to a cashless economy was rapidly embraced by Indians. Its digital payments volume, on average, has increased by 50% annually over the last five years, one of the highest in the world (see fig. 1.1). Furthermore, the expansion of India's digital payments has been even more resounding primarily due to the rapid adoption of the country's fast payments system - Unified Payments Interface (UPI) (Kearns and Mathew, 2022a). This explosive growth of India's digital payments is a result of long-term planning.

India's digital payments evolution journey began with the introduction of credit and debit cards, which enabled customers to make digital payments at merchant establishments. That said, the adoption of these cards was limited due to the requirement for point-of-sale (POS) infrastructure and the high cost of card acceptance. The next phase of evolution came with the launch of mobile wallets, such as Paytm and FreeCharge. These mobile wallets or e-wallets allowed their registered users to make transactions using their smartphones. These wallets became a popular mode of payment due to their cashback offers, ease of use, and low transaction fees.

However, launched in 2016, UPI was the biggest disruptor in the digital payments industry. UPI enabled real-time interbank transfers by making digital payments even more convenient, accessible, and secure (National Payments Corporation of India, n.d.). The interoperability of UPI allowed users to make transactions among different banks and payment platforms which further increased its popularity. UPI also simplified the payment process, since users are required to know only the recipient's mobile number or UPI ID to make a payment. Its low transaction fees have also contributed to the massive uptake of UPI-based mobile applications. These applications have gained widespread acceptance due to their easy integration with merchant establishments and cashback incentives. Figure 1.2 showcases the exponential growth registered in volume and value of

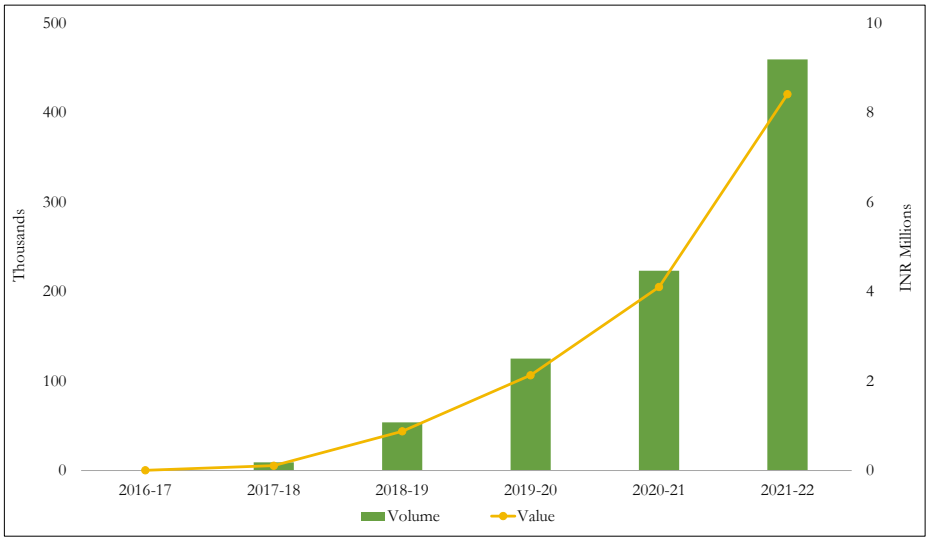
digital payments driven by UPI alone. As these platforms charge a nominal transaction fee, it is a cost-effective solution for both users and merchants. As a result, the adoption of UPI-led digital payments by small merchants has substantially increased over the last few years. UPI has played a significant role in improving financial inclusion in India.

Figure 1.1: Volume and Value of Digital Payments in India (FY2016-2022)



Source: Asia Competitiveness Institute (ACI) based on data from the Reserve Bank of India (RBI).

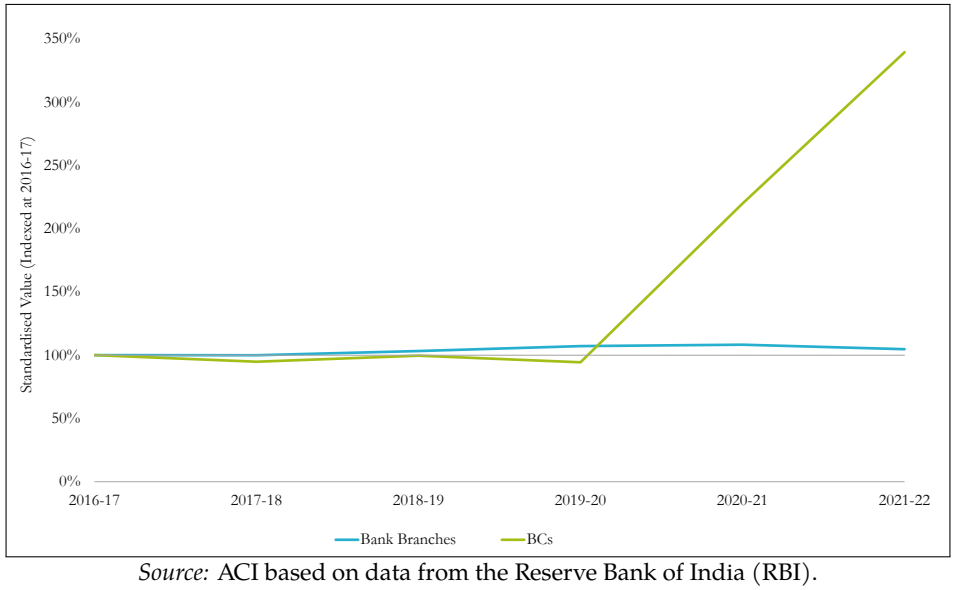
Figure 1.2: UPI-based digital payments(FY2016-2022)



Source: ACI based on data from the Reserve Bank of India (RBI).

The government of India has also played a crucial role in promoting the use of UPI. Initiatives such as the Digital India programme and Jan Dhan Yojana have led to wider adoption of UPI. The aim of these initiatives was to boost digital payments by creating awareness and increasing financial literacy at the same time (Department of Financial Services, Ministry of Finance, n.d.). The key challenge for the government was to take its digital payments drive to the last mile. To make that happen, the central government and the central bank promoted the adoption of a Banking or Business Correspondent (BC) model, especially in areas with no bank branches. A BC is a person or an entity authorised by a bank to offer banking services on its behalf. They act as intermediaries between the bank and its customers.

Figure 1.3: Growth in Bank Branches and Bank Correspondents (BC) in Rural India (FY2016-2022)



Source: ACI based on data from the Reserve Bank of India (RBI).

In rural India, where access to formal banking services is limited, BCs help bridge the gap by providing basic banking services to customers in local communities. They enable customers to open bank accounts, deposit and withdraw money, and access other banking services such as loans and insurance. Besides this, they also play a crucial role in educating customers on the benefits of digital payments and providing training on the functions of digital payment platforms. Additionally, BCs address customer concerns and reassure people that digital payments are safe and secure. Interestingly, the deployment of BCs witnessed a sudden surge during the COVID-19 pandemic years (see fig. 1.3). The state governments engaged more BCs during the pandemic to ensure continued essential banking services were available to the underserved, particularly in the rural areas. Besides offering digital and contactless banking services, BCs also played a vital role in the effective disbursement of government relief funds during that time.

To summarise, the evolution of digital payments in India has been driven by a com-

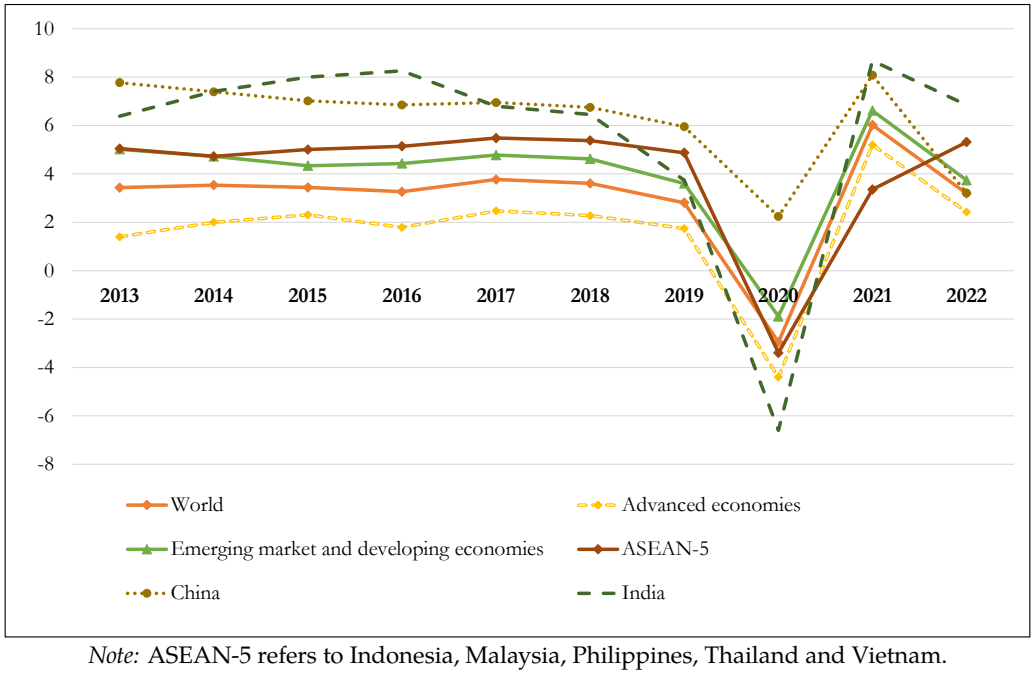
bination of factors, including technological advancements, government initiatives, and changing consumer behaviour. BCs have contributed significantly to the adoption of digital payments in India. The growth of digital payments has brought about a more transparent, efficient, and inclusive financial system in India, contributing to the country's digital transformation.

After offering a brief overview of India's digital payment revolution, the remainder of the chapter presents a discussion on the recent macroeconomic developments in Section 1.2. Section 1.3 concludes the chapter by providing a synopsis of all the remaining chapters of this book.

1.2 A Macroeconomic Overview of India's Economy

The global uncertainties owing to the COVID-19 pandemic, the Russia-Ukraine conflict and rising inflation added some downward pressure on India's post-pandemic economic growth. Despite a rapid rebound in growth in 2021 and 2022, India continued to face challenges such as rising inflation, widening Current Account Deficit, and declining exports. That said, the global economic slowdown and high commodity prices have not been a major impediment to India's growth due to a strong recovery in its private consumption. The country's successful vaccination drive has played a huge role in the rebound in consumption and production activities.

Figure 1.4: India's Real GDP Growth in Perspective (Percent)



Note: ASEAN-5 refers to Indonesia, Malaysia, Philippines, Thailand and Vietnam.
Source: ACI based on data from IMF, World Economic Outlook (WEO).

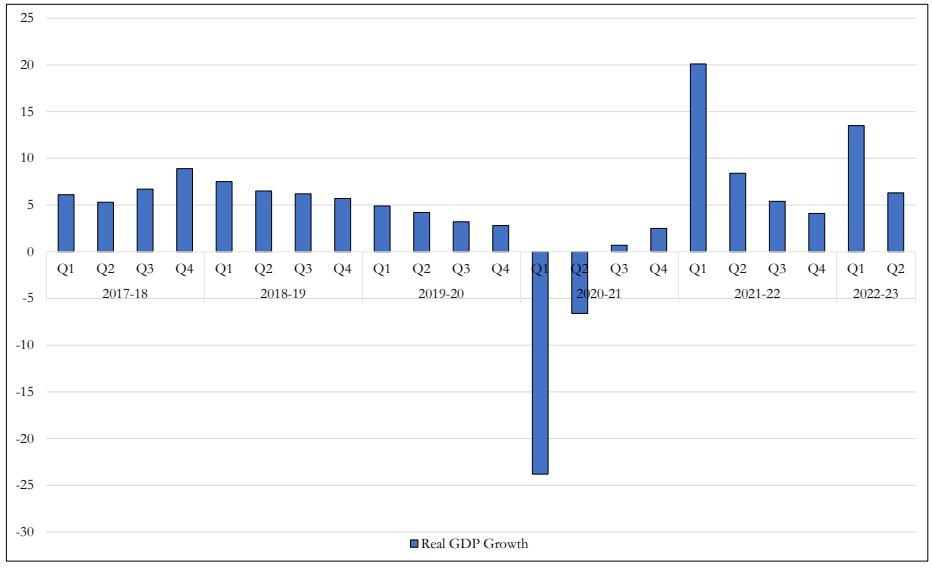
Based on the current economic outlook, IMF has projected India's economy to grow at 6.8% and 6.1% for India in FY2022-23 and FY2023-24, respectively (Batra and Ohri, 2023). On the other hand, the Ministry of Economic Affairs is confident that under the baseline scenario, the economy will grow at 6.5% in FY2023-24, making it one of the fastest among emerging economies (Ministry of Finance, Government of India, 2023).

We measure the economic performance of India for the last few years by looking at key macroeconomic indicators. We start by comparing India's growth to that of its peers.

Stable global economic growth and low crude oil prices supported India's GDP growth, from 2015 to 2017, compared to that of its counterparts (see fig. 1.4). However, in 2019, the growth rate dropped to 4.2%, owing to a contraction in credit growth, weak domestic demand, and a fall in investments and exports (Zhang and Gupta, 2020). Like the world economy, India and other emerging markets witnessed a COVID-19-induced drop in economic growth in 2020 (International Monetary Fund, 2022b).

In the subsequent year, both emerging markets and advanced economies registered a strong rebound in their economic growth. Fewer mobility restrictions and increased vaccination coverage supported the recovery of the global economy. Amidst the global uncertainties, India emerged as a 'Shining Star' as its economy grew by 8.68% in 2021 after contracting by 6.6% in 2020. Despite the dim global economic outlook, India maintained its growth rate around 6.84% in 2022, primarily due to strong domestic demand (International Monetary Fund, 2022a).

Figure 1.5: Quarterly Real GDP Growth (Change over Same Quarter Previous Year) (Percent)

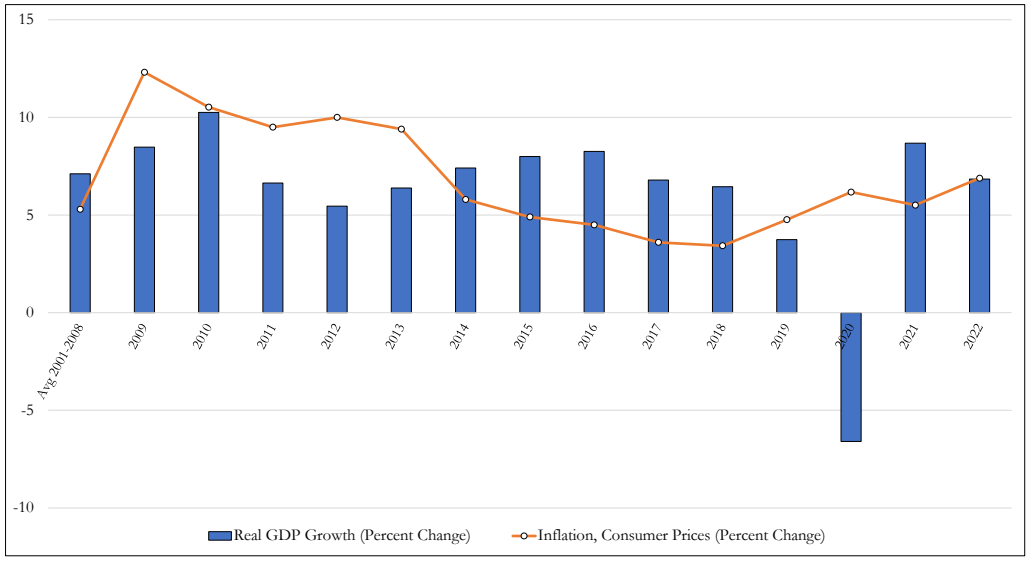


Source: ACI based on data from Ministry for Statistics and Programme Implementation (MOSPI)

Figure 1.5 presents the quarterly GDP growth rate of India. The economy witnessed exponential growth in the first quarter of FY2021-22, which was followed by a continuous decline in growth in the subsequent quarters of the same fiscal year. The Omicron

wave, conflict in Europe and the related- supply chain disruptions dampened its economic recovery during the last quarter of FY2021-22. However, the economy bounced back quickly and registered a 13.5% growth on account of an uptick in private consumption and capital expenditure. Having said that, the tightening of monetary policy due to inflationary pressure led to a slowdown in economic activity in the second quarter of FY2022-23. That said, unlike the majority of emerging economies, the Indian economy witnessed a complete economic recovery after the pandemic in FY2022-23.

Figure 1.6: Annual Real GDP Growth and Inflation (Percent)



Source: ACI based on data from IMF, WEO.

During the COVID-19 pandemic, several factors, such as supply chain disruptions and rising global energy and food prices, pushed up both retail and wholesale inflation in India (Ministry of Finance, Government of India, 2023). The Russia-Ukraine conflict added further pressure on the distressed supply chains and drove up the prices of critical commodities such as crude oil, natural gas, fertilisers and wheat (ibid.). As a result, in 2022 the global economy witnessed a massive surge in inflation.

To rein in rising inflation, RBI tightened its monetary policy, which increased the cost of borrowing and subsequently, dampened rapid economic growth. Inflation in the country witnessed an upward trend in 2019, even before the pandemic intensified inflationary pressure across the world (see fig. 1.6). The central bank currently has a flexible inflation-targeting policy that aims to keep the annual inflation rate between 2% and 6%. Despite the continued increase in the Consumer Price Inflation (CPI) Index, RBI has maintained its upper tolerance level of 6%.

To identify the drivers of economic growth, we take a closer look at the supply-side and demand-side breakdowns of the GDP. On the supply side, the economic recovery in FY2021-22 was underpinned by a rebound in the industry sector in the first quarter

and resilient growth in the agriculture sector. Additionally, non-contact, intensive services recovered strongly in the second half of the fiscal year (see fig. 1.7). That said, the growth in the industry sector nosedived in the last two quarters of the year, primarily due to continued supply chain snarls and a shortage of critical inputs. The industry outlook remained glum during the first quarter of FY2022-23 as extreme supply uncertainty and price volatility further increased the input cost. In contrast, the services sector recovered fully, owing to the release of pent-up demand and the easing of COVID-19-induced restrictions. Besides the Information Technology-Business Process Management (IT-BPM) and the E-commerce industry, the growth in this sector is driven mainly by the hospitality, tourism and real estate industries (ibid.). Surprisingly, the agriculture sector demonstrated a steady increase in the last few years. Government initiatives to promote crop diversification, improve productivity, and create the Agriculture Infrastructure Fund have contributed to the sector's growth and made India a net exporter of agricultural goods.

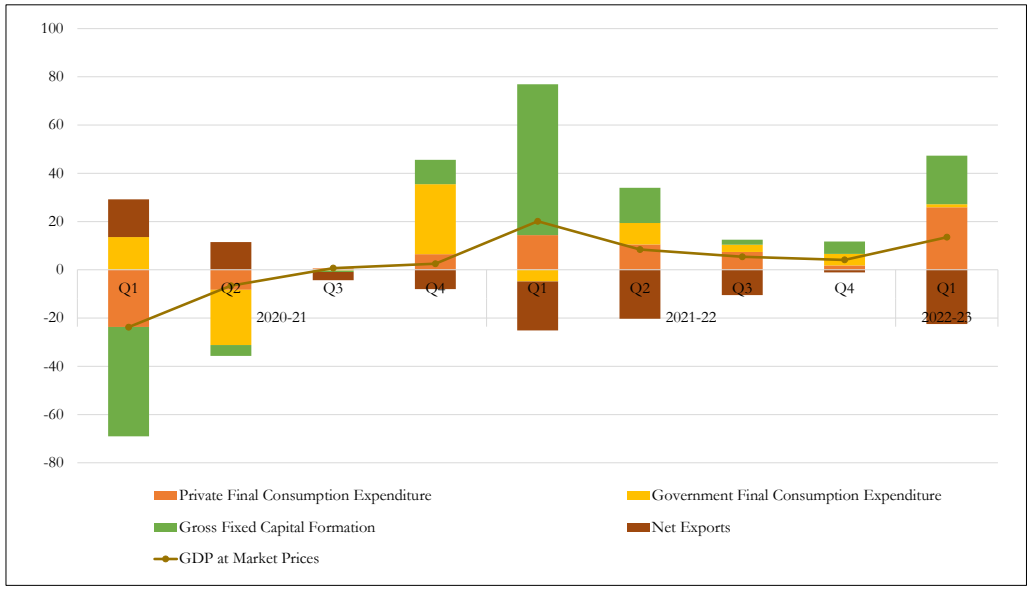
Figure 1.7: Supply-Side Contributions to GVA Growth (Percent)

Note: 2018-19 figures are first revised estimates and 2019-20 and 2020-21 are provisional estimates.
Source: ACI based on data from Reserve Bank of India (RBI).

On the other hand, the registered growth rate for the first quarter of FY 2021-22 surpassed its pre-pandemic level, owing to a strong recovery in private consumption and capital formation (see fig. 1.8). Nevertheless, the aggregate demand in the subsequent quarters was dragged down by the shrinking government consumption and rising imports (Reserve Bank of India, 2022). A solid rebound in private consumption supported GDP growth in the first quarter of FY2022-23. Increased consumer confidence due to expanded vaccination coverage released the 'pent-up' demand and led to higher discretionary spending, especially on tourism and entertainment. Furthermore, the growth in fixed capital formation in this quarter reflected the buoyancy of the construction sector. However, during the same quarter, the growth in government consumption continued to

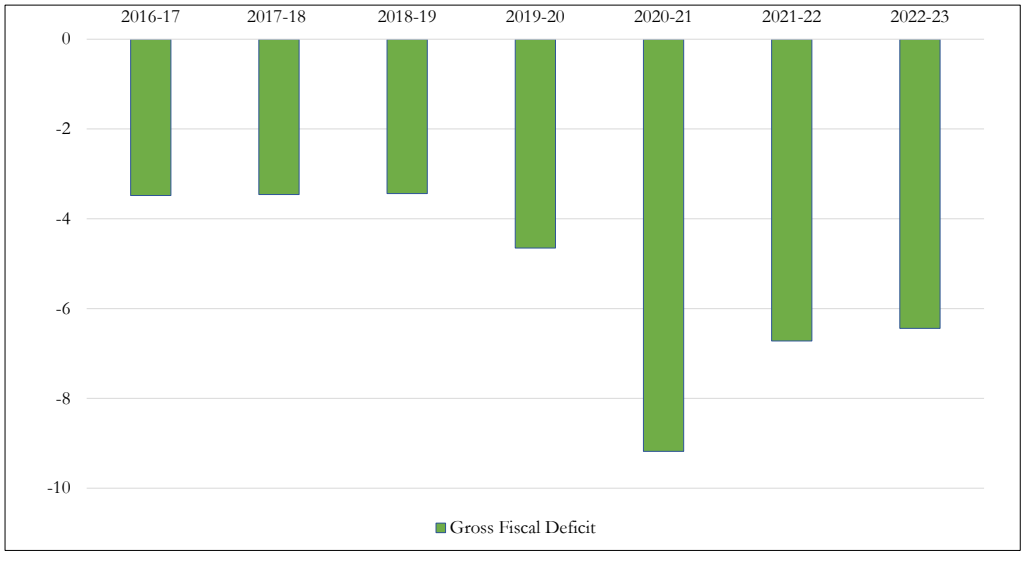
decline as the government pivoted its focus toward qualitative spending. Lastly, rising geopolitical tensions and slackening external demand weakened the growth of merchandise exports.

Figure 1.8: Demand-Side Contribution to GDP Growth (Percent)



Note: 2018-19 figures are first revised estimates and 2019-20 and 2020-21 are provisional estimates.
Source: ACI based on data from RBI.

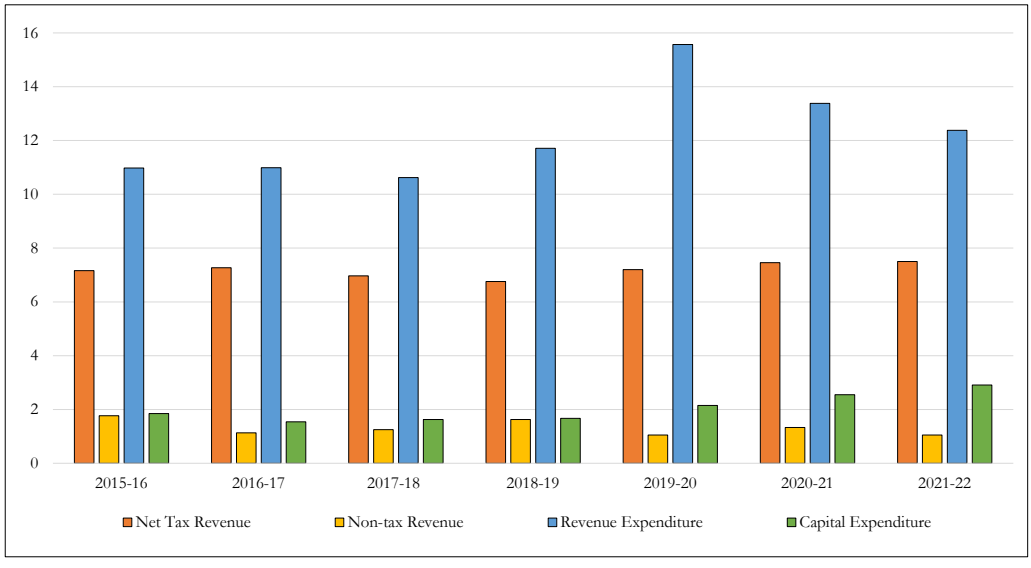
Figure 1.9: Fiscal Balance (Percent of GDP)



Source: ACI based on data from RBI.

We now move our discussion to the fiscal landscape of India, which includes fiscal balance and the performance of critical fiscal indicators in order to gauge the financial performance of the government. The central government successfully managed to keep the fiscal deficit below 4% until FY2019-20 (see fig. 1.9). But, in FY2020-21, the fiscal deficit plunged to 9.2%, mainly due to increased government expenditure on fiscal stimulus packages and declines in disinvestment receipts and non-tax revenue (The Hindu, 2021). In the following fiscal year, the fiscal deficit improved due to the surge in both tax and non-tax revenue, including direct tax and GST collections. The fiscal deficit for FY2022-23 is projected to dip further on account of the complete economic recovery and consistent increase in tax revenue (Ministry of Finance, Government of India, 2023).

Figure 1.10: Key Fiscal Indicators (Percent of GDP)



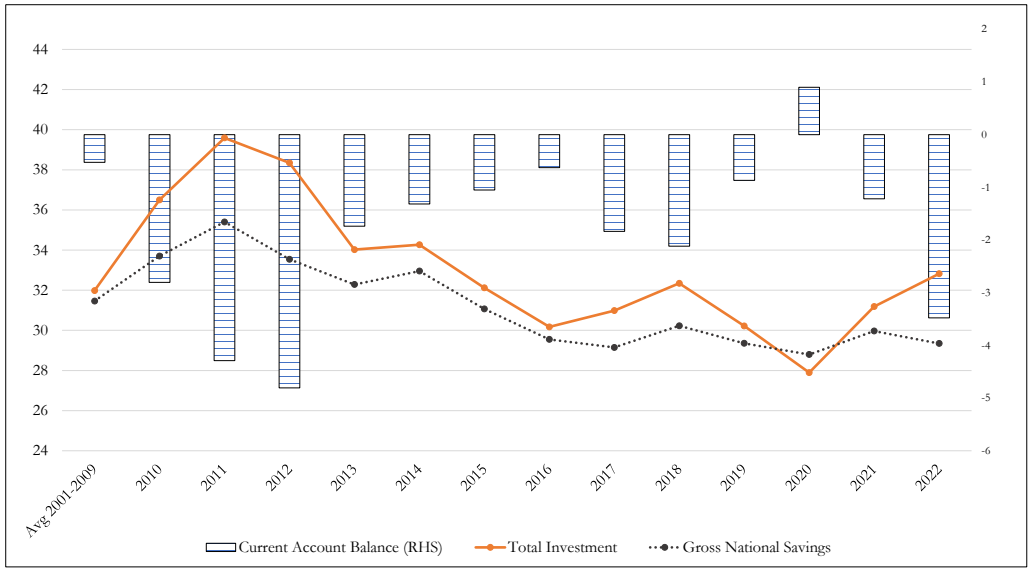
Source: ACI based on data from RBI.

Figure 1.10 offers a breakdown of the different components of the fiscal deficit. The revenue expenditure of the central government has remained above 10% for the last seven years. Furthermore, the tax and non-tax revenue continued to fall short of the government's total expenditure. However, after nosediving in 2020, the revenue receipts have registered a sizeable growth due to a solid rebound in the tax collections (ibid.). Radical reforms such as the introduction of the Goods and Services Tax (GST) and the rapid expansion of the digital economy have expanded the tax net by reducing the size of the informal sector in the economy. In addition, simplification of the return filing system and assistance in GST filing have facilitated greater tax compliance.

The trends in India's national savings, investment and current account deficit (CAD) are presented in fig. 1.11. National savings as well as investments registered positive growth after the 2008 global financial crisis. Since 2012, both indicators have showcased a declining trend. In 2020 investments were at their lowest due to pandemic-related fac-

tors. The following year saw some improvement in total investments, primarily due to economic recovery and increased vaccination coverage. This reflected the kick-start of the investment cycle. In 2022 investments continued to surge further. On the other hand, the current account deficit widened, owing to sluggish growth in exports and high commodity prices caused by the conflict in Europe.

Figure 1.11: National Savings, Investment and Current Account Deficit (Percent of GDP)

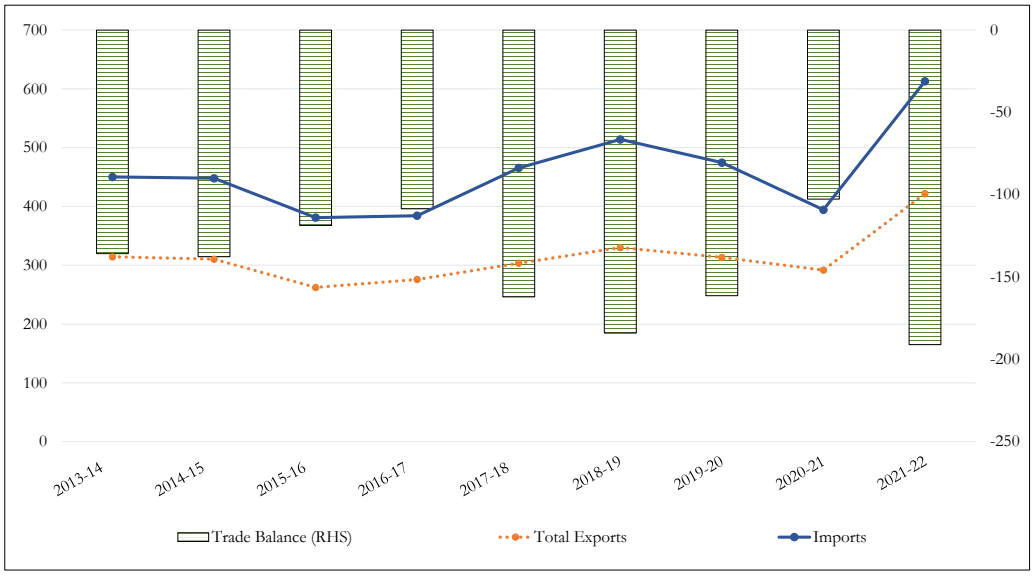


Source: ACI based on data from IMF, WEO.

Given the CAD is largely influenced by international trade, it is critical to analyse India's trade balance, exports and imports. Figure 1.12 highlights an increasing trend in both exports and imports since 2016-17. That said, the pandemic-led global slowdown negatively impacted trade due to the disruptions in the global supply chain networks (Zhang and Gupta, 2020). Yet, India's trade deficit declined due to lower imports in 2020. As soon as the impact of the pandemic started to wane in the following year, both imports, as well as exports, rose, however, at different rates. Since the imports exceeded exports owing to weak global demand and prolonged strains on the supply chains, net exports contracted in FY2021-22.

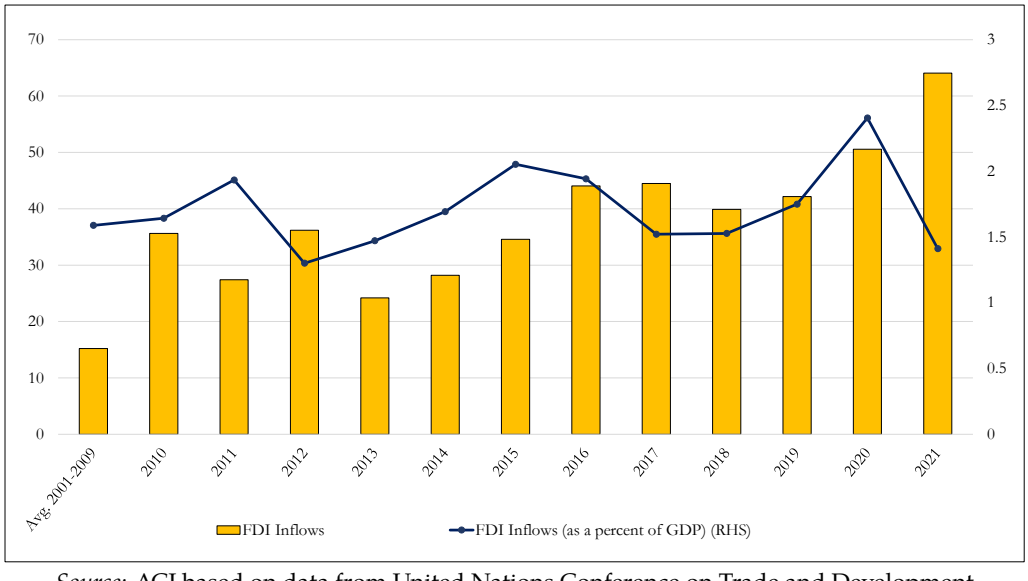
We conclude our discussion of the macroeconomic landscape by examining India's post-pandemic foreign direct investment (FDI) flows. FDI inflows to India have remained on an upward growth trajectory since 2017 (see fig. 1.13). The FDI inflows, in absolute terms, witnessed a strong jump in 2021. However, as a percentage of GDP, FDI inflows have remained muted since 2017. In 2020, India saw an increase in FDI inflows, as a percentage of GDP, probably due to low base effects. Interestingly, FDI fell by a solid 1% in 2021. The majority of the FDI inflows this year were attracted by the computer software and hardware sector, followed by services and trade. As per RBI, A significant share of the total inflow came from Singapore, the USA, the UAE, and the European Union.

Figure 1.12: Exports and Import of Merchandise Trade and Trade Balance (US$ Billion)



Source: ACI based on data from RBI.

Figure 1.13: FDI Inflows to India (US$ Billion and Percent of GDP)



Source: ACI based on data from United Nations Conference on Trade and Development (UNCTAD).

1.3 Roadmap of the Book

This book, *India and its Digital Economy*, is the tenth edition of ACI's competitiveness analysis of the sub-national economies of India. The next two chapters - Chapters 2 and 3 -

focus on the competitiveness analysis at the sub-national and regional levels. The chapters start by offering the rationale behind this analysis and outline ACI's competitiveness framework methodology, which sets the stage for our study.

Additionally, Chapter 2 renders a discussion on Shapely Weights methodology, where the subjectivity from weight assignment is eliminated by relaxing the assumption of equal weights and by assigning Shapley values - a key concept used in cooperative game theory. Given that this method is based on solid mathematical and theoretical foundations, we add robustness and objectivity to our research findings by applying this approach.

In Chapter 2, we also study the results of a novel tool called the *What-if* simulation analysis. The *What-if* simulation takes our analysis a step further by offering meaningful insights regarding the strengths and weaknesses of each sub-national economy as well as of the region. It answers the question of how the Indian sub-national economies can improve if 20% of their weakest indicators were raised to the national average, *ceteris paribus*. Furthermore, the simulation offers a cue to the top sub-national economies to be cautious of the competition, as the other sub-national economies can enhance their performance by enacting relevant policy recommendations.

Besides the competitiveness ranking and score analysis, Chapter 3 presents a discussion on the top 20% of each region's strongest and weakest indicators.

In Chapter 4, we study the digital competitiveness of the sub-national economies of India by using a comprehensive Digital Competitiveness framework. Lastly, the chapter deep dives into the digital payments boom in India and the impact of the COVID-19 pandemic on its digital payments landscape.

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