

# INDIA POLICY FORUM 2024

VOLUME 21

Barry Eichengreen and Poonam Gupta  
The State of the States: Federal Finance in India

Sonalde Desai, Debasis Barik, Pallavi Choudhuri, Bijay Chouhan,  
Om Prakash Sharma, Sharan Sharma and Dinesh Kumar Tiwari  
Rethinking Social Safety Nets in a Changing Society: Evidence  
from the India Human Development Survey

Ratna Sahay, Navya Srivastava and Mahima Vasishth  
Female Leadership in India: Firm Performance and Culture

Lakhwinder Singh, Nirvikar Singh and Prakarsh Singh  
Economic Development of the Indian State of Punjab:  
Prospects and Policies

Chetan Ghate, Kenneth Kletzer and Mahima Yadav  
India's Foreign Reserves and Global Risk

EDITED BY  
POONAM GUPTA, PRAVIN KRISHNA  
KARTHIK MURALIDHARAN

# INDIA

# POLICY FORUM

VOLUME 21

# 2024

EDITED BY

*Poonam Gupta*

*Pravin Krishna*

*Karthik Muralidharan*

NATIONAL COUNCIL OF APPLIED  
ECONOMIC RESEARCH

*New Delhi*



ACADEMIC FOUNDATION  
NEW DELHI



Copyright © National Council of Applied Economic Research (NCAER), 2025

This book is an open access publication. It can be downloaded from [www.ncaer.org](http://www.ncaer.org)

All rights reserved. No part of this book may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, recording, or by any information storage or retrieval system, without permission in writing from NCAER. Email: [info@ncaer.org](mailto:info@ncaer.org) Website: [www.ncaer.org](http://www.ncaer.org).

*Disclaimer:* The papers and the associated comments represent the views of the individual authors and do not imply agreement by the IPF Editors or the Governing Body, officers, or staff of NCAER or by members of the IPF panels, or the co-publisher, AF Press.

First published in 2025 by



**AF Press**

No. 35, Sector 7, IMT Manesar,  
Gurugram - 122 050, Haryana (India).  
[www.academicfoundation.org](http://www.academicfoundation.org)



**National Council of Applied Economic Research (NCAER)**

11 Indraprastha Estate, New Delhi 110 002, India.  
[www.ncaer.org](http://www.ncaer.org)

*In collaboration with:*



**नीति आयोग**

National Institution for Transforming India



**THE WORLD BANK**

Academic Foundation is an imprint of AF Press.

Email: [booksaf@gmail.com](mailto:booksaf@gmail.com)

**ISSN:** 0972-9755

**ISBN:** 978-93-3270-699-6 (PB)

**ISBN:** 978-93-3270-700-9 (eBook)

Typeset in 10.5 pt Times.

Typeset, printed and bound by AF Press, Manesar, Gurugram - 122 050.

# INDIA

## POLICY FORUM

VOLUME 21

2024

### *Editors' Summary*

vii

BARRY EICHENGREEN AND POONAM GUPTA

#### *The State of the States: Federal Finance in India*

1

Comments by Govinda Rao

General Discussion

SONALDE DESAI, DEBASIS BARIK, PALLAVI CHOUDHURI, BIJAY CHOUHAN,  
OM PRAKASH SHARMA, SHARAN SHARMA AND DINESH KUMAR TIWARI

#### *Rethinking Social Safety Nets in a Changing Society:*

#### *Evidence from the India Human Development Survey*

71

Comments by Saurabh Garg and Shanta Devarajan

General Discussion

RATNA SAHAY, NAVYA SRIVASTAVA AND MAHIMA VASISHTH

#### *Female Leadership in India: Firm Performance and Culture*

113

Comments by M. Damodaran, Auguste T. Kouame and Devesh Kapur

General Discussion

LAKHWINDER SINGH, NIRVIKAR SINGH AND PRAKARSH SINGH

#### *Economic Development of the Indian State of Punjab:*

#### *Prospects and Policies*

175

Comments by Seema Bansal and Montek Singh Ahluwalia

General Discussion

CHETAN GHATE, KENNETH KLETZER AND MAHIMA YADAV

#### *India's Foreign Reserves and Global Risk*

235

Comments by Poonam Gupta, Barry Eichengreen and Ranil Salgado

General Discussion



---

## PURPOSE AND ORGANIZATION

---

This 21<sup>st</sup> *India Policy Forum 2024 Volume* comprises papers and highlights of the discussions at the India Policy Forum (IPF) held on July 2-3, 2024. The IPF is organized by National Council of Applied Economic Research (NCAER), India's oldest and largest, independent, non-profit, economic think tank.

The IPF promotes original economic policy and empirical research on India. The IPF Editors commission both empirical research papers and policy-focused expert reviews which are also based on robust, original research. The annual IPF Conference provides a unique combination of intense scholarship and policymaker engagement, which reviews the research papers, leading to their eventual publication in this international journal.

An international Research Panel of India-based and overseas scholars with an abiding interest in India supports this initiative through advice and active participation at the IPF Conference, and the search for innovative papers that promise fresh insights, especially from younger scholars. An international Advisory Panel provides overall guidance.

Papers appear in this annual *IPF Volume* after revisions based on IPF discussants' comments, a lively floor discussion, and the editorial guidance provided by the IPF Editors. To allow readers to get a sense of the richness of the conversations that happen at the IPF, edited discussants' comments as presented at the IPF, are included here. The 2024 volume also provides hyperlinks to the video of each IPF session, including the floor discussion with IPF participants. Consistent with the editorial independence of the IPF, the papers and associated comments represent the views of the individual authors and do not imply agreement by the Governing Body, IPF Editors, the management and staff of NCAER, or the IPF Panels.

The IPF 2024 featured several panel discussions, including 'Digitalisation and Development: States' Fiscal Challenges'; 'Employment Challenges in India and Beyond'; 'The Middle-Income Trap'; and 'India's Economic Prospects in a Turbulent World', along with the 6<sup>th</sup> *T.N. Srinivasan Memorial Lecture*, titled, "Cracks in the System: How Geo-economic Fragmentation is Reshaping the World", delivered by Pierre-Olivier Gourinchas, Chief Economist of the IMF. The videos of the lectures are available at the hyperlink at the end of the Editors' Summary.

---

## **PARTNERS AND FUNDERS**

---

NCAER gratefully acknowledges the collaboration and partial funding for IPF 2024 from NITI Aayog and The World Bank, and partial funding from Bill and Melinda Gates Foundation. Their support reflects the deep commitment and enlightened leadership of these organisations to the values of NCAER in carrying forward its rich legacy and historical traditions of promoting empirical and evidence-based economic policy research.

---

## **CORRESPONDENCE**

---

Correspondence about papers in this *IPF Volume* should be addressed directly to the authors (each paper contains the email address(es) of the corresponding author(s)). All author affiliations in the papers are as of the IPF Conference. Feedback on the IPF Volume itself may be sent to: The Editors, India Policy Forum, NCAER, 11 Indraprastha Estate, New Delhi 110002, or by email to [ipf@ncaer.org](mailto:ipf@ncaer.org). More information on the IPF is available on [www.ncaer.org](http://www.ncaer.org), including links to downloadable previous IPF Volumes and videos of individual IPF sessions of the past several years.

---

## **THE IPF TEAM**

---

NCAER is responsible for the development, planning, organization, editing, and publication of the India Policy Forum Volume. The Editors are deeply grateful to the following NCAER staff for their major contributions in the production of the IPF 2024 Volume:

Anil Kumar Sharma

*Overall Management*

Anupma Mehta and Pradip Bagchi

*Managing Editors*

Additional thanks are due to all those mentioned below for their support in organizing and conducting the IPF Conference:

Pooja Singh, Divya Singh, Ishita Trivedi, Devanshi Mankotia, Praveen Sachdeva, Aakansha Atal, Shubhashree Jha, Jayanta Talukder, Arjita Chandna, Vibhor, Girish Khulbe, Khushvinder Kaur, Rochelle Prakash, Rakesh Srivastava, Rajendra Lenka, Prem Prakash Joshi, Vipin Kumar, and Ruchita Behera.

# Editors' Summary

The India Policy Forum (IPF) marked its 21<sup>st</sup> year with its annual conference in New Delhi on July 2-3, 2024. The IPF was established with the main objective of promoting original economic policy and empirical research on issues concerning India and has since then become a distinctive annual event showcasing rigorous scholarship and research with a focus on policy implications.

The papers presented at the 2024 IPF conference, which were subsequently revised by the authors after incorporating the suggestions made by the discussants and conference participants, are published in this journal. It also carries the comments made by the formal discussants and a summary of the floor discussions on each paper. Additionally, the IPF features lectures and panel discussions on a host of policy issues, which have the potential to shape India's economic policymaking.

This Editors' Summary provides the gist of the five papers presented at the IPF 2024 Conference, concluding with hyperlinks to the IPF 2024 program. These links extend to the Conference versions of the IPF 2024 papers, video recordings of the open sessions, and presentations from each of the IPF 2024 sessions, including the 6<sup>th</sup> T.N. Srinivasan Memorial Lecture and various panel discussions held during the conference.

## **The State of the States: Federal Finance in India**

This paper by Barry Eichengreen and Poonam Gupta examines India's subnational public debt, focusing on the rising burden borne by state governments and the implications for fiscal stability, equity across states, and future debt sustainability. The authors highlight that a third of India's total public debt is owed by states, a proportion that is notably high compared to other federal economies. As debt burdens diverge across states, the paper offers an in-depth analysis of fiscal trends, debt composition, and institutional mechanisms, and suggests reforms for enhancing state-level fiscal discipline. India's state debt-to-GDP ratios have grown considerably over the last decade. Half of the 21 largest states increased their debt-to-GDP ratios by more than 10 percentage points between 2012-13 and 2022-23. States like Punjab, Kerala, Bihar, and Tamil Nadu have emerged as highly indebted, while some others like Maharashtra, Gujarat, and Odisha have maintained relatively lower debt levels.

This divergence is fueled by fiscal imbalances, weak enforcement of fiscal rules, and limited market discipline. States vary widely in fiscal performance, with some showing sustained primary deficits and accumulating large contingent liabilities emanating from sectors like power and irrigation. The

authors show that Indian states have contributed disproportionately to periods of debt escalation, particularly in three episodes: 1996–2004, 2014–2019, and during the COVID-19 pandemic. Despite accounting for only a third of public debt, states were responsible for two-thirds of the debt increase in 1996–2004, half in 2014–2019, and a third during 2019–2021. This underlines the crucial role states play in national debt dynamics. Additionally, debt service is a significant fiscal burden, crowding out development spending on infrastructure, health, and education. In heavily indebted states, debt servicing can consume up to a quarter of total revenues, impairing their long-term growth prospects.

Both the Centre and states rely heavily on long-term, rupee-denominated debt held mostly by domestic institutional investors like banks, insurance companies, and provident funds. State debt is considered low-risk due to implicit sovereign guarantees and regulated interest rates, which have muted market discipline. Most state-issued securities are perceived to be nearly as safe as Central Government bonds, resulting in little variation in borrowing costs across states, regardless of fiscal prudence. Marketable securities now dominate state debt, comprising about two-thirds of total liabilities. Non-marketable instruments like loans from the National Small Savings Fund (NSSF) have declined in importance, while back-to-back loans from the Centre (notably under the GST compensation scheme) have increased.

The maturity profile of state debt has improved, reducing rollover risk. Several states, including Telangana and Tamil Nadu, have begun issuing 20-year+ securities, although on average, state debt still has shorter maturities than the Centre's. The effective interest rate on state debt has dropped significantly— from 10 percent in 2000–01 to about 6.9 percent in 2022–23, converging with Central Government rates. Nonetheless, interest rates show minimal correlation with debt levels, suggesting an absence of risk-based pricing.

The paper identifies primary deficits and contingent liabilities as key drivers of increasing debt. Heavily indebted states tend to have:

- Higher committed expenditures (on salaries, pensions, interest);
- Larger subsidies;
- Lower fiscal rule compliance; and
- Slower GSDP growth.

These states typically finance ongoing expenditures via borrowing rather than mobilizing adequate revenues. Punjab, for instance, spends 96 percent of its revenue receipts on committed expenses, leaving little room for developmental expenditure.

Given the divergence in fiscal performance, the authors assess the sustainability of a state's public debt in the near future. Using extrapolated trends in primary deficit, GSDP growth, and interest rates, the authors project

debt paths for each state under two scenarios—baseline and one assuming realization of contingent liabilities. By 2027-28, debt-to-GSDP ratios are projected to rise further in most states. Punjab, Rajasthan, Bihar, and Kerala could exceed 40–50 percent of GSDP. Even moderate states may see debt inch up unless corrective measures are taken.

Another important aspect of divergent fiscal outcomes is propensity of compliance with fiscal rules. In this paper, the authors utilize data from the CAG State Financial Audit Reports to show that states' compliance with their fiscal rules—especially those related to revenue deficits, fiscal deficits, and debt ceilings—has been poor. The average compliance rate over 2012-13 to 2021-22 is only 60 percent, with Kerala and West Bengal showing the lowest adherence. States with greater debt accumulation over the last decade also show lower compliance with fiscal targets, undermining the credibility of existing frameworks.

The paper outlines seven major reforms to improve state-level debt sustainability:

1. Forensic Fiscal Reviews: Diagnose specific causes of fiscal slippage in debt-stressed states.
2. Revenue Enhancement: Broaden tax bases, streamline administration, boost property taxes, and encourage privatization.
3. Contingent Liability Management: Establish state debt management offices for forecasting and oversight.
4. Independent Fiscal Councils: States should set up autonomous fiscal councils to assess budget realism and provide public oversight.
5. Market Discipline: The RBI should reconsider policies that equalize borrowing costs across states, enabling interest rates to reflect fiscal health.
6. Revamp Finance Commission Incentives: Shift away from rewarding revenue-deficit states to incentivizing fiscal prudence.
7. A Grand Bargain: Offer a conditional Central debt relief package to fiscally distressed states in exchange for greater Central oversight and reform commitments.

India's fiscal health cannot be safeguarded without strengthening state finances. Despite institutional arrangements like the Finance Commission and Fiscal Responsibility and Budget Management (FRBM) Acts, fiscal discipline remains uneven, and mechanisms to enforce accountability are weak. The growing divergence in debt levels among Indian states poses risks not only to state-level service delivery and growth, but also to the macro-fiscal stability of the country as a whole. The authors stress that correcting this trajectory requires a delicate balance of market incentives, institutional reforms, and political will.

Without such measures, prudent states will continue to subsidize profligate ones, reinforcing fiscal inequality and weakening the federal compact.

## **Rethinking Social Safety Nets in a Changing Society: Evidence from the India Human Development Survey**

In this paper, the authors Sonalde Desai, Debasis Barik, Pallavi Choudhuri, Bijay Chouhan, Om Prakash Sharma, Sharan Sharma, and Dinesh Kumar Tiwari point out that poverty in India has consistently declined during the period from 2004-05 to 2022-24. Preliminary<sup>1</sup> estimates from three rounds of the India Human Development Survey (IHDS), organized by NCAER in collaboration with the University of Maryland, document a drop in the poverty headcount ratio from 38.6 percent in 2004-05 to 21.2 percent in 2011-12, further declining to 7.1 percent by 2022-24. The poverty estimates use the inflation-adjusted poverty line, first proposed by the Tendulkar Committee. This trend is consistent with data from other sources, including the newly available Household Consumption Expenditure Survey (HCES) conducted by the National Statistical Office, although the exact estimates differ.

The paper argues that most of the discourse around poverty in India is static and focuses on poor households at specific points in time while paying little attention to movement in and out of poverty, possibly due to a lack of longitudinal data. Even during periods of relative economic stability, when poverty rates move slowly, individual households may experience income and consumption changes as household composition changes, workers retire, and children grow up and find employment. Illness and natural disasters may also affect income. During periods of economic transition, unforeseen circumstances may become particularly important. India has seen widening regional divergence in economic growth, with a college graduate in Tamil Nadu earning much more than his peer in Madhya Pradesh. Opportunities in some occupations have declined while those in others have expanded.

This suggests a need to examine household economic status from a longitudinal perspective. The results presented in this paper document the transition in household consumption, showing both entry into and exit from extreme poverty between 2004-05 and 2011-12, and between 2011-12 and 2022-24.

Their results show the movement in and out of poverty for 38 percent of households that were poor in 2004-05 and 62 percent of households that were not poor. By 2011-12, poverty had declined, and 25 percent of families had moved out of poverty, with 13 percent still mired in poverty. At the same time,

---

1. In the absence of recent Census data, sampling weights should be treated as preliminary.

of the 62 percent of non-poor households in the prior wave (2004-05), 8 percent had now become poor. These newly poor households comprised about 39 percent of all the impoverished households in 2011-12.

A similar exercise with 2022-24 data shows a similar trend, with 18 percent of households moving out of poverty and 4 percent falling back during the period between 2011-12 to 2022-24. The change between the two periods is that the overall poverty level in 2022-24 is substantially lower, and the newly poor form a more significant part of all poor households at about 60 percent. Most of the households falling into poverty came from the group classified as ‘near-poor’—between the poverty line and 200 percent of the poverty line.

For the poverty transitions between 2004-05 and 2011-12, the authors have undertaken a detailed analysis of the characteristics of entry into and exit from poverty, which documents that this movement out of poverty is greater for historically disadvantaged groups like the Scheduled Castes (SCs). These groups retain higher vulnerability to falling back into poverty, suggesting a precarious perch in lower-middle-class status. Other studies using IHDS Waves 1 (2004-05) and 2 (2011-12) data have tried to examine underlying conditions at Wave 1, such as household size, presence of the elderly, land ownership, and caste/religion that may predict the potential of slipping into poverty in Wave 2. These studies found that their ex-ante vulnerability measure is a positive and significant predictor of future poverty.

However, the coefficients are relatively small, reflecting the inability to predict accidents of life ex-ante perfectly. This is in sharp contrast to the observations from studies in the 20<sup>th</sup> century, which found considerable persistence of chronic poverty among SCs, Scheduled Tribes (STs), land-less households, and large households. It is important to note that chronic poverty for STs is higher in both the 20<sup>th</sup> and 21<sup>st</sup> century studies.

### *Dynamic Nature of Poverty Makes it Difficult to Identify the Poor*

Social protection programs introduce cost-efficiency by limiting their benefits to the poorest households. India began implementing this approach by moving from a universal public distribution system for foodgrains to a targeted public distribution system in 1997. This required the designation of households as poor, or in the words of Indian officialdom, as “Below Poverty Line” or BPL households.<sup>2</sup> The Ministry of Rural Development made this identification through nationwide censuses in 1992, 1997, 2002, and 2011.

The latest exercise in 2011 was conducted through the Socio-Economic Caste Census (SECC) conducted by the Ministry of Rural Development in rural areas and the Ministry of Housing and Urban Poverty Alleviation

---

2. In recent years, the terminology has changed to Priority Households as the segment covered has grown to cover a larger share of the population, but BPL remains popular in common parlance and we continue to use it in this paper.

in urban areas. Identification of households as being deprived was based on criteria for automatic exclusion (e.g., having an automobile or government job), automatic inclusion (e.g., primitive tribal groups or people living on alms), and a graded score based on occupation, living conditions, caste/tribe, and family composition. These criteria were selected for use in rural areas based on the recommendations of a working group headed by Dr N.C. Saxena for rural areas and Professor Hashim for urban areas. Local government authorities make a provision for the validation of the target households. While this method produces a ranked list, the cut-off for households deemed eligible is determined by the proportion of households deemed poor in a state based on the 2011-12 National Sample Survey.

Following Akerlof (1978),<sup>3</sup> proxy-means testing without verifiable income for social benefits has a long history. However, the validity of specific criteria used in identifying deprived households for issuing BPL cards has come under considerable criticism, even from one of the originators of the identification schema. These reviews found that many poor households were excluded from the BPL list, while many non-poor households were included.

The authors argue that when inclusions and exclusions were observed, they were often attributed to the local political economy, which allows some individuals to negotiate access to BPL cards, regardless of their economic status. Research shows that elite capture and social networks play an important role in who can get a BPL card. With some innovation, improving the identification of the poor may be possible using carefully crafted inclusion and exclusion criteria. However, little attention has been paid to how these targeting strategies may fare in a rapidly changing economy.

The paper suggests that the movement of households in and out of poverty becomes more critical as chronic poverty declines. However, the cost and logistic difficulties in undertaking major initiatives like SECC imply that these exercises will be infrequent and may not be effective in an era of rapid change.

Using data from different waves of IHDS, the authors examine the correlation between possession of BPL<sup>4</sup> cards and per capita consumption expenditure. The results highlight that while the poor are more likely to hold a BPL card, but errors of exclusion and inclusion persist at each expenditure level (poor, near-poor, and non-poor).

At the time of IHDS Waves 1 (2004-05) and 2 (2011-12), the BPL cards would have been issued using the 2002 survey, but by IHDS Wave 3 (2022-24), the SECC survey 2011 was used for BPL designation. The total number of households eligible for BPL cards expanded slightly between IHDS-1 and

---

3. Akerlof, G. 1978. "The Economics of 'Tagging' as Applied to the Optimal Income Tax, Welfare Programs, and Manpower Planning", *American Economic Review*, 68(1): 8-19.

4. Other categories of households eligible for programs like Annapurna Yojana and Antyodaya Anna Yojana are combined with BPL households here.

IHDS-2 but expanded substantially by the time IHDS-3 was conducted. This expansion was due to the implementation of the National Food Security Act (NFSA), which mandated that 75 percent of rural and 50 percent of urban households be covered for highly subsidized food distribution. This massive expansion should have addressed the exclusion errors, and all poor households should have received BPL (or PHH- Priority Household) cards. In contrast, inclusion errors would have increased due to the program's expansion, an acceptable form of error under NFSA.

This hope has been only partially fulfilled. While BPL cards became more common in 2022-24, about 31 percent of the poor still do not have access to them, nor do 35 percent of the households above the poverty line but below twice the poverty line, a zone where they can still slide into poverty. Ironically, between Wave 2 and Wave 3, poor households' BPL card access increased from 59 percent to 69 percent, but the expansion for non-poor households was far greater, from 29 percent to 57 percent.

However, focusing on elite capture may overstate the issue. A part of the exclusion of the poor may be due to the original design for BPL cards being linked to residential locations, which led to the exclusion of migrants. The 'One Nation, One Ration card' (ONOR) initiative may help enhance the portability of BPL cards, reducing vulnerability among poor urban migrant workers. A larger problem may be that this inconsistency is due to poverty decline, with many poor households (which correctly held BPL cards when the cards were issued) having now moved up to the non-poor category but retaining these cards due to infrequent identification of the poor. Conversely, households that were not poor during the SECC survey may have fallen into the poverty or non-poor but vulnerable category. However, their initial designation could only be changed with new assessments. Hence, they were excluded from gaining BPL cards.

This imprecision in the identification of the poor has concrete consequences. Eligibility for many benefits, particularly access to government-provided health insurance under the Ayushman Bharat Yojana, is tied to the household's designation as 'poor'. However, working in selected occupations may also confer some of these benefits. We find that households in different consumption categories, with and without BPL cards, differ substantially in their access to public insurance. Whether they are poor, vulnerable, or rich, among households with a BPL card, about 40-43 percent have access to government insurance, including both Central and state schemes, but without a BPL card, this number drops to about 23-25 percent. While private insurance access is also rising, it does not fill the hole for the poor households without a BPL card. The dynamic nature of poverty suggests that once in a decade, identifying poor households and providing them with social protection may miss out on those who fall into poverty while supporting those who no longer need social protection.

## Female Leadership in India: Firm Performance and Culture

In this paper, the authors Ratna Sahay, Navya Srivastava, and Mahima Vasishth analyse the impact of the ‘woman director’ mandate under The Companies Act (2013) on the performance of firms and their culture. Women’s share in corporate leadership has been steadily rising, including in India. The ‘woman director’ mandate under The Companies Act (2013) in India marked a significant step toward gender-inclusive corporate leadership, requiring listed firms to have at least one woman on their Board. Within a year, the percentage of listed firms without women on Board plummeted from 53 percent to less than 10 percent. Despite this progress, as of 2021, the average share of women on Boards in India stood at 17.1 percent, lower than the global average at 19.7 percent, and much lower than the best-performing country, France, with 43.2 percent.

India also lags in middle and senior management roles. Global data on the share of women in senior and middle management positions show that the share of women in these positions of leadership in India remains low, at just 17 percent in 2019. For context, the share of women in senior and middle management positions is 32.4 percent on average for advanced economies, and 32.8 percent on average for the world. India is also lagging behind other emerging markets in Asia, which had an average of 27.2 percent of women in senior and middle management positions in 2019, more than 10 percentage points higher than the Indian average. Still, starting from a low base, there has been progress over time, with the proportion of women in senior and middle management in India increasing by nearly 40 percent between 2010 and 2019.

The authors combine personnel-level data in NSE-listed firms with firm performance indicators to document the status of gender-inclusive corporate leadership in India. First, the paper studies changes in Board composition (in terms of both gender composition, and other director characteristics, like age, education, number of other directorships held, and share of meetings attended) that took place following the enforcement of the Companies Act (2013) and track any positive spillovers to rising share of women in top management teams. Second, the authors exploit the enforcement of the ‘woman director’ mandate as an exogenous shock to the hiring behavior of listed firms in India and quantify the relationship between the presence of women on Boards and firms’ financial performance, including profits, returns on capital, and financial stability. Third, they study the association between the share of women on Boards and firm culture. The authors measure culture by using employee ratings and sentiment scores, as well as text reviews posted by employees on an online company review platform. By showing the benefits of hiring more women in leadership positions for firm outcomes, the paper makes a business case for encouraging gender diversity in corporate leadership, which could also help in breaking down cultural norms.

The paper contributes to the existing literature on female leadership in corporate Boards and firm performance in two significant ways. First, the authors utilize quasi-random variation in the appointment of women to the Boards of Indian firms, leveraging a large panel of firms in the country to assess the impact of female representation on firm performance. The relationship between female leadership and firm performance is often endogenous, as women and men may select into different type of firms based on unobservable factors correlated with firm performance. This makes understanding the causal impact of female leadership challenging. The authors address this by exploiting the exogenous shock introduced by the Companies Act (2013) mandate for woman directors. This mandate allows them to compare “policy-responders” and “policy-unaffected” firms based on their pre-existing Board compositions, thereby alleviating endogeneity concerns. Additionally, the use of a large number of firms covering a majority of all NSE-listed firms enhances the relevance of the findings in the paper for national policy and enables the authors to explore how firms of different sizes respond differently to gender diversity on their Boards.

Second, the authors provide descriptive evidence on the mechanisms driving the positive impact of female leadership. By examining the association between the share of women on Boards and firm culture and by using a novel and widely used employee review database, they offer insights into how female leadership influences organizational culture. The paper processes rich text information from 400,000 employee reviews to measure different aspects of firm culture for offices based in India, that allows the authors to bring quantitative understanding of the impact of gender equity within leadership on firm culture. Focusing on Indian firms and work culture allows them to consider unique cultural idiosyncrasies around women in leadership and helps them effectively inform policy efforts needed in this area.

### *Establishing Stylized Facts*

Using personnel-level data from NSE-listed firms, the authors first explore the age and education levels of female directors compared to male directors. They find that women on Boards were much younger than their male counterparts, both before and after the enforcement of the Companies Act (2013). This gap in age widened significantly after the enforcement, indicating that new female hires were also significantly younger than the older cohort of women directors. In addition to being younger, they were also more educated. Although the average education for women on Boards had already surpassed that of men in FY 2012-13, this difference (conditional on age) became statistically significant in the years following the mandate’s enforcement (FY2014-15 onwards). Further, the authors find that women from the pre-existing network of directors were the ones who held a greater number of directorships after the mandate, while very few “outside” women were appointed. The authors say these gender gaps in demographic characteristics of the Board members are noteworthy and reflect

the underlying challenges that may persist at the level of hiring—in terms of plausible hiring biases from the demand side, or the lack of supply of qualified candidates, or both.

Second, the authors establish that in the years following the enforcement of the mandate, the gender gap in attendance of Board meetings reduced, as the attendance for women rose faster than that of men. By 2020, the average share of meetings attended by men and women was approximately equal. This may be reflective of a more open environment, allowing women to attend Board meetings more regularly and meaningfully contribute to decision-making, following the rise in the number of women on Boards due to the mandate. They also find that the average independence of women directors increased sharply following the mandate, surpassing the average for men in April 2015.

Third, they find that the positive trends observed on female representation of Boards following the mandate were not replicated in top management teams (C-Suite). The rate of increase for the share of women in top management is very low and plateaued around FY2016-17. In fact, in FY2022-23, more than half of the NSE-listed firms in the authors' sample did not have even one woman in their top management teams, and less than 10 percent of firms had exactly one woman.

### *Relationship between Gender Composition of Board and Firm Performance*

To study the relationship between financial performance and the presence of women on Boards, the authors build a firm-year level panel dataset for 1402 NSE-listed firms over a period of 15 years (FY2005-06 to FY2019-20), by combining personnel data on directors with firm performance data collected from annual financial statements. Using a “reverse difference-in-difference” strategy, they find a strong relationship between the presence of women on Boards and financial performance, but only for relatively larger firms. Event study plots show that in the years following the mandate enforcement, firms did see a change in financial indicators. However, this change was not sustained over time for the whole sample considered. For larger firms (i.e., firms that were, on average, categorized as either mid-cap or large-cap throughout the period of observation), the change in financial performance indicators was persistent over time, and the average effect of the mandate was found to be significant. The authors find that having at least one woman on Board is associated with higher economic performance, financial stability, and lower risk, and this effect is large and statistically significant for large and medium-sized firms, but not for small firms.

### *Association between Women in Leadership and Firm Culture*

To measure the association between women in leadership positions and firm culture, the authors web scrape rich employee ratings and text information

associated with these reviews from an online employee review platform. Using a natural language processing algorithm, they quantify employee review information into sentiment polarity and quantify firm culture across four broad aspects: employee sentiment; work culture; employee growth; and work security. They study the association between these metrics of firm culture and the average of current and previous share of women in Boards, under the assumption that continuous representation of women is more likely to influence present culture. They control for firm characteristics like size (based on the estimated number of employees), age, and industry, and seniority of the employee leaving the review.

The authors find that a higher share of women in Board positions correlates positively with employee ratings and sentiment scores, but this association is economically and statistically significant for firms with at least one woman in top management. In other words, employees are more likely to give higher ratings and use positive language to describe the culture of their workplace in firms with a higher share of women on Boards, only if the firm also has women in their top management team.

In sum, the paper documents the status of gender-inclusive corporate leadership and uses the ‘woman director’ mandate in the Companies Act (2013) to study its relationship with firm outcomes, including financial performance and corporate culture in India. The authors find that firms, on average, were appointing more women than mandated by the Act, suggesting the favourable impact of the current government’s signal to foster women-led development, as well as the positive business experience gained by firms by hiring more female directors. At the same time, newly appointed women were younger, more educated, and more independent than their male counterparts and their average number of directorships—“stretch factor”—increased significantly compared to men. Combining personnel-level data from NSE-listed firms with firm performance data and employing a reverse difference-in-difference econometric strategy, they find that having at least one woman on Board is associated with higher economic performance, financial stability, and lower financial risk for the large and medium-sized firms. This analysis highlights the business case for appointing more women at the top in corporate India.

## **Economic Development of the Indian State of Punjab: Prospects and Policies**

This paper by Lakhwinder Singh, Nirvikar Singh, and Prakarsh Singh assesses Punjab’s economy, reasons for its current situation, prospects for growth, and policies to enable growth. Punjab’s economy is characterized by slow growth, societal challenges, and environmental degradation. The authors identify four interrelated issues that act as constraints for Punjab’s economy. First, driven

largely by dependence on the Central Government's food procurement policy, and its specific nature, the state remains heavily agricultural in a narrow manner. Second, Punjab's fiscal situation is constrained in ways that make fiscal policy dysfunctional: the related causal factors include the agricultural structure and the state's political economy. Both physical and soft infrastructure have been negatively affected by the problems in public finances. Third, the authors say that a combination of regional and domestic politics during an era of liberalization has disadvantaged the state, with existing manufacturing industries declining, and new industries and services not emerging rapidly enough. Fourth, both individual human capital and institutional or organizational capital have either failed to develop, or have deteriorated in some dimensions over recent decades, making Punjab less innovative and less attractive for new investment.

The paper argues that prospects for meaningful economic development in Punjab will depend on collaboration between the state and national governments, including fiscal support to the former from the latter, to deal with various issues. The authors also discuss several specific policy areas, including agricultural diversification, industrial development and innovation, cross-border services, and decentralization to the local level.

While a major reform of the national food procurement policy has been announced, offering farmers unlimited purchases of maize and pulses at Minimum Support Prices (MSPs) if they switch from wheat or paddy, this may not be enough to incentivize large scale changes in crop choices. The authors say that additional payments may be required, which could be justified politically as compensation for past contributions to national food security. Those payments could be earmarked for upgraded infrastructure for marketing or processing the crops to which farmers switch. A previous proposal, what was termed a Special Investment Deficiency Package (SIDP), would have supplemented the state government budget by about 20 percent a year for five years.

The paper argues that at a basic level, Punjab's long-run economic growth will require a number of policy reforms to support industrial transformation. Business owners require 'ease of doing' business at a very granular level, as numerous barriers continue to remain beyond the initial step of government clearance: inspectors, enforcement of contracts, access to finance, finding skilled workers, and access to markets. In these areas, Punjab does worse than many other states, especially in the cost of electric power and structure of taxes.

In addition to attending to current interlinked obstacles to economic growth, future sources of growth have to be envisioned. As economic growth becomes increasingly knowledge-intensive, Punjab's economic structure appears more and more out of date. Much of the Punjab economy—in agriculture, manufacturing, and services—involves activities and firms that are low-productivity, low-wage, and input-intensive. In particular, Punjab's agriculture sector has relatively higher productivity compared to other Indian states, but because most of its output goes to national food procurement, there is

very low value added beyond the farm gate. Many of Punjab's subsectors in manufacturing and services are also low in value addition.

Punjab spends very little on R&D, in both public and private sectors. Its universities are also falling behind, partly because of lack of financial resources, and partly due to organizational decline. Punjab also does relatively worse in higher education, though not at lower levels of education. The authors say that all these issues will have to be addressed if Punjab is to make any kind of transition to a knowledge economy. In addition to investments in innovation and higher education, urban infrastructure needs serious attention. Punjab's urban local governments are relatively weak, both fiscally and institutionally. Much of this situation is a consequence of the decline in state-level institutional quality and the deterioration of state government finances. Strengthening local governments financially and institutionally seems to be a necessary condition for creating high-value-added clusters, along with investments in digital and other local infrastructure. In many areas, specific, granular reforms are also needed, and are being implemented, such as streamlining some government processes for citizens and businesses. However, these micro-level reforms cannot fully succeed without fundamental changes in Punjab's economic structure, and the political economy that accompanies it.

The authors say that lack of desirable employment, social problems such as drug and alcohol use, and over-politicization of religion, all seem to stem from Punjab's lock-in to the agricultural system created by the Green Revolution and an outdated national food procurement policy. The destruction of the groundwater table in Punjab, and potential desertification, will destabilize the state further, and have enormous national consequences. The original Green Revolution came from a national need for food security, and cooperation between the Central and state governments. At the time, there was greater political alignment between the Centre and most state governments. The current political system may not be as well-equipped to achieve a new political bargain which replaces the one that originally made the Green Revolution system effective. However, realizing that the economic, social and environmental situation in Punjab is a matter of national concern is the first step in working towards a new bargain.

## **India's Foreign Reserves and Global Risk**

In this paper, the authors Chetan Ghate, Kenneth Kletzer, and Mahima Yadav suggest that reserve accumulation continues to provide a precautionary benefit to India and the benefits could only increase as the country becomes further integrated with international financial markets. Since 1991, India has accumulated a substantial stock of foreign exchange reserves. This rise in reserves relative to GDP is part of a pattern of reserve accumulation by many large emerging market economies. The hoarding of reserves by the emerging

markets raises several questions about how these countries use their reserves—whether they hold adequate reserves for appropriate purposes; and if the marginal benefit of greater reserves outweighs the cost. This paper considers these issues for India. The analysis by the authors seeks to measure the effect of additional reserves on international capital flows over the global financial cycle and on the opportunity cost of holding reserves for India.

The authors identify three primary motives for central banks to hoard reserves. First, the reserves provide self-insurance against runs on domestic financial markets and institutions by foreign and domestic asset holders. Reserves can be held as a precautionary measure against sudden capital outflows related to global financial or domestic shocks. Second, reserves are used for intervention in the foreign exchange market to reduce short-term exchange rate volatility. A third, mercantilist, motive concerns systematic purchases of reserves to maintain export competitiveness with a depreciated exchange rate.

A natural policy question arises: when does the RBI have enough, or too many, reserves? Additions to reserves beyond what is needed to cover potential sudden capital outflows and import shocks might provide benefits by bringing assurance to creditors and other market participants that the central bank will not hesitate to intervene as much and as long as necessary. Reserves may mitigate risk due to global and domestic financial shocks reducing the incidence of capital flow reversals and the risk premium on government debt, whether denominated in domestic currency or foreign currency.

The adequacy of precautionary reserves has traditionally been defined in terms of the potential demand for reserve currency in the short run using a metric based on ratios of reserves to ‘rule-of-thumb’ exposures of a country to sudden outflows or shortfall of inflows. While continuing to use reserve ratios, the International Monetary Fund (IMF) now assesses reserve adequacy using a more forward-looking approach. The Assessing Reserve Adequacy (ARA) metric provides broader assessment of a country’s external vulnerabilities based on IMF projections. For emerging markets, reserves are broadly considered adequate for precautionary reasons if they range between 100 to 150 percent of the ARA metric (see Guidance Note on the Assessment of Reserve Adequacy and Related Concerns, June 2016.). In its Article IV assessment for 2024, the IMF reported that India’s reserves were 109 percent of the ARA metric, at the lower end of what would be considered adequate.

Floating exchange rate regimes raise the question of whether reserves should be held for the purpose of intervening in response to foreign capital outflows due to global or domestic shocks. Advanced economy central banks typically allow exchange rate movements to absorb the impact of global financial cycles. Emerging Market Economies (EMEs) appear to be vulnerable to financial instability from large exchange rate movements. This could justify the use of reserves to intervene against large depreciations associated with capital flow reversals. Over the last two decades, capital flows to India have risen to the level

of other major EMEs, and the economy's exposure to external financial shocks has increased. The Reserve Bank of India (RBI) tends to respond to shocks by selling reserves as the rupee depreciates.

The authors estimate the effect of reserves on volatile capital flows for India over the entire probability distribution of foreign capital flows rather than just at the mean. Their method follows recent research applying 'capital-at-risk' analysis to international capital flows. Quantile regressions for India are used to estimate the marginal effect of reserves on gross capital flows over the distribution of external and internal shocks, given global financial, growth, and monetary policy risks. Their analysis focuses on foreign gross capital inflows because these are most salient for financial stability concerns for India. Unlike most emerging markets, domestic gross capital outflows are subject to capital controls and are very small. Exceptional foreign gross portfolio outflows tend to exceed one percent of GDP.

Global financial turbulence and foreign monetary policy shocks are significant drivers of foreign capital outflows from India. The authors say global financial shocks are proxied by the VIX index, and relative India and U.S. monetary policy rates by the monetary shocks. Their results show that additional reserves can significantly reduce large outflows occurring with 5 percent probability. Interacting risks with reserve holdings shows how additional reserves reduce capital outflows, given global uncertainty shocks or monetary policy shocks. Using the quantile regressions to estimate a probability distribution for foreign portfolio capital flows allows prediction of how an increase in reserves mitigates a global uncertainty shock or monetary policy shock.

Monetary shocks affect foreign portfolio debt and equity flows differently. An increase in reserves significantly reduces the volatility of portfolio debt flows. Reserves reduce capital outflows following a rise in the federal funds rate and lower capital inflows with U.S. monetary easing. While reserves have a stabilizing effect on foreign debt flows, they do not significantly affect equity flows, as expected.

Weighing against the benefits of holding additional reserves are the opportunity costs of holding them. These costs include the interest differential between Government of India and U.S. Treasuries; changes in the valuation of reserves; and the carrying cost of foreign reserves. The authors estimate a model of the interest rate spread and find that spreads decline with the ratio of reserves to GDP. Their estimate of the marginal opportunity cost of reserves is significantly below the interest rate spread. The results show that increasing reserves reduces the overall sovereign bond spread by reducing both currency risk and credit risk using the 10-year US-India bond spread. The RBI adopted inflation targeting in the sample period, and the authors included a dummy variable for it. They conclude that inflation targeting has a significant negative effect on the interest spread by reducing exchange risk as expected.

## The T.N. Srinivasan Memorial Lecture and IPF Panel Discussions

The 2024 IPF also hosted the 6<sup>th</sup> T.N. Srinivasan Memorial Lecture. Professor Srinivasan, who passed away in November 2018, was one of the IPF's most ardent supporters, not missing a single IPF event over its first 15 years. His persistent focus on the quality of data and empirical analysis remains a guiding theme for the IPF. The 2024 T.N. Srinivasan Lecture, titled "Cracks in the System: How Geo-economic Fragmentation is Reshaping the World", was delivered by Pierre-Olivier Gourinchas, Chief Economist of the IMF. By geo-economic fragmentation, he meant the policy-driven reversal of global economic integration, often guided by strategic considerations, whether it is national security or some other reasons. The lecture was chaired by Nandan Nilekani, Co-founder and Chairman, Infosys, and Chairman, NCAER, followed by a discussion with Robert Lawrence, Professor, Harvard Kennedy School; Martin Raiser, Regional Vice President for South Asia, the World Bank; and Pravin Krishna, Professor, John Hopkins University, as the panelists.

A number of panel discussions were held during the IPF 2024. The discussion on 'Digitalisation and Development' was chaired by Neeraj Mittal, Secretary, Ministry of Communications, with Amiyatosh Purnanandam, Professor, University of Michigan; Gaurav Chiplunkar, Assistant Professor, University of Virginia; and, Deepak Mishra, Director and Chief Executive, Indian Council for Research on International Economic Relations (ICRIER), as the panelists. The discussion on 'States' Fiscal Challenges' was chaired by Arvind Panagariya, Chairman, 16<sup>th</sup> Finance Commission, with Poonam Gupta, Director General, NCAER; S. Krishnan, Secretary, Ministry of Electronics and Information Technology; and, M Govinda Rao, Councilor, Takshashila Institution, on the panel.

The session on 'Employment Challenges in India and Beyond' was chaired by Manish Sabharwal, Vice Chairman, TeamLease and NCAER, with BVR Subrahmanyam, CEO, NITI Aayog; Franziska Ohnsorge, Chief Economist for South Asia, The World Bank; Lant Pritchett, Director, Blavatnik School of Government, University of Oxford; and, Amit Basole, Professor, Azim Premji University, as the panelists.

The panel discussion on 'The Middle-Income Trap' was moderated by BVR Subrahmanyam, CEO, NITI Aayog, while Somik Lall, Senior Advisor, The World Bank; Ufuk Akcigit Professor, University of Chicago; Ashish Dhawan, Founder, Central Square Foundation; and, Karthik Muralidharan, Professor, University of California, were the panelists.

The main speaker for the concluding session of IPF 2024, on 'India's Economic Prospects in a Turbulent World', was Martin Wolf, Chief Economics Commentator, *Financial Times*. The lecture was followed by a discussion with Barry Eichengreen, Professor, University of California; Anantha Nageswaran,

Chief Economic Advisor to the Government of India; Swaminathan Aiyar, Editor Emeritus, *The Economic Times*; and, Pierre-Olivier Gourinchas, Chief Economist, IMF, on the panel. The session was moderated by Latha Venkatesh, *CNBC India*.

To view the IPF program with hyperlinks to all IPF papers, and videos of all sessions, scan this QR code or use the following URL:  
<https://ncaer.org/event/india-policy-forum-2024/>





BARRY EICHENGREEN\*  
*University of California, Berkeley, and NCAER*

POONAM GUPTA  
*NCAER*

# The State of the States: Federal Finance in India<sup>§</sup>

**ABSTRACT** Fully a third of India's very considerable public debt is debt of the states, a large fraction by the standards of other federal economies. State debts vary from less than 20 percent of state GDP in Odisha, Maharashtra and Gujarat to nearly 50 percent in Punjab. The recent evolution of these variables points to continued divergence in debt burdens across lightly and heavily indebted states and bodes difficulties for the latter in meeting all but essential expenditures. In the last ten years, half of India's larger states have added more than 10 percentage points to their debt-to-state-GDP ratios. Of the rest, about half have exhibited fiscal prudence, while the other half have exhibited moderate levels of debt increase. Under the business-as-usual scenario, a majority of states will become even more indebted, and the financial condition of more and less indebted states will continue to diverge. We point to reforms to strengthen fiscal discipline at the state level and address risks associated with the states' relatively high level of public debt.

**Keywords:** *Debt Management, Debt Sustainability, Federal Finance, Finance Commission, Fiscal Deficit, Public Debt, Contingent Liabilities, Subnational Finance*

**JEL Classification:** *E62, H6, H61, H63, H72, H74, H75, H77*

## 1. Introduction

In an earlier paper for the *India Policy Forum*, we analyzed general government debt in India, concluding that while public debt is worrisomely high, India faces no immediate crisis of debt sustainability. In this paper we focus specifically on the debts of the states, an oft-neglected but critically important aspect of the issue.

---

\* [eichengr@berkeley.edu](mailto:eichengr@berkeley.edu)

<sup>§</sup> Eichengreen is at the University of California, Berkeley, and NCAER; and Gupta was at NCAER at the time of writing the paper. Comments are welcome at [eichengr@berkeley.edu](mailto:eichengr@berkeley.edu). We thank Arvind Panagariya, Udaibir Das, and Chinmaya Goyal for their useful comments and Ayesha Ahmed, Shubhashree Jha, and S. Priyadarshini for research assistance.

The findings, interpretations, and conclusions expressed are those of the authors and do not necessarily reflect the views of the Governing Body or Management of NCAER.

As we show, fully a third of all public debt in India is debt of the states. Moreover, debt ratios have risen in all but four Indian states over the last decade. The average state debt ratio of 28 percent of state GDP is high by the standards of other federal economies, where sub-national governments have limited ability to raise taxes to service debts owing to the mobility of the tax base. India has the highest sub-national debt as percent of GDP of BRICS countries (RBI's State Finance Report 2019-20). It has the highest subnational debt as a percentage of revenue of any country (S&P Global Research 2021).

More generally, in periods when the debt ratio increases rapidly, the states are directly implicated. The states were responsible, in an accounting sense, for fully two-thirds of the increase in public debt between 1997-98 and 2003-04, more than half in the period 2014-15 to 2019-20, and a third in the COVID period 2019-20 to 2020-21, these being the main periods of rapid debt ratio increases.

With heavy debts come heavy debt service burdens. Their cost limits the ability of state governments to fund programs designed to meet social and developmental needs. They divert resources away from investments in education, infrastructure and public health. They limit the ability of state governments to fund adaptation to climate change-related risks (increased risk of monsoon-related flood in the northeast, drought in the west, cyclone risks and coastal flooding in the South).<sup>1</sup>

Importantly, these debt burdens, and their associated costs, differ enormously across states. Debts vary from less than 20 percent of state GDP in Odisha, Maharashtra and Gujarat, to nearly 50 percent in Punjab. As we show, not only primary fiscal balances but also interest-rate-growth-rate differentials vary dramatically across states, due to differences in both economic growth rates and the relative importance of non-marketable debt, which bears concessional interest rates.<sup>2</sup> The recent behavior of these variables points to continued divergence in debt burdens across lightly and heavily indebted states. It bodes of difficulties for the latter in financing all but essential expenditures.

A first question is how heavily indebted states got into this pickle. (This is prior to the next question of how they might get out.) Deficit spending by state government is supposed to be constrained by a combination of fiscal rules and market discipline. Neither constraint has functioned adequately. Although all states have formal fiscal rules, some states are chronic violators. Moreover, there has been little variation in the interest rates on the marketable debts of different states, or between the debts of the states and debts of the union government. This lack of variation reflects heavy intervention in the market by the government's debt manager, the Reserve Bank of India. As a result, market

---

1. The fiscal implications of climate change for the finances of different states are a bit beyond our brief, but we consider them briefly in Appendix IX.

2. Details are in Appendix IV, Table IV.1.

discipline does little to restrain the more profligate states, which are effectively subsidized by their more prudent counterparts. The question then becomes what might be done to strengthen both fiscal rules and fiscal discipline, and more generally what changes in policy and institutions would help to limit the accumulation of excessive state debts.

## 2. Level and Composition of Public Debt

Debt is issued both by the government at the Centre and by the states. The states account for about a third of the total government debt. Their share increased from about 30 percent to 40 percent between 1991 and the mid-2000s, and has recently inched down to 34 percent of GDP aggregated across states (Figure 1).<sup>3</sup>

State debt ratios have comoved with that of the Centre while contributing significantly to the episodic increases in the debt of the General Government (Figure 2). We identify three episodes in the last three decades when the General Government's debt-to-GDP ratio increased sharply. These are 1996-97 through 2003-04, when the ratio increased by 19.2 percentage points; 2014-15 through 2019-20, when it increased by 8.6 percentage points; and 2019-20 through 2020-21, when due to COVID, the debt ratio increased by 14.1 percentage points within a year. Of the 19.2 percentage points increase in the debt-to-GDP ratio in the 1996-97 and 2003-04 period, the debt ratio of the states increased by 12 percentage points, whereas that of the Centre by 7.2 percentage points. Of the 8.6 percentage points increase in the 2014-15 to 2019-20 period, the debt ratio of the states increased by 4.9 percentage points, and the Centre's by 3.7 percentage points. In contrast, of the 14.1 percentage point increase during COVID, the Centre accounted for a larger amount (9.7 percentage points), with the states adding only 4.4 percentage points.

Thus, although the states account for only one third of total General Government debt, they have accounted for a significant proportion of the increases in the latter; and their debt can matter importantly for debt sustainability.

At an aggregate level, higher primary deficits, a less favorable growth-rate-interest-rate differential, and higher contingent liabilities all contributed to the rise in the states' share in General Government debt in the episodes identified above (Table 1).<sup>4</sup> Overall, primary budget deficits as a share of GDP have been smaller for the states. The average annual fiscal deficit for the Centre between

---

3. Data sources are documented in Appendix I.

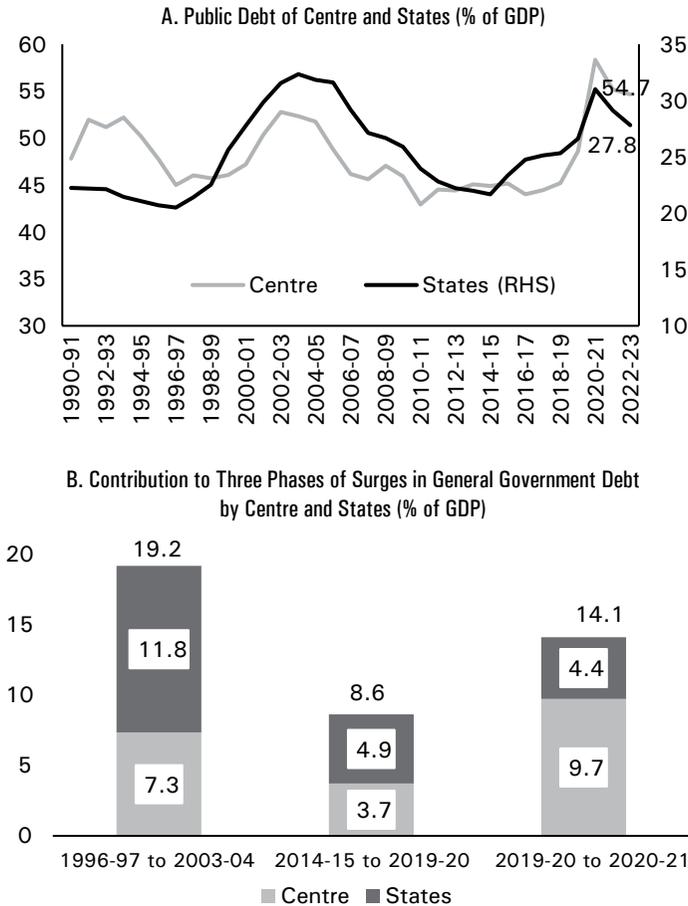
4. We further consider how the primary deficit, interest payments, nominal effective interest rate, contingent liabilities and debt levels of the Centre and states have varied over the last three decades (decadal averages) in Appendix III, Table III.1.

**FIGURE 1. General Government Debt and Share of Centre and States in it**

Source: Data are from the RBI's Handbook of Statistics on Indian Economy for the Centre; and State Finances Report for the states.

Note: RE refers to Revised Estimates. The Centre's debt is net of what the states owe it.

1990-91 and 2022-23 was 5.2 percent of GDP, compared to the states' 2.9 percent. The Centre's average primary deficit between 1990-91 and 2022-23 was 1.5 percent of GDP; against the states' 1 percent (Figure 3). The aggregate primary deficits of the states were about the same as that of the Centre until about 2008-09, but were then less than that of the Centre subsequently.

**FIGURE 2. Public Debt of Centre and States**

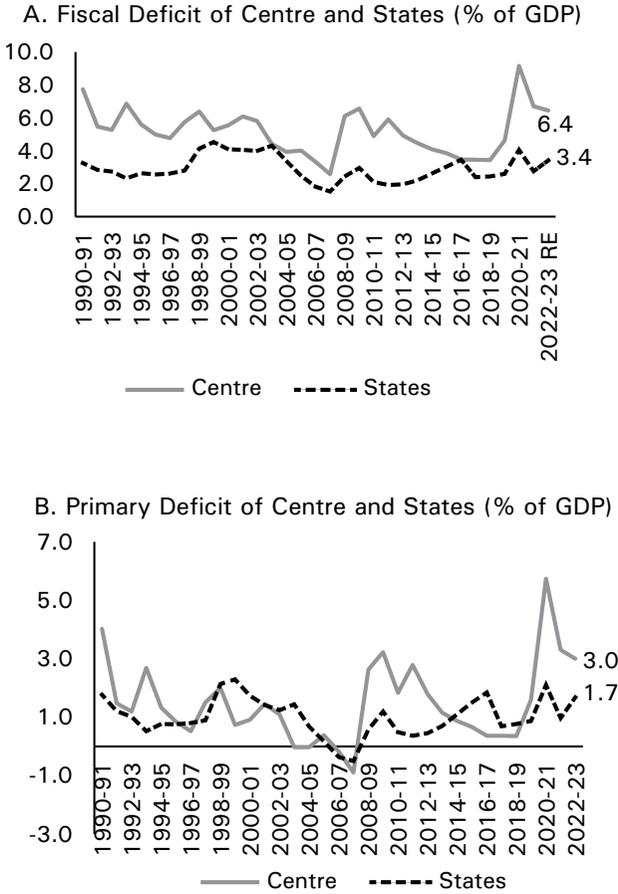
Source: Data are from the RBI's Handbook of Statistics on Indian Economy for the Centre; and RBI State Finances Report for the states.

Note: RE refers to Revised Estimates.

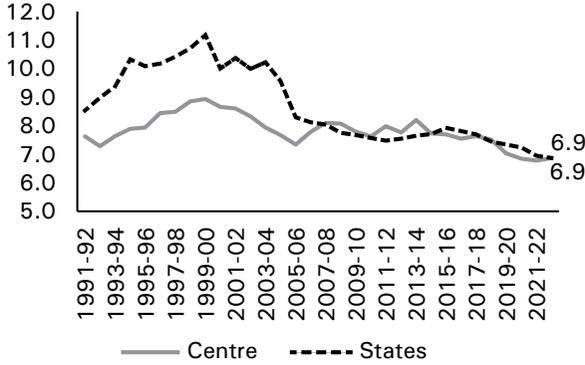
Until the mid-2000s, the states faced much higher effective interest rates than the Centre, though their effective interest rates have since declined. Average effective interest rates averaged 8.1 percent for the states and 7.7 percent for the Centre over the period 2000-01 to 2022-23.<sup>5</sup> While contingent liabilities of both the Centre and states declined over the last two decades, states' contingent liabilities continue to exceed those of the Centre. Rajasthan, Punjab, Telangana,

5. Realizing the growing interest burden of the states, the Centre introduced a debt swap scheme in 2002-03 under which high-cost loans of the states from the Centre bearing interest rates of above 13 percent were swapped through fresh issuances of low-cost market borrowings and securities issued to National Small Savings Fund (NSSF).

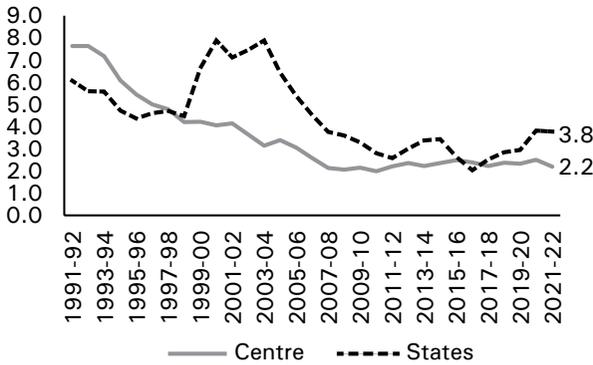
**FIGURE 3. Fiscal and Primary Deficits of Centre and States**



C. Nominal Effective Interest Rate of Centre and States on Debt (%)



D. Contingent Liabilities of Centre and States (% of GDP)



Source: For the Centre, data on deficits and interest payments are from RBI’s Handbook of Statistics (downloaded from CEIC). Data for contingent liabilities are from the Annual Report of RBI and the Union Budget. For the states, data are from RBI’s State Finances Report (downloaded from CEIC).

Note: Effective interest rate has been calculated as interest payments as percent of total outstanding liabilities as of the previous year.

Uttar Pradesh, and Andhra Pradesh stand out as states with very high contingent liabilities (as percent of their respective state GDP figures averaged from 2013-14 to 2021-22).<sup>6</sup> The power sector accounts for the largest share of these guarantees, accounting for 44 percent of the total guarantees. Other sectors are more state-specific; they include irrigation and agriculture, among other items.<sup>7</sup> The Centre's contingent liabilities in the past have derived primarily from aid to public sector banks and Air India.

**TABLE 1. Fiscal Variables for Centre and States during Episodes of Sharp Changes in General Government Debt**

	<i>I. 1996-97 to 2003-04</i>		<i>II. 2014-15 to 2019-20</i>		<i>III. 2019-20 to 2020-21</i>	
	<i>Centre</i>	<i>States</i>	<i>Centre</i>	<i>States</i>	<i>Centre</i>	<i>States</i>
Change in Debt (percentage point)	52.3 - 45.0 = 7.3	32.3 - 20.5 = 11.8	48.6 - 44.9 = 3.7	26.6 - 21.7 = 4.9	58.3 - 48.6 = 9.7	31.0 - 26.6 = 4.4
Primary Deficit, % of GDP (average of period)	1.1	1.6	0.7	1.1	5.7	2.1
Growth-Interest Differential (average of period; percentage point)	1.9	0	2.6	2.4	-8.1	-8.5
Contingent Liabilities, % of GDP (average of period)	4.0	6.6	2.4	2.6	2.5	3.8

Source: For the Centre, data on deficits and interest payments are from RBI's Handbook of Statistics (downloaded from CEIC). Data for contingent liabilities are from the Annual Report of RBI and Union Budget. For the states, data are from RBI's State Finances Report (downloaded from CEIC).

Note: Effective interest rate has been calculated as interest payments as percent of total outstanding liabilities as of the previous year.

There is a large vertical gap in India. States collect only one-third of total public revenues but spend about two-thirds. Thus, one-third of total resources are transferred by the Centre to the states. This has amounted to about 6.5 percent

6. As of 2021-22, the five states with highest contingent liabilities (as percent of their respective state GDP) are Telangana, Andhra Pradesh, Uttar Pradesh, Rajasthan, and Kerala. Data for state-wise contingent liabilities has been collated using CAG's (Comptroller and Auditor General) State Finances Audit Reports for the years 2013-14 till 2021-22 (the last year for which data for all states is available). RBI State Finances Report also makes available data for the states' contingent liabilities but there are missing data points and inconsistencies between subsequent years of data revision. Since CAG is the original source for public finance data for the states, we decided to use the latter.

7. See Chakrabarty and Vipra (2023), PRS India State of State Finances: 2023-24 (prsindia.org).

of GDP in recent years. Most is transferred as per the recommendation of the Finance Commission (which is constituted every five years as a constitutionally mandated body) and the rest by the Centre through various grants. The Finance Commission recommends tax sharing according to a formula focusing mostly on income distance and population size. We discuss this further in Appendix II.

### 3. Debt Composition

The Centre and states finance their debts in similar fashion: long term, rupee denominated, held domestically by institutional investors, and at fixed rates.

Nearly 90 percent of General Government debt is long term (i.e., with a residual maturity longer than one year). The share of the Centre's debt that is long term has increased from 83 percent in 2000-01 to nearly 90 percent currently. Since the turn of the century, a steady 94 percent of the debt of State Governments has been long term (Figure 4).

Public debt is predominantly held by domestic investors (Table 2). For the Centre, the share of external debt has fallen gradually in recent years, to less than 5 percent at end-March 2022. This low share of external debt insulates the debt portfolio from currency risk, since debt sold to foreigners tends to be denominated in foreign currency. State governments are not allowed to contract external debt. External loans intended for state government projects are contracted by the Centre and on-lent to the states.<sup>8</sup>

Further, the debt portfolios of the Centre and states are insulated from short-run interest rate volatility. States cannot issue securities with floating rates, while only 6 percent of Central Government debt is at floating rates.

Thus, both because of regulatory restrictions on holding foreign debt, foreign currency debt and debt with floating rates, and because of the Centre's implicit guarantees, state debt is perceived as equally safe as the debt of the Centre. States on average pay only a very small premium over the Centre.

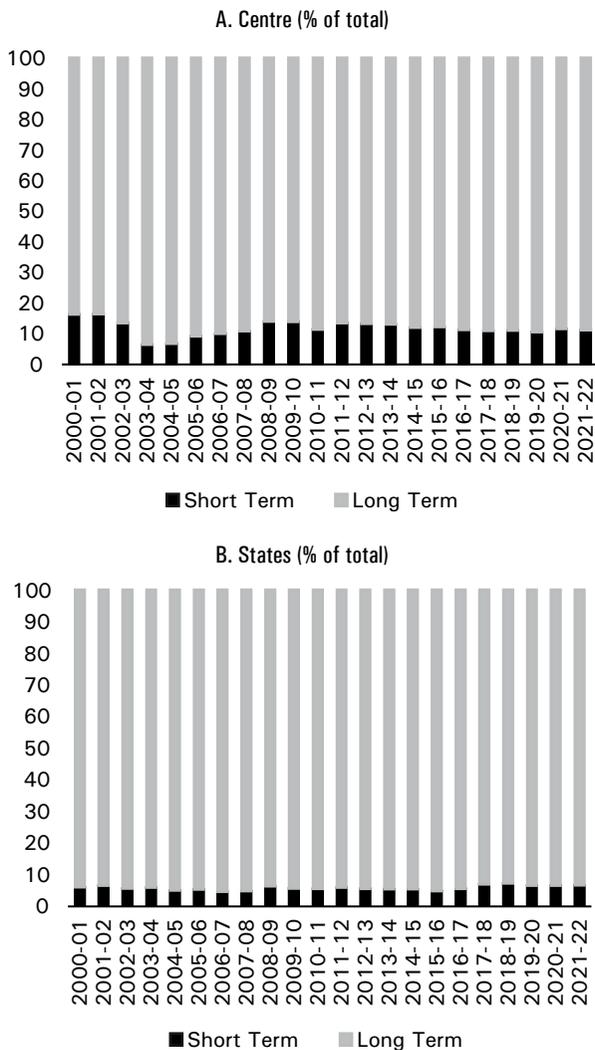
#### 3.1. Who Holds Public Debt?

The composition of investors in state debt is changing. The share of market loans in state debt has increased from about one half (51.4 percent) at end-March 2018 to about two-thirds (66 percent) at end-March 2024. Within non-marketable debt, the share of borrowings from the National Small Savings

---

8. As per the Status Paper (2023), "The Constitution of India under Article 293(1) empowers State Governments to borrow only from domestic sources. Further, Article 293(3) of the Constitution states that, 'A State may not without the consent of the Government of India raise any loan if there is still outstanding any part of a loan which has been made to the State by the Government of India or by its predecessor Government, or in respect of which a guarantee has been given by the Government of India or its predecessor Government.'"

**FIGURE 4. Long Term versus Short Term Debt of Centre and State Governments**



Source: Data are from Status Paper on Government Debt, Ministry of Finance, September 2016 (for 2000-01 to 2009-10) and April 2022 (2010-11 onwards).

Fund (NSSF) and sundry other sources has declined (Table 2), while that from the Centre has increased.<sup>9</sup>

9. States' dependence on market borrowings has increased following the recommendation of the Fourteenth Finance Commission to exclude most of the states from NSSF (Cabinet approves the exclusion of states from the investments of National Small Savings Fund from 1.4.2016 (pib.gov.in)).

**TABLE 2. Composition of Centre's and States' Debt**

	<i>Composition of Centre's Debt (% of total)</i>				
	<i>2017-18</i>	<i>2018-19</i>	<i>2019-20</i>	<i>2020-21</i>	<i>2021-22</i>
Marketable Securities	66.0	64.0	62.4	64.5	63.6
Borrowings from NSSF	15.4	16.1	17.0	17.1	17.5
Loans from Banks and Other Institutions	2.5	3.4	3.7	3.3	3.0
External Liabilities	5.3	5.1	5.2	5.0	4.7
Other Liabilities	10.8	11.4	11.7	10.0	11.2
	<i>Composition of States' Debt (% of total)</i>				
	<i>2017-18</i>	<i>2018-19</i>	<i>2019-20</i>	<i>2020-21</i>	<i>2021-22</i>
Marketable Securities	51.4	53.5	57.2	60.5	61.6
Borrowings from NSSF	11.1	9.2	7.7	6.1	5.1
Loans from Banks and Financial Institutions	4.9	4.8	4.8	4.2	3.8
Loans from the Centre	3.8	3.6	3.0	5.1	7.2
Uday Bonds	4.8	4.1	3.5	2.9	2.3
Other Liabilities	23.6	24.2	23.5	20.9	19.8

Source: Data for Centre's debt is from Status Paper on Government Debt 2021-22. Its 'Other Liabilities' include 14-day intermediate T-Bills and Compensation and Other Bonds, State Provident Fund, Reserve Funds and Deposits, Other Accounts, and Extra Budgetary Resources. States' data is from RBI's State Finances Report (December 2023). Their 'Other Liabilities' include State Provident Funds, Deposits and Advances, Reserve Funds, Contingency Funds.

After declining substantially in previous decades (from 40 percent in 2000-01 to 16 percent in 2004-05, and to a miniscule 3 percent of the total in 2019-20), loans from the Centre have increased again since 2020-21.

With Goods and Services Tax (GST) implementation in 2017, the ability to raise revenue from goods and services shifted from origin states (where the good or service is produced) to destination states (where it is consumed). This posed revenue uncertainty for certain states. In response, the Centre imposed and collected a Compensation Cess, which was used to compensate states for revenue losses arising on account of the GST over the following five years. However, in 2019-20 and subsequently during Covid, resources thereby collected fell short, so the Central Government borrowed the requisite amounts and released them to the states and Union Territories via a back-to-back loan

---

The National Small Savings Fund is a fund operated by a government agency, the National Savings Organization, which mobilizes funds through small savings schemes. Earlier, the states were mandated to borrow funds so collected within the respective states. Interest rates have typically been higher than the rate on marketable debt. Upon the recommendation of the Fourteenth Finance Commission, state governments were exempted from borrowing from the NSSF as of April 1, 2016. This shift away from the NSSF has lowered interest costs. Also see Mishra and Singh (2018).

facility (on the identical terms at which the Centre borrowed). These loans by the Centre to the states in lieu of GST compensation (together with 50-year interest-free loans distributed under the scheme ‘Special Assistance to the States for Capital Investment’ during Covid) increased the proportion of loans from the Centre in states’ borrowing portfolios.<sup>10</sup>

Marketable securities are primarily held by banks, insurance companies and provident funds. All three kinds of institutions have statutory requirements to invest in government bonds (Eichengreen, Gupta and Ahmed 2023). Public sector banks were the largest category of investors in both central government and state government securities until 2014-15. Their share has declined since, in the case of state government securities, from 50 percent in 2007-08 to 26 percent in 2021-22, with a corresponding increase in the shares of insurance companies (to about 28 percent in 2021-22) and provident funds (to 21 percent in 2021-22). The share of private and foreign banks has also increased, from 3.5 percent in 2007-08 to 8.3 percent in 2021-22 (Figure 5). Thus, the securities of the states, like those of the Centre, are now held by a more diversified investor base, reflecting a larger and more competitive market. This has further lowered interest costs and rollover risks.

### *3.2. Duration of Debt*

The authorities have sought to reduce rollover risk by issuing longer tenor securities. The weighted average maturity of outstanding securities has been increasing (Figure 6), while the maturity of newly issued securities has risen even higher. The weighted average maturity of dated securities of the Centre issued in 2021-22 increased to 16.99 years compared to 14.49 years in the previous year.

On average, the maturity of the states’ debts is lower than that of the Centre and has increased more slowly. About 5 percent of outstanding securities had a maturity of less than a year as of March-end 2022. Even so, the share of states’ securities with maturity greater than 10 years has increased from 3.8 percent to nearly 19 percent.<sup>11</sup> A number of states now issue securities of more than 20-year tenure (at end-March 2023, this was the case for 21 percent of the debt of Telangana, 16.4 percent of Tamil Nadu, 9.3 percent of Kerala, 4.4 percent of Rajasthan, 3.0 percent of Punjab, and 1.5 percent of Madhya Pradesh).<sup>12</sup>

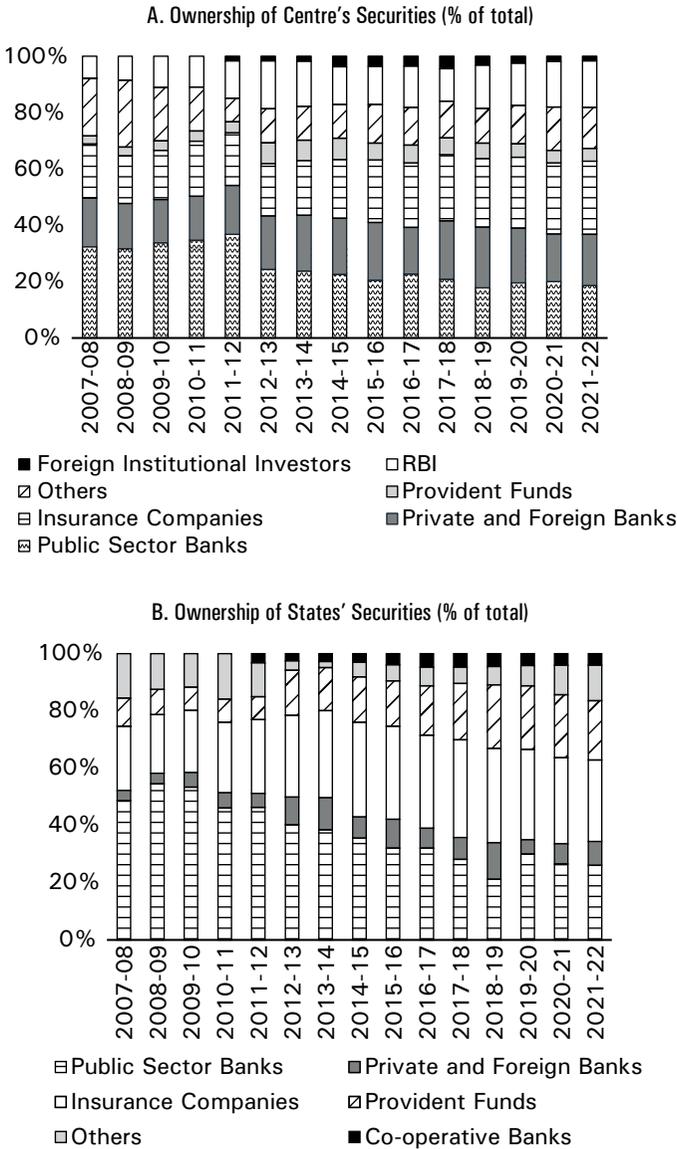
---

10. RBI State Finances Report (2024, Appendix Table 12); Fifty-year loans for capex; and Loans in lieu of GST compensation.

11. The Centre’s short-term debt includes 14-day intermediate treasury bills, 91-day, 182-day and 364-day treasury bills; dated securities maturing in the ensuing one year; and external debt with remaining maturity of less than one year. The states’ short-term debt includes market loans maturing within the next one year, Special Drawing Facility (SDF), and Ways and Means Advances (WMA); and repayment of loans to the Centre falling due in the ensuing year.

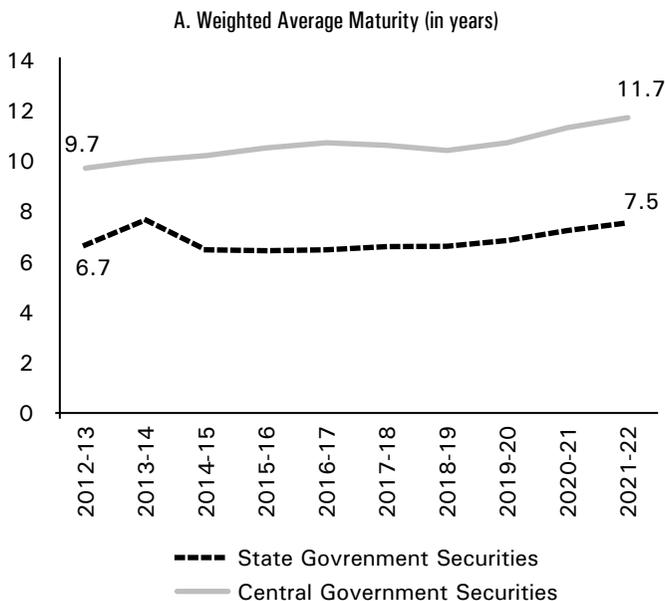
12. RBI’s State Finance Report 2024 (Table II.5).

**FIGURE 5. Ownership of Centre's and States' Marketable Securities**

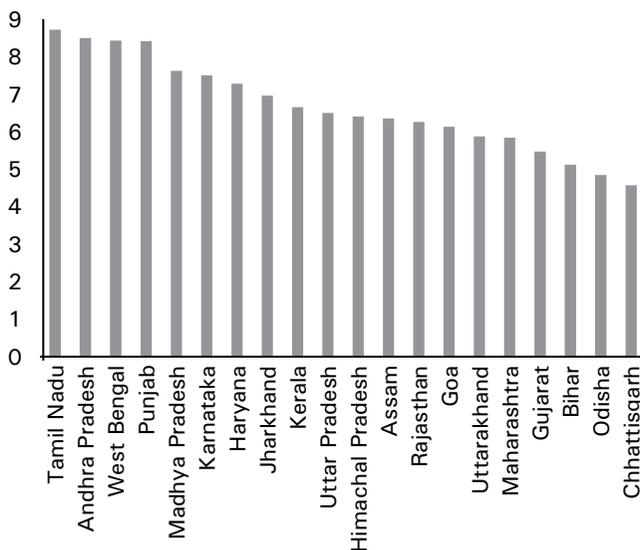


Source: Data are from Public Debt Statistics, RBI. Provident Funds are retirement funds run by the government. For states, 'Others' includes the RBI, Primary Dealers, Financial Institutions, Mutual Funds, Corporates, Foreign Institutional Investors (FIIs) and Others. For the Centre, 'Others' include Mutual Funds, Co-operative Banks, Primary Dealers, Financial Institutions, Corporates, and State Governments.

**FIGURE 6. Weighted Average Maturity of Outstanding Market Securities**

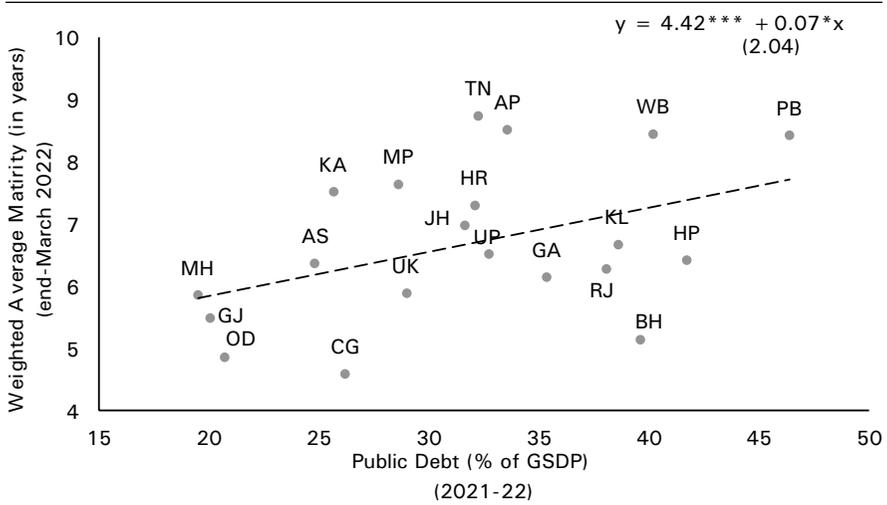


**B. State-wise Weighted Average Maturity (in years, as of End-March 2022)**



Source: Data for states are from Monthly Reviews of the Economy, Clearing Corporation of India; for the Centre, from Status Paper on Government Debt and Quarterly Reports on Public Debt Management, Ministry of Finance.

Note: Telangana, with a weighted average maturity of 15.2 years, is not included in the right panel.

**FIGURE 7. Weighted Average Maturity of Securities and Level of Indebtedness**

Source: Author's calculations.

Note: t-statistic in parentheses; \*, \*\*, and \*\*\* indicate significance at 10, 5, and 1 percent levels, respectively. Telangana is not included in the figure.

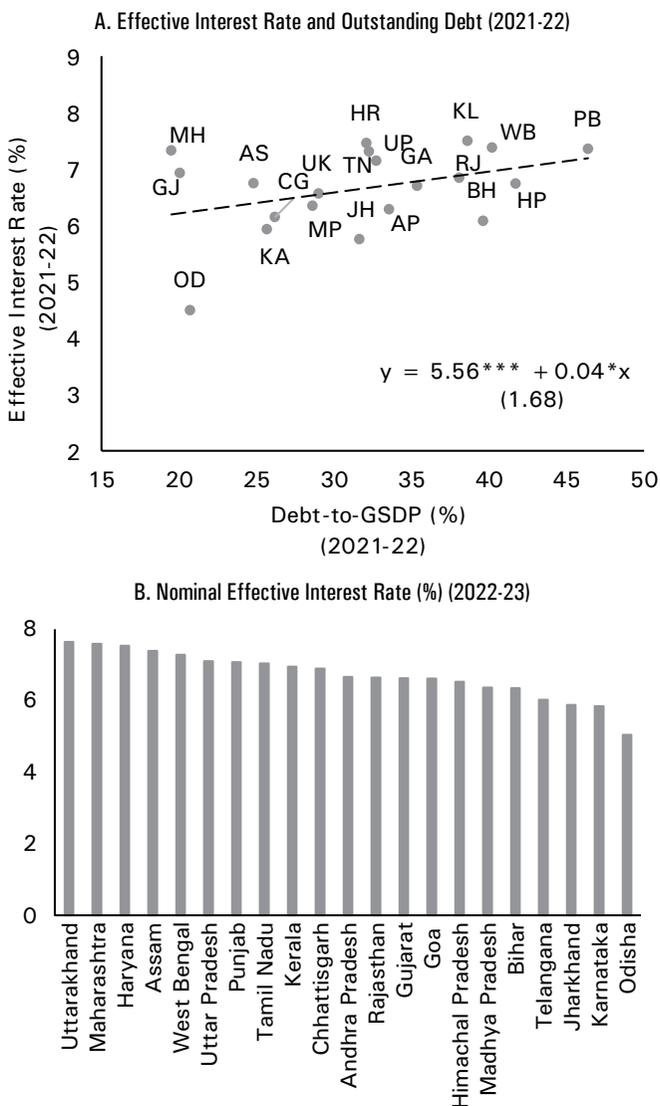
Somewhat surprisingly, moreover, more indebted states actually issue longer tenor securities (Figure 7).

### 3.3. Nominal Effective Interest Rate

As we saw in the previous section, the effective interest rate (calculated as interest payments divided by the debt stock of the previous year, as in IMF 2022) of both the Centre and the states has declined from levels prevailing in the early 2000s. This fall has been steepest for the states, from an average of 10 percent in 2000-01 to 6.9 percent in 2022-23. As a result, effective interest rates facing the Centre and the states have converged. While there is some variation in effective interest rates paid by the states, this is not significantly associated with state-debt-to-GSDP ratios (Figure 8, and Appendix IV, Table IV.2).<sup>13</sup>

13. In Table IV.2, we regress nominal effective interest rate on debt to GSDP one year at a time from 2014-15 to 2022-23. We do not find any evidence of a significant association between the two variables and the relationship does not exhibit any changes over time.

**FIGURE 8. Nominal Effective Interest Rate on Outstanding Debt of States**



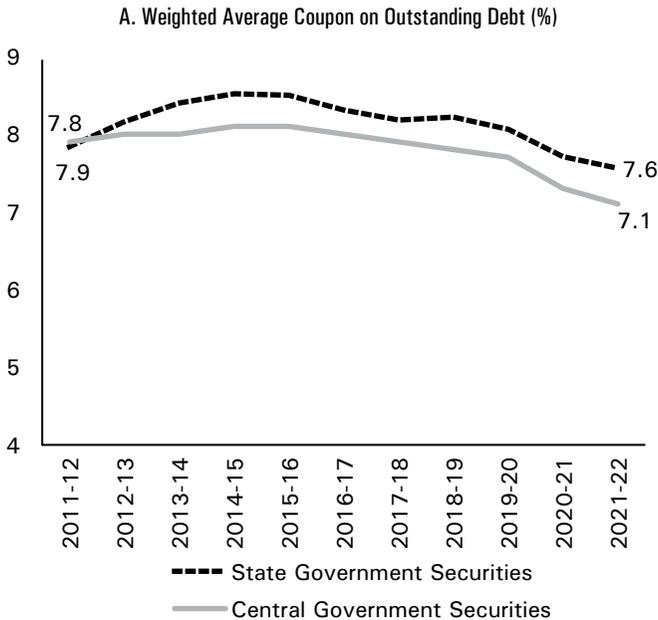
Source: Data for interest payments and debt are from RBI (downloaded from CEIC); GDP data has been taken from MoSPI. Note: Effective interest rate is calculated as total interest payments as percent of total outstanding liabilities of the previous year.

Between 2011-12 and 2021-22, the weighted average coupon on outstanding marketable securities of both the states and the Centre declined (Figure 9A). The average yield on primary issues of securities of state governments saw a larger decline, dropping from about 11 percent in 2000-01 to 7.7 percent

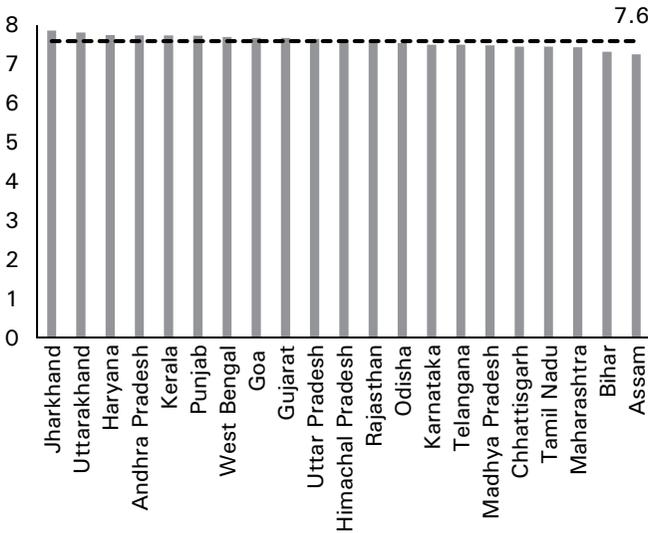
in 2022-23. For the Centre, the decline was from 7.8 percent to 7.6 percent. Similar to the weighted average coupon on the outstanding stock, the weighted average yield on primary issues of state governments has consistently been higher than the weighted average yield on Central Government securities. In Appendix IV (Table IV.1), we present the data for weighted average yield and effective interest rates for each state along with their nominal GSDP growth rates. The range of nominal effective interest rate is wider than the range of weighted average yield.

States display little heterogeneity in the rates at which they borrow (Figure 9B). Rates do not vary significantly with the level of indebtedness, the primary deficit, or the rate of economic growth. This could be due to the existence of an implicit guarantee from the Central Government; the fact that the largest investors in government bonds (public sector banks, insurance companies and Provident Funds, themselves owned by the Central Government, and not profit-maximizing entities) do not have an incentive to discriminate across states; or the fact that the securities of different states all carry identical risk weights in regulatory calculations. In addition, the RBI, by carefully scheduling the calendar of borrowing and coaxing government-owned investors to hold the bonds of the states, ensures that interest rates on state debt remain in a tight range.

**FIGURE 9. Average Coupon Rate on Outstanding Securities**



B. State-wise Weighted Average Coupon on Outstanding Securities (%) (as of End-March 2022)



Source: Data for the states’ weighted average coupon on outstanding debt are from Monthly Reviews of the Economy published by Clearing Corporation of India (CCIL); weighted average coupon on outstanding debt for Central Government securities have been taken from the Status Paper on Government Debt and Quarterly Report on Public Debt Management (multiple issues). State-wise details have been taken from the Status Paper on Government Debt 2021-22. These are nominal rates.

The RBI State Finances Report (2024) notes that the weighted average spread of securities of the states over corresponding Central Government securities is small and has declined further in recent years, from 55 bps in 2019-20 to 53 bps in 2020-21, 41 bps in 2021-22, 31 bps in 2022-23, and 24 bps in 2023-24 (until October 2023). It notes that differences across states are small: on 10-year fresh issuances of securities, the difference between the largest and smallest spread was a mere 6 basis points in 2019-20 and 10 bps in 2020-21. Spreads then narrowed further to 4, 3, and then 2 bps in the three subsequent years. Especially striking is the comparison between Gujarat and Punjab. Punjab, with a debt-to-GSDP ratio of over 45 percent, has the same average rate on its securities as Gujarat, which has a debt-to-GSDP ratio of about 20 percent (Table 3).

**TABLE 3. Comparing Duration and Yield on Securities of Gujarat and Punjab**

			<i>New Issues of Securities in the Year</i>			<i>Outstanding Securities</i>		
<i>State</i>	<i>Year</i>	<i>Debt to GSDP (%)</i>	<i>Weighted Avg. Yield (%)</i>	<i>Weighted Avg. Maturity</i>	<i>Issued Amount (Rs Cr)</i>	<i>Weighted Avg. Coupon (%)</i>	<i>Weighted Avg. Maturity</i>	<i>Outstanding Amount (Rs Cr)</i>
Punjab	FY 2022-23	46.8	7.7	18.0	28,460	7.61	10.02	2,11,901
	FY 2023-24	47.6	7.6	13.0	28,536	7.59	10.24	2,41,419
Gujarat	FY 2022-23	18.9	7.7	8.7	43,000	7.60	5.33	2,83,057
	FY 2023-24	18.2	7.5	7.4	22,500	7.53	4.85	2,95,005

Source: Data are as of end-March for each financial year. Debt-to-GSDP ratio has been taken from the RBI State Finances Report (Budget Estimates for 2023-24). Data for new issues is from CEIC (compiled from RBI's press release on State Government Securities Auction Results). The data pertains to only the new issue with the highest tenure in that auction for each state. To calculate the weighted average maturity and weighted average yield, the yield and maturity on each new issue is weighted by the issued amount in a financial year. Data for outstanding securities has been taken from Rakshitra report of Clearing Corporation of India.

#### 4. Debt Levels across States

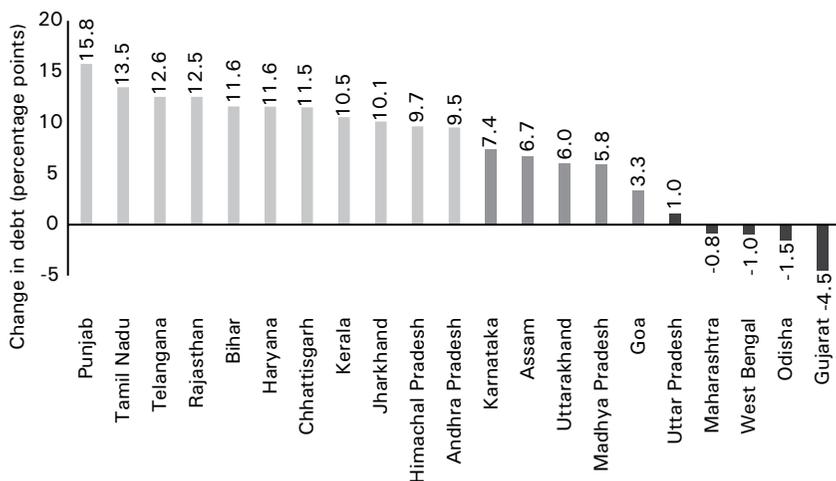
We focus on 21 largest states, that collectively account for about 96 percent of the national population and 95 percent of national GDP (Appendix III, Table III.2). There is significant heterogeneity across these states, both in the level and increase of indebtedness from 2012-13 to 2022-23. Except Gujarat, Odisha, West Bengal and Maharashtra, debt ratios have increased in all states over this period (Figure 10).

About half of the states (11) have added more than 10 percentage points to their respective debt-to-GSDP ratios over the last decade. We categorize these as 'High Increase in Debt' states. This group includes Bihar, Andhra Pradesh, Chhattisgarh, Haryana, Himachal Pradesh, Jharkhand, Kerala, Punjab, Rajasthan, Tamil Nadu, and Telangana. On average, a state in the High group added 11.7 percentage points to its debt-to-GSDP ratio, with Punjab at the top of the list, with an increase of 15.6 percentage points.

Five states, including Goa, Assam, Karnataka, Madhya Pradesh, and Uttarakhand, had moderate increases in debt ratios over the period, averaging 5.8 percentage points which are categorized as 'Medium Increase in Debt' states. The remaining five states, including Maharashtra, Gujarat, Odisha, Uttar Pradesh, and West Bengal, exhibited fiscal prudence. Their debt ratios fell or increased at most by a small amount. The average decline in debt ratios for this group, clubbed together into 'Low Increase in Debt' group was 1.4 percentage points over the decade.

A more comprehensive comparison across these groups is in Appendix V, Table V.1.

**FIGURE 10. Change in Debt-to-GDP in 2012-13 and 2022-23**



Source: Data are from the RBI State Finances Report; and authors' calculations.

Among the correlates of the increase in debt in the last ten years, the most significant is primary deficit, followed by contingent liabilities. These patterns are borne out in the regression results reported in Table 4 (as well as in Appendix V, Table V.2). We regress potential correlates of change in debt on a dummy variable taking on a value 1 for the states that experienced an above median increase in debt, and 0 for the states that experienced a below median increase in debt during the last decade, as per Equation 1:

$$y_i = \alpha_0 + \alpha_1 \text{Dummy for Above Median Increase in Debt}_i + \varepsilon_i \quad (1)$$

In Equation 1,  $i$  indexes states,  $y$  refers to the variables of interest potentially correlated with increase in debt, and the dummy as described above. Thus, the dummy (High Increase in Debt) takes a value 1 if the state is Bihar, Andhra Pradesh, Chhattisgarh, Haryana, Himachal Pradesh, Jharkhand, Kerala, Punjab, Rajasthan, Tamil Nadu, and Telangana; and 0 for the remaining 10 states.

Results indicate that states with a larger increase in debt have had higher primary deficits and larger contingent liabilities (these variables are statistically significant at 1 percent and 5 percent, respectively). They have also had a less favorable growth-rate-interest-rate differential (though not significantly so). Average expenditure over the 10-year period does not vary significantly between the different groups. Heterogeneity in debt outcomes is driven entirely by revenue expenditure patterns.

**TABLE 4. Accounting for Change in Debt-to-GSDP across States during 2012-13 to 2022-23**

	(1)	(2)	(3)
	<i>Change in Debt (% of GSDP) (2012-13 to 2022-23)</i>	<i>Primary Deficit (% of GSDP)</i>	<i>Real Growth Rate</i>
States with Above Median Increase in Debt (dummy = 1)	9.48*** (6.87)	0.84*** (3.94)	-0.23 (0.51)
Constant	2.24** (2.25)	0.98*** (6.33)	6.18*** (18.80)
No. of Observations	21	21	21
	(4)	(5)	(6)
	<i>Real Effective Interest Rate</i>	<i>Real Growth minus Real Effective Interest Rate</i>	<i>Contingent Liabilities (% GSDP)</i>
States with Above Median Increase in Debt (dummy = 1)	0.77 (1.70)	-1.00 (1.43)	2.75** (2.45)
Constant	2.32*** (7.11)	3.86*** (7.64)	1.64* (2.02)
No. of Observations	21	21	21
	(7)	(8)	(9)
	<i>Revenue Receipts (% GSDP)</i>	<i>States' Own Revenue (% GSDP)</i>	<i>Transfers from Centre (% GSDP)</i>
States with Above Median Increase in Debt (dummy = 1)	0.10 (0.05)	-0.10 (0.15)	0.20 (0.10)
Constant	14.91*** (10.64)	7.83*** (17.57)	7.09*** (5.21)
Observations	21	21	21
	(10)	(11)	(12)
	<i>Expenditure (% GSDP)</i>	<i>Revenue Expenditure (% GSDP)</i>	<i>Capital Expenditure (% GSDP)</i>
States with Above Median Increase in Debt (dummy = 1)	1.39 (0.71)	1.41 (0.88)	-0.02 (0.04)
Constant	17.61*** (12.44)	14.67*** (12.72)	2.94*** (8.70)
Observations	21	21	21

contd...

...contd...

	(13)	(14)	(15)
	<i>Expenditure on Wages &amp; Salaries (% GSDP)</i>	<i>Expenditure on Pension (% GSDP)</i>	<i>Interest Payments (% of GSDP)</i>
States with Above Median Increase in Debt (dummy = 1)	0.041 (0.06)	0.28 (0.92)	0.32 (1.38)
Constant	4.25*** (9.00)	1.76*** (8.06)	1.65*** (9.92)
Observations	21	21	21

	(16)	(17)	(18)
	<i>Subsidies (% GSDP)</i>	<i>Pension, Wages &amp; Salaries, Subsidies, and Interest Payments (% GSDP)</i>	<i>Pension, Wages &amp; Salaries, Subsidies, and Interest Payments (% of Total Revenue)</i>
States with Above Median Increase in Debt (dummy = 1)	0.34 (1.33)	1.20 (1.31)	9.14 (1.58)
Constant	0.88*** (4.66)	8.07*** (11.89)	55.90*** (13.01)
Observations	20	20	20

Source: Data for debt, deficit, revenue receipts (and its components), and expenditure (revenue and capital) are from RBI State Finances Report, averages over 2013-14 till 2022-23. Data for contingent liabilities are from CAG's State Finances Audit Report (multiple years) averages over 2013-14 till 2021-22 (West Bengal's average is for 2013-14 till 2020-21). Data for subsidies is from CAG's State Finance Accounts. Goa is dropped from columns (16) and (17) due to the unavailability of data. For 2021-22 and 2022-23, subsidies data for West Bengal is not available. Data for States' GDP is from MoSPI and State Budget (downloaded from EPWRF). For Andhra Pradesh and Telangana, averages are from 2014-15 due to bifurcation of Andhra Pradesh.

Note: t-statistics are in parentheses; \*, \*\*, \*\*\* indicate significance at 10, 5, and 1 percent levels, respectively.

States in the High group spend a large proportion of their revenues on committed expenditures such as wages, salaries, pensions, subsidies, and interest payments. Such expenditure is higher for these states by 1.4 percentage points of GSDP. Committed expenditure accounts for a full 67 percent of their total revenue receipts, compared to 54 percent for the remaining states. Moreover, average committed expenditure for states in the High group is about 10 percentage points higher than that of the Low group. When we include spending on subsidies, committed expenditure as a percent of the total revenue exceeds 90 percent for some states in the High group, with Punjab being the highest with committed expenditure at 96 percent of its revenue receipts. Kerala and Haryana, with 78 percent and 77 percent of committed expenditure (as percent of total revenue receipts), respectively, are second and third highest spenders. Thus, the higher primary deficits of High group states are more an issue of more spending and suboptimal composition of their expenditures than one of lower revenues.<sup>14</sup>

More indebted states spend a larger proportion of their revenues on debt service, not unexpectedly. Interest payments absorb up to a quarter of revenues, leaving fewer resources for core government functions (see Appendix VII, Figure VII.1). Such states display significantly higher average budget deficits and lower economic growth rates.

## 5. Projecting Debt Levels

Even if currently, due to the implicit guarantee of the Central Government and other institutional support, the debts of the states may appear to be safe, the same may not be true going forward. The concern is state-specific: the growth prospects of heavily indebted states are likely to remain impaired; the need to transfer federal resources to them will continue; and there will be adverse implications for prudent states, which will be effectively subsidizing states with heavier debt burdens.

We use extrapolations of the debt-to-GSDP ratio as a way of thinking about debt sustainability at the state level. We use Equation 2 to project the trajectory of public debt for each state (details are in Appendix VI).<sup>15</sup>

$$\Delta b_t = \frac{b_{t-1}(r_t - g_t)}{1 + g_t} + pd_t \quad (2)$$

---

14. These patterns are robust to defining the dependent variable as the change in debt, rather than a discrete dummy. We regress actual change in debt to GSDP (between 2012-13 and 2022-23) on the same set of correlates as in Equation 1. The results, presented in Appendix V, Table V.2, are very similar to those obtained in Table 4.

15. The exercise assumes that  $g$ ,  $r$ , and  $pd$  are exogenous, that is, they are not impacted by the level of debt.

Here  $b_t$  is the debt-to-GSDP ratio,  $pdt$  is the primary-deficit-to-GSDP ratio (fiscal deficit net of interest payment),  $g_t$  is growth of real GSDP, and  $r_t$  is the real effective interest rate on public debt; all in year  $t$ .  $\Delta b_t$  is the change in debt-to-GSDP ratio between  $t$  and  $t-1$ .

We consider a baseline in which primary deficit, real GSDP growth, and the real effective interest rate are assumed to evolve at the same average rate as they did in the last ten years (i.e., during 2013-14 to 2022-23). We project the debt-to-GSDP ratio for each of the states for the next five years, from 2023-24 to 2027-28.

In a second scenario, we use the same parameters but in addition assume that contingent liabilities will be taken onto the budget at a rate of 20 percent of their stock in 2021-22 each year for the next five years.<sup>16</sup>

Projected outcomes are given in Table 5. Under the ‘business as usual’ scenarios, when primary deficit, the real growth rate and the real interest rate are expected to remain at their average levels of past ten years, a majority of states will accumulate additional debt. Debt-to-GSDP ratios are already quite high for some states; these are the same states where debt is likely to increase further (Figure 11).

Currently almost all states have debt-to-GSDP ratios greater than 20 percent (exceptions are Gujarat, Odisha, and Maharashtra; these states will likely remain the least indebted). More than half of states have debt levels exceeding 30 percent, and two states, Punjab and Himachal Pradesh, have debts exceeding 40 percent. As projected in the baseline scenario, more states will have debt levels above 40 and even 50 percent of GSDP by the end of the period. Punjab’s debt will exceed 50 percent, and four states comprising Himachal Pradesh, Rajasthan, Bihar, and Kerala will have debt ratios above 40 percent. Rankings change little when adding the materialization of contingent liabilities. (Figure 12).<sup>17</sup>

---

16. We also conduct this exercise for the seven smaller North-eastern states that are not included in the above sample of 21 states. The results are summarized in Appendix VI (Tables VI.2 and VI.3).

17. Punjab’s debt ratio is projected to reach 57 percent, and Rajasthan’s to exceed 50 percent. Andhra Pradesh and Telangana will have debt ratios above 40 percent, while the debt ratios of Tamil Nadu, Haryana, and West Bengal will approach this figure. In contrast, the debt ratio for Uttar Pradesh would decline under the baseline scenario due to a nearly zero primary deficit and one of the most favorable growth-interest differentials. However, it is projected to increase by 6.0 percentage points in the second scenario due to a high stock of contingent liabilities.

TABLE 5. Projected Debt-to-GSDP in 2027-28

	<i>10-year averages (2013-14 to 2022-23)</i>						
	<i>Debt/ GSDP in 2012-13</i>	<i>Debt/ GSDP in 2022-23 (% of GSDP)</i>	<i>Change in Debt/ GSDP in last 10 years</i>	<i>Primary Deficit (pd) (% of GSDP)</i>	<i>Real GSDP Growth (g) (%)</i>	<i>Effective Interest Rate (r) (%)</i>	<i>Growth- Interest Differential (g-r) (percentage points)</i>
Andhra Pradesh	23.4	32.9	9.5	2.3	7.3	1.7	5.6
Assam	18.9	25.6	6.7	1.8	7.5	2.6	4.8
Bihar	27.5	39.1	11.6	2.0	5.7	2.0	3.7
Chhattisgarh	12.1	23.6	11.5	1.7	6.3	2.8	3.5
Goa	29.5	32.8	3.3	0.8	5.7	3.2	2.5
Gujarat	23.4	18.9	-4.5	0.3	8.1	3.6	4.5
Haryana	19.5	31.1	11.6	1.5	4.2	2.9	1.3
Himachal Pradesh	35.5	45.2	9.7	1.0	5.6	4.6	1.1
Jharkhand	20.1	30.2	10.1	1.5	5.0	2.8	2.1
Karnataka	16.2	23.6	7.4	1.5	7.6	1.4	6.2
Kerala	26.7	37.2	10.5	1.7	4.9	2.5	2.4
Madhya Pradesh	23.5	29.3	5.8	1.8	6.0	0.4	5.6
Maharashtra	19.3	18.5	-0.8	0.5	4.9	3.3	1.6
Odisha	18.8	17.2	-1.5	0.7	6.8	1.1	5.6
Punjab	31.0	46.8	15.8	1.6	5.1	4.7	0.4
Rajasthan	24.0	36.6	12.5	2.4	5.7	2.5	3.2
Tamil Nadu	17.9	31.4	13.5	1.6	6.3	3.8	2.5
Telangana	14.4	26.9	12.6	2.3	7.1	2.9	4.2
Uttar Pradesh	29.7	30.7	1.0	0.7	5.8	1.8	4.0
Uttarakhand	20.4	26.4	6.0	1.2	4.9	3.3	1.6
West Bengal	39.9	39.0	-1.0	0.6	4.6	2.4	2.1

contd...

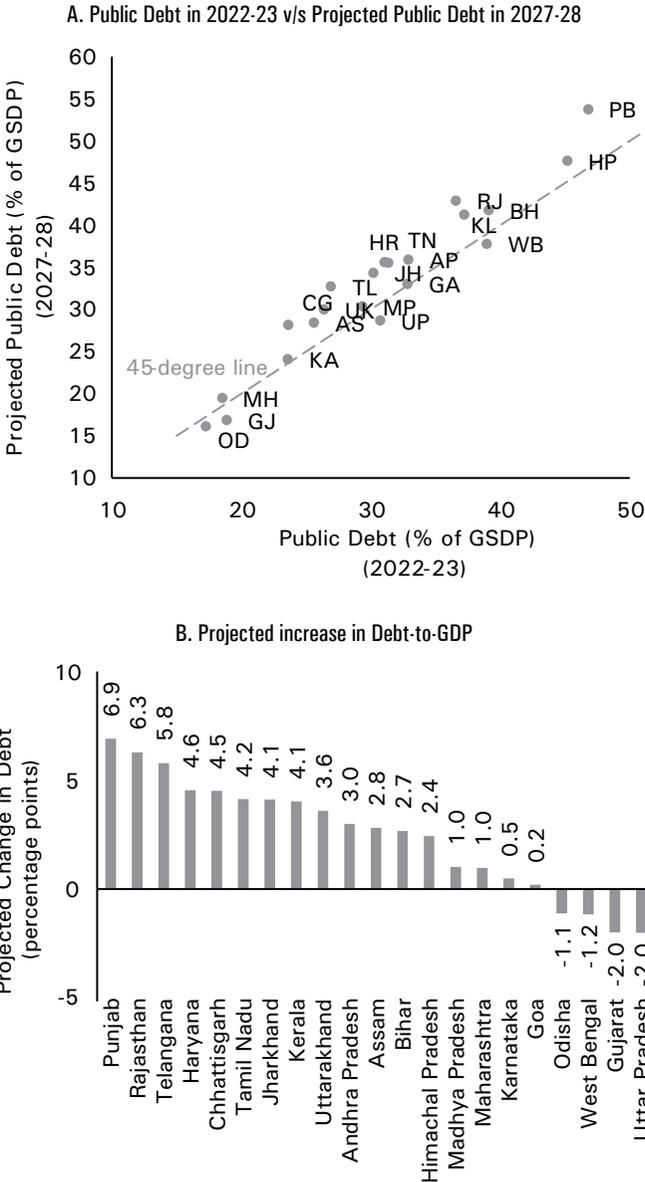
...contd...

	<i>Scenario 1: Baseline scenario</i>			<i>Scenario 2: Baseline + Contingent Liabilities are absorbed</i>	
	<i>Projected Debt/GSDP in 2027-28</i>	<i>Change in Debt/GDP in 2027-28 over 2022-23</i>	<i>Contingent Liabilities/GSDP stock in 2021-22</i>	<i>Projected Debt/GSDP in 2027-28</i>	<i>Change in Debt/GSDP in 2027-28 over 2022-23</i>
Andhra Pradesh	35.3	2.4	10.4	44.7	11.8
Assam	28.4	2.8	0.1	28.5	2.9
Bihar	41.8	2.7	3.9	45.4	6.3
Chhattisgarh	28.2	4.5	4.8	32.6	9.0
Goa	33.0	0.2	0.8	33.8	1.0
Gujarat	16.9	-2.0	0.2	17.0	-1.9
Haryana	36.5	5.4	2.8	38.3	7.2
Himachal Pradesh	47.6	2.4	1.1	48.7	3.5
Jharkhand	34.3	4.1	0.2	34.5	4.3
Karnataka	24.1	0.5	1.7	25.6	2.0
Kerala	41.3	4.1	4.8	45.8	8.6
Madhya Pradesh	30.4	1.0	3.1	33.1	3.8
Maharashtra	19.5	1.0	1.6	21.1	2.6
Odisha	16.1	-1.1	0.9	16.9	-0.3
Punjab	53.7	6.9	3.3	57.0	10.2
Rajasthan	42.9	6.3	7.9	50.3	13.7
Tamil Nadu	35.5	4.2	4.4	39.8	8.4
Telangana	32.7	5.8	12.0	41.4	14.5
Uttar Pradesh	28.7	-2.0	8.8	36.9	6.2
Uttarakhand	30.0	3.6	0.1	30.1	3.7
West Bengal	37.8	-1.2	0.7	38.4	-0.5

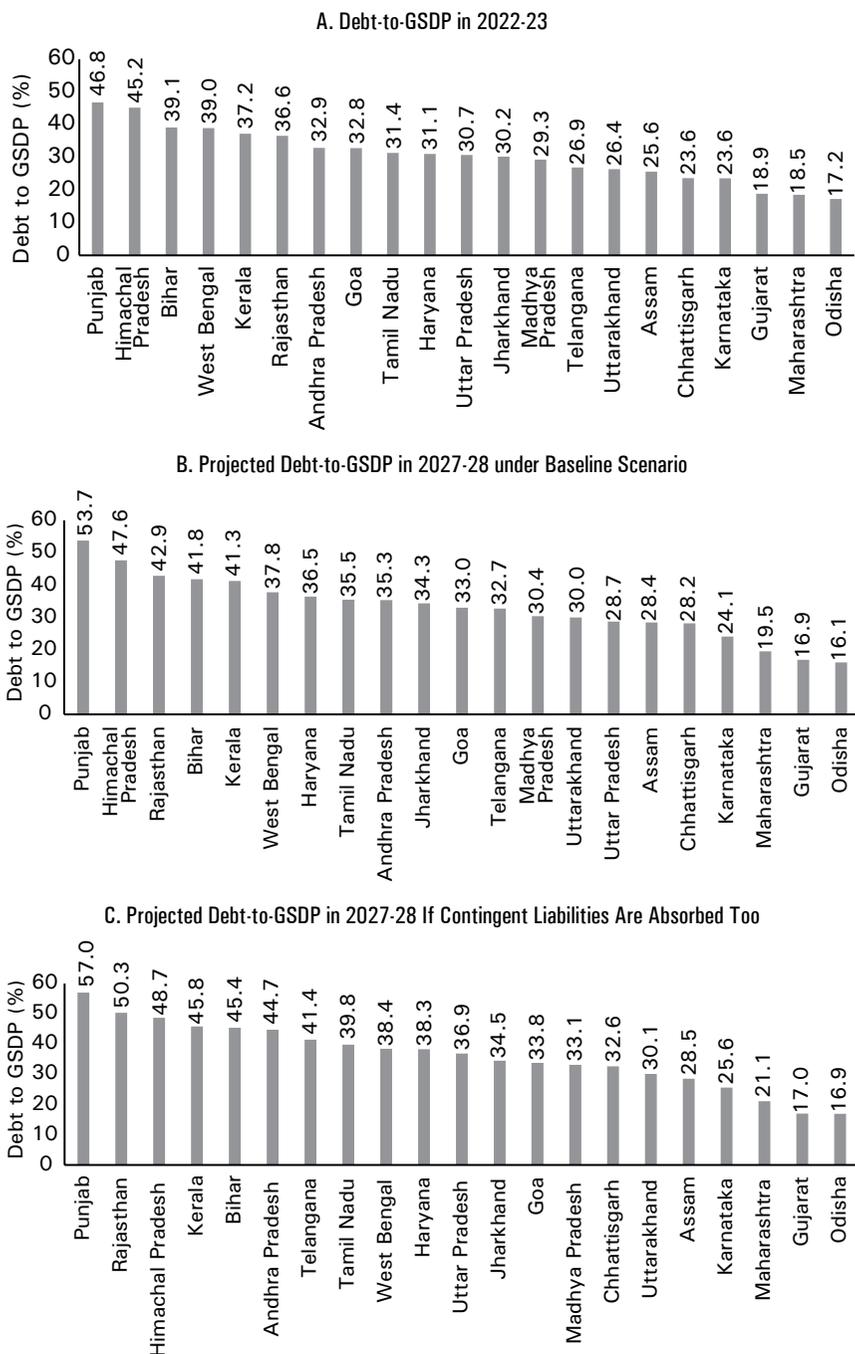
Source: For Andhra Pradesh and Telangana, data used is from 2014-15 rather than 2012-13 due to the bifurcation of Andhra Pradesh. For contingent liabilities, we have used the data for 2021-22 from CAG State Finances Audit Reports, it being the latest year for which actual data is available for all state governments (for West Bengal, it is available until 2020-21).

Note: Debt, primary deficit, and contingent liabilities are in percent of GSDP of the respective states. Effective interest rate has been calculated as total interest payments divided by total outstanding liabilities in the previous year. Deflator growth has been calculated as nominal growth rate minus real growth rate.

**FIGURE 11. Projected Level of Debt and Increase in Debt across States**



Source: Data for debt has been taken from RBI State Finances Report; and authors' calculations.

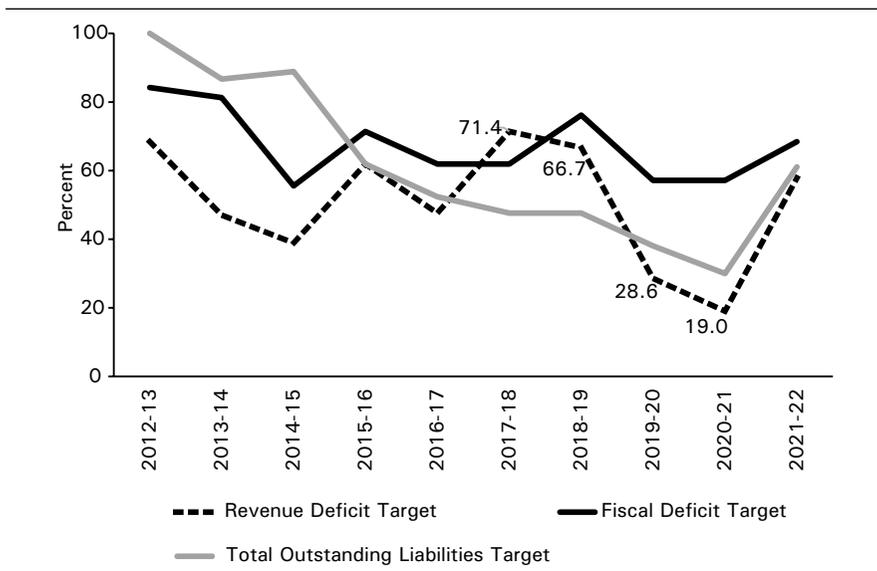
**FIGURE 12. Current and Projected Debt-to-GSDP across States**

Source: Data for debt has been taken from the RBI State Finances Report; and authors' calculations.

## 6. Fiscal Rules

States enacted fiscal rules in the mid-2000s. Typically, these target the revenue deficit, fiscal deficit, and debt as percent of GSDP.<sup>18</sup> We compiled data on compliance with fiscal rules for each of the 21 states during the 10 years spanning 2012-13 to 2021-22, attaching a score of 1 for each year they complied with the rule and 0 for the years they did not. Average compliance across the three rules is calculated as a simple average of the percentage compliance of the three targets for each state (Figure 13).

**FIGURE 13. Percentage Compliance with Each Fiscal Rule Target across States**



Source: Data are compiled from CAG's State Finances Audit Reports; and authors' calculations.

Data are from CAG's State Finances Audit Reports. These reports, available annually for each state, code whether the state has met its fiscal targets or not. As per the fiscal rules (Fiscal Responsibility and Budget Management Acts) of

18. Some states also have a target for contingent liabilities, though we do not consider this in the analysis immediately below. Only some states have a rule for outstanding guarantees, and the data on this is patchy. Where available, it shows 100 percent compliance. Thus, we focus only on the remaining three rules. We have compiled the data for different targets from CAG State Finances Audit Reports of States from 2012-13 to 2021-22. The data for Andhra Pradesh and Telangana begin from 2014-15 and 2015-16, respectively. The CAG State Finances Audit Reports are unavailable for the following states and years: Andhra Pradesh (2014-15), Assam (2013-14), Chhattisgarh (2014-15), Goa (2013-14), Karnataka (2013-14), Maharashtra (2021-22), Tamil Nadu (2013-14), Uttarakhand (2013-14) and West Bengal (2021-22). The values corresponding to these states and years are hence recorded as missing values in the dataset. The average compliance across targets is a simple average of compliance with the three targets for each state.

the states, they have to issue a medium-term fiscal plan (MTFP) in their annual budgets with annual rolling targets. In addition, the Finance Commissions also suggests fiscal targets for the states. The CAG assesses compliance based on the MTFP targets if they are available. Otherwise, compliance is recorded as per the targets suggested by the Finance Commission.

Of the 21 states analyzed, 5 have compliance rates of more than 80 percent, while 5 have compliance rates of less than 40 percent. Kerala and West Bengal have the worst records, with 10 and 19 percent compliance, respectively (refer to Appendix VIII, Figure VIII.2). On average, states are found to follow their rules about 60 percent of the time. Compliance is higher with fiscal deficit targets (67 percent) and debt targets (61 percent) than revenue deficit targets (50 percent). As seen in Table 6, and further in Appendix VIII, states that are more indebted or accumulated more debt during the last decade are least compliant with their rules. Odisha and Gujarat have nearly 100 percent compliance, while Punjab and West Bengal, have less than 40 percent compliance. This correlation is established through the following equation:

$$\text{Compliance with rules}_i = \alpha_0 + \alpha_1 \text{Dummy for above median increase in Debt}_i + \varepsilon_i \quad (3)$$

In Equation 3,  $i$  indexes states; the dependent variable, compliance with fiscal rules, refers to the percent compliance with the respective fiscal rule during 2012-13 to 2021-22; and as before, the dummy variable takes on a value 1 for the states that experienced an above median increase in debt, and 0 for the states that experienced a below median increase in debt during the last decade. The results, summarized in Table 6, indicate that a state with above median increase in debt on average has had 18.4 percent lesser compliance with all three fiscal rules.

**TABLE 6. Increase in Debt (% of GSDP) and Compliance with Different Fiscal Rules across States during 2012-13 to 2021-22**

<i>Dependent Variable →</i>	<i>(1)</i>	<i>(2)</i>	<i>(3)</i>	<i>(4)</i>
	<i>Percent Compliance with Revenue Deficit Rule</i>	<i>Percent Compliance with Fiscal Deficit Rule</i>	<i>Percent Compliance with Outstanding Liabilities Rule</i>	<i>Percent Compliance with all Three Rules (average)</i>
Dummy for Above Median Increase in Debt (dummy = 1)	-22.30 (1.66)	-24.39** (2.32)	-8.57 (0.67)	-18.42* (1.86)
Constant	62.78*** (6.45)	80.22*** (10.54)	64.25*** (6.91)	69.08*** (9.65)
Observations	21	21	21	21

Source: Data are compiled from CAG's State Finances Audit Reports; and authors' calculations.

Note: t-statistics are in parentheses; \*, \*\*, \*\*\* denote significance at 10, 5, and 1 percent levels, respectively. Compliance variables are averages over 2012-13 and 2021-22.

## 7. Recommendations

What can be done to strengthen state finances?

First, officials should conduct a forensic analysis identifying the specific revenue shortfalls or expenditure overruns resulting in excessive budget deficits and debt increases in the fiscally worst performing states. Understanding what went wrong in the past is a first step in preventing and remedying problems that may arise in the future.

Second, state governments should improve revenue mobilization through digitalization and administrative streamlining, by broadening the tax base, raising property tax, and adopting new taxes, and by increasing privatization receipts while re-orienting spending toward capacity- and infrastructure-enhancing investment that promises to further boost states' GSDP and revenues.

Third, state governments should acknowledge the risk to the public finances posed by contingent liabilities. These should be addressed by adopting institutional reforms, such as creating self-standing debt management offices at the state level responsible for forecasting contingent liabilities and more generally for executing the state government's debt management strategy, assessing the tradeoffs associated with different strategies, and providing advice to governmental decision makers.

Fourth, to further strengthen institutional capacity, each state could create its own independent fiscal council, whose members would include academics, financial market participants and other experts. Their reports would assess the realism of state government forecasts of revenues and expenditures and offer forecasts of their own, which they would make available to the state government and the public. They would provide independent analyses of the scope for realization of contingent liabilities. The experience of other countries, including some, such as Jamaica, whose population (and therefore, stock of qualified experts) is significantly smaller than that of individual Indian states, points to the feasibility of this approach in middle-income economies. As for decentralization to the state level, the European Union has analogous arrangements in place. Under the most recent reform of its fiscal rules, the European Commission acts as a kind of quasi-fiscal council at the level of the union, receiving and assessing the forecasts of member states and offering forecasts of its own, while each member is required to create its own fiscal council at the state level to similarly assess the budgetary outlook.

Fifth, the RBI should review its policies of intervening in the markets to cap spreads on the bonds of heavily indebted states. Limiting such intervention would strengthen market discipline. To be sure, there may be reluctance to move in this direction on the grounds that states should be treated equally, on borrowing costs just like other conditions, and for fear of contagion from the bonds of poorly performing states to the bonds of others that are innocent bystanders. But without market discipline, there can be no fiscal discipline.

Sixth, the role of the Finance Commission should be reconsidered. The 15<sup>th</sup> Finance Commission was asked to recommend performance incentives for states in areas like the power sector and solid waste management (Fifteenth Finance Commission Report 2020). However, Finance Commissions have not been asked to consider overall fiscal prudence when recommending allocations. The horizontal devolution of taxes among states, awarded by the Finance Commission every five years, does not provide incentives for fiscal rectitude. Perversely, Finance Commissions are mandated to allocate more resources to states with larger revenue deficits, which is an obvious source of moral hazard and a mechanism through which errant states are subsidized.

Even more ambitiously, the Finance Commission should contemplate new procedures that withhold a portion of agreed transfers to states in violation of those fiscal rules. Such withholding would continue until credible corrective action is taken. Europe has done something similar. Thus, the original Stability and Growth Pact provided for fines against member states that violated its fiscal rules. The European Union (EU) has suspended the transfer of Structural Funds to Hungary due to the country's violation of the EU's asylum policies. At the same time, European experience points to the politically fraught nature of this approach. Member states were reluctant to fine violators of the Stability and Growth Pact on the grounds that fines would only add to the fiscal burdens of governments already struggling with large budget deficits. They have been reluctant to withhold transfers to governments violating its rules, in all but the most egregious cases, on the grounds that the policy could be corrosive of EU solidarity. Similar issues would arise in India. We are not arguing that a policy of withholding transfers would be easy. But it is worth exploring.

Seventh and finally, there may be room for a fiscal "grand bargain," where heavily indebted states with the worst prospects receive a modicum of debt relief (a portion of their debt is transferred to the balance sheet of the Central Government) in return for their conceding additional Central Government oversight and even a loss of fiscal autonomy. Such bargains have worked in other fiscal federations, such as Brazil in the 1990s. After ad hoc bailouts of Brazilian states in 1989 and 1993 that encouraged the rescued governments to increase their spending and deficits subsequently, a third bailout in 1997 was conditioned on state governments committing to fiscal adjustment programs and pledging own and shared revenues as guarantees to the federal government for service of the restructured debt (Bevilaqua 2002). Thus, when Minas Gerais suspended debt-service payments in 1999, the Brazilian federal government withheld state revenues in the amount of the scheduled debt service and refused to extend a federal guarantee. These steps discouraged similar behavior on the part of other states.

These measures would strengthen the finances of state governments and put their debts on a sustainable footing. In turn, this would do much to enhance the overall fiscal stability of the Indian public sector.

## References

- Bevilaqua, Afonso. 2002. "State Government Bailouts in Brazil", *Inter-American Development Bank Research Network Working Paper No. R-441*. [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=1814701](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1814701).
- CAG of India. Various Years. *State Accounts Report (Finance Accounts)*, New Delhi: Comptroller and Auditor General of India. <https://cag.gov.in/en/state-accounts-report>.
- . Various Years. *State Finances Audit Report*, New Delhi: Comptroller and Auditor General of India. [https://cag.gov.in/en/audit-report?ts=allwords&title=&gt=49&udt=&state=&state%5B%5D=&lbt=&sector=&sector%5B%5D=&report\\_type=&report\\_type%5B%5D=53&od=&yrf=&yrt=](https://cag.gov.in/en/audit-report?ts=allwords&title=&gt=49&udt=&state=&state%5B%5D=&lbt=&sector=&sector%5B%5D=&report_type=&report_type%5B%5D=53&od=&yrf=&yrt=)
- CCIL. Various Editions. *Monthly Reviews of the Economy*, Mumbai: Clearing Corporation of India. <https://www.ccilindia.com/web/ccil/monthly-review-of-economy>.
- . Various Editions. *Rakshitra*, Mumbai: Clearing Corporation of India. <https://www.ccilindia.com/web/ccil/rakshitra>.
- CSE. 2024. *Climate India 2024: An Assessment of Extreme Weather Events*, New Delhi: Centre for Science and Environment. <https://www.cseindia.org/climate-india-2024-an-assessment-of-extreme-weather-events-12460>
- Eichengreen, Barry, Poonam Gupta, and Ayesha Ahmed. 2023. "India's Debt Dilemma", *India Policy Forum*, Vol. 20, pp. 1-53, New Delhi: National Council of Applied Economic Research. <https://www.ncaer.org/wp-content/uploads/2024/07/IPF2023-Paper-1.pdf>.
- Fifteenth Finance Commission. 2020. *Finance Commission in Covid Times: Report for 2021-26 (Volume-I Main Report)*, New Delhi. <https://fincomindia.nic.in/asset/doc/commission-reports/XVFC%20VOL%20I%20Main%20Report.pdf>.
- IMF. 2022. *Article IV Review of India*, Washington, D.C.: International Monetary Fund. <https://www.imf.org/en/Publications/CR/Issues/2022/12/21/India-2022-Article-IV-Consultation-Press-Release-Staff-Report-and-Statement-by-the-527283>.
- Ministry of Finance. 2016. *Status Paper on Government Debt*, New Delhi: Department of Economic Affairs, Government of India. Available at: <https://dea.gov.in/sites/default/files/StatusPaperGovtDebtSeptember2016.pdf>.
- . 2017. "Cabinet Approves the Exclusion of States from the Investments of National Small Savings Fund from 1.4.2016", New Delhi: Press Information Bureau. <https://pib.gov.in/newsite/PrintRelease.aspx?relid=157440>.
- . 2021. "Government of India Releases Balance Amount of ₹ 44,000 Crore to States and UTs (with Legislature) under the Back-to-back Loan Facility in-lieu of GST Compensation", New Delhi: Press Information Bureau. <https://pib.gov.in/PressReleasePage.aspx?PRID=1767194>.
- . 2022. *Status Paper on Government Debt for 2021-22*, New Delhi: Department of Economic Affairs, Government of India. <https://dea.gov.in/sites/default/files/Status%20Paper%20on%20Government%20Debt%20for%202021-22.pdf>.
- Mishra, Neelkanth and Prateek Singh. 2018. "A Deep Dive into State Budgets in India", *India Policy Forum*, Vol 14, pp. 53-99, New Delhi. [https://www.ncaer.org/wp-content/uploads/2022/09/A-Deep-Dive-into-State-Budgets-in-India\\_Neelkanth-Mishra-Prateek-Singh.pdf](https://www.ncaer.org/wp-content/uploads/2022/09/A-Deep-Dive-into-State-Budgets-in-India_Neelkanth-Mishra-Prateek-Singh.pdf).

- National Institute of Disaster Management. 2019. *Climate Risk Management Framework*, New Delhi: Ministry of Home Affairs, Government of India. [https://nidm.gov.in/PDF/pubs/GIZ\\_NIDM\\_imate%20RiskManagementFramework.pdf](https://nidm.gov.in/PDF/pubs/GIZ_NIDM_imate%20RiskManagementFramework.pdf).
- RBI. Various Years. *Public Debt Statistics*, Mumbai: Reserve Bank of India. [https://www.rbi.org.in/scripts/FS\\_PDS.aspx](https://www.rbi.org.in/scripts/FS_PDS.aspx).
- . Various Years. *State Finances Report*, Mumbai: Reserve Bank of India. <https://rbi.org.in/Scripts/AnnualPublications.aspx?head=State+Finances+%3a+A+Study+of+Budgets>.
- . 2020. “States Medium Term Fiscal Challenge”, *State Finances Report 2019-20*, Mumbai: Reserve Bank of India. <https://rbi docs.rbi.org.in/rdocs/Publications/PDFs/STATEFINANCE201920E15C4A9A916D4F4B8BF01608933FF0BB.PDF>.
- . 2022. “State Finances, A Risk Analysis”, *RBI Bulletin*, Mumbai: Reserve Bank of India. <https://rbi docs.rbi.org.in/rdocs/Bulletin/PDFs/6STATEFINANCESARISKANALYSIS143105EB27A744E1B9C404CF7D96909A.PDF>.
- S&P Global Research. 2021. “Local Government Debt 2021: Global Borrowing to Hit \$2.25 Trillion”. <https://www.spglobal.com/ratings/en/research/articles/210325-local-government-debt-2021-global-borrowing-to-hit-2-25-trillion-11879561>.
- Thirteenth Finance Commission. 2009. *Thirteenth Finance Commission 2010-2015 (Volume-I Report)*, New Delhi. <https://fincomindia.nic.in/asset/doc/commission-reports/13th-FC/english/13fcengVol1.pdf>.

To view the entire video of this IPF session, please scan this QR code or use the following URL:  
<https://www.youtube.com/watch?v=SWy-s1jxIUg>



## APPENDIX I: Data Sources

**TABLE I.1. Sources and Relevant Information for All Variables**

<i>Variable</i>	<i>Source</i>	<i>Time Period</i>	<i>Other Relevant Information</i>
Total Outstanding Liabilities	EPWRF; RBI State Finances Report	1990-91 till 2022-23	Data for 2021-22 (Accounts), and 2022-23 (Revised Estimates) is from RBI's State Finances Report
Fiscal Deficit			
Primary Deficit			
Interest Payments			
Total Receipts			
Tax Revenue			
Own Tax Revenue			
Tax Revenue from Centre			
Own Non-Tax Revenue			
Grants from the Centre			
Revenue expenditure			
Expenditure on pensions			
Expenditure on wages and salaries			
Expenditure on subsidies	CAG State Finance Accounts (multiple years)	2013-14 till 2022-23	Goa is dropped as its data is not available. For 2021-22 and 2022-23, subsidies data for West Bengal is not available. RBI State Finances Report has the expenditure on subsidies only from 2018-19, and the data is not available consistently for all states, hence we took the data from CAG.
Capital Expenditure (Capital Outlays + Loans and Advances by State Government)	Calculated by adding the data for Capital Outlays and Loans and Advances as per the definition used by RBI's State Finances Report. Data are from EPWRF; RBI State Finances Report.	1990-91 till 2022-23	Data for Capital Outlays and Loans and Advances for 2021-22 (Accounts), and 2022-23 (Revised Estimates) are from RBI's State Finances Report
Total Expenditure (Revenue + Capital Expenditure)	Calculated by adding Revenue and Capital Expenditure		
Nominal GSDP	EPWRF; MoSPI	1990-91 till 2022-23	For 2022-23, data for Maharashtra is from its Economic Survey.
Real GSDP	EPWRF; MoSPI		2011-12 back series has been used from EPWRF for GSDP data prior to 2011-12.

Contingent Liabilities	RBI State Finances Report (for States' Total) CAG State Finances Audit Reports for state-wise data (2013-14 till 2021-22)	1991-92 till 2021-22 (for States)	Data for 2022-23 is not available for all states from the CAG audit reports. There are missing data points and inconsistencies between subsequent years of data revision in contingent liabilities data provided in RBI State Finances Report. Hence, we took the data from CAG.
Effective Interest Rate	Calculated as interest payments in time period t over total outstanding liabilities in time period t-1	1991-92 till 2022-23	
Deflator Growth Rate/ Inflation Rate	Calculated as nominal GSDP growth rate minus real GSDP growth rate	1990-91 till 2022-23	
Duration of Debt (Long term/Short term)	Status Paper, Ministry of Finance	2000-01 to 2021-22	Long term debt calculated as 100 - % of short term debt.
Weighted Average Maturity (in years)	Monthly Reviews of the Economy, Clearing Corporation of India (CCIL)	2012-13 to 2023-24	
Weighted Average Coupon	Monthly Reviews of the Economy, Clearing Corporation of India (CCIL)	2012-13 to 2023-24	
Weighted Average Yield	RBI DBIE	1980-81 to 2022-23	
Ownership of State Government Securities	Handbook of Statistics on the Indian Economy (RBI).	1990-91 to 2021-22	For most of the sub-components, data prior to 2007-08 is not available.
Centre's Gross Debt	Calculated as consolidated debt minus state's debt minus loans and advances from the Centre		
Centre's Net Debt	Calculated as consolidated debt minus state's debt		
Centre's Fiscal Deficit	CEIC (compiled from Union Budget)	1990-91 to 2022-23	
Centre's Primary Deficit			
Centre's Contingent Liabilities	Annual Report of the RBI, Union Budget Documents and CAG Reports	1991-92 till 2021-22	

## APPENDIX II: Transfers from the Centre to States

### Vertical Gap between Centre and State

**TABLE II. 1. Shares of Total Revenue and Total Expenditure for Centre and States across Finance Commission (FC)**

	<i>Revenues</i>		<i>Expenditure</i>	
	<i>Centre</i>	<i>States</i>	<i>Centre</i>	<i>States</i>
12th FC (2005-06 to 2009-10)	63.9	36.1	44.8	55.2
13th FC (2010-11 to 2014-15)	61.9	38.1	43.4	56.6
14th FC (2015-16 to 2019-20)	62.7	37.3	36.9	63.1
15th FC (2021-22 to 2022-23)	63.9	36.1	41.9	58.1

Source: Data are from the Union Budget for the Centre; and from RBI's State Finances Report for the states.

Note: Centre's share is calculated as 100 minus States' shares. For each Finance Commission periods, the ratio is calculated using the formula:  $\sum_t Revenue_{states} / \sum_t Revenue_{General Govt}$ . For the 15<sup>th</sup> FC, the data is for two years only, i.e., 2021-22 and 2022-23.

### Breakdown of States' Revenue Receipts

**TABLE II. 2. Revenue Receipts, % of GDP**

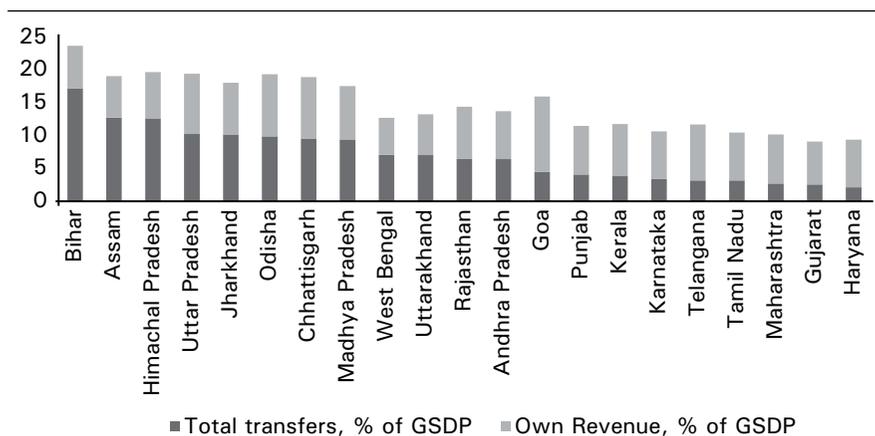
<i>% National GDP</i>	<i>12<sup>th</sup> FC (2005-06 to 2009-10)</i>	<i>13<sup>th</sup> FC (2010-11 to 2014-15)</i>	<i>14<sup>th</sup> FC (2015-16 to 2019-20)</i>	<i>15<sup>th</sup> FC (2021-22 to 2022-23)</i>
States' Total Revenue Receipts (i + ii + iii + iv + v)	12.4	12.5	13.5	14.1
Own Tax Revenue (i)	5.8	6.3	6.3	6.5
Own Non-Tax Revenue (ii)	1.5	1.2	1.2	1.1
Tax Transfers (iii)	2.8	2.8	3.7	3.6
Finance Commission Grants (iv)	0.6	0.5	0.6	0.8
Other Grants (v)	1.7	1.7	1.8	2.2

Source: Data are from the RBI State Finances Report for total revenue receipt, own tax revenue, own non-tax revenue, and tax transfers; and from the Union Budget for the FC grants to states from the Centre.

Note: 'Other grants' was calculated as the difference between total revenue receipts and all other components. The nominal GDP from 2011-12 based on the 2011-12 series. For the years 2005-06 to 2010-11, the nominal GDP was spliced using the 2004-05 based series using the standard splicing method. The ratio was calculated using the formula:  $\sum_t Revenue Receipts_i / \sum_t GDP_t$ . The 15<sup>th</sup> FC covers the years 2021-22 and 2022-23. 2020-21 has been dropped since a separate report was recommended by the 15<sup>th</sup> FC.

## Share of Own Revenue and Transfers from the Centre by State

**FIGURE II.1.** Revenue Components, % of GDP (Average between 2013-14 and 2022-23)



Source: Data are from the RBI State Finances Report for state revenue components, and from MoSPI for GDP.

Note: Own Revenue includes both tax and non-tax revenues, and transfers from the Centre include tax transfers, Finance Commission grants and non-Finance Commission grants.

**TABLE II.3.** Matrix for Tax Devolution across Finance Commissions

Criteria	Criteria Weights			
	12 <sup>th</sup> FC	13 <sup>th</sup> FC	14 <sup>th</sup> FC	15 <sup>th</sup> FC
Demography	25	25	27.5	27.5
Income Distance	50	47.5	50	45
Area	10	10	15	15
Forest Cover	0	0	7.5	10
Fiscal Performance	15	17.5	0	2.5
Total	100	100	100	100

Source: Finance Commission Reports.

## Equalization Regressions<sup>19</sup>

**TABLE 11.4 A. Regressions for Per Capita Tax Devolution and Per Capita Income**

	<i>Dependent variable is log of per capita tax devolution (avg 2013-14 to 2022-23)</i>		
	<i>All States</i>	<i>Larger States</i>	<i>North-East and Hilly States (NEH)</i>
Log of Per Capita Income (avg 2010-11 to 2012-13)	-0.12 (0.37)	-0.33** (2.72)	0.49 (0.83)
Constant	10.10*** (2.88)	12.09*** (8.89)	4.10 (0.63)
Observations	27	17	10

Source: MoSPI; RBI's State Finances Report.

Note: t-statistics in parentheses; \*, \*\*, \*\*\* denote significance at the 10, 5, and 1 percent levels, respectively.

**TABLE 11.4 B. Regressions for Per Capita Total Transfers (tax + FC grants + non-FC grants) and Per Capita Income**

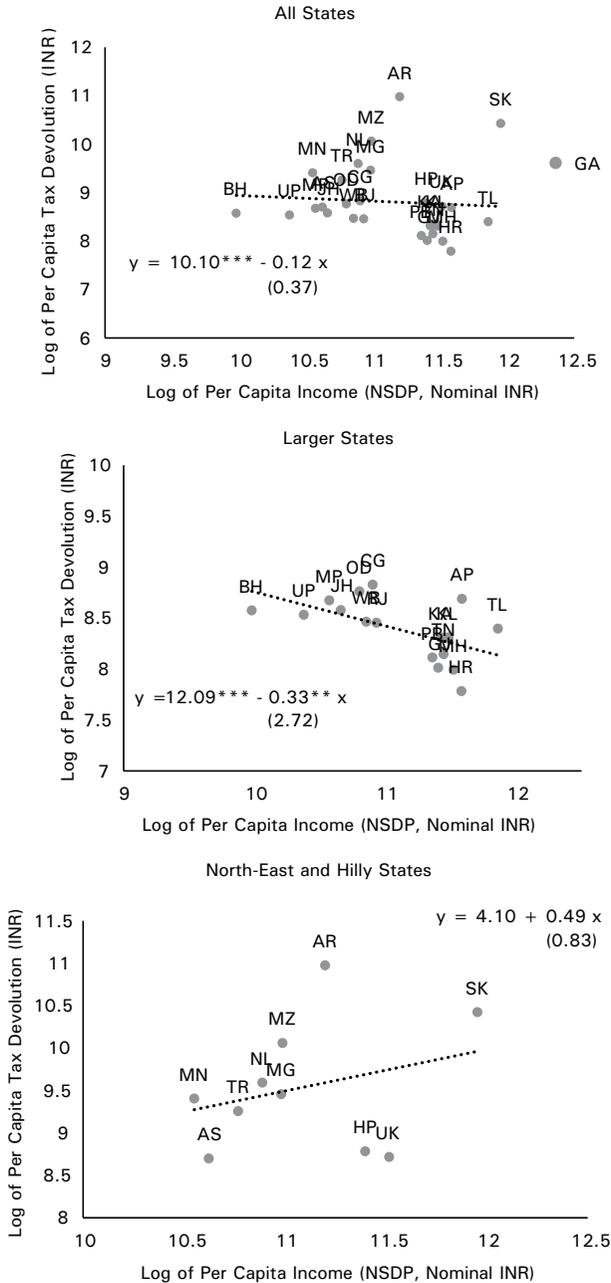
	<i>Dependent variable is log of per capita total transfers (avg 2013-14 to 2022-23)</i>		
	<i>All States</i>	<i>Larger States</i>	<i>North-East and Hilly States (NEH)</i>
Log of Per Capita Income (avg 2010-11 to 2012-13)	0.02 (0.05)	-0.10 (0.92)	0.40 (0.83)
Constant	9.27** (2.45)	10.10*** (8.14)	5.90 (1.09)
Observations	27	17	10

Source: MoSPI; RBI's State Finances Report.

Note: t-statistics in parentheses; \*, \*\*, \*\*\* denote significance at the 10, 5, and 1 percent levels, respectively.

19. The per capita figures were calculated using the formula:  $\sum_t Tax\ Devolution_i / \sum_t Population_i$ . Per capita tax devolution and total transfers (tax + FC grants + non-FC grants) are from 2013-14 to 2022-23, and per capita income (NSDP) are for the three prior years from 2010-11 to 2012-13 for all states, except for Andhra Pradesh and Telangana for which they are from 2017-18 to 2022-23 and 2014-15 to 2016-17, respectively. The time periods are different for Andhra Pradesh and Telangana since the data is available from 2014-15, after the bifurcation of the state. Larger states consist of: Andhra Pradesh (AP), Bihar (BH), Gujarat (GJ), Haryana (HR), Karnataka (KA), Kerala (KL), Madhya Pradesh (MP), Maharashtra (MH), Odisha (OD), Punjab (PB), Rajasthan (RJ), Tamil Nadu (TN), Uttar Pradesh (UP), West Bengal (WB), Chhattisgarh (CG), Jharkhand (JH) and Telangana (TL) (14<sup>th</sup> FC onwards). NEH states consist of: Arunachal Pradesh (AR), Assam (AS), Himachal Pradesh (HP), Manipur (MN), Meghalaya (MG), Mizoram (MZ), Nagaland (NL), Sikkim (SK), Tripura (TR), and Uttarakhand (UK). We dropped Goa and Jammu & Kashmir since the former is an outlier and the latter is now classified as a Union Territory.

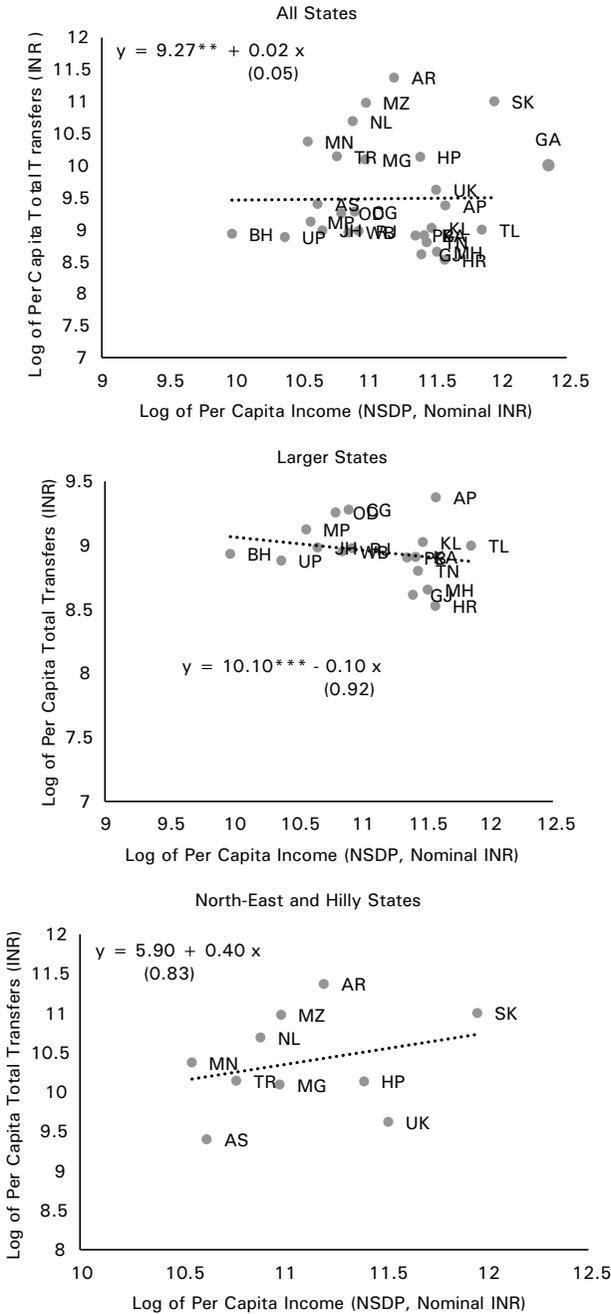
**FIGURE 11.2. Per Capita Tax Devolution and Per Capita Income**



Source: MoSPI; RBI's State Finances Report.

Note: t-statistics in parentheses; \*, \*\*, \*\*\* denote significance at the 10, 5, and 1 percent levels, respectively. In the larger states, Goa is excluded from the linear fit and equation. NSDP refers to Net State Domestic Product.

**FIGURE 11.3. Per Capita Total Transfer and Per Capita Income**



Source: MoSPI; RBI's State Finances Report.

Note: t-statistics in parentheses; \*, \*\*, \*\*\* denote significance at the 10, 5, and 1 percent levels, respectively. In the larger states, Goa is excluded from the linear fit and equation. NSDP refers to Net State Domestic Product.

### APPENDIX III: Comparing Debt, Deficit, Interest Rate and Contingent Liabilities for Centre and States and Comparing Larger and Smaller States

Table III.1 compares, for the Centre and states, some key drivers of indebtedness over the last three decades. While the states' effective interest rates were higher than those of the Centre, they have converged to similar levels over this period owing to the measures taken to consolidate states' debt. Contingent liabilities remain a concern for the states as they have not seen a consistent decline over the years, and remain higher than the Centre at 3.8 percent of GDP as of 2021-22. The states' primary deficit has been lower than the Centre in all three decades.

**TABLE III.1. Comparing Relevant Variables for the Centre and States**

	<i>Centre</i>	<i>States</i>	<i>Centre</i>	<i>States</i>	<i>Centre</i>	<i>States</i>
	<i>Annual Average during 1990-91 to 1999-2000</i>		<i>Annual Average during 2000-01 to 2012-13</i>		<i>Annual Average during 2013-14 to 2022-23</i>	
Primary deficit, % of GDP	1.6	1.2	1.1	0.7	1.7	1.2
Interest Payments, % of GDP	4.2	1.8	3.8	2.2	3.3	1.7
Fiscal deficit, % of GDP	5.8	3.1	4.9	2.9	5.0	2.9
Nominal Effective Interest rate, %	8.1	10.0	8.0	8.7	7.4	7.5
Contingent Liabilities, % of GDP, end of period (1999-00, 2012-13, 2021-22)	4.2	6.6	2.4	3.0	2.2	3.8
Debt to GDP, % (average)	48.4	22.0	47.7	27.9	48.6	25.7
Debt to GDP, % end of period (1999-00, 2012-13 and 2021-22)	46.1	25.6	44.4	22.2	54.7	27.8

Source: For the Centre, data on deficits and interest payments are from RBI's Handbook of Statistics (downloaded from CEIC). Data for contingent liabilities are from the Annual Report of RBI and Union Budget. For the states, data are from RBI's State Finances Report (downloaded from CEIC).

Note: Effective interest rate has been calculated as interest payments as percent of total outstanding liabilities as of the previous year. The Centre's debt is net of what the states owe it. Contingent liabilities data for the Centre and states is available till 2021-22.

## Sample of Larger States and Smaller North-eastern States

Our state-level analysis focuses on the 21 largest states, accounting for about 96 percent of national population and nearly 95 percent of national GDP. We did not include seven smaller North-eastern states, accounting for about 1.2 percent of national population and 1.1 percent of national GDP, due to their data being erratic. These states are Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, and Tripura.<sup>20</sup> Descriptive statistics of the larger and smaller states are provided in Tables III.2 and III.3.

As seen from these tables, an average smaller state has a larger debt-to-GSDP ratio and much higher expenditure – about twice as high as that of a larger state. The higher expenditure is seen in both the revenue and capital expenditures by these states. Considering that their own revenue collection is lesser than that of a larger state, it can be concluded that the higher expenditure is enabled by transfers from the Centre to these North-eastern states.

**TABLE III.2. Statistics for 21 Largest States (Annual Average during 2013-14 to 2022-23)**

<i>Variable</i>	<i>Mean</i>	<i>Median</i>	<i>Min</i>	<i>Max</i>
Debt/GSDP, %	27.9	27.2	18.5	40.6
Fiscal Deficit/GSDP, %	3.2	3.3	1.7	4.6
Primary Deficit/GSDP, %	1.4	1.6	0.3	2.4
Total Expenditure/GSDP, %	18.3	18.3	11.0	28.1
Revenue Expenditure/GSDP, %	15.4	16.2	9.0	23.2
Capital Expenditure/GSDP, %	2.9	3.0	1.4	4.9
Total Revenue/GSDP, %	15.0	13.8	9.1	24.1
Own Revenue/GSDP, %	7.8	7.4	5.6	11.6
Transfers from the Centre/GSDP, %	7.2	6.6	2.1	17.5
Share in National GDP (2022-23), %	4.5	3.7	0.3	12.9
States' Per Capita Income/National Per Capita Income (2022-23, at current prices)	1.1	1.2	0.3	1.7

Source: RBI's State Finances Report; MoSPI.

Note: Data are from RBI's State Finances Report (downloaded from EPWRF); and National Commission of Population, Ministry of Health and Family Welfare. Larger states include Andhra Pradesh (AP), Assam (AS), Bihar (BH), Chhattisgarh (CG), Goa (GA), Gujarat (GJ), Haryana (HR), Himachal Pradesh (HP), Jharkhand (JH), Karnataka (KT), Kerala (KL), Madhya Pradesh (MP), Maharashtra (MH), Odisha (OD), Punjab (PB), Rajasthan (RJ), Tamil Nadu (TN), Telangana (TL), Uttarakhand (UK), Uttar Pradesh (UP), and West Bengal (WB). Data for Andhra Pradesh and Telangana begins from 2014-15.

20. We did not consider Union Territories in the analysis.

**TABLE III.3. Descriptive Statistics for 7 Smaller North-eastern States Not Included in State Level Analysis (Annual Average during 2013-14 to 2022-23)**

<i>Variable</i>	<i>Mean</i>	<i>Median</i>	<i>Min</i>	<i>Max</i>
Debt/GSDP, %	37.5	37.2	25.7	46.5
Fiscal Deficit/GSDP, %	3.3	3.1	2.9	3.8
Primary Deficit/GSDP, %	1.3	1.5	0.3	1.9
Total Expenditure/GSDP, %	40.7	43.8	24.6	59.8
Revenue Expenditure/GSDP, %	33.5	37.3	19.8	45.2
Capital Expenditure/GSDP, %	7.2	5.9	4.8	14.6
Total Revenue/GSDP, %	37.4	40.2	21.7	56.8
Own Revenue/GSDP, %	5.5	5.0	4.5	6.9
Transfers to the State/GSDP, %	31.9	35.1	15.6	50.1
Share in National GDP (2022-23), %	0.16	0.1	0.1	0.3
States' Per Capita Income/National Per Capita Income (2022-23, at current prices)	1.2	0.9	0.5	3.2

Source: RBI's State Finances Report; MoSPI.

Note: Data are from RBI's State Finances Report (downloaded from EPWRF); and National Commission of Population, Ministry of Health and Family Welfare.

## APPENDIX IV: Interest Rates and State GDP (GSDP) Growth Rates

State governments raise debt by issuing securities in the market as well as from other non-marketable sources. Of the total debt of the states, about two-third is marketable securities, while the rest consists of various other sources. The interest paid on primary issues of market securities (referred to as the weighted average yield) is quite similar across states; interest paid on total outstanding liabilities (i.e., debt from both marketable and non-marketable sources) referred to as effective interest rate, is lower but varies more across states (Table IV.1).

**TABLE IV.1. Interest Rates and GDP Growth of the States (Annual Average between 2013-14 and 2022-23)**

	<i>I. Weighted Average Yield on Primary Issues of Market Securities</i>	<i>II. Effective Interest Rate on Outstanding Debt</i>	<i>III. Nominal GSDP Growth</i>
	<i>States</i>		
Andhra Pradesh	7.6	6.7	12.2
Assam	7.5	7.4	12.2
Bihar	7.7	6.7	10.4
Chhattisgarh	7.6	6.8	10.3
Goa	7.8	7.3	9.8
Gujarat	7.8	7.5	12.0
Haryana	7.8	8.2	11.1
Himachal Pradesh	7.7	7.8	8.8
Jharkhand	7.8	6.7	8.8
Karnataka	7.8	6.5	12.7
Kerala	7.8	7.6	10.0
Madhya Pradesh	7.8	7.1	12.7
Maharashtra	7.7	7.8	9.3
Odisha	7.4	5.7	11.3
Punjab	7.8	8.2	8.6
Rajasthan	7.7	7.6	10.8
Tamil Nadu	7.8	8.3	10.8
Telangana	7.7	8.5	12.7
Uttar Pradesh	7.8	6.8	10.8
Uttarakhand	7.7	7.2	8.8
West Bengal	7.8	8.0	10.1
<b>Average of the states</b>	<b>7.7</b>	<b>7.3</b>	<b>10.6</b>
<b>Range (max-min)</b>	<b>0.4</b>	<b>2.8</b>	<b>4.1</b>
<b>Std. deviation</b>	<b>0.1</b>	<b>0.7</b>	<b>1.4</b>

Source: CCIL; RBI's State Finances Report; MoSPI.

Note: Data for Andhra Pradesh and Telangana begins from 2014-15 due to the bifurcation of Andhra Pradesh. Effective interest rate in Column II is calculated as interest payments as percent of total outstanding liabilities as of the previous year. Both interest rates are in nominal terms.

In Table IV.2, we present results from regressing effective interest rate on debt to GSDP for the 21 states in the sample. We estimate these regressions for one year at a time. Results show that the effective interest rate does not significantly vary with debt to GSDP, and that this result has not changed over time.

**TABLE IV.2. Nominal Effective Interest Rate and the Level of Indebtedness (Dependent Variable is Nominal Effective Interest Rate (%))**

<i>Years →</i>	<i>2014-15</i>	<i>2015-16</i>	<i>2016-17</i>	<i>2017-18</i>	<i>2018-19</i>	<i>2019-20</i>	<i>2020-21</i>	<i>2021-22</i>	<i>2022-23</i>
Debt to GSDP (%) (respective years)	0.06* (1.82)	-0.01 (0.23)	0.01 (0.52)	-0.03 (0.56)	0.02 (0.57)	0.02 (0.82)	0.02 (0.67)	0.04 (1.68)	0.01 (0.82)
Constant	6.17*** (8.19)	8.12*** (9.95)	7.45*** (11.25)	8.48*** (6.05)	6.89*** (8.36)	6.70*** (9.30)	6.74*** (8.28)	5.56*** (8.16)	6.25*** (10.92)
Observations	20	21	21	20	21	21	21	21	21

Source: CCIL; RBI's State Finances Report; MoSPI.

Note: t-statistics are in parentheses; \*, \*\*, \*\*\* indicate significance at 10, 5, and 1 percent levels, respectively. Data is unavailable for Telangana for 2014-15 and is unavailable for Uttarakhand for 2017-18, reflected in the number of observations being 20 in both these years.

## APPENDIX V: Key Statistics for States Classified by Change in Debt

The level of debt as well as the increase in debt over the last decade has been heterogenous across states, as highlighted in Section 4. Instead of dividing the states into above and below median based on the change in their debt to GSDP ratio between 2012-13 and 2022-23, as in Table 4, we categorized our sample of 21 states into three groups. There are eleven states which fall in the “High Increase in Debt” category, with an increase of 9.5 percentage points or more. Five states exhibited fiscal prudence with their debt levels declining, or increasing by less than 1 percentage point of GSDP, and these are categorized as “Small Increase in Debt”. The remaining five states fall in the “Medium Increase in Debt” category. Averages in Table V.1 show that the states in the “High” group have higher primary deficit and contingent liabilities, lower GDP growth, less favorable g-r, and higher expenditure, particularly revenue expenditure.<sup>21</sup>

**TABLE V.1. Key Statistics of the States Classified by Change in Debt (during 2012-13 and 2022-23)**

	<i>States with Small Increase in Debt</i>	<i>States with Medium Increase in Debt</i>	<i>States with High Increase in Debt</i>
	<i>(averages of states within a group)</i>		
Debt in 2022-23 % of GSDP	24.9	27.5	34.6
Change in Debt-to-GDP (percentage points)	-1.4	5.8	11.7
Primary Deficit % of GSDP	0.6	1.4	1.8
Contingent Liabilities % of GSDP	2.1	1.1	4.2
Real GDP Growth Rate (%)	6.0	6.3	5.9
Growth-Interest Differential (percentage points)	3.6	4.2	2.9
Revenue Receipts % of GSDP	14.3	15.5	15.0
State’s Own Revenue Receipts % of GSDP	7.7	7.9	7.7
Transfers from Centre % of GSDP	6.6	7.6	7.3
Revenue Expenditure % of GSDP	13.9	15.4	16.1
Capital Expenditure % of GSDP	2.8	3.1	2.9
Total Expenditure % of GSDP	16.7	18.5	19.0

Source: RBI’s State Finances Report and author’s calculations.

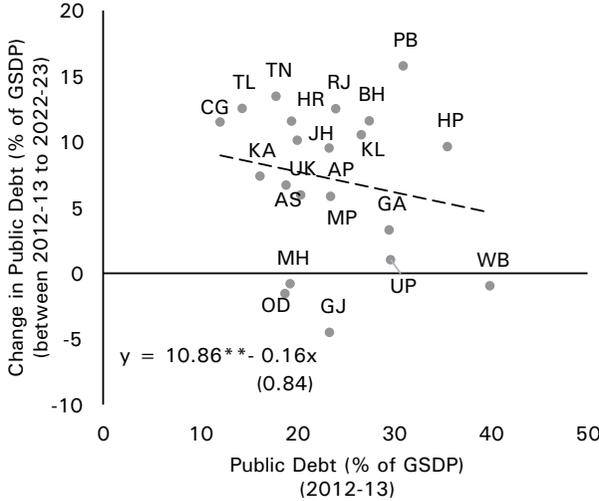
Note: All variables are averages between 2013-14 and 2022-23 unless otherwise noted. Contingent liabilities are averages from 2013-14 to 2021-22 (West Bengal’s average is for 2013-14 to 2020-21 as per data availability). States in the small increase in debt category are Gujarat, Odisha, Maharashtra, Uttar Pradesh, and West Bengal; those in the medium increase in debt category are Assam, Goa, Karnataka, Madhya Pradesh, and Uttarakhand; those in the high increase in debt category are Andhra Pradesh, Bihar, Chhattisgarh, Haryana, Himachal Pradesh, Jharkhand, Kerala, Punjab, Rajasthan, Tamil Nadu, and Telangana.

21. The average contingent liabilities of the states with small increase in debt is higher than that of those with medium increase in debt, driven entirely by Uttar Pradesh’s contingent liabilities.

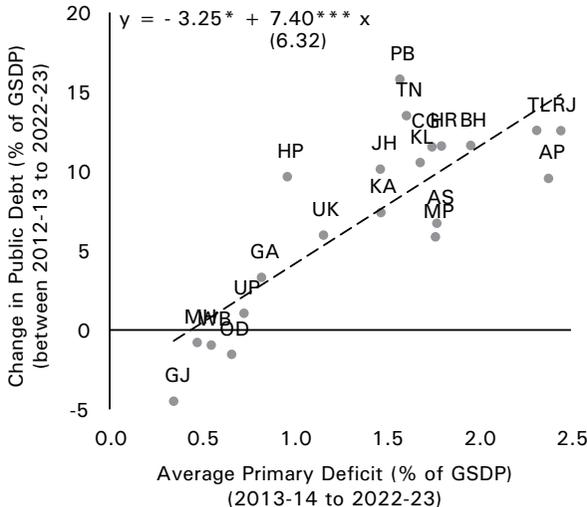
In a more continuous setting, Figure V.1 highlights the relationship between change in debt-to-GSDP during 2012-13 to 2022-23 and initial debt, and 10-year averages of primary deficit, contingent liabilities, and growth-interest differential. Results indicate that states with a higher initial debt burden did not experience a larger increase in debt in the subsequent decade; states with higher contingent liabilities and primary deficit experienced a larger increase in debt (statistically significant at 5 percent and 1 percent, respectively); the impact of a favorable g-r on subsequent increase in debt is negative but not significant.

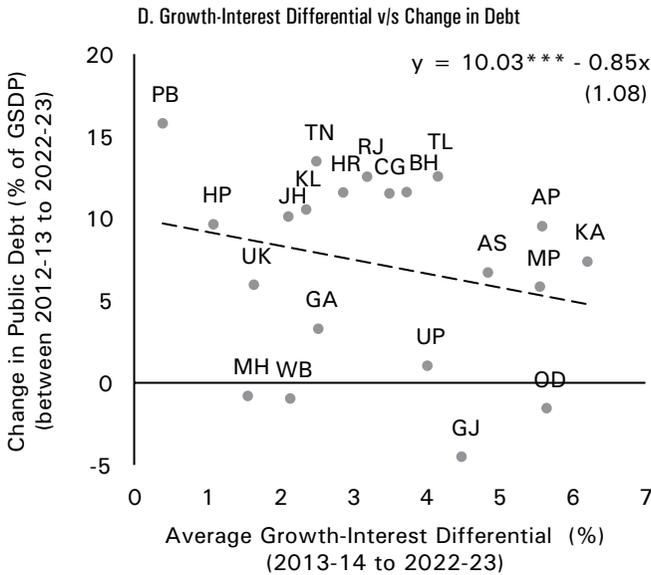
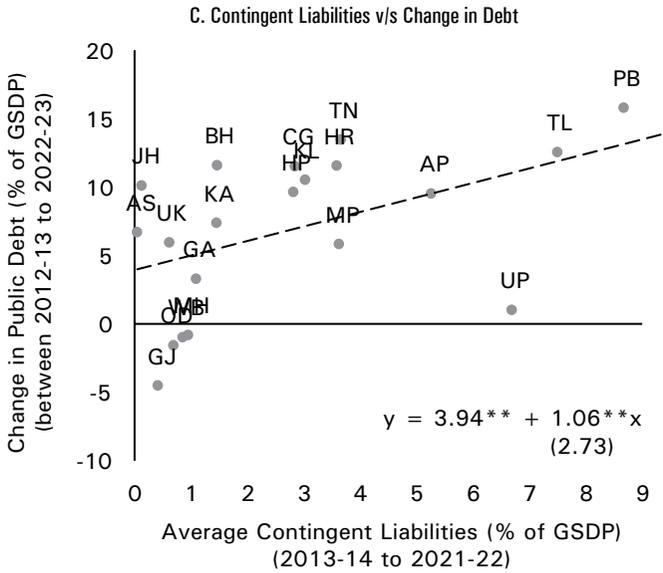
**FIGURE V.1. Correlates of Changes in Debt-to-GSDP from 2012-13 to 2022-23**

A. Public Debt (% GSDP) in 2012-13 v/s Change in Public Debt between 2012-13 to 2022-23



B. Primary Deficit v/s Change in Debt





Source: Data for debt and deficit are from RBI's State Finances Report; averages over 2013-14 till 2022-23. Data for contingent liabilities are from CAG's State Finances Audit Report (multiple years); averages over 2013-14 till 2021-22 (West Bengal's average is for 2013-14 to 2020-21 as per data availability). Data for states' GDP are MoSPI and the State Budget (downloaded from EPWRF). For Andhra Pradesh and Telangana, averages are from 2014-15 due to the bifurcation of the state.

Note: t-statistics in parentheses; \*, \*\*, \*\*\* indicate significance at 10, 5, and 1 percent levels, respectively.

## Regressions for Change in Debt

To determine whether our findings in Table 4 are robust, we define an alternate specification to Equation 1, where we test for correlates of change in debt (percent of GSDP) during 2012-13 and 2022-23, rather than for the dummy variable for High group states, i.e., we define the regression equation, as shown below.

$$\text{Change in Debt}_i = \alpha_0 + \alpha_1 X_i + \varepsilon_i \quad (4)$$

In Equation 4,  $i$  indexes the states,  $X$  refers to the variables of interest potentially correlated with change in debt, and the dependent variable is change in debt in state  $i$  during 2012-13 and 2022-23.

Table V.2 summarizes the results of these regressions. As before, we see that primary deficit and contingent liabilities are significantly correlated with change in debt (percent of GSDP). Among the revenue and expenditure variables, the only statistically significant correlate of change in debt turns out to be committed expenditure (on pensions, wages and salaries, interest payments and subsidies) whether calculated as a percent of GSDP or as percent total revenue receipts (columns 16 and 17 in Table V.2). States with higher levels of committed expenditure have observed a greater increase in their debt, significant at 10 percent.

**TABLE V.2. Correlates of Change in Debt to GSDP (%) (2012-13 to 2022-23)**

	(1)	(2)	(3)	(4)	(5)
Primary Deficit (% GSDP)	7.4*** (6.32)				
Real Growth Rate		-0.56 (0.43)			
Real Effective Interest Rate			1.46 (1.24)		
Real Growth minus Real Effective Interest Rate				-0.85 (1.08)	
Contingent Liabilities (% GSDP)					1.06** (2.73)
Constant	-3.25* (1.80)	10.59 (1.34)	3.25 (0.95)	10.03*** (3.48)	4.03** (2.48)
Observations	21	21	21	21	21
Adjusted R <sup>2</sup>	0.66	-0.04	0.03	0.01	0.23

contd...

...contd...

	(6)	(7)	(8)	(9)	(10)	(11)
Revenue Receipts (% GSDP)	0.032 (0.10)					
States' Own Revenue (% GSDP)		-0.20 (0.21)				
Transfers from Centre (% GSDP)			0.06 (0.18)			
Expenditure (% GSDP)				0.24 (0.83)		
Revenue Expenditure (% GSDP)					0.34 (0.95)	
Capital Expenditure (% GSDP)						0.27 (0.22)
Constant	6.73 (1.42)	8.74 (1.16)	6.81** (2.62)	2.77 (0.50)	2.01 (0.36)	6.41 (1.63)
Observations	21	21	21	21	21	21
Adjusted R <sup>2</sup>	-0.05	-0.05	-0.05	-0.02	-0.005	-0.05
	(12)	(13)	(14)	(15)	(16)	(17)
Exp. on Wages & Salaries (% GSDP)	0.53 (0.59)					
Exp. on Pension (% GSDP)		1.73 (0.94)				
Exp. on Interest Payments (% GSDP)			2.58 (1.09)			
Exp. on Subsidies (% GSDP)				3.33 (1.48)		
Exp. on Wages, Pensions, Subsidies & Interest Payments (% GSDP)					1.08* (1.89)	
Exp. on Wages, Pensions, Subsidies & Interest Payments (% Total Revenue)						0.17* (2.06)
Constant	4.95 (1.22)	3.91 (1.05)	2.53 (0.57)	3.87 (1.43)	-2.05 (0.41)	-3.15 (0.61)
Observations	21	21	21	20	20	20
Adjusted R <sup>2</sup>	-0.03	-0.006	0.01	0.06	0.12	0.14

Source: Data for debt, deficit, revenue receipts (and its components), and expenditure (revenue and capital) are from RBI's State Finances Report; averages over 2013-14 till 2022-23. Data for contingent liabilities are from CAG's State Finances Audit Report (multiple years); averages over 2013-14 till 2021-22 (West Bengal's average is for 2013-14 till 2020-21 due to data unavailability). Data for subsidies is from CAG State Finance Accounts (multiple years). Goa is dropped as its data is not available. For 2021-22 and 2022-23, data for subsidies for West Bengal is not available, but the state is included in the regressions. Data for the states' GDP are from MoSPI and State Budgets (downloaded from EPWRF). Only for Andhra Pradesh and Telangana, the averages are from 2014-15 due to the bifurcation of the state.

Note: t-statistics in parentheses; \*, \*\*, \*\*\* indicate significance at 10, 5, and 1 percent levels, respectively.

## APPENDIX VI: Debt Evolution across States with Past Five-Year Averages as the Benchmark

In Section 5, we projected debt under the ‘business as usual’ scenarios, when primary deficit, real growth rate and real interest rate are expected to prevail at the average levels of past ten years. The derivation for the debt equation is shown below.

$D_t = D_{t-1}(1 + i_t) + PD_t$ , where  $PD_t$  is the primary deficit at time t,  $D_t$  is the debt stock at time t,  $i_t$  is the nominal interest paid on past debt,  $D_{t-1}$  and is the debt stock at time t-1. We divide throughout by nominal GDP denoted by  $Y_t$  and  $\gamma_t$  is the growth rate of nominal GDP between t and t-1.

$$\frac{D_t}{Y_t} = \frac{D_{t-1}}{Y_{t-1}} \left( \frac{1+i_t}{1+\gamma_t} \right) + \frac{PD_t}{Y_t}$$

We can write  $b_t = b_{t-1} \left( \frac{1+i_t}{1+\gamma_t} \right) + pd_t$ , where debt, and primary deficit are denoted as ratios to nominal GDP. Using Fischer Equation, we further simplify it to  $\left( \frac{1+i_t}{1+\gamma_t} \right) = \frac{(1+r_t)(1+\pi_t)}{(1+g_t)(1+\pi_t)} = \frac{(1+r_t)}{(1+g_t)}$ , where  $r_t$  is the real interest rate,  $g_t$  is the real growth rate, and  $\pi_t$  is the rate of inflation.

By taking the change in debt stock on both LHS and RHS, we obtain the following:

$$b_t - b_{t-1} = b_{t-1} \left( \frac{1+r_t}{1+g_t} - 1 \right) + pd_t$$

$$\Delta b_t = b_{t-1} \left( \frac{r_t - g_t}{1+g_t} \right) + pd_t$$

Now we consider a scenario when these variables are projected to prevail at the average value of past five years (2018-19 to 2022-23). This period coincided with the COVID years, hence, it is unsurprising that many states’ five-year averages of primary deficits are higher (primary deficit is higher for 12 states, the same for 1 state, and lower for 8 states); and g-r is less favorable (it is less favorable for 14 states, same for 3 states and better for 4 states).<sup>22</sup> Thus, on average, projected debt levels are higher with five-year averages. Barring 6 states, projected debt to GSDP ratio of 15 states are higher than they would be in the ten-year averages case. Table VI.1 presents the results of the DSA with five-year averages.

---

22. Reserve Bank of India (2020) notes that India has the highest sub-national debt as percent of GDP of BRICS countries (State Finance Report, 2019-20); while S&P Global Research (2021) notes that India has the highest subnational debt globally as a percentage of revenue.

**TABLE VI.1. Projected Debt-to-GDP in 2027-28 (Using 5-year Averages)**

	<i>5-year averages (2018-19 to 2022-23)</i>						
	<i>Debt/ GSDP in 2012-13</i>	<i>Debt/ GSDP in 2022-23</i>	<i>Change in Debt/ GSDP last 10 years</i>	<i>Primary Deficit/ GSDP (pd)</i>	<i>Real GDP Growth (g) (%)</i>	<i>Effective Interest Rate (r) (%)</i>	<i>Growth- Interest Differential (g-r) (percentage points)</i>
Andhra Pradesh	23.4	32.9	9.5	2.0	5.3	1.2	4.1
Assam	18.9	25.6	6.7	2.9	6.6	2.1	4.5
Bihar	27.5	39.1	11.6	2.6	5.4	1.7	3.7
Chhattisgarh	12.1	23.6	11.5	1.9	6.7	2.9	3.8
Goa	29.5	32.8	3.3	1.2	2.7	3.5	-0.8
Gujarat	23.4	18.9	-4.5	0.4	6.4	2.5	3.9
Haryana	19.5	31.1	11.6	1.5	4.2	2.9	1.3
Himachal Pradesh	35.5	45.2	9.7	1.1	4.1	4.5	-0.4
Jharkhand	20.1	30.2	10.1	0.8	4.5	2.2	2.2
Karnataka	16.2	23.6	7.4	1.8	5.7	0.5	5.2
Kerala	26.7	37.2	10.5	1.6	3.9	2.7	1.2
Madhya Pradesh	23.5	29.3	5.8	2.1	4.7	0.2	4.5
Maharashtra	19.3	18.5	-0.8	0.8	2.9	1.9	1.0
Odisha	18.8	17.2	-1.5	0.3	5.3	-1.2	6.4
Punjab	31.0	46.8	15.8	0.8	4.3	4.5	-0.2
Rajasthan	24.0	36.6	12.5	2.0	4.6	1.3	3.4
Tamil Nadu	17.9	31.4	13.5	1.8	5.3	2.9	2.4
Telangana	14.4	26.9	12.6	2.4	5.3	0.3	5.0
Uttar Pradesh	29.7	30.7	1.0	0.0	4.7	1.7	3.0
Uttarakhand	20.4	26.4	6.0	0.6	2.0	2.8	-0.9
West Bengal	39.9	39.0	-1.0	0.9	4.0	1.9	2.1

contd...

...contd...

	<i>Scenario 1: Baseline scenario</i>			<i>Scenario 2: Baseline + Contingent Liabilities absorbed</i>	
	<i>Projected Debt/GSDP in 2027-28</i>	<i>Change in Debt/GSDP in 2027-28 over 2022-23</i>	<i>Contingent Liabilities/GSDP (CL) stock in 2021-22</i>	<i>Projected Debt/GSDP in 2027-28</i>	<i>Change in Debt/GSDP in 2027-28 over 2022-23</i>
Andhra Pradesh	36.3	3.4	10.4	46.0	13.1
Assam	33.9	8.3	0.1	33.9	8.3
Bihar	44.6	5.5	3.9	48.2	9.1
Chhattisgarh	28.5	4.9	4.8	33.0	9.4
Goa	40.4	7.5	0.8	41.2	8.4
Gujarat	17.3	-1.6	0.2	17.4	-1.5
Haryana	36.5	5.4	2.8	39.2	8.1
Himachal Pradesh	51.7	6.5	1.1	52.8	7.6
Jharkhand	31.0	0.8	0.2	31.1	0.9
Karnataka	26.5	2.9	1.7	28.0	4.4
Kerala	43.1	5.9	4.8	47.8	10.5
Madhya Pradesh	33.1	3.8	3.1	35.9	6.6
Maharashtra	21.4	2.8	1.6	23.0	4.5
Odisha	14.1	-3.2	0.9	14.9	-2.4
Punjab	51.3	4.5	3.3	54.6	7.8
Rajasthan	40.5	3.9	7.9	47.8	11.3
Tamil Nadu	36.7	5.3	4.4	40.9	9.6
Telangana	32.0	5.1	12.0	42.9	16.0
Uttar Pradesh	26.4	-4.3	8.8	34.8	4.0
Uttarakhand	30.3	4.0	0.1	30.5	4.1
West Bengal	39.2	0.3	0.7	39.9	0.9

Source: For Andhra Pradesh and Telangana, data used is from 2014-15 rather than 2012-13 due to the bifurcation of the state. For contingent liabilities, the data for 2021-22 is from CAG State Finances Audit Reports, it being the latest year for which actual data is available for all state governments (for West Bengal, it is available until 2020-21).

Note: Debt, primary deficit, and contingent liabilities are in percent of GSDP of the respective states. Effective interest rate has been calculated as total interest payments divided by total outstanding liabilities in the previous year. Deflator growth has been calculated as nominal growth rate minus real growth rate.

We present below the debt projections for the smaller North-eastern states which are not included in our sample of 21 states. Table VI.2 shows the projections using the ten-year averages for primary deficit and growth-interest differential, while Table VI.3 shows the projections with five-year averages. With ten-year averages, results are more benign. Debt is projected to increase only for Meghalaya. If the states are projected to assume contingent liabilities as well, Sikkim's debt is projected to increase as well. For the remaining states, debt is projected to decline.

On the other hand, under the five-year averages scenario, debt-to-GSDP ratio is projected to increase for all other states except Tripura; and for all the states when contingent liabilities are expected to be absorbed as well.<sup>23</sup> For six of the seven states, primary deficit is higher, and for five of the states,  $g-r$  is less favorable in the past five-year averages. Thus, in general, projected debt is higher when benchmarked with past five-year averages. Debt is projected to rise to upwards of 45 percent when contingent liabilities are not expected to be absorbed and even higher when contingent liabilities are expected to be absorbed. A more detailed scrutiny is important to understand the reasons why these states have added or will add more to their debt despite receiving very large transfers from the Centre each year.

---

23. As can be seen in Table VI.2, the data for contingent liabilities for Arunachal Pradesh is zero in the CAG reports, which could be a reporting error or could be due to lack of transparency in reporting of contingent liabilities data.

**TABLE VI.2. Projected Debt-to-GSDP in 2027-28 (Smaller North-eastern States, 10-year Averages)**

	<i>10-year averages (2013-14 to 2022-23)</i>						
	<i>Debt/ GSDP in 2012-13</i>	<i>Debt/ GSDP in 2022-23</i>	<i>Change in Debt/ GSDP last 10 years</i>	<i>Primary Deficit/ GSDP (pd)</i>	<i>Real GSDP Growth (g) (%)</i>	<i>Real Effective Interest Rate (r) (%)</i>	<i>Growth-Interest Differential (g-r) (percentage points)</i>
Arunachal Pradesh	34.0	47.6	13.5	0.8	6.6	1.1	5.5
Manipur	49.6	43.2	-6.4	1.0	5.7	-0.3	5.9
Meghalaya	24.1	44.1	20.1	1.9	2.2	1.2	1.1
Mizoram	66.1	42.0	-24.1	1.8	10.3	0.4	9.9
Nagaland	52.7	47.9	-4.8	0.3	4.0	0.4	3.7
Sikkim	24.2	31.2	7.0	1.5	6.9	-0.1	7.0
Tripura	35.4	32.2	-3.2	1.5	7.7	1.3	6.4

	<i>Scenario 1: Baseline scenario</i>		<i>Contingent Liabilities/ GSDP stock in 2021-22</i>	<i>Scenario 2: Baseline + Contingent Liabilities (CL) are absorbed</i>	
	<i>Projected Debt/GSDP in 2027-28</i>	<i>Change in Debt/GSDP in 2027-28 over 2022-23</i>		<i>Projected Debt/GSDP in 2027-28</i>	<i>Change in Debt/GSDP in 2027-28 over 2022-23</i>
Arunachal Pradesh	40.2	-7.4	0.0	40.2	-7.4
Manipur	36.7	-6.5	1.7	38.2	-5.0
Meghalaya	51.4	7.3	7.7	58.9	14.8
Mizoram	33.8	-8.2	0.5	34.2	-7.8
Nagaland	41.5	-6.4	0.6	42.1	-5.8
Sikkim	28.7	-2.5	10.9	38.3	7.1
Tripura	30.5	-1.6	1.0	31.4	-0.7

**TABLE VI.3. Projected Debt-to-GSDP in 2027-28 (Smaller North-eastern States, 5-year Averages)**

	<i>5-year averages (2018-19 to 2022-23)</i>						
	<i>Debt/ GSDP in 2012-13</i>	<i>Debt/ GSDP in 2022-23</i>	<i>Change in Debt/ GSDP last 10 years</i>	<i>Primary Deficit/ GSDP (pd)</i>	<i>Real GSDP Growth (g) (%)</i>	<i>Real Effective Interest Rate (r) (%)</i>	<i>Growth-Interest Differential (g-r) (percentage points)</i>
Arunachal Pradesh	34.0	47.6	13.5	2.8	6.4	0.7	5.7
Manipur	49.6	43.2	-6.4	2.6	3.7	0.0	3.7
Meghalaya	24.1	44.1	20.1	3.1	2.4	1.1	1.3
Mizoram	66.1	42.0	-24.1	3.0	6.8	1.5	5.2
Nagaland	52.7	47.9	-4.8	1.1	3.0	1.8	1.3
Sikkim	24.2	31.2	7.0	2.9	4.6	1.1	3.6
Tripura	35.4	32.2	-3.2	1.1	5.5	1.7	3.8

	<i>Scenario 1: Baseline scenario</i>			<i>Scenario 2: Baseline + Contingent Liabilities are absorbed</i>	
	<i>Projected Debt/GSDP in 2027-28</i>	<i>Change in Debt/GSDP in 2027-28 over 2022-23</i>	<i>Contingent Liabilities/ GSDP stock in 2021-22</i>	<i>Projected Debt/GSDP in 2027-28</i>	<i>Change in Debt/GSDP in 2027-28 over 2022-23</i>
Arunachal Pradesh	48.9	1.4	0.0	48.9	1.4
Manipur	48.1	4.9	1.7	49.6	6.5
Meghalaya	56.5	12.4	7.7	64.0	19.8
Mizoram	46.2	4.2	0.5	46.6	4.7
Nagaland	50.3	2.3	0.6	50.8	2.9
Sikkim	39.6	8.4	10.9	49.8	18.7
Tripura	31.7	-0.5	1.0	32.6	0.5

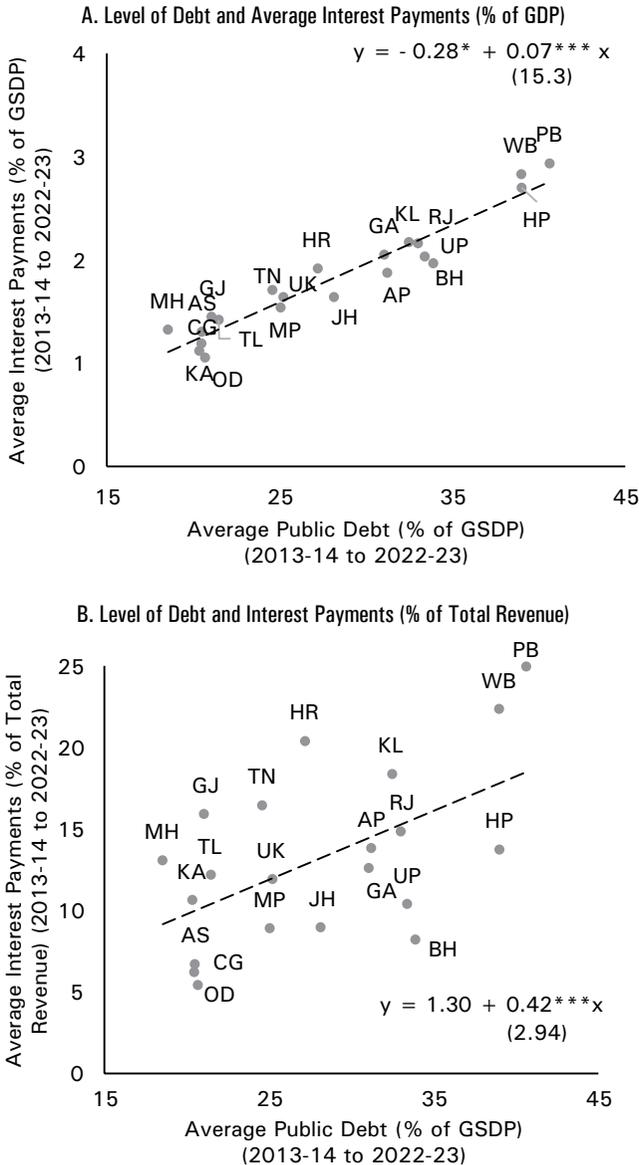
Source (Tables VI.2 and VI.3): Data for debt and primary deficit has been taken from RBI's State Finances Report; data for contingent liabilities has been compiled from CAG's State Finances Audit Reports (multiple years); and data for states' GDP is from MoSPI (downloaded from EPWRF).

Note: Deflator growth rate has been calculated as the difference between nominal growth rate and real growth rate.

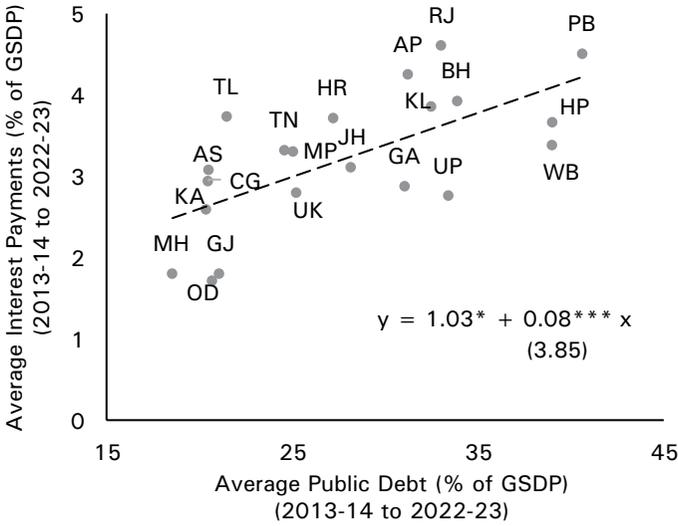
### APPENDIX VII: Debt Levels and Outcomes

The scatter plots in Figure VII.1 show that states which have had higher average public debt in the last ten years have paid significantly larger amounts in interest payments (percent of GSDP or total revenue receipts); have had significantly higher average fiscal deficit; and a significantly lower average real growth rate.

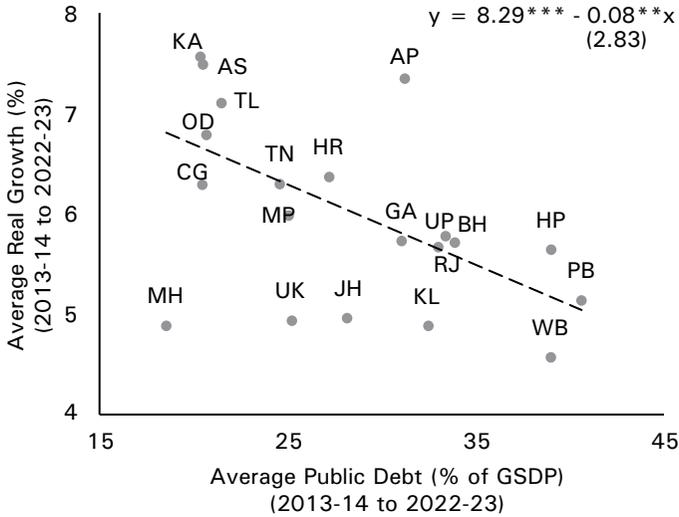
**FIGURE VII.1. Debt-to-GDP Ratios and Fiscal and Real Outcomes across States**



C. Level of Debt and Fiscal Deficit (% of GSDP)



D. Level of Debt and GDP Growth (Real)



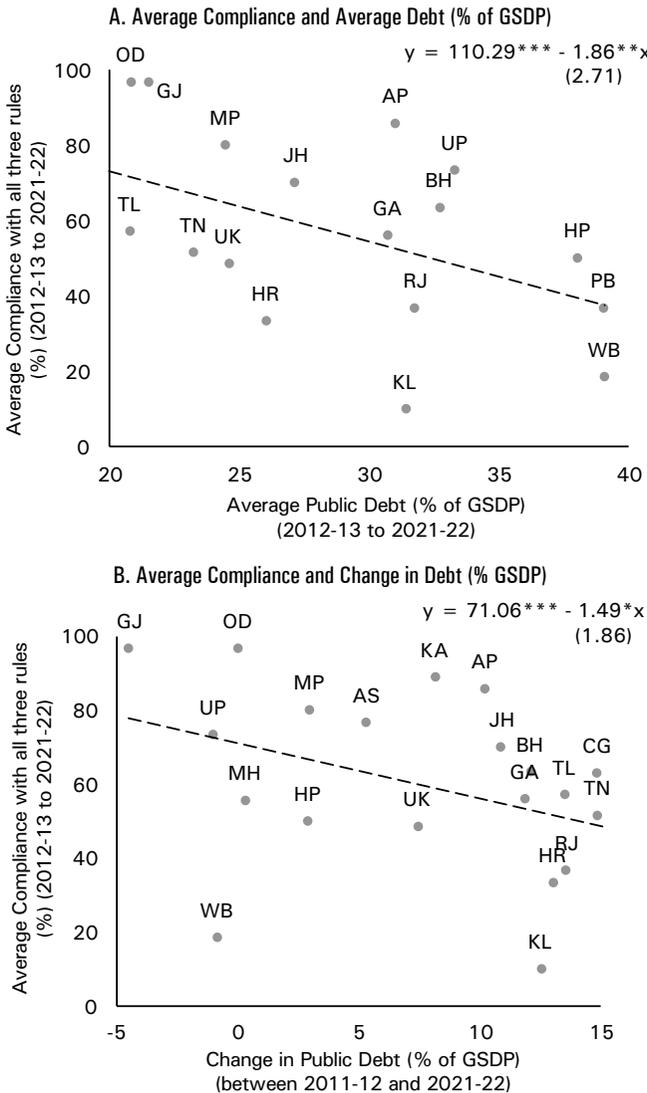
Source: Data for debt, deficit, and interest payments are taken from RBI State Finances Report; states' GDP data is from MoSPI.

Note: For all variables, averages are taken over 2013-14 and 2022-23; for Andhra Pradesh and Telangana, averages are over 2014-15 and 2022-23 due to bifurcation of the state.

### Appendix VIII: Fiscal Rules across States

The scatter plots in Figure VIII.1 highlight how the average compliance exhibited by states correlate with their average debt-to-GSDP ratios and change in debt-to-GSDP ratios over the last ten years. States with higher levels of average debt tend to comply less with the fiscal rules as well as states which have observed an increase in their debt levels between 2011-12 and 2021-22 comply less with the fiscal rules.

**FIGURE VIII.1. Level of Debt or Increase in Debt vs Compliance with Different Fiscal Rules**



Source: Data on compliance are compiled from CAG's State Finance Audit Reports; and authors' calculations.

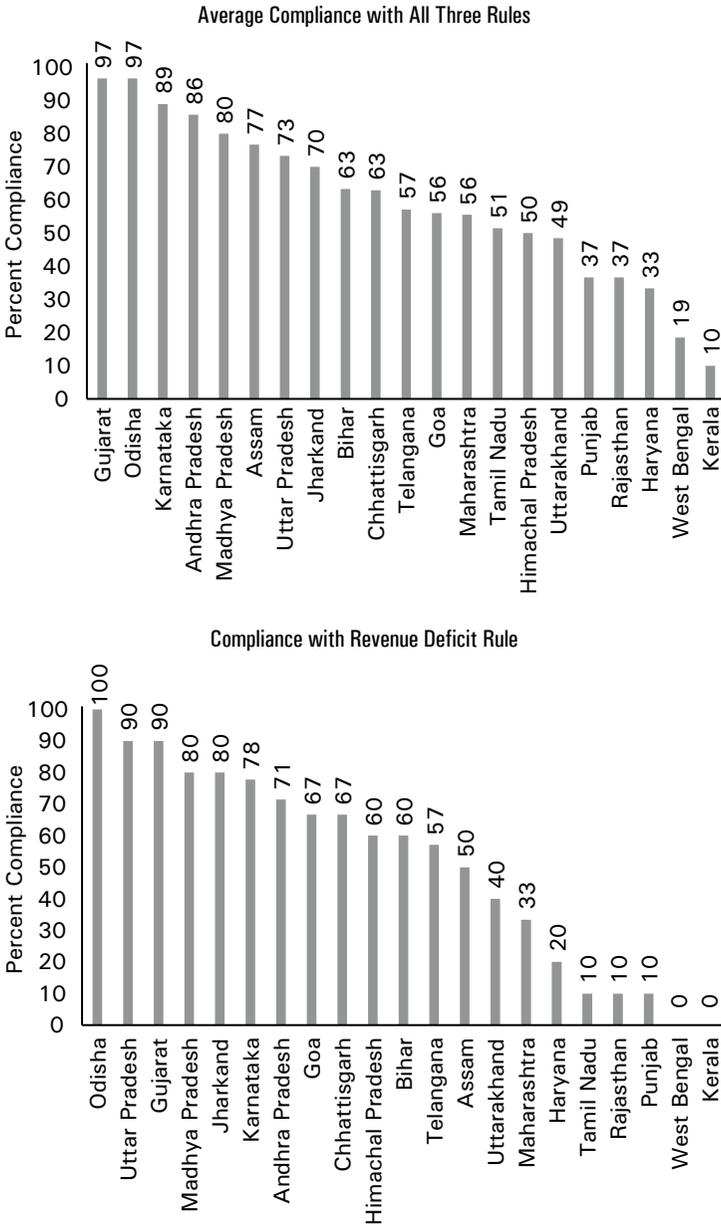
**TABLE VIII. 1. State-wise Compliance with Different Fiscal Rules**

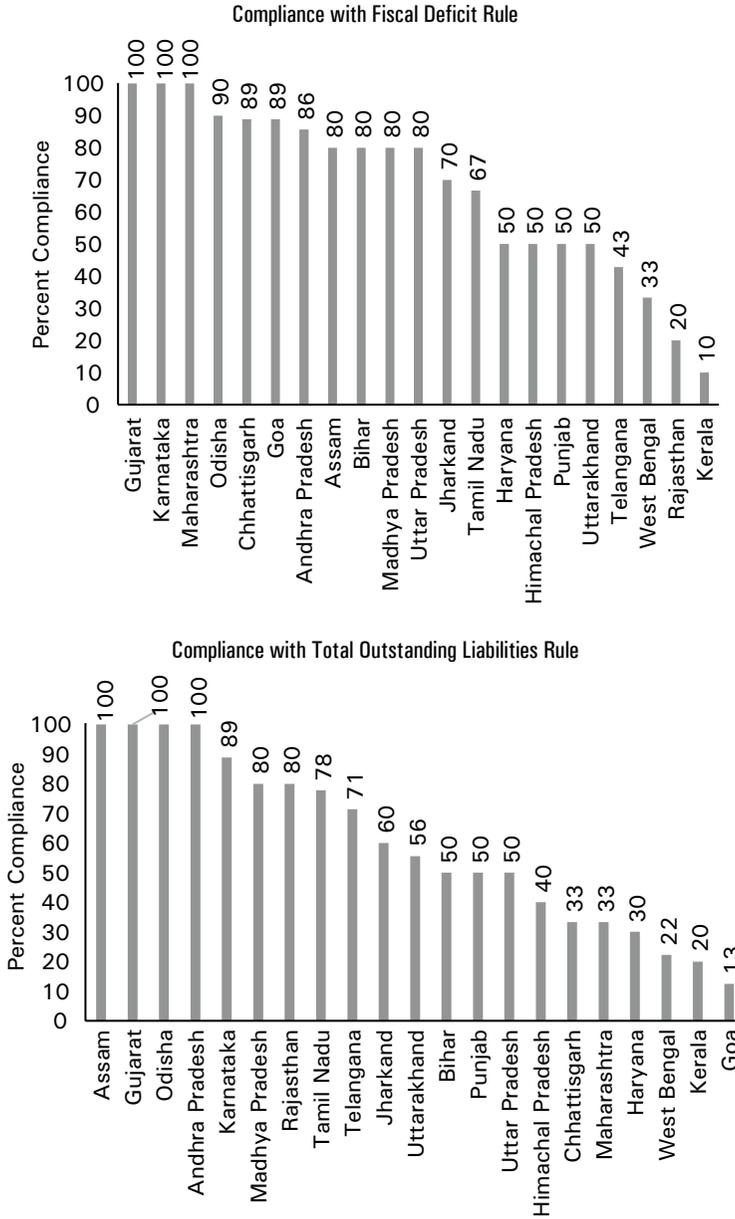
<i>State</i>	<i>Percent compliance with revenue deficit rule</i>	<i>Percent compliance with fiscal deficit rule</i>	<i>Percent compliance with outstanding liabilities rule</i>	<i>Average compliance with all three rules</i>
<i>(average between 2012-13 and 2021-22)</i>				
Andhra Pradesh	71.4	85.7	100.0	85.7
Assam	50.0	80.0	100.0	76.7
Bihar	60.0	80.0	50.0	63.3
Chhattisgarh	66.7	88.9	33.3	63.0
Goa	66.7	88.9	12.5	56.0
Gujarat	90.0	100.0	100.0	96.7
Haryana	20.0	50.0	30.0	33.3
Himachal Pradesh	60.0	50.0	40.0	50.0
Jharkhand	80.0	70.0	60.0	70.0
Karnataka	77.8	100.0	88.9	88.9
Kerala	0.0	10.0	20.0	10.0
Madhya Pradesh	80.0	80.0	80.0	80.0
Maharashtra	33.3	100.0	33.3	55.6
Odisha	100.0	90.0	100.0	96.7
Punjab	10.0	50.0	50.0	36.7
Rajasthan	10.0	20.0	80.0	36.7
Tamil Nadu	10.0	66.7	77.8	51.5
Telangana	57.1	42.9	71.4	57.1
Uttar Pradesh	90.0	80.0	50.0	73.3
Uttarakhand	40.0	50.0	55.6	48.5
West Bengal	0.0	33.3	22.2	18.5
Average across states	51.1	67.4	59.8	59.4

Source: Data on compliance are compiled from CAG's State Finances Audit Reports; and authors' calculations.

Figure VIII.2 shows the state-wise compliance with the revenue deficit rule, fiscal deficit rule, contingent liabilities rule and the average across these three rules.

**FIGURE VIII.2. Percentage Compliance with Fiscal Rules by States (Average during 2012-13 and 2021-22)**





Source: Data on compliance are compiled from CAG's State Finances Audit Reports; and authors' calculations.

## APPENDIX IX: Climate Change and its Fiscal Pressures

The Centre for Science and Environment (2024) highlights that ‘India faced extreme weather events on 93 percent of days in the first nine months of 2024, marked by heat and cold waves, cyclones, lightning, heavy rain, floods, and landslides,’ resulting in significant material damages. The 15<sup>th</sup> Finance Commission noted that in recent years, India has witnessed large-scale floods in different states like Uttarakhand, Tamil Nadu, Assam, Bihar and Kerala, cyclones in Andhra Pradesh, Odisha, West Bengal and Tamil Nadu, and successive droughts in Rajasthan, Maharashtra, Karnataka, Andhra Pradesh and Telangana.

A 2019 report, “A Climate Risk Management Framework for India”, by the National Institute of Disaster Management, notes the differential projected impact of climate change across different regions of the country. It projected an overall decrease in winter precipitation and increase in intensity of summer precipitation for the North-eastern region, which could increase landslides during summers and decrease in yields during winters. It also predicted an increase in temperature in the Western Ghats, combined with increased rainfall in the Northern part, which could lead to more flooding and soil erosion, an increase in the sea surface temperatures and rainfall intensity as well as a rise in the sea level. Changes in climatic conditions could increase the frequency and intensity of current extreme weather events, giving rise to new vulnerabilities and socio-economic impacts on communities. More frequent episodes of weather-related emergencies could place additional fiscal pressures on the state’s resources.

The susceptibility of the Indian states to climate risks has been noted in both the RBI’s State Finance Reports and the reports of the Finance Commission.

RBI (2023) notes that India’s diverse topography has led to varying climate vulnerabilities across states. Indian states are among the top 50 regions globally at risk of climate change-related damage to their environment. It emphasizes that the states play a pivotal role in customizing climate actions to local needs. It recommends that the states integrate climate finance into their broader fiscal planning processes. It has also suggested that the Centre should introduce performance-based incentives for the states to make significant progress towards climate goals, including through additional grants to the states that succeed in reducing emissions or increasing renewable energy generation.

The RBI followed the same line of reasoning and recommendation in its report for 2024 and recommended the adoption of climate budgeting in order to integrate climate action into fiscal planning.

The 13<sup>th</sup> Finance Commission noted, “In India, the financing of disaster relief is an important aspect of federal fiscal relations. There are significant variations in the disaster-proneness profiles of different states and wide regional disparities in terms of levels of economic development. This implies that the coping capacity of a majority of the states to deal with disasters on their own is inadequate. This is compounded by the fact that the poorer states are often the most disaster-prone. The financing of disaster relief has, as a result, come to be firmly accepted as a joint endeavour of the Central and State Governments.”

# Comments and Discussion \*

Chair: **Arvind Panagariya**

*16<sup>th</sup> Finance Commission*

## **Govinda Rao**

*Takshashila Institution*

It is important to understand the whole issue of state finances in this country because it accounts for almost two-thirds of total expenditures and raises about one-third of the revenues.

The authors of the paper have focused on macroeconomic stabilization issues. Both macroeconomic stabilization and redistribution are predominantly Central functions, but that does not mean that the state's fiscal operations do not have macroeconomic implications.

Article 293, Sub-clause 3 of the Constitution stipulates that the Union Government has to control the borrowings of a state if it is indebted to the Centre. This clearly implies that the overall control over state's borrowing is the responsibility of the Union Government. As long as the states are indebted to the Union Government, they have to seek the permission of the Centre to borrow. The Union Government can also impose conditions besides placing limits on borrowing by the states.

The states have an important role to play in providing public services or on allocative decisions. According to the Musgravian classification, the Government's economic functions are organized into three categories: allocation, distribution, and stabilization. As regards allocation, the states have a predominant responsibility for human development and a co-equal responsibility in providing economic services. The paper has mainly touched upon the stabilization issue concerning debt sustainability and related issues. I mostly agree with what is said in the paper except on one issue: it mentions that Gujarat was the best state as far as debt comparison is concerned. However, it is not Gujarat but Odisha that has always had the lowest level of debt. In terms of reducing the debt-GSDP ratio, Gujarat's performance is the best.

Let me make five points here. First, broadly, states have calibrated the rule-based policy in a much better manner than the Union Government. Until the pandemic, by and large, their aggregate revenue deficit was almost zero and

---

\* To preserve the sense of the discussions at the India Policy Forum, these discussants' comments reflect the views expressed at the IPF and do not necessarily take into account revisions to the conference version of the paper in response to these and other comments in preparing the final, revised version published in this volume. The original conference version of the paper is available on NCAER's website at the links provided at the end of this section.

the fiscal deficit was around 2.5 to 2.8 percent. The more recent period has seen some disrupting trends, and the revenue deficit estimate in 2022-2023 is estimated at 2.6 percent of GDP. I think, by the time they implement the budget and the final accounts figures come in, it will be much lower.

Second, there have also been some interesting developments. The paper talks about the decline of the indebtedness to the Centre by the states—the reason for this is very clear. The 12<sup>th</sup> Finance Commission gave an incentive to the states, suggesting that they should follow the rule-based fiscal policy and a state passing that Act would get 50 percent remission on the outstanding loans of the Centre and every improvement in the revenue deficit would correspondingly result in the reduction in Central outstanding loans. After this recommendation, all the states, except West Bengal and Sikkim, passed the Fiscal Responsibility Act.

However, the issue of contingent liability is a bigger problem than the debt position seen in the Budget. For instance, despite many reforms in the power sector, there are many off-budget liabilities. As of 2022-23, the total losses in the sector amounted to Rs 1,06,069 crore, in addition to the explicit subsidy given by the states amounting to Rs 37,000 crore. Further, there are losses in the transport sector and other problems such as under-recovery in irrigation and losses in many public enterprises and pendency in contractor's bills.

A classic example of the off-budget liability is that of Kerala's infrastructure investment fund, which has been floated as a *masala* bond in the London Stock Exchange. The question here is, if obviously the states cannot borrow without the permission of the Union Government, how could they create a separate company and borrow through that?

The short point is that if the Union government softens the budget constraint of the states, there will be problems.

The third point that I want to make is that low-income states have a larger proportion of children in the age group of 0-14 years. They are the ones that require higher spending on education and healthcare. Although the aggregate fiscal position is satisfactory in the states, some of the states, including Punjab, Kerala, Bihar, Rajasthan, and even Andhra Pradesh, have very serious fiscal stresses, as pointed out in the paper. Even a fiscally prudent state like Tamil Nadu is slipping. Consequently, the share of revenue deficit in fiscal deficit is high; it is almost 71 percent in Punjab. Even the 13<sup>th</sup> Finance Commission flagged this issue, identifying West Bengal, Punjab, and Kerala as fiscally stressed states. It gave them a different adjustment plan but they did not follow it.

The fourth issue that I want to flag relates to inter-state inequalities in spending on development expenditure. There is very low spending on education and health: the total spending of the Centre plus states on education is 2.6 percent of GDP, whereas on healthcare, it is only 1.2 percent of GDP. According to experts, education spending should be about 6 percent of GDP and health expenditure should be 3 percent of GDP. The consequence of low levels of spending is that in many states, teachers are not appointed, and health

centers are not established according to the norms set by the Ministry of Health and Family Welfare. Actually, contract teachers are called in from colleges and the quality of higher education has been declining, especially in Odisha, Karnataka, and many other states.

The actual expenditure is the lowest in Bihar in terms of per capita expenditure on education and health, which is clearly reflected in social and economic indicators. Even the highest spending state has low per capita income expenditures on education and healthcare. The recent trends are also very disturbing. There are several poorly designed and targeted Centrally-sponsored schemes. Originally, there were 247 such schemes, which fell to 176. Thereafter, the UPA Government brought them down to 66 umbrella schemes, and now there are a total of only 28 such schemes. The objective of specific purpose transfer is to ensure minimum standards of services in respect of these meritorious services, but the minimum standards to be ensured are not specified any of the 28 Centrally Sponsored Schemes. There are serious problems with the design and implementation of these schemes.

The fifth point relates to the emerging risk in many states. As per the theory of 'Salmon Mechanism' in competitive federalism, the best performing states are imitated by the other states. However, the worst performing states are also imitated by the other states and there is a proliferation of subsidies for electoral gains. Distribution of freebees is a major fiscal risk in the country. Of course, redistribution is a legitimate government activity but it entails significant opportunity cost which the political parties do not consider.

As regards the Finance Commission, there are two problems with its reports: one that there is a tyranny of the base year, which implies that if the base year expenditure in a state is low, the forecast made on that will continue to be low and there is little scope for the state to equalize the level of its services. Secondly, the Finance Commission does the job of a fiscal dentist because the grants are given to fill in post-devolution budgetary cavities and the cavities become larger and larger over time.

In Punjab, for example, 50 percent of the revenue goes for interest payments and the revenue receipts are not adequate to make interest payments, pensions, and subsidies, which leaves a large gap in the revenue account. The Finance Commissions are supposed to fill the revenue account gaps, but over the years, they too apply norms, and this results in the use of borrowed funds to fill the revenue deficit. As already mentioned, over 75 percent of borrowed funds in Punjab are used to fill the revenue deficit. The 15<sup>th</sup> Finance Commission capped the interest payment annual growth at 7 percent in its projections, but the state has not taken any corrective measures. It is important to consider the consequences of such situations. Overall, it is important for the analysts to consider fiscal discipline not just in containing the deficits and debt but also in providing public services which the states are assigned to do under the Seventh Schedule of the Constitution.

## General Discussion

Saurabh Garg suggested that fiscal prudence is an outcome of the question regarding what you pay for or not and what services you want more of. He said that Kerala was the first state to move from a fiscally more stable to a less stable situation, followed by Tamil Nadu, Andhra Pradesh, and Karnataka. Gujarat has consistently been an outlier. He said that Gujarat's fiscal prudence is partly cultural and partly a result of the way it has been administered. The choice of the development model is important. Discussing the issues of good subsidies versus bad subsidies and a good pension scheme versus a bad pension scheme, he noted that the pension scheme is a fixed contribution scheme with no assurance of any benefit, which poses a risk. While fixed contribution is important, from a welfare perspective, government employees also need an assurance about the benefits. He pointed out the need for a contributory pension scheme, which also offers a modicum of fixed benefit with any gaps being filled in by government contribution. As regards growth risks and the kind of restructuring required, he stated that a huge part of the debt earlier was owed to the Government of India whereas now, most of the debt is owed to the market and very little to the Government of India. He argued that while a debt relief package to a state may not be possible, the entities that really need a debt relief package are the DISCOMS, which are currently caught in a difficult position.

Govinda Rao listed a variety of reasons on the question why some states continue to remain fiscally prudent. Kerala has always maintained that its focus is on social services while Punjab argues that it is looking after India's population and security. The states that do not qualify for getting grants depend on devolution. He said that states like Tamil Nadu, Karnataka, Andhra Pradesh, and Maharashtra do not qualify for grants, and would not gain by being profligate. He recalled that in 1992, the National Development Council (NDC) Committee, chaired by Biju Patnaik, recommended that there should be a charge of 50 paise per unit of electricity on farmers, which was, however, not implemented. The committee was called the Austerity Committee. He said this is one of the reasons why Odisha had a very low debt, though its expenditure is also very low.

Ratna Sahay asserted that it is fallacious to say that debt is sustainable because it is propped up artificially, creating distortions for two reasons. One, there are capital controls, and two, there is financial repression because financial institutions are forced to hold debt. If these go, debt would not be sustainable, she added. Regarding the comment on transfers based on per capita income, Sahay cited one of her papers to say that it had zero impact on the Finance Commission or the government as it does not lead to income convergence or growth convergence, at least not in the case of India. On why some states are more disciplined than others, she said that it was going to be a race to the bottom and cited the finding in the paper—when there is zero impact on the risk

premium, contingent liabilities become real liabilities. Why should the states not borrow if there is no cost to it?

Speaking on the issue of the race to the bottom, Nirvikar Singh wondered how Himachal Pradesh managed to achieve such a high debt to SGDP ratio, especially since it has been growing much faster than Punjab.

Lakhwinder Singh stated that while examining state indebtedness, one should look into the history of various states. Some of the states which happened to be very prudent and very efficient in terms of fiscal policy had raised a lot of debt, for which there are historical reasons. He said that the period of 34 years since liberalization had had a tremendous impact on the structure of various states of India as well as on fiscal policy. Singh said that the development paradigm too had changed over a period of time and is also reflected in terms of how the political leadership takes decisions. The political leadership has to impress the voters, but development has to be delivered by the market. This dichotomy needs to be taken into consideration. Summing up the discussion, Poonam Gupta briefed that her paper with Barry Eichengreen addresses the reasons for high public debt in India and that it is not a macroeconomic risk. She said household financial savings rate had been coming down as also capital controls. The second question, she said, is the growth cost of having such high debt in terms of it being a crisis-like situation. The bigger point is that it is certainly a risk, a growth risk for at least 5-6 states, but still not a sustainability risk.

The session video and all presentations for this IPF session can be accessed by scanning this QR code or going to:  
<https://ncaer.org/event/india-policy-forum-2024/>





SONALDE DESAI\*  
*University of Maryland College Park and NCAER*

DEBASIS BARIK†  
*NCAER*

PALLAVI CHOUDHURI#  
*NCAER*

BIJAY CHOUHAN\*\*  
*NCAER*

OM PRAKASH SHARMA§  
*NCAER*

SHARAN SHARMA &  
*University of Maryland College Park and NCAER*

DINESH KUMAR TIWARI®  
*NCAER*

# Rethinking Social Safety Nets in a Changing Society: Evidence from the India Human Development Survey<sup>§</sup>

**ABSTRACT** With a growing economy and declining poverty, India faces a curious challenge in providing a social safety net to its citizens. Using data from three rounds of the India Human Development Survey (IHDS), collected in 2004-05, 2011-12, and 2022-24, this paper shows that households face considerable transition in and out of poverty as the economy grows. Historically, India's approach to social safety nets has involved identifying the poor and providing them with priority access to various social protection programs that include both in-kind and cash assistance—however, the nature of poverty

---

\*sonalde.desai@gmail.com; †dbarik@ncaer.org; #pchoudhuri@ncaer.org; \*\*bchouhan@ncaer.org; §opsharma@ncaer.org; §snsharma@umd.edu; ®dktiwari@ncaer.org

§ This paper draws on data from the newly completed Wave 3 of the India Human Development Survey (IHDS) as well as data from Waves 1 and 2 of the IHDS. This work has been supported by Grant No. R01HD041455 from the National Institutes of Health and INV-048560 and INV-003352 from the Gates Foundation.

The findings, interpretations, and conclusions expressed are those of the authors and do not necessarily reflect the views of the Governing Body or Management of NCAER.

changes with economic growth. This churn in households' economic circumstances makes it difficult to identify and target the poor precisely.

Using unique, newly collected, panel data, this paper makes three observations about India's anti-poverty programs: (1) Identification of households as poor (now dubbed priority households) relies on identification exercises carried out every 10-15 years and assumes that poverty status is relatively static. However, results presented in this paper document a substantial transition in and out of poverty. (2) This ex-ante identification of needy households leads to relatively weak correlation between households' actual economic status and access to social safety nets. This should not be assumed to be an example of elite capture but rather an artefact of a static program design. (3) Recognition of exclusion and inclusion errors led to an advocacy for a vast expansion of the population eligible for benefits. It was assumed that this expansion will reduce exclusion of the poorest, even if it leads to greater inclusion of the non-poor. However, experience of the National Food Security Act 2013, documented in this paper, shows that even as the proportion of households owning a Below the Poverty Line (BPL) card grew from 41 percent to 60 percent between 2011-12 and 2022-23, 30 percent of the poor were left out. This suggests that addressing inclusion and exclusion errors may be difficult, particularly in an era of economic growth. Social safety nets may need to be redesigned in a way that is responsive to changing economic conditions and unexpected events, both at the individual and the community levels.

*Keywords: Poverty, Social Safety Net, Consumption Expenditure, Welfare Subsidies, Policy, Poverty Transition, India*

*JEL Classification: I32, I38, D63, D15*

## 1. Introduction

The pandemic highlighted the need for governments the world over to intervene to ensure households could meet their basic needs. As the lockdowns were implemented, production and transportation bottlenecks led to shortages and price rises, and small businesses suffered tremendous losses. The pandemic experience also highlighted the importance of rethinking how governments provide social protection under unforeseen conditions.

The Indian approach to social protection was developed at a time when a vast proportion of the population lived below the poverty line and unequal access to productive resources such as land and education led to endemic poverty among some sections of the society (e.g., the Scheduled Castes and the Scheduled Tribes) and some areas (e.g., poorest districts such as Dahod, Gadchiroli, and Dhubri). This has led to safety nets structured around identifying the poorest sections of society and providing them with a host of benefits ranging from subsidized or free foodgrains to health insurance and pensions.

However, a growing economy creates both new opportunities and challenges. This paper seeks to address whether this time-honored strategy continues to be relevant in 21<sup>st</sup>-century India. We rely primarily on three waves of the India

Human Development Survey (IHDS) conducted in 2004-05, 2011-12, and 2022-24. As a nationwide panel study of over 41,000 households, IHDS offers unique opportunities for exploring changes in the lifestyles of ordinary Indians; but it is even more useful in understanding changes and relationships over time than offering cross-sectional estimates of parameters of policy interest such as poverty. See Appendix A, with Tables A.1 and A.2, for a description of the IHDS sample and attrition over time. One caveat should be noted: while the weights in Appendix Table A.3 take into account differential urban and rural growth rates for each state based on the projections by the Ministry of Health and Family Welfare, in absence of a recent census, these weights remain an approximation; moreover at present, they do not take into account sample attrition.

With these caveats, some stylized observations on India's poverty transition and social protections are helpful as we reflect on emerging priorities in social protection.

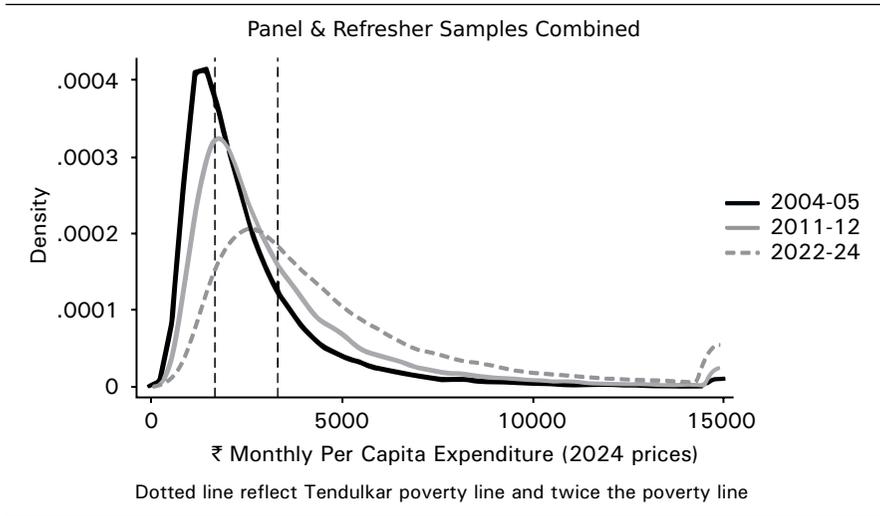
### *1.1. Poverty Has Declined Substantially*

Estimating poverty in India has historically been a contentious issue (Deaton and Kozel 2005). In its modern avatar, a lively debate ranges about whether these poverty lines are too low and whether the consumption basket underlying CPI indices needs to be recalibrated (Ghatak and Kumar 2024). The absence of comparable consumption data, the staple source of poverty estimation in India, in recent years, has also led to divergent opinions on the extent of poverty decline in India, the divergence between results from employment data and consumption data, and the role of changing methodology on estimates of poverty (see an e-symposium on measuring poverty, Ghatak 2022). The recent release of the Household Consumption Expenditure Survey (National Sample Survey Office 2024) should lay to rest some of these controversies but will require detailed analyses to ensure comparability.

Although crucial for estimating poverty, these debates are outside this paper's scope. As T.N. Srinivas noted, poverty lines serve two purposes, normative and monitoring, where normative standards reflect a social contract about the basic standard of living that should be available to all individuals, while monitoring standards track lifestyle changes over time (Srinivasan 2007). Following the monitoring approach, we focus on understanding the poverty dynamics at the household level, using panel data for the purposes for which they are designed, with no attempt at critiquing existing poverty lines.

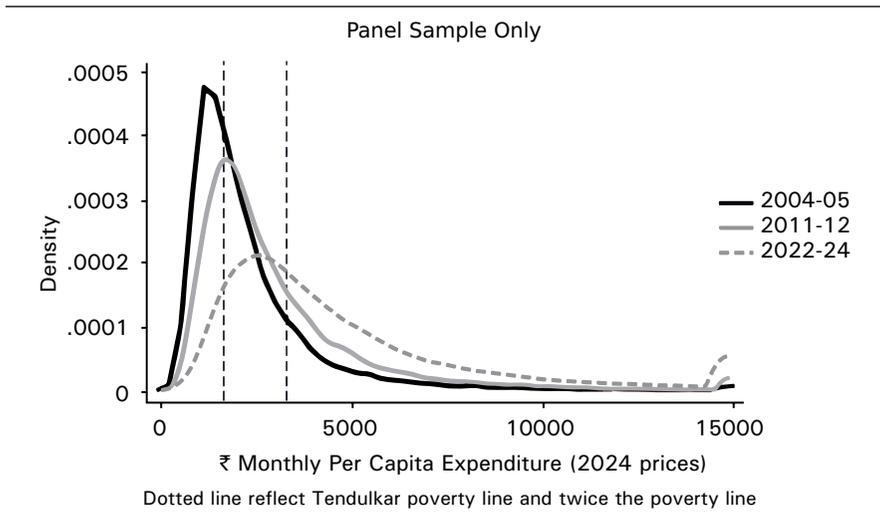
The three rounds of the India Human Development Survey (IHDS) administered identical questions to respondents about consumption of food and frequently used items with a reference period of 30 days and about infrequently purchased items with a reference period of 365 days, somewhat analogous to the Mixed Recall Period used by the National Sample Survey. However, since the IHDS relies on a more limited set of items than the NSS, it is not ideal for

**FIGURE 1. Rightward Shift in the Distribution of Per Capita Consumption Expenditure (in 2024 Prices)**



Source: Authors' computation based on the IHDS (2004-05, 2011-12, 2022-24).

**FIGURE 2. Household Consumption Has Grown Longitudinally for Panel Households in the IHDS (in 2024 Constant Prices)**



Source: Authors' computation based on the IHDS (2004-05, 2011-12, 2022-24).

estimating poverty levels (for a comparison of IHDS design characteristics with that of NSS, see Appendix B). Nevertheless, it offers comparable data for the same households over 20 years, allowing for critical analytical insights.

Figures 1 and 2 show the change in the distribution of monthly per capita consumption expenditure for the cross-sectional samples over the period 2004-05 and 2022-24 (containing both panel and refresher households) and only the panel households, respectively. These data are drawn from the IHDS, 2004-05, 2011-12, and 2022-24, described in Appendix Tables A.1 and A.2 and presented in constant values for 2024. Both figures document a rightward shift, showing increasing consumption in constant terms and a slightly greater dispersion.

Table 1 presents the Headcount Poverty Ratios (HCRs) based on the IHDS data using the inflation-adjusted poverty line recommended by the Tendulkar Committee (The Planning Commission 2013). Given the widespread agreement that the poverty line is set too low, we differentiate between the poor (individuals living below the poverty line recommended by the Tendulkar Committee) and the individuals who are near-poor, with monthly per capita consumption above the poverty line but below twice the poverty line. The results document a substantial poverty decline with many of the formerly poor moving up to a lower middle income but vulnerable category and households in this lower-middle-income category becoming non-poor and moving out of the vulnerability zone.

While the IHDS is not the best source of the contemporaneous estimate of poverty, directionally, it offers the same insights as other studies and validates the general conclusion that extreme poverty in India has declined substantially. According to the IHDS findings presented in Table 1, poverty declined significantly between 2004-05 and 2011-12 (from an HCR of 38.6 to 21.2), and it continued to decline between 2011-12 and 2022-24 (from 21.2 to 7.1) despite the challenges posed by the pandemic. The poverty line recommended by the Tendulkar Committee Report was set to ₹447 and ₹579 for rural and urban areas, respectively, but varied among states for 2004-05. These poverty thresholds were subsequently adjusted by The Planning Commission to ₹860 and ₹1000 for the year 2011-12. We have updated these thresholds using state- and sector-specific Consumer Price Indices provided by the Ministry of Statistics and Programme Implementation to calculate the HCRs. We have also highlighted the near-poor households as those located just above the poverty line and having monthly consumption expenditures below that of twice the poverty line.

The poverty figures presented by the IHDS in 2004-05 and 2011-12 are comparable to those estimated using the 61<sup>st</sup> and 68<sup>th</sup> rounds of the NSS data. For the last wave (2022-24), they are comparable for rural areas, estimated at 7.2 by the SBI Research using the fact-sheet for Household Consumption Expenditure Survey (HCES) data (National Sample Survey Office 2024). For urban areas, the IHDS-3 figures are slightly higher, at 6.5, as compared to the HCES data (estimated at 4.6 by the SBI) but they are generally very

**TABLE 1. Head-count Ratios of Poverty Declined Substantially over the Three Waves of the IHDS between 2004-05 and 2022-24**

		2004-2005			2011-2012			2022-24		
		HCR	LCI	UCI	HCR	LCI	UCI	HCR	LCI	UCI
Rural	Poor	42.6	[ 41.6	43.6 ]	24.6	[ 23.7	25.4 ]	7.3	[ 6.9	7.8 ]
	Near-Poor	41.5	[ 40.5	42.4 ]	46.6	[ 45.6	47.5 ]	33.9	[ 33.1	34.8 ]
	Non-Poor	16.0	[ 15.3	16.6 ]	28.9	[ 28.1	29.7 ]	58.7	[ 57.9	59.6 ]
Urban	Poor	27.2	[ 26.2	28.3 ]	13.1	[ 12.4	13.9 ]	6.5	[ 6.0	7.1 ]
	Near-Poor	42.2	[ 40.8	43.6 ]	40.7	[ 39.7	41.7 ]	32.8	[ 31.8	33.8 ]
	Non-Poor	30.5	[ 29.6	31.5 ]	46.2	[ 45.3	47.2 ]	60.7	[ 59.6	61.7 ]
Total	Poor	38.6	[ 37.8	39.4 ]	21.2	[ 20.6	21.8 ]	7.1	[ 6.7	7.5 ]
	Near-Poor	41.7	[ 40.9	42.5 ]	44.8	[ 43.8	45.2 ]	33.6	[ 32.9	34.2 ]
	Non-Poor	19.8	[ 19.2	20.3 ]	34.0	[ 33.7	35.0 ]	59.3	[ 58.7	60.0 ]

Source: Authors' computation based on the IHDS (2004-05, 2011-12, 2022-24).

Note: The poor have been defined using the Tendulkar poverty line and the near-poor have been defined as being above the poverty line but below twice the poverty line. LCI and UCI refer to upper and lower confidence intervals at a 95% level.

similar despite the differences between the IHDS methodology and the HCES methodology, which are presented in Appendix B. Given the small sample size of the IHDS as compared to the HCES (47,465 households for IHDS versus 2,61,746 households for HCES), fewer items included in the IHDS consumption module (52 versus 405), and limitations on sample representation due to a panel design, we recommend that for cross-sectional estimates of poverty, readers should refer to the HCES data, relying on the IHDS to explore the dynamic nature of poverty.

### *1.2. Accidents of Life Are Increasingly More Important*

Even during periods of relative economic stability, when poverty rates move slowly, individual households may experience income and consumption changes as household composition changes, workers retire, and children grow up and find employment. Illness, job loss and natural disasters may influence incomes. However, the practice of measuring poverty based on consumption may dampen the impact of these life-cycle changes and sudden shocks as

households calibrate their expenditures to their long-term incomes.<sup>1</sup> During relatively stable economic conditions, the forces that shape the long-term earnings of individuals, such as their human capital, health, local labor market conditions, labor market discrimination, and accidents of birth associated with caste, religion, inheritance of productive assets, and regional location may dominate economic fortunes of individuals. While both chronic and transient poverty affect household well-being, past research has tended to rely on cross-sectional data and has thereby tended to ignore transitions into and out of poverty. Nonetheless, a few longitudinal studies, described in Table 2, provide us some estimates of poverty transitions since the 1970s.

**TABLE 2. Estimates of Poverty Transitions in the Late 20<sup>th</sup> Century Show Stagnation in Both Chronic and Transient Poverty**

<i>Poverty status</i>	<i>% of Sample Rural Panel Households</i>			
	<i>Gaiha (1968-70)</i>	<i>NCAER (1970-71 to 1981-82)</i>	<i>Bhide and Mehta (1970-71 to 1981-82)</i>	<i>Dhamija and Bhide (1981-82 to 1998-99)</i>
Chronically poor	33	28	25	23
Entry	13	17	13	20
Exit	24	25	23	18
Non-poor	30	30	39	39

Source: Mehta et al. 2011, *India Chronic Poverty Report*. Table 3.3, p. 43.

How has the relative importance of these two aspects of poverty changed over time? Studies from the 1970s through the 1990s, summarized in Table 2, show a relatively large amount of chronic poverty as well as transient poverty during an era of relative economic stagnation with the number of non-poor (using a different poverty threshold) staying relatively stable.

The IHDS surveys cover an era of relatively high economic growth. India saw fairly high rates of economic growth between 2004-05 and 2022-24. Estimates from the Ministry of Statistics and Programme Implementation show that the average growth rate between 2004-05 and 2011-12 was about 6.8 percent while that between 2011-12 and 2023-24 was about 6.1 percent despite the disruption caused by the pandemic. Thus, it is not surprising that the IHDS data show considerable churn in the poverty status of the households and the growing importance of transitory poverty. Figures 3 and 4 summarize the changes in the poverty status of households between 2004-05 and 2011-12, and between 2011-12 and 2022-24, respectively.

1. For one of the earliest investigations linking income and consumption for India, see Bhalla 1979.

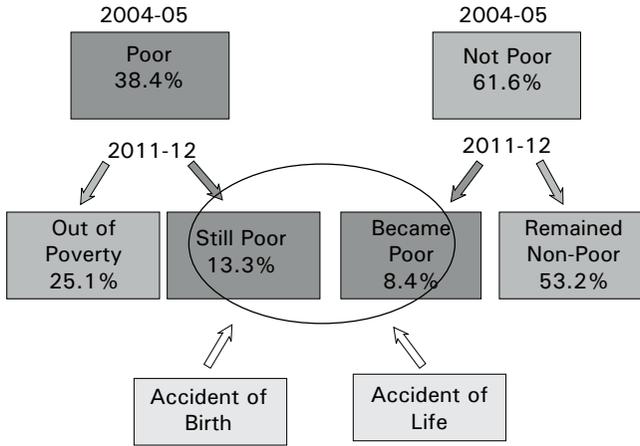
During an era of economic growth, when opportunities increase, the long-term determinants of poverty may decline in significance while accidents of life associated with natural disasters, illness, and death, and changes in occupation-specific opportunities may become more important. Accidents of birth are more likely to affect long-term chronic poverty, whereas accidents of life may have a transitory effect on moving in and out of poverty.

Figure 3 documents the movement in and out of poverty for 38 percent of the households that were poor in 2004-05 and 62 percent of the households that were not poor. By 2011-12, poverty had declined, and 25 percent of the families had moved out of poverty, with 13 percent still mired in poverty. At the same time, of the 62 percent of households that were non-poor in the prior wave, 8 percent had now become poor. These newly poor comprised about 39 percent of all the impoverished households in 2011-12. A similar exercise undertaken with 2022-24 data in Figure 4 shows a similar trend, with 18.4 percent of the households moving out of poverty and 4.4 percent falling back. The change between the two sets of transitions is that the overall poverty level in 2022-24 is substantially lower, and the newly poor form a more significant part of all poor households, at about 60 percent. Most of the households falling into poverty come from the group we have classified as near-poor—between the poverty line and 200 percent of the poverty line.

For the poverty transitions in 2011-12, we have undertaken a detailed analysis of the characteristics of entry into and exit from poverty (Thorat et al. 2017), which documents that this movement out of poverty is greater for historically disadvantaged groups like the Scheduled Castes (SCs). However, these groups retain higher vulnerability to falling back into poverty, suggesting a precarious perch in lower-middle-class status. Other studies using data from IHDS Waves 1 and 2 have tried to examine underlying conditions at Wave 1, such as household size, presence of the elderly, land ownership, and caste/religion that may predict the potential of slipping into poverty in Wave 2 (Bandyopadhyay and Bhattacharya 2022) and found that their ex-ante vulnerability measure is a positive and significant predictor of future poverty but the coefficients are relatively small, reflecting our inability to predict accidents of life ex-ante perfectly. This is in sharp contrast to the observations from studies in the twentieth century (Mehta et al. 2011), which found considerable persistence of chronic poverty among SCs, Scheduled Tribes (STs), land-less households, and large households. It is important to note that STs remain consistently mired in chronic poverty in both the twentieth and twenty-first century studies.

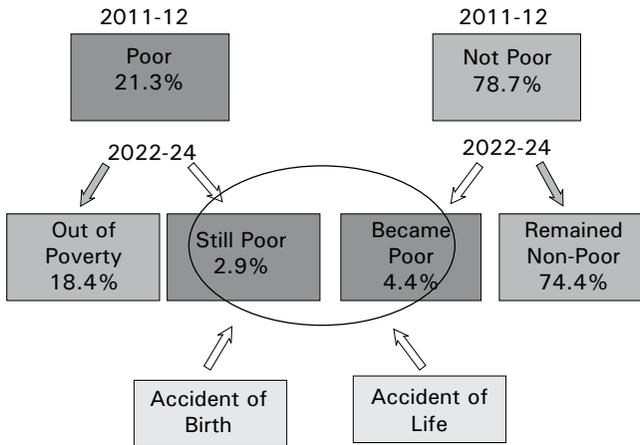
While this study highlights the vulnerability of the near-poor who fall into poverty, as they are neglected in the policy discourse, accidents and disasters also affect the extreme poor and may increase their depth of poverty. However, as we discuss below, strategies for addressing increasing deprivation due to unforeseen emergencies for both groups remain similar.

**FIGURE 3. Poverty Transition between IHDS Waves 1 and 2 Documents Both Chronic and Transient Poverty, While Overall Poverty Declined**



Source: Authors' computation based on the IHDS (2004-05, 2011-12, 2022-24).

**FIGURE 4. As Poverty Further Declined, Transient Poverty Became More Important between IHDS Waves 2 and 3**



Source: Authors' computation based on the IHDS (2004-05, 2011-12, 2022-24).

**1.3. Food Subsidies Have Grown Substantially, Further Reducing Poverty**

India established a Public Distribution System (PDS) in the early periods after Independence when food shortages necessitated large food imports under PL-480 grants from the United States. This program was continued and substantially

expanded with internal resources after the PL-480 grants ended. In its early years, PDS was focused on urban areas and regions with food shortages, but as we will show below, this bias has reversed now. In 1997, the PDS was streamlined by introducing the Targeted Public Distribution System (TPDS), in which households were divided into BPL (Below Poverty Line) and APL (Above Poverty Line) families, with BPL households receiving subsidized grain and APL households receiving grains at an economic cost. Moreover, sugar and kerosene were also distributed through the PDS shops (known as ration shops). PDS also covers several other categories of households at extremely low cost and higher allocation. This includes Antyodaya Anna Yojana (AAY), directed at extremely poor households, and Annapurna Yojana for the elderly poor. The National Food Security Act (NFSA), passed in 2013, expanded the pool of households eligible for subsidized rations to 50 percent of the urban households and 75 percent of the rural households; it also added millets and pulses to the list of items to be covered under NFSA.

During the pandemic, access to food through the PDS was expanded through the Pradhan Mantri Garib Kalyan Anna Yojana (PMGKAY), providing an additional 5 kg of rice or wheat and 1 kg of pulses to eligible individuals at no cost. This was in addition to the regular entitlement of 5 kg of cereals under the NFSA. The APL or Non-Priority households also received an allocation during the pandemic, but this was discontinued thereafter.<sup>2</sup>

The overall estimates of food subsidies in the three rounds of IHDS surveys, along with their implied impact on poverty estimates, are presented in Tables 3 and 4. It is essential to highlight that between IHDS Waves 2 and 3, food subsidies grew. However, sugar and kerosene subsidies were withdrawn from most of the states. Thus, the overall increase in PDS subsidies from a household perspective is moderated, though the access to foodgrains has widened substantially.

While calculating the PDS benefits to the households, it is important to recognize that PDS has existed for a long time, and households in all three waves of IHDS benefited from it. However, in contrast to the first two waves, which recorded the use of PDS for foodgrains as well as sugar and kerosene, the majority of the PDS usage in the third wave relates to foodgrains only. For example, among the 78 percent of the households, which made some purchase from the PDS shop in 2011-12, only 54 percent of them purchased grain; in contrast, in 2022-24 all of the purchases were for food items. We calculate the value of the PDS subsidy by subtracting the amount spent at ration shops for rice, wheat, other cereals, kerosene, and sugar from the market price. Since pulses are only now being distributed under PDS, data on the PDS purchase of

---

2. However, since some of our interviews took place in 2022 before discontinuation of the APL allocation and some states like Tamil Nadu are far more generous in their eligibility criteria, some of the IHDS non-BPL households also report PDS grain allocation.

pulses is only available for Wave 3. Table 3 shows basic statistics on the type of PDS purchase and the imputed subsidy value.

**TABLE 3. PDS Usage and Imputed Value of Subsidies Increased over Time and Moved to Cover Foodgrains Instead of Kerosene and Sugar**

	<i>Rural</i>	<i>Urban</i>	<i>Total</i>
<i>2004-05</i>			
Any PDS Purchase	78%	47%	69%
Any grain purchased vis PDS	35%	22%	31%
Imputed PDS subsidy per person per month (in 2024 prices)	48	34	44
<i>2011-12</i>			
Any PDS Purchase	84%	62%	78%
Any grain purchased vis PDS	57%	45%	54%
Imputed PDS subsidy per person per month (in 2024 prices)	108	85	101
<i>2022-23</i>			
Any PDS Purchase	77%	65%	73%
Any grain purchased via PDS	77%	65%	73%
Imputed PDS subsidy per person per month (in 2024 prices)	139	122	134

Source: Authors' computation based on the IHDS (2004-05, 2011-12, 2022-24).

**TABLE 4. Adding Imputed Value of Subsidy to Consumption Reduces Poverty HCR Substantially**

		<i>2004-05</i>			<i>2011-12</i>			<i>2022-24</i>		
		<i>HCR</i>	<i>LCI</i>	<i>UCI</i>	<i>HCR</i>	<i>LCI</i>	<i>UCI</i>	<i>HCR</i>	<i>LCI</i>	<i>UCI</i>
<i>Without PDS Subsidy</i>										
Rural	Poor	42.6	[ 41.6	43.6 ]	24.6	[ 23.7	25.4 ]	7.3	[ 6.9	7.8 ]
Urban	Poor	27.2	[ 26.2	28.3 ]	13.1	[ 12.4	13.9 ]	6.5	[ 6.0	7.1 ]
Total	Poor	38.6	[ 37.8	39.4 ]	21.2	[ 20.6	21.8 ]	7.1	[ 6.7	7.5 ]
<i>Including Imputed Value of PDS Subsidy</i>										
Rural	Poor	40.9	[ 39.9	41.9 ]	21.3	[ 20.5	22.1 ]	5.9	[ 5.5	6.3 ]
Urban	Poor	26.2	[ 25.2	27.2 ]	11.5	[ 10.8	12.2 ]	5.5	[ 5.0	6.0 ]
Total	Poor	37.2	[ 36.4	38.0 ]	18.4	[ 17.8	19.0 ]	5.7	[ 5.4	6.1 ]

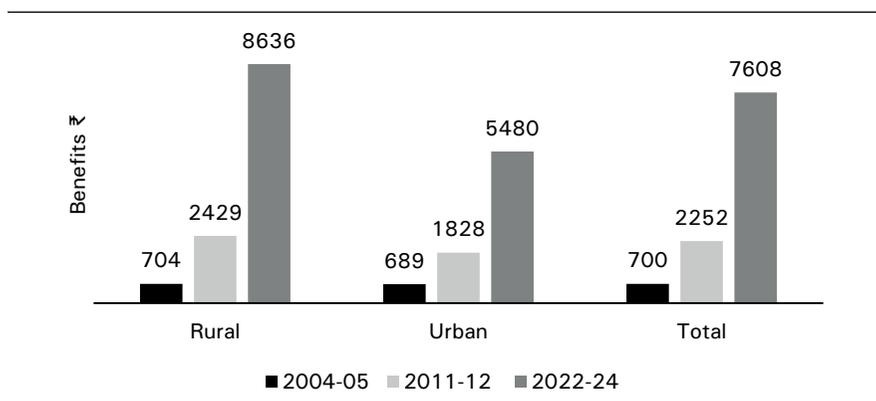
Source: Authors' computation based on the IHDS (2004-05, 2011-12, 2022-24).

In each of the three waves, adding this imputed value to household consumption reduces the proportion of households that are poor. However, this effect is largest for the third wave in proportional terms, suggesting that expanding food subsidies while curtailing sugar and kerosene subsidies led to a more pro-poor outcome. Other research undertaken by the NCAER National Data Innovation Centre immediately before and after the pandemic also suggests that enhanced access to PDS rations kept food consumption stable during the pandemic even as household incomes declined (Choudhuri and Desai 2025).

#### 1.4. Government Benefits Have Expanded Substantially since 2012

Even between 2004-05 and 2011-12, the share of government benefits in total income had increased from 0.7 percent to 2 percent and played a small but important role in the poverty decline during that period (Balcázar et al. 2016). Since then, several new programs have been introduced, and the benefits given through existing programs have increased, and we anticipate that future analyses with these data will show an even larger role of subsidies.

**FIGURE 5. Government Benefits Increased over Time, with a Sharp Jump between Waves 2 and 3**



Source: Authors' computation based on the IHDS (2004-05, 2011-12, 2022-24).

Note: All figures in 2024 are at constant prices.

Subsidies include Old Age Pension Programs and Widow Pension Programs for the poor, additionally PM-KISAN provides cash benefits to farmers. Many states have introduced their own version of these programs, such as Rythu Bandhu in Telangana, and Kalia in Odisha. While these are the major programs, there are many other benefit schemes, including maternity schemes, girl child welfare schemes, and scholarship programs.

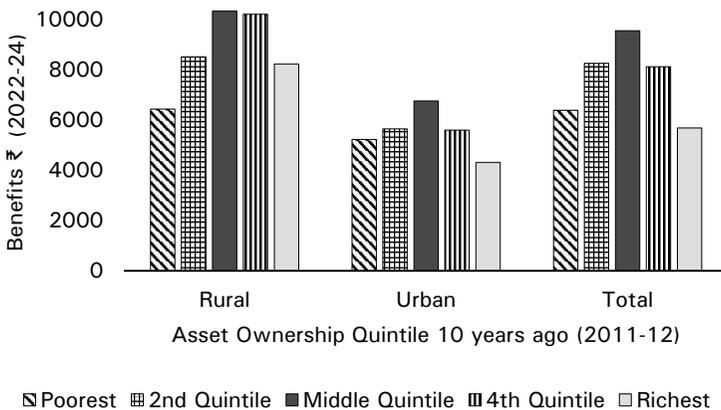
In each of the waves of IHDS, an effort was made to capture the benefits that households receive from major social programs. As Figure 5 shows, the total

benefits received from these programs have increased substantially in 2024 constant prices.

The number of welfare schemes in any district is large, and survey respondents often cannot distinguish between Centrally-sponsored and state schemes. However, two schemes predominate: PM-KISAN, which provides cash benefits to farmers (and its different state-level formulations, such as Kalia in Odisha), and the old age pension scheme. Consequently, as Figure 5 documents, the distribution of these benefits is somewhat skewed towards rural areas.

Exploring the pro-poor nature of benefits, or lack thereof, is hampered by the endogeneity of consumption expenditure to increased income through benefits, particularly since the value of benefits is substantial in 2022-24. Hence, Figure 6 shows the extent of benefits received in Wave 3 by households at different levels in the ownership of assets, a slow-moving measure of economic well-being. Our past research (Barik *et al.* 2018), as well as work by others, suggests that ownership of consumer durables and housing conditions act as a long-term marker of household economic status (Filmer and Pritchett 2001), while consumption expenditure is more short-term in nature. Nonetheless, to avoid potential endogeneity, we index household economic status by data collected over ten years ago in 2011-12. The results suggest that benefits are reasonably evenly distributed across households at different asset ownership levels in rural areas, with a concentration among households located in the third and fourth quintiles in the prior wave. In contrast, in urban areas, households in the middle receive slightly more benefits than those in the upper asset quintiles, but on the whole, the benefits receipt is evenly spread across all income groups. How these benefits shape the well-being of households in the current period and influence their consumption behavior is an area that deserves future attention.

**FIGURE 6. Benefits in Rural Areas Seem to be Skewed towards Upper Income Groups (in 2024 Constant Prices)**



### *1.5. Identification of Poor through Proxy-means Testing Is Imperfect*

The prior section suggests that though many benefits were meant to target the poor, this targeting is imperfect. It is important to locate the targeting process in a historical context to understand the processes leading to this weak correlation.

While consumption expenditure surveys provide estimates of poverty in the country, they do not tell us who is poor when it comes to delivering social safety nets. The crucial link between poverty estimates and safety nets is provided by designating households as being poor, or in the words of Indian officialdom, being “Below Poverty Line” or BPL households.<sup>3</sup> The Ministry of Rural Development made this identification through nationwide censuses in 1992, 1997, 2002, and 2011 (Saxena 2015). The latest exercise in 2011 was carried out through the Socio-Economic Caste Census (SECC) conducted by the Ministry of Rural Development in rural areas and the Ministry of Housing and Urban Poverty Alleviation in urban areas. Identification of households as being deprived was based on criteria for automatic exclusion (e.g., having an automobile or government job), automatic inclusion (e.g., primitive tribal groups or people living on alms), and a graded score based on occupation, living conditions, caste/tribe, and family composition. These criteria were selected for use in rural areas based on the recommendation of a working group headed by Dr N.C. Saxena for rural areas (Ministry of Rural Development 2009) and Professor Hashim for urban areas (The Planning Commission 2012). Local government authorities make a provision for the validation of the target households. While this method produces a ranked list, the cut-off of households deemed eligible is determined by the proportion of households deemed poor in a State based on the 2011-12 National Sample Survey.

Proxy-means testing for social benefits when verifiable income is not available, has a long history (Akerlof 1978; Banerjee et al. 2024). However, the validity of specific criteria used in identifying deprived households as a part of issuing BPL cards has come under considerable criticism (Alkire and Seth 2013; Dreze and Khera 2010; Sharan 2011), even from one of the originators of the identification schema (Saxena 2015). These reviews found that many poor households were excluded from the BPL list, while many non-poor households were included. With some innovation, it may be possible to improve the identification of the poor using carefully crafted inclusion and exclusion criteria (e.g., see Asri et al. 2022), but little attention has been paid to how these targeting strategies may fare in a rapidly changing economy. As we have shown earlier, the movement of households in and out of poverty becomes increasingly important as chronic poverty declines, but the cost and logistic difficulties in undertaking major initiatives like SECC imply that these exercises will be infrequent and may not be effective in an era of rapid change.

---

3. In recent years, the terminology has changed to Priority Households as the segment covered has grown to expand a larger share of the population, but BPL remains popular in common parlance and we continue to use it in this paper.

Using data from different waves of IHDS, we examine the correlation between possession of BPL cards and per capita consumption expenditure. Table 5 shows ownership of BPL/AAV/Annapurna card for households in different economic strata. The results highlight that while the poor are more likely to hold a BPL card, we find both types of households at each expenditure level. While the distributions have progressively converged (results not shown), exclusion and inclusion errors continue to operate.

**TABLE 5. Access to BPL/AAV/Annapurna Card Grew over Time, but Errors of Exclusion Persist**

		<i>2004-05</i>	<i>2011-12</i>	<i>2022-24</i>
Rural	Poor	50%	61%	71%
	Near-Poor	40%	49%	69%
	Non-Poor	30%	37%	62%
Urban	Poor	35%	49%	62%
	Near-Poor	22%	36%	56%
	Non-Poor	12%	18%	46%
Total	Poor	47%	59%	69%
	Near-Poor	35%	45%	65%
	Non-Poor	23%	29%	57%
All India	All	36%	41%	60%

Source: Authors' computation based on the IHDS (2004-05, 2011-12, 2022-24).

At the time of IHDS Waves 1 and 2, the BPL cards would have been issued using the 2002 survey, but by IHDS Wave 3, the SECC survey of 2011 was used for BPL designation. The total number of households eligible for BPL cards expanded slightly between IHDS-1 and IHDS-2 but expanded substantially by the time IHDS-3 was conducted. This expansion was due to implementation of the National Food Security Act (NFSA), which mandated that 75 percent of rural and 50 percent of urban households should be covered for highly subsidized food distribution. This massive expansion should have addressed the exclusion errors, and all poor households should have received BPL (or PHH-Priority Household) cards. In contrast, inclusion errors would have increased due to the program's expansion, an acceptable form of error under NFSA.

This hope has been only partially fulfilled. As Table 5 shows, while BPL cards became more common, about 31 percent of the poor do not have access to them, nor do 35 percent of the households above the poverty line, which are still in a zone that they can slide into poverty. Ironically, between Waves 2 and

3, the access of poor households to BPL cards increased from 59 percent to 69 percent, but the expansion for non-poor households was far greater, from 29 percent to 57 percent. Research shows that elite capture and social networks play an important role in who can get a BPL card (Besley et al. 2005; Panda 2015).

However, focusing on elite capture may overstate the issue. A part of the exclusion of the poor may be due to the original design for BPL cards being linked to residential locations, which led to the exclusion of migrants. The One Nation, One Ration card (ONOR) initiative may help enhance the portability of BPL cards, reducing vulnerability among poor urban migrant workers. A larger problem may be that this inconsistency is due to poverty decline, with many poor households (which correctly held BPL cards when the cards were issued) having now moved up to the non-poor category but retaining these cards due to infrequent identification of the poor. Conversely, households that were not poor during the SECC survey may have fallen into poverty or the non-poor but vulnerable category, but their initial designation could not be changed without new assessment and they were hence excluded from gaining BPL cards.

This imprecision in the identification of the poor has concrete consequences. Eligibility for many benefits, particularly access to government-provided health insurance under the Ayushman Bharat Yojana, is tied to the household's designation as being poor though working in selected occupations may also confer some of these benefits. We find that households in different consumption categories, with and without BPL cards, differ substantially in their access to public insurance. Whether they are poor, vulnerable, or rich, among households with a BPL card, about 40-43 percent have access to government insurance including both Central and State schemes, but without a BPL card, this number drops to about 23-25 percent. While private insurance access is also rising, it does not fill the hole for the poor households without a BPL card.

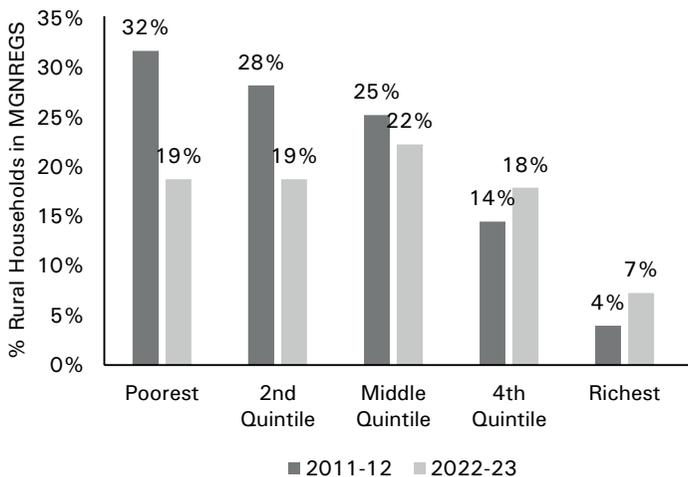
Universalizing benefits or expanding the number of eligible recipients may be seen as one way of addressing imperfect targeting. However, as discussed above, even the tremendous expansion of eligible households under NFSA has yet to eliminate the exclusion of some poor households.

Universalization of employment guarantee programs offers a different perspective on this issue. The Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) of 2005 adopted a rights-based approach to guarantee 100 days of manual labor for any household that asked for it. Tremendous safeguards were put in place to ensure that the financial allocation would not be siphoned off into administrative expenses or the procurement of materials. This involved mandating that 60 percent of all funds be allocated to labor costs, work undertaken through the program should not replace other regular employment, and households (and states and districts) should not face any eligibility restrictions in their ability to obtain work under the MGNREGA program.

The program relied on natural targeting, assuming that households with other sources of income would not want to undertake manual work in MGNREGA, creating a natural self-targeting mechanism. While early evaluations of this program were highly positive, noting various benefits, including a decline in debt and improvement in household welfare (Desai *et al.* 2015), some of its fissures in reaching the most vulnerable have begun to emerge in recent years, as Figure 7 shows.

The data from IHDS Waves 2 and 3 presented in Figure 7 are not strictly comparable and should not be used to compare the proportion of households that worked in the Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS) during the two waves. However, we can examine the existence of this natural targeting mechanism by looking at work in the program for different social classes defined by asset ownership within each wave. The data suggest that the natural targeting aspect of MGNREGS has declined over time at an all-India level. While in 2011-12, households in the bottom three quintiles were most likely to be employed in MGNREGS, by 2022-24, employment in the third and fourth quintiles (defined by asset ownership in the prior wave) has outpaced employment in the bottom 40 percent.

**FIGURE 7. Self-targeting Feature of MGNREGS Has Been Progressively Diluted with Middle-Income Households More Likely to Work than the Poorest**



Source: Authors' computation based on the IHDS (2004-05, 2011-12, 2022-24).

A deeper analysis in Table 6 shows that this decline is mainly due to differential access to MGNREGS work between states, with differential income growth between the southern states and the northern plains creating the unanticipated relationship documented in Figure 7.

**TABLE 6. Regional Differences in Economic Status and Implementation Dilute the Self-Targeting Nature of MGNREGS**

<i>Asset Quintile</i>	<i>Asset Quintile Distribution</i>		<i>NREGS Employment</i>	
	<i>Northern Plains</i>	<i>Southern States</i>	<i>Northern Plains</i>	<i>Southern States</i>
Poorest	39%	8%	17%	37%
2 <sup>nd</sup> Quintile	25%	14%	13%	41%
Middle Quintile	18%	32%	10%	42%
4 <sup>th</sup> Quintile	11%	28%	5%	36%
Richest	8%	19%	2%	13%
Total	100%	100%	13%	37%

Source: Authors' computation based on the IHDS (2004-05, 2011-12, 2022-24).

Note: \* Only data for IHDS Wave 3 (2022-24) are presented for parsimony.

The IHDS data are not representative below the all-India level but combining the five southern states (Karnataka, Tamil Nadu, Kerala, Andhra Pradesh, and Telangana) on the one hand, and the North-Central states (Madhya Pradesh, Uttar Pradesh, Bihar, Chhattisgarh, and Jharkhand) on the other, offers interesting insights. Within each region, the program continues to be self-targeting, with higher-class households less likely to obtain work in MGNREGS than poorer households. However, overall, the program usage in the southern states is higher than that in the northern states, and more households in the southern states are likely to be in the upper asset quintiles, thus diluting the self-targeting at an all-India level.

The conundrum of richer states accessing MGNREGS more than the poor states is well recognized in policy discourse (Chatterji 2022), but its implications for households are less clearly recognized. A clearer understanding of program structure (mandated by the MGNREGA) that may reduce the effectiveness of this highly popular and important program to be pro-poor deserves greater attention.

## 2. Key Challenges

The sub-sections in the preceding section have tried to provide empirical contours to declining poverty and changes in social safety nets over the past two decades, mainly using data from the three waves of IHDS. As we think about implications of these trends for public policies, it is important to keep in mind two observations that emerge from the data presented above, which are delineated below.

### *2.1. Dealing with Uncertainty*

The uncertainty of predicting the future based on current conditions has increased, as evidenced by the increasing importance of events resulting in non-poor households falling into poverty. Life events such as death, illness, and job losses combined with external disasters like drought and pandemics, cannot be predicted. As long as chronic hard-core poverty continued to dominate the fortunes of Indian households, safety nets based on the designation of long-term poverty status continued to serve their purpose by covering most people in need. However, as chronic poverty declines, it is important to develop safety nets that take these unforeseen events into account, while continuing to protect people mired in hard-core poverty.

### *2.2. Addressing Implementation Difficulties*

Consistent with the observations of many other studies (The World Bank 2011), we have highlighted implementation challenges in several areas. The list of studies documenting elite capture and leakages in various safety net programs is long. It is not our intention to make recommendations about reducing elite capture but rather to suggest that it may be time to accept that under conditions of scarcity and social inequality, ensuring failsafe mechanisms to limit beneficiaries to a limited pool may be challenging. Moreover, even the best-designed programs, such as the MGNREGS, may fail to serve the poorest.

## **3. Policy Implications: Principles for Redesigning Safety Nets**

With these twin challenges of uncertainty and implementation difficulties, how should we think about redesigning social safety nets? We propose three principles for thinking about safety nets, as described in the following sections.

### *3.1. Universal Programs for a Limited Set of Basic Safety Nets*

Holding the resources invested in any program constant, targeting programs to the poor implies much greater levels of benefits to the recipients than if the benefits were made universally available (Hanna and Olken 2018). Nonetheless, societies provide universal services in many areas, including basic education, healthcare, and sewage collection, which have spillover benefits for society. This is particularly crucial for in-kind provision of goods and services that require institutional structures for distribution. As we saw with the pandemic, a network of fair-price shops and existing distribution mechanisms ensured that the government could ramp up food allocation and avoid mass starvation. With sharp price rises during the lockdown and transportation difficulties, simply providing cash may not have been effective.

‘Universally available’ does not mean ‘universally used’. Mid-day meals provide an interesting example. While school mid-day meals are universally available to primary school children in government schools, with the increasing privatization of education, they have been self-targeting in that most middle-class children do not avail of them.

Identifying and keeping this core set limited and fully funded is the challenge. Massive expansion of the number of programs without concomitant resource increase would render this approach futile.

### *3.2. Risk Insurance*

With the rising recognition of accidental events in pushing households into poverty, risk insurance must form a part of a comprehensive package of safety nets. The challenge with these insurance programs is that without careful design and regulatory oversight, perverse incentives can render them ineffective. Evaluations of the Rashtriya Swasthya Bima Yojana (RSBY) found that since it only covered hospital costs, there was an incentive on the part of both patients and providers to admit patients to the hospital even for ailments that could be treated in outpatient clinics (Palacios et al. 2011).

In our fieldwork, we have observed an emergence of for-profit players setting up hospitals to cater to the Ayushman Bharat beneficiaries explicitly. Some of this inefficiency may be impossible to eliminate, but a careful review of the insurance sector, particularly the health insurance sector, is needed to ensure that we do not set in motion inflation of medical costs that will affect all patients, regardless of their insurance access.

### *3.3. Building in Flexibility and Institutional Framework*

During the pandemic, governments worldwide struggled with the means of getting cash in the hands of consumers. The US government sent \$600 per eligible adult and child to households as income support during the pandemic. An Urban Institute study (Holtzblatt and Karpman 2020) found that though the funds were sent out by mid-April in 2020, more than a month later, only 70 percent had received them. This proportion was particularly low among the poor who most needed these funds. The reason for non-receipt was that money was sent first to people who filed income tax returns and had linked their bank accounts to receive refunds, leaving out non-filers and people who do not receive refunds. The Indian experience of migrants being left out of extra ration distribution is another instance where the absence of a transfer mechanism excluded some of the most vulnerable. In contrast, it was easy to send money to the recipients of PM-KISAN since they were already in the system.

These examples of transferring cash where one has bank linkages are like looking for keys under the lamp-post. When a disaster strikes whole communities, be it drought, earthquake, or the pandemic, normal channels of

help from family and friends are unavailable since everyone is facing the same problem. This is precisely when the government needs to step in but cannot do so with some sort of social registry to identify potential recipients. We already have extensive Aadhaar and bank account linkages. Ensuring that these registries contain extensive geographic location codes and regularly updating them would make it possible to provide timely disaster assistance.

Flexibility remains the key to ensuring effective program design that can respond to changing conditions. Rights-based approaches that institute programs through legislative acts sometimes create such inflexible systems that they fail the purposes for which they were designed. MGNREGS offers an interesting illustration. Since the program's inception, it has never been fully funded, leading to rationing of work (Dutta *et al.* 2014; Pankaj 2023). This has led to several unexpected consequences, most importantly, greater access to MGNREGA employment in the states that need it less. The southern states have the financial resources to implement work programs from their own resources and wait for reimbursement, increasing the work allocation in the South while the North-Central states languish. Modifying the program rules is against the legislation, creating a conundrum that dilutes the self-targeting structure, as shown in Table 6.

This example has important lessons. Instead of legislating programs as rights, it may be useful to allow flexibility in program structures to allow for a response to long-term social changes. Instituting programs is easy but changing them is difficult. Hence, it might make sense to put programs in place for a finite duration where they can be re-evaluated and restructured, if needed, before continuation. This would be relevant for both programs that are struggling as well as those that are successful, but the goalpost needs to be expanded. Maternity benefit schemes provide an interesting example. Such programs have been extremely successful. For example, maternity benefit schemes have achieved their objective of encouraging hospital delivery, even among families that do not receive these benefits. As data from the National Family Health Survey (NFHS) show, hospital delivery increased from 39 percent to 89 percent between 2005-06 and 2019-21. However, antenatal care has failed to keep pace, increasing from 9 percent to 26 percent over the same period (Barik and Desai 2024). The next avatar of the program can be restructured to move the goalpost to include antenatal care and hospital delivery through clearer milestones for incentives. Setting a sunset clause when programs can be extended, restructured, or eliminated allows for flexibility and reduces political costs. The extension of free foodgrains under PMGKAY in 2023 offers a valuable example of this approach, which should be used for all programs.

While we have emphasized the importance of transient poverty in this paper, we would be remiss if we did not note a small but significant segment of the population that remains mired in chronic poverty. Members of the STs living outside the North-eastern states are most likely to be poor and stay poor.

However, some strategies mentioned above can easily be tailored to meet their unique needs. For example, most of the ST households are located in small pockets of the country. Geographically-based cash distribution, discussed above, could be useful in addressing this hard-core poverty.

In sum, economic growth and poverty decline create a dynamic climate that requires nimble social protection programs. Traditional strategies designed to address chronic poverty in a large segment of society may be less effective as accidents of birth become less important than accidents of life. Ensuring that social protection systems keep up with the pace of social transformation will be a key challenge facing India as it strives towards achieving equitable development.

## Appendix A: Overview of the India Human Development Survey

India Human Development Surveys, Wave 1 (2004-05), Wave 2 (2011-12), and Wave 3 (2022-24) are part of a collaborative research program between researchers from the National Council of Applied Economic Research (NCAER) and the University of Maryland. The IHDS is a multi-topic survey designed to examine changes in livelihoods and life-styles of Indian households in an era of rapid social transformation. The IHDS research program is governed under guidance from an advisory panel headed by Dr Pronab Sen, former Chairman, National Statistical Commission, and consists of representatives from several ministries as well as researchers from universities and civil society institutions.

IHDS data for Waves 1 and 2 are available in public domain for cost-free download. They have been downloaded by over 11,000 users worldwide and have resulted in over 1200 papers and dissertations.

The strengths of the IHDS include: (1) A multipurpose multi-topic design including questions on income, consumption, health, education, employment, social networks, and gender relations, among others; (2) Many innovative features, including administration of short reading, writing, and arithmetic tests to children aged 8-11 years, questions about symbolic aspects of gender (e.g., *pardah*, men and women eating together in the household), information on social networks; and (3) Information on village infrastructure and facility survey for two schools/medical facilities in each sampling unit.

The IHDS has a unique niche, even as a cross-sectional survey. However, its longitudinal dimension makes it especially important for studying a society undergoing a rapid transition. With surveys of the same households in 2004-05, 2011-12, and 2022-24, IHDS is the first panel study of urban and rural households in India that covers all age ranges. Substantial field efforts were made in IHDS-I to secure contact information (telephones, neighbors' names, family contacts) so that the IHDS-I households could be easily relocated, even in the event of a move. While many international surveys today are part of panel designs, in India the most widely used surveys, the NSS and the NFHS, remain repeated cross-sections. Therefore, the IHDS plays an important role in providing panel data for one of the world's most important regions. Panel designs are favored for good reasons, despite their added cost and the difficulties of re-contacting a shifting and often busy population.

The advantages of panel data include:

- Estimates of entry, exit, and duration in such vital phenomena as poverty, education, and migration.
- Research on path-dependent changes such as the impact of childhood health on adult outcomes, the interaction between population growth and environment, or household response to rising incomes in switching from biofuels to clean fuels.
- Application of better statistical models for controlling unobserved heterogeneity enhanced the possibility of computing fixed-effects models that account for unmeasured, time-invariant characteristics of the household or individual (e.g., over-time growth in academic skills when comparing public and private schools).
- Better analysis of the role of exogenous shocks between fielding various rounds of the survey.

*Sample Attrition:*

In 2011-12, IHDS-II was able to re-interview 83 percent of the original 41,554 households interviewed in IHDS-I (2004-05). A fresh sample of 2,134 urban households was added to the original sample to keep the sample cross-sectionally representative. Since IHDS-II interviewed all household splits between 2004-05 and 2011-12 as long as the respondents resided in the same locality, the sample for IHDS-II included 42,152 households. For IHDS-3, a fresh sample of 7,321 households was added, covering two new households in each rural PSU and five new households in each urban PSU.

The fieldwork for IHDS-3 was completed only in June 2024, so a full analysis of data quality has not yet been undertaken. However, since attrition remains a major challenge in any panel survey, we present the basic characteristics of the households we lost during the current round from the prior wave.

The sampling weights (multipliers) used in this analysis are adjusted from the weights in IHDS, Wave 2, and take into account the expected urban and rural population growth predicted by the Ministry of Health and Family Welfare. However, these weights have yet to be adjusted for attrition.

**TABLE A.1. Number of Households Included in Each of the Three Waves of IHDS**

<i>Interview Status</i>	<i>Wave 1</i>	<i>Wave 2</i>	<i>Wave 3</i>
	<i>2004-05</i>	<i>2011-12</i>	<i>2022-24</i>
2005 Only	5,504		
2012 Only		1,077	
2022 Only			7,321
2005 and 2012, not 2022	7,068	7,343	
2005 and 2022	1,407		1,644
2012 and 2022		1,057	1,227
All 3 Waves (*)	27,575	32,675	37,273
Total Sample	41,554	42,152	47,465

Source: Authors' computation based on the IHDS (2004-05, 2011-12, 2022-24).

Note: \* Due to household splits, number of households increases over time.

**TABLE A.2. Characteristics of the Household That Were Not Re-interviewed between Waves 1 and 2, and 2 and 3**

<i>Characteristics at Prior Wave</i>	<i>Between 2004-05 and 2011-12</i>	<i>Between 2011-12 and 2022-24</i>
<i>Residence</i>		
Rural	10%	12%
Urban residence (2011 Census)	28%	37%
<i>Owns or Cultivates Farmland</i>		
Does not farm	23%	27%
Farms	8%	11%
<i>Consumption Quintile</i>		
Lowest	15%	17%
2 <sup>nd</sup>	14%	13%
Middle	16%	16%
4 <sup>th</sup>	17%	22%
Richest	20%	29%
<i>Asset Quintile</i>		
Lowest	11%	12%
2 <sup>nd</sup>	12%	11%
Middle	14%	15%
4 <sup>th</sup>	18%	23%
Richest	25%	37%
<i>Social Group</i>		
Forward Caste	21%	26%
OBC	15%	19%
SC	13%	15%
ST	15%	13%
Muslim	19%	21%
Christian, Jain, Sikh	21%	35%
<i>Highest Adult Education in Household</i>		
None	14%	16%
1-4	13%	15%
Completed Primary	14%	14%
6-9	14%	15%
Secondary (10 and 11)	17%	20%
Higher Secondary, Some College	18%	21%
Graduate	25%	34%

contd...

...contd...

<i>Family Size Categories</i>		
1	43%	46%
2-3	25%	25%
4-5	18%	19%
6+	9%	14%
<i>Total</i>	17%	20%

Source: Authors' computation based on the IHDS (2004-05, 2011-12, 2022-24).

Note: \* About 20 percent of the households lost between Waves 1 and 2 were recovered in Wave 3, but are not included in this table.

**TABLE A.3. Characteristics of IHDS Sample at Each of the Three Waves**

<i>Key Characteristics</i>	<i>Unweighted Distribution</i>			<i>Weighted Distribution</i>		
	<i>IHDS-1</i>	<i>IHDS-2</i>	<i>IHDS-3</i>	<i>IHDS-1</i>	<i>IHDS-2</i>	<i>IHDS-3</i>
<i>Residence</i>						
Rural	64.94	68.23	69.86	71.66	70.5	67.44
Urban (2011 Census)	35.06	31.77	30.14	28.34	29.5	32.56
<i>Owns or Cultivates Farmland</i>						
Does Not Farm	58.1	55.4	53.5	55.28	55.48	55.2
Farms	41.9	44.6	46.5	44.72	44.52	44.8
<i>Consumption Quintile</i>						
Lowest	17.65	17.12	19.17	20	20	20
2 <sup>nd</sup>	17.92	18.78	19.86	20	20	20
Middle	19.49	19.91	19.89	20	20	20
4 <sup>th</sup>	21.05	21.45	20.39	20	20	20.01
Richest	23.9	22.73	20.68	20	20	19.99
<i>Asset Quintile</i>						
Lowest	21.84	18.84	20.56	26.6	23.04	22.41
2 <sup>nd</sup>	16.7	18.03	21.64	18.5	19.02	22.57
Middle	15.72	20.69	22.3	16.17	20.27	21.71
4 <sup>th</sup>	22.63	21.52	14.74	20.28	19.98	14.46
Richest	23.12	20.91	20.76	18.46	17.68	18.84

contd...

...contd...

---

<i>Social Group</i>						
Forward Caste	23.01	21.87	20.01	20.54	20.38	19.03
OBC	33.81	33.91	32.65	35.64	35.75	35.51
SC	20.05	21.22	22.08	21.96	22.08	22.63
ST	8.28	8.65	9.83	7.83	8.29	9.18
Muslim	11.39	11.49	12.78	11.3	11.34	11.65
Christian, Jain, Sikh	3.47	2.86	2.65	2.72	2.17	2.01
<i>Highest Adult Education in Household</i>						
None	20.74	17	11.71	23.35	19.42	12.41
1-4	7.46	5.98	4.77	8.27	6.28	5.11
Completed Primary	7.07	7.21	5.27	7.51	7.46	5.45
6-9	24.15	24.63	21.58	24.24	24.36	21.33
Secondary (10 and 11)	14.86	14.48	13.88	13.6	13.67	13.44
Higher Secondary, Some College	10.48	13.43	17.66	9.57	12.34	16.82
Graduate	15.24	17.27	25.13	13.47	16.48	25.44
<i>Family Size Categories</i>						
1	1.93	2.89	3.89	2.06	3.23	4.23
2-3	20.32	24.4	29.6	20.81	25.69	30.16
4-5	41.48	41.34	41.23	40.7	41.21	40.96
6+	36.27	31.37	25.27	36.43	29.87	24.66
Sample Size	41,554	42,152	47,465	41,554	42,152	47,465

---

Source: Authors' computation based on the IHDS (2004-05, 2011-12, 2022-24).

## Appendix B: Measuring Consumption Expenditure: IHDS and NSS

<i>India Human Development Survey (IHDS)</i>	<i>National Sample Survey (NSS)</i>
<p><i>Reference Period</i> Mixed Recall Period (MRP)</p> <ul style="list-style-type: none"> <li>- Food items 30 days</li> <li>- Consumables 30 days</li> <li>- Durables and major expenditures 365 days</li> </ul>	<p><i>Reference Period</i> Modified Mixed Recall Period (MMRP)</p> <ul style="list-style-type: none"> <li>- Some food items 7 days</li> <li>- Cereals and other foods 30 days</li> <li>- Consumables 30 days</li> <li>- Durables and major expenditures 365 days</li> </ul> <p>In earlier surveys NSS used MRP but now switched to MMRP.</p>
<p><i>Consumption Items Included</i></p> <ul style="list-style-type: none"> <li>- 53 items combining many items (e.g., salt and spices) under a single heading</li> <li>- Data on PDS as a source collected, but not other items</li> </ul>	<p><i>Consumption Items Included</i></p> <ul style="list-style-type: none"> <li>- Detailed item list</li> <li>- Source information collected</li> </ul>
<p><i>Number of Visits</i> Single visit, though the interviewer may pause the interview and may return within the next day or so to accommodate respondent time constraints.</p>	<p><i>Number of Visits</i> In the latest round, data collected over three visits, spaced about a month apart. Overall consumption may be influenced by short-term adjustments made in response to sudden expenditures, introducing measurement error.</p>
<p><i>Household Size</i> 4.5 Rural 4.3 Urban</p> <p>Due to detailed household member follow-up, better recording of household size. But may also lead to slight over-estimation as some of the non-resident members may get included.</p>	<p><i>Household Size (calculated from unweighted numbers in Appendix Table A.2)</i> 4.5 Rural 3.8 Urban</p> <p>NSS under-estimation of urban household size is well recognized. Compare to the average urban household size of 4.2 recorded by NFHS-5.</p>
<p><i>Comparability over Time</i> No change in questionnaire, reference period. Designed for comparability across three waves.</p>	<p><i>Comparability over Time</i> Substantial design changes over time in question wording, reference period and number of visits.</p>
<p><i>Sample Representativeness</i> Longitudinal data affected by attrition of panel households. Addition of households from the same block/village to refresh the sample does not make up for the fixed panel of PSU. PSU selection done in Wave 1 excludes some of the peri-urban areas that have grown recently</p>	<p><i>Sample Representativeness</i> Far more representative sample due to inclusion of newly growing areas and larger sample size.</p>
<p><i>Fruitful Use</i> Understand changes in household living conditions over time, link to other life events and access to diverse public programs such as MGNREGA and AAY</p>	<p><i>Fruitful Use</i> Obtaining the current estimate of poverty levels, access to certain types of welfare benefits. State-level estimates.</p>

## References

- Akerlof, G. 1978. "The Economics of 'Tagging' as Applied to the Optimal Income Tax, Welfare Programs, and Manpower Planning." *American Economic Review*, 68(1): 8-19.
- Alkire, S. and S. Seth. 2013. "Identifying BPL Households: A Comparison of Methods." *Economic and Political Weekly*, 48(2): 49-57.
- Asri, V., K. Michaelowa, S. Panda, and S.B. Paul. 2022. "The Pursuit of Simplicity: Can Simplifying Eligibility Criteria Improve Social Pension Targeting?", *Journal of Economic Behavior & Organization*, 200: 820-846.
- Balcázar, C.F., S. Desai, R. Murgai, and A.N. Narayan. 2016. "Why Did Poverty Decline in India? A Non-parametric Decomposition Exercise." In P. Choudhuri, S. Desai, and A. Dubey (eds.), *India's Social and Economic Transformation in the 21<sup>st</sup> Century*. New York: Routledge.
- Bandyopadhyay, S. and J. Bhattacharya. 2022. "Vulnerability as an Ex Ante Measure of Poverty." *Economic and Political Weekly*, 57(34): 13-17.
- Banerjee, A.V., R. Hanna, B. Olken, and D. Sverdlin Lisker. 2024. "Social Protection in the Developing World." *Journal of Economic Literature*, 62(4): 1349-1421.
- Barik, D., S. Desai, and R. Vanneman. 2018. "Economic Status and Adult Mortality in India: Is the Relationship Sensitive to Choice of Indicators?", *World Development*, 103: 176-187.
- Barik, D. and S. Desai. 2024. "The Piquant Case of a Successful Maternity Benefit Scheme." *The Hindu Businessline*, February 29.
- Besley, T., Besley, T., R. Pande, and V. Rao. 2005. "Participatory Democracy in Action: Survey Evidence from South India." *Journal of the European Economic Association*, 3(2-3): 648-657.
- Bhalla, S.S. 1979. "Measurement Errors and the Permanent Income Hypothesis: Evidence from Rural India." *The American Economic Review*, 69(3): 295-307.
- Chatterji, S. 2022. "PM Modi Favours Rural Jobs Guarantee Scheme Recast to Help Poorest." *Hindustan Times*, December 4.
- Choudhuri, P. and S. Desai. 2025. *Changes in the Household Consumption Basket during COVID-19 in India*. Under review.
- Deaton, A. and V. Kozel. (eds.). 2005. *The Great Indian Poverty Debate*. New Delhi: Macmillan.
- Desai, S., P. Vashishtha, and O. Joshi. 2015. *Mahatma Gandhi National Rural Employment Guarantee Act: A Catalyst for Rural Transformation*. New Delhi: National Council of Applied Economic Research.
- Dreze, J. and R. Khera. 2010. "The BPL Census and a Possible Alternative." *Economic & Political Weekly*, 45(9): 54-63.
- Dutta, P., R. Murgai, M. Ravallion, and D. van de Walle. 2014. *Right to Work? Assessing India's Employment Guarantee Scheme in Bihar*. Washington D.C.: The World Bank.
- Filmer, D. and L.H. Pritchett. 2001. "Estimating Wealth Effects without Expenditure Data-or Tears: An Application to Educational Enrollments in States of India." *Demography*, 38(1): 115-132.
- Ghatak, M. 2022. "Introduction to e-Symposium: Estimation of Poverty in India." *Ideas for India*, October 10. Retrieved from <https://www.ideasforindia.in/topics/poverty-inequality/introduction-to-e-symposium-estimation-of-poverty-in-india.html>

- Ghatak, M. and R. Kumar. 2024. "Poverty in India over the Last Decade: Data, Debates, and Doubts." *The India Forum*, June 15.
- Hanna, R. and B.A. Olken. 2018. "Universal Basic Incomes versus Targeted Transfers: Anti-Poverty Programs in Developing Countries." *Journal of Economic Perspectives*, 32(4): 201-226.
- Holtzblatt, J. and M. Karpman. 2020. *Who Did Not Get the Economic Impact Payments by Mid-to-Late May, and Why?* Retrieved from <https://www.urban.org/sites/default/files/publication/102565/who-did-not-get-the-economic-impact-payments-by-mid-to-late-may-and-why.pdf>
- Mehta, A.K., A. Shepherd, S. Bhide, A. Shah, and A. Kumar. 2011. *India Chronic Poverty Report: Towards Solutions and New Compacts in a Dynamic Context*. New Delhi: Indian Institute of Public Administration.
- Ministry of Rural Development. 2009. *Report of the Expert Committee to Advise the Ministry of Rural Development for Conducting the Below Poverty Line Census for 11th Five Year Plan*. Retrieved from: [https://prsindia.org/files/bills\\_acts/bills\\_parliament/2011/Report\\_of\\_the\\_Expert\\_Group\\_\(NC\\_Saxena\)\\_on\\_the\\_methodology\\_for\\_the\\_BPL\\_Census\\_2009.pdf](https://prsindia.org/files/bills_acts/bills_parliament/2011/Report_of_the_Expert_Group_(NC_Saxena)_on_the_methodology_for_the_BPL_Census_2009.pdf)
- National Sample Survey Office. 2024. "Survey on Household Consumption Expenditure: 2022-2023." *NSS Report No. 591*, New Delhi: Ministry of Statistics and Programme Implementation, Government of India.
- Palacios, R., J. Das, and C. Sun. (eds.). 2011. *India's Health Insurance Scheme for the Poor: Evidence from the Early Experience of Rashtriya Swasthya Bima Yojana*. New Delhi: Centre for Policy Research.
- Panda, S. 2015. "Political Connections and Elite Capture in a Poverty Alleviation Programme in India." *The Journal of Development Studies*, 51(1): 50-65. doi:10.1080/00220388.2014.947281
- Pankaj, A. 2023. *Inclusive Development Through Guaranteed Employment: India's MGNREGA Experiences*. New Delhi: Springer.
- Saxena, N.C. 2015. "Socio Economic Caste Census." *Economic & Political Weekly*, 50(30): 14-17.
- Sharan, M.R. 2011. "Identifying BPL Households: A Comparison of Competing Approaches." *Economic & Political Weekly*, 46(26-27): 256-262.
- Srinivasan, T.N. 2007. "Poverty Lines in India: Reflections after the Patna Conference." *Economic and Political Weekly*, 42(41): 4155-4165.
- The Planning Commission. 2013. *Report of the Expert Group to Recommend the Detailed Methodology for Identification of the Families Living Below Poverty Line in Urban Areas*. Retrieved from <https://des.mizoram.gov.in/uploads/attachments/981d16edfe868b9c691d76c48e8f1251/pages-53-bpl-criteria-in-urban.pdf>
- The World Bank. 2011. *Social Protection for a Changing India*. Washington, D.C.: The World Bank.
- Thorat, A., R. Vanneman, S. Desai, and A. Dubey. 2017. "Escaping and Falling into Poverty in India Today." *World Development*, 93: 413-426.

To view the entire video of this IPF session and the General Discussion that ended the session, please scan this QR code or use the following URL:  
<https://www.youtube.com/watch?v=vzRjXTdj2zs>



# Comments and Discussion\*

Chair: **P.K. Mishra**

*Government of India*

## **Saurabh Garg**

*MoSPI, Government of India*

I will present what I think is a possible way forward and what the thinking on social safety nets is. In the monthly per capita expenditure, which has come out in Household Consumption and Expenditure Survey (HCES) of 2022-23, for the first time we also did an imputed calculation of the benefits that are flowing to people—an estimate of the food and some of the non-food items which are given free or nearly free. The non-food items are cycles, school uniforms, laptops, and tablets. I want to particularly mention that even after taking the imputed values, we have not included the free health and education that the people get, as it becomes difficult to monetize. Therefore, the Monthly Per Capita Consumption (MPCE), even the imputed one, is conservative at best.

The Periodic Labour Force Survey (PLFS) wants to highlight that the unemployment rate in rural areas—whether male, female, or overall— is all below 3 percent. Irrespective of whether you call it the natural rate or the steady state of unemployment, this shows that there are no people who are seeking employment and not getting it. I think that is a very important finding of the PLFS.

My last point on the HCES is the fact that the percentage share of non-food in the total monthly expenditure is increasing. The past twenty years' data shows an extremely positive trend, that the proportion of food in the total expenditure is really decreasing. Like the authors, I want to focus on the implications for social safety net programs. In HCES, we have the fractile distribution of income across from the lowest 5-10 percent. If you look at the lowest fractile (5 percent) in the HCES, it shows that the income levels have increased. The focus is on addressing the well-being of the people.

If we look at the early life-interventions of up to 6 years, the focus is on 'Saksham Anganwadi' and 'Poshan'. The saturation approach being followed

---

\* To preserve the sense of the discussions at the India Policy Forum, these discussants' comments reflect the views expressed at the IPF and do not necessarily take into account revisions to the conference version of the paper in response to these and other comments in preparing the final, revised version published in this volume. The original conference version of the paper is available on NCAER's website at the links provided at the end of this section.

by the Government is that minimum basic needs should be available to all, irrespective of their income levels. The 'Indradhanush' program prioritizes immunization whereas the intensified mission focuses on all vaccines. The PM Matru Vandana Yojana talks of the wage loss during pregnancy while the NPS Vatsalya scheme has to do with the transient nature of children who might move out of or into various levels of vagrancy. The Palna scheme, comprising daycare centres and crèches across the country, is aimed at increasing women's participation in the labor force. One can see the impact of these schemes over ten years in terms of the sex ratio, institutional deliveries, and reduction in wasting and stunting, among others.

For children aged 6-18 years, the focus is on education because beyond the age of 18 years, there would be income issues. The focus is thus on universalizing access to school education. We have come to a point where we are focusing on specific groups, whether it's the economically weaker sections, Scheduled Castes (SCs), or Scheduled Tribes (STs). They are attaining higher education and we are in a position to provide scholarships to them so that they are not constrained by economic needs in acquiring education.

The 'PM Shri' scheme has been started to ensure quality education and develop role models in every district, so that they can become magnets to attract students as education levels increase. Overall, the Gross Enrollment Ratios have increased, and the focus is on ensuring that there are no dropouts when students move from primary to secondary or secondary to post-secondary levels of education.

Regarding the working age population, I would like to mention the 'One Nation, One Ration Card' scheme, which enables a migratory laborer to withdraw ration separately. This scheme aims to ensure the availability of minimum food levels.

The National Rural Livelihood Mission (NRLM) has ushered in a revolution in terms of Self-Help Groups (SHGs) for women, which is ensuring access to micro-credit and improving the quality of life for them. The Kaushal Vikas Yojana and MGNREGA schemes ensure that anyone seeking wage labor gets it, and the figures show that 99.74 percent of the demands under these schemes were fulfilled in 2023-24.

I also want to mention the removal of fake job cards through the use of technology and to ensure better targeting. More than 400 occupations are listed on the e-shram portal, which brings us to the basic social registry which the authors have mentioned. Under PM Kisan, the beneficiaries are also better targeted using the exclusion criteria. Credit has always been a bugbear for micro-entrepreneurs and 400 million loans have been sanctioned under PM Mudra. All this has been possible because of the saturation approach. There is also a pension scheme for the unorganized sectors and senior citizen homes for those aged more than 50 years.

Building resilience is very important, and the target of the Ayushman Bharat scheme is to have more than 50 crore beneficiaries. We also have Janaushadhi Kendras, offering generic medicines, which are often 50-90 percent cheaper than the other medicines. The JAM trinity of Jan Dhan, Aadhaar, and Mobile is enabling Direct Benefit Transfer (DBT), which ensured that funds could be transferred to people in need even during COVID. The sense of identity that Aadhaar provides in terms of empowerment also needs to be recognized.

Further, there are schemes for risk insurance, crop losses, and accidental and debt insurances. Disaster resilience work is being done as part of National Cyclone Risk Mitigation Project (NCRMP), and the Green India Mission is also being implemented.

We are at a stage where we can examine different groups in terms of age, gender, and occupation, to identify the more vulnerable people in terms of economic factors or special needs groups. The other important programs that aim to take care of people's basic needs include the Jal Jeevan Mission, wherein more than 11 crore households have got tap connections; the Swachh Bharat Abhiyan for construction of toilets; PM Ujjwala for providing LPG connections and cooking fuel; and the Saubhaya Yojana for ensuring complete electrification of households.

Most of these schemes have evaluation issues, as under the current system, schemes are approved for only five years, after which they are re-examined to assess what needs to be done to ensure right targeting. The Expenditure Finance Committee (EFC) system ensures this. At this stage, we are now looking at the production frontier, not just the basic issues of survival but how to achieve better targeting and better focusing, and ensuring that no one is left behind. As regards the social sector spending, the Government has already reached 8.3 percent of the targeted population, while the corresponding figure for the Brazil, Russia, India, China, and South Africa (BRICS) nations is somewhere around 10-11 percent. With the continued efforts of researchers like Dr Sonalde Desai, our programs will only increase as we work towards a 'New Bharat'.

## **Shanta Devarajan**

*Georgetown University*

I want to make five points, and in some ways complement what Saurabh Garg said, by drilling deeper into the Indian situation. I want to spread out and talk about the comparison with other countries and the international context of poverty reduction and safety nets.

The first is the point that Saurabh Garg made, which is that extreme poverty has declined quite dramatically in India and that the people who are near the poverty line have been a substantial part of it because they are the ones who

moved out of poverty. That is reflected in the world as a whole. So, if one looks at the developing world as a whole, the share of people living in extreme poverty (as per the international poverty line) is actually 8 percent. Part of that is because India is such a big part of the world, but this phenomenon is happening in different parts of the world.

Similarly, if you look at the higher poverty line of \$3.65, in addition to the \$1.15 which is the extreme poverty line, it is a bit like India's near-poor. That number is about 25-30 percent in the world. There is now a substantial difference between people who are living in extreme poverty and the near-poor. There's an even higher poverty line, the \$6.25 poverty line—that is 50 percent of the world. And \$6.50 is still no great shakes as a lifestyle. The poverty agenda is not over. We are still fighting for it and people are in danger of falling below that line very quickly. The pattern that the author and her colleagues evoked is actually reflective of the developing world as a whole. And there may be some way in which we can learn from each other in terms of how to deal with it.

I want to caution or qualify something that the authors said about the fact that we should shift the focus from chronic poverty to vulnerability. It would mean that we focus on people above the poverty line but below the double poverty line.

The point is that people even below the poverty line also face the same accidents of life. In many ways, they face even greater accidents of life, but these do not get reflected in the 'poverty system' because they are already poor. So, we have to be very careful. And this is what is pernicious about the headcount poverty indicator because it says that everybody below the poverty line is equal but we know they are not. What happens is that when they get hit with a shock, they get even poorer.

I will give you some evidence. Let's look at infectious diseases because there was a mention of vulnerability in the paper. People get hit with COVID-19 and other kinds of infectious diseases. However, if you look at infectious diseases, they disproportionately affect the very poor, which is different from non-communicable diseases, which actually affect the rich even more. So, these are just two examples from India and China, which show that the incidence of communicable diseases is highly skewed towards the bottom 20 percent of the population. I looked up and recently found that in India, infectious diseases disproportionately affect the poor. In contrast, cardiovascular diseases disproportionately affect the rich.

I think this is important because studies now show the effect of COVID-19 on poverty. A World Bank report showed that 80 percent of the increase in poverty due to COVID-19 was in South Asia. While working on a project on the impact of COVID-19 in Sub-Saharan Africa, I saw devastation there. The fact is that the people in Africa were already poor. They became poorer as a result of COVID. But that did not come up in the headcount poverty indicator. In India, fewer people were already poor, but a lot of people were in the vulnerable

category, who fell into poverty. That is why I would say that we need to look at the concept of depth of poverty, which is the distance from the poverty line. That's another way to measure poverty. When people suffer shocks, they move further from the poverty line, and that needs to be picked up in the statistics.

The third point is to extend what the paper talked about and Saurabh Garg also picked up on. This is to elaborate our measures of poverty by including public programs and subsidies, among others. They did some work on food subsidies in India in the paper. And there is interesting new work that shows one can do it for other public goods because the government spending on public goods can actually improve people's welfare, and should be incorporated in poverty calculations.

There's a recent paper by Amory Gethin of Paris School of Economics. At the global level, there has been a huge increase in public spending. He has done something very clever, but controversial, because he made lots of assumptions to do it. He has actually tried to look at what incorporating this means for the reduction in global poverty. He recalculated global poverty, incorporating public goods. And he finds, not surprisingly, that the reduction in global poverty is even steeper than before—90 percent since 1980. If Gethin can do it for the world, I am sure we can try to do something for India as well.

The fourth point, mentioned in the paper, is that these social safety nets were having a pro-poor impact on income distribution. And we should consider scaling up these programs. This comes up a lot in public policy but we should also carefully look at what happens to the financing of these programs. And if we examine the incidence of taxation, which is what they are effectively financed by, it is sometimes not very good news.

There have been some studies on these issues. There is one study for rich countries, for OECD countries, that looks at what they call market income, or the actual income before taxes and transfers, and looks at the distribution, the Gini coefficient. And that is compared to disposable income, which is market income, less taxes, plus transfers. This study finds a substantial reduction in the Gini coefficient in the OECD countries. Hence, it shows an improvement in income distribution when you take into account taxes and transfers.

However, in the developing countries, the news is not good. In the sample of developing countries, with the exception of South Africa, which has the highest Gini in the world, there is almost no change when taxes and transfers are incorporated. One thus goes through this whole rigmarole of collecting taxes and then transferring them, but ends up where one started from. This is very distressing. So, even as one advocates for scaling up all these programs, one finds that actually the poor are being taxed in order to finance a program for the poor.

I just checked again for more recent data. There is a very interesting project by Nora Lustig, which she has done for a large number of countries, not India. One of the questions which arose is: At what point in the income distribution

do people become net payers into the fiscal system—i.e., they receive less than what they are paying out? The ultra poor in Uganda, Tanzania, Nicaragua, and Ghana, people earning between 0 and \$1.25 a day, are net payers into the system. And for middle-income countries like Sri Lanka, it is the third quintile that becomes a net payer into the system. So, we have a problem in terms of the incidence of taxes and have to do something about that in order to scale up the programs.

The last point is that there is a mention in the paper about the potential for these programs to be captured. The political capture of social safety net programs is actually quite widespread.

Sri Lanka has its flagship program called ‘Samurdhi’, which transfers about 1 percent of GDP to poor households. The eligibility was set at one-third of the poverty line. But what they found was that about 50 percent of the households were receiving some of the payments, and there were rampant errors of inclusion and exclusion. So, something like 30 percent of the Samurdhi payments were going to the poorest quintile of the population, and the poverty rate at that time was about 20 percent.

Furthermore, of the poor, only 53 percent actually received Samurdhi payments. Some studies have looked at who received some of those Samurdhi payments and correlated those findings with who they voted for in the previous election. The party in power at that time was the People’s Alliance (PA), and if any district voted between 40-60 percent for the PA, it got the Samurdhi payments.

It is election season in Sri Lanka even now and I read in the newspapers that the party with a majority in the Parliament was organizing a rally of supporters and telling the people: “If you don’t attend the rally, you risk losing the Samurdhi payments.” So, let’s pay very close attention to the potential political influence in all our social programs.

## General Discussion

Ratna Sahay commenced the discussion by saying that India is a high-growth story and asked the lead author Sonalde Desai about three competing hypotheses. First, she asked whether poverty had fallen, as shown in the paper, because of high growth or if it was a trickle-down effect. The second aspect is the focus on the increase in social spending. The third factor is that the government has spent a lot on infrastructure, including electricity and roads, which makes a huge difference to the poor, and one needs to analyze how that impacts poverty, and also which of these has made the biggest difference.

On Shanta Devarajan’s mention of the difference between market income and net income, minus taxes and transfers, to analyze the impact on income distribution, Sahay asked why rich farmers were not taxed in India. She said

though it is a political economy issue, it is high time that the rich farmers were taxed.

M. Govinda Rao said the dynamics of transition to poverty, as mentioned in the paper, threw up policy questions. He asked the authors whether from the data, it was possible to chart out the contributions of short-term palliatives as compared to long-term empowerment issues like education and healthcare. It would be helpful to know this from a policy perspective.

Shekhar Aiyar pointed out that the analysis of the paper was in terms of the Tendulkar Poverty Line and wanted to know how it lined up with the \$2.75 Purchasing Power Parity, the International Poverty Line of the World Bank. Alluding to the survey quoted in the paper, he said it seemed that rural poverty had fallen much more than urban poverty to the point where they both now stood at 8.5 percent. He also wanted to know the reasons why rural poverty had fallen so much faster and what might be the consequences of this in terms of rural-urban migration.

In her response, Sonalde Desai made a special mention of Shanta Devarajan for pointing out that the poor should not be ignored when it comes to transient poverty and called it a remarkable comment.

Responding to Ratna Sahay, Desai said poverty decline cannot take place just by implementing social programs. Social safety nets are designed not to reduce poverty but to provide protection against descent into despair, and this was the starting premise of the study. Regarding Sahay's suggestion on taxing the rich farmers in India, she said that after extensive fieldwork, she does not believe that rich farmer is a class that exists in India. Land sizes have become much smaller and farmers have become richer not because of land ownership but by participating in non-agricultural activities, which is enabling them to generate income in the rural areas. She wondered whether one should tax farmers or higher income earners.

On Govinda Rao's point regarding short-term palliatives versus long-term measures, Desai said there is no question that long-term economic growth is most important, but short-term palliatives are necessary in cases where people can fall into absolute misery and poverty. She said India's example during the pandemic was fantastic. NCAER had started a survey measuring food consumption just before the pandemic. She said that in spite of the severe economic decline during the pandemic, food consumption did not go down, which is quite a tribute to the food distribution programs that were put in place.

Replying to Shekhar Aiyar's question, Desai said that the Tendulkar Line is actually lower than the World Development Line. At this point in time, it is roughly adjusted for the 2024 prices. It varies for urban and rural areas—Rs 1,600 and Rs 1,900 per person per month, respectively. But she said that the paper had used the Tendulkar Line as that is the national poverty line. Regarding rural versus urban, Desai said she did not have a good answer as to how rural poverty fell faster, despite recalculating data many times. She referred to the

Lakdawala Poverty Line, which showed urban and rural poverty more or less in tandem with each other. She said that since Tendulkar did not believe that the rural poverty line was about the same as the urban poverty line, he increased the rural poverty line.

Desai said a number of issues were involved and some of them had to do with prices and consumption baskets. She said historically poverty was thought of in a rural context and yet there was a tremendous amount of vulnerability in urban India. People who are leaving and migrating to urban areas also fall into deeper poverty. Thus, urban areas have both rich people and a reasonable number of poor people, which requires greater examination.

Referring to Ratna Sahay's suggestion of taxing the rich farmers, Shanta Devarajan said the ultra-rich were being under-taxed and that is one of the reasons to try and bring in wealth tax. He said social protection programs are intended to smoothen fluctuations over time. People are faced with shocks all the time and a good program would smoothen this, which is very important. He cited the example of Tanzania and Rwanda, with both having more or less the same per capita income and the same growth rate over a ten-year period. Rwanda reduced poverty by 10 percentage points while the corresponding figure was zero for Tanzania. He said that it turned out that both these countries are subject to huge fluctuations, and Rwanda has a social protection system that is automatic and starts kicking in as soon as there are any shocks to the system. Tanzania, on the other hand, has a very ineffective social security system. He also said out-migration increases with per capita income and a diminishing rural-urban gap might actually increase rural-urban migration, as is evident around the world.

Suman Bery said that India has been wedded to the idea that poverty and welfare should be measured on the basis of consumption. He said that according to the World Bank, income is a concept that could be measured, and asked the authors about the glide path to go from consumption to income, and whether information is lost on the way. He sought to know what kind of tax data should be in the public domain.

Latha Venkatesh asked whether the paper had taken into account free electricity, which allows children to study at home and increases the productivity of the parents. She also wanted to know whether the steeper fall in poverty in rural areas is because of the advent of the MGNREGS, as it is a rights-based program.

Sam Asher pointed out that the paper had rightly highlighted that the churn in and out of poverty is due to 'mistargeting' when it comes to the eligibility of benefits while using the poverty census and that the assets are an imperfect proxy for actual poverty.

Devesh Kapur argued that the best safety net a person can have is a good formal sector job and asked whether the growth of India's safety nets is a sign of success or failure.

Rajshekhar Joshi noted that the big focus is on schemes and there is a lot of duplication. He said the second part is about how to strengthen the capacity of the states because India cannot grow unless the states grow. He also talked of the capacity of the Gram Sabhas and how to make them more effective. He said one should focus on the supply-side rather than the demand-side of things.

Karthik Muralidharan highlighted two fundamental problems with poverty targeting, that poverty is continuous, and it is dynamic, not static. Since the government continuously monitors the annual fluctuations and there are automatic stabilizers, the schemes respond to the shocks experienced. He said that India is quite far from schemes that can be dynamic. He suggested that by using certain states as pilots, some measures could be put together to track continuously over time as well at a particular point in time. This could be used to run certain simulations to see what a dynamic social protection program would look like.

Prabhat Barnwal suggested that it is important to also look at programs which have been run successfully. He cited the example of LPG subsidies, for which the Nilekani Committee report prescribed three steps and the Ministry implemented it and Aadhaar played a big role. He said it is important to look at programs where people have moved out. It would be good to have data regarding when households got their Aadhaar or bank accounts, and one could look at the exposure and how it translated into reduction of poverty. His third point was about MGNREGA and the South-North divide. He said some states have the fiscal funding to manage cyclical changes and that it would be desirable to have programs where states do well due to supplementary funding.

Referring to the author's response to Govinda Rao's comment about insurance and short-term versus long-term palliatives, Manish Sabharwal said insurance cannot cost 11-12 percent of GDP as it is a short-term palliative and it also mattered how social security is financed, i.e., by debt or by taxes. He said insurance should be 2-4 percent of GDP.

On the issue of short-term palliatives versus insurance, Shanta Devarajan asserted that it is a question of design and that the principle of social protection is insurance. He said unfortunately systems had been created in which these are not insurance but transfer payments. He attributed the system of transfer to inefficient subsidies in the economy like fuel and energy, which distort prices and are typically pro-rich. Referring to power subsidy, he said those who consume more electricity are people who use high electricity consumption items like air-conditioners and washing machines. It is, therefore, a system which confuses insurance with transfer payments and distortionary subsidies. A system of cash transfers is thus preferable over subsidies and an insurance system. He said financing of social expenditure systems should not be earmarked as separate from overall financing. That should be done economy-wide and it is very dangerous to earmark particular public expenditure. Regarding income versus

consumption, he said that from a purely conceptual point of view, consumption is a better measure of wealth and for capturing welfare though some countries choose to measure income. From a data point of view, measuring income is more difficult.

Auguste Kouame said if one were to measure income, it would be challenging to ensure capturing of all the income coming in from the informal sector in most countries.

Saurabh Garg stated that the government was carrying out expenditure surveys but there was no plan to do income surveys. There are more possibilities of people not talking about their real income and hence the focus on expenditure. On Latha Venkatesh's point regarding free electricity, he noted that the Household Consumption and Expenditure Survey (HCES) looked at imputed income, based on figures of certain food and non-food items, for the first time. Health and education did not figure in it, and electricity has not been constant. To that extent, the consumption expenditure has been conservative, but in the interest of being more credible, other imputations need to be done.

On Sam Asher's point regarding administrative data, Garg averred that it is one of the focus areas of the government because the administrative data are much more current, but the problem is that they are embedded within departments and ministries, and need to be pulled out. Citing the Palna Scheme for creating crèches, he said data revealed that rural areas where women had access to crèches saw improved productivity. The schemes have a demand-based side as opposed to solely a supply side. He also said schemes are evaluated every five years to assess their impact and feasibility. On the issue of continuous deprivation, Garg revealed that a lot of work has been done to focus on the ultra-poor, especially in the aspirational districts in Bihar and Chhattisgarh. On Barnwal's mention of state-wise variations, Garg said that is the reason why many states have top-ups of the same program, which are based on local demands and the impact.

In her final response, Sonalde Desai flagged two aspects to the various points made during the discussion: Is it possible to identify what is happening to the society over time in terms of poverty distribution, and second, can the poor who need to be targeted with specific benefits be identified? Regarding income versus consumption, Desai said that the paper had looked at the consumption outliers and at the people with high consumption, and found that most of the time, it is because of sickness in the family. These people should actually be in the vulnerable section but data show them at a much higher level due to their increased consumption expenditure. She opined that for identification of poverty, income is perhaps a better measure in spite of all the issues that occur during collection of data. This also applies to the use of administrative data or continuous monitoring data or tax data, and so on. People participate in any government program because they know about the program, so there is clearly a lot of endogeneity at play.

Regarding MGNREGS, Desai said the program was designed such that about 60 percent of the expenditure goes to labor, nearly 40 percent to material components, and around 6 percent for the administrative element. However, when the money is released from the Centre, the labor pool gets it much sooner than the materials pool, which is why in many states, the contractors have to wait for a long time to get paid. Hence, any state which is able to provide the money for the materials is able to get greater access to the program. Secondly, it is not supposed to take away any of the regular paying jobs. As regards the 'Palna Scheme' for crèches for rural women, they themselves cannot be employed and here MGNREGS comes into play. Desai said that the extreme regulations that were put in place to ensure that implementation of the program could not be perverted have now become somewhat of a shackle where the program is actually getting perverted because of those regulations.

The session video and all presentations for this IPF session can be accessed by scanning this QR code or going to:  
<https://ncaer.org/event/india-policy-forum-2024/>





RATNA SAHAY\*  
*NCAER and CGD*

NAVYA SRIVASTAVA†  
*NCAER*

MAHIMA VASISHTH#  
*NCAER and Bocconi University*

## Female Leadership in India: Firm Performance and Culture<sup>§</sup>

**ABSTRACT** Globally, women’s share in corporate leadership has been steadily rising, including in India. The ‘female director’ mandate under The Companies Act (2013) in India marked a significant step toward gender-inclusive corporate leadership, requiring listed firms to have at least one woman on their board. Within a year, the percentage of listed firms without women on board plummeted from 53 percent to less than 10 percent. Despite this progress, India still lags in the share of women in middle and senior management roles at only 17 percent, compared to nearly 33 percent for the world.

This paper documents the status of gender-inclusive corporate leadership and uses the ‘woman director’ mandate in the Act to study its relationship with firm outcomes, including financial performance and corporate culture in India. Interestingly, we find that firms, on average, were appointing more women than mandated by the Act, suggesting the favorable impact of the current government’s signal to foster women-led development and the positive experience gained by firms. At the same time, newly appointed women were younger and more educated than their male counterparts and their average number of directorship (the “stretch factor”) increased significantly compared to men.

Combining personnel-level data from NSE-listed firms with firm performance data and employing a difference-in-differences in reverse econometric strategy, we find that having at least one woman on board is associated with higher economic performance and financial stability. Additionally, using almost 400,000 employee reviews scraped

---

\* [ratnasahay2022@gmail.com](mailto:ratnasahay2022@gmail.com)

† [nsrivastava@ncaer.org](mailto:nsrivastava@ncaer.org)

# [mahima.vasishth@unibocconi.it](mailto:mahima.vasishth@unibocconi.it)

§ We are grateful to Reshma Anand, Meleveetil Damodaran, Devesh Kapur, Auguste T. Kouame, and Shabana Mitra for their comments on our paper. We thank Aryan Gangwar, Deepa Sharma, Mehak Jain, and Swapnanil Sengupta for research assistance.

The findings, interpretations, and conclusions expressed are those of the authors and do not necessarily reflect the views of the Governing Body or Management of NCAER.

from a company review platform, we find that higher share of women in board positions correlates positively with employee ratings and sentiment scores only when firms also hire women in top management positions. This analysis highlights the business case of appointing more women at the top.

**Keywords:** *Women's Leadership, Firm Performance, Firm Culture*

**JEL Classification:** *J16, L25, M59*

## 1. Introduction

**R**ecognizing the wide gender disparities globally, the 2023 G20 Leaders' Declaration in New Delhi highlighted the importance of women-led development and women's economic empowerment. Promoting female leaders across sectors is a priority in Indian national economic policy. Several initiatives have been taken to bridge these gaps, including implementing the Companies Act (2013), which mandated Indian companies to appoint at least one female director. This paper focuses on assessing whether this mandate has been successful and, more generally, whether women in top management positions in corporate India have increased as well. In addition, we explore whether such increases have gone hand-in-hand with better firm performance and firm culture.

The share of women directors in corporate India, at 17 percent, is lower than the global average of nearly 20 percent, and substantially lower than the best-performing country, France, at over 43 percent. The number of 'women in chair' positions decreased between 2018 and 2021 (Deloitte 2022).

Furthermore, India lags in terms of representation of women in middle and senior management positions, with a share of only 17 percent (ILOSTAT 2024). For context, the average share of women in senior and middle management positions is 32.4 percent for advanced economies, and 32.8 percent for the world.

In this paper, we answer three questions on women's leadership in response to this Act. First, we study the evolution of Board gender composition for NSE-listed firms in India. Specifically, we document the increase in women's representation on Boards following the enforcement of the 'woman director' mandate under The Companies Act (2013) and explore the demographic characteristics of the female Board members. Relatedly, we also explore whether there have been positive spillovers to appointing more women in management positions. Second, we use a difference-in-differences in reverse design to isolate the effect of women on the Board on firms' financial performance, in terms of profits, returns, and financial stability. Third, we use rich text data on company reviews by employees to study the association between the share of women on Boards and firm culture. We quantify firm culture by analyzing

about 400,000 employee ratings and sentiment scores based on reviews posted on AmbitionBox.<sup>1</sup>

There are three main findings of this paper. First, after the implementation of the Companies Act in 2014, women's share on Boards in NSE-listed firms increased by 9 percentage points over the next seven years, reaching 14.1 percent in 2021. At the same time, we also find that women hired as directors after this mandate were younger and more educated than their male counterparts. These women held a greater number of directorships across firms and were more independent, on average, than their male counterparts. The gender gap in attendance at Board meetings fell as well. However, there were little spillovers in terms of increasing managerial roles for women.

Second, we find that the presence of women on Boards led to better financial performance for the large and medium cap firms but not for the small cap firms. For the larger firms, we find that in the years following the mandate enforcement, there was a positive change in firms' financial indicators, which was sustained over time. Specifically, we find that larger-sized firms with at least one woman on Boards are associated with better financial returns and greater financial stability measured by debt-equity ratio.

Third, we find that higher shares of women in Board positions are positively associated with employee ratings and sentiment scores, but only for firms with at least one woman in top management.

The organization of this paper is as follows: In Section 2, we specify how our paper contributes to the existing literature. In Section 3, we present stylized facts on female leadership in corporate India, covering both directorship and management positions over time, and relative to other countries. In Section 4, we explore the relationship between gender gaps in director positions and firm-level financial performance. In Section 5, we ask whether having more women as directors and in top management positions is associated with better organizational culture. In Section 6, we present the conclusions of the paper. The last section proposes policy recommendations based on the analysis in this paper. From a policy perspective, these results help make a business case for hiring more women at the top.

## 2. Contribution to the Existing Literature

This paper contributes to the existing literature in several ways. As a starting point, we combine several novel data sources to construct a comprehensive database on the gender composition in Boards and key managerial positions, firm performance, and organizational culture. We focus on firms listed in the

---

1. Data scraped from AmbitionBox was also used in Chakraborty and Mahajan (2023), to analyze the number of benefits provided to employees by different firms.

National Stock Exchange (NSE) for the period 2006-2023.<sup>2</sup> To study firm performance, we combine firm-level panel data on leadership personnel with financial performance data collected from annual financial statements. To quantify and study organization culture, we built a novel database by scraping text information presented in company reviews by their employees and using the corresponding sentiment scores and employee ratings to proxy for firm culture.

Second, we systematically establish a positive causal relationship between female leadership and firm level financial outcomes, which has been elusive in most of the existing national literature and scarce in the global literature. We do this by identifying an exogenous shock to Indian companies that made it mandatory to hire at least one woman on the company's Board and by exploiting the quasi-random variation in the share of women on Boards following this mandate.

Third, we explore and find that inclusive firm culture, as measured directly by employee reviews collected from an independent source, is associated with the presence of women directors on Boards, but only when accompanied by the presence of women in top management positions.

There is a growing literature on the role of women leaders on firm performance, but the evidence has been mixed. Global evidence suggests that the presence of more female directors on the Board improves financial performance (Credit Suisse 2012; Catalyst 2014; Christiansen and Others 2016; Sahay and Cihak 2018), but others find that the impact on firm performance is either negative (Adams and Ferreira 2009; Ahern and Dittmar 2012; Matsa and Miller 2013), or zero (Bertrand et al. 2019).

Specific to India, the evidence until very recently has been mixed as well. While some studies (albeit with a smaller sample size of firms) find that a greater gender diversity on Board is positively associated with firm performance (Chatterjee and Nag 2022; Duppati et al. 2019; Roy 2023), other studies find a negative association between female leadership and firm performance, which they argue is due to an increase in the agency cost following the appointment of a female CEO (Jadiyappa 2019). These mixed results can be explained by the endogenous selection of women into different types of firms, leading to a biased inference (Rob and Wattson, 2012). Jain (2022) and Roy (2023) argue that the performance depends on the gender norms in the states of India where these firms are located. A shortcoming of these studies is that the relationship between female leadership and firm performance remains endogenous.

In this paper, we put together a large panel of most Indian firms listed on the National Stock Exchange (NSE) as of 2023, which includes both financial and non-financial firms. Controlling for several demographic factors at the firm level, we use the quasi-random variation in the appointment of women

---

2. Throughout the rest of this paper, financial years have been used for data on gender composition in leadership positions and firms' financial outcomes. The ending years are used to refer to them. Therefore, FY 2014-15 is referred to as 2015 in both the text and figures.

directors, to explain the differences in firm performance which depend on the gender gap in Board directors.

The literature on female leadership and firm culture is scarce. At the global level, Callahan et al. (2024) found a positive relationship between higher share of women on Boards and the enactment of human capital development policies that benefit firm employees for a sample of S&P 1500 firms based in the US. With regard to India, we are not aware of any papers that directly look at the relationship between higher share of women in leadership positions and firm culture, as measured by employee sentiments.

Two recent papers by Biswas et al. (2023) and Dhar (2023), respectively, have also exploited the Company's Act (2013) to establish a relationship between female leadership and firm performance. Their results confirm our findings. Dhar (2023) exploits the variation in women's representation in Boards pre-mandate as an instrumental variable to find a positive impact of including women on Boards on firm's financial performance. She also identifies firm culture indirectly by looking at the firm's expenditure on staff welfare

### **BOX 1. The Companies Act (2013)**

The Companies Act (2013) was passed by Parliament and approved by the President of India on 29 August 2013. Some of its provisions were implemented by a notification published on 12 September 2013. The initial deadline imposed by the Securities and Exchange Board of India (SEBI) for meeting the mandate regarding women directors was 31 October 2014. This deadline was later pushed to 1 April 2015.

As per the Companies Act, 2013, it is mandatory to appoint at least one woman on Board in certain types of companies. The penalty for non-compliance of provision extends to a fine of Rs 10,000 with a further fine of Rs 1,000 per day if the contravention continues. A woman director has to play the role like any other director. Women directors can hold a maximum of twenty directorships that includes the sub-limit of ten public companies. Any contravention on this part shall be subjected to a fine ranging between Rs 5,000-Rs 25,000.

A woman director may leave the company for any reason such as resignation, removal, automatic vacation or retirement by rotation before the expiry of her term as a Director. The Board of Directors must fulfil this vacancy known as intermittent vacancy within a period of three months. In case of an absence of a woman director for a period of not less than three months, the Board must appoint an alternative director to ensure smooth functioning of the company. The alternative director shall leave the firm after the return of the woman director. In case there are more than one woman on the Board, it is optional for the company to appoint an alternative director. A woman director can hold the position of director until the next Annual General Meeting from the date of appointment. She is also entitled to seek reappointment at the general meeting. The tenure of a woman director is liable to retirement by rotation similar to other directors. Like any other director, a woman director can also tender her resignation any time before the expiry of her term by giving a notice to the company.

A company, whether a public company or a private company, will be required to appoint at least one woman on Board if it fulfils any of the following criteria: (1) it is a company whose securities are listed on any stock exchange; (2) it is a company with a paid-up capital of Rs 100 crore or more and a turnover of Rs 300 crore or more.

and training. However, expenditures do not directly measure well-being as employee surveys do. Biswas et al. (2023) find that higher network centrality of women (i.e., their connectedness) on Boards is associated with higher firm value, through their information advantage and women director networks. Our work extends the understanding of this relationship in several ways using a methodology that allows us to understand the average effect of women's representation in firms that had to respond to this policy, allowing for changes in other characteristics within the firm due to women's representation.

We also consider more measures of financial performance and firm culture than others. First, in our paper, we find evidence for the hypothesis that women contribute to greater financial stability of firms by analyzing the debt-equity ratio of firms. Second, we explore firm culture directly by quantifying employee ratings and sentiment scores, which is collected from employee reviews from an independent online platform. We also look at whether having more women directly has spillover effects in the appointment of more women managers in leadership positions. Finally, our findings on the increase in the number of directorships held by women following the enforcement of the 'woman director' mandate are consistent with Biswas et al. (2023). This may be an important channel underlying our results on the positive impact of increased representation of women relative to men on firm performance, through the increased network that women bring in relative to men.<sup>3</sup>

### 3. Gender Gaps in Corporate Leadership—Stylized Facts

As compared to other parts of the world, the share of women directors in corporate India, at 17 percent, is lower than the global average of nearly 20 percent, and substantially lower than the best-performing country (France), at over 43 percent. The number of 'women in chair' positions decreased between 2018 and 2021 (Deloitte 2022).

We first look at the trends in female directorship in India before and after the implementation of the Company's Act (2013), and then explore whether there has been a positive spillover of hiring women in Boards under the Company's Act (2013) on top management positions in firms.

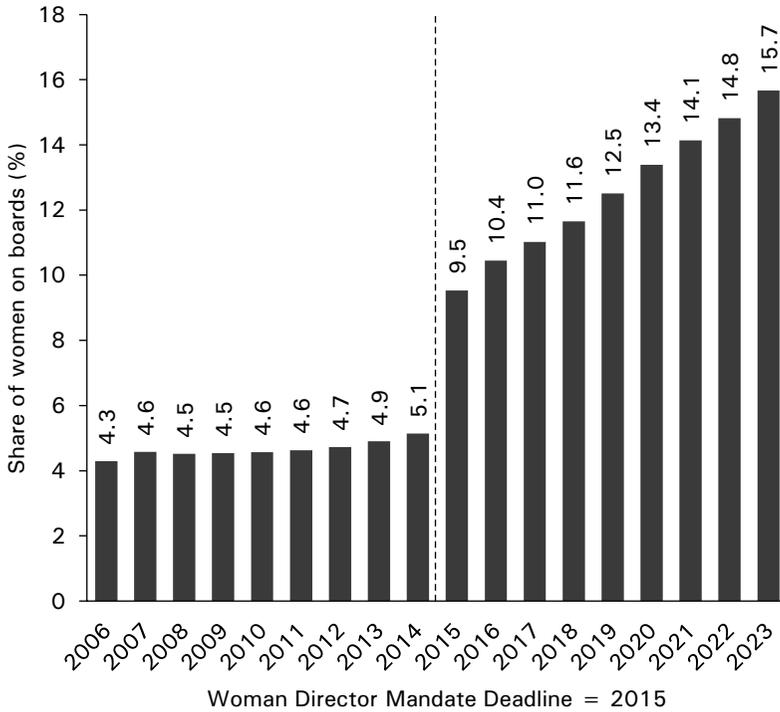
#### 3.1. *How Did Board and Management Gender Composition Evolve?*

Although the Companies Act was officially implemented in 2013, the deadline for meeting the woman director mandate was set for April 1 2015. Figure 1 shows a jump in the share of women in Boards in 2015. This increase was observed for both financial and non-financial firms. This is shown in Appendix II, Figure A1.

---

3. This is discussed in more detail in Section 3.2 of this paper.

**FIGURE 1. Share of Women on Boards**

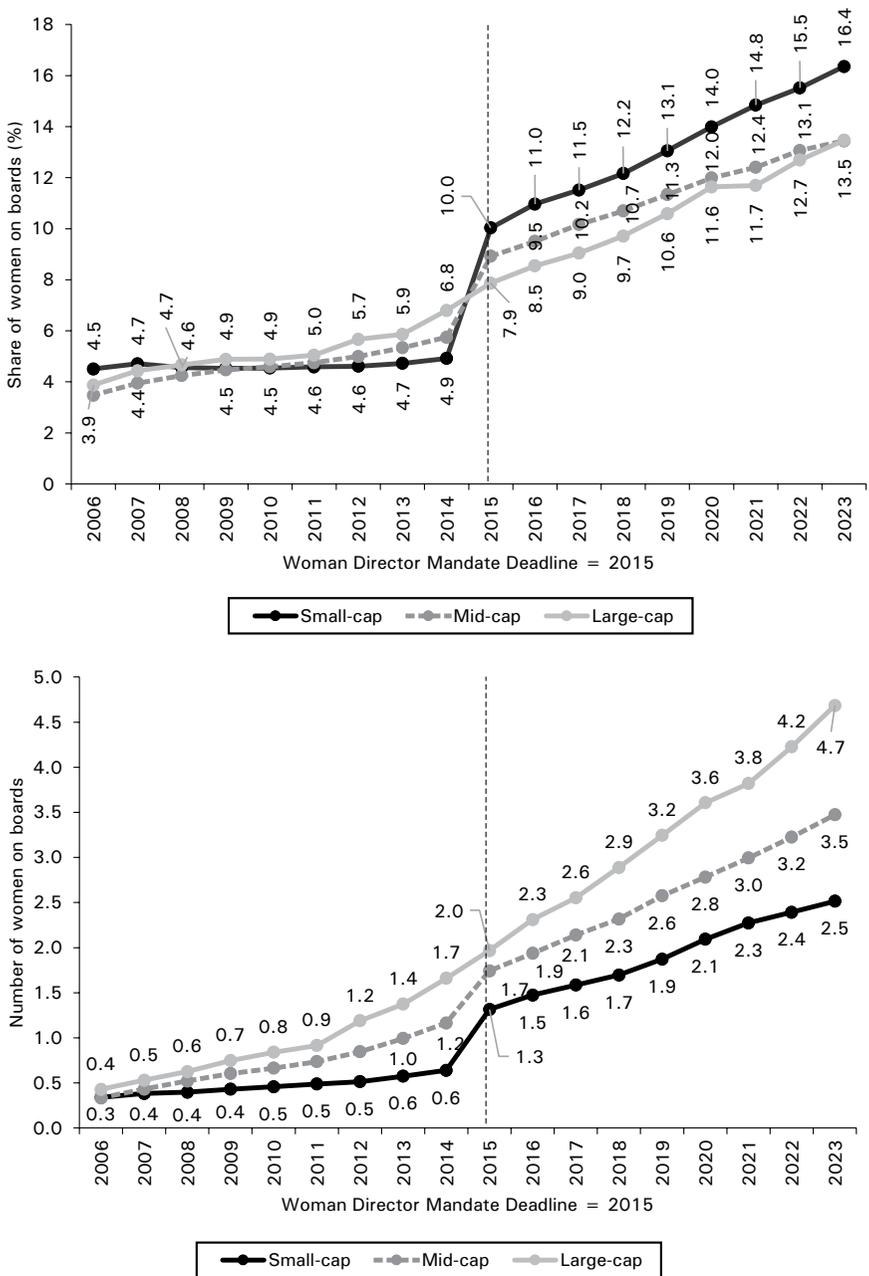


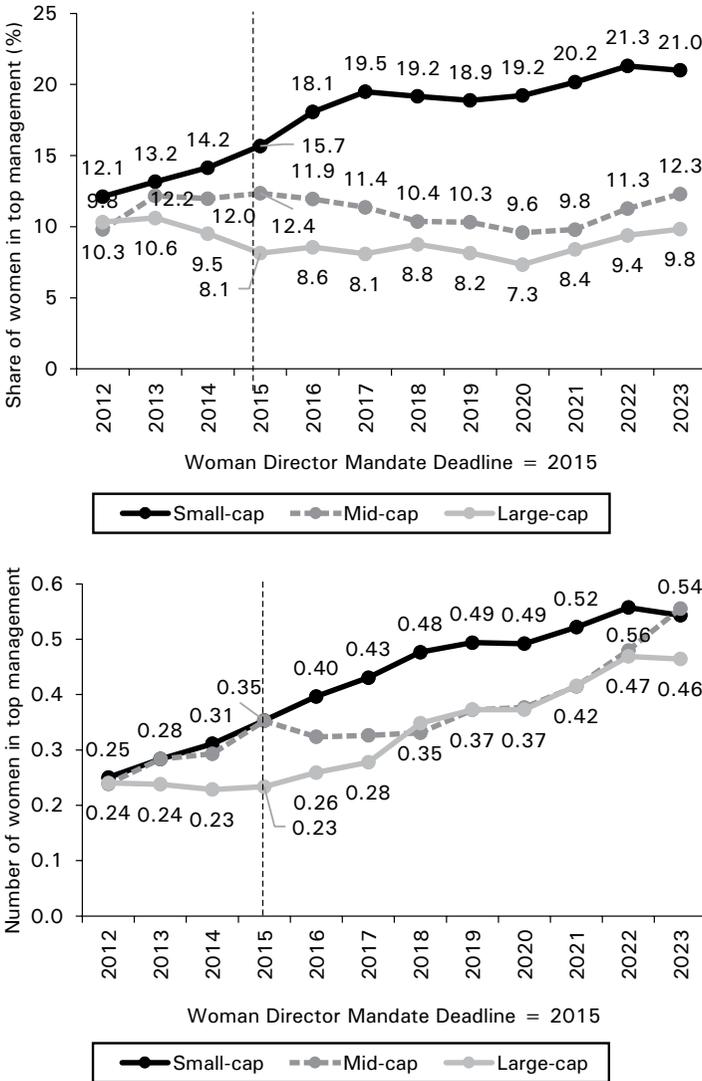
Source: PRIME database.

Younger firms established after liberalization in India (since 1991) have a higher share of women in leadership positions, for both Boards and top management. In fact, for top management positions, this difference was almost 10 percentage points in 2023. This indicates that younger firms are embracing diversity more often than older firms, which appear to exhibit more rigid cultural norms (Appendix II, Figure A2).

Figure 2 indicates that small-cap firms have higher share of women on their Boards than mid-cap and large-cap firms. The number of women on Boards experienced a jump for small firms in 2015, while the Board size remained relatively stable. Smaller firms also have more women in managerial positions on average, despite having fewer managerial personnel in total. Since we expect large industry leaders to set a higher standard for gender equality in the corporate sector via a demonstration effect, we consider the case of top ten large cap firms (based on market capitalization in 2023) in Box 2.

**FIGURE 2. Average Share and Number of Women in Leadership: By Firm Size**

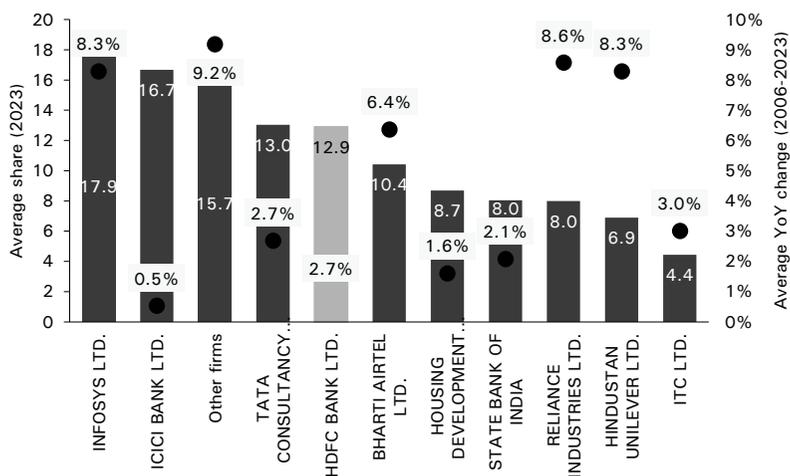




Source: PRIME and CMIE databases.

### 3.2. What Were Women Board Member Characteristics?

In addition to gender composition, we also looked at five director-level characteristics: education, age, number of other directorships held, share of meetings attended, and hiring of independent directors. This enabled us to assess whether their characteristics were different from men’s and proxy for whether they played an active role in Board decisions.

**BOX 2. Status of Women in Top Ten Firms in India****FIGURE 3. Share of Women on Boards (March 2023) and Average Year-on-Year Change (FY 2005-06 – FY 2022-23)**

Source: PRIME and CMIE databases. List of top ten firms were based on market capitalization as of March 2023, and was cross-checked using NSE India.

Note: The share of women on the Boards as of March 2023 (represented by dark gray bars for top ten firms and light gray bar for all other firms on average) are shown on the left-hand side y-axis. The average year-on-year percentage change in the share of women in Boards over the entire period of observation (2006-2023) for these firms are represented by dots and shown on the right-hand side y-axis.

**Best Performers**

Of the top ten firms, Infosys Ltd. and ICICI Bank Ltd. performed better than the industry average with regard to director positions. Infosys Ltd appointed four additional women Board directors between 2014-16, taking the total to six. All women appointed were independent, and the average level of education for women increased significantly, surpassing that of men in the two years following the mandate's announcement, thus alleviating "tokenism" concerns or concerns that the average quality of women fell after the 'female director' mandate. While women were better educated and held more committee membership and chair positions than their male counterparts, their remuneration was, on average, lower than men's. In contrast to a rising number of women directors, the top management team (including C-suite positions) in Infosys Ltd. had no women throughout the sample period.

ICICI Bank Ltd. had the highest number of women (nine) on their Board out of the top ten firms, as of March 2023. Given the large Board size of 54 members, the share remained relatively low, with a low average year-on-year percentage increase. Similar to the industry average, the women hired were younger and more educated compared to their male counterparts. They held about the same number of chair positions on committees and had higher remuneration on average. We also find that there were positive spillovers to hiring women in C-suite positions—throughout the period, there were one to two women among the four to seven-member top management team.

### **Worst Performers**

Hindustan Unilever Ltd. and Reliance Industries Ltd. were the only firms that did not have any woman prior to the 'woman director' mandate. They appointed one woman each in the year the mandate was enforced. As a result, both firms showed two of the highest rates of increase in the share of women on Boards, at 8.3 percent and 8.6 percent, respectively. This is somewhat misleading as the starting point was low, and despite the high rate of increase, their share of women directors in 2023 was the lowest in this group. Both firms only hired one additional woman director in the years following the mandate. Additionally, Reliance Industries Ltd. had no independent women on Board until as late as March 2019, only following an amendment in the Companies Act mandating the appointment of at least one independent woman director. Moreover, in both these companies, no woman director chaired any committee until April 2021. Interestingly, the women directors had lower education and remuneration, on average, relative to their male counterparts. Reliance Industries Ltd. had no women in top management until FY 2018-19, and Hindustan Unilever Ltd. had none throughout our sample period.

ITC Ltd. was the worst performing firm in terms of share of women directors as of 2023. The first female director was appointed in late 2012 and one other in later years. Women, on average, were younger and more educated and held no chair positions on committees (despite holding more membership positions than their male counterparts). ITC Ltd. also had no women in their top management team throughout our sample period.

It is worth pointing out that although the State Bank of India had a relatively low share of women, it had the second-highest number of women on Board (tying with Infosys Ltd. with 7 female Board members). On the other hand, participation of women in Board committees as chairs was almost zero, and as members, remained lower than that of men for most years. During 2019-2021, there were no women in top management despite an expansion in their size from 6 to 9 members.

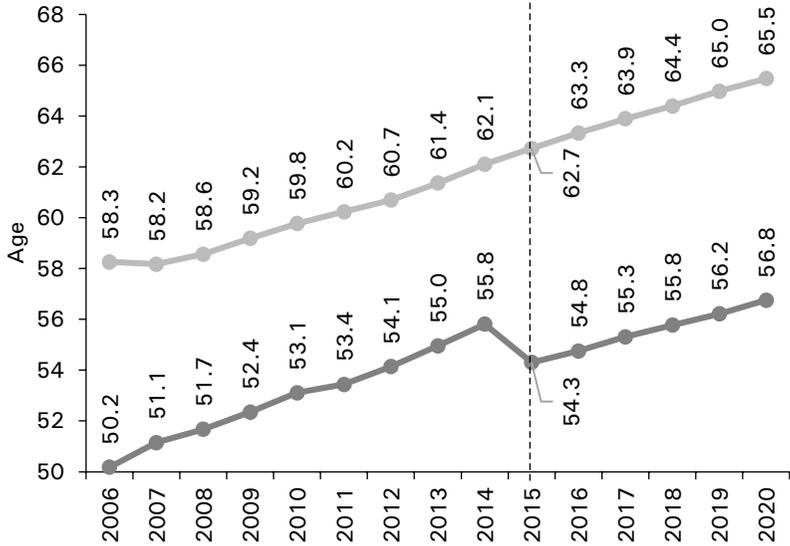
### **3.2.1. AGE OF DIRECTORS**

Following the enforcement of the mandate, there was a sharp decrease in the average age of women. Figure 4 shows that new women added to the directors' pool following the mandate were significantly younger than both their male counterparts and the women already on Boards before the mandate was enforced.

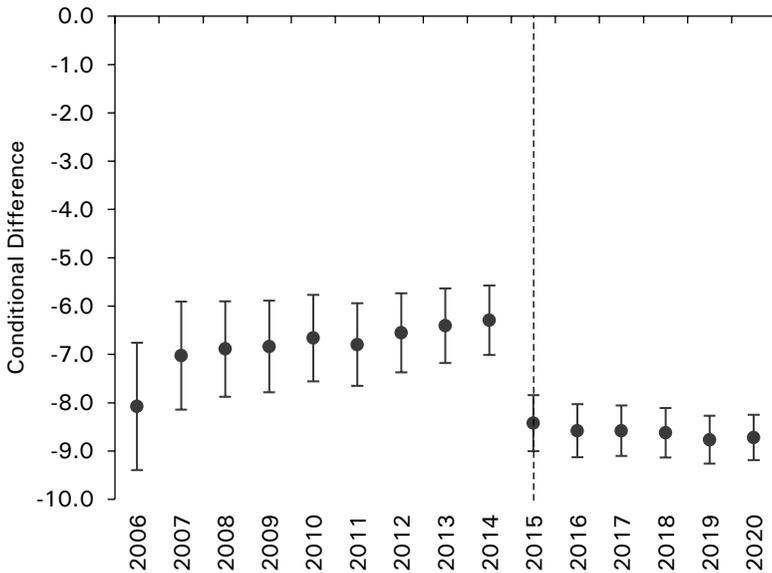
### **3.2.2. EDUCATION LEVEL**

Figure 5 shows the educational profile of both women and men being hired before and after the implementation of the mandate. The average (minimum) number of years of education for women caught up with the average for men around 2012, and became significantly higher (conditional on age) starting from 2015. The average education for women has also been consistently increasing at a faster rate compared to that of men, which remained comparatively flat throughout the period. In sum, following the enforcement of the 'woman director' mandate, women on Boards were significantly younger and more educated than their male counterparts.

**FIGURE 4. Average Age of Directors: By Gender**



Woman Director Mandate Deadline = 2015

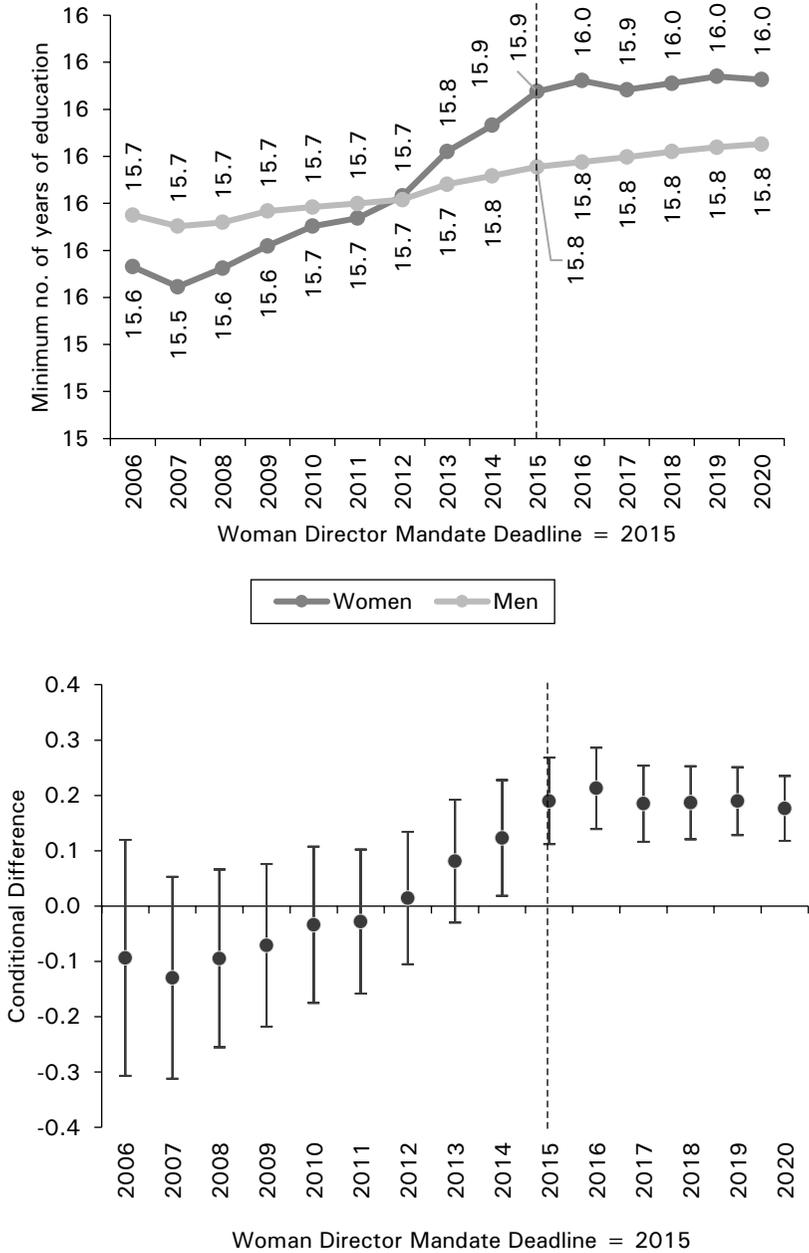


Woman Director Mandate Deadline = 2015

Source: PRIME database.

Note: Age difference between women and men, conditional on year. The bars show the 95% confidence interval.

**FIGURE 5. Average Minimum Years of Education: By Gender**



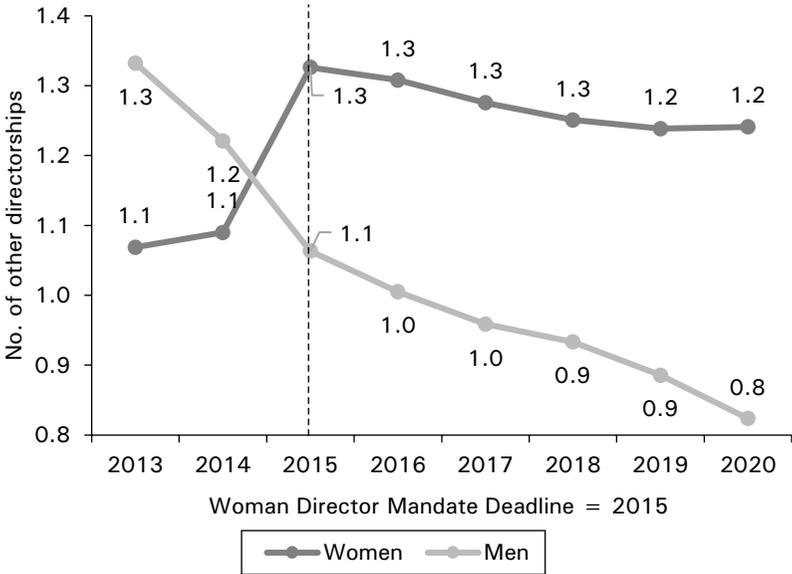
Source: PRIME database.

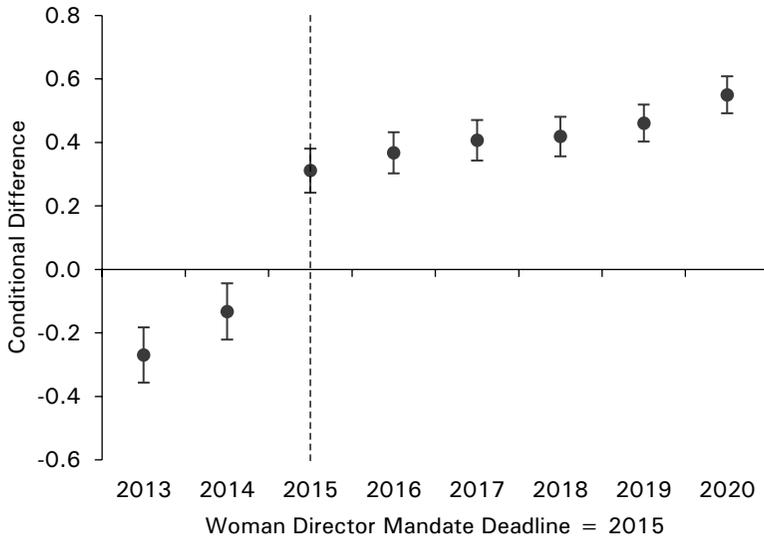
Note: Education level difference between women and men, conditional on age and year. The bars show the 95% confidence interval.

3.2.3. NUMBER OF OTHER DIRECTORSHIPS HELD

Figure 6 shows that on average, women held fewer other directorships compared to men before the implementation of the mandate in 2014. There were also fewer unique women in the pool of directors compared to men before 2015 (around 928 unique women compared to around 15,541 unique men). Although the approximate number of unique women increased after the implementation of the mandate (around 4,677 unique women after 2015), this increase was not enough to keep up with the mandate requirements of having at least one woman on Board. Consequently, the same women were hired across multiple Boards. Furthermore, the approximate number of unique men increased at a faster rate compared to women post-mandate (to around 28,000 after 2015), which likely contributed to a decrease in the average number of other directorships held by men. In general, although the mandate allowed multiple directorships of women on corporate Boards, the pool of women did not expand fast enough to comply with the mandate. This could reflect supply (shortage of qualified women) or demand-side factors (conscious or unconscious bias in hiring) or both. The demand-side factors seem more binding, given that the women being hired were more educated than men.

**FIGURE 6. Average Number of Other Directorships Held: By Gender**





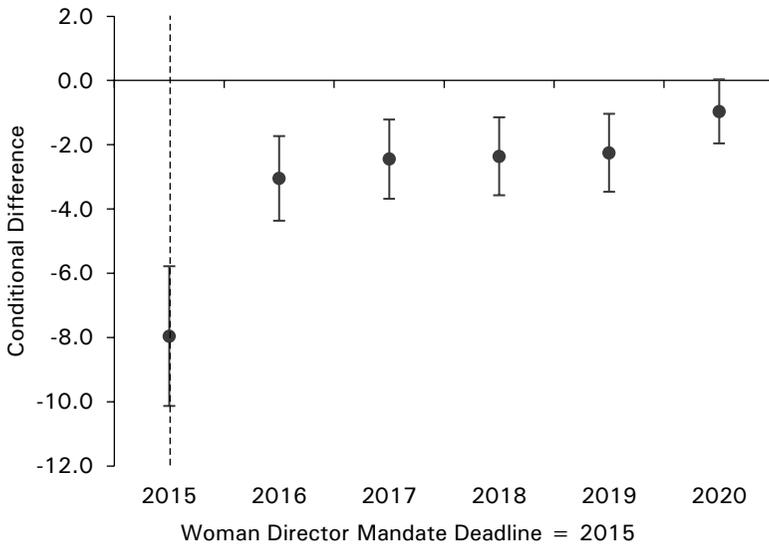
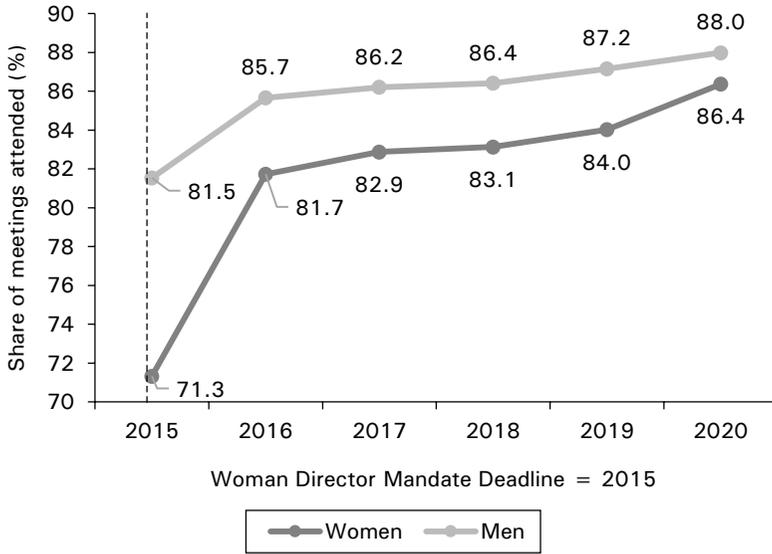
Source: PRIME database.

Note: Difference in multiple directorship between women and men, conditioned on year, education, and age. The bars show the 95% confidence interval.

#### 3.2.4. BOARD MEETING ATTENDANCE

It is also interesting to note that the average share of Board meetings attended by women (an indication of participation in decision-making) was significantly lower than that of men in the years following the implementation of the mandate (Figure 7). However, this gap has been slowly closing, as more firms hire more than one woman on their Boards, leading to greater gender diversity. Despite this, there is still a gender gap in the meeting attendance, implying that women are still not able or willing to attend more meetings. This could reflect female discomfort with male-dominated Boards or the disproportionate burden of unpaid care work on women. The absence of women in Board meetings reduces the ability of women directors to participate fully in firms' decision-making processes.

**FIGURE 7. Average Share of Board Meetings Attended: By Gender**

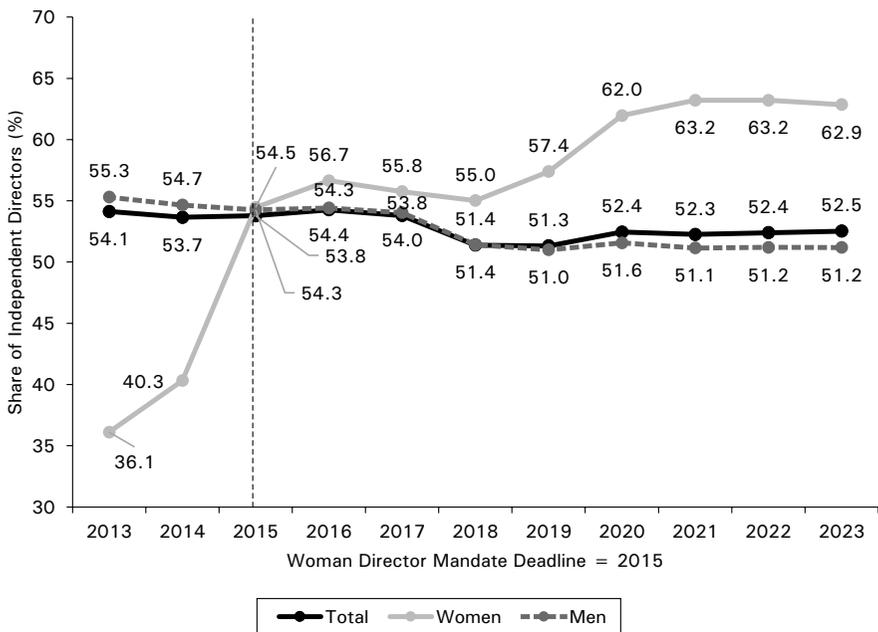


Source: PRIME database.

Note: Board attendance difference between women and men, conditioned on year, education, and age. The bars show the 95% confidence interval.

**3.2.5. BOARD INDEPENDENCE**

A key criticism of implementing a mandate to improve gender diversity on Boards is that such mandates may lead to “tokenism”, where firms appoint

**FIGURE 8. Average Share of Board Independence – Total vs Women vs Men**

Source: PRIME database.

insiders with connections to the owners or current Board members, simply to meet a quota. However, data on director independence paint a different picture. As can be seen in Figure 8, the share of independent women on Boards (out of total women) did not see a decrease following the mandate. In fact, the share of independent women directors surpassed the share of independent men directors, and remained higher throughout the post-mandate period. This may be due to the fact that an amendment to the Companies Act in 2018 mandated the appointment of at least one independent woman director. The deadline for compliance was 1 April 2019, for the top 500 firms by market capitalization and 1 April 2020, for the top 1000 firms. However, while this amendment led to a sharp increase in the share of independent women directors, female directors were already more likely to be independent than their male counterparts even before its introduction. The total level of Board independence remained flat throughout.<sup>4</sup>

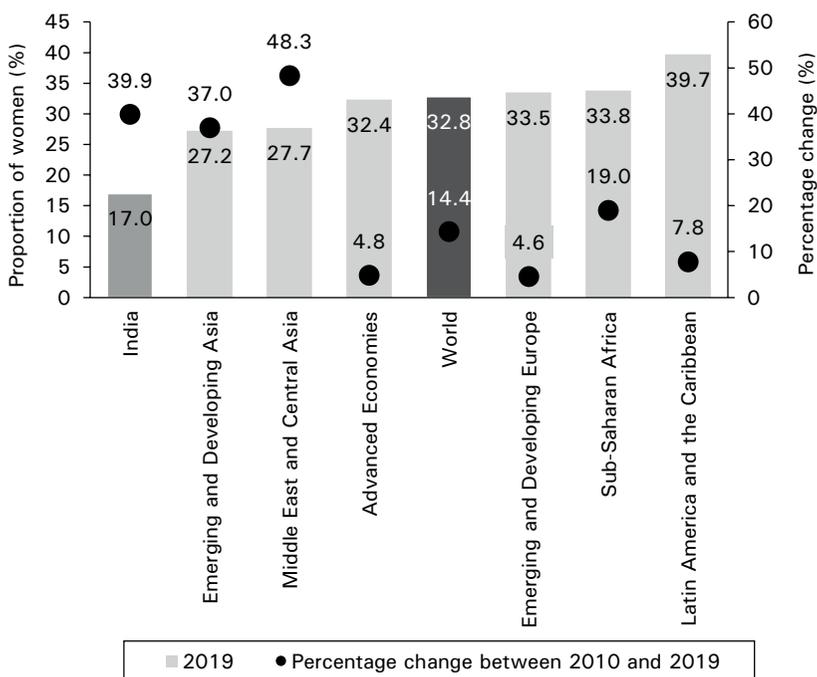
4. Although the statistics show an optimistic picture, we currently do not have the data to meaningfully investigate tokenism in boards following the mandate.

### 3.3. Did the Effect of the Companies Act (2013) Trickle Down to C-suite and Middle Management Positions?

We document gender gaps in management positions in India relative to other countries, as reported by the International Labor Organization. This is defined as the number of women employed in middle and senior management as a percentage of total employment in management. The data for this indicator were available for 69 countries in 2010 and for 96 countries in 2019. We calculate group averages using IMF's definitions for country groups and track the progress for these groups relative to India over a 10-year period (2010-2019) for which comparative data are available.

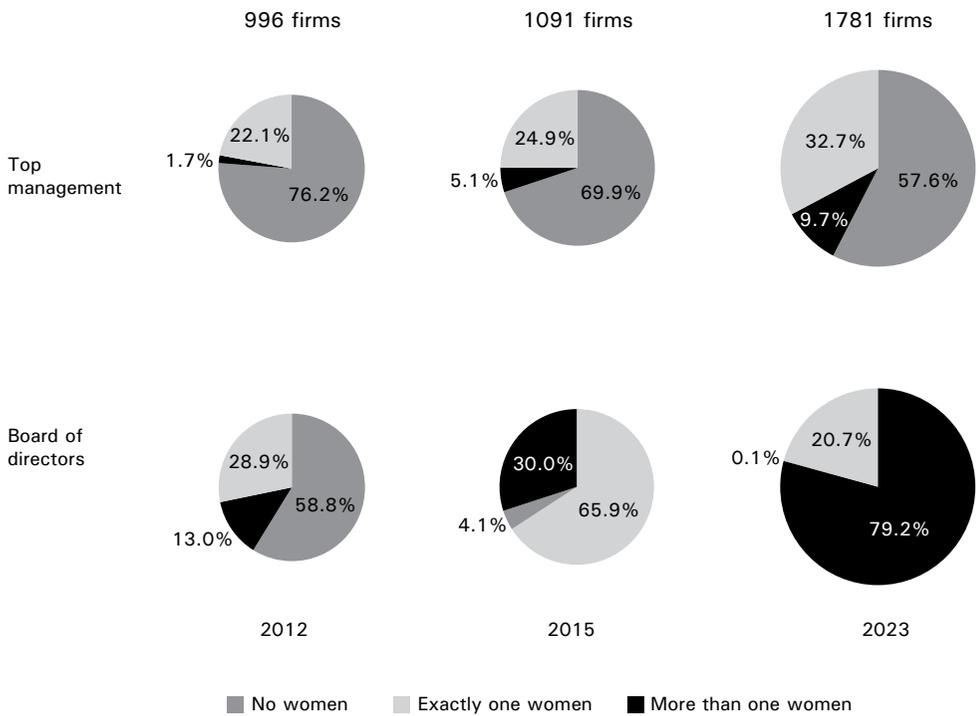
Figure 9 shows that presence of women in top management positions is the lowest for India relative to other regions and compared to the global average, even though the rate of increase is among the highest during 2010-19.

**FIGURE 9. Share of Women in Management Positions in a Global Context**



Source: ILOSTAT.

**FIGURE 10. Share of Firms in Sample by Number of Women in Leadership**



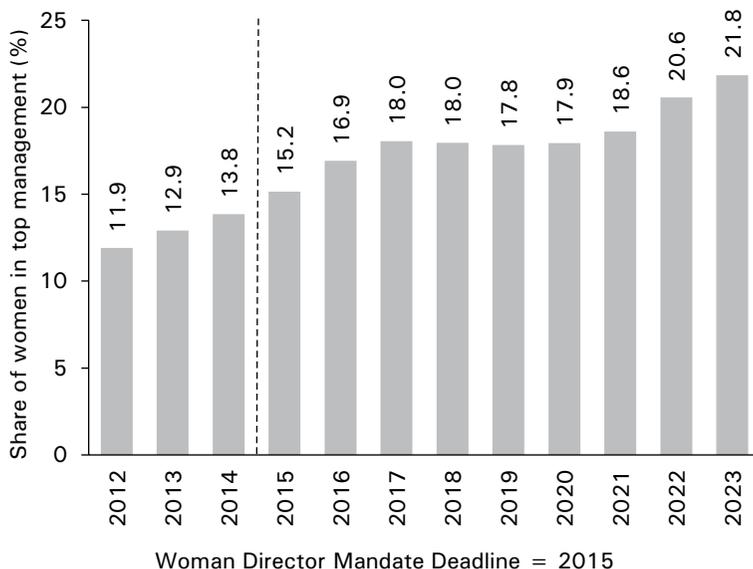
Source: PRIME database.

We next explore if there were positive spillovers from the ‘female director’ mandate to management positions in India. The mandate has been successful in that the share of firms with no women on Board dropped from 58.8 percent in 2012 to 4.1 percent in 2015, as observed in Figure 10. Furthermore, many firms went beyond the mandate and appointed additional women post-2015. The proportion of firms in the sample with two women or more increased from 13 percent in 2012 to 30 percent in 2015, and reached nearly 80 percent in 2023.

With regard to management positions, there is little evidence of positive spillovers. More than 50 percent of NSE-listed firms had no women in the top management team in 2023; 33 percent had only one woman; and less than 10 percent had more than one woman. This is concerning as Post et al. (2021) find that women’s integration in top management teams is effective only when there is more than one woman in such teams.

The absence of spillovers from the ‘director mandate’ to management positions is confirmed in Figure 11 where no jump in the share of women in top management (C-suite) positions is observed following the implementation of the mandate.

**FIGURE 11. Share of Women in Top Management**



Source: PRIME database.

#### 4. Gender Composition of Boards and Firm Performance

To establish a causal effect of female representation on Boards on firms’ financial performance, we use the external shock stemming from the implementation of the Companies Act (2013), and divide firms into policy “unaffected” and policy “responders” groups.

#### 4.1. *Sample Design*

A firm is in the “responders” group if it is an NSE-listed firm and has had no women Board directors prior to the enforcement of the mandate in 2015, but subsequently appointed at least one woman to their Board by the deadline. The “responders” group, therefore, contains only compliers for the purpose of our study. This led to the dropping of 11 non-complying firms from our original sample. The “unaffected” group has firms that already had women on their Board before the mandate was implemented.

The year firms were affected by the mandate is defined as the later of the two years: the first year the firms were listed or 2015 (the year the Companies Act was enforced) is taken as the enforcement year because the Companies Act came into force in October 2013, and the deadline to meet the mandate was April 2015.

Firms that were listed on the NSE after 2015 had to be dropped for two main reasons. The first reason relates to a lack of relevant information on these firms. Our database starts recording Board information for firms either from 2006 or from the year they were listed on the National Stock Exchange (NSE). Therefore, if firms were listed after the mandate deadline (2015) and they had at least one woman on their Board in the first year of observation, we do not have any information on whether the woman was appointed before the firm’s mandate deadline (classifying the firm as “unaffected”), or after the deadline (classifying the firm as a “responder”). Second, even if we knew the year when the first woman was appointed to the Board, if they were not listed by 2015, they could have still been affected by the changes in hiring environment and the general move towards equitable gender representation in Boards. Including these firms in the “unaffected” group rather than the “responders” group could, therefore, bias our empirical estimates downwards, and vice versa, if they were not affected by the changing environment. By dropping the firms that were listed after 2015, the treatment year for all firms included in the sample is 2015.

We begin our sample with 2580 firms for which data on both financial performance and Board-related composition and characteristics are available. We exclude 684 firms that were listed after 2015 for reasons noted in the previous paragraph. We then drop an additional 424 firms for which either pre- or post-treatment observations were not available. Finally, we remove 59 firms that were unlisted after the mandate was implemented. The final sample size for estimation purposes, therefore, includes 1413 firms, of which 707 firms are in the “unaffected” group, and 706 are in the “responders” group. Of the 706 “responders”, 11 firms are non-compliers, and 695 firms are compliers. After dropping these 11 firms, we finally have 707 “unaffected” firms and 695 “responder” firms.<sup>5</sup>

---

5. The dropped firms are more likely to be smaller and younger relative to the firms in our final sample, but have a similar distribution over industries. Given the difference in average size and age, excluding these firms might introduce a selection bias to our final estimate. Since we do not have enough data for these firms to include them in our model, we are unable to rule out this bias.

## 4.2. Empirical Model

To find the impact of hiring at least one female Board member on the financial performance of firms, we exploit the exogenous policy shock of the Companies Act (2013), and implement a difference-in-differences (DiD) in reverse strategy a la Kim and Lee (2018). Since all firms in our sample either have to comply or have already complied with the mandate, we do not have treatment and control groups. Instead, we have an “always treated” (unaffected) group and a “switched” (responder) group. The always treated group had women on their Board even before the Act was implemented, and therefore did not need to change their hiring behavior. The switched group did not have any women on their Board after the Act was implemented, and therefore, had to change their behavior.<sup>6</sup>

The following DiD in reverse model is estimated:

$$Y_{it} = \alpha + \delta D_{it} + \beta_1 \text{size}_{it} + \beta_2 \text{traded}_{it} + \gamma_i + \theta_t + \epsilon_{it} \quad (1)$$

where  $Y_{it}$  is the outcome (financial indicators) for firm  $i$  at time  $t$ ;  $\text{size}_{it}$  is a dummy fixed effects variable for the three categories of firms—large, medium, and small cap;  $\text{traded}_{it}$  is a dummy variable indicating whether firm  $i$  was traded on the stock market (either NSE or BSE) at time  $t$ ;  $D_{it}$  is a treatment dummy as explained below; and  $\gamma_i$  and  $\theta_t$  are firm and time-fixed effects, respectively.

The dummy  $D_{it}$  gives the treatment status of firm  $i$  at time  $t$ . Since we have responders (switched firms) and unaffected firms (always treated firms),  $D_{it}$  is calculated in the following way:

$$D_{it} = 1 - Q_i + Q_i I_{[t \geq 2015]} \quad (2)$$

where  $Q_i$  is equal to 0 if firm  $i$  is a “policy unaffected” firm and equals 1 if the firm is a “policy-responder.” The term  $I_{[t \geq 2015]}$  is equal to 1 if the year is equal to or greater than 2015, and 0 if not. This means that  $D_{it}$  for a “policy unaffected” firm is equal to 1 throughout the sample period. On the other hand,  $D_{it}$  for a “policy-responder” is 0 before 2015 and 1 thereafter.

Here, we can interpret “treatment” as a firm’s willingness to hire at least one woman on the Board, either at their own volition or due to the mandate (thus reflecting hiring behavior that can be interpreted as more gender-diverse at the director level). Intuitively, the treatment dummy  $D_{it}$  reflects this, and takes the value 1 for unaffected firms throughout the time period (given their willingness to hire at least one woman without the need for a mandate). Similarly, it takes the value of 1 for the responder group only after 2015, given that their willingness to hire at least one woman switched following the mandate. Since the DiD in reverse model is simply a traditional DiD model which has been linearly transformed by the term  $\delta(1 - Q_i)$ , our coefficient estimate  $\delta$  will be equal for

---

6. Only five listed firms had no women on their board during the sample period. We assume that the appointment of all women in FY 2014-15 was in response to the mandate.

both the DiD and DiD in reverse models. However, by implementing the DiD in reverse model, we are able to account for the fact that the average impact of having at least one woman on Board (following the willingness to appoint at least one woman) would be driving financial performance of the unaffected firms throughout the time period, while for responder firms, this impact would kick in only after the implementation of the mandate.

For the DiD in reverse model to yield unbiased results, a key assumption that needs to be made is that in the absence of the mandate, the financial outcomes of the two groups would have followed the same trend over time, even if there are systematic differences in the value of the financial outcomes. Given that this assumption is plausible, we can take the behavior of the unaffected firms in the post-period as the counterfactual.<sup>7</sup> We then estimate the “catch up” by responder firms over the years following the implementation of the mandate, which gives us an estimate of the post-period effects of the mandate on responder firms.

We use event study plots to visualize the similarity or difference in trends between unaffected and responder firms, taking 2014 as the base year. This also helps us to visualize the effect of the implementation of the mandate at each point in time, starting in 2015.

For this, we run the following regression:

$$Y_{it} = \alpha + \lambda_t(Q_i * year_t) + \beta_1 size_{it} + \beta_2 traded_{it} + \gamma_i + \theta_t + \epsilon_{it} \quad (3)$$

where  $\lambda_t$  represents the systematic difference in value of the average financial outcomes between the unaffected and responder firms at time  $t$ . We take 2014 as the base year, when the difference in the value of the financial indicators between the two groups is normalized to zero. Our hypothesis is that  $\lambda_t$  should not be significantly different from zero before the year of treatment (2015) for the parallel trends assumption to hold.

Event study plots for profits after tax, returns on net worth, and debt-to-equity ratio are presented in and discussed further in the next section.

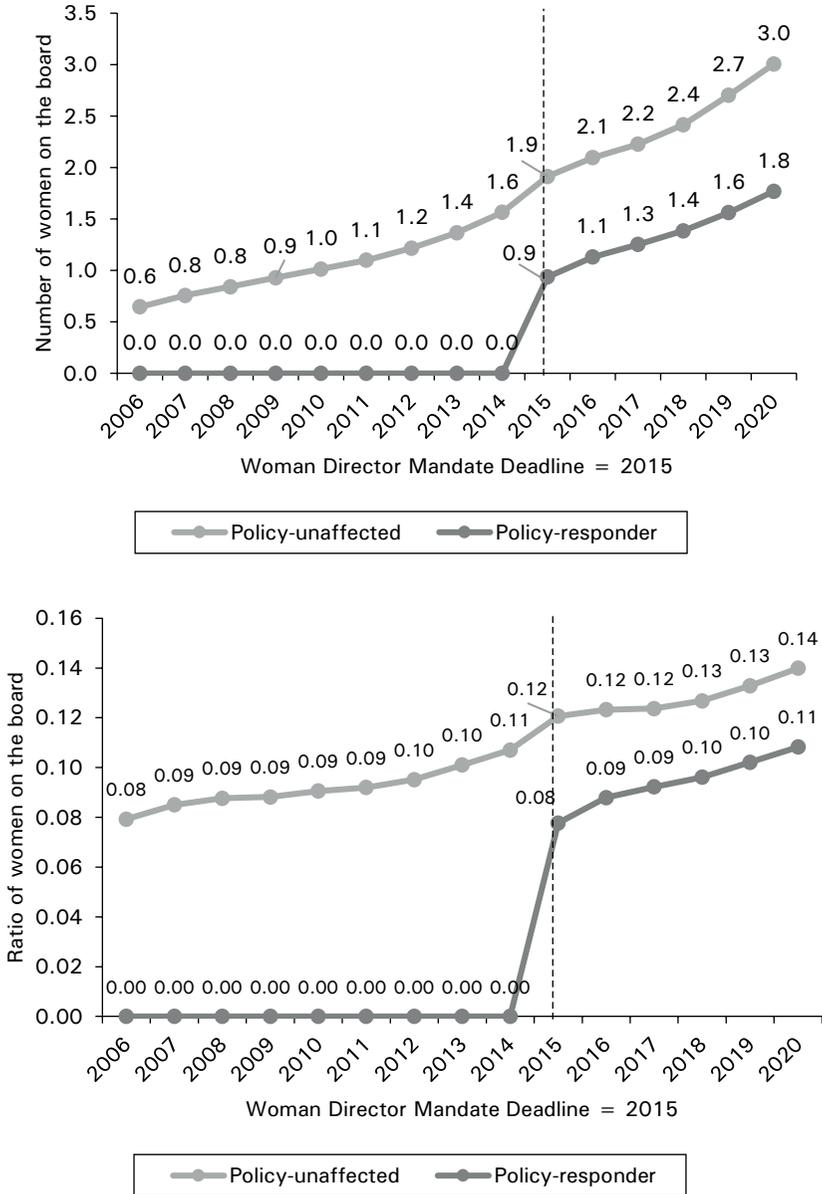
### 4.3. Trends by Treatment Group and Common Time Trends

Since the policy was implemented on 12 September 2013, and the deadline for compliance was eventually set for 1 April 2015 (end of FY 2014-15, represented as 2015 in our dataset), we assume that most of the women being hired as a response to this policy were appointed during 2015. We can observe the jump in the average share of women on Boards for responder firms in Figure 12, while the trend for unaffected firms remains relatively flat. The dark gray line in Figure 12 shows the deadline for the mandate (end of FY 2014-15, represented by 2015 in our dataset).

---

7. Following Kim and Lee (2019), this is a plausible counterfactual if the condition of common trends in the pre-treatment periods between the two groups is met.

**FIGURE 12. Number and Ratio of Women on Board: By Treatment Group**



Source: PRIME database.

Appendix I, Table A1 provides a detailed description of firm characteristics by treatment group—the unaffected and responder groups.

Figure 13 shows event study plots for three firm outcomes: profit after tax, return on net worth, and debt-to-equity ratio.<sup>8</sup> These graphs plot the coefficients (as described in Equation 3) for all years except for 2014, which is taken as the base year and normalized to zero. Therefore, the coefficients for each year show the conditional differences between responder and unaffected firms.

For all the three event studies, the coefficients are not significantly different from zero in the pre-mandate period, confirming the plausibility of the parallel trends.

For profit after tax, the average difference between outcomes for responder and unaffected firms with respect to 2014 is insignificant and very close to zero in the pre-mandate period. There is a jump in the year after the mandate enforcement (2016), and the conditional differences in the post-mandate years show that on average, there is a positive catch-up (indicated by the positive mean), leading to a lower conditional difference between the two groups. Similar trends can be seen for returns on net worth. However, the jump (and the corresponding “catch-up” for policy responders) following the mandate enforcement is not as significant for returns on net worth, and the effect of the mandate seemingly diminishes in the following years, reaching pre-mandate difference in 2020.<sup>9</sup>

For debt-to-equity ratio, unaffected firms, on average, have consistently had higher debt-to-equity ratios, both before and after the mandate’s enforcement. However, this difference seems to be widening in the years following the mandate enforcement, as the average debt-to-equity ratio for policy responders is pushed downwards. However, conditional on firm fixed effects, size, and trading status, the event study plot shows that this change in the debt-to-equity ratio for responders with respect to unaffected firms is small and insignificant.

We compare the average financial performance of unaffected firms and responder firms in the pre-period, and find that unaffected firms are more likely to be mid- or large-cap firms. We find that these unaffected firms have significantly higher profits and returns on net worth in the pre-period. These baseline differences could affect how unaffected firms and responder firms may respond to the policy shock and also threatens the validity of using the unaffected firms as a control group. However, it is worth noting that our model identifies within-firm changes over time and the firm fixed effects in our regression allows us to control for these systematic differences in the baseline.

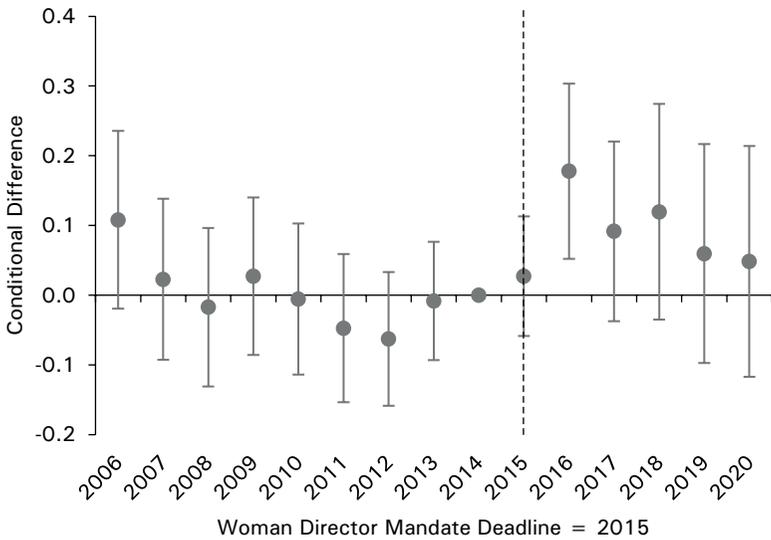
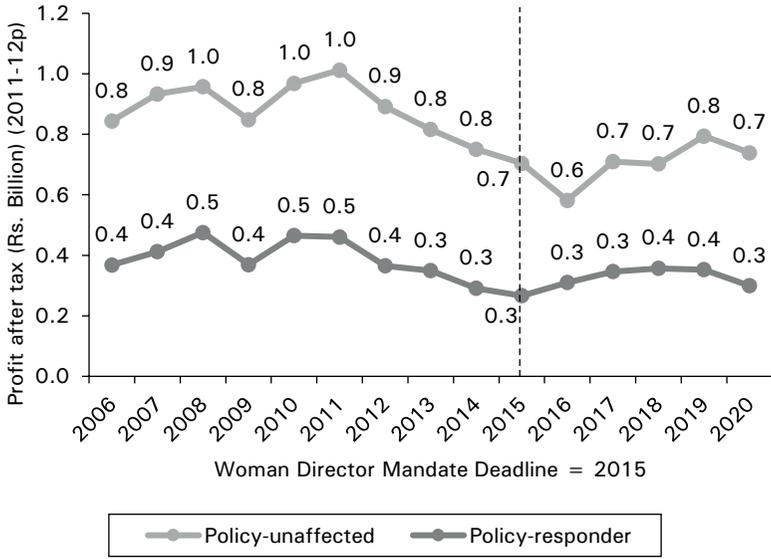
---

8. Profit after tax (given in Rs billion) has been adjusted for inflation using FY 2011-12 as the base year. Additionally, all measures of financial performance have been transformed using the inverse hyperbolic sine function in order to reduce bias introduced by outliers in the data.

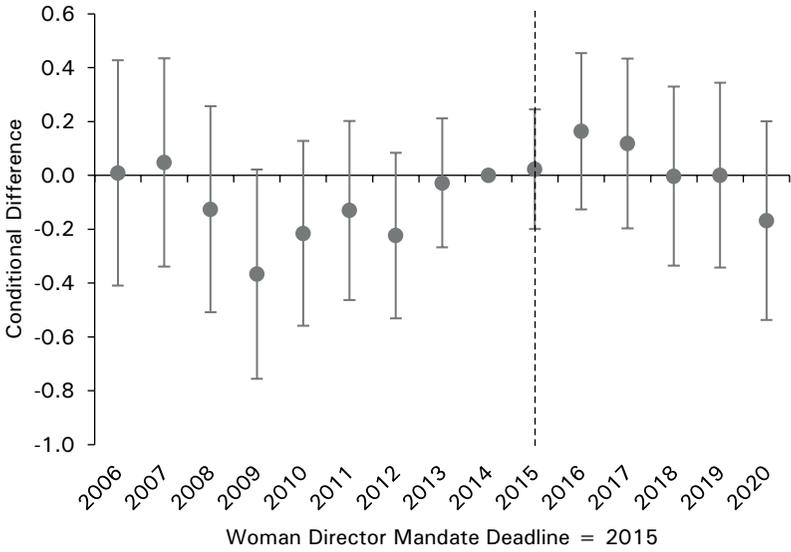
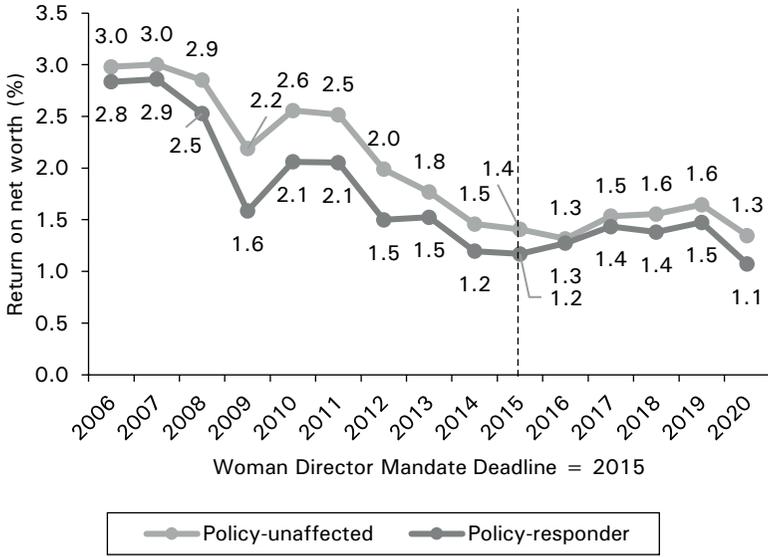
9. Furthermore, most of the difference between average post- and pre-mandate conditional difference between policy-unaffected and policy-responders seems to be driven by the fact that the financial crisis in FY 2008-09 seemingly hit responders harder, widening the difference between the two groups. This is plausible, since policy-responders are, on average, smaller, and by association, less likely to be able to absorb external shocks.

**FIGURE 13. Unconditional Means and Conditional Differences**

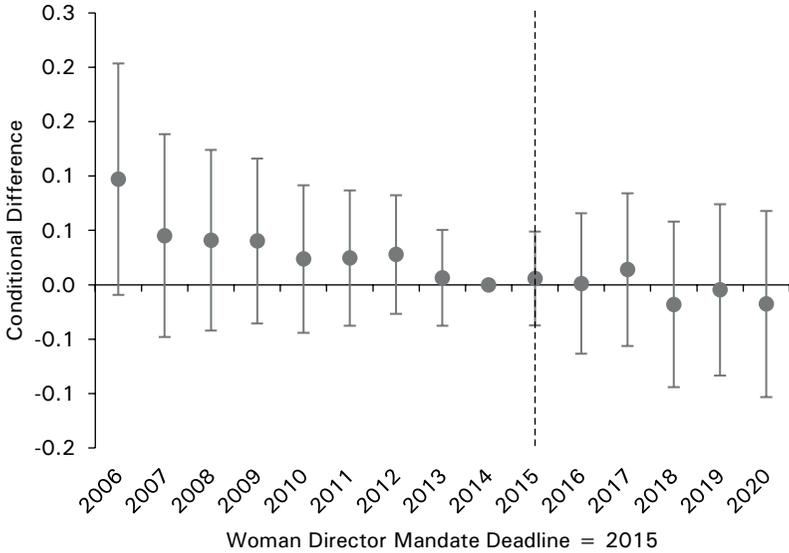
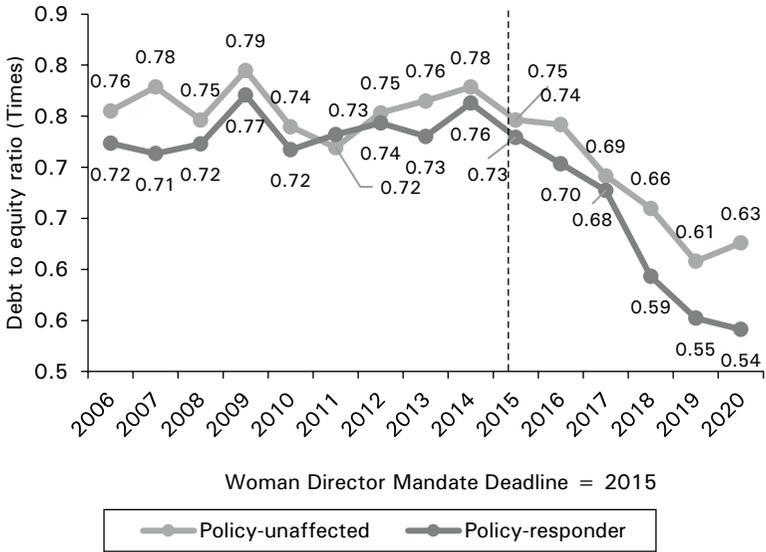
Profit after Tax (2011-12P)



Return on Net Worth



Debt-to-Equity Ratio



Source: PRIME and CMIE databases.

Note: All indicators have been transformed using the inverse hyperbolic sine (I.H.S.) function, to reduce the effect of outliers. The bars show the 95% confidence interval.

#### 4.4. Regression Results

Table 1 shows the result of the difference-in-difference (DiD) in reverse regression, controlling for firm size, trading status, and firm and year fixed effects. Following the mandate's enforcement, firms that did not have any women on Board, and therefore, had to appoint at least one woman, experienced 9.4 percent higher profits, 14.6 percent higher returns on net worth, and 3.1 percent lower debt-to-equity ratio. However, the results for return on net worth and debt-to-equity ratio are not statistically significant, and the result for profits after tax is weakly significant.

Following our observations from the event study plots (Figure 13), it is possible that the weak significance of these results is driven by the fact that the jump following the mandate did not result in consistently lower differences between the responder and unaffected firms. For profit after tax, the difference between the two groups reverted to the pre-mandate difference around 2017, while for returns on net worth and debt-to-equity ratio, the mandate effects were insignificant throughout.<sup>10</sup>

**TABLE 1. D-I-D in Reverse Regression Results**

	<i>Profit after tax (Rs. Billion) (2011-12p)</i>	<i>Return on net worth (%)</i>	<i>Debt to equity ratio (Times)</i>
[1 – Responder + (Responder*Post)]	0.0939* (0.0515)	0.146 (0.116)	-0.0313 (0.0289)
Traded dummy	Yes	Yes	Yes
Size FE	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Observations	17587	16647	16591
Mean of Dep. Variable	0.587	1.803	0.712

Source: Authors' calculations.

Note: Standard errors (in parentheses) are clustered at the firm level. Dependent variables are transformed by the inverse hyperbolic sine function \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

The coefficient refers to the DiD-in-reverse treatment dummy, which is equal to 0 for responder firms and 1 for unaffected firms before policy implementation (before 2015) and 1 for all firms after policy implementation (2015 onwards). The coefficient represents the difference between the average difference in financial performance between unaffected and responder firms after policy implementation (when both groups have the same treatment state) and the average difference between unaffected and responder firms before policy implementation (when responder firms are "not treated"). Therefore, the coefficient shows average "catch-up" in financial performance indicators for responder firms, with respect to the unaffected firms following the enforcement of the mandate.

10. It is also important to note the impact of the financial crisis of 2008-09 (represented as 2009 in our data) on our final estimate. Policy-unaffected firms were seemingly less affected by the financial crisis, and there might be an upward bias in our final treatment effect because of this.

We expect the effect of hiring at least one woman on Boards, where there were previously none, on firm performance to differ across different types of firms. Our hypothesis is that larger firms with more resources and better benefits (in all positions) are more likely to attract and retain more women on Boards show better results. This is tested in the next section.

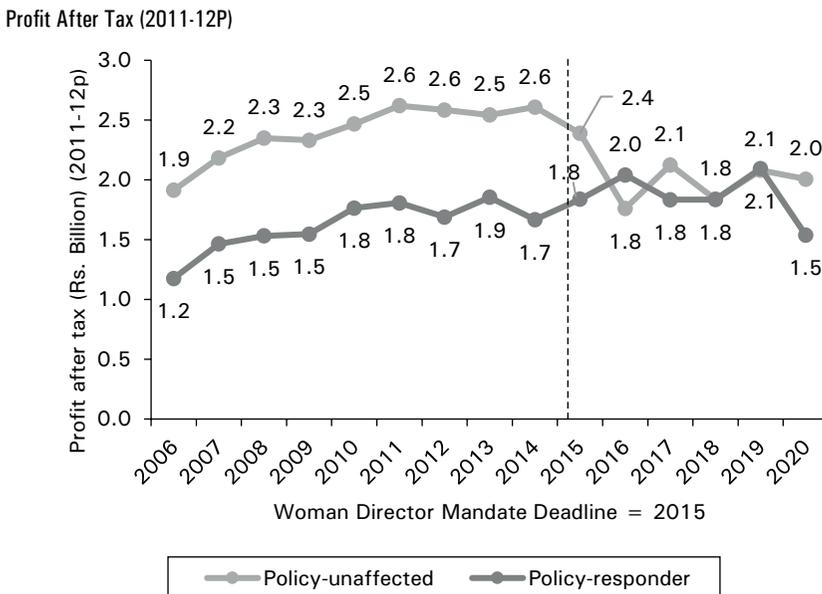
#### 4.5. Heterogeneity By Size

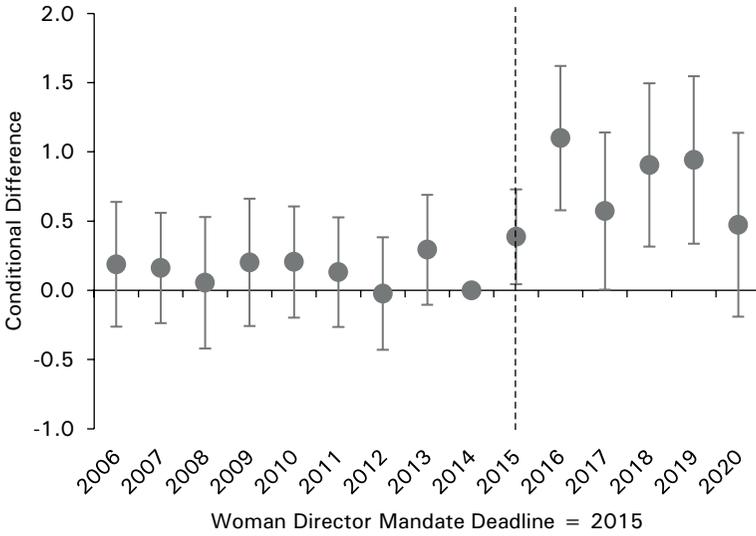
We run separate regressions on sub-samples of two groups: (i) small-cap firms, and (ii) mid- and large-cap firms. The sample is divided based on the average size group of firms throughout the period of observation, rather than the size group of the firms in a particular year. We do this to reduce the effect of large spikes in firm performance (resulting in changes in a firm’s market capitalization, and by association, current size group) on the sample selected.

We divide the sample into the two size groups to allow for changes in the coefficients because there may be structural difference in the relationship between firm performance and the presence of female directors.

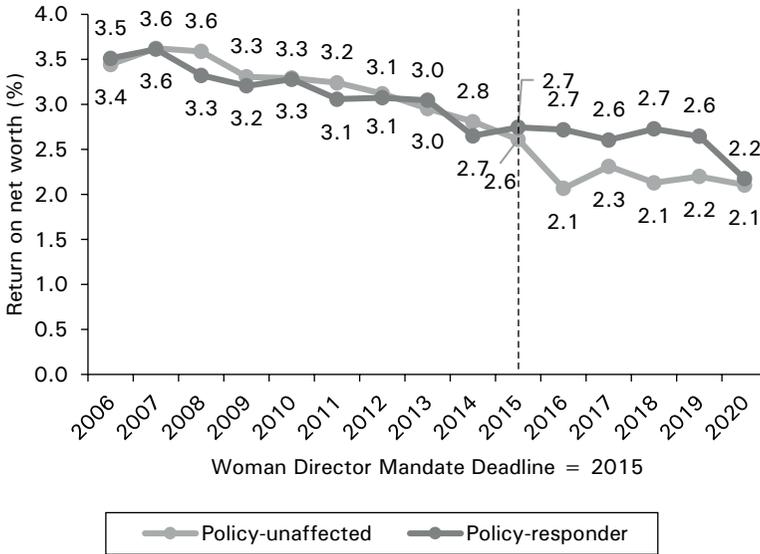
The event studies for only the sample of mid- and large-cap firms are given in Figure 14. For larger responder firms, the change in conditional differences following the mandate enforcement did not revert to pre-mandate differences as quickly as it did for small-cap firms. This ability to maintain the jump in

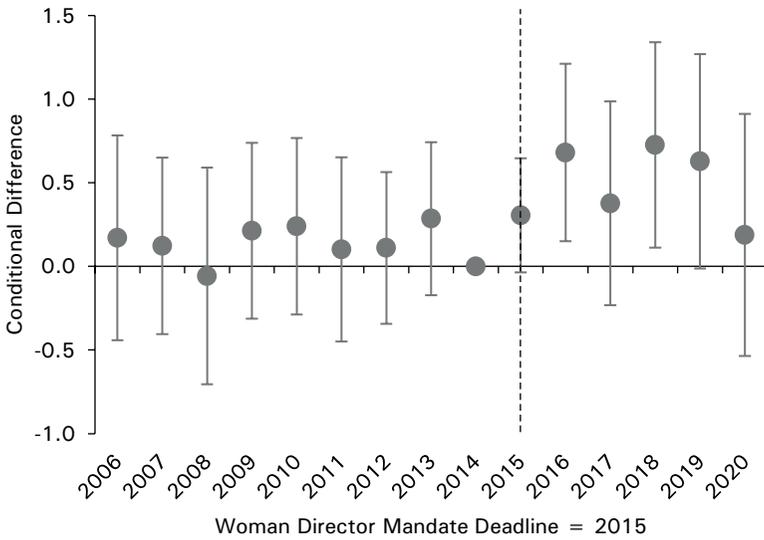
**FIGURE 14. Unconditional Means and Conditional Differences – Subset of Mid- and Large Cap Firms**



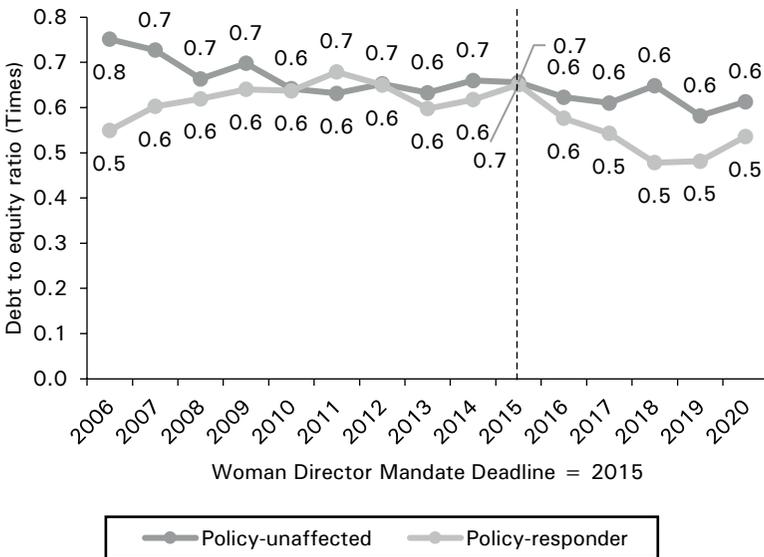


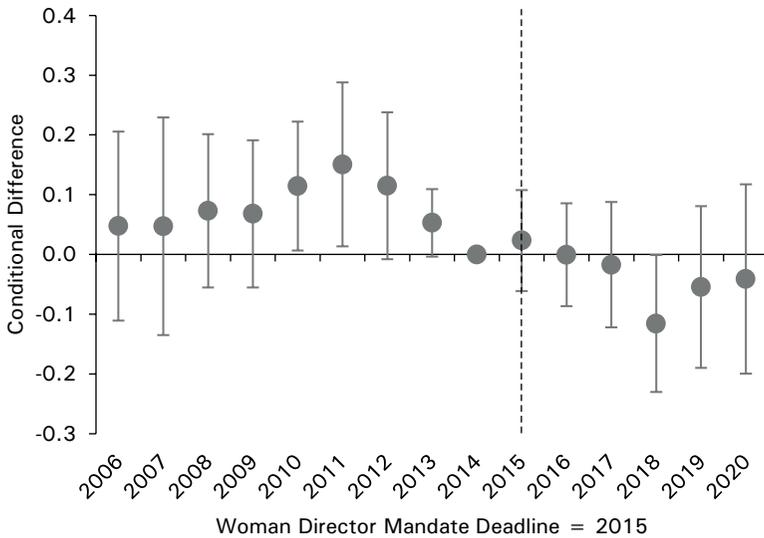
Return on Net Worth





Debt-to-Equity Ratio





Source: PRIME and CMIE databases.

Note: All indicators have been transformed using the inverse hyperbolic sine (I.H.S.) function, to reduce the effect of outliers. The bars show the 95% confidence interval.

performance in the years following the mandate led to a more consistent shift in firm performance for these firms. In other words, there was a significant positive effect of the mandate on these firms.

As can be seen in Table 2, mid- and large-cap responder firms experienced almost 60 percent higher profits, 35.3 percent higher returns on net worth, and 11 percent lower debt-to-equity ratio. The effects for the sample of small-cap firms, on the other hand, are weaker and not statistically significant.<sup>11</sup>

11. We also test if treatment effects differ based on whether firms appoint more than one woman at some point in the post-mandate period, as opposed to consistently having only one woman on their boards to meet mandate requirements. Taking the full sample of firms, we find that the treatment effect on profits after tax is stronger and significant (around 10 percent) for firms that appointed more than one woman. However, we do not find a large difference in the treatment effect on returns on net worth.

**TABLE 2. DDR Regression Results – Sub-sample, By Firm Size**

	<i>Profit after Tax (Rs. Billion) (2011-12p)</i>		<i>Return on Net Worth (%)</i>		<i>Debt to Equity Ratio (Times)</i>	
	<i>Small-cap</i>	<i>Mid- or Large-cap</i>	<i>Small-cap</i>	<i>Mid- or Large-cap</i>	<i>Small-cap</i>	<i>Mid- or Large-cap</i>
[1–Responder + (Responder*Post)]	-0.0169 (0.0413)	0.599*** (0.172)	0.108 (0.137)	0.353* (0.184)	-0.0240 (0.0341)	-0.110** (0.0508)
Traded dummy	Yes	Yes	Yes	Yes	Yes	Yes
Size FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	14380	3207	13482	3165	13430	3161
Mean of Dep. Variable	0.247	2.111	1.556	2.857	0.730	0.634

Source: Authors' calculations.

Note: Standard errors (in parentheses) are clustered at the firm level.

Dependent variables are transformed by the inverse hyperbolic sine function.

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

The coefficient refers to the DiD-in-reverse treatment dummy, which is equal to 0 for responder firms and 1 for unaffected firms before policy implementation (before 2015) and 1 for all firms after policy implementation (2015 onwards). The coefficient represents the difference between the average difference in financial performance between unaffected and responder firms after policy implementation (when both groups have the same treatment state) and the average difference between unaffected and responder firms before policy implementation (when responder firms are "not treated"). Therefore, the coefficient shows average "catch-up" in financial performance indicators for responder firms, with respect to the unaffected firms following the enforcement of the mandate.

**TABLE 3. DDR Regression Results – Consistent Sample**

	<i>Profit after Tax (Rs. Billion) (2011-12p)</i>	<i>Return on Net Worth (%)</i>	<i>Debt to Equity Ratio (Times)</i>
[1–Responder + (Responder*Post)]	0.187** (0.0787)	0.180 (0.163)	-0.0525 (0.0374)
Traded dummy	Yes	Yes	Yes
Size FE	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Observations	8490	8189	8182
Mean of Dep. Variable	0.841	2.081	0.692

Source: Authors' calculations.

Note: Standard errors (in parentheses) are clustered at the firm level.

Dependent variables are transformed by the inverse hyperbolic sine function.

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

The coefficient refers to the DiD-in-reverse treatment dummy, which is equal to 0 for responder firms and 1 for unaffected firms before policy implementation (before 2015) and 1 for all firms after policy implementation (2015 onwards). The coefficient represents the difference between the average difference in financial performance between unaffected and responder firms after policy implementation (when both groups have the same treatment state) and the average difference between unaffected and responder firms before policy implementation (when responder firms are "not treated"). Therefore, the coefficient shows average "catch-up" in financial performance indicators for responder firms, with respect to the unaffected firms following the enforcement of the mandate.

#### 4.6. Robustness Check – Consistent Sample of Firms

To check the sensitivity of the effect of appointing women on Boards to changes in the sample of firms across time, we take a fixed sample of firms for which data are consistently available for all 15 years taken for our analysis (2006 to 2020). This gives us a sample of 567 firms, out of which 306 are unaffected and 261 are responders. The results for this are shown in Table 3.

Within the consistent sample of 567 firms, 142 firms are, on average, not in the small-cap category. Out of these, 108 firms are unaffected and 34 firms are responders. On average, 424 firms are in the small-cap category, out of which 198 firms are unaffected and 226 firms are responders. We rerun DDR using a consistent sample of firms, divided by their average size group (either small-cap, or mid- to large-cap). The results for this are shown in Table 4. These results indicate that the qualitative results are the same for the sub-sample of firms for which we have data for all 15 years.

**TABLE 4. DDR Regression Results – Consistent Sample, Sub-sample By Firm Size**

	<i>Profit after Tax (Rs. Billion) (2011-12p)</i>		<i>Return on Net Worth (%)</i>		<i>Debt to Equity Ratio (Times)</i>	
	<i>Small-cap</i>	<i>Mid- or Large-cap</i>	<i>Small-cap</i>	<i>Mid- or Large-cap</i>	<i>Small-cap</i>	<i>Mid- or Large-cap</i>
[1–Responder + (Responder*Post)]	-0.0148 (0.0579)	0.781*** (0.217)	0.0190 (0.197)	0.463* (0.238)	-0.0332 (0.0467)	-0.116** (0.0569)
Traded dummy	Yes	Yes	Yes	Yes	Yes	Yes
Size FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	6360	2130	6091	2098	6088	2094
Mean of Dep. Variable	0.369	2.249	1.800	2.897	0.702	0.663

Source: Authors' calculations.

Note: Standard errors (in parentheses) are clustered at the firm level.

Dependent variables are transformed by the inverse hyperbolic sine function.

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

The coefficient refers to the DiD-in-reverse treatment dummy, which is equal to 0 for responder firms and 1 for unaffected firms before policy implementation (before 2015) and 1 for all firms after policy implementation (2015 onwards). The coefficient represents the difference between the average difference in financial performance between unaffected and responder firms after policy implementation (when both groups have the same treatment state) and the average difference between unaffected and responder firms before policy implementation (when responder firms are “not treated”). Therefore, the coefficient shows average “catch-up” in financial performance indicators for responder firms, with respect to the unaffected firms following the enforcement of the mandate.

#### 4.7. Interpretation of Results and Caveats

While we do not have the data to rigorously test the mechanisms explaining these results, there are a few plausible mechanisms identified in the literature that could explain the positive relationship between women's representation on Board and firm performance.

First, gender-balanced Boards can partially substitute weak corporate governance (Gul et al. 2011). Adams and Ferreira (2009) find that having female directors on Board can improve monitoring and oversight management, thereby strengthening corporate governance. Using descriptive data on attendance of Board members in our context, we find suggestive evidence that the gender gaps in Board meeting attendance have been going down over time in conjunction with increased presence of women on Boards. Moreover, adding women to a previously all-male Board has the potential to drastically change the culture within the boardroom, leading to better attendance and governance by the male counterparts as well.

Second, if there are discriminatory hiring practices, women of higher quality might get hired, leading to better outcomes. We find that women hired as Board members have more years of education as compared to the male Board members, although there are very strong pre-trends in this increase in education.

Third, women may bring different experiences, perspective and network (Biswas et al. 2023) access. This multiplicity of views and better risk management by having balanced decision-making may improve the quality of Board decisions and lead to better firm practices (Hillman et al. 2007).

There are some limitations to interpreting our results as causal. Although the results suggest a causal impact of the presence of women on Boards on firm performance, and previous studies support this evidence, data availability and the methodology used in this paper may introduce some biases to our final estimates. It could be that the policy responder and policy unaffected groups are not randomly selected. We find that policy unaffected firms are more likely to be either mid- or large-cap, which is also supported by the finding that women are more concentrated in larger firms, possibly due to the higher benefits and better resources they offer, which aid women's participation and retention in the labor market. Although we account for firm size, certain unobservable factors, like the ability to weather economic, or industrial shocks, might bias our estimates.

Another source of bias could stem from the fact that the Companies Act (2013) introduced several new caveats apart from the 'woman director' mandate. Although these affect all firms, they might affect firms differently based on certain characteristics like size. Given that treatment group allocation is not random, there may be certain changes in trends independent of the 'woman director' mandate that may be driving our results.

Finally, some firms may have appointed one woman to their Board in anticipation of the Act in either FY 2012-13 or FY 2013-14 (given that a version of the Act was first introduced in FY 2012-13, and the final version was

passed in the third quarter of FY 2013-14). This would group them with policy unaffected firms, even though they were responders to the anticipated change in the Company's Act. Furthermore, it is difficult to confidently conclude that the firms that appointed a woman in the post-mandate period would not have done so regardless of the mandate. Since "willingness to appoint a woman" is unobservable, we can only proxy this by the firms' actions in terms of hiring women directors. This could possibly bias our estimates.

## 5. Women in Leadership Positions and Firm Culture

In this section, we focus on the association between the share of women on Boards and firm culture, and the circumstances under which this association holds. Previous studies on this topic suggest that firms with greater gender equity in leadership positions are more likely to be more productive, inclusive, and collaborative, and inspire more organizational loyalty. In this context, it is important to consider the prevalent culture of firms before the mandate—if firms are required by law to appoint women on their Boards, they may not necessarily possess the culture of inclusivity that allows women to meaningfully participate in decision-making.

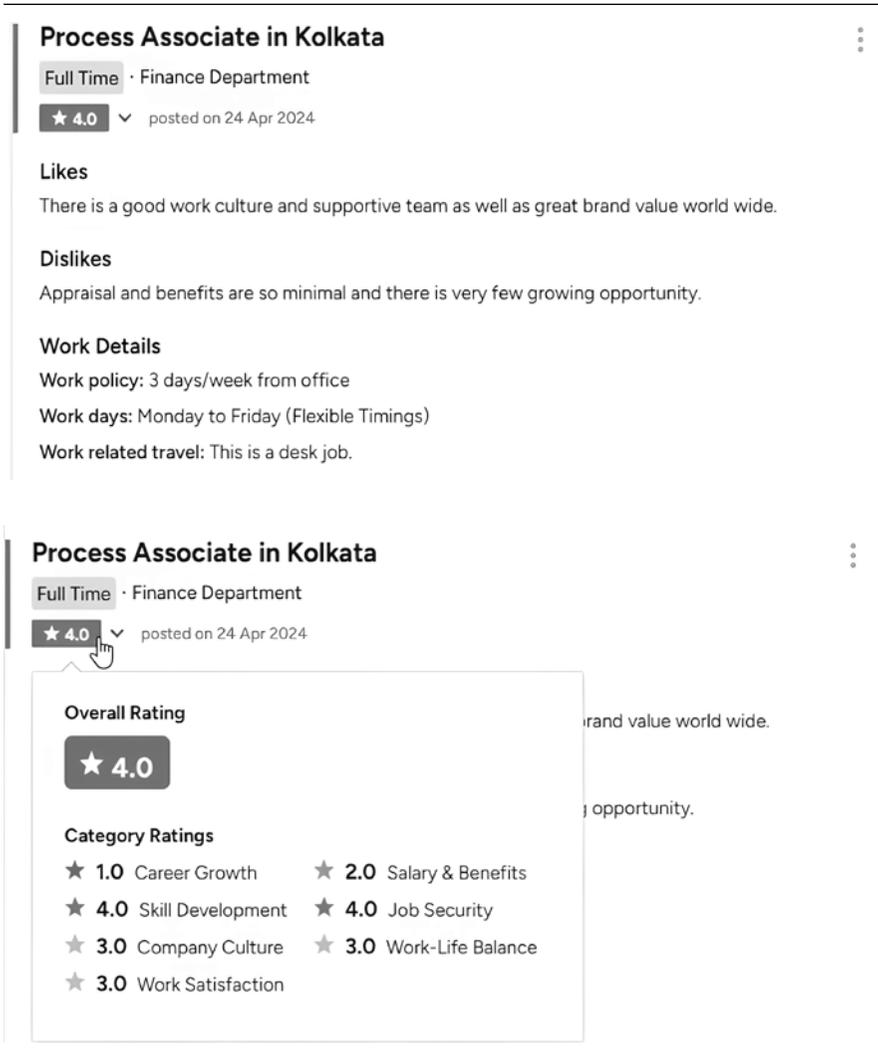
We test two main hypotheses. First, we study the association between ratio of women on Boards and firm culture and hypothesize that this relationship is positive (i.e., we expect higher ratios of women to be associated with better firm culture). Second, we hypothesize that the association between the ratio of women on Board and firm culture is stronger if there is evidence that the firm also has women in senior management positions.

### 5.1. Data Description and Methodology

We quantify firm culture using employee ratings scraped from AmbitionBox, which is an online platform used by employees to find and rate companies. All the reviews posted are from employees working in offices based in India. Since AmbitionBox was established in 2017, data is only available from 2017 onwards.

We scraped more than 1 million employee reviews posted between 2017 and 2023 (the year 2023 also includes reviews posted in the early months of 2024, until March), covering 2526 firms. Figure 15 shows an example review from AmbitionBox. For each review, we collected the overall rating, and ratings given under individual categories (namely career growth, skill development, company culture, work satisfaction, salary & benefits, job security, and work-life balance). These ratings range between 1 and 5. We also collected the review text under 'likes', 'dislikes', and 'work details'. Finally, we collected information on the employee's job title and the year the review was posted.

FIGURE 15. Example of Employee Review from AmbitionBox



Source: AmbitionBox.

We combine some groups to calculate work culture ratings (simple average of company culture, work satisfaction, and work-life balance), growth ratings (simple average of career growth and skill development ratings), and security ratings (simple average of salary & benefits and job security ratings).

Using the processed<sup>12</sup> rich text data collected under ‘likes’, ‘dislikes’, and ‘overall review’, we calculate sentiment polarity scores, which range from -1 to 1.<sup>13</sup> The score is negative if the overall sentiment of the text is negative, positive if the sentiment is positive, and 0 if the sentiment is neutral. Throughout the analysis, these scores have been weighted by the word length of their respective cleaned texts. The texts are “cleaned” to eliminate “stop words” (see Footnote 9) to prevent bias caused by long texts but with very few substantive words, which tend to increase the occurrence of zeros and results in unreliable average scores.

The correlation between overall weighted sentiment polarity scores for the review texts and the ratings left by employees is positive and significant. This correlation is stronger for sentiment polarity scores calculated for ‘likes’ more than ‘dislikes’. This is because employees who leave low ratings are more likely to describe the negative aspects of their workplaces’ cultures using comparatively neutral language. On the other hand, employees who leave positive ratings are more likely to use language with higher positive sentiment in their reviews.

We study four different measures of employee ratings (average ratings, work culture ratings, growth ratings, and work security ratings), and three different measures for employee sentiment (compound sentiment scores for ‘likes’, ‘dislikes’, and ‘total review’ text), giving us seven different measures of firm culture.

Firm culture is more likely to be affected by the ratio of women on Board if this ratio has been consistently high. To account for this, and to avoid introducing bias to our estimates by using outliers, we take the average of the share of women on Board in the current and last year as the main independent variable. Introducing lag terms in our analysis allows us to account for the possible lasting effects of having more women on Board on firm culture.

The average number of reviews per firm rose substantially from 14 in 2017 to 169 in 2023. Since the number of reviews posted per firm was the highest in 2023, and more than 90 percent of firms were covered in 2023, we use 2023 as our year of analysis. This is also done to make sure that we can use lagged averages for gender composition in Board while minimizing the effect

---

12. We process the review texts by excluding words that can be considered “redundant” in terms of influencing overall sentiment of the text. We call these “stop words”. Natural Language Processing Toolkit (NLTK), which is a Python library for Natural Language Processing, considers a list of 179 words as “stop words”, which we exclude from our text data. Both the sentiment polarity scores and word length of reviews have been calculated using text that excludes these “stop words”.

13. For this, use the VADER SentimentAnalyzer function, which is included in the Natural Language Toolkit library on Python. This function works with a sentiment lexicon, which is a dictionary containing words or phrases and their respective sentiment ratings, depending on whether they are positive or negative. For our analysis, the cleaned text for each review is first “tokenized”, or broken into individual words. These individual words are then checked against their respective sentiment scores, based on which the overall compound sentiment score of the text is calculated.

of COVID-19 on our data. Since the main dependent variable for 2023 will be the average share of women on Board in FY 2022-23 and FY 2021-22, we minimize the influence of COVID-19 (FY 2020-21). Therefore, our final sample includes around 400,000 employee reviews.

Each employee review is taken as one observation for the purposes of our study to be able to identify input from managers and other employees separately. As has been observed in surveys worldwide, the seniority of the employees likely changes their perspective on firm culture.

Finally, we control for firm-level characteristics including firm size, industry, and age groups. Instead of size based on market capitalization, we find that size based on the number of employees in the firm explains heterogeneity within ratings and sentiment polarity better. The size is web-scraped from the company profile page on AmbitionBox. The size categories used are: 1-10, 11-50, 51-200, 201-500, 501-1k, 1k-5k, 5k-10k, 10k-50k, 50k-100k, and 100k+ employees. The industry groups are: banking, non-banking finance, construction & real estate, diversified, electricity, manufacturing, mining, and services (other than financial). The firms are divided into age groups based on the year of establishment. The categories used for this are before 1950; between 1951 and 1971; between 1972 and 1985; between 1986 and 1990; and after 1991.

We run simple OLS regressions (including weights for sentiment polarity scores) to quantify the association between firm culture and share of women on Board. Since the share of women in top management positions is heavily concentrated at 0, we are unable to separately study the effect of gender inclusive leadership in top management teams. However, we study the simultaneous impact of having women in Boards and at least one woman in the top management team, as our second hypothesis.

## 5.2. Association between Ratio of Women in Boards and Firm Culture

To check if the association between the ratio of women on Board and firm culture is positive, we run the following regression (for review  $r$  given for firm  $i$ , for year 2023):

$$Y_{ir} = \alpha + \delta \text{ratio}_i + \gamma \text{manager}_{ir} + \beta X_i + \epsilon_{ir} \quad (4)$$

where  $Y_{ir}$  refers to the rating or sentiment score given under review  $r$  for firm  $i$ ,  $\text{ratio}_i$  refers to the average ratio of women on board in 2022 and 2023 for firm  $i$ ,  $\text{manager}_{ir}$  is a dummy variable equal to 1 if review  $r$  posted for firm  $i$  is from an employee in a managerial position, and  $X_i$  refers to firm-level controls (industry, age, and size).

**TABLE 5. OLS, with Firm and Review-Level Characteristics, for 2023**

	<i>Average Rating (out of 5)</i>	<i>Average Work Culture Ratings</i>	<i>Average Growth Ratings</i>	<i>Average Work Security Ratings</i>	<i>Compounded Sentiment Score for Likes</i>
Average ratio of women on board over current and last year	0.311 (0.205)	0.230 (0.247)	0.301 (0.223)	0.282 (0.220)	0.0903* (0.0485)
Manager flag	-0.0995*** (0.0165)	-0.164*** (0.0210)	-0.0687*** (0.0217)	0.00659 (0.0181)	-0.0133*** (0.00454)
Size FE	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes
Age FE	Yes	Yes	Yes	Yes	Yes
Observations	344681	298016	298016	298016	295789
Mean of Dep. Variable	3.905	3.636	3.452	3.677	0.416

Source: Authors' calculations.

Note: Standard errors (in parentheses) are clustered at the firm level.

Sentiment scores are weighted by the corresponding word length.

Since scores for dislikes are largely concentrated on zero (implying neutral sentiment polarity), we have not included results for compounded 'dislikes' and total sentiment scores (which are also affected by the scores for 'dislikes') in this table. Results for these outcomes are in Appendix II, Table A2.

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

Table 5 shows that the ratio of women on Board is positively associated with firm culture. However, this association is only significant at the 10 percent level for only one of the variables—the sentiment polarity scores for 'likes'. The low significance of this association is not surprising, given that Board members do not directly manage a company.

We run the regression described in equation (4) on sub-samples of firms based on whether they have at least one woman in top management. Table 6 shows that across all measures of firm culture, the association between ratio of women on Boards and firm culture is higher and significant for firms that currently have at least one woman in their top management team.

## 6. Conclusion

In this paper, we document the status of gender-inclusive corporate leadership and use the 'woman director' mandate in the Companies Act (2013) to study its relationship with firm outcomes, including financial performance and corporate culture in India.

We find that firms, on average, were appointing more women than mandated by the Companies Act (2013). At the same time, newly appointed women were younger, more educated, and independent than their male counterparts and their

**TABLE 6. OLS with Firm and Review-Level Characteristics, for 2023 – Sub-sample Based on Presence of Women in Top Management**

	<i>Average Rating (out of 5)</i>		<i>Average Work Culture Ratings</i>	
	<i>No women</i>	<i>At least one woman</i>	<i>No women</i>	<i>At least one woman</i>
Average ratio of women on board over current and last year	0.223 (0.298)	0.769** (0.308)	0.190 (0.376)	0.570* (0.328)
Manager flag	-0.099*** (0.0196)	-0.082*** (0.0188)	-0.160*** (0.0250)	-0.143*** (0.0215)
Size FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Age FE	Yes	Yes	Yes	Yes
Observations	182514	123679	155608	110066
Mean of Dep. Variable	3.912	3.857	3.628	3.606

	<i>Average Growth Ratings</i>		<i>Average Work Security Ratings</i>		<i>Compounded Sentiment Score for Likes</i>	
	<i>No women</i>	<i>At least one woman</i>	<i>No women</i>	<i>At least one woman</i>	<i>No women</i>	<i>At least one woman</i>
Average ratio of women on board over current and last year	0.257 (0.293)	0.934** (0.379)	0.388 (0.311)	0.596* (0.335)	0.139** (0.0697)	0.169** (0.0713)
Manager flag	-0.071*** (0.0231)	-0.039* (0.0215)	0.014 (0.0176)	0.026 (0.0202)	-0.012*** (0.0042)	-0.006 (0.0059)
Size FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Age FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	155608	110066	155608	110066	154506	109155
Mean of Dep. Variable	3.450	3.405	3.680	3.635	0.413	0.413

Source: Authors' calculations.

Note: Standard errors (in parentheses) are clustered at the firm level.

Sentiment scores are weighted by the corresponding word length.

Since scores for 'dislikes' are largely concentrated on zero (implying neutral sentiment polarity), we have not included results for compounded 'dislikes' and total sentiment scores (which are also affected by the scores for 'dislikes') in this table. Results for these outcomes are in Appendix II, Table A3.

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

average number of directorships- the “stretch factor”- increased significantly compared to men. Furthermore, Board meeting participation increased for both men and women in the years following the enforcement of the mandate, and consequently the gender gap in meeting attendance decreased. Despite these large changes in both the share of women on Boards and average director characteristics, we do not see the positive trends replicated for top management teams (C-suite). In FY 2022-23, more than half of the NSE-listed firms in our sample did not have even one woman in their top management teams, and less than 10 percent of firms had exactly one woman.

Regarding the impact of the presence of women on Boards on financial performance, we find that having at least one woman on Board is associated with higher economic performance and financial stability for the larger firms. We observe that although all firms see some impact on financial performance after hiring at least one woman following the mandate, mid-cap and large-cap firms see a more consistent impact for a longer period post-mandate.<sup>14</sup>

We use quantitative measures for firm culture across four different dimensions to study the impact of higher representation of women in leadership on firm culture and employee satisfaction. We find that a higher share of women in Board positions is positively associated with employee ratings and sentiment scores, but the relationship is significant only when there is at least one woman in top management (C-suite) positions. These results help us understand possible channels through which gender-equitable Boards and top management teams could positively impact firm culture.<sup>15</sup>

## 7. Policy Recommendations

The analysis presented in this paper has several policy implications.

First, the positive impact on firm’s financial performance due to the presence of women in corporate Boards, as well as the positive findings on firm culture of hiring more women in top management positions, confirm that there is a clear business case for appointing more women in top positions in the corporate sector.

Second, we find that the Companies Act (2013) was instrumental in increasing the representation of women in Boards. By 2023, almost 80 percent of all firms in our sample had more than one woman. Moreover, companies tended to go

---

14. Understanding why significant results are observed only for mid- and large-cap firms requires further analysis of the channels through which these effects are propagated. Following Biswas et al. (2023), one possible explanation is that larger firms benefit from broader director networks and greater access to information. Exploring this mechanism presents an important avenue for future research.

15. The influence of firm directors and top management on firm culture and employee satisfaction remains understudied, both in India and internationally. While this paper suggests a potential correlation between gender equity in firm leadership and employee satisfaction, further research is needed to understand how this influence is propagated. Future studies could explore this by conducting more detailed employee surveys or analyzing board meeting notes to identify differences in director contributions.

beyond the mandate, suggesting the favorable impact of the current government's priority to foster women-led development and the positive experience gained by firms. This means that sustained efforts from top policymakers to promote women in leadership positions and in implementing the quota mandate were highly successful and should continue.

Third, the positive spillovers from or the “demonstration effect” of the directorship mandate to hire more women in top management positions did not materialize. In other words, the expectation that adding women to Boards would improve gender diversity in other levels of leadership cannot be taken for granted. Given our finding that there is a positive association between the presence of senior women managers and firm culture, there is a lesson for the corporate sector to hire more women in top management positions. Mandating quotas for women in management teams could be considered by policymakers. Alternatively, the government and business community could promote several human resources practices in the private sector that have been successful in other countries. These include annual gender-bias training for companies; ensuring that there is a gender balance in the interviewing panel; systematically including and seeking out the views of women in management meetings; allowing for flexible working arrangements; and mentorship or sponsorship programs for women.

Fourth, if the problem is on the supply side, we believe it is unlikely due to the absence of highly qualified women, given the rising and substantial number of women graduating in India or in higher education, at levels similar to their male counterparts in most fields. If that is the case, it is worth exploring why highly educated women do not join the work force or drop out of the work force after a few years. A major factor could be the disproportionate burden that women carry for unpaid care work and household chores. A recent nationwide time-use study from India found that women aged 15-29 allocate 7.4 hours per day to household chores and care work, while similarly aged men only allocate 2.8 hours to these activities (Vikram et al. 2024). This calls for more child and elder care facilities, which could be provided at work or established by the government and private sector. The government could also consider providing subsidies for care facilities to companies that hire and retain more women, and incentivize paternal involvement in child care duties.

Fifth, data on director-level characteristics indicate that women hired on Boards have consistently been significantly younger and more educated than their male counterparts. This is good news to the extent that it shatters the myth that the firms have had to compromise on quality because of the enforcement of the Companies Act (2013). At the same time, it points to exploring deeper if there are conscious or unconscious biases against women. Some studies (for example, Ng and Wiesner 2007) indicate that women must be more qualified than their male counterparts to be considered for the same positions.

Sixth, the finding in our paper that the number of ‘other’ directorships held by women skyrocketed in the years following the mandate points to whether a serious attempt has been made by companies to expand the pool of potential women

directors. If women serve on many Boards, it could constrain their capacity to attend multiple Board meetings and contribute more productively to Board discussions and decisions. Business organizations that represent and advocate the interests of industry could create a roster of qualified women directors and C-suite managers, which could be periodically shared with their member-firms.

Finally, empowering women begins at home. The cultural environment at home that fosters an equal treatment of boys and girls has a significant bearing on the attitudes of women themselves when they enter the work force. The influence and views of spouses and in-laws after marriage is also critical. Policies to address cultural and social factors are complex, but there is increasing evidence which signals that support of top policymakers, business leaders, and religious/spiritual leaders can make a significant difference.

## References

- Adams, R.B. and D. Ferreira. 2009. "Women in the Boardroom and Their Impact on Governance and Performance", *Journal of Financial Economics*, 94(2): 291–309. doi:10.1016/j.jfineco.2008.10.007
- Ahern, K.R. and A.K. Dittmar. 2012. "The Changing of the Boards: The Impact on Firm Valuation of Mandated Female Board Representation", *The Quarterly Journal of Economics*, 127(1): 137–197. doi:10.1093/qje/qjr049
- Bertrand, M., S.E. Black, S. Jensen, and A. Lleras-Muney. 2018. "Breaking the Glass Ceiling? The Effect of Board Quotas on Female Labour Market Outcomes in Norway", *The Review of Economic Studies*. 86(1): 191-239. doi:10.1093/restud/rdy032
- Biswas, S., J. Sarkar, and E. Selarka. 2023. "Women Director Interlocks and Firm Performance Evidence from India", SSRN. doi:10.2139/ssrn.4653412
- Catalyst. 2015. "2014 Catalyst Census: Women Board Directors", New York: Catalyst. Retrieved from <http://www.catalyst.org/knowledge/2014-catalyst-census-women-board-directors>
- Chakraborty, P. and K. Mahajan. 2023. "Firm Size and Female Employment", Retrieved from <https://www.ashoka.edu.in/research/firm-size-and-female-employment/>
- Chatterjee, C. and T. Nag. 2022. "Do Women on Boards Enhance Firm Performance? Evidence from Top Indian Companies", *International Journal of Disclosure and Governance*, 20(2): 155–167. doi:10.1057/s41310-022-00153-5
- Christiansen, L., H. Lin, J. Pereira, J. Topalova, R. Turk, and P. Koeva. 2016. "Unlocking Female Employment Potential in Europe: Drivers and Benefits", IMF European Department, IMF Strategy, Policy, and Review Department 16/01.
- Companies Act. 2013. Retrieved from <https://www.mca.gov.in/content/mca/global/en/acts-rules/companies-act/companies-act-2013.html>
- Credit Suisse. 2012. "Gender Diversity and Corporate Performance", Credit Suisse Research Institute. Retrieved from <https://publications.credit-suisse.com/tasks/render/file/index.cfm?fileid=88EC32A9%2083E8-EB92-9D5A40FF69E66808>
- Dhar, D. 2023. "Essays on Constraints and Solutions to Women's Human Capital Development in India" PhD Thesis, University of Oxford. doi:10.5287/ora-kz58evqj5
- Duppati, G., N.V. Rao, N. Matlani, F. Scrimgeour, and D. Patnaik. 2019. "Gender Diversity And Firm Performance: Evidence from India and Singapore", *Applied Economics*, 52(14): 1553–1565. doi:10.1080/00036846.2019.1676872

- Gul, F.A., B. Srinidhi, and A.C. Ng. 2011. “Does Board Gender Diversity Improve the Informativeness of Stock Prices?”, *Journal of Accounting and Economics*, 51(3): 314–338. <https://doi.org/10.1016/j.jacceco.2011.01.005>
- Hillman, A.J., C. Shropshire, and A.A. Cannella. 2007. “Organizational Predictors Of Women on Corporate Boards”, *Academy of Management Journal*, 50(4): 941–952. <https://doi.org/10.5465/amj.2007.26279222>
- Jadiyappa, N., P. Jyothi, B. Sireesha, and L.E. Hickman. 2019. “CEO Gender, Firm Performance and Agency Costs: Evidence from India”, *Journal of Economic Studies*, 46(2): 482–495. doi:10.1108/jes-08-2017-0238
- Jain, R. 2022. “Gender Diversity, Gender Norms and Firm Performance: Evidence from India”, *Economic Systems*, 46(4): 101006. doi:10.1016/j.ecosys.2022.101006
- Kim, K. and M. Lee. 2018. “Difference in Differences in Reverse”, *Empirical Economics*, 57(3): 705–725. doi:10.1007/s00181-018-1465-0
- Matsa, D.A. and A.R. Miller. 2013. “A Female Style in Corporate Leadership? Evidence from Quotas”, *American Economic Journal: Applied Economics*, 5(3): 136–169. doi:10.1257/app.5.3.136
- Ng, E.S. and W.H. Wiesner. 2007. “Are Men Always Picked over Women? The Effects of Employment Equity Directives on Selection Decisions”, *Journal of Business Ethics*, 76(2): 177–187. doi:10.1007/s10551-006-9266-3
- Post, C., B. Lokshin, and C. Boone. 2021. “Research: Adding Women to the C-suite Changes How Companies Think”, Retrieved from <https://hbr.org/2021/04/research-adding-women-to-the-c-suite-changes-how-companies-think>
- Robb, M. Alicia and John Watson. 2012. “Gender Differences in Firm Performance: Evidence from New Ventures in the United States”, *Journal of Business Venturing*, 27(5): 544–558.
- Roy, A. 2023. “Gender Differences and Firm Performance: Evidence from India”, *The B.E. Journal of Economic Analysis Policy*, 24(1): 1–34. doi:10.1515/bejeap-2022-0049
- Sahay, R. and M. Cihak. 2018. “Women in Finance: A Case for Closing Gaps”, *Staff Discussion Notes*, 18(05): 1. doi:10.5089/9781484375907.006
- Smith, N., V. Smith, and M. Verner. 2006. “Do Women in Top Management Affect Firm Performance? A Panel Study of 2,500 Danish Firms”, *International Journal of Productivity and Performance Management*, 55(7): 569–593. doi:10.1108/17410400610702160
- Vikram, K., D. Ganguly, and S. Goli. 2024. “Time Use Patterns and Household Adversities: A Lens to Understand the Construction of Gender Privilege among Children and Adolescents in India”, *Social Science Research*, 118: 102970. doi:10.1016/j.ssresearch.2023.102970
- Women in the Boardroom: Deloitte Global. 2022. Retrieved from <https://www.deloitte.com/be/en/services/risk-advisory/perspectives/women-in-the-boardroom-2023.html>

To view the entire video of this IPF session and the General Discussion that ended the session, please scan this QR code or use the following URL:  
<https://www.youtube.com/watch?v=rDYzXADHHPU>



## APPENDIX I

### Data Sources and Sample – Gender Composition of Boards and Firm Performance

Our firm-level analysis includes firms listed on the National Stock Exchange (NSE), and covers indicators under four broad topics: firm identification; financial performance; leadership; and culture. Indicators for firm-level corporate leadership have been collected from PRIME for 2707 firms. This has been combined with financial performance indicators and market capitalization collected from CMIE to get a firm-year unbalanced panel dataset covering 2580 firms over 18 years (from FY 2005-06 to FY 2022-23). To avoid bias in our results due to COVID-19, we only include the 15-year period in our analysis, until FY 2019-20. Indicators on firm culture have been calculated using employee reviews scraped from AmbitionBox.

Firm leadership indicators include data on directors and top managerial personnel. Details about company directors, including gender, age, education, board meeting attendance, and number of other directorships held (indicating director ‘stretch factor’) have been collected for around 33,547 unique directors for 2707 NSE-listed firms between 2006 and 2023. Data on gender, age, and education are available starting from 2006, while data on number of other directorships held are available from 2013 and share of meetings attended from 2015. These indicators have been averaged to create a firm-year unbalanced panel dataset. We have also calculated averages disaggregated by gender to explore if director characteristics differed by gender, and how they differed both before and after the implementation of the Companies Act (2013). Gender composition of top management teams has also been collected for a total of 2332 firms (including both firms listed on the NSE, and some unlisted financial sector firms). The data are available between FY 2011-12 and FY 2023-24. Top management positions include C-suite positions like CEO, CFO, COO etc., and a few other positions including Company Secretary, Compliance Officer, etc. Gender composition data within leadership (Board and top management) positions are used as the main dependent variable in our analysis.

Firm identification indicators include industry, age of the firm, firm size, and listing information. We broadly use the CMIE industry classification, which gives us eight industry groups: Banking; Non-banking finance; Construction & real estate; Diversified; Electricity; Manufacturing; Mining; and Non-financial services. The firms are also divided into five age groups, depending on the business and economic environment of the country at the time of incorporation. The five groups are those of firms incorporated as per the following dates: before 1950; between 1951 and 1971; between 1972 and 1985; between 1986 and 1990; and after 1991. Firm size is based on its market capitalization value given on the stock exchange where it is listed (or averaged across multiple stock exchange values, if the firm is listed on multiple stock exchanges). These firms are then divided into small-cap, mid-cap, and large-cap based on the rules defined by SEBI (Securities and Exchange Board of India). Two firm-level dummies have also been calculated, indicating whether the firm is listed on at least one stock exchange, and whether the firm’s shares are being actively traded on at least one stock exchange. If a firm is listed on at least one stock exchange, and has not been suspended from this stock exchange, then we classify the firm as “traded”.

Financial performance indicators have been collected from CMIE for 2580 NSE-listed firms between FY 2005-06 and FY 2022-23, and include measures for profits

after tax, returns on net worth, and debt-to-equity ratio. We focus on these indicators to analyze a firm's profitability (using the profits and returns indicators), and financial stability (using debt-to-equity ratio, which is an indicator for liquidity). Since profits after tax is a currency value, we have adjusted it for inflation using the GDP deflator, indexing on the year FY 2011-12.

The financial performance dataset, merged with Board and identification data, forms our final unbalanced panel dataset, including information for 2580 NSE-listed firms between FY 2005-06 and FY 2022-23. This final sample of firms covers a wide range of economic activities. The sample includes 2215 listed firms, and 365 unlisted firms (as of FY 2022-23). There are 2190 non-financial firms, 325 financial non-banking firms, and 65 banking firms. Most (~53.1 percent) of these firms have been established after liberalization (1991). Within this sample, 191 firms (around 7.4 percent of the final sample) only have one year available for financial performance. Therefore, these firms have been dropped during the econometric analysis.

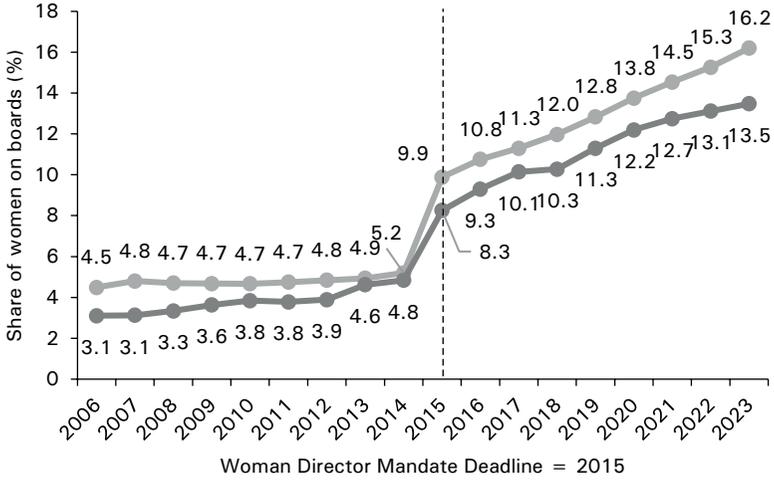
**TABLE A 1. Firm Characteristics: By Treatment Group**

	<i>Policy Unaffected</i>	<i>Policy Responders</i>	<i>Total</i>
All firms	707	695	1402
Industry			
Banking	32	6	38
Non-banking finance	79	78	157
Construction & real estate	55	55	110
Diversified	10	22	32
Electricity	10	8	18
Manufacturing	352	385	737
Mining	11	4	15
Services (other than financial)	158	137	295
Age group			
Before 1950	104	68	172
Between 1951 and 1971	88	80	168
Between 1972 and 1985	155	157	312
Between 1986 and 1990	100	127	227
After 1991	260	263	523
Size Groups in 2020			
Small-cap	439	547	986
Mid-cap	69	47	116
Large-cap	70	16	86
Missing size group	24	6	30
Total firms in 2020	602	616	1218

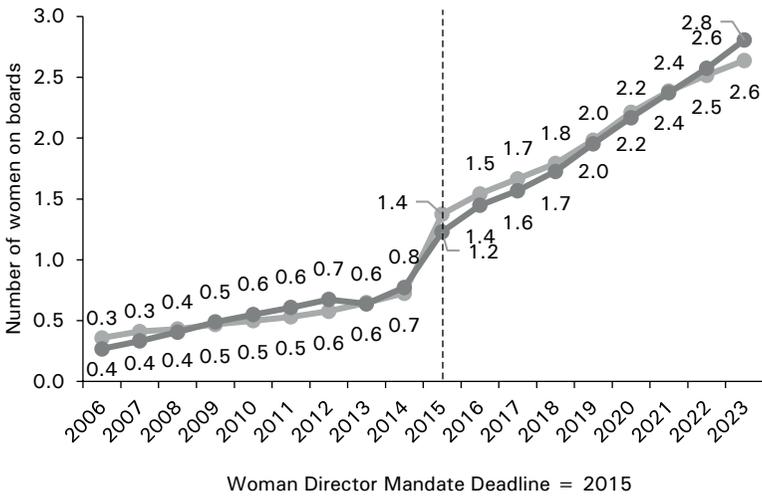
Source: PRIME and CMIE databases.

APPENDIX II

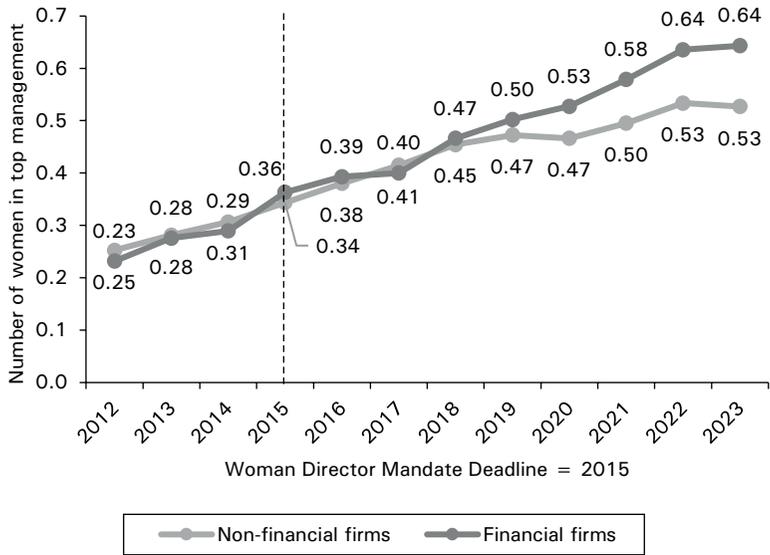
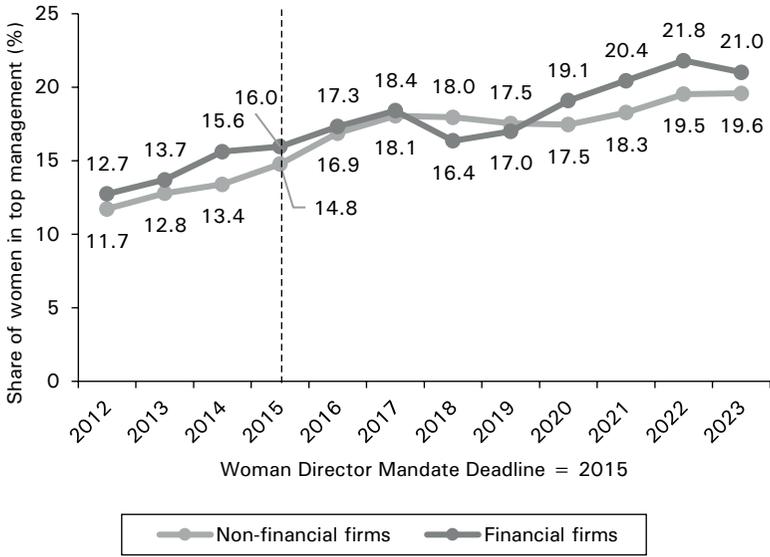
FIGURE A 1. Average Share and Number of Women in Leadership: By Industry



— Non-financial firms — Financial firms

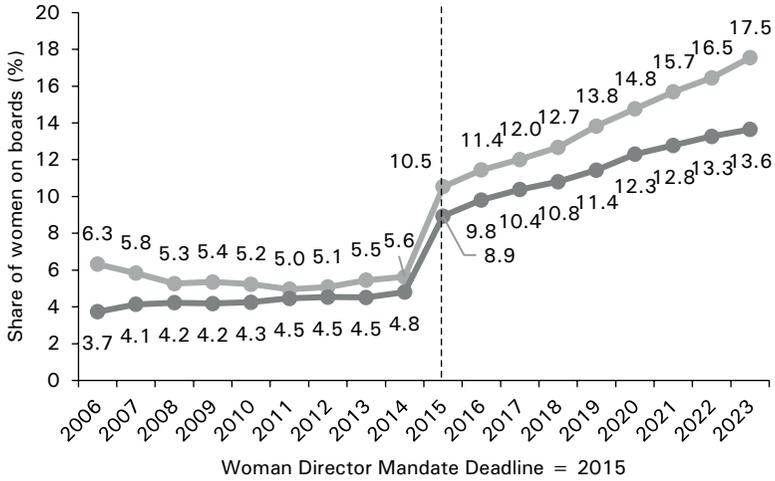


— Non-financial firms — Financial firms

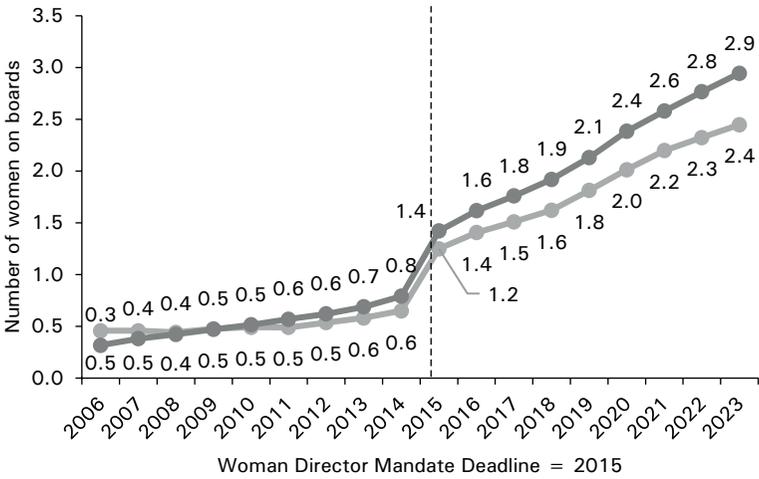


Source: PRIME and CMIE databases.

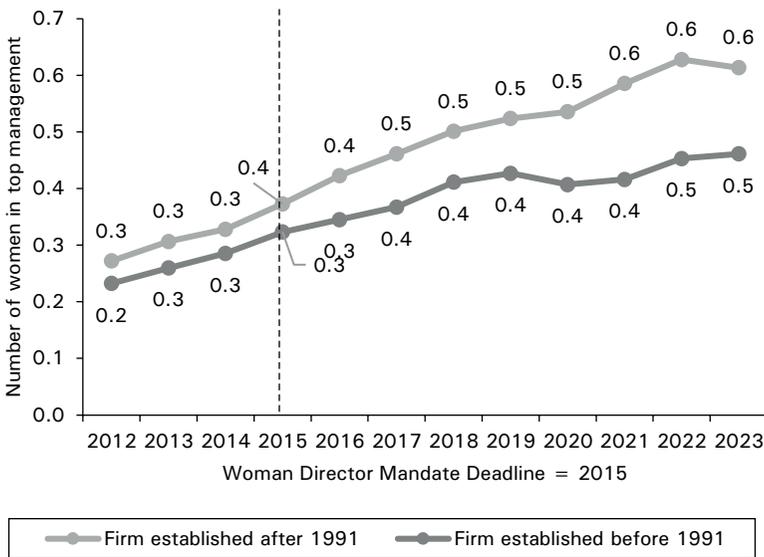
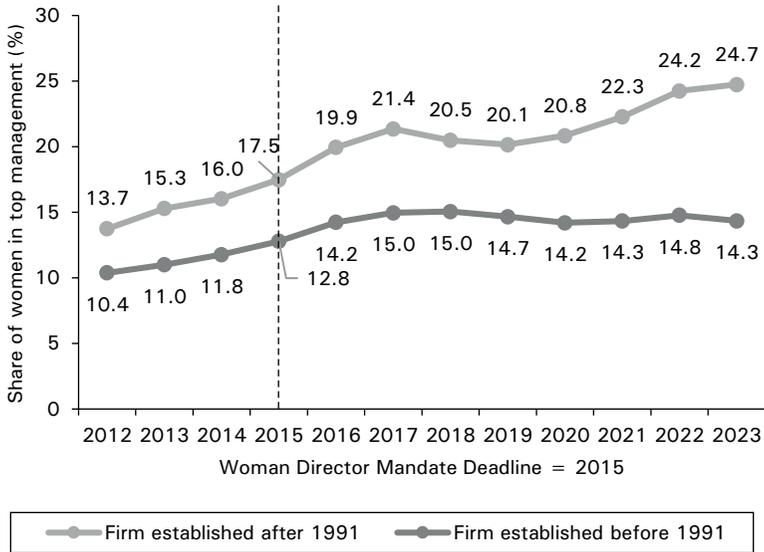
**FIGURE A2. Average Share and Number of Women in Leadership: By Firm Age**



—●— Firm established after 1991    —●— Firm established before 1991



—●— Firm established after 1991    —●— Firm established before 1991



Source: PRIME and CMIE databases.

**TABLE A 2. OLS, with Firm and Review-Level Characteristics, for 2023**

	<i>Compounded Sentiment Score</i>	<i>Compounded Sentiment Score for Dislikes</i>
Average ratio of women on board over current and last year	0.0734 (0.0636)	0.00260 (0.0406)
Manager flag	-0.0184*** (0.00501)	-0.00550 (0.00337)
Size FE	Yes	Yes
Industry FE	Yes	Yes
Age FE	Yes	Yes
Observations	344681	298016
Mean of Dep. Variable	3.905	3.636

Source: Authors' calculations.

Note: Standard errors (in parentheses) are clustered at the firm level.

Sentiment scores are weighted by the corresponding word length.

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

**TABLE A 3. OLS, with Firm and Review-Level Characteristics, for 2023 – Sub-sample Based on Presence of Women in Top Management**

	<i>Compounded Sentiment Score</i>		<i>Compounded Sentiment Score for Dislikes</i>	
	<i>No women</i>	<i>At least one woman</i>	<i>No women</i>	<i>At least one woman</i>
Average ratio of women on board over current and last year	0.0854 (0.0973)	0.150* (0.0809)	-0.0246 (0.0629)	-0.0113 (0.0571)
Manager flag	-0.0140*** (0.00484)	-0.0163** (0.00734)	-0.000541 (0.00405)	-0.00840 (0.00607)
Size FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Age FE	Yes	Yes	Yes	Yes
Observations	155570	110038	148566	105416
Mean of Dep. Variable	0.355	0.351	0.0305	0.0284

Source: Authors' calculations.

Note: Standard errors (in parentheses) are clustered at the firm level.

Sentiment scores are weighted by the corresponding word length.

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

# Comments and Discussion \*

Chair: Reshma Anand

*Ford Foundation*

## **M. Damodaran**

*Excellence Enablers Private Limited, Ex-Chairman, SEBI*

It's a privilege being here among such distinguished members from the world of academics to which I don't belong. What I bring are observations based on several years in boardrooms and a few years advising boardrooms after I stepped out of them. First, let me compliment the author on the extraordinarily good paper. It certainly had me thinking. As someone who has been talking about this for some time, articulating views that are not really popular, I was delighted to see some of the observations that you have made. I am not entirely persuaded that some of the causal relationships have been established. I would like to see some more evidence.

The 2013 Act was clearly a game-changer. Until then, those who saw value in bringing women on Boards brought them. We did have companies that had women directors and they clearly added value. Otherwise, when there was no compulsion or mandate, they wouldn't have been brought on board. They were carefully chosen but the numbers regrettably were not too many—either in terms of the number of Boards that had women or the number of women that got onto Boards. In most cases, it was just one woman who was taken on the Board with an average size of 10-12.

With that experience, I have canvassed and I would urge you to look at it some time- whether having two women on the Board is much better than having just one woman, especially if both of them don't come in at the same time. Everyone has finite tenures. You don't want both to step out at the same time. There is merit in getting two people at different points in time into the boardroom.

What the Companies Act should have done but did not do was to mandate that there should be a woman independent director. It mandated a woman director. So, in the initial years post the Companies Act, when you knew that there was a mandate and that non-compliance could lead to penalties, human ingenuity kicked in. So, unwilling members of the family were persuaded to

---

\* To preserve the sense of the discussions at the India Policy Forum, these discussants' comments reflect the views expressed at the IPF and do not necessarily take into account revisions to the conference version of the paper in response to these and other comments in preparing the final, revised version published in this volume. The original conference version of the paper is available on NCAER's website at the links provided at the end of this section.

get into boardrooms to tick the boxes that there was a woman in the boardroom. Not that they were less qualified than the men in their families. The son of the promoter was presumed to be good enough to be on the Board but when it came to the wife or the daughter, questions started getting asked. “Are they getting there because you need a woman on the Board?” And I have been in a hopeless minority, arguing that “if you did not ask these questions when the sons and brothers were taken into the boardroom, why are you asking these questions now? Give them a chance, let them go in there and demonstrate that they add value to the boardroom”.

People quickly got in family members into boardrooms just before the last date on which they were expected to comply. If you see the dates on which many of them were appointed, it was in the week preceding the last date before the penalties kicked in. We’ve done some studies on that in my company and they have been very revealing.

The second set of people, which is the government companies (PSUs), thought that “so what if there is a mandate, we are government companies, we are not obliged to follow it and no one will punish us”. In this country, there has been a record of not holding government companies accountable for some of their transgressions. There are five companies—Coal India, Indian Oil, Indian Railways Finance Corporation, Power Grid, and State Bank of India—which have no woman director on their Board as we speak today. So much for what the law has mandated and what exists in the boardrooms. They would say that we had one some time ago but they stepped away and we didn’t get a replacement in time and the argument that I am tired of hearing is that there are not enough women to match the number of vacancies.

Friends of mine, and we have sat on Boards together, have said that companies reached out to them and asked what did I think they should do. I told them: “Ask this question: Are you being taken because you are a competent person who will add value or are you being taken because they need a woman director? The company will of course tell you it is because of your value and talent. Then please ask this supplementary question: If all of that is true, why didn’t you reach out to me before the mandate and why is it that after the mandate, you are reaching out to me?”

I have seen some women directors coming from domains completely unrelated to the domain of the company on whose Boards they are and they hit the ground running because they bring sector-neutral values to the Board. They don’t have to tell you how to manufacture something that the company is producing but they will certainly ask the basic questions to see whether there is a value system that informs the process that the company follows and that is of great value.

I am not entirely convinced that having women on Boards translates into better financial performance. I would like to see some more evidence of that. The reason I am saying this is that I saw some of the numbers the authors have put up, and the names of the companies, and I went through the report. The

authors have marshalled enough evidence to support the conclusion that the presence of women adds value. But are there other factors and is this just one of the contributing factors? I would like to dig a little deeper into that and derive some conclusions.

The related question is what happens when an all-male Board has a woman director getting into the Board. I spoke about this in a conference where 95 percent of the audience comprised women, and I made this point that the boardroom sees dynamic changes. What happens is that the people who slouched in very comfortable boardroom chairs sat up. That people did not want to see themselves as unprepared in a discussion. There was a lot more preparation because there was a new member from another gender to judge them among friends that they have on the Board—people that they might have gone to school or college with or played golf with. Earlier, they didn't have a problem with them (the friends) being judgmental.

And that certainly added to more serious and focused conversations in the boardroom. Management personnel became far more prepared and far more careful in their responses—no off-hand explanations, no trotting out excuses masquerading as explanations, none of that would wash in that kind of situation. And this persuaded me that you did need a second woman on every Board. I have numbers here that in 2023, there were 40 companies that had more than one woman independent director on the Board. I don't have their financial performance yet. Two women in the boardroom are certainly a force that management would have to deal with.

On the question whether culture is impacted, yes, it is. Boardroom culture was always a prisoner of old boy relationships and networks. That in some sense has got addressed. So now you have discussions on questions like “Is this the right thing to do? Are we doing it at the right time?” My company, Excellence Enablers, defines corporate governance in terms of four rights—doing the right things, at the right time, in the right manner, and for the right reasons. These questions are getting asked in the boardrooms. I have even heard questions like “Isn't this a matter of operational detail? Why are we looking at it? We have limited time and we need to look at the larger issues.”

Managements might like to lead you down that path to see that you don't raise the larger questions that need to be addressed in the boardrooms. But when it comes to higher ratings, when it comes to surveys that show a better satisfaction level, I think it doesn't have too much to do with the presence of a woman. It is the management that really impacts and the larger question is—“Has the Companies Act providing for one woman director in the Board resulted in more women in positions below the Board?” The statistics (presented by the authors) show that it isn't a very happy picture. The problem is that this will take time because if you look at the talent pipeline within the company, there aren't enough people who can move up unless you go for a very radical fast-track promotion for very good woman performers and move them up. Many

companies will not even address that possibility. You need to look outside the system. Every vacancy doesn't have to be filled by an insider. If there is a competent woman outside, get her in and let her demonstrate that she adds value. There are any number of them.

So, I think the Companies Act has fallen short. Of course, it was a brave step, moving from zero to one. I wish they had said two, because amending a law in India is a very torturous process.

Luckily in India, the governance approach has been more through regulations than by law—it is SEBI rather than the Companies Act. It is the Listing Obligations and Disclosure Requirements (LODR) that said you must have a woman independent director which meant that you have to look outside the family and find a competent person. This debate about talent versus tokenism, which my company raised a decade ago, I think, got addressed through the SEBI LODR and not the Companies Act. What is needed is that the nomination and remuneration committee, which has a very critical role, should find women chairpersons who believe that a woman will add value and persuade the management to look around and see whom you can get. I think we will get there sooner rather than later. Culture will take time to change but I think the philosophy of companies that believe that they are enlightened companies will reflect that change.

## **Auguste T. Kouame**

*The World Bank*

This must be one of the few papers that analyze the impact of the 2013 Companies Act on Boardroom dynamics and female leadership. A key challenge now will be to bring this out in the public eye to showcase its potential for meaningful change—a point I plan to emphasize. If I had the global or nationwide authority to prioritize issues, gender and female labor force participation would certainly be among those. At the World Bank, we have several research papers indicating that labor income plays a more significant role in reducing poverty than social programs and fiscal transfers. If the government wants to reduce reliance on fiscal tools for poverty alleviation, it is essential to focus on job creation for everyone, including women.

It is not just efficient, but also macroeconomically critical, to leverage women's existing human capital for sustainable growth. Human capital is a key driver of growth, and in India, a large portion, especially the human capital represented by women, can be better tapped to boost growth. India has invested heavily in developing this human capital. Indian women today are almost as educated as men, with 21 million women enrolled in higher education and their enrollment rate comparable to, if not higher than, those of men. Thus, the argument that there are not enough women to bring on for management

roles is weak. From a macroeconomic perspective, not leveraging this existing investment is suboptimal. Using the established human capital to drive growth will be a better option than channeling resources into new sources, as reinvestment would create additional inflationary pressures.

We know that employment boosts self-worth. In some way, we all take pride in our work and in contributing to something productive, which can also influence dynamics within the household and families. Employment can shift the household power balance, and when tilted towards women, it positively impacts education, investment and healthcare within the family—benefiting everyone. As the paper demonstrates, having women in decision-making roles within the business sector can bring significant advantages. While the paper does not fully touch upon the importance of including women on the Boards of small-cap companies, evidence suggests that decision-making within these companies improves with the presence of women in Board roles. As Mr Damodaran pointed out in the discussion, the benefits are even more pronounced when there are two women participating in Boardroom discussions and meetings.

One somewhat debatable conclusion in the paper is whether companies have followed the mandate. I don't believe they have. If they had, there would be more women on Boards because India still lags behind its peers and the global average in representation in management and female labor force participation. The only area where India is on par is in investment in education for women. If there is one takeaway from this presentation, it is that India has already made substantial investments in education for women but is not fully leveraging that potential.

On August 15, 2022, Prime Minister Narendra Modi emphasized the same point: While companies recognize the benefits, moving beyond the current mandate requires an additional push and external incentives. Some ideas are circulating in this regard. I don't think a recruitment mandate is likely to work. Instead, incentives could be more effective. For example, Argentina offers training incentives for women, and Australia requires companies to report the share of women in their workforce, especially in management. In Japan, companies with a high percentage of women in management receive an investment boost as the government promotes them as more investable. Similar nudges could be effective in India.

The paper found positive association between company performance and women on Boards, with particularly strong results in the IT and service sectors. This is critical for India to achieve its goal of becoming a high-income country by 2047. Without a rise in female labor force participation, reaching this target may be challenging. Our data show that if India could increase female labor force participation to match the global average, it could achieve and sustain an 8 percent growth rate as early as 2024.

This is a low-cost solution, as the necessary investment has already been made and continues to grow. I mentioned that many women are in higher education, yet companies often fail to implement key laws, including maternity leave provisions. Household responsibilities and childcare frequently prevent

women from entering the workforce. Some companies even cite maternity as a reason not to hire women, highlighting the need for further studies to understand if and how hiring decisions are impacted. Regulations requiring companies of a certain size to provide childcare facilities, such as creches, should be examined in detail, possibly with public subsidies to reduce the perceived burden of providing creches and maternity benefits. Incentivizing companies to recruit women is likely more effective than mandating Boardroom quotas. While the Companies Act 2013 was a positive step, it has shown that this approach alone may not be the most impactful solution.

The paper's observation that a company's culture shifts when women join management, not just in the Boardroom, is very telling. Unlike Board-level influence, which remains largely unseen by staff and the public, more women in management and staff roles can create visible role models. This mirrors the recent UPSC Civil Services exam results in India, where all four top-ranked candidates were women. I think we need to move the conversation beyond the Boardroom and management, to focus on increasing women's representation across all levels of the workforce. Our data also indicate that women in mid-level positions face particular pressure, often struggling to remain in the workforce due to family constraints. Addressing this "middle squeeze" is essential as well.

Moreover, companies should be incentivized to invest in and retain women in their workforce. In India, we must think about and develop networks and training systems for women. While fostering connections within the Boardroom is helpful, broader networking opportunities would support women throughout their careers. Public policy can play a role here. Finally, I noticed that the paper did not address the appointment of women family members to Boards to satisfy mandates, an issue that was raised in the discussion. It would be valuable for the authors to explore whether women are being selected competitively or simply to meet the mandate and regulatory requirements.

## **Devesh Kapur**

*Johns Hopkins University*

The paper raised two larger questions. First, how do we think about inclusion in a society where there is the manifest historical bias against a social group? And second, is mandated representation a good a way to address this bias? Mandated representation for women in local bodies was first put in place in the 73<sup>rd</sup> and 74<sup>th</sup> Constitutional amendments in 1992, and then in Parliament and State legislatures in the 106<sup>th</sup> Constitutional amendment in 2023. This raises the question that while there is one-third mandated representation of women in politics, why is the minimal representation of women Board members in corporations just one? Should it be, as Mr Damodaran said, at least two? Or should it be at least 10 percent?

Women directors comprised less than 1 percent of all directors in the 200 leading firms of India until the 1990s, which rose to 2 percent by 2000 and 5 percent in 2010 (Tumbe 2022). Following a regulatory change in 2013—Section 149(1) of the Companies Act, 2013, requiring every listed company to have at least one woman director—women’s representation on the Boards of listed firms rose to nearly 16 percent in 2023.

The paper argues that the regulatory change, resulting in the greater representation of women on corporate Boards in India, boosted firm performance on a variety of parameters. The paper raises an important and interesting question. While I wanted to believe in the findings of the paper, I was not fully persuaded. We are all aware of severe gender bias in India and even more so in senior positions in all aspects of public life, including management. I won’t go over the empirics of the paper. Some of the key findings that the authors presented broadly show good outcomes as a consequence of the 2013 policy change. But the outcomes I interpreted from the paper itself are not as strong as the presentation.

For one, if the presence of women directors indeed has strong positive effects on firm performance, why is the salary gap (between male and female directors) widening, both in companies in the Nifty 500 as well as for those outside the Nifty 500? If we look at all-NSE listed companies, the average female executive director salary has declined since 2012-13, while it has risen for males. The men are doing pretty well. So again, I wasn’t sure how to understand that if something is providing so much value, why should it be valued so much less in the firm itself? It’s possible that women directors are more likely to be professionals while male directors are more likely to be promoters. And in all firms, promoter-directors receive significantly higher pay than professional directors since they can self-deal themselves quite generously in comparison to professional directors.

It might be worth looking at dividing the sample between promoter-driven firms versus non-promoter firms or family-owned versus non-family owned companies to see if there are differences in salaries of women directors (from men). It is also important to understand the role of the type of directorship—we have nominees and investor representatives; non-independent; non-executive and executive professionals; and independent directors. I am not sure if the sample size for the paper is large enough, but it might be worth seeing if the type of directorship matters in shaping the outcomes observed. Another interesting comparison is with PSUs. In 2023, just 9 percent of Central PSU employees were women. Despite the 2013 mandate, just half of all PSUs have female Board-level directors and barely 9 percent are executives. Why has the government not implemented the mandate on itself that it requires of the private sector?

Now where I struggled the most with the paper is the mechanisms. Why do we think having a woman director matters and in which ways? I am skeptical of claims that the presence of woman on a Board changes corporate culture.

I have been a faculty member at different private universities and I had no idea who was on the Board of trustees. For faculty, the Deans mattered, the President mattered but not the Board. Yes, one can argue that the Board selects the management and therefore it matters. Firms with female directors might attract more women to join in senior management and/or push the firm to hire more senior managers. But does the presence of a female director strongly affect selection into senior management and thereby shape corporate culture?

Indeed, since this mandate, according to one study, the number of female senior and middle management roles has *declined* (Sawhney 2024). I would have expected that if corporate culture is improving (because of more female directors), there will be more women-managers and as a result corporate culture would begin to change. That's a plausible mechanism. But instead, we appear to be seeing a decline of women managers.

Another plausible mechanism, attributed to one of India's most well-regarded corporate lawyers who also serves on the Board of many companies, is that women are better negotiators and have much better EQ. It is also possible that to prove themselves, women take their Board responsibilities more seriously. However, the attendance rates of women directors are not higher. If they are really making a difference, I would expect them to show up more.

The paper would be strengthened by a more in-depth discussion of mechanisms and ways these might be tested. Without a clear mechanism, it is hard to be confident that the results are causal.

## References

- Sawhney, Anoushka. 2024. "Women Executive Directors Paid Less than Male counterparts, Gap Widening", *Business Standard*, June 21.
- Tumbe, Chinmay. 2022. "Women Directors in Corporate India, c. 1920-2019", *Business History*, 6(8): 2123-2136.

## General Discussion

Ganeshan Wignaraja initiated the discussion by saying that the first point is simply about better educated people making better decisions. He said he would have quite liked to see some separate regression, taking some dummy variable into account. The second point he raised was about old-fashioned case studies. He said it would make sense to have faced some of the women directors and see their career paths and ascertain what impact they had and wondered if this could be used as a supplement to this work.

Robert Lawrence wanted to build on the observation about education. He put a question: "If you are under pressure to hire someone, what's the best

signal that they're going to be qualified?" He gave the example of South Africa where Black economic empowerment required Boards to increase the number of Black South Africans. He said one could observe that the Blacks who were chosen typically had professional degrees, and CAs accounted for a very high percentage as firms could take it as a signal that there's a uniform test that both Blacks and Whites had taken and so having that qualification was important. He said an MBA degree was also considered as important. He was suspicious of the number of years of schooling as the indicator. The question is relevant education. He said he would prefer to see some sort of effort to find a more relevant education indicator because it is going to play an important role. He said he was struck as well by the fact that some sit on numerous Boards, indicating that they are bringing something to the table and are recognized broadly by the firms. He said this also suggested that it has got something to do with their qualifications and not only with their networks.

Responding to the issue of years of schooling, Ratna Sahay said the problem is that data on it is not easily available. Referring to the other questions that if women were so valuable then why were their salaries falling, she said the obvious answer, which people would find hard to accept, is that there are clear biases. She said people go against their own well-being and business interests because of the biases as has been seen in many studies. The second issue, she said, is what diversity brings to the table. Citing one instance, Sahay said she made sure she had male co-authors for her paper which showed that women in financial roles and leadership mattered a lot for the financial performance, but one of the male co-authors refused to sign off. She said she told him that she is not saying that women are superior, but just that when one brings one or two women on board, it brings diversity of thought. Besides scientifically, women are supposed to be more risk-averse than men. So, for a company to do well, you need both and that combination plays out extremely well.

Responding to Auguste Kouame's question on whether quotas are good, Sahay gave the example of the IMF and World Bank. She said the World Bank decided the quota route and IMF didn't go that route with the result that the World Bank had 40 percent women managers while IMF, after 20 years, had 10 percent women managers. She said there is some merit in quota, though it is difficult to specify the optimal level. EU has now mandated that there will be 40 percent share of women as directors on Board. There are studies in US and Norway that this mandate of 40 percent is too high, Sahay said adding that it's an empirical question as to what the optimal quota should be but it certainly should not be zero.

The session video and all presentations for this IPF session can be accessed by scanning this QR code or going to: <https://ncaer.org/event/india-policy-forum-2024/>



LAKHWINDER SINGH\*

*Institute for Human Development, New Delhi and  
Punjabi University, Patiala, Punjab*

NIRVIKAR SINGH†

*University of California, Santa Cruz, USA*

PRAKARSH SINGH#

*Plaksha University, Mohali, Punjab*

# Economic Development of the Indian State of Punjab: Prospects and Policies<sup>§</sup>

**ABSTRACT** This paper assesses the state of Punjab's economy, reasons for its current situation, prospects for growth, and policies to enable that growth. Punjab's economy is characterized by slow growth, societal challenges, and environmental degradation. We identify four interrelated issues that act as constraints on the Punjab economy. First, driven largely by dependence on the Central Government's food procurement policy, and its specific nature, the state remains heavily agricultural in a narrow manner. Second, Punjab's fiscal situation is constrained in ways that make fiscal policy dysfunctional: related causal factors include the agricultural structure and the state's political economy. Both physical and soft infrastructure have been negatively affected by the problems in public finances. Third, a combination of regional and domestic politics during an era of liberalization has disadvantaged the state, with existing manufacturing industries declining, and new industries and services not emerging rapidly enough. Fourth, both individual human capital and institutional or organizational capital have either failed to develop, or have deteriorated in some dimensions over recent decades, making Punjab less innovative and less attractive for new investment. The paper argues that prospects for meaningful economic development in Punjab will depend on collaboration between

---

\* [lakhwindergill@pbi.ac.in](mailto:lakhwindergill@pbi.ac.in)

† [boxjenk@ucsc.edu](mailto:boxjenk@ucsc.edu)

# [prakarsh.singh@plaksha.edu.in](mailto:prakarsh.singh@plaksha.edu.in)

§ This is a revised version of the paper presented at the NCAER India Policy Forum 2024. We are grateful to our discussants, Montek Ahluwalia, Vini Mahajan, and Seema Bansal, for helpful comments and suggestions, which we have incorporated in this revision to the extent possible. We also benefited from comments from the participants, especially Devesh Kapur and Karthik Muralidharan. The full scope of the discussants' remarks and floor comments can be found in the session transcript. We are also grateful to Poonam Gupta and Karthik Muralidharan for the opportunity to present our analysis, and to Pradip K. Bagchi for assistance with finalizing the manuscript.

The findings, interpretations, and conclusions expressed are those of the authors and do not necessarily reflect the views of the Governing Body or Management of NCAER.
--

the state and national governments, including fiscal support from the latter to deal with switching costs and accumulated fiscal issues. We also discuss several specific policy areas, including agricultural diversification, industrial development and innovation, cross-border services, and decentralization to the local level.

**Keywords:** *Punjab, India, Growth, Development, Agriculture, Industrialization, Public Finances*

**JEL Classification:** *H70, O13, O14, O15, O43*

## 1. Introduction

This paper assesses the state of Punjab's economy, reasons for its current situation, prospects for growth, and policies to enable that growth. Punjab's economy is characterized by slow growth, social unrest, and environmental degradation. Punjab's recent economic trajectory has been shaped by its geography, including its location on an international border, and its water availability. The availability of water for agriculture was politically constrained by the partition of the region in 1947, and then by dividing Indian Punjab in 1966. The latter event occurred soon after the national food security policy created a major shift in the state's pattern of agriculture, towards a greater reliance on a wheat-rice crop cycle, tied to intensive use of water and fertilizers. Furthermore, Punjab's position on the border with Pakistan, over a decade of conflict in the 1980s and 1990s, and proximity to Jammu and Kashmir constrained industrial investment and what might have been a typical progression of development in the state.

After the 1947 Partition, the most agriculturally developed areas of Punjab remained in Pakistan. However, the government of Indian Punjab, piggybacking on national efforts such as the Bhakra-Nangal Dam complex, introduced land reforms, provided an agricultural research and extension system, irrigation and drainage system, credit, and a paved road network connecting villages and towns (Singh and Kohli 2005). As a result, Punjab was well positioned to be at the forefront of the national effort to achieve food security, built on new high-yielding varieties of wheat and rice, and a food procurement system that created an assured market for these foodgrains – what popularly came to be known as the Green Revolution (GR).

The development of the Punjab economy, as driven by the evolution of the GR and its impact on the wider economy, has resulted in a mixed picture regarding growth of per capita income, reduction of poverty, provision of healthcare services and development of human capital.<sup>1</sup> After the GR, the Punjab economy

---

1. As emphasized to us by Montek Singh Ahluwalia, low physical capital investment has also been a feature of Punjab in recent decades. We quantify this issue later in the paper (Figure 1).

topped the rankings of per capita income among Indian states until 2000, but thereafter its ranking fell continuously, and was the tenth among the major Indian states as of 2021-22. Punjab continues to do well in more durable measures. Its rank in the Human Development Index and Multidimensional Poverty Index is still among the top five states of India. Similarly, its physical infrastructure, such as roads and telecommunications, is relatively better than the income rank would indicate. Of course, this situation can change in the future if the economy stagnates. More than that, a major concern is the possibility of environmental disaster. In particular, the highly specialized, monoculture agricultural structure contributes to environmental problems such as air and water pollution, soil contamination, and a rapidly falling groundwater table. Climate change will almost certainly exacerbate these problems.

Just as Punjab's geography and history have shaped its current economic situation, they have implications for its development prospects. While Punjab is small relative to many other Indian states, it is not negligible in terms of size, with a population as large as that of Australia, though with completely different resource endowments and geographic position. The state's agricultural sector, molded by the national food security policy, can be characterized by diminishing returns. Even these diminishing returns are coming at a cost that is not properly measured, because of large subsidies for water and electricity. These subsidies are obviously a consequence of the political economy structures induced by the food procurement system, and they have created an enormous drain on the state's public finances.

A natural avenue for economic development based on an agricultural base would be a combination of agricultural diversification and development of agro-processing industry. Policies for crop diversification have been formulated since the 1980s, but have made relatively little progress. The higher risks and uncertainty in production and income generation associated with other crops, relative to the safety of growing wheat and rice for the national food procurement system, have acted as a barrier to switching. Many potential crops that could be part of a diversification effort also require more sophisticated infrastructure for storage and transport than what has worked for wheat and rice.

In industry, Punjab had historically done well in small and medium industry, and in subsectors such as light manufacturing, and textiles and garments. Its manufacturing capabilities in these sectors were comparable to the rest of India. In fact, some of the state's industrial development was a response to the needs of more mechanized agriculture—a byproduct of the GR, because harvest timings and labor scarcity favored the use of tractors and harvesters. However, the collapse of the Soviet Union had a negative impact on Punjab's manufacturing sector exports, and this coincided with economic liberalization in India, for which the state was relatively less well-positioned than many other states,

because of its particular economic structure.<sup>2</sup> The geographic position and skilled labor resources of Punjab may work against its competitiveness in large-scale manufacturing, relative to other states, including its neighbor, Haryana.<sup>3</sup> Areas of possible comparative advantage related to cultural distinctiveness, such as designer textiles or garments, also present challenges, not so much in terms of costs, but in identifying and accessing markets.<sup>4</sup>

In the services sector, Punjab has failed to establish a significant presence in higher-value-added services such as Information and Communication Technology-enabled services, especially with Gurugram in Haryana becoming a major regional hub for such services. Political corruption<sup>5</sup> and an inadequate human capital base were also factors. At the lower end of the skill range in services, hospitality and cultural tourism have potential, given the relatively large Punjabi diaspora. In particular, Sikhs living abroad view Punjab as their homeland in terms of religious heritage, and represent an important source of tourism, often combined with family visits.

The slow growth of Punjab's economy in recent years, especially in relative terms compared to neighboring states and to the recent past, has had serious negative consequences, including high unemployment rates (with youth unemployment being 20 percent and close to 30 percent for young women between 2017-22), high rates of emigration,<sup>6</sup> accelerated degradation of the

2. The violent conflict in the state in this period also played a role, by disrupting many forms of activity, especially by discouraging investment. We discuss these issues later in the paper. Montek Singh Ahluwalia raised the issue that our paper does not analyze growth drivers across states. However, this was done in Sanyal and Singh (2021), at a previous IPF, in which the authors empirically analyzed connections between growth and structural change across states. Punjab's specific economic structure and lack of structural change was one of the foci of that analysis.

3. Montek Singh Ahluwalia disagreed with our assertion that Punjab's location is particularly disadvantageous. While some of this was addressed in Lakhwinder Singh's response (see session transcript), subsequently, Devesh Kapur (personal communication), suggested that the status of Ludhiana as a railway hub means that, with a concerted effort and some investment, Punjab can accomplish what Uttar Pradesh is doing with respect to Greater Noida. We would still argue that, while it is not the only source of competitive disadvantage, the extra transport cost for Punjab versus Haryana and UP does matter. Many other factors influence industrial location choices, including political alignment between the Central and state governments, and certain kinds of tax breaks (which have favored Himachal Pradesh and Uttarakhand in some industries).

4. "Cultural distinctiveness" in this context merely refers to design choices, and has parallels in other states or regions—it has nothing to do with the possible cultural factors discussed by Vini Mahajan.

5. Overall, Punjab has generally been below average on recent state rankings of 'ease of doing business' from 2015 to 2019 (RBI, 2022, Table 140, p. 357), though it ranks at the top in terms of 'ease of starting a business'.

6. According to a study by Punjab Agricultural University, Punjab has seen a rise in emigration with approximately 13.34 percent of rural households with at least one member having migrated. Amritsar, Gurdaspur, Shaheed Bhagat Singh Nagar, and Ferozepur districts have more than 30 percent of households reporting some migration. See <https://www.hindustantimes.com/cities/chandigarh-news/rural-punjab-witnesses-steady-rise-in-emigration-pau-study-101705084071517.html>

environment,<sup>7</sup> agrarian distress (including suicides),<sup>8</sup> and social problems such as drug abuse.<sup>9</sup> The environmental issues are particularly concerning. There may be significant environmental benefits from diversifying agriculture, if that reduces water use and soil contamination. However, new industrial investment, and even services like tourism, generate their own negative environmental impacts. Many of these issues have to be tackled at the national level, through carbon pricing and water pricing, but state and local policies, such as building standards or enforcement of vehicle emission restrictions, are needed as well.

Our historical overview and identification of a range of problems in the Punjab economy has not stated anything that is not already known, and recognized repeatedly by economic analysts and policymakers. What are the constraints on policy-making and implementation that have prevented a growth revival in Punjab? We identify four interrelated issues that act as constraints on the Punjab economy.

First, driven largely by dependence on the Central Government's food procurement policy, and its specific nature, the state remains heavily agricultural in a narrow manner. This structure has created a lock-in, and raised the economic and political costs of switching to a different economic structure. The diversification of the state's economy, in general, and the agriculture sector, in particular, has been severely limited by these costs. Even within the existing structure, economic growth is hindered by the weakness of interlinkages between sectors (I. Singh and L. Singh 2011).

Second, Punjab's fiscal situation is constrained in ways that make fiscal policy dysfunctional: related causal factors include the agricultural structure and the state's political economy. Both physical and soft infrastructure have been negatively affected by the problems in public finances. Some of the problems in the state's public finances arose from the costs imposed by the turmoil of the 1980s, and the associated deterioration of many of the state's organizations and institutions, including for revenue collection. Committed expenditure regularly exceeds the revenue collected by the state government. But over 90 percent of current borrowing goes to debt service. Agriculture based on unprocessed foodgrains provides little opportunity for tax revenue. Most prominently, the increasing cost of power and water subsidies, driven by the worsening economics of growing wheat and paddy with heavy irrigation and inadequate surface water, has dominated the state's budget.

---

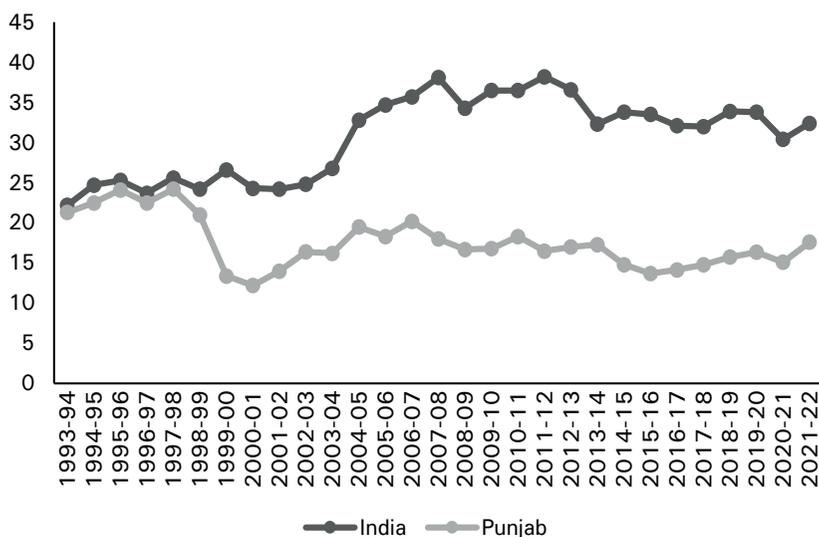
7. Among recent surveys of this phenomenon, see Pratiksha and Sharma (2020) and Liu et al. (2021).

8. "The frequency of farmer suicides in Punjab has jumped since 2015. From nearly 70 suicides a year between 2000 and 2014, the number increased by nearly four times to 263 a year after 2015 (peaking at 323 in 2018)." See: <https://www.theindiaforum.in/article/spike-farmer-suicides-punjab>. The relative decline in Punjabi farmers' incomes is substantial. For example, a Meghalaya farmer's income is now higher than a Punjab farmer's income.

9. According to Chavan et al. (2019), nearly 35 percent of the households in Punjab have at least one person with a substance use disorder.

Third, a combination of regional and domestic politics during an era of liberalization has disadvantaged the state, with existing industries declining, and new ones not emerging rapidly enough. India's economic reforms of 1991 included import liberalization at the same time as China's rise, and this had a negative impact on the state's existing industries, which were already in weaker positions. Simultaneously, the collapse of the Soviet Union affected some export markets for Punjab's manufacturers. Other contributing factors have included poorly designed and inefficient tax and duty structures, difficulties in acquiring land, expensive electric power (partly related to agricultural power subsidies), lack of access to finance, and more attractive incentives offered by governments of neighboring states. Punjab's long border, two wars, and constant tensions with Pakistan have deterred both domestic and foreign investment in the state.

**FIGURE 1. Gross Fixed Capital Formation as a Percentage of GDP/GSDP of India and Punjab**



Source: Government of India National Accounts.

Fourth, both individual high-skilled human capital and institutional or organizational capital have either failed to develop, or have deteriorated over recent decades, making Punjab less innovative and less attractive for new investment. The investment rate in Punjab has fallen significantly, both in absolute terms, and relative to the average for India as a whole (Figure 1). While the casual perception is that Punjabis have abundant entrepreneurial and

leadership skills,<sup>10</sup> inadequate public investment in education and health, without sufficient high-quality private substitutes, has created a mismatch between the skills in demand by business and the low-skilled human capital produced in the state. Higher rates of emigration accentuate this imbalance.<sup>11</sup> Many public sector institutions have actually declined in their functioning, as a legacy of the long period of attenuated or absent electoral accountability that marked the era of conflict. Arguably, a nexus of police-bureaucracy-political elites led to reduced opportunities for private enterprise investment to flourish in Punjab and contributed to the exodus of human and financial capital from the state. The state government also exercises heavy control over local governments, reducing their capabilities as well.

Given these interrelated constraints, the paper argues that prospects for meaningful economic development in Punjab will depend on collaboration between the state and national governments, including fiscal support from the latter to deal with switching costs and accumulated fiscal issues. We also discuss several specific policy areas, including agricultural diversification; industrial development and innovation; cross-border services; and decentralization to the local level. The rest of the paper is organized as follows. In Section 2, we discuss Punjab's economic structure, as captured in the standard classification of agriculture, industry and services. We consider output, employment, productivity and the composition of each sector, as well as some recent policy perspectives that have emerged in government documents and expert reports. In Section 3, we examine some salient aspects of labor and employment in more detail, while Section 4 deals with education and health services. Section 5 examines the important issues of public finances and governance quality. While various policy concerns are raised in these sections, Section 6 offers some additional, integrated consideration of policy options for the Punjab government. Section 7 provides a summary and conclusion.

## 2. Economic Structure

We consider agriculture (including allied services), industry and services sequentially in this section. The agricultural sector is dominated by growing of

---

10. We want to emphasize that we are not claiming any unique distinction for Punjab or Punjabis in this dimension. There is ample evidence for many other regions or groups in or from India having such qualities. In her remarks, Vini Mahajan discussed possible cultural factors for Punjab's current situation, but our assessment is that there is nothing particularly "cultural" in the factors that have shaped Punjab's economic trajectory. While economists have analyzed social norms as drivers of economic outcomes, we would argue that India's political economy has been far more important than cultural factors, including religion.

11. The impact of this emigration, and possibilities for return flows of capital or other resources from the large Punjabi diaspora, were raised in the discussion, and more details can be found there, as well as a brief consideration later in the paper.

wheat and paddy for the national food procurement system, and that is a major focus of our discussion. Within industry, our main focus is on the manufacturing sector, and its components. Services are more heterogeneous, and we discuss several aspects of the services sector, although health and education are treated in a separate section.

## 2.1. Agriculture

According to the latest Punjab Economic Survey (PES, GoP 2024) for 2023-24, published on 1 March 2024, the share of agriculture and allied activities in GSVa based on advance estimates was 26.68 percent while the sector accounted for 24.64 percent of employment in 2022-23. The state's share of agriculture had not declined much since the early 2000s, and was higher than that of other Indian states with similar levels of per capita income. Of course, this reflects the unique structure of the Punjab economy. As the PES points out, Punjab accounts for only 1.53 percent of India's area, but contributes 31.22 percent of the rice and 46.24 percent of the wheat procured by the Central Government. In fact, these statistics highlight the central problem of Punjab agriculture, and of the state economy as a whole. Even within agriculture, diversification into less water-intensive crops, or into higher-value-added activities such as animal husbandry, has been inhibited.

Punjab has an area of about 5M hectares, out of which 4.1M hectares is the net area sown. Out of these 4.1M hectares, 3.7M hectares is area sown more than once, so cropping intensity is high at 190 percent (2019-20). The area deployed for rice increased slightly between 2018-19 and 2020-21, from 2.59M hectares to 2.74M hectares. Productivity also increased by 12.8 percent for non-*basmati* varieties, but declined nearly 20 percent for *basmati* (which constituted one-sixth of the rice area sown and typically has a lower yield than common paddy). Wheat has been consistently cultivated on over 3.5M hectares, with a stable yield around 5,000 kg/ha in the past few years. Cereals like rice and wheat made up 84-87 percent of the crop area between 2015-16 and 2019-20. Pulses only constituted 0.2-0.4 percent of the crop area and fruits made up less than 1 percent of the crop area. Cotton and sugarcane represented slightly larger shares but were still under 5 percent each. For cotton, the area decreased slightly over the years while yield decreased by about 20 percent.

There is a long history of failed attempts to make changes to Punjab's agriculture sector, but the PES highlights the state government's efforts to shift rice to less water-intensive varieties; monetary incentives for direct seeding which also saves water; and a new Minimum Support Price (MSP) for *dals* (pulses or lentils).<sup>12</sup> More significantly, soon after the PES was released, the

---

12. Failed state agricultural policies have been intertwined with the national food procurement system, and even the militancy and conflict of the 1980s and early 1990s, which had multiple roots, but included concerns about the viability of GR agriculture. The conflict directly seems

Government of India (GoI) announced a major shift in its food procurement policy, with greater purchases of pulses and maize at MSPs, to wean farmers away from rice. Since rice yields in Punjab are the highest in the country, and rice and wheat are grown in a tight alternating cycle, the exact nature of this shift will be important in determining its impact. The PES documents the precipitous decline in the area devoted to maize, and especially pulses, but notes that yields in Punjab are higher for these as well, compared to the rest of India. Fruits are also a potential crop for diversification, accounting for only 1 percent of cropped area, though it presents different challenges in terms of production and marketing than foodgrains, especially when those are procured by the government.

The PES is optimistic about the potential for animal husbandry, particularly dairy products, although this also requires additional infrastructure. Even fisheries are presented as an opportunity for further development. In neither case are the environmental impacts of livestock or fisheries discussed, so those issues may need to be considered more carefully. In the realm of environmental impacts, in addition to greenhouse gas emissions and a declining water table, the excess and imbalanced use of fertilizer in growing wheat and rice is well-recognized. Although the inefficiency of fertilizer use has moderated slightly, as has excess use, they remain major problems.

Another well-recognized problem that contributes to distortions in Punjab agriculture is the provision of free electricity to farmers, which encourages over pumping of groundwater. The use of credit by Punjab farmers is similar, on average, to the rest of the country, although much of this credit is for working capital during the crop cycle, and there is lower use of credit for investment.<sup>13</sup> This could be an obstacle to shifting Punjab agriculture away from its almost complete reliance on growing wheat and rice for Central Government procurement. This reliance can be gauged from the percentages of output that is procured: 89.1 percent of paddy and 62.17 percent of wheat in 2022-23 (PES, GoP 2024, p. 234). Factors that could favor the ability to change the nature of the agricultural sector are good road, rail, and telecom connectivity in rural areas, as well as relatively good quality rural housing and low poverty rates, all of which suggest a situation that is not dire.

The Punjab Vision Document 2047 (PVD) of the state government, which was published in April 2023, covers much of the same ground as the PES, but emphasizes the overall unsustainability of the current agricultural system, in terms of fertilizer, pesticide, and water use, all having a negative impact

---

to have contributed towards a decrease in farmer incomes and in long-term investments. For example, P. Singh (2013) estimated that a major terrorist incident in a district in a year reduced long-term fixed investment by about 17 percent after controlling for other factors. These negative impacts were greater for richer farmers and those living in bordering districts. These impacts translated into a farmer losing close to 4 percent of annual income, on average.

13. Marginal farmers in Punjab are relatively heavily indebted, but this is probably true across all of India.

on soil health and productivity. The PVD also places greater emphasis on the mechanization or capital intensity of the state's agriculture, which, along with the migration of agricultural labor into Punjab, has reduced employment opportunities for the native population. The PVD alludes to various uses of technology for precision agriculture to improve the efficiency of input use. At the same time, it highlights using new varieties of rice and wheat developed by researchers, plus timely supplies of power, fertilizer, and credit to increase the yields of these crops. A vision document cannot be expected to provide detailed plans, but it is not clear from the PVD what priority should be given to different policies, since some of the recommendations could prolong the current system, and delay the needed major restructuring of the agricultural sector.

In some cases, such as the livestock sector, both the PES and the PVD provide more detailed recommendations for improving efficiency and for innovation, which suggests that policymakers are giving this sector more attention. This is also true for fruits and vegetables, though these represent a much smaller proportion of the agricultural sector's GVA, as compared to animal husbandry. Even so, the overall or detailed plans are presented as quantitative or qualitative targets, typically without a clear indication of how policies will be designed and implemented to change agricultural production incentives, investment patterns, and market access, nor what the costs or impacts will be of such policies.<sup>14</sup>

The Punjab Budget Analysis 2024-25 from PRS reports net expenditure for the Government of Punjab (GoP) in 2023-24 (RE) at Rs 1.3 lakh crore, with about 10 percent of this amount being spent on agriculture and allied activities, and another 1.5 percent on irrigation and flood control.<sup>15</sup> Two-thirds of the agriculture sector budget was purely on electric power subsidies for farmers, which leaves relatively little for other government expenditure in this sector.<sup>16</sup> The PVD offers some ambitious targets for replacing chemical-

---

14. In some cases, such as recommendations for diversification to maize, there is some discussion of uses for increased maize output in the government documents. Gulati et al. (2021) also provide suggestions with significant qualitative and (sometimes) quantitative details, for all the typical diversification recommendations, including horticulture, livestock, and fisheries.

15. The decline of the groundwater table in Punjab is not uniform, and some areas suffer from waterlogging. While the reduction of Punjab's share of the river waters flowing through it has pushed farmers to exploit groundwater, the state has a good system of canals, and there may be possibilities of combining flood control with replenishment of aquifers. This is a possibility that deserves more analysis. Additional analysis of recent state budgetary allocations within agriculture can be found in Gulati et al. (2021).

16. To consider an example, the PES reports that an incentive of Rs 1,500 per acre is being offered to switch to direct seeding of paddy. This is about Rs 3,700 per hectare. Yields of paddy are about 7,500 kg of rice per hectare, and the MSP is about Rs 22 per kg. Thus, the gross revenue from a hectare under paddy is about Rs 165,000. Variable costs are about one-third of gross revenue, so after subtracting these costs, the direct seeding incentive payment is roughly 4 percent of those net returns, which is non-trivial. The other issues raised are whether there is an ongoing impact on production costs, such as labor use, beyond one-time switching costs. On the budgetary side, Rs 3,700 per hectare for 3M hectares of paddy amounts to about Rs 1,100 crore, which would

intensive agricultural production with “integrated methods”, such as 20 percent of cropped area under integrated agriculture by 2030, only a few years away. But the economic calculations, in terms of net returns or switching costs, and who will bear such costs, are not always clear or obvious. No doubt, such calculations are performed, but not always in a manner that aligns with high level policy targets.

Note that the GoP’s analysis suggests an important role for agriculture in the state’s economic development. In the PES (p. 187):

“Punjab continues to be an agrarian economy and exploratory analysis shows that agriculture sector plays an important role in driving growth in other sectors. With a lag of a year, a unit’s rise in agricultural products results in 1.4 units rise in services products and 1.8 units rise in industrial products, which is two to three times the impact of other sectors. With majority of industries in Punjab being agro-based, the growth in agriculture adds to the raw material for the industries. Further, with Punjab producing a majority share of central pool of wheat and rice, transportation of these cereals adds to the growth of services sector. Additionally, it should be noted that with higher agricultural income, the demand for products from the industry and services sector grows, boosting the entire economy. It is evident that agriculture sector is the axis in the economy, strongly impacting growth in other sectors and driving the economy.”

While the qualitative statements about transportation and demand would apply to any other part of the economy, the numerical comparison of the linkage effects across sectors is the key claim made, and deserves more investigation. Gulati et al. (2021) ask a different, though related question: what have been the drivers of agricultural growth in Punjab? A regression analysis covering the period 1970-71 to 2015-16 finds that irrigation and road density promoted agricultural growth, as did the agricultural terms of trade.<sup>17</sup> Furthermore, this was found to be a stable long-run relationship. At a general level, these results are unsurprising, and they hint at the idea (recognized in Gulati et al. 2021) that further growth in agriculture may need to come from other sources, since there are diminishing returns or limits to increases in the growth drivers identified in the regression.

With respect to policy changes that alter incentives, Gulati et al. (2021) are more explicit in recognizing the need for them – government survey or vision

---

be about 27 percent of the entire state budget for agriculture after power subsidies. However, if this were a one-time expenditure spread over several years, it could be fiscally feasible. On the other hand, incentives to switch away from paddy may be a more effective long-run policy, especially if the new crops are higher-value-added, or meet national nutritional needs better.

17. Specifically, the ratio of GDP deflators for agriculture and industry for Punjab was used to measure the terms of trade.

documents have to be more cautious in that respect. Examples of these market-oriented recommendations include:

- Metering and charging electric power supply to farmers beyond a fixed level of free supply, and providing cash transfers instead of the price subsidy.
- Switching from fertilizer subsidies to direct cash transfers to farmers, with the requirement that they get the soil tests and soil health cards to qualify for these.
- Simultaneously, removing import duties and price controls on urea.

It should be noted that these are major institutional changes, which potentially introduce new risks and uncertainties for farmers, and will face political feasibility challenges. However, adopting these recommendations would also help in reducing the state debt burden, which currently crowds out more productive public expenditure and hinders economic growth, as discussed in Section 5. Note also that the third recommendation above would involve a national policy change that has ramifications well beyond Punjab, so it would need separate analysis.

The political feasibility issue was demonstrated when similar recommendations were included in the first report of a “Group of Experts” created at the request of the then Chief Minister (CM) of the state (PEG 2020). Indeed, even more radical changes to agriculture were proposed for consideration in that report, with respect to land markets, including changing state laws to open up a leasing market for agricultural land; geo-tagging all farms and matching them with land records and Aadhaar cards to enable that market; and liberalizing laws relating to the conversion of agricultural land to non-agricultural uses. The merits of these recommendations require separate analysis, and also have to be part of a national effort, although states have constitutional responsibility for agriculture.

The Central Government’s attempt in 2020 to change many aspects of the agricultural sector, especially in the direction of a greater role for markets, was particularly unpopular in Punjab and surrounding states. The Punjab CM rejected the entire agricultural reform section of the initial expert group report, and it was omitted in a final version (PEG 2021). One can conjecture that this would have happened even if the 2020 report had not coincided with the massive protests against the “farm bills”. In the process, technical recommendations to improve the markets for farm machinery and seeds, or the technologies of irrigation, were also lost from the report.

## *2.2. Industry*

The share of industry in Punjab’s GSVA is 27.4 percent, quite close to the share of agriculture in the state (PES, GoP 2024, p. 186, Table 1), and to the average

share of industry for India as a whole. However, industry accounts for a higher employment share in the state than agriculture, at 34.3 percent. Gross Capital Formation (GCF) in industry is 31 percent of GSVA, fairly similar to the national figure, although the disparity between the state and national rates at the aggregate level (Figure 1) needs to be kept in mind here. Industrial growth in Punjab has been higher than that of agriculture, and similar to the average for India as a whole. The industry category includes manufacturing, construction and electricity, gas and water supply. Manufacturing is about 61 percent of industry, with another 26 percent coming from construction (PES, GoP 2024, p. 242, Figure 40). Much of the focus in this section, naturally, will be on manufacturing, although construction is more labor-intensive, accounting for 45.6 percent of industrial sector employment, versus 51.8 percent for manufacturing. This focus is because of the greater potential of manufacturing in generating future growth.<sup>18</sup>

In India, there is a legal distinction between registered and unregistered manufacturing, based on the number of employees and the use of electric power. The terms “formal” and “informal” or “organized and “unorganized” are also used for these two categories. Registered manufacturing units are surveyed in the Annual Survey of Industries (ASI), and there are about 250,000 such units in India. One-third of these factories are registered as corporations of some form. The remaining two-thirds are registered as individual proprietorships, partnerships, cooperatives, and so on. The number of manufacturing units in the unregistered, unorganized or informal sector is over 9 million. Employment in the registered manufacturing sector is about 17 million, which breaks down to average employment of about 110 per corporate manufacturing unit and 20 per non-corporate firm unit. Total employment in unregistered manufacturing is about 45 million, implying 4-5 workers per unit in this sector.

According to the Statistical Abstract of Punjab (SAP, 2023), the state has about 21,000 registered factories, employing a little over 800,000 workers (p. 287). The definition here may be different than the ASI definition, and other calculations based on ASI data report a larger proportion of registered manufacturing units for Punjab, at around 5 percent of the national total (Singh and Cheema 2021; ASI 2021-22). On the other hand, there are almost 312,000 unregistered units in the state (Ministry for MSME, <https://dcmsme.gov.in/ssiindia/census/ch5.htm>). Compared to the all-India figures, therefore, Punjab has a higher proportion of registered units versus unregistered units, by these measures. The state’s proportion of registered units is higher than its population share of 2.3 percent, but the same is the case for unregistered units, for which it is 3.4 percent.

In the following section, we will use data from the PES (2024). Table 1 is based on Table 18 from PES, 2023-24, and reports the distribution of manufacturing

---

18. On the other hand, GCF has been shifting in relative terms from manufacturing to construction over the last decade (PES, p. 247, Figure 46). This is similar to the rest of the country, and one of the factors behind this trend is likely the after-effects of the early 2000s’ investment boom, followed by the global financial crisis and an increase in non-performing assets in the banking sector.

across the ten most important subsectors, based on registered units only. Differences in scale, capital investment, and profitability across subsectors are apparent. Food products and non-metallic mineral products account for the largest proportions of units, but they have relatively low proportions of total investment and low profits per factory. Textiles, motor vehicles, and chemicals appear to have the largest scale, and textiles and machinery and equipment (n.e.c.) sectors are the most profitable at the factory level.

**TABLE 1. Select Indicators of Registered Manufacturing Subsector Performance, Punjab, 2021-22**

	<i>Share of Number of Operational Factories in the State (in %)</i>	<i>Share of GVA in the Registered Manufacturing Sector (in %)</i>	<i>Share of GCF in the Registered Manufacturing Sector (in %)</i>	<i>Per Factory Profit (in lakhs of Rs)</i>
Food products	25	13	13	83.42
Textiles	5	13	9	564.57
Machinery & eqt. n.e.c.	8	12	6	470.67
Non-metallic mineral products	15	4	2	68.71
Wearing apparel	7	5	6	105.57
Basic metals	7	6	9	193.10
Other transport equipment	6	4	2	99.76
Fabricated metal products, except machinery and eqt.	6	4	4	115.36
Motor vehicles, trailers & semi-trailers	2	3	3	180.29
Chemicals & chemical products	2	5	4	547.09

Source: Based on Table 18 from PES, GoP 2024.

The subsectors reported in Table 1 account for 69 percent of GVA in registered manufacturing. Later in the PES, the food processing industry is further disaggregated (Figure 48), based on the same ASI data as the table, but a much higher percentage of manufacturing GVA is reported for the subsector.<sup>19</sup> The discussion reiterates that food processing is a natural industry given Punjab's agricultural base, but the economic incentives for such activities are not discussed.<sup>20</sup> Most wheat and rice is sold to the national procurement system,

19. Profitability statistics are also reported (PES, Figure 49), but are difficult to interpret.

20. Note that we do not have data on factory size and profit relative to capital investment, so we cannot draw firm conclusions from profit per factory figures. However, based on the percentages in Table 1, we can derive a rough estimate that investment per unit in food processing is about 30 percent of that in textiles, while profits per unit are closer to 15 percent. The case for food processing might still be made, based on considerations such as employment, market potential, and interlinkages.

but it is not clear as to what degree other agricultural products are processed, or what markets are served.

Some disaggregation of the textile sector is also provided in the PES (Figure 50), but the different components of the sector do not appear to have any great degree of differentiation beyond that between textiles and apparel. In this sector, a disaggregation for unorganized enterprises is also provided, based on the 2015-16 UES survey, and apparel accounts for a much higher proportion of the unorganized sector, which makes intuitive sense. However, there is no comparison of GVA or profitability across the different types of manufacturing enterprises, namely registered versus unregistered.<sup>21</sup>

A few other subsectors of unregistered manufacturing are also discussed briefly, with light engineering, accounting for just 6.3 percent of unregistered manufacturing GVA, receiving the most attention, i.e., metal fasteners and bicycle parts, in particular. There is some consideration of how clusters might be created, and this is discussed below. The PES, while advocating for policy attention to these kinds of metal and light engineering products, does not address the decline of such manufacturing in clusters that had been developed in the 1960s (Goyal 2020).

In general, studies of Punjab manufacturing find evidence of a decline from the 1980s onward, with some recovery in the early 2000s, but further stagnation thereafter. Empirical studies indicate that technical efficiency and productivity growth have been relatively low. Investment in industry has also been low—some of this was undoubtedly because of the shadow of the conflict of the 1980s and 1990s, followed by liberalization of industrial licensing and other reforms in 1991. But in the last decade, industrial policy incentives from neighboring states likely also played a role (Goyal 2020). While some aspects of infrastructure are good, access to reliable electricity and workers with appropriate skills have been relatively poor, given Punjab's otherwise strong economic profile. Underinvestment is both a cause and consequence of the size distribution of firms, and even registered manufacturing firms are mostly very small.<sup>22</sup> Small firms also have a more difficult time obtaining credit—these patterns are somewhat true across the country, but some states have been able to overcome such obstacles.

A few studies have supplemented official statistics with small surveys. Singh, Singh, and Cheema (2022) surveyed 191 small enterprises in Tarn Taran and Gurdaspur districts, and identified several obstacles. Note that these are both border districts, and this location can also be a disadvantage. Small size and lack of access to financial capital were major reasons for many respondents

---

21. There is a separate summary of data from the Khadi and Village Industries Commission, which covers small rural enterprises. Khadi is handwoven cloth, but it is not clear how this data is related to unregistered textile units in general. In any case, the employment numbers are small, though the reported output figures per unit are surprisingly large.

22. Many of these issues were analyzed in Singh and Jain (2007). See also Jain (2016), Verma and Kaur (2018), Goyal (2020), and Singh and Cheema (2021).

not engaging in any technology upgrading. In these districts, the infrastructure was not rated as particularly good, and even acted as a deterrent to potential industrial customers. Despite efforts by the GoP to improve the ‘ease of doing’ business, many respondents found approval processes to be still fragmented or cumbersome. Furthermore, there was no evidence of an active state-level policy to connect small firms to larger industrial buyers of their products. Essentially the same issues were found in a survey of 120 small firms in Jalandhar district (Bedi et al. 2021). This is more surprising, since Jalandhar is a major industrial hub in Punjab, second only to Ludhiana. This suggests that the findings for Tarn Taran and Gurdaspur districts are not local phenomena due to their border status, but reflective of state-level policy design and implementation issues.

The PES does summarize some policy measures with respect to clusters (Box 6, p. 258) in Ludhiana (garments, sewing machines, and packaging and printing), Kapurthala (foundry and general engineering), and Patiala (cutting tools). Specific policies for these clusters are not presented, but the PES describes generic policies to increase the ‘ease of doing’ business. The description of the government funding being provided (in some cases from GoI schemes) suggests that the main expenditure is on creating common facilities for small firms to operate in.

Separately, the PES mentions the sports goods cluster in Jalandhar, and mentions plans for technology support, as well as testing and certification facilities for a sports goods park. In fact, Mehta (2023) has provided a detailed analysis of this particular cluster. Jalandhar district appears to be somewhat unique among the largest industrial centers of Punjab, in that it has no significant large firms in the area: thus, it is second in output value for MSMEs, after Ludhiana, but a distant 16<sup>th</sup> in the output of large and medium firms (PES, Figures 56 and 57). Mehta’s study is based on a primary survey of 45 firms (including 4 medium-sized, 21 small, and 20 micro enterprises). The medium-sized firms are much better placed, but even many of the small firms export successfully. There are familiar challenges, of access to raw materials, availability of skilled workers and institutional support for imparting skills when needed. For the micro and small firms in the cluster, industry associations and policy-making did not provide enough support,<sup>23</sup> and high import duties on equipment and raw materials were a significant obstacle.

---

23. A completely different study (Mehta and Kaur 2021) found that even in a much larger and more well-established cluster, that of woolen textiles in Ludhiana, firms were often unaware of government support programs instituted during the COVID pandemic. This is another example of distance of policy-making from day-to-day manufacturing firms’ operations. A comparison of agriculture and industry might be useful in this respect, to identify the factors that inhibit communications between government and smaller firms, in particular. Kaur et al. (2023) also use primary data, collected in 2018, to analyze two clusters in Punjab, a textile cluster in Ludhiana, and a hi-tech metal cluster in Mohali. Many of the workers in these clusters were migrants from other states, and they formed effective labor pools in each cluster. There was evidence of knowledge-sharing within the two clusters in this study, and less heterogeneity than in the Jalandhar sports goods cluster. However, there is no data on policies that might have shaped the development of these clusters, through positive action or through absence.

The distance between policy-makers and the operation of industry in practice also emerges from the Punjab Vision Document 2047 (PVD, GoP 2023). PVD recognizes that small size and outdated technology are major obstacles to the growth and efficiency of Punjab's industry. However, policy recommendations for existing industry (PVD, GoP 2023a, p. 50) focus on subsidies, tax breaks, and even a call to resurrect the Freight Equalization Scheme, which seriously distorted industrial location in India and was scrapped in 1993. For future industrial growth, the PVD focuses on a wide range of industries that are deemed to fit the label of Industry 4.0 (p. 48), as well as various kinds of services—this list has 38 different items, many of them extremely broad such as Artificial Intelligence and Electronics; areas where Punjab may be unlikely to be considered suitable like Aerospace and Defense; and specific—but mundane—items such as event management services. A list of nine potential industrial hubs/clusters/parks is also a heterogeneous collection of ideas without much foundation (p. 49). However, referring to an earlier 2030 Vision Document, there is a discussion of agro-food processing as an important priority.

The lesson from these lists is that there is a disconnect between the actual needs of Punjab's manufacturing industry that would promote efficiency and growth, and the vision for the future. In the Punjab government documents, there is no systematic conceptual or empirical analysis of different industrial clusters or subsectors, which could be the basis for policy design.<sup>24</sup> As an alternative conceptual approach for designing more dynamic clusters, one can instead apply the ideas of Chandra (2022), which describes examples from Italy, China, Japan, and other parts of India. In these examples, small firms become a part of a network that collectively acts as a large firm in some respects. These kinds of clusters allow firms to coordinate functions and collaborate in specific ways. In the Italian example, integrated textile mills in Prato (Italy) started losing their competitive advantage, and responded by becoming a cluster of small firms, specializing in certain product categories or specific process capabilities. They cooperated on common services such as logistics, banking, and maintenance, while still competing within the cluster to win orders. In this case, the former owners of the mills provided the expertise and organizational skills to build and maintain the network, whereas in other country cases, new private entities, such as agency firms or industry associations filled this role. Chandra (2022) also gives examples of successful clusters in Rajasthan and Gujarat, so there are models closer home for Punjab to adapt to its own needs.<sup>25</sup>

---

24. Montek Ahluwalia objected to our assessment as being disparaging. However, the concern expressed in our analysis is not the setting of ambitious goals, but a lack of conceptual cohesion and articulation of a pathway to achieving those objectives.

25. Punjab's geographic position and human capital profile work against its competitiveness in large-scale manufacturing, relative to some other states. The region around the National Capital Territory, including Punjab's neighbor, Haryana, has attracted industrial investment in a manner that Punjab has been unable to match. Even though Punjab has higher production and employment than Haryana in small and medium enterprises (RBI 2022, Tables 129 and 130, pp. 335-336), its overall industrial value added is lower.

With respect to the choice of industrial sectors, more technologically advanced versions of food processing, bicycle manufacturing, and chemicals are all cases where upgrading is a logical option to consider: these are all in the clusters list. Items such as surgical instruments, medical devices, and prosthetics are other examples of products where quality matters, but the production itself is not necessarily technologically sophisticated. But other suggestions might be a wish list that remains in that category, especially if import barriers, worker skills, access to finance, and access to markets do not improve.

### 2.3. Services

Mirroring a pattern found across India, Punjab's services sector is larger than agriculture or industry. It accounts for 45.9 percent of GSVA and 41.1 percent of employment (PES, GoP 2024, p. 186, Table 1). The sector has also grown faster than the others, over recent decades, again similar to the rest of India. One difference between Punjab and most other states at similar per capita income levels is that its agriculture sector is proportionately larger, and its services sector share is, therefore, considerably lower than the national average of 54 percent. However, Punjab's service sector employs proportionately more of its workforce than the all-India average of 29 percent (PES, GoP 2024, p. 188, Box 2). This reflects the lower labor intensity of Punjab agriculture, as compared to the rest of the country.

The services sector is well-known to be extremely heterogeneous, in terms of the nature of the services provided. These can range from tasks that can be done with minimal skills, to those that require an extremely high degree of education and training. The breakdown in Table 2 is still somewhat aggregated,

**TABLE 2. Services Sector Components**

	<i>Share in Nominal GSVA, 2012-13 to 2020-21 (in %)</i>	<i>Share in Nominal GSVA, 2023-24 (A) (in %)</i>	<i>Average Growth Rate, 2012-13 to 2020-21 (in %)</i>	<i>Growth Rate, 2023-24 (A) (in %)</i>
Trade, Repair, Hotels & Restaurants	10.8	9.6	5.1	6.2
Transport, Storage, Communication & Services Related to Broadcasting	5.4	5.9	4.9	6.2
Financial Services	5.2	4.5	4.3	8.6
Real Estate, Ownership of Dwellings & Professional Services	9.2	9.3	6.0	6.1
Public Administration	5.2	5.9	6.7	7.2
Other Services	10.1	10.7	7.2	8.7

Source: Based on PES, GoP 2024, Table 5, p. 192.

and the ‘Other Services’ residual category is clearly heterogeneous. But even the other categories combine fairly disparate types of services. Three of the categories each account for 20 percent or more of services GVA, and the other three each about 10 percent of services GVA. The growth rates have differed across the categories, and over time, though there are seemingly no outliers at this level of aggregation. Within the first category of services, Trade & Repair account for 95 percent of the GVA, so that Hotels & Restaurants are actually a minor contributor to the overall economy (PES, GoP 2024, Table 20, p. 263).

Further disaggregation of the above subsectors (Table 20 of PES) also indicates that road transport is the most important component of the second category, followed by communications services. However, other categories are not broken down further in this table. The “Other Services” category includes health, education, and entertainment, so it is an important subsector of the economy. Indeed, health and education services have distinctive characteristics and economic implications, and we treat them separately in this paper.

The role of the services sector in India’s economic growth has been analyzed by many (Singh 2007; Eichengreen and Gupta 2011). In this context, the heterogeneity of the sector matters, since the growth of different subsectors will have very different implications for output growth and employment growth. In particular, the potential for productivity growth can vary greatly—indeed some kinds of services are the hallmark of a less-developed economy. It should also be borne in mind that the boundary between industry and services can be arbitrary. For example, Indian national accounts classify electricity, gas, and water services as part of the industrial sector. This reflects their capital intensity and economies of scale. Conceptually, they combine elements of production (manufacturing) and delivery of those products (service provision).

The PVD (p. 48) lists 38 subsectors or activities that are considered to have high growth potential. Many of these refer to the production of technologically advanced products such as semi-conductors or e-vehicles, or to categories such as aerospace and pharmaceuticals. Others in the list are so broad that they include elements of products and services, such as “tele-communication and information technology” or “IoT (Internet of Things)”. The items on the list that clearly come under the category of services are:

1. AI (Artificial intelligence);
2. Cloud computing;
3. Data analytics;
4. Cyber security technology;
5. Software development;
6. R & D firms;
7. Consultancy services for insurance, share market, financial matters, real estate;
8. Career counseling, guidance and employment services;

9. International business, immigration and study abroad services
10. Tourism;
11. Hotel management and catering services;
12. Event management services;
13. Skill development centers;
14. Incubation centers;
15. Media entertainment; and
16. Logistics.

This is clearly an eclectic list, but it can be mapped onto the different components of the services summarized in Table 2. There are some overlaps, especially in the first five items in the list. What is not clear from the Vision Document is what their current role and importance is in Punjab's economy.

The PES offers an extended discussion of tourism, with a focus on cultural tourism as a motive, although reported numbers presumably include medical tourists as well. The "tourist footfall" was over 26 M in 2022 (PES, GoP 2024, Table 22), of which a little over 1 percent were foreign tourists (PES, GoP 2024, Table 21). Adjusting for the size and location of the state, Punjab does reasonably well, compared to other states, in attracting foreign tourists. Overall numbers indicate that Amritsar is by far the most popular single destination within Punjab, which is to be expected. However, the assertions about the positive contribution of tourism to growth are not quantified in any manner. Certainly, there are economies such as Italy's, which are very heavily dependent on tourism, but such countries also have other highly developed sectors. Tourism can also have negative environmental impacts and distort patterns of urban development and human capital acquisition. Punjab does not have the same cultural tourism potential as countries like Italy, or environmental or natural tourism potential as regions with coastlines, forests, or wildlife. Globally, travel and tourism contributed 9.1 percent to GDP in 2023 (<https://wtcc.org/research/economic-impact>), but this is likely far greater than the potential in Punjab. It is unclear whether tourism can be an engine of growth, and how much policy attention it deserves.

In the case of other services subsectors, such as road transport, telecommunications, and financial services, the state-level statistics for Punjab are all relatively good as compared to other states, or to all-India averages (PES, GoP 2024, pp. 270-277). However, these averages do not provide any information on the level of infrastructure needed for cities or towns to serve as growth poles, by being the sites for dynamic industrial clusters. Some of the weaknesses of industrial clusters in Punjab were analyzed in the section on industry. Summaries of urban development in Punjab (e.g., PES, GoP 2024, Chapter 5), or of government initiatives (PES, GoP 2024, pp. 277-278) do not address the infrastructure needed for such clusters, although the problem of electricity supply is discussed in the context of urban development.

The precise nature of the financial, transport, and communication services will depend on the service or industry being supported: any of the first five categories in the list of 16 subsectors extracted from the PVD will need greatly increased communications bandwidth with high reliability. Even sports goods and textile firms need good communications if their suppliers and customers are spread around India or the world. Even in the PVD, there does not appear to be any analysis of the precise nature of improvements in infrastructure that come under the services sector, which would be needed for industrial development, both by specific industry and by local region.<sup>26</sup>

A different approach to the question of industrial development, also rooted in the services sector, can be found in the two reports of the Punjab Expert Group (2020, 2021), which included representatives of the private sector as well as academics and policymakers. These reports included recommendations such as:

- Streamlining and simplifying procedures for development of land for industrial purposes (PEG, 2020, p. 27);
- Modifying rent control laws and building height restrictions (PEG, 2020, p. 27);
- Making vacant urban land available for development (PEG, 2020, p. 28)
- Improving urban land records, including removing ambiguities in titles (PEG, 2021, p. 28);
- Extend land use for industrial estates to the outskirts of urban areas (PEG, 2021, p. 29);
- Improving institutional and financial mechanisms for joint cost sharing of industrial infrastructure development by industry and government bodies (PEG, 2020, p. 28);
- Incentivizing the use of online platforms to improve liquidity of small firms through more timely payment from industry and government customers (PEG, 2020, p. 32);
- Improve mechanisms for obtaining rights-of-way for digital infrastructure (PEG, 2020, p. 36);
- Focus on coordinating digital infrastructure build-out with the needs of industrial clusters (PEG, 2020, p. 36);
- Involve universities and technology companies in assessing the needs at the high end for digital infrastructure concentrations (PEG, 2021, p. 36);
- Create an institutional ecosystem for start-up formation and success, including funding, training and incubation (PEG, 2020, pp. 38-41); and
- Rethinking the design and functioning of public sector technology development institutions (PEG, 2021, p. 32).

---

26. The PVD does allude to using information technology, including AI, to improve delivery of health services, traffic management, and so on, but these are also not discussed with any specificity in either dimension, location, or economic activity.

Note that most of these recommendations can be viewed as policy interventions to improve the functioning of three services subsectors—real estate, finance, and telecommunications—specifically for industrial development.

### 3. Labor and Employment

Punjab's agriculture is more highly mechanized than that of most of the rest of India. Furthermore, yields are higher. As a result, the ratio of agricultural output to employment is higher in Punjab. Correspondingly, the ratio of GVA to employment is lower for industry and services, as compared to the rest of India. The PES (Box 2, p. 188) interprets this as a more balanced economy, but it is not clear whether there is any virtue in that balance. For 2022-23, based on PLFS data (PES, GoP 2024, Table 8, p. 204), Punjab's labor force participation rate was considerably lower than the national average (53.5 percent versus 57.9 percent) and its unemployment rate was almost double the national average (6.1 percent versus 3.2 percent). Furthermore, the worker-population ratio in the state was much lower than the all-India figure (50.2 percent versus 56.0 percent).

These numbers also have to be interpreted in the context of substantial immigration from poorer states such as Uttar Pradesh and Bihar (PES, pp. 201-202), as well as out-migration. According to the 2011 Census, there were 2.4 million migrants in Punjab, representing 5.3 percent of the nation's migrants, more than double of Punjab's share of the national population. Many of the migrants were seeking employment, typically as daily casual labor. At the same time, many of those registering with the unemployment bureau are classified as skilled, and there is a high demand for emigration to countries which already have substantial Punjabi diaspora populations. Even countries such as Italy, which did not historically fall in that category, have seen rapidly rising immigrant populations from Punjab, especially from among rural Sikhs. This highlights the mismatch between Punjab's economic structure and its employment opportunities, something that the balanced distribution hides. Note that the difference in unemployment rates between Punjab and the all-India figures is much greater for the rural sector. This may be because of greater labor intensity in much of rural India, or the nature of migration—surplus rural labor in Uttar Pradesh can more easily migrate to Punjab, whereas surplus rural labor in Punjab has to migrate abroad, or shift to skilled jobs in the urban sector, each of which presents greater obstacles than cross-state rural migration for unskilled workers.

Several other specific features of Punjab's employment patterns are worth noting. Punjab has a relatively high employment-output ratio for its service sector, compared to the national average. One can infer from this that Punjab lacks the kind of high productivity service sector employment that would be found in major cities. Arguably, some of this might be because Chandigarh,

by far the most well-off city in the region, is not included in the statistics for Punjab. On the other hand, Ludhiana, Amritsar, Jalandhar, and Patiala are all substantial cities, with industries and universities. A significant amount of service sector employment in Punjab is in the trade and repair segment—the share of this sector in total employment is among the highest for all states in India, at 14.57 percent (PES, GoP 2024, p. 266).

Urbanization in Punjab is slightly higher than the national average, and has been trending upward in a similar fashion. When one examines employment patterns across men and women in rural areas, another striking difference emerges in Punjab. The female worker participation rate in urban Punjab is similar to the national figures (23.2 percent versus 23.5 percent, PES, GoP 2024, Table 62, p. 324). However, the differences in the rural sector are vast (26.3 percent versus 40.7 percent). This is consistent with the mechanized nature of Punjab agriculture, and associated social norms. Women and male youths are not doing agricultural jobs in ways that they would in a more subsistence agricultural situation. This can also be seen in the prevalence of a much higher unemployment rate for rural women in Punjab, versus the national average (8.7 percent versus 1.8 percent). This is suggestive of a situation where neither rural nor urban jobs are being created that fit the individual and social expectations of the population. For example, trade and repair services jobs, even when rural, are unlikely to be filled by women. In many parts of India, middle class women's entry in the labor force has been into white collar-type jobs, which may not be adequately available in Punjab.<sup>27</sup>

### *3.1. Youth Labor Force Participation and Unemployment Rate Patterns: Punjab versus Haryana*

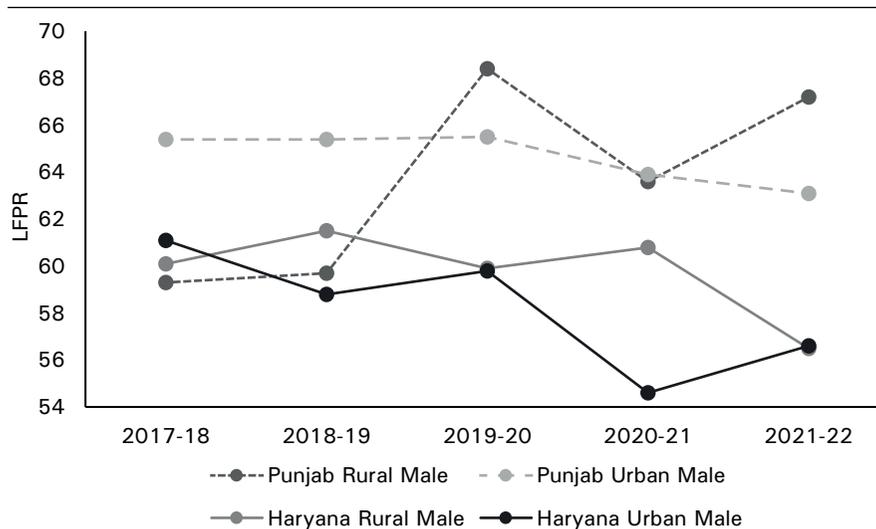
It is also instructive to compare youth employment in Punjab with that in the neighboring state of Haryana. Using Periodic Labour Force Surveys (PLFS) from 2017-18 to 2021-22 (Figure 2), we find that youth labor force participation rates for males (15-29 years) are slightly higher in Punjab as compared to Haryana (64 percent versus 59 percent overall). There was a declining trend in the labor force participation in urban Punjab in 2020-21 and in 2021-22. However, the labor force participation rate among urban males went up after a steeper fall in Haryana, whereas it recovered faster among rural males in Punjab. This is a puzzle—why did a LFPR recovery happen among urban males in Haryana but among rural males in Punjab?

Among female youth (15-29 years), Punjab has a higher LFPR than Haryana (18 percent versus 12 percent) and all cohorts (rural or urban, Punjab or Haryana) appear to be showing an uptick in LFPR (Figure 3). Patterns in unemployment among the youth are shown for the two states for males in Figure 4 and for

---

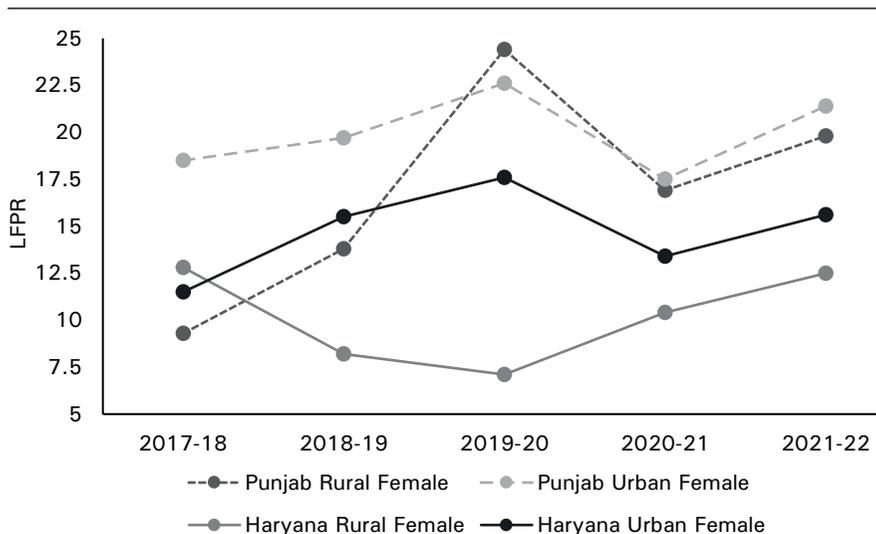
27. Emigration can be a way to avoid the constraints of social norms, as working in a factory or other manual occupations is acceptable in a foreign location, but not within one's own social milieu.

**FIGURE 2. Labor Force Participation Rate (15-29 Years) for Males in Punjab and Haryana (Rural versus Urban)**



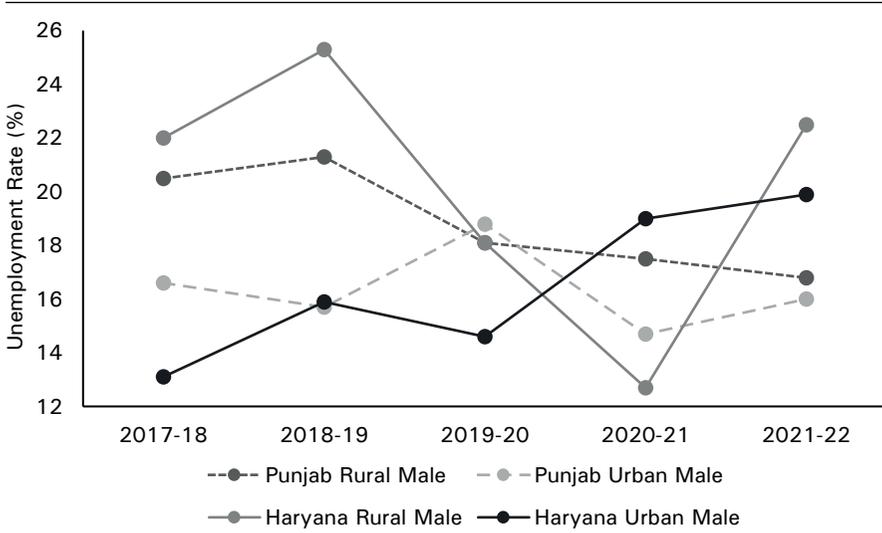
Source: PLFS data.

**FIGURE 3. Labor Force Participation Rate (15-29 Years) for Females in Punjab and Haryana (Rural versus Urban)**



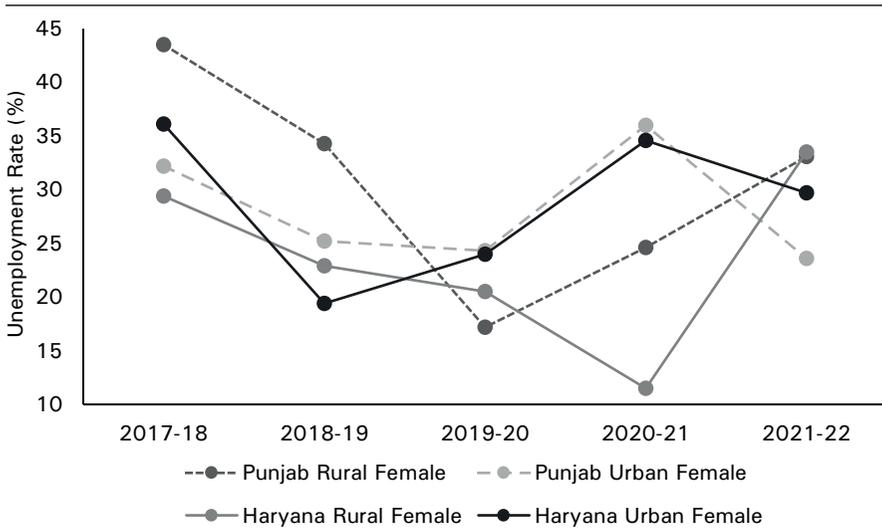
Source: PLFS data.

**FIGURE 4. Unemployment Rate (15-29 Years) for Males in Punjab and Haryana (Rural versus Urban)**



Source: PLFS data.

**FIGURE 5. Unemployment Rate (15-29 Years) for Females in Punjab and Haryana (Rural versus Urban)**



Source: PLFS data.

females in Figure 5. While rural unemployment is higher in both states for young males, Punjab's rural unemployment depicts a declining trend in the data (with 2021-22 levels at 19.2 percent) whereas Haryana's youth unemployment (>20 percent) has increased to return to its pre-COVID levels. The overall youth female unemployment rate is high at 30 percent for Punjab but the rural female unemployment rate has skyrocketed to 33 percent. This lack of opportunity (i.e., one out of three young women in Punjab cannot find a job despite looking for it) could depress investments in higher education among females in Punjab, and we do find suggestive evidence for the same in Section B.

## 4. Education and Health

Education and health services are part of the 'Other Services' category in the state income accounts, but they obviously have some characteristics that are very different. Both sectors involve building human capital, or capabilities more generally. At the level of basic provision of capabilities and well-being, such as child nutrition or literacy and numeracy, they are—to use a term coined by Richard Musgrave—merit goods. There is some societal agreement that they should be provided because of their benefits in terms of human flourishing, not on the basis of willingness or ability to pay. Therefore, there is a case for public or publicly-subsidized provision that goes beyond the usual economic case based on goods being non-rival and non-exclusive—the economists' classic definition of public goods. On the other hand, some aspects of education and health may be more in the category of goods that the market can provide relatively effectively and closer to optimal levels, though even here, there may be an equal access goal for the provision of advanced education and medical care which justifies some public intervention. Punjab suffers from some issues that are common across all of India, but here we focus on its special characteristics.

### 4.1. Education

Punjab has a population of slightly over 30 million, with about one-fifth of this being of school-going age (5-18 years). Enrollment ratios are high, and dropout rates for primary education are low, but they rise more than for other better-off states in upper primary school. Approximately half of the school-going population attends government schools, which is similar to the national average. The ratio of students in government schools has increased slightly in recent years, arguably because of investments in school infrastructure.<sup>28</sup>

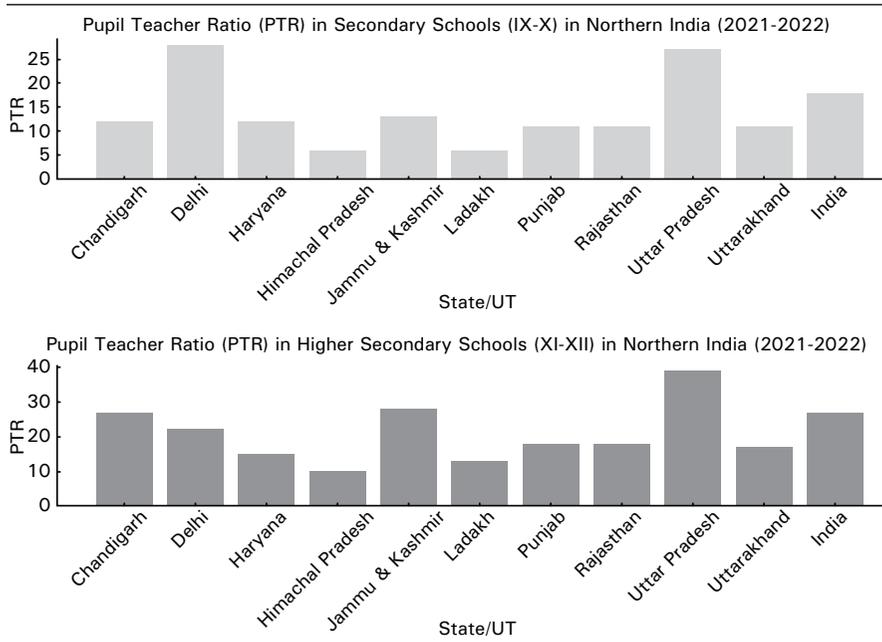
According to national education statistics, Punjab has 27,700 schools, 6.15 million enrollments, and 257,000 teachers (GoI 2021-22a, UDISE+, 2022).

---

28. See <https://www.newindianexpress.com/good-news/2021/Jun/06/punjab-government-run-schools-see-growth-of609-lakh-in-enrollment-in-four-years-2312295.html>

On some indicators, Punjab has been the best performing state in India of late with respect to educational outcomes. For example, the Performance Grading Index 2.0 report (2021-22) released by the Ministry of Education showed that Punjab received the best overall grade based on 73 indicators that were broken down by Learning Outcomes and Quality (LO), Access (A), Infrastructure and Facilities (IF), Equity (E), Governance Processes (GP) and Teacher Education and Training (TE&T). Across LO and IF, Punjab was the best performing state but ranked slightly lower on A, E, GP, and TE&T (though it was still among the good-performing states). Learning outcomes were evaluated on language, mathematics in Classes-3, 5, 8, and 10 as well as in science and social science in Classes 8 and 10.<sup>29</sup> On the overall Pupil-Teacher Ratio, Punjab appears to do better than average compared to the national average but has a higher Pupil-Teacher Ratio than Haryana for higher secondary schools (Figure 6). This relative lack of human capital inputs in Punjab could reduce the learning outcomes advantage over time that we observe today for Punjab relative to Haryana.

**FIGURE 6. PTR in Secondary and Higher Secondary Schools across Northern Indian States**

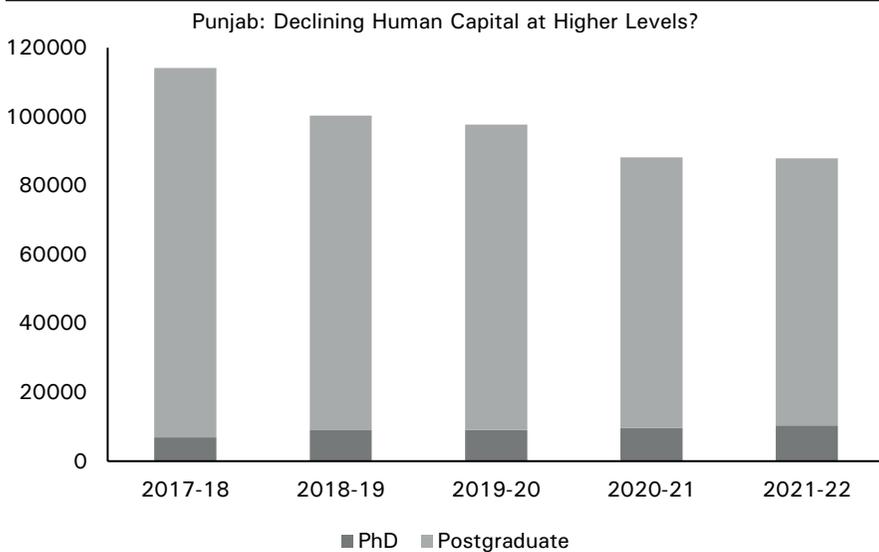


Source: Ministry of Education, GoI 2021-22c.

29. In contrast, an earlier study (Brar 2016) had suggested that, as compared to other better-off Indian states, Punjab's record in the education of its citizens has been weak for decades, as measured by actual skills attained, and by inclusiveness.

While primary education outcomes are quite good in Punjab, evidence from Muralidharan and Sundararaman (2011) suggests that school teachers should be provided with performance-based incentives for even better outcomes in language, mathematics, and science. This does not appear to be happening in Punjab currently. Similarly, school management systems (hiring, performance assessment, promotions, exit) could be re-evaluated for truly understanding the performance of teachers, and then acting on these. There is room for experimentation in a pilot set of representative schools from where wider implications can be drawn. Finally, there is some suggestive evidence from Figure 7, that for education at higher levels (postgraduate), Punjab is showing a decline. This decline is almost entirely driven by female postgraduates. There could be several reasons for this, but we identify three key reasons why this could be happening with an increase in unemployment among females as observed in Section 3.1: (1) The expected return after a postgraduate degree is not realized, as high-skilled jobs in Punjab are not being created at the rate to offer employability to postgraduates (youth unemployment rates are high, as discussed above); (2) There is a decline in the quality of higher educational institutions in Punjab (to add significant value/signal to the student's profile); and (3) There is a decline in the number of higher educational institutions available per capita.

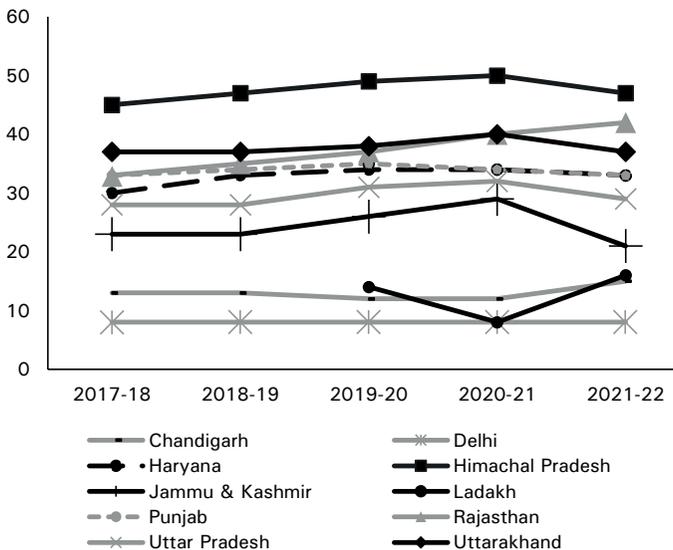
**FIGURE 7. Number of Postgraduates and PhDs in Punjab from 2017-18 to 2021-22**



Source: All India Survey on Higher Education 2021-22.

Next, we rule out (3). The number of Higher Education institutions increased by 14 percent in Punjab from 973 to 1,111 between 2010-11 and 2019-20. From the data in the All India Survey on Higher Education (2021-22), we observe that Punjab is not an outlier among northern states when it comes to colleges per lakh population. In Figure 8, we see that Punjab has 34 colleges per lakh population in 2021 or 3.4 for every 10,000. This does not vary much over time, suggesting that a decline in the number of colleges per capita is not the right explanation for the decline in the number of postgraduates. As of March 2020, there were 32 universities and 1079 colleges in Punjab and the national ranking of Punjab in terms of Gross Enrollment Ratio is 18<sup>th</sup> (Report of the CAG of India on Performance Audit on Outcomes of Higher Education in Punjab, 2022). However, availability of faculty in colleges was insufficient—which made the student-faculty ratio 49:1—more than twice of the recommended 20:1. This contributes to the lack of incremental value-added that postgraduates may also feel. Additionally, the qualifications of the existing faculty were below par. During the CAG audit, it was found that the salaries paid to 241 teachers, who were appointed as Assistant Professors on a contractual basis, ranged between ₹ 5,000 and ₹ 21,500 during 2019-20, which was less than the prescribed minimum pay while 81 percent of guest faculty and 36 percent of teachers in the colleges did not have basic qualification as per UGC norms, thereby compromising the quality of teaching being imparted in these Higher Educational

**FIGURE 8. Trends in Number of Colleges per Lakh Population across Northern Indian States/UTs (2017-21)**



Source: All India Survey on Higher Education 2021-22.

Institutions (HEIs). Further only 1.7 percent HEIs were accredited with A++/A+ grade. This indicates that the quality of higher education imparted in the state was not satisfactory and needs to be improved through a sustained push towards more qualified faculty members and higher pay for them (especially with a component based on performance). Out of 44 government colleges eligible for accreditation, only 18 percent received an ‘A’ grade, 14 percent of the colleges were given a ‘B++/B+’ grade, 20 percent of the colleges a ‘B’ grade, and 2 percent received a ‘C’ grade. Fortyfive percent of the colleges did not get an accreditation from NAAC (NAAC website). The proliferation of low-quality educational institutions has the potential to create expectations for high-skilled employment, but this does not appear to be happening after graduation as these high-skilled jobs (e.g., software engineers) are not available to cater to the supply-side made of graduates.

Reason (2) is unlikely to be the case if the decline in postgraduate education is only happening for females in Punjab. Furthermore, reason (1) appears most likely—no data appears to have been maintained with regard to students’ employment, students’ progression to higher studies, and students’ performance in competitive examinations across colleges. In the CAG audit, less than 30 percent of the colleges were found to have a placement cell. Focusing on creation of job-facilitating mechanisms for students would help in reducing costs of search and matching for potential graduates and postgraduates, apart from improving their NAAC grades.

#### 4.2. Health

In many aspects of healthcare and health outcomes, Punjab does considerably better than the national average, though not necessarily better than other better-off states.<sup>30</sup> Life expectancy is just a few years more than the national figures, but Punjab’s statistics for prenatal and postnatal care, immunization, malnutrition, and infant and child mortality are much better than those for India as a whole.<sup>31</sup> This situation is a consequence of Punjab’s previous decades of prosperity, and reflects the durability of certain kinds of institutional development that occur in parallel with income and output growth. At the same time, statistics indicate that Punjab’s rate of improvement is slowing down, and other states in India are catching up. Additionally, changes in lifestyles and nutrition associated with prosperity are having new, adverse impacts on health. Finally, Punjab’s demographic transition is occurring more rapidly than in many other parts of India, so it will have an aging population earlier than some other Indian states. Therefore, there is no basis for complacency in healthcare policy. We consider

---

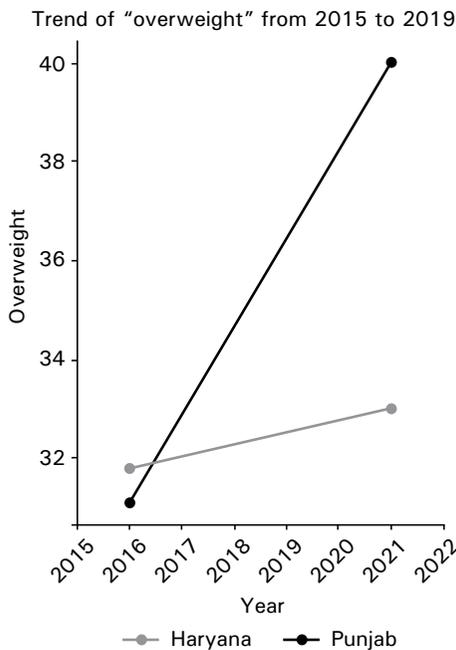
30. It should be kept in mind that states with relatively high per capita incomes such as Maharashtra and Karnataka may also have much higher intra-state inequality than Punjab, because they contain very wealthy metros as well as poor rural regions.

31. See, for example, Arora, Singh and Visaria (2023) and PES (GoP 2024, Chapter 6.2).

some of the detailed indicators of possible health issues for Punjab, currently and in the future.

Looking at the evidence from the fourth and fifth rounds of the National Family Health Survey (NFHS), a significant shift in female health outcomes was observed in Punjab between 2015-16 and 2019-21. The proportion of women aged 15-49 years with a normal Body Mass Index (BMI) (18.5 to 24.9 kg/m<sup>2</sup>) decreased from 56 percent to 47 percent. In contrast, Haryana remained relatively stable at a rate of about 52 percent. This reduction in Punjab was largely due to an increase in the percentage of overweight or obese women (BMI  $\geq$ 25.0 kg/m<sup>2</sup>), which rose from 31 percent to 40 percent (Figure 9).

**FIGURE 9. Percentage of Women 15-49 Years Who Are Overweight or Obese (BMI  $\geq$  25.0 kg/m<sup>2</sup>).**



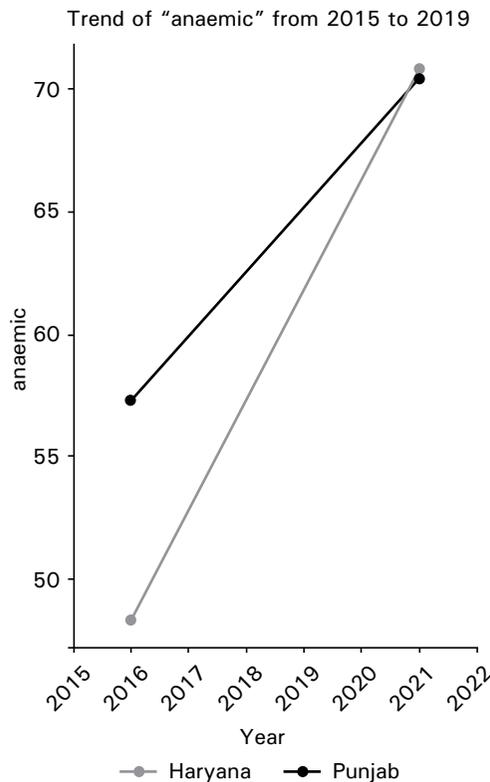
Source: NFHS 4 and 5.

A closer look at specific districts within Punjab reveals substantial increases in overweight female populations: Bathinda saw an increase of 80 percent, Faridkot 76 percent, and Jalandhar, 52 percent. Moreover, there was a notable 67.5 percent surge in the proportion of overweight women within the 15-19 years age group in Punjab, hinting at the concerning trend of teenage obesity in Punjab, especially among females.

The increase in anemia rates among women and children over the past five years across both Punjab and Haryana is also concerning. In Punjab, the

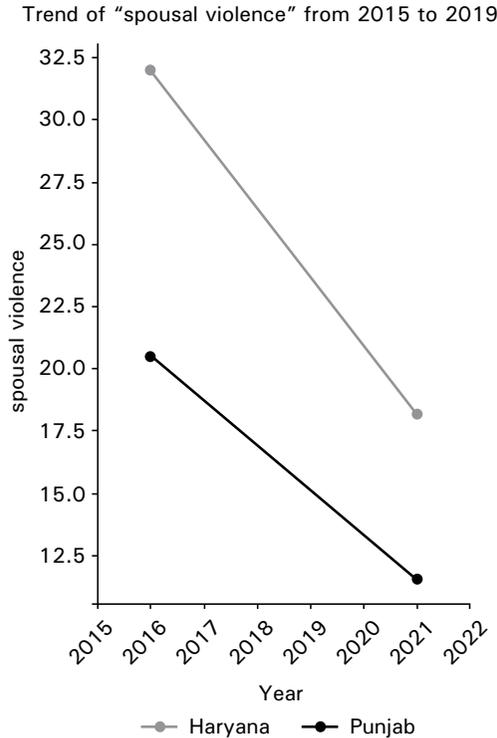
proportion of women with anemia (haemoglobin levels below 10.9 g/dl) rose by 6 percentage points, from 53 percent in 2015-16 to 59 percent in 2019-21. The rate of severe anemia in women—characterized by haemoglobin levels below 7.0 g/dl—more than tripled, escalating from 0.5 percent to 3 percent during the same period. Among children below 5 years of age as well, the population having anemia went up from 57 percent to 70 percent in these five years while severe anemia went up from 1.3 percent to 5 percent (see Figure 10). This suggests a need to create initiatives to combat obesity and anemia at an early part of the life cycle, since these are likely to create explicit costs (healthcare), implicit costs (say, due to lower work productivity and wages as a result of anemia for which there is sufficient evidence) and intergenerational costs (since children of anemic women may be more likely to be anemic) for households and workers. Iron fortification of rice, easier access to healthier food, nutritional information, with heavier regulation or Pigouvian taxes on obesity-causing foods (such as packaged chips, aerated drinks) should be evaluated.

**FIGURE 10. Children (6-59 months) Who Are Anemic (< 11.0 g/dl)**



On a positive note, both Punjab and Haryana showed a decline in self-reported ‘spousal violence’ where Punjab went down from 20.5 percent to 11.6 percent of ever-married women (18-49 years) who have ever experienced spousal violence and continued to do better than Haryana (Figure 11).

**FIGURE 11. Percentage of Ever-Married Women Aged 18-49 Years Who Have Ever Experienced Spousal Violence. Spousal Violence Is Defined as Physical and/or Sexual Violence**



Source: NFHS 4 and 5.

## 5. Public Finances and Governance

Even in an era of markets and liberalization, the role of government remains well-recognized. Governance involves a range of institutions—political, judicial and administrative. Aside from institutional quality, the heart of government functioning is the collection of revenues and allocation of expenditures. Fiscal policy is a vital contributor to economic stability and growth. In a federal system like India, state governments play significant roles, although their functioning is greatly affected by that of the national government, as well as the constraints embodied in the federal structure.

Any state government in India, including that of Punjab, can use fiscal policy to effect economic growth and development in the short, medium, and long runs. Indeed, a wide range of economically important activities and sectors are the sole or concurrent responsibility of state governments, including health and education. Especially after the reforms of 1991, state governments can devise incentive (or disincentive) systems for influencing private investment in their jurisdictions, although they may be competing with other states in this effort. Even though macroeconomic stability is the purview of the nation's central bank and the Central Government, state governments do have the ability to borrow within certain limits, and this can play a role in promoting the stability of their own economies.

In general, however, the structures and actual operation of Indian federalism have tended to give the Central Government considerable influence over what state governments can do in practice. Recently, several states of India have reported difficulties in the operation of their fiscal policies. Five chief ministers of different states of India (three from southern states and two from northern states) staged a protest in New Delhi to highlight how the Union government was putting hurdles in their way for fiscal policy. In a historic first, the government of Kerala filed a case in the Supreme Court of India to challenge sudden new borrowing restrictions imposed by the Union Government. While the Supreme Court denied interim relief to the state government in this case, the underlying issue is that the Constitution assigns wide discretionary powers to the Union Government, within a framework where revenue assignments also favor the Centre. Centre-state fiscal transfers, in principle meant to give states adequate fiscal resources, are also subject to this discretionary power.<sup>32</sup> With these kinds of structures, the concept of cooperative federalism does not have a firm footing in practice.

The structural centralization of revenue assignments has combined with particular historical circumstances to impact Punjab's public finances particularly negatively. As a result, the state's fiscal policy has been dysfunctional for decades. Punjab suffered from severe political and social turmoil from the early 1980s through the mid-1990s. During that decade-and-a-half, Punjab remained under President's rule for much of the time. There was a significant shift of public expenditure from developmental purposes to the law and order machinery, which itself operated without checks and balances. A revenue surplus turned into a revenue deficit, which has persisted. The revenue collection machinery also collapsed, and the state government's borrowing rose

---

32. The Finance Commission, appointed every five years to determine Centre-state revenue-sharing, is independent, but only makes recommendations. Precedent and political bargaining both affect the nature of recommendations and the extent to which they are implemented. Each state also appoints its own finance commission to determine transfers to local governments—the report of the Punjab Finance Commission is discussed in Section 5.2.

dramatically. The gap between revenue receipts and revenue expenditure was Rs 544 crore in 1990-91 and has risen consistently, so that the revenue deficit was Rs 24,588 crore in 2022-23 (RBI 2023). After adjusting for inflation, this represents a five-fold increase in revenue deficit. This section mainly focuses on examining the nature and drivers of Punjab's public finances, and the sources and extent of the challenges to fiscal policy, as well as possible corrective measures. We also briefly examine some ways of assessing the quality of governance in the state, since a decline in governance quality has arguably accompanied the state's fiscal problems.

### *5.1. Fiscal Situation of Punjab*

The story of fiscal dysfunction is apparent when we look at the rising outstanding liabilities. At the beginning of the century, the Punjab government had an outstanding debt of Rs 34,063 crore, which was 38.97 percent of the GSDP. The debt of the state quickly increased, reaching Rs 47,548 crore in 2004-05. The debt-GSDP ratio peaked at 49.10 percent. Subsequently, the debt-GSDP ratio fell, reaching a low of 30.78 percent in 2013-14. The debt-GSDP ratio then resumed its increase, reaching 49.46 percent in 2021-22.<sup>33</sup> According to Reserve Bank of India (RBI) statistics, the Punjab government has a debt burden of 47.6 percent of GSDP, which is more than Rs 3.51 lakh crore, as of March 2024. If we include pending liabilities, non-guarantee loans and expected government borrowings in the current fiscal year (2024-25), the total accumulated debt by end-March 2025 will exceed Rs 4 lakh crore. Compared with other major states of India, Punjab has the highest debt-GSDP ratio. Each government in the state, during its time in office, has borrowed in a profligate manner. The state debt rose 22.85 percent and 40.80 percent in 2015-16 and 2016-17, respectively, though this was partly due to exceptional circumstances (Footnote 33). Subsequently, the state debt has been rising at an annual average rate of more than 9 percent. However, most of the new borrowing has to be used for servicing the existing debt. In 2021-22, the government of Punjab paid Rs 32,468 crore (interest payments Rs 18,210 crore + repayment of principal Rs 14,258 crore) for servicing the debt (see Table 3 as well). The net availability of borrowed funds was only Rs 2,734 crore (7.8 percent of total borrowings). In other words, 92.2 percent of new borrowing went to debt service. In effect, the Punjab government is in a debt trap, which is a huge drag on the revival of economic growth in the state.

---

33. One reason was that in 2006-07, a special term loan of Rs 3,772 crore was waived by the Government of India. Another reason was implementation of the Punjab Fiscal Responsibility and Financial Management Act 2003. There was also a slight decline in interest rates. A jump in the debt-GDP ratio again occurred in 2016-17 when a Rs 30,000 crore discrepancy in receiving advance payments to procure foodgrains for the PDS was added to the debt.

**TABLE 3. Rising Share of Committed Expenditure (Rs Crore)<sup>34</sup>**

Year	Main Components of Revenue Expenditure					Total
	Salaries/ Wages	Pensions/ Retirement Benefits	Interest Payments	Power Subsidy	Other	
2001-02	4133	1035	3178	448	3916	12710
%	32.5	8.1	25.0	3.5	30.8	100.0
2011-12	12064	5657	6280	3200	5844	33045
%	36.5	17.1	19.0	9.7	17.7	100.0
2016-17	21729	8773	11642	5601	7551	52296
%	39.3	15.9	21.1	10.1	13.7	100.0
2020-21 PA	24187	14730	18909	14516	24141	96462
%	25.1	15.3	19.6	15.0	25.0	100.0
2022-23 BE	31172	15146	20122	15846	25647	107932
%	28.9	14.0	18.6	14.7	23.8	100.0

Source: (RBI 2023) State Finances-A Study of Budgets, Accessed from Reserve Bank of India - State Finances: A Study of Budgets (rbi.org.in).

In terms of ratios, the revenue deficit-GSDP ratio in 2018-19 was 2.56 percent and rose to 3.23 percent in 2020-21. In 2022-23, the revenue realization was 63 percent of the target, which suggests that Punjab's revenue deficit-GSDP will increase further. If we include past liabilities, the promised employment generation through government hiring and promised transfer payments and subsidies will increase expenditure without raising the desired level of revenue.

What are the factors that have contributed to Punjab's precarious public finances? An important reason has been the low tax capacity of the state. The own tax revenue-GSDP ratio has remained low, fluctuating from 6.56 percent in 2001-02 to 8.27 percent in 2004-05 and down to 5.59 percent in 2019-20. It has improved thereafter, reaching 7.24 percent in 2022-23. One reason for the low tax capacity is that Punjab is heavily agricultural, and that sector is exempted from direct taxes. Another reason is tax evasion, where the institutional quality and capacity of the government matters. Surprisingly, the implementation of GST has not improved the own tax revenue situation of the state (Table 4). The revenue problems go beyond tax collection. Indeed, there has been a sharp decline in the non-tax revenue-GSDP ratio, from 5 percent in 2001-02 to less than one percent in 2022-23.

34. See also Table 3.2 in the Punjab Finance Commission report (GoP 2022), which documents the declining share of developmental expenditure in the state budget. Figure 4.13 in the same document displays the increasing share of committed expenditure over just the last decade.

**TABLE 4. Structure of Own Tax Receipts of Punjab**

<i>Type of Tax</i>	<i>2001-02</i>	<i>2011-12</i>	<i>2016-17</i>	<i>2020-21</i>	<i>2021-22 PA</i>	<i>2022-23BE</i>
Land Revenue	8.58	25.65	67.82	67.63	83.54	150.30
%	0.18	0.13	0.24	0.23	0.22	0.33
Stamp Duty and Registration	444.31	3079.13	2043.61	2470.33	3308.35	3600.00
%	9.21	16.34	7.37	8.22	8.36	7.90
GST				11818.93	15541.59	20550.00
%				39.33	41.64	45.08
Sales Tax/VAT	2063.86	10754.70	16930.98	5372.02	6869.31	6250.00
%	42.80	57.08	61.02	17.88	18.40	13.71
Central Sales Tax	620.47	416.97	655.73			
%	12.87	2.21	2.36			
Excise Duty	1350.06	2754.60	4406.01	6164.32	6157.28	9647.87
%	27.99	14.62	15.88	20.51	16.60	21.16
Vehicle Tax	318.44	850.06	1548.74	1472.13		2575.00
%	6.60	4.51	5.58	4.90		5.65
Electricity Duty	9.19	928.28	1993.01	2541.84	5366.78	2550.00
%	0.19	4.93	7.18	8.46	14.38	5.59
Others*	7.62	32.61	100.78	145.63		265.00
%	0.16	0.17	0.36	0.48		0.58
Total	4822.53	18841.00	27746.68	30052.83	37226.85	45588.17
%	100.00	100.00	100.00	100.00	100.00	100.00
GST/VAT/CVAT	2684	11172	17587	17191	22411	26800
%	55.66	59.29	63.38	57.20	60.04	58.79

Source: (RBI 2023) State Finances-A Study of Budgets, Accessed from Reserve Bank of India - State Finances: A Study of Budgets (rbi.org.in).

As noted earlier, the origins of the ballooning state government debt lie in the 1980s' turmoil in Punjab. A revenue deficit first emerged in 1984-85, and became chronic in 1987-88. Not only was economic activity disrupted, but many government institutions, including those for revenue collection, became dysfunctional. Arguably, the creation of a security apparatus led to vested interests that has made reconfiguring expenditure back toward developmental purposes difficult. For example, attempts to withdraw or reduce security cover were appealed to the Punjab and Haryana High Court. The Punjab government continues to recruit more police personnel every year to strengthen the security apparatus, and its spending on police is among the highest among all major states (Table 5, and N. Singh 2023).

**TABLE 5. Trends in Budgetary Expenditure in Punjab (Figures Are in %)**

Year	Social Services		Economic Services					General Services		
	Education	Health	Agri and AAs	Irrigation and FC	Energy and Power	Industry and Minerals	Transport and Comm.	Pensions	Interest Payment	Police
1981-82	23.26	9.11	9.80	6.81		0.91	12.02	11.93	2.61	6.09
1985-86	20.32	7.19	5.98	6.88		0.93	7.92	na	na	na
1991-92	13.55	4.32	4.05	3.16	32.84	0.31	4.11	8.59	3.40	6.06
2001-02	14.42	4.86	3.31	2.56	3.55	0.18	3.19	25.00	8.14	6.60
2011-12	16.01	4.69	2.61	3.0	9.69	0.16	2.10	19.00	17.12	8.64
2016-17	15.94	5.19	10.34	2.35	2.92	0.11	0.91	21.05	15.87	8.58
2020-21	13.85	4.36	9.64	1.17	2.54	2.46	1.02	21.05	15.86	7.12
2021-22 RE	13.45	4.61	1.46	1.08	4.28	2.48	0.82	18.70	13.86	9.05

Source: (RBI 2023) State Finances-A Study of Budgets, Accessed from Reserve Bank of India - State Finances: A Study of Budgets (rbi.org.in).

How can Punjab come out of the double trap of slow growth and increasing debt? The state government has to take concerted steps. First, it can modify institutional arrangements to strengthen the internal policy-making process to identify sources of tax evasion. Proper auditing of goods and services entering the state, and of the wholesalers, and retailers involved, will help to collect the legitimate revenue owed from the GST. The same logic applies to non-tax revenue, the share of which has declined from 30 percent in 2001-02 to 6 percent in 2021-22. These revenues include user charges for services such as police and use of government facilities, and institutional precedents and mechanisms exist for collecting these, and so there is scope for restoring such revenues. New service charges are also possible, and unnecessary subsidies can be eliminated, such as free electricity for income tax-paying households if they consume below some level. Second, as the economy is transitioning from capital asset-based income to knowledge-based income, the state government should devise new taxes to raise revenue. Third, there is a general need to rationalize subsidies and reorient expenditure to support a faster transition to a knowledge-based economy.<sup>35</sup>

Whatever the Punjab government does, its accumulated debt will continue to remain the biggest constraint. Is there some way to reduce the debt? Clearly,

35. Various granular reforms in expenditure control and revenue administration were suggested in PEG (2020). All such reforms are useful, but will be insufficient by themselves, because of the high debt service cost. The same applies to any realistic increase in devolution through the Finance Commission, as proposed in PEG (2021).

state government revenue has to be increased, and expenditure reoriented away from the security apparatus toward investment in future growth.<sup>36</sup> Among other options, the government could set up a Debt Relief Fund (DRF) and issue an appeal to all citizens concerned, as well as Punjabi emigrés, to voluntarily deposit money in the DRF, possibly with some tax advantages. Another option could be rescheduling the debt by issuing new bonds. The national government has used such devices in the past, and the state would need approval from the Centre and RBI, but all options need to be considered.

Much more directly, Punjab can argue that the services it provides to the rest of the country, in the form of national security—including food security—deserve to be explicitly valued and compensated. A moratorium on state debt, or targeted investment grants, could be ways of implementing compensation. The national government can also pay for Punjabi farmers to switch out of the increasingly unremunerative and destructive wheat-paddy rotation. On its own, Punjab will have difficulty in fixing its public finances in any meaningful way, because of the double trap it is in.

## 5.2. Local Governments

State finance commissions are charged with making recommendations for transfers from the state government to local governments within that state. In addition, because of the limitations on such state-local devolution, the Central Finance Commission also makes recommendations for transfers from the Union government to local governments in each state. In the case of Punjab, per capita grants to rural local governments by the 15<sup>th</sup> Finance Commission were Rs 3124 (slightly more than the average for India), and for urban local governments they were Rs 2661, lower than the average for the country). In aggregate, the grants to local governments in Punjab were Rs 8174 crore.<sup>37</sup> However, these figures are all five-year aggregates, so the annual average grants are only one-fifth of these amounts. The annual per capita grants are about Rs 600, while the annual total is less than 1 percent of the total annual budget of the state.

The Fifth Punjab Finance Commission, which made recommendations for 2016-2021, proposed devolution by the state government to local governments of Rs 7274 crore over that entire period, based on a formula of 4 percent of net own-tax revenue (NOTR), but the actual devolution was almost zero (GoP 2022, Table 6.2). This complete disregard of devolution by the state government

---

36. The PEG (2021) report highlighted the analysis of the Fifteenth Finance Commission (FFC), which submitted its full report in February 2021, regarding lack of public investment in the state. To quote PEG (2021), “The Fifteenth Finance Commission, ... has also drawn pointed attention to the fiscal situation in Punjab which it has described as “extremely precarious” with an unsustainable debt pattern in recent years. The FFC drew attention to the fact that Punjab’s capital expenditure in the budget is only 0.7 percent of GSDP compared with 2.6 percent for all states. In fact, it is the lowest of any state.”

37. All these numbers are taken from GoP (2022), Table 5.3, p. 94.

was a pattern that began with the Third Finance Commission, which made recommendations for the period beginning 2006-07. The state government has been making compensatory payments outside the state finance commission framework, but the latest report (GoP 2022) argues that these payments are not well-structured. Overall, the quality of urban local governments' expenditures is poor, and their incentives on the revenue side are also badly structured in the current system.

Averaging over 2013-18, per capita expenditure by rural local governments in Punjab was only Rs 341 (GoP 2022, Table 7.3), which was comparable to some of India's poorest states, and much lower than an average of Rs 2083 for 13 major states. Most of Punjab's rural local government expenditure was from own revenues, whereas other states achieved higher expenditure through devolved funds (GoP 2022, Table 7.4). Similarly, for urban local governments, Punjab's per capita revenue is lower than the average for India, and those governments rely much more on their own funds, with very little devolution from the state government (GoP 2022, Figures 8.4 to 8.7). However, own tax revenue is not particularly strong, and there is a case for strengthening the urban property tax regime (PEG 2020), but that will require improving institutional capacity at the local level.<sup>38</sup>

To some extent, the problems of underfunding of local governments are a nationwide issue, but Punjab seems to do particularly poorly on this front. Its rank is not necessarily the lowest, but in particular, other states with stronger recent economic growth records do better. The per capita expenditure of the state's two largest municipal corporations (Ludhiana and Amritsar) is also relatively low (GoP 2022, Table 8.13), suggesting that these cities are doing less to prepare for future possible growth. Of course, comparisons across states, or any kind of counterfactual, are fraught with difficulties because of the heterogeneity of India, and the limited information on the functioning of urban local governments.

### *5.3. Governance—Focus on Efficiency*

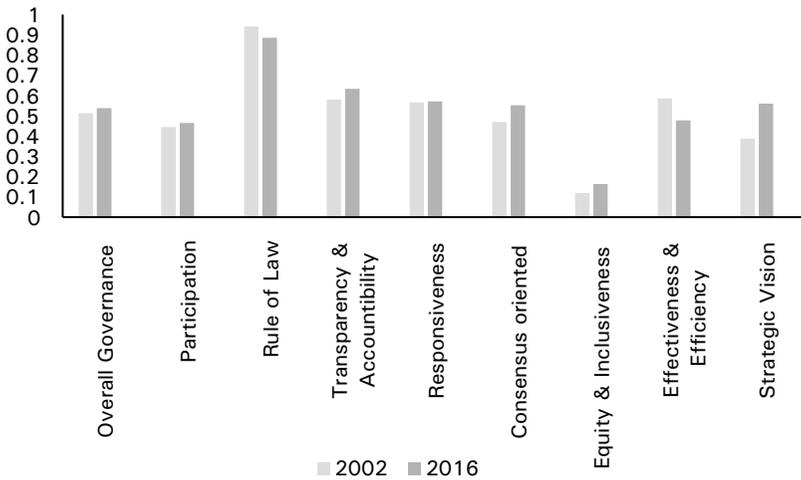
The United Nations Development Program (UNDP) has suggested eight major characteristics of good governance. These are: (a) participation; (b) rule of law; (c) transparency; (d) responsiveness; (e) equity and inclusiveness; (f) accountability; (g) effectiveness and efficiency; and (h) consensus. Sodhi (2024) explored different aspects of governance for Punjab and attempted an index of its governance performance (based on the eight principles mentioned above). Sodhi finds that apart from (g) effectiveness and efficiency, Punjab's

---

38. Despite a decade having passed since the introduction of a modern property tax system (replacing an old "house tax"), the state has done little to make it effective, even forcing reductions in rates in the tax's early days in 2013-14.

performance in 2016 has generally improved relative to 2002, or even if there has been a slight decrease, the overall levels are significantly higher than other states (e.g., on rule of law) (Figure 12). This suggests that where Punjab may need to improve are on the components of effectiveness and efficiency—these include metrics, such as power, urban development, transport and communication, irrigation, and fiscal performance.

**FIGURE 12. Punjab Governance Index over Time (2002-2016)**



### Variables of Governance Index

<i>Sub-dimensions</i>	<i>Indicators</i>
• Participation (SDI 1)	Women Participation
• Rule of Law (SDI 2)	Incidence and rate of crime, Victims of rape and murder
• Transparency and Accountability (SDI 3)	Corruption cases, Crimes by police
• Responsiveness (SDI 4)	Pendency of cases in courts and with police, Vacancies in courts and police
• Consensus (SDI 5)	Inclusion in state assembly elections, SC/ST representation
• Equity and Inclusiveness (SDI 6)	Inclusion in education/welfare, PDS, regional development
• Effectiveness and Efficiency (SDI 7)	State of power, urban development, transport/communication, fiscal performance, irrigation
• Strategic Vision (SDI 8)	Human resource development, social/family welfare, environment & sustainability

Source: Sodhi (2024).

## 6. Policy Discussion

As noted earlier, Punjab's governance institutions eroded during a long period of political and social unrest, and many of them have been slow to recover. Recent efforts to improve governance have included digital access to citizen services and improving 'ease of doing' business. Punjab's high ranking in the specific dimension of starting a business—one of eight used to construct the overall ease-of-doing business index—is based on its single-window clearance process for new businesses. In 2019, existing efforts at improved governance were embedded in a consultative process, the Punjab State Advisory Council (PSAC), but it made slow progress, until being overtaken by the pandemic in early 2020. The PSAC attempted a broader scope of policy action, simultaneously examining several aspects of the state economy and economic reform. In particular, it recognized the link between the condition of Punjab's public finances and the quality of the state's governance institutions, at a granular level. Previously, such integrated approaches had been embodied in traditional planning exercises. Academics working outside government had also been an important source of such integrated analyses (e.g., CDEIS 2012). More often, government policy-making that brings in experts for consultation proceeds through specialized committees, as in the case of crop diversification. As we have argued, narrow efforts at reform face obstacles because of the interlocking constraints that are very specific to Punjab.

The PSAC was replaced by a "Group of Experts," which produced two reports (PEG 2020; 2021), with numerous granular level recommendations, some of which were discussed in the sections on agriculture and industry. The reports covered eight areas: health, agriculture, industry, skill development, social sectors, public finances, digitization, and start-ups. There were some tie-ins across these areas. For example, digitization included governance—with implications for public finances—as well as goals of improving access to finance for smaller firms, and making agricultural value chains more efficient. For the health sector, recommendations such as filling vacancies in the public health system were inevitably tied to strained public finances, but also to shortages of personnel due to inadequate higher education institutions and to emigration. On the health front, Punjab faces challenges of an aging population, lifestyle diseases, and possible novel infections in the future. Public expenditures on healthcare in Punjab are low, and the state's weak record in health as well as in higher education can be traced to a combination of lack of fiscal resources and weak institutions.

As discussed earlier in the paper, the first PEG report (2020) included technical reforms for agriculture in matters such as seeds and irrigation, but these were lost in the political alarm raised by recommendations for reducing subsidies or replacing them with cash transfers, reforming land markets, and marketing reforms. In this situation, the resources needed for making systemic

changes arguably have to come from the national government. While a major reform of the national food procurement policy has been announced—offering farmers unlimited purchases of maize and pulses at MSPs if they switch from wheat or paddy, this may not be enough to incentivize large-scale changes in crop choices. Additional payments may be required, which could be justified politically as compensation for past contributions to national food security, in a manner that distinguishes the Punjab case from those of other states.<sup>39</sup> Those payments could be earmarked for upgraded infrastructure for marketing or processing the crops to which farmers switch, in addition to directly incentivizing switching. On a less ambitious scale, the first PEG report (2020) argued that the Food Corporation of India (FCI) should bear some of the costs of procurement, which were straining the state government budget.<sup>40</sup> Measures like these can be fiscally helpful in the short run, as part of a transition away from the current agricultural system. The larger scale CDEIS proposal, for what it termed a Special Investment Deficiency Package (SIDP), would have supplemented the state government budget by about 20 percent a year for five years. Coincidentally, the current gap between the state government’s receipts and expenditures is a little less than 20 percent of expenditures, with borrowing covering the gap.<sup>41</sup>

The state’s side of this “grand bargain” would have to include more than accepting earmarking of such additional support.<sup>42</sup> Structural adjustment assistance often comes with conditions, but in this case, the state government is well-placed to develop a list of actions to which it could commit. Without going into detail, there are a range of possibilities with respect to improving tax collections (such as clamping down on evasion and strengthening local government tax capacities), reducing agricultural subsidies in a phased manner,

---

39. The CDEIS (2012) report explicitly recommended this conceptual approach and framing, namely that the national government pay the state for its contributions to national food security. In her comments, Vini Mahajan noted that Punjab’s early investments in infrastructure, often from the state’s own funds, have subsequently left it in a disadvantaged position for availing of many central or centrally sponsored schemes, which are designed to promote “catch-up”. She also pointed out some specific impacts on Punjab of the shift to GST, because of its economic structure and resulting pattern of indirect taxes.

40. The final report, PEG (2021) modified this suggestion to a withdrawal of the state government from procurement, which would shift the cost to the FCI.

41. The increases in Punjab’s share of devolution recommended by the FFC were far short of the scale calculated by the CDEIS report, and that scale requires careful attention to how it is framed, to achieve political acceptability. The history of Punjab as a contributor to national food security, and the accumulated costs associated with that, suggest a possible narrative. Such a program would likely need to fall outside the purview of the Finance Commission.

42. We are grateful to Karthik Muralidharan for emphasizing this aspect of the solution, and suggesting the term “grand bargain”. Though that term has been used earlier in other contexts, it seems particularly appropriate for the case of Punjab, which involves a range of political-economy complexities. In his discussion, Montek Ahluwalia also emphasized the need for incentive compatibility with respect to the state’s use of Central assistance.

and even new taxes that can be justified as targeted against environmental harms. Farmers are very conscious of the environmental degradation they are encountering, and a transparent and progressive tax (with higher incidence on large farmers) could be politically acceptable, particularly when there is visible Central support. As noted earlier, a grand bargain of this nature does not have to be restricted to shifts within agriculture, but could include positive incentives for local industry.

At a basic level, Punjab's long-run economic growth will require a number of policy reforms to support industrial transformation. Business owners require 'ease of doing business' at a very granular level, and numerous barriers remain beyond the initial step of government clearance: inspectors, enforcing contracts, access to finance, finding skilled workers, and access to markets. In these areas, Punjab does worse than many other states, especially in the cost of electric power and the structure of taxes.

In addition to attending to current interlinked obstacles to economic growth, as discussed earlier in the paper, future sources of growth have to be envisioned. The Punjab Vision Document 2047 provides some general perspectives. But as indicated earlier, it lacks specific analysis. As economic growth becomes increasingly knowledge-intensive, Punjab's economic structure appears more and more out of date. Much of the Punjab economy, in agriculture, manufacturing, and services, involves activities and firms that have low productivity, low wages, and are input-intensive. In particular, the agriculture sector has been relatively high in productivity compared to other Indian states, but because most of its output goes to national food procurement, there is very low value added beyond the farm gate. Many of Punjab's subsectors in manufacturing and services are also low in value addition.

According to a relatively new composite innovation index, developed by NITI Aayog, Punjab is not doing too badly. It ranks sixth among 17 major states, with an index value of 15.35 in 2021—in a range which goes from 10.97 to 18.01. Delhi and Chandigarh have much higher index values, each at about 27, and Haryana, while its own index is only slightly higher than that of Punjab, borders both cities. With Delhi being a much larger city than Chandigarh, one might argue that Punjab's relative position is worse than the index values suggest. It must also be recognized that the innovation index is based on very broad and diverse criteria. Punjab does relatively better on input measures than on output measures. Perhaps the most striking relative deficiency is in investment in science, technology, and the environment. Punjab spends as little as 0.39 percent of its GSDP in this category, much less than many other states. Other areas in which Punjab is weak are knowledge-intensive employment, involvement of NGOs in knowledge-intensive activities and skill development training.

The state's lack of financial resources is a pervasive problem. For example, the PEG report (2020) recommended a "skills university", and this was reported to be under construction a year later, namely, the Sri Guru Gobind

Singh Skill Institute. But in 2022, construction had been halted because of a lack of funds. The parent institution, the IK Gujral Punjab Technical University, is itself an umbrella for hundreds of colleges of varying quality. Another barrier to the delivery of quality education at all levels in the state could be a lack of organizational incentives for performance, both at the level of individual employees, and at the institutional level, through regulatory mechanisms such as accreditation. Skill development efforts also run into problems because there is little effective participation from industry, which, because of its structure, itself lacks adequate competitive pressure and financial resources to drive skilling or training programs. In contrast, an example of what can be accomplished is the success of Indian software firms that served foreign markets, and developed internal training programs for university graduates using international certification standards.<sup>43</sup>

If, as seems to emerge from the PVD 2047, the goal is to transform the Punjab economy into some form of knowledge economy, the state government and private economic actors will have to consider how to effectively increase expenditure on in-house R&D, and increase the level of involvement of science and technology workers. While science and technology workers can potentially be hired from elsewhere, there is probably a case for ramping up local production—universities and colleges in Punjab would have to improve their educational capabilities in key areas as emphasized in the PVD 2047. This will also require significant investments in building organizational infrastructure and capabilities in these higher education institutions.

Within the government, annual budget formulation could include a new budgetary head, namely, investment in R&D. An immediate, short-run target for R&D could be 1 percent of GSDP, to be raised to 2 percent in the medium term, with a final target of the level of the East Asian tigers, at around 3 percent.<sup>44</sup> The state government would also need to find ways of enabling the improvement of business-university linkages. Additionally, the R&D budget could focus more on risky, but short-gestation projects for specific technologies. Both the state government and business enterprises can seek stronger linkage with

---

43. In a different context, the Innovation Mission Punjab, created as a recommendation of the PEG, seems to have developed effective institutional mechanisms for imparting the eclectic range of skills required for successful entrepreneurship. But here one is not providing industrial-scale skills to workers, nor technical skills, but rather a combination of other higher-level skills to owners of firms.

44. One has to be careful in terms of implementing such a recommendation—the definition and quality of expenditures in this category can vary greatly, and some states in India have figures much higher than 3 percent of GSDP for the broader science, technology, and environment category. In the floor discussion, Devesh Kapur pointed out some of the challenges of engaging productively with the Punjabi diaspora, and Lakhwinder Singh, in his response, noted some of the limitations as a source of significant new investment. To some extent, the role of the diaspora is highly contingent on a process of structural adjustment that can come from a Centre-state “grand bargain.”

the diaspora, as has happened in the case of software hubs in southern India. Spillover effects from the knowledge gained from work experience in developed countries can be substantial.<sup>45</sup> Local spillover effects from creating industrial clusters, but built around universities in the case of knowledge industries, can also be substantial, as the experience of other innovation regions, from Silicon Valley to Bengaluru, illustrates.

## 7. Conclusion

Punjab is locked-in to an economic structure that is subject to diminishing returns, technological stagnation, and environmental degradation. The core of this structure is a national food procurement policy that encourages farmers to grow wheat and rice in a tight rotation, using water, electricity, and fertilizer that are subsidized or even given away. The cost of the subsidies distorts public finances, and the state government has been accumulating debt at unsustainable rates. Modifying the agricultural system with support from the Central Government has to be the prime component of any reform, and one of the keys to unraveling the current inefficient equilibrium. Giving farmers alternative, less-water-intensive options for crops that can be grown for procurement at MSPs is an important step forward, but likely not enough on its own. Farmers may need larger incentives for switching to occur at a large enough scale. If the Central Government provides a compensation fund that can be used for investments to promote switching, such as for infrastructure and marketing for alternative crops, that could begin to solve the problem, especially since the state budget cannot support such investments in its current situation.

Transforming the industrial and service sectors also has to be part of the solution to Punjab's stagnation. The state has too many subsectors that are not very productive, partly because of lack of scale, but also because they are not geared toward quality and high value-added products or market segments. There is ample scope for upgrading various subsectors, but investments in higher education and in urban infrastructure will be required, especially for more knowledge-intensive industries and services. Strengthening local governments financially and institutionally seems to be a necessary condition for creating high-value-added clusters. In many areas, specific, granular reforms are also needed, but those cannot succeed without fundamental changes in Punjab's economic structure: they will be "putting a band-aid on a corpse".<sup>46</sup>

Lack of desirable employment, social problems such as drug and alcohol use, and the over-politicization of religion all seem to stem from Punjab's lock-in to the agricultural system created by the Green Revolution and an outdated

---

45. Green energy is an obviously important area for innovation in various technologies.

46. This phrase is memorably used by Banerjee et al. (2008).

national food procurement policy. The destruction of the groundwater table in Punjab, and potential desertification, will destabilize the state further, and have enormous national consequences. The original Green Revolution came from a national need for food security, and cooperation between the Central and state governments. At the time, there was greater political alignment between the Centre and most state governments. The current political system may not be as well-equipped to achieve a new political bargain which replaces the one that originally made the Green Revolution system effective. However, realizing that the economic, social, and environmental situation in Punjab is a matter of national concern is the first step in working towards a new bargain.

## References

- Annual Survey of Industries. 2021-22. Data Processing Division, National Statistical Office, Ministry of Statistics and Programme Implementation, New Delhi: Government of India.
- Arora, P., N. Singh, and A. Visaria. 2023. "Healthcare Costs, Choice of Providers and Patient Satisfaction: Survey Evidence from India", *Journal of Quantitative Economics*, 21: 593-616.
- Banerjee, A., R. Glennerster, and E. Duflo. 2008. "Putting a Band-Aid on a Corpse: Incentives for Nurses in the Indian Public Health Care System", *Journal of the European Economic Association*, 6(2-3): 487-500.
- Bedi, Ubique, Inderpal Singh, Rupinder Sampla, and Tarunjit Singh. 2021. "Constraints and Prospects of Small Scale Industries in Punjab: An Analytical Study", *The Journal of Contemporary Issues in Business and Government* 27(3): 2752-2758.
- Brar, J.S. 2016. "Critical Evaluation of Educational Development in India", in L. Singh and N. Singh (eds.), *Economic Transformation of a Developing Economy: The Experience of Punjab, India*, pp. 291-312, Singapore: Springer.
- CDEIS. 2012. "Rejuvenation of Punjab Economy: A Policy Document", *Policy Paper No. 1*, Centre for Development Economics and Innovation Studies, Patiala: Punjabi University.
- Chandra, Pankaj. 2022. "Changing the Frame: Making Small firms Compete Like Large Ones", *Ideas for India*, September, <https://www.ideasforindia.in/topics/productivity-innovation/changing-the-frame-making-small-firms-compete-like-large-ones.html>
- Chavan, B.S., R. Garg., S. Das, S Puri, and A.A. Banavaram. 2019. "Prevalence of Substance Use Disorders in Punjab: Findings from National Mental Health Survey", *Indian J Med Res*. April, 149(4):489-496. doi: 10.4103/ijmr.IJMR\_1267\_17. PMID: 31411172; PMCID: PMC6676856.
- Datanet India Private Limited. 2021-22. "Indiastat Focused on Facts". <https://www.indiastat.com/>
- Eichengreen, Barry and Poonam Gupta. 2011. "The Service Sector as India's Road to Economic Growth", *Working Paper No. w16757*, Cambridge, MA: National Bureau of Economic Research.

- GoI. 2017-18. “Periodic Labour Force Survey (PLFS)”, National Sample Survey Office, Ministry of Statistics and Programme Implementation, Government of India, New Delhi. <https://microdata.gov.in/nada43/index.php/catalog/166/datafile/F2/V116>
- . 2018-19. “Periodic Labour Force Survey (PLFS)”, National Sample Survey Office, Ministry of Statistics and Programme Implementation, Government of India, New Delhi. <https://microdata.gov.in/nada43/index.php/catalog/162>
- . 2019-20. “Periodic Labour Force Survey (PLFS)”, National Sample Survey Office, Ministry of Statistics and Programme Implementation, Government of India, New Delhi. <https://microdata.gov.in/nada43/index.php/catalog/163>
- . 2020-21. “Periodic Labour Force Survey (PLFS)”, National Sample Survey Office, Ministry of Statistics and Programme Implementation, Government of India, New Delhi. <https://microdata.gov.in/nada43/index.php/catalog/178>
- . 2021-22. “Periodic Labour Force Survey (PLFS)”, National Sample Survey Office Ministry of Statistics and Programme Implementation, Government of India, New Delhi. <https://microdata.gov.in/nada43/index.php/catalog/165>
- . 2021-22a. “UNIFIED DISTRICT INFORMATION SYSTEM FOR EDUCATION PLUS”, Department of School Education and Literacy, Ministry of Education, Government of India, New Delhi. [https://www.education.gov.in/sites/upload\\_files/mhrd/files/statistics-new/udise\\_21\\_22.pdf](https://www.education.gov.in/sites/upload_files/mhrd/files/statistics-new/udise_21_22.pdf)
- . 2021-22b. “Performance Grading Index (PGI): 2.0”, Department of School Education and Literacy”, Ministry of Education, Government of India, New Delhi. [https://www.education.gov.in/sites/upload\\_files/mhrd/files/statistics-new/pgi-s.pdf](https://www.education.gov.in/sites/upload_files/mhrd/files/statistics-new/pgi-s.pdf)
- . 2021-22c. “All India Survey on Higher Education Department of School Education and Literacy”, Department of Higher Education, Ministry of Education, Government of India, New Delhi. <https://aishe.gov.in/aishe/viewDocument.action?documentId=353>
- . 2015-16. “National Family Health Survey”, Ministry of Health and Family Welfare, New Delhi. <https://rchiips.org/nfhs/nfhs4.shtml>
- . 2019-21. “National Family Health Survey”, Ministry of Health and Family Welfare, New Delhi. [https://rchiips.org/nfhs/factsheet\\_NFHS-5.shtml](https://rchiips.org/nfhs/factsheet_NFHS-5.shtml)
- GoP. 2022a. “Comptroller and Auditor General of India on Performance Audit on Outcomes of Higher Education in Punjab”, Government of Punjab, Chandigarh. <http://surl.li/txyxi>
- . 2022b. *Report of the 6<sup>th</sup> Finance Commission*, Government of Punjab, Chandigarh.
- . 2023a. *Punjab Vision Document 2047*, Department of Planning, Government of Punjab, Chandigarh, <https://pbplanning.punjab.gov.in/node/5869>, accessed 30 November 2023.
- . 2023b. *Statistical Abstract of Punjab*, Directorate of Statistics, Department of Planning, Government of Punjab, Chandigarh.
- . 2024. *Punjab Economic Survey, 2023-24*, Directorate of Statistics, Department of Planning, Government of Punjab, Chandigarh.
- Goyal, Kamlesh. 2020. “Structural Change and Growth of Manufacturing Industries in Punjab: Post-reforms Analysis”, *Indian Journal of Economics and Development*, 16(3): 389-396.
- Gulati, Ashok, Ranjana Roy, and Siraj Hussain. 2021. “Performance of Agriculture in Punjab”, pp. 77-112, In Ashok Gulati, Ranjana Roy, and Shweta Saini (eds.), *Revitalizing Indian Agriculture and Boosting Farmer Incomes*, Springer Nature.

- Gulati, Ashok, Ranjana Roy, and Shweta Saini. 2021. “Revitalizing Indian agriculture and boosting farmer incomes”, Springer Nature.
- Jain, Varinder. 2016. “Manufacturing Sector in Punjab: Evolution, Growth Dynamism, Key Concerns and Rejuvenation Strategy”, pp. 251-272, in Lakhwinder Singh and Nirvikar Singh (eds.), *Economic Transformation of a Developing Economy: The Experience of Punjab, India*, Springer.
- Kaur, Kamaldeep, Baldev Singh Shergill, and Swati Mehta. 2023. “Micro Foundations of Cluster Development: Evidence from Two Industrial Clusters in Punjab”, Chapter 8, pp. 119-136, in Baldev Singh Shergill and Swati Mehta (eds.), *Challenges to Punjab Economy*, London: Routledge.
- Liu, Rongchen, Anirban Sanyal, and Nirvikar Singh. 2021. “Environmental Issues, Economic Policies and Agricultural Development: The Case of Punjab, India”, *Indian Public Policy Review*, March-April, 2(2): 25-48.
- Mehta, Swati. 2024. “Innovation Systems, Value Chains and Industrial Clusters in Developing Economies: Case of Jalandhar’s Sports Goods Industry”, *African Journal of Science, Technology, Innovation and Development*, 16(1): 99-112.
- Mehta, Swati and Manpreet Kaur. 2021. “COVID-19 and Ludhiana’s Woollen Knitwear Industry: Way Forward”, *Research Journal of Textile and Apparel*, 25(3): 209-225.
- Muralidharan, Karthik, and Venkatesh Sundararaman. 2011. “Teacher Performance Pay: Experimental Evidence from India”, *Journal of Political Economy*, 119(1): <https://doi.org/10.1086/659655>
- Pratiksha and Preeti Sharma. 2020. “Status of Environmental Pollution in Rural Punjab and its Management”, *International Archive of Applied Sciences and Technology*, 11(4): 98-104.
- PRS Legislative Research. 2024. *Punjab Budget Analysis, 2024-25*.
- Punjab Expert Group. 2020. “Medium and Long-term Post-COVID Economic Strategy for Punjab: A Multi Sectoral Approach to Building Resilience and Recovery”, First Report of the Group of Experts, Government of Punjab, Chandigarh, July 31.
- . 2021. “Medium & Long Term Post-COVID Economic Strategy for Punjab: A Multi Sectoral Approach to Building Resilience and Recovery”, Final Report of the Group of Experts on a Post COVID Strategy for Punjab”, Government of Punjab, Chandigarh, June 30.
- RBI. 2022. “*Handbook of Statistics on Indian States*”, Reserve Bank of India, Mumbai.
- . 2023. “State Finances—A Study of Budgets”, *Reserve Bank of India—State Finances: A Study of Budgets*, (rbi.org.in).
- Sanyal, Anirban, and Nirvikar Singh. 2021. “Structural Change and Economic Growth: Patterns and Heterogeneity among Indian States and Implications for a Post-COVID Recovery”, *India Policy Forum*. Vol. 17(1). National Council of Applied Economic Research, New Delhi.
- Singh, Jatinder, and Maninder Deep Cheema. 2021. “Regional Industrial Development under Liberal Economic Regime in Punjab”, *Indian Journal of Economics and Development*, 17(2): 339-349.
- Singh, Jatinder, Jagsir Singh, and Maninder Deep Cheema. 2022. “Challenges for Industrial Development in Punjab”, *Third Concept*, 36(426): 12-15.
- Singh, Inderjit and Lakhwinder Singh. 2011. “Regional Input-Output Table for the State of Punjab, in Inderjit Singh, Sukhwinder Singh and Lakhwinder Singh (eds.) *Punjab’s Economic Development in the Era of Globalisation: Essays in Honour of R.S. Ghuman*, New Delhi: LG Publishers.

- Singh, Lakhwinder and Varinder Jain. 2007. "Growth and Dynamics of Unorganised Industries in Punjab", *International Journal of Business and Globalisation*, 1(1): 60-87.
- Singh, Nirvikar, and Deepali S. Kohli. 2005. "The Green Revolution in Punjab, India: The Economics of Technological Change", *Journal of Punjab Studies*, 12(2): 285-306.
- Singh, Nirvikar. 2007. "Services-led Industrialization in India: Assessment and Lessons", pp. 235-291, in David O'Connor (ed.), *Industrial Development for the 21<sup>st</sup> Century: Sustainable Development Perspectives*, New York: UN-DESA.
- Singh, Nirvikar. 2023. "Public Finances of Internal Security in India", pp. 135-158, in Amit Ahuja and Devesh Kapur (eds.), *Internal Security in India: Violence, Order, and the State*, New York: Oxford University Press.
- Singh, Prakarsh. 2013. "Impact of Terrorism on Investment Decisions of Farmers: Evidence from the Punjab Insurgency", *Journal of Conflict Resolution*, 57(1): 143-168.
- Sodhi, Nausheen and Upinder Sawhney. 2023. "Governance in Indian States: An Inter and Intra State Analysis", *Journal of Economic Policy Researches*, 10(1): 61-86. <http://dx.doi.org/10.26650/JEPR1109691>
- Sodhi, Nausheen. 2024. "Governance in Punjab – A Policy Note", Unpublished mimeo. Plaksha University.
- Verma, Satish, and Gurinder Kaur. 2017. "Total Factor Productivity Growth of Manufacturing Sector in Punjab: An Analysis", *The Indian Economic Journal*, 65(1-4): 91-106.

To view the entire video of this IPF session and the General Discussion that ended the session, please scan this QR code or use the following URL:  
<https://www.youtube.com/watch?v=E55qn-sbPkQ>



# Comments and Discussion \*

Chair: V K Singh

*Government of Punjab*

## **Seema Bansal**

*Punjab Development Commission*

A lot is talked about in terms of the decline of Punjab, but it is relative and the state still ranks among the top 12-13 in terms of per capita GDP. If you look at growth rates, they are not that much below national averages. But when it is compared as to what Punjab was, what Punjab is, or what Punjab is becoming, I think that's where the challenge actually sits.

A lot of people talk about the decline of Punjab from the 1980s. But there's also a story to be told in terms of the ascent of Punjab from the 1960s to the 1980s. In 1960, Punjab was like any other middling state in the country in terms of per capita GDP. But as regards the growth that it saw over the next 15 years, I don't think any state has ever boasted of that kind of acceleration. And I think there's a story there. That story is one of Centre-state partnership, and the reason why I mentioned this is because I think that is probably what is required in addressing the Punjab situation going forward.

In the 1960s, it was the Central Government which funded a lot of infrastructure creation like dams, canals. It was the state which actually invested in building the procurement systems. It was Punjab Agriculture University (PAU) which did stand out in research as compared to any other part of the country as to how can rice, which was never grown in Punjab and never eaten in the state, be indigenized. It was the farmer who knew how to work hard and that acceleration took 10 years to show results. So, there are no silver bullets that we are actually going to find today to solve the Punjab problem which does not require a 10-15-year effort.

The relative decline that Punjab is seeing today, being 12<sup>th</sup> or 13<sup>th</sup> among states in terms of per capita GDP, starts from agriculture. Agriculture is only growing at 1 or 2 percent in the country and that's because we are growing the same set of crops. Yield and productivity have maximized. And then the prices go at MSP. You have other states like UP and Maharashtra, where agriculture is

---

\* To preserve the sense of the discussions at the India Policy Forum, these discussants' comments reflect the views expressed at the IPF and do not necessarily take into account revisions to the conference version of the paper in response to these and other comments in preparing the final, revised version published in this volume. The original conference version of the paper is available on NCAER's website at the links provided at the end of this section.

growing at 6-8 percent. That is not happening in Punjab. Industries and services are also not growing. There are many historic reasons for it—militancy in the 1980s, 1991, and Punjab not being ready for liberalization, but more recently, Punjab being the border state. One of the biggest challenges for growing industry and services in Punjab is availability of capital. There has been absolutely no capital available, and I think the paper actually shows it. There has been no capital available to invest in infrastructure and create shared infrastructure or to give incentives. Many other challenges exist. For example, land in Punjab is the most expensive. More than 75-80 percent of land in Punjab is arable. It does not have a lot of fallow land or waste land which can be given to industries. So, if you compare land prices with any of the states, especially neighboring states, land is more expensive.

There are a number of reasons why Punjab's finances are so distressed. I think one of the things is that Punjab historically has had a much larger public workforce in some of the sectors and spaces than any other state. So, if you look at the police force in Punjab, it's twice that of the average across the country, the main reason being that it is an active border state, a border in conflict. Because Punjab invested in agriculture, it has a much larger agricultural workforce than any other state. That actually leads to cost. While wages were set to the Government of India rates in 2019, there is a very large workforce continuing from before which continues to get paid much larger wages than the rest of the country.

And these are some of the things which are leading to the financial distress, besides some of the subsidies. One more thing that is not talked about much is that GST has been actually very hard for Punjab in view of its financial situation. Punjab actually had a number of taxes which got subsumed under GST but it doesn't get compensated for them. Right or wrong, there was an agricultural purchase tax in Punjab, which actually does not come through in GST. Second, Punjab has historically been a production state and not a consumption state. All consumption states have been struggling to come up to the same level of tax value as compared to what they were before. That should be accounted for when we look at Punjab's fiscal health.

The paper is about policies and prospects. So, the question is: Where do we go from here? The first growth of Punjab started from agriculture. This one probably will also have to start from agriculture. When we talk about what needs to happen in agriculture, the answer is a no-brainer. Everyone has talked about it for the last 30 years. It's diversification (of crops). There have been enough reports on diversification and so the question is: Why does diversification not happen? And there I would like to go back to my initial point that diversification will actually have to be funded and supported by the Centre. The state itself cannot do diversification. We have looked at every single crop and not one comes even close to the profitability of rice. But that does not mean that it cannot happen. It will take the same number of years that Punjab took to perfect

rice growing and its yield and profitability. And during that time, investments are needed. Money is needed to actually compensate the Punjabi farmer for diversifying into something else, until the profitability of rice and that new crop actually matches. Money is needed for research that PAU will have to do; money is needed for setting up supply chains and setting up infrastructure. The state actually does not have that money.

At the same time if one thinks about the money that the Central Government might save if they were to procure less rice from Punjab, there is fertilizer subsidy and cost of procurement. This is not about questioning the food security of the country. This is about reducing rice in Punjab to a level where some amount of money, power, and water starts getting freed up. This is the responsibility that the Centre also needs to take as it talks about Punjab diversifying away from rice. Of course, the state needs to put in the money that it will save from power. There are certain parts of Punjab where our analysis indicated that the cost of power per acre is as high as Rs 20,000 to actually grow rice. The value the farmer gets out of rice is Rs 30,000-32,000. And the cost of power is already reaching that level. So, when the state starts saving money, how much of that does it actually start putting in? I think there are some no-brainers. Maize is now a very big Government of India priority as a source for ethanol. Today, productivity and yield do not match up to rice but I think we can get there in five years if we invest in maize.

That can easily take care of 15-20 percent of rice-growing area and then one can start looking at fruits and vegetables, and the related supply chains. When you start focusing on agriculture, jobs start getting created in the supply chains and farmer unrest and dissatisfaction, which often becomes a hindrance to big change in Punjab, will start getting addressed. That's when money will start getting freed up, power and water will get freed up for industry. And that's when one can think simultaneously about industry and services. It is a border state, small state, and landlocked state, and I do not think Punjab can be very competitive in industry. But I think there are industries, as our analysis says, like textiles, farm equipment, for which historically skill-sets and supply chains exist in Punjab, that can bring in investments and help SMEs get bigger.

Food processing, linked to agricultural diversification, could be another one. I think there are some other interesting possibilities. When you land at Mohali airport, you can see 1500 acres of land, largely owned by the government, which is available. I fail to understand why Pune should continue to be an IT, ITS, and Global Capability Centre (GCC) center for the country. Punjab has an amazing technical education ecosystem at this point of time. We have IIT Ropar, Thapar Institute, Punjab Engineering College, and universities like Plaksha. I think that place is ripe for a 10-year of evolution into IT, ITS, and GCC if we were to think about it from that perspective.

Finally, I would like to talk about tourism. There is no reason why Punjab cannot be the next Rajasthan. There is border tourism; Sikh history, as the

Maharajas of Punjab were very rich and had large visions of architecture, which you can see in Patiala; Anglo-Sikh history; and farm tourism. It is one of those sectors where a lot of disaggregated jobs can be created across the state. Ease of doing business is a very big challenge in the state. The state also needs to look at some of the labour laws.

Summing up, I want to say that there is no silver bullet but I do think that there are bankable, aspirational solutions for Punjab. I do not think this problem can be solved by Punjab alone anymore. Punjab has obviously served the country in terms of protecting the border, and providing rice and water. I think some amount of Centre-state partnership has to happen for Punjab to come through this. People of Punjab are up for that second resurgence.

## **Montek Singh Ahluwalia**

*CSEP*

I am grateful to the IPF organisers for allowing me to depart from the extempore comments I made during the discussion and offer a more considered set of comments instead. These comments are influenced by the fact that in 2020, Captain Amarinder Singh, who was then the Chief Minister of Punjab, asked me to head an Expert Group to advise him on how to restore Punjab to its earlier “pre-eminent” position.

I was struck by the ambition of the objective because Punjab was at the top of the list of major states ranked by per capita GDP in 2000, but it had slipped to the 12<sup>th</sup> position over the next twenty years. This happened because the state had grown much more slowly than many other states. I explained to the CM that to get back to the top, Punjab would have to grow at least 2 percentage points faster than the national average, and maintain this differential for twenty years!

An acceleration of this magnitude requires a very concerted push in terms of policy to achieve higher levels of investment, and also productivity, and the latter often calls for a review of traditional policies that have been in place for many years. I should add that Nirvikar Singh, who is one of the authors of the Punjab paper prepared for this conference, was one of the members of the Expert Group. The paper by Lakhwinder Singh, Nirvikar Singh, and Prakash Singh provides an excellent review of the current problems facing the state and also identifies the broad directions in which policy must move. It also brings out that actual movement in these directions has been disappointing. One of the points made in the paper is that although problems are clearly identified in Punjab government documents, there is typically no clear indication of what might be the pace at which corrective steps can be taken.

Let me illustrate this with the agricultural sector. Agriculture has a larger share in the GSDP in Punjab than in other states and Punjab rightly views itself

as a leader. It was indeed a leader in agriculture in the 1970s, when it played the dominant role in making the Green Revolution a success, but it did not retain this lead in subsequent years. In fact, its very success in grains production led to a prolonged dependence on wheat and paddy cultivation, making it lag behind in agricultural diversification to fruits and vegetables, which can yield much higher income levels.

The failure to diversify agriculture in Punjab is primarily due to the combined effect of existing policies at the state and Central levels. These include: (a) gross underpricing of urea leading to its excessive use compared with P and K, which has led to serious depletion of soil quality; (b) free power for farmers leading to excessive withdrawal of ground water, seriously jeopardizing future productivity of land; (c) reliance on MSP as the main form of price support and an associated reliance on the FCI as the principal source of procurement; and (d) frequent resort to export bans to deal with rising prices and sale of FCI wheat at prices much below costs to keep grain prices in check, which operates against the interest of farmers. A resuscitation of agricultural dynamism in Punjab calls for a thorough review of these policies but there is no agreement on this issue. Of these, the only policy that is directly under the control of the state government is the policy of free power to farmers. The others are under the control of the Central Government.

It is no secret that the government is politically locked into these policies because of the belief that they are pro-farmer. However, as Ashok Gulati has pointed out, OECD studies conclude that the net effect of these interventions on farmer income is actually negative. In other words, eliminating all these interventions would lead to farmers being better off! The think tanks that feed into public perception and policy-making must work harder to evolve a national consensus on these issues if we are to move to a new equilibrium.

If these distortions cannot be comprehensively reviewed, the only way towards diversification is to give subsidy to Punjab farmers to get out of rice. The paper mentions this as an option but Ashok Gulati has estimated that farmers will need a subsidy of Rs 40,000 per acre, to shift out of rice to other crops. However, this will require the Central Government to finance a large part of the subsidy. It is argued that it will save this amount in lower fertilizer usage but this assumes that the fertilizer thus saved in Punjab will not be absorbed elsewhere.

More generally, the case for agricultural diversification also requires modernization of agricultural marketing and allowing a greater role for the private sector. Unfortunately, there is deep suspicion on the part of the Punjab farmer of any dilution of the role of the FCI in procuring wheat and rice. Evidence suggests that the MSP may not be as important as farmers believe because the rate of growth of fruits, vegetables, and milk is much faster than the growth in cereals and these products do not have assured MSPs. But this has not led to greater acceptability of a private sector role in the farming community.

Since marketing issues are largely under the control of state governments, perhaps the solution lies in encouraging state governments to experiment. If Haryana could be persuaded to allow a larger role for the private sector, it might make Punjab farmers more willing to change their mind.

Although agriculture is important in Punjab, it cannot be the only basis for faster growth. Faster growth in industry is equally necessary and experience in this area has been disappointing. The paper brings out that the industry lagged behind in the 1980s, possibly because disturbed conditions in Punjab in those years may have discouraged investment. There is also the view that Punjab's small-scale industry, which was its real strength, suffered because of economic liberalization. It may be the case that liberalization may have caused some disruption initially, but all states experienced this to some degree. Liberalization, which began in 1991, has been good for the industry. But it has not had quite as much a positive effect in Punjab.

A common complaint explaining Punjab's weak performance in industry is that the state is at one corner of the country. This is true, but Punjab is well connected with the rest of the country and is only about six hours away from Indira Gandhi International Airport, which is a major international hub for air transport. The development of the North-South and East-West rail freight corridors provides further infrastructural support for industrial development in Punjab. The paper rightly draws attention to the 'ease of doing business' as an area entirely under the control of the state government, where a great deal could be done.

Studies done in recent years show that there is a profusion of industrial controls and regulations at the state level, which involve numerous provisions which can translate into criminal prosecutions. These need to be urgently reviewed and drastically pruned. The Expert Group I headed in 2020 had made detailed recommendations on what could be done in these areas. They need to be exhumed and acted upon.

I could go on, but in essence what I want to say is that the paper brings together much of the work that had been done on Punjab in different fora. One area where Punjab should be doing better is in promoting start-ups. Fortunately, a start has been made in this area. Interestingly, Ajay Banga, now President of the World Bank, was one of the members of the Expert Group I headed. Perhaps the state government should ask the World Bank to make a critical assessment of what has happened in promoting start-ups and what could be done to reshape policy to achieve better results in this area.

Finally, I would like to disagree with the speaker who said one of the reasons Punjab's industry has not done well is that the state is not a "consumption state", implying that the level of consumption could be boosted. Most people who know Punjabis view them as a boisterous fun-loving people who love to consume. In fact, the love of consumption is deeply rooted in Punjab's history. This goes back to the saying "Khada Peeta Lahe Da, Baki Ahmed Shahe Da".

This translates roughly into “what you eat and drink brings you benefit, the rest goes to Ahmed Shah”. It refers to Ahmed Shah Abdali who invaded Punjab many times in the 18<sup>th</sup> century, looting whatever he could find. This is said to have encouraged Punjabis to consume rather than save because consumption would benefit you while savings would only go into gold and jewellery, which would be robbed periodically!

Finally, let me say that I am really glad that we are seeing more and more state-level analysis of the constraints on growth. In my memoirs, *Backstage: The Story of India's High Growth Years*, I have mentioned that we did not have enough state-specific analysis of what would be relevant drivers of growth for each state. Our states are very different, not only in terms of the per capita GSDP but also in terms of the economic structure and we need to tailor growth strategies to reflect these differences.

## General Discussion

Karthik Muralidharan initiated the discussion by hoping that more such state-specific papers would be commissioned for the India Policy Forum in future. He said the sense he gathered from the paper was that things are difficult for Punjab and it needed Central assistance. He wanted to know from the authors what that ‘grand bargain’ might look like and that the state itself should be proactive in spelling out the issues. There is a certain transition glide path for which the state needs assistance. Muralidharan wanted the state to come very concretely on the fiscal support it needs and its own commitments. On the broader issue of agricultural reforms, he said something like a GST Council for agriculture factor market reforms may be needed, where the Centre and the state could come together and the Centre could compensate a certain amount, subject to some conditions. He said if Punjab sets the agenda by spelling out the reform pathway, it would be a more proactive way than saying that the state is in trouble. He said Punjab has to solve three problems—an economic problem, a political problem, and a trust problem. The economics is getting the incentive, aligning the prices, and getting all of that right; the politics is thinking through the distributional effects and making sure the structure of the reform is win-win for most; and the trust is the hardest part, and that’s where a GST-type mechanism is needed, where there are legislative guarantees and potential amendments.

Addressing Montek Singh Ahluwalia, Martin Wolf said nearly 30 years ago he had written that nothing fails like success. He told Montek that Punjab was a spectacular success, but he has seen many times that economy and society get trapped by the structural, economic, and political implications of a colossal success. He said it is part of the problem and it is unbelievably difficult to change things that have been associated with extraordinary success.

Devesh Kapur said actually the state to which Punjab should be compared is West Bengal. Half a century ago, these two states were India's leading states. Both have seen a steep decline in the last three-four decades as compared to the rest of India. He said both states have seen a very rapid capital flight and more importantly, flight of people. From Punjab, it is outside the country while from Bengal, it is within the country. He said the most fundamental problem is when people lose confidence in the future of the country or a state. He said Punjab is witnessing a strong sign of loss of confidence. He cited the Indian Army, saying that the Punjab regiment was not getting enough soldiers from the state to enlist, which was completely unprecedented. He also wanted to know from the authors whether the role of the Punjabi diaspora is an asset or a liability. It has pushed the price of land because of remittances, which means that the industry finds it much harder to set up because the price of a factor is too high. The remittances drive the consumption in the state's economy. He asked the authors how Punjab can leverage its diaspora so that it becomes an asset.

In response to the contention of high land prices in Punjab, as expressed by some, Lakhwinder Singh, one of the authors, said he did not agree with it. He said when the Union Government decides to open three gates on the border with Pakistan for trade, there is a beeline of investors to purchase land at whatever cost. If there is no opportunity, one will not take away land even if it is available at throwaway prices. He said it is the opportunities which are not available and excuses were being made that land in Punjab is very costly. He said the industry had largely built an idea that they are going to get land without any cost. He said free land pool has been developed by the Punjab government and industrialists sometimes try to get it, but they are not setting up industries. He said Punjab is facing a different set of problems because transportation cost is relatively very high compared to pre-1991 when a freight equalization policy was in place. Punjab's industry was doing better because of this particular policy. And after the dismantling of this policy, industry has started moving out to locations where the cost of transportation of goods and services is relatively low. On Devesh's question regarding diaspora, Lakhwinder said the Punjabi diaspora is very heterogeneous. A large section of the diaspora does not have large funds to be invested in setting up enterprises. Their small savings are part of the remittances, which are meant to serve them as insurance for the future. The third important thing which has not been talked about in the paper as well as by discussants is that the long period of turmoil has changed the political leadership in a manner that it has grown very rich as also the bureaucracy in Punjab, but not the citizens. Addressing Montek Singh Ahluwalia, Lakhwinder said every five years, the government has been changing in the state, but there was no change in public policy as well as effectiveness in terms of delivering goods and services. The problem is that both the political leadership and bureaucracy are very risk-averse. The political leadership gives subsidies before

elections and considers it to be welfare. Then, it is observed that those subsidies do not work in the next election.

On Karthik Muralidharan's larger question of what should be the state's proposal to the Centre, Lakhwinder said they are working on the nitty-gritties. He said the main issue is that no investment has been taking place in Punjab and the investors already there are searching for options outside the state. A large part of the investment has moved out to Haryana and Himachal Pradesh during the period of turmoil. In the post-liberalization period, a large number of industries expanded outside Punjab. Punjab was battling for peace when the liberalization process was on. This was the investment Punjab was making for the country as a whole. So, it failed to get the benefits of the liberalization process. The state is unable to generate the amount of investable resources which are required to break the venomous situation. He said their paper talks about a balance between the efforts by the state government and the Centre because the major constraining factor which is holding back Punjab is the international border for which all the decisions had been taken by the Union Government without consulting the state.

V K Singh, who chaired the session, said the 1991 moment seems to be here again and Punjab will not fail this time and would do whatever is required to rise, in partnership with the Government of India. On Devesh Kapur's question whether diaspora is an asset or liability, Singh said he agreed that sometimes they are assets, but at other times, they behave like liabilities. Similarly, he said the Green Revolution turned out to be Red for the state if one sees the level of environmental degradation and water pollution, which are very serious issues now. He said the state government had taken some steps and hoped that the Finance Commission team would be able to give more ideas. He said the recent turmoil in the farm sector due to the Centre's now repealed farm laws and the COVID-19 pandemic set back the efforts of the state. He exuded confidence that Punjab will once again rise as the land of prosperity.

The session video and all presentations for this IPF session can be accessed by scanning this QR code or going to:  
<https://ncaer.org/event/india-policy-forum-2024/>





CHETAN GHATE\*

*Indian Statistical Institute – Delhi Center and  
Institute of Economic Growth, Delhi*

KENNETH KLETZER†

*University of California, Santa Cruz*

MAHIMA YADAV#

*Independent Researcher*

## India's Foreign Reserves and Global Risk<sup>§</sup>

**ABSTRACT** India has accumulated a sizable stock of foreign exchange reserves over the past three decades, common with many other emerging economies. Its current reserves surpass several thresholds for adequacy used by the International Monetary Fund and others. An assessment of whether the stock of reserves is appropriate depends on an evaluation of the benefits and costs of reserves. An important precautionary benefit is the role that reserves provide in terms of self-insurance against sudden financial outflows by non-resident investors or resident savers. Following the “at-Risk” literature to study the size of reserves and capital flows, we estimate probability densities of future gross capital flows for India, as a function of global financial conditions, policy frameworks, reserves, and domestic structural characteristics. We find that foreign exchange reserves play a significant role in shifting the empirical distribution of gross flows wherein the probability of large (negative) outflows is substantially reduced. Higher reserves reduce both extreme inflows and outflows of foreign capital. Following the approach in Devereux and Wu (2022), we find that an increase in the reserves to GDP reduces the risk premium on reserves, so that the sovereign interest rate spread over-estimates the marginal cost of reserves in India. This suggests that additional reserves reduce currency risk. Our results suggest that reserve accumulation continues to provide a precautionary reserve benefit for India. The precautionary benefits of reserves could well increase as India becomes further integrated to international financial markets.

**Keywords:** *Quantile Regressions, Foreign Exchange Reserves, Foreign Portfolio Flows, Precautionary Reserves, Global Financial Shocks*

**JEL Classification:** *F31, F32, E52*

---

\* *cghate@gmail.com*

† *kkletzer@ucsc.edu*

# *mahima9yadav@gmail.com*

§ We are grateful to Barry Eichengreen, Poonam Gupta, and Ranil Salgado for comments on the paper. We also thank participants of the 2024 India Policy Forum (IPF) at NCAER, New Delhi, for valuable feedback.

The findings, interpretations, and conclusions expressed are those of the authors and do not necessarily reflect the views of the Governing Body or Management of NCAER.

## 1. Introduction

Since the 1991 balance of payments crisis, India has accumulated a substantial stock of foreign exchange reserves. This rise in reserves accords with the pattern of reserve accumulation by many large emerging market economies. The hoarding of reserves by emerging markets has raised several questions about how these countries use their reserves, whether they hold adequate reserves for appropriate purposes, and if the marginal benefit of greater reserves outweighs the cost. Determining the appropriate size of reserves to hold as a precaution against extreme capital outflows is an important topic of monetary policy for policy-making and academic research.

Figure 1 shows that in January 1991, India's total foreign reserves were US \$6.4 billion. In August 2024, they were \$682 billion.<sup>1</sup> The average annual compound growth rate in reserves during this period is 16 percent. As of August 2024, approximately 3.4 percent of reserves were in Special Drawing Rights (SDRs) and the reserve tranche position. Approximately 9 percent of reserves were held in gold.

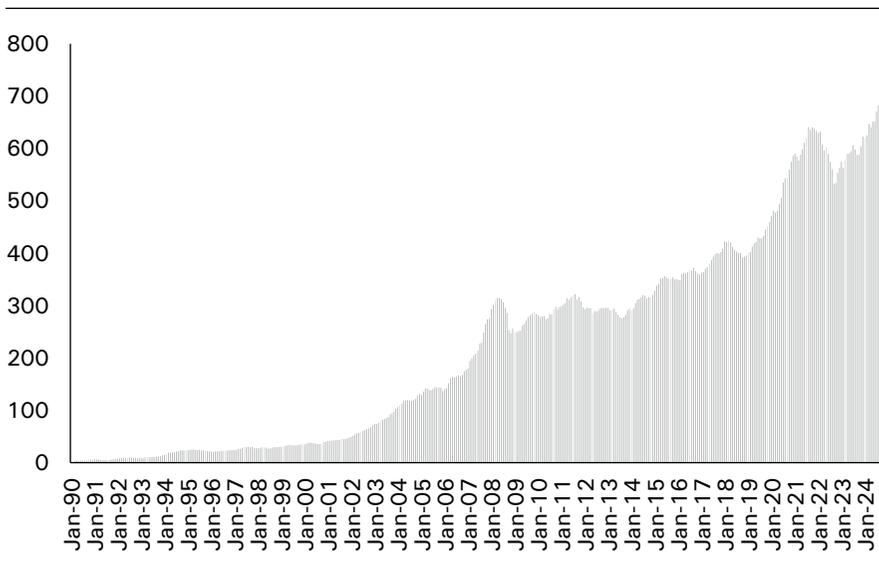
There are three primary motives for central banks to hoard reserves. First, the reserves provide self-insurance against runs on domestic financial markets and institutions by foreign and domestic asset holders. Reserves can be held as a precautionary measure to mitigate the impact of global financial or domestic shocks on external capital flows. Second, reserves are used for intervention in the foreign exchange market to reduce short-term exchange rate volatility. A third, mercantilist, motive concerns systematic purchases of reserves to maintain export competitiveness with a depreciated exchange rate.<sup>2</sup>

In this paper, we focus on the first motive and analyze the impact of reserves on international capital flows between 2004 and 2023 for India. Our empirical approach follows Adrian et al. (2019). This research adopts an approach from capital-at-risk analysis, which uses quantile regressions. To quantify the impact of reserves on international capital flows over the global financial cycle, as in Muduli, Behera, and Patra (2022), and Gelos et al. (2022), we use quantile regressions for India to estimate the marginal effect of reserves as a share of GDP on gross capital flows across the distribution of external and internal shocks given global financial, growth, and monetary policy risks. We focus

---

1. The Reserve Bank of India does not publicly report the composition of its reserves beyond the break-up in Figure 1.

2. Eichengreen (2007) suggests that countries that have historically maintained a competitively valued exchange rate, thereby allowing resources to move to the export sector, performed better in terms of medium-term economic growth rates. Barguelli, Ben-Salah, and Zmami (2018) show that exchange rate volatility negatively impacts economic growth, though the effect of exchange rate volatility on growth depends on the exchange rate regime and the degree of financial openness. Volatility is more harmful in countries with flexible exchange rate regimes and more financial openness.

**FIGURE 1. Foreign Reserves, India (Billion \$)**

Source: RBI Database of the Indian Economy.

on gross capital inflows, which matter most for financial stability concerns, and amounted to about 1 percent of GDP in 2023.<sup>3</sup> By interacting risks with reserve holdings, we demonstrate that additional reserves reduce large outflows of foreign-owned capital in adverse events. Higher reserves can reduce both extreme inflows and outflows of foreign capital. We analyze the effects for foreign portfolio debt and foreign portfolio equity flows separately. We find that foreign exchange reserves play a significant role in shifting the empirical distribution of gross flows wherein the probability of large (negative) outflows is substantially reduced. The estimates suggest that reserve accumulation continues to provide a precautionary reserve benefit for India.

A natural policy question arises: when does the RBI have enough, or too many, reserves? Additions to reserves beyond what is needed to cover potential

3. We follow a large literature and the data provided by the OECD (see Mehigan 2018) in defining gross capital inflows as net sales of domestic financial instruments to foreign residents, or non-residents. An alternative classification differentiates between gross/net flows by non-residents and residents. In this classification, gross inflows are referred to as non-resident net inflows, or non-resident inflows minus outflows. Resident net outflows are resident outflows minus inflows, and are referred to as gross outflows. Hence, gross inflows are synonymous with non-resident net inflows, and gross outflows are synonymous with resident net outflows with the difference between gross inflows and gross outflows referred to as net inflows. See Bhargava et al. (2023, Footnote 6). Gross capital inflows arise when the economy incurs more external liabilities (inflows with a positive sign) or the economy reduces its external liabilities (inflows with a negative sign). Also see Broner et al. (2013).

sudden capital outflows and import needs can provide assurance to creditors and other market participants that the central bank will not hesitate to intervene as much and as long as necessary. Reserves may reduce the risks due to global and domestic financial shocks reducing the incidence of capital flow reversals and the risk premium on government debt whether denominated in domestic currency or foreign currency.

The adequacy of precautionary reserves has traditionally been defined in terms of the potential demand for reserve currency in the short run. Assessments were based on ratios of reserves to rule-of-thumb measures of an economy's exposure to sudden outflows or reversals of inflows. These include short-term external debt exposure (months of imports, and the ratio of reserves to broad money. These adequacy metrics, however, are increasingly viewed as ad hoc.

Starting in 2016, the IMF moved towards assessing reserve adequacy with a more forward-looking approach. The Assessing Reserve Adequacy (ARA) metric provides broader assessment of a country's external vulnerabilities based on IMF projections.<sup>4</sup> For emerging markets, reserves are broadly considered adequate for precautionary reasons if they range between 100 to 150 percent of the ARA metric (see IMF 2016). In 2024, the IMF noted that India's reserves were 114 percent of the ARA metric, at the lower end of what would be considered adequate.<sup>5</sup>

Floating exchange rate regimes raise the question of whether reserves should be held for the purpose of intervening in response to foreign capital outflows due to global or domestic shocks. Advanced economy central banks typically allow exchange rate movements to absorb the effects of global financial cycles. As Obstfeld (2015) argues, financial markets in emerging market economies are vulnerable to stress from large exchange rate changes. He suggests that the use of reserves to mitigate large depreciations associated with capital flow reversals can be warranted. Over the last two decades, capital flows to India have risen to the level of other major Emerging Market and Developing

---

4. The ARA is a composite metric which includes not only broad money and short-term debt as in the traditional metrics, but also other liabilities such as medium- and long-term debt, and exports. The weight on each variable depends on whether a country follows a fixed or flexible exchange rate regime. For instance, a higher weight is placed on broad money if a country's capital account is more open because of the potential for domestic flight. The ARA metric is also separately calculated depending on whether a country is advanced, emerging, or low income.

5. The External Sector Report for 2024 presents the assessment of reserve adequacy as follows: "Various criteria confirm that the official FX reserves are adequate for precautionary purposes. As of the end of 2023, they represented about 219 percent of short-term debt (on residual maturity), 109 percent of the IMF's composite metric (for a de facto stabilized exchange rate arrangement), and more than eight months of import coverage. In view of India's moderately strong external position, generally deep and liquid FX markets, limited FX mismatches, well-anchored inflation expectations, and adequate reserves level, Integrated Policy Framework analysis indicates that FX interventions should be limited to addressing disorderly market conditions." (See IMF 2024, p. 74).

Economies (EMDEs), and the economy's exposure to external financial shocks has risen. The RBI tends to respond to shocks by expending its reserves as the rupee depreciates.

The quantile regression analysis provides a way of estimating the effect of additional reserves on foreign capital flows.<sup>6</sup> Reserves held as a precaution against liquidity crises can affect the probability of crises and their impact on financial markets. The anticipation that reserves will be available to mitigate the effects of global financial shocks and to meet sudden outflows of foreign capital is likely to affect the amount and nature of foreign capital inflows. Self-insurance is purposed toward financial stability and, hence, more efficient investment financing. Higher reserves that are seen to reduce financial fragility could improve the maturity structure of capital inflows reducing exposure to short-term capital outflows.

Weighing against the benefits of having reserves are the opportunity costs of holding them. These costs include the interest differential between Government of India and U.S. Treasuries, changes in the valuation of reserves, and the carry cost of foreign reserves. We estimate a model of the interest rate spread and find that spreads decline with the ratio of reserves to GDP. The marginal cost of reserves appears to be less than the interest rate spread. Our results show that increasing reserves appear to reduce the overall sovereign bond spread by reducing both currency risk and credit risk using the 10-year US-India bond spread.

The paper is organized as follows. Following the Introduction in Section 1, Section 2 gives a selective review of the literature on reserve adequacy and the dynamics of capital flows to emerging markets. Empirical research on international capital flows concentrates on cross-country analysis. Our summary highlights the results for emerging markets collectively or selectively that can directly inform discussions of policy and prospects for India. Section 3 provides a narrative overview of capital flows for India, reserve policy, and risks. Section 4 describes and reports the analysis of gross capital flows using quantile regressions. Section 5 discusses the cost of reserves and estimates the marginal effect of reserves on interest rate spreads. Section 6 presents the conclusion.

---

6. As noted in Eguren Martin et al. (2021), modeling the probability distribution of the variable under consideration involves using information from extreme observations. Given that extreme observations tend to be rare by definition, the exclusion of such observations could lead to a change in results. We show that our results are robust to a variety of different formulations. Saleh and Saleh (2021) discuss some of the limitations of the quantile regression approach, such as the non-monotonicity problem, or the "crossing problem."

## 2. International Capital Flows and Emerging Market Reserves: A Literature Review

The series of financial crises in emerging markets between 1980 and 2000 has motivated a large academic literature as well as advocacy by economists and multilateral financial institutions for central banks to raise reserve holdings as a buffer stock against sudden stops and avoid fixed exchange rates. It is well recognized that reversals lead to nominal depreciations, which can be sharp or severe, if not managed by foreign exchange intervention. Large capital episodes, in turn, can have implications for financial stability if a country's external obligations are denominated in foreign currency. Large capital episodes can also have consequences for inflation, depending on the pass-through from extreme exchange rate movements, which motivates reserve sales in episodes of Foreign Portfolio Investment (FPI) reversals caused by external shocks.

By accumulating a sufficient level of reserves, emerging market economies would be able to sell reserves to accommodate sudden reversals of capital inflows. Such self-insurance could allow countries to avoid the sharp drops in output and domestic absorption caused by financial shocks.<sup>7</sup> The accumulation of a stock of reserves might also reduce the incidence of capital flow runs, for example, when crises are self-fulfilling. In addition to precautionary reserve holding, proposed and adopted measures include macroprudential policies and capital controls.

The notion of precautionary reserves leads to the question of determining the optimal level of reserves for a central bank. Heller (1966) argues that given the opportunity cost of holding reserves, the level of reserves should be determined by the trade-off between this cost and the welfare cost of crisis risk. Jeanne and Ranciere (2011) derive a formula for optimal reserves to protect against sudden stops based on the idea that reserves replicate an insurance contract against sovereign default. An underlying concept is that the call on reserves and the holding cost should be discounted and priced using a stochastic discount factor in a forward-looking model. By the formula, optimal reserves equal the sum of the potential capital outflow and the output loss due to the sudden stop discounted for the probability of a crisis and flow opportunity cost of reserves. Jeanne and Sandri (2020) take a similar approach to model optimal reserves for a country that is financially closed but open to trade. When calibrated for countries with very low private capital flows and low short-term external public debt, their model generates optimal reserves equal to 3.3 months of imports matching the conventional import cover rule very well.

---

7. The policy response can be a mix of allowing the exchange rate to float (and thus act as a "shock-absorber") and intervening in the foreign exchange market to limit the rate of depreciation.

Empirically, Jeanne and Ranciere show that the reserves held by emerging market central banks exceed the optimal level for the precautionary reserves predicted. The empirical results of Aizenman and Lee (2007) and others find that the reserves accumulated by East Asian countries after the 1998-99 crisis can only be partly explained as precautionary savings against external liabilities. Durdu et al. (2009) argue that financial globalization increases volatility, leading to larger precautionary reserves. Their empirical analysis finds that the reserve growth can be explained by financial globalization and sudden stop risk, but not by domestic output fluctuations. Calvo, Izquierdo, and Loo-Kung (2013) find similar results.

A large literature considers the role of gross flows for the financial vulnerability of EMDEs and, hence, for precautionary reserve accumulation and macroprudential policies. For instance, Forbes and Warnock (2012) and Broner et al. (2013) define capital flow regimes using data on gross capital inflows and outflows, and identify factors that affect these flows. Gross flows can be very large and volatile, respond to global financial cycles, and are associated with emerging market financial crises. Following Calvo, Leiderman, and Reinhart (1993), Forbes and Warnock distinguish between external (push) factors on gross flows and domestic (pull) factors on flows. Negative global financial shocks typically lead to large outflows of foreign-owned capital (stops), and inflows of domestic-owned capital abroad (retrenchments). Global shocks induce gross flows that are much larger than the net flows. Forbes and Warnock show that global shocks drive gross flows but that domestic factors such as GDP growth do not. Gross flows are positively correlated with the global cycle. During periods of global financial volatility or uncertainty, foreign capital leaves and domestic assets return. Broner et al. show that the overall dynamics of gross capital flows hold for different types of flow (portfolio debt, portfolio equity, direct investment, and other flows) individually. Koepke (2019) surveys the empirical literature on the response of gross flows to shocks. Estimates of the effects of macroprudential policies on gross capital flows tend to be insignificant or inconclusive (see Forbes and Warnock 2012; Beirne and Friedrich 2014; and Galati and Moessner 2018).

Using a sample of 34 emerging market economies, Eichengreen, Gupta and Masetti (2018) show that while capital inflows (both FDI and non FDI) into emerging markets conform with conventional wisdom on their relative volatility, outflows from emerging markets behave differently. In particular, FDI outflows from emerging markets have become more volatile since the turn of the century. They also show that there is a significant increase in bank intermediated capital outflows from EMEs. However, for India, gross domestic portfolio outflows are restricted by capital flow management measures and are dominated by portfolio inflows. Over the last two decades, the mean foreign portfolio inflows were more than 30 times the mean foreign portfolio outflows

for India. Their relatively small size means that outflows do not quantitatively influence the demand for precautionary reserves. In comparison to middle-income emerging markets, capital flight and retrenchment do not feature in the Indian response to global shocks. For these reasons, we focus only on portfolio inflows (debt and equity) in this paper.<sup>8</sup>

Obstfeld, Shambaugh, and Taylor (2010) argue that international reserves can provide liquidity, often of higher quality, against capital outflows from domestic financial markets during periods of distress (an internal drain). They conclude that depth of domestic financial markets can contribute to an economy's risk exposure and motivate larger reserve holdings. They confirm the significance of M2 empirically for explaining emerging market reserves share of GDP. The inclusion of the reserves to M2 ratio in IMF evaluation of reserve adequacy reflects this. Financial crises are often associated with the unwillingness of creditors to refinance maturing public and private debt. Hur and Kondo (2016) and Bianchi, Hatchondo, and Martinez (2018) model how rollover risk can motivate additional reserves for precautionary reasons. In these articles, reserve accumulation reduces the probability of a crisis in the presence of potential sovereign default.

The current account reversal in a sudden stop episode is the net outflow of capital. Bianchi and Mendoza (2020) estimate this to be around 3.7 percent of GDP for a typical sudden stop in emerging market economies over the period 1979 to 2016. These episodes are clustered around global financial events. The exposure of the economy to global shocks may be better measured by the dynamics of gross outflows and gross inflows than by net flows. Surges in capital inflows are associated with the accumulation of foreign liabilities and exchange appreciation that can create significant financial vulnerabilities, including asset price bubbles, raising the likelihood of banking, debt, and currency crises. In terms of gross flows, a sudden stop is characterized by a sharp reversal of foreign inflows. Reserve accumulation provides liquidity to the central bank to act in the event of surge reversals and serves to counter real appreciation pressures.

### *2.1. Quantile Regressions*

A new approach to estimating the effects of shocks and policies on gross flows is proposed by Gelos et al. (2022). They use quantile regressions following the literature on value-at-risk to estimate the entire probability distribution of external portfolio capital flows using a panel dataset of emerging markets. We adopt this approach in our paper. The objective is to estimate how the future distribution of gross portfolio flows in short and medium runs varies with

---

8. See Eichengreen and Gupta (2013) for a discussion on how Indian banks fared during the Great Financial Crisis.

global shocks, country characteristics, policy frameworks, and policy actions. Of particular interest is the impact of global shocks on extreme capital flows in the tails of the distribution under alternative policies. In terms of country characteristics, they estimate how exchange rate regimes, institutional quality, monetary policy frameworks, and domestic financial depth affect capital flows. The findings indicate that more flexible exchange rate regimes are associated with more capital flow volatility in the short run and less in the medium run. Central bank transparency, stronger institutions, and deeper financial markets reduce the volatility of capital outflows in the medium term. The authors find that macroprudential policies seem to reduce volatility while the imposition of capital controls in response to adverse global shocks exacerbates gross flows.

Eguren Martin et al. (2021) use the same quantile regression approach using a cross-country panel. An innovation is the construction of global and domestic financial conditions indices from asset prices using high-frequency data. Effects for foreign direct investment, portfolio equity flows, portfolio debt flows, and banking flows are estimated separately. They find that push (global) shocks affect portfolio and banking flows the most and foreign direct investment the least. Pull shocks affect each type of flows, but most strongly affect banking flows. The effects of global shocks diminish quickly. Capital controls on outflows do not change the distribution of flows, while control on inflows tend to reduce extreme inflows and outflows.

Most empirical analysis of capital flows and reserves for emerging markets relies on cross-country variation, often in panel datasets, for sufficient variation in country characteristics and policies. The ‘capital flows at risk’ approach is adaptable to the study of a single country. Quantile regressions suggest a way to estimate the risk of extreme capital outflows during global financial shocks or in response to domestic shocks and quantify the precautionary requirement for reserves. Precautionary reserve models and estimates are based on a measure of the potential portfolio capital outflows caused by adverse shocks. The outflows at risk can originate from both foreign and domestic holdings of domestic assets. Estimating the tails of a distribution of capital flows might more accurately measure the exposure that needs to be covered by reserves than balance sheet items.

One use of these regressions could be to estimate a value for setting a lower bound on precautionary reserves. Another is to estimate the effects of additional reserves on gross capital outflows and inflows in the presence of global shocks. If additional reserves reduce the risk of outflows during financial turbulence, then holding reserves in excess of the base amount needed to match outflows in the event should be beneficial. For example, Gourinchas and Obstfeld (2012) show empirical evidence that the frequency of banking crises, currency crises, and debt crises all fall with increasing reserve ratios.

In our analysis, we use time series data to estimate the probability distribution of gross cross-border flows for India using conditional quantile regressions for India. The effects of reserves on gross capital flows at the margin are estimated using interactions with financial shocks and monetary policy changes. We examine whether reserves reduce the risk of extreme capital outflows, by how much, and how these effects vary across types of flows. Muduli, Behera, and Patra (2022) have already used the approach of Gelos et al. (2022) to analyze the distribution of capital inflows over global shocks. Their dependent variables are net capital flows so that extreme outflow events should be interpreted as current account reversals. Our approach treats gross capital inflows (increases in domestic assets owned by non-residents) and gross capital outflows (decreases in domestic assets owned by non-residents) separately. This approach follows Gelos et al. (2022). Our analysis of how reserves affect gross flows over the global financial cycle is new.

### 3. Reserves and Gross Flows for India

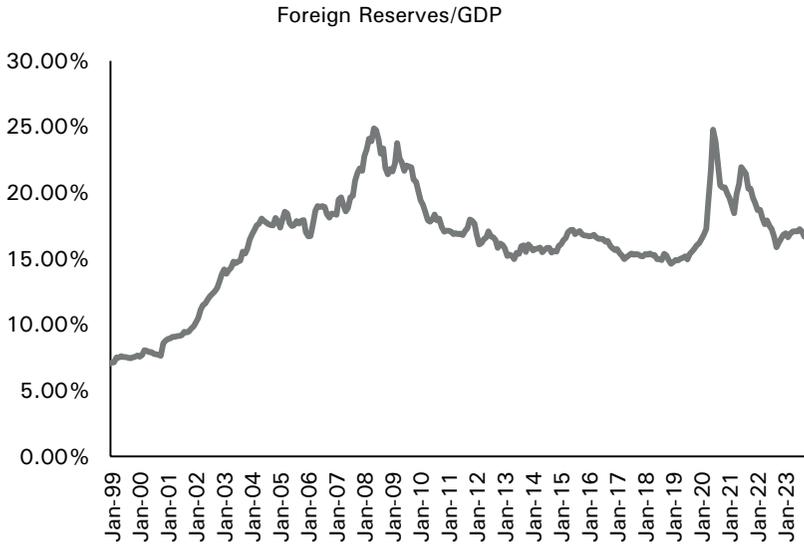
In common with many emerging market central banks, the Reserve Bank of India accumulated international reserves at a rapid pace over the first decade of the 2000s. The ratio of reserves to GDP (measured in USD) rose from about 6 percent in July 1996 to 25 percent in May 2009. India's reserve accumulation began a decade earlier following the currency crisis of early July 1991. In a speech before Parliament, the then Minister of Finance, Dr Manmohan Singh noted that India's less than \$1 billion of foreign exchange reserves barely covered two weeks of imports in mid-1991.<sup>9</sup> The steady accumulation of reserves over the 1990s appears to have been a priority for monetary policy. Following the start of the Global Financial Crisis, the ratio of reserves to GDP declined until 2013, then growing in trend with nominal output until the COVID-19 lockdown. Figure 2 depicts the trends in reserves as a share of GDP.

Gross Foreign Portfolio Inflows (FPIs) to India tend to be very responsive to the global financial cycle and have experienced large reversals during global shocks. Sudden and large outflows of capital provide a basis for the self-insurance motive for maintaining a stock of reserves. The use of precautionary reserves should result in substantial large reserve outflows in times of large FPI outflows. Between 2004 and 2024, reserves fell annually in six events during the years 2008-09, 2011, 2013, 2018, 2020, and 2021-22. Each of these can be associated with a period of global financial turbulence facing emerging markets: the GFC, the European debt crisis, the Taper Tantrum, monetary tightening by the Federal Reserve (2016-19), the COVID-19 lockdown, and the U.S. rate increases and Russian-Ukrainian War. Each of these episodes lasted from two

9. Presentation of the interim budget for 1996-97 on 28 February 1996.

to several months. Nath et al. (2024) provide detailed plots of daily foreign portfolio inflows and cumulative FPI flows, as well as time-series plots of global volatility for each episode except the start of the lockdown. The monthly data for gross capital flows are depicted in Figure 3, and the corresponding descriptive statistics are given in Table 1.

**FIGURE 2. Reserves as a Percent of GDP**



Source: RBI, IMF International Financial Statistics.

**TABLE 1. Descriptive Statistics for Monthly Capital Flows (USD Billions)**

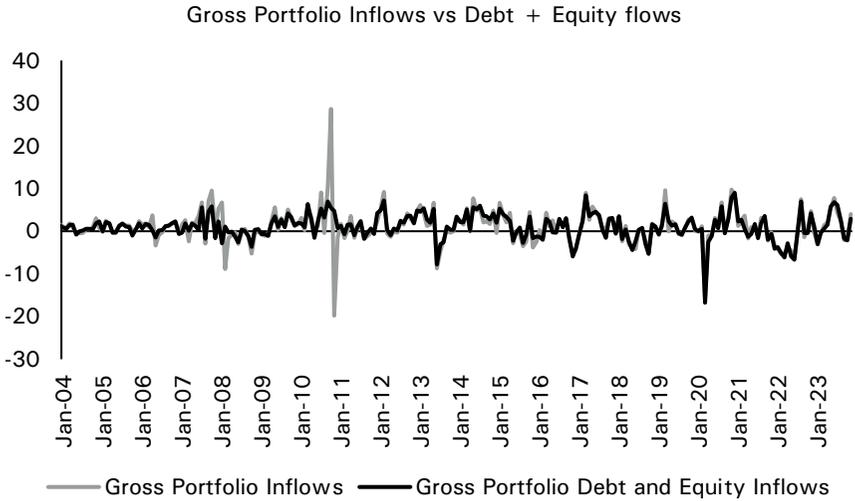
	<i>Debt Inflows</i>	<i>Equity Inflows</i>	<i>FDI Inflows</i>	<i>Gross Portfolio Inflows</i>	<i>FDI Outflows</i>	<i>Gross Portfolio Outflows</i>
Mean	0.245	0.759	2.568	1.070	0.831	0.084
Median	0.128	0.805	2.227	0.919	0.804	-0.050
Min	-8.284	-8.503	-2.159	-19.811	-0.517	-2.233
Max	4.239	8.438	18.699	28.704	3.428	2.042

Source: OECD Monthly Capital Flow Dataset.

Note: Statistics for gross inflows are for the period January–December 2023. OECD data for gross portfolio outflows are available for the period March 2011–December 2023.

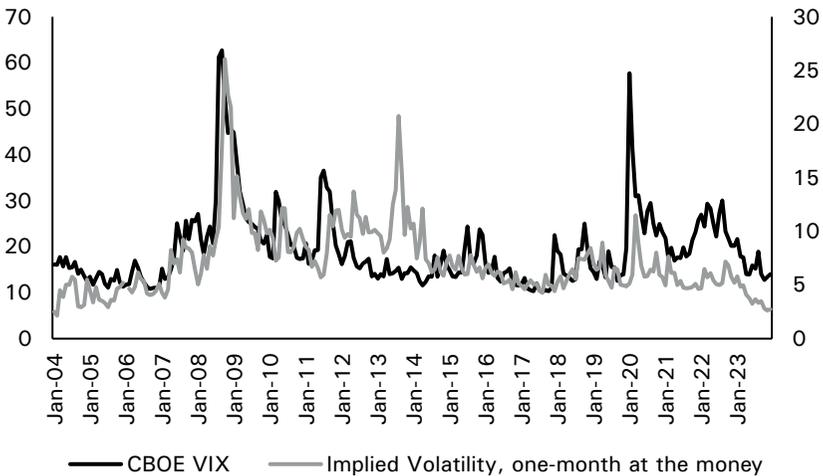
As can be seen in Table 2, around the Great Financial Crisis in 2008–2009, India experienced gross foreign capital outflow from May 2008 through March 2009, reaching a cumulative gross foreign portfolio outflow over \$24 billion. This gross flow was 7.6 percent of reserves held by the RBI in May 2008.

**FIGURE 3. Foreign Portfolio Inflows (USD Billions)**



Source: OECD Monthly Capital Flow Dataset.

**FIGURE 4. CBOE VIX and Implied Volatility Index**



Source: Federal Reserve Bank of St. Louis FRED, Bloomberg.

In the European debt crisis, FPI was negative for the months of September and October 2011. The cumulative foreign portfolio outflow was \$1.5 billion despite substantial global financial volatility.

In the Taper Tantrum, FPI flows were negative from May to November 2013. The total outflow over these six months was over \$15 billion, which was equal to 5.4 percent of reserves in May 2013. After the Federal Reserve began raising the federal funds rate, India had cumulative gross foreign portfolio outflows between April and November of 2018, reaching a peak cumulation equal to \$18 billion. Sudden outflows at the beginning of the pandemic lockdowns were \$16 billion (USD) in March 2020 alone, followed by additional foreign portfolio debt outflows in April and May. The post-pandemic increases in U.S. rates and the Russian-Ukrainian war saw monthly outflows in excess of one standard deviation from December 2021 to June 2022.<sup>10</sup> The cumulative outflow over these seven months was \$33 billion, equal to 5 percent of total initial reserves. In this event, U.S. monetary policy was reflected by a sharp rise in long-term U.S. treasury yields, absent in each of the others. As can be seen in Table 2, because of reserve accumulation, there has been a diminishment in the amount of movement in the exchange rate as measured by peak depreciation after 2008.

Shown together in Figure 4, with the exception of the Taper Tantrum (May 2013), significant financial shocks for India are global shocks. The Volatility Index (VIX) is a leading measure of global financial volatility, while the implied volatility for the rupee-dollar exchange rate by Bloomberg is a measure of the impact of global financial conditions on India. Around the great financial crisis of 2008–2009, both the local (implied volatility by Bloomberg, dark blue line) and the global (Chicago Board Options Exchange (CBOE) VIX, light blue line) proxy for uncertainty rose in concordance. In the Taper Tantrum in 2013, the Bloomberg implied volatility increases more than CBOE VIX, suggesting that India was part of an emerging market sell-off episode (Gupta and Jain 2021). In COVID, there is a reversal, with the CBOE VIX rising much more than the implied volatility, suggesting that global uncertainty dominated.

**TABLE 2. Large Gross Foreign Portfolio Outflows (in USD Billions)**

<i>Event</i>	<i>Duration</i>	<i>Cumulative Outflow (USD)</i>	<i>Fraction of Reserves</i>	<i>Peak Depreciation</i>
2008-09	14 months	\$24.4 billion	7.6%	29.6%
2011	2 months	\$1.5 billion	0.5%	9.0%
2013	6 months	\$15.7 billion	5.4%	28%
2018	7 months	\$18.1 billion	4.0%	14.5%
2020	3 months	\$18.0 billion	3.8%	6.4%
2021-22	7 months	\$33.1 billion	5.2%	6.9%

Source: Authors' calculations.

10. The standard deviation is calculated for monthly flows from January 2000 to November 2023.

Table 2 also shows that portfolio capital outflows are substantially smaller than measures of reserve adequacy for India based on short-term external debt exposure. Nearly all of India's short-term external debt is denominated in foreign currency (primarily, U.S. dollars). For the third quarter of 2023, 97 percent of short-term debt exposure, reported by the World Bank, was denominated in foreign currency. External debt payments due within 12 months at the end of March 2023 were 44 percent of reserves, and original maturity short-term debt at the end of March 2023 was 22.2 percent of reserves (Government of India 2023). The residual value exceeded a year's amortization of debt by more than 100 percent. The ratio of India's reserves at the end of the third quarter of 2023 to imports over the quarter also exceeded the traditional target by 3.4 times. Reserves were 21 percent of broad money (M3). These are depicted in Figures C.1, C.2, and C.3 in Appendix C. For 2023 and 2024, the ratio of Reserves to the ARA metric has been 1.14.<sup>11</sup>

Central banks use reserves to intervene in the foreign exchange market. One purpose of central bank intervention is to stabilize the level of the exchange rate or its rate of change. The bank may seek to reduce the impact of market volatility on the exchange rate or resist trends toward appreciation or depreciation. It may be "leaning against the wind" or acting as a mercantilist, trying to gain or maintain export competitiveness. Moving a market-clearing exchange rate necessitates changing the money supply, which is achieved by unsterilized intervention.

A second motive for intervention arises when the exchange market faces a liquidity constraint. The central bank can supply foreign or domestic currency to ease liquidity shortages in the spot or forward market through sterilized interventions. Du, Tepper, and Verdelhan (2018) demonstrate that deviations from covered interest parity are common in forward markets for EME currencies. Sterilized intervention can provide resources for private party arbitrage in these markets. Central banks will realize carry trade returns on their positions, which can be positive or negative.

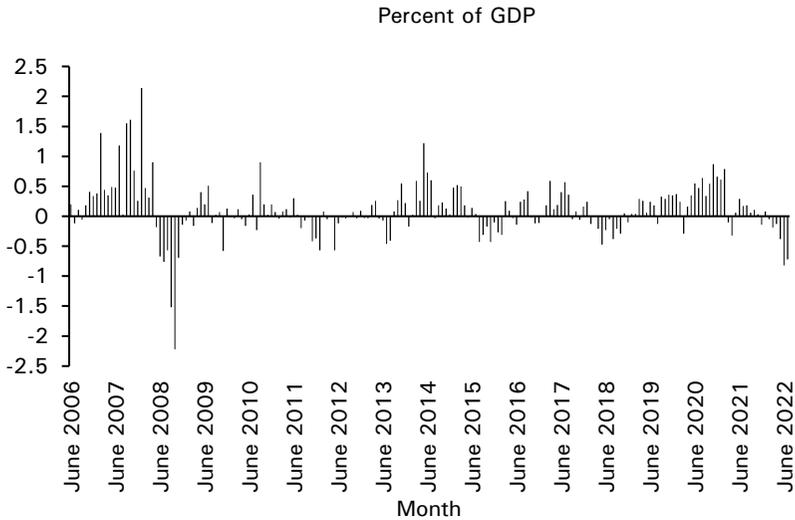
The Reserve Bank frequently intervenes in spot and forward exchange markets, including the non-deliverable forward offshore market. The non-deliverable forward markets are most active in the currencies that cannot be delivered offshore due to capital controls. RBI intervention in the NDF market provides necessary liquidity in the rupee and accommodates arbitrage.

---

11. The IMF considers the INR-dollar exchange rate to have been relatively tightly managed by the RBI, and therefore considers India closer to a fixed exchange rate regime, which lowers the adequacy rate of reserves under the ARA metric as compared to what would be considered adequate if the exchange rate regime were floating.

A new IMF database<sup>12</sup> provides monthly estimates of foreign exchange intervention by 122 central banks, including the RBI. Adler et al. (2024) document the construction of a broad proxy for foreign exchange intervention that provides a comprehensive measure of foreign exchange intervention based on a precise definition of exchange intervention.<sup>13</sup> It includes an indicator showing whether the monthly intervention was fully sterilized or not fully sterilized. The sterilization indicator is reported for June 2006 through July 2022. For this period, fully sterilized intervention is reported for 153 months out of 194 months. The absolute value of monthly interventions over this period has a mean of 0.31 percent of GDP and standard deviation of 0.34. Interventions during the GFC were very large, reaching a maximum of 2.22 percent of GDP in October 2008. Monthly intervention as a percentage of a three-year moving average of annual GDP for India is shown in Figure 5. Interventions classified as not fully sterilized are shown in Figure 6, which shows that unsterilized interventions are clustered and mostly occur around the GFC.

**FIGURE 5. Foreign Exchange Intervention (Monthly)**



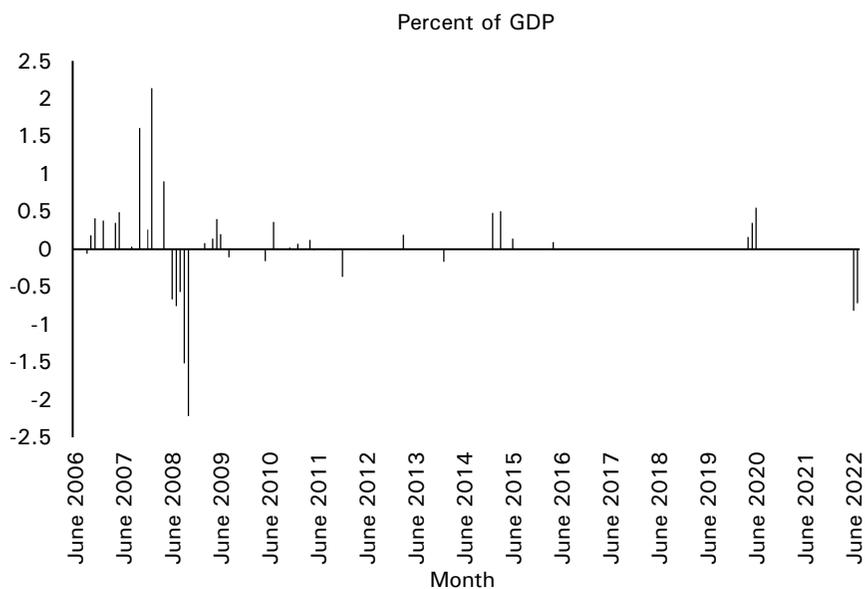
Source: IMF, Foreign Exchange Intervention Data and Proxies.

12. <https://www.imf.org/en/Publications/WP/Issues/2021/02/19/Foreign-Exchange-Intervention-A-Dataset-of-Public-Data-and-Proxies-50017>.

13. The broad proxy measures active central bank intervention in spot and derivative markets that change its foreign currency position. It does not include passive changes (valuation effects and investment income) or offsetting spot and forward positions. It includes unpublished confidential reports of central bank activities vis-à-vis non-residents and residents reported to the IMF but not published. For more details, see Adler et al. (2024).

The duration and depth of extreme FPI outflows is informative, but it does not seem to be a good guide for reserve adequacy. In particular, gross capital flows are conditional on policy responses and the stock of reserves in place. Additional reserves on hand may reduce the vulnerability of the economy to extreme FPI outflows caused by either global or domestic shocks. Using quantile regressions, the next section provides an empirical analysis of this effect of precautionary reserves.

**FIGURE 6. Not Fully Sterilized FX Intervention (Monthly)**



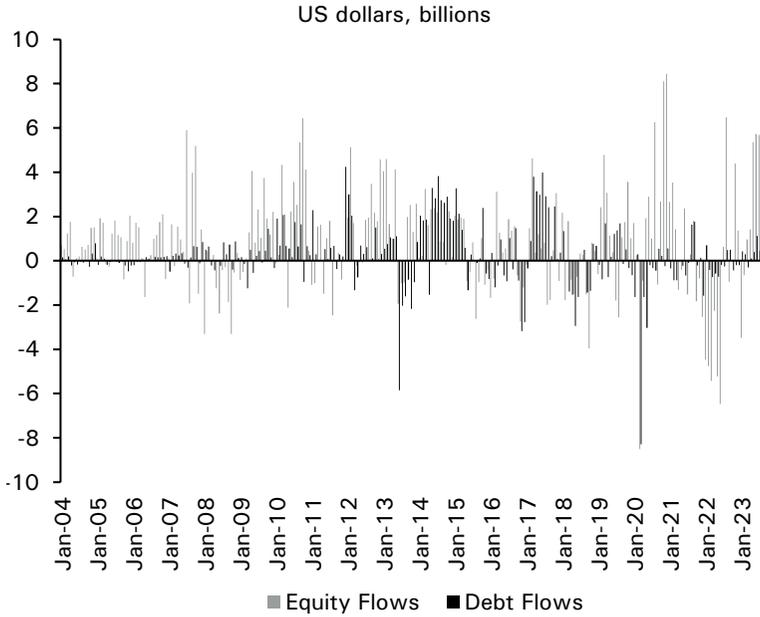
Source: IMF, Foreign Exchange Intervention Data and Proxies.

#### 4. Quantitative Analysis

In this section, following Gelos et al. (2022) and Muduli, Behera, and Patra (2022), we estimate the empirical distribution function of capital flows in India using a quantile regression approach. The main advantage of using quantile regressions is that one can model the entire conditional distribution of the dependent variable, thereby allowing the effects of the co-variates to differ across quantiles. Based on the estimated conditional distribution, the risks to capital flows can then be quantified by estimating the size of outflows for a given quantile (e.g., 5 percent). The key departure from Gelos et al. (2022) and Muduli, Behera, and Patra (2022) in our paper is that we analyze the role

that foreign exchange reserves have for mitigating portfolio capital outflows at different quantiles. Given the current level of reserves, we are able to quantify the benefit of having more foreign exchange reserves.

**FIGURE 7. Equity versus Debt Capital Flows India**



Source: OECD Monthly Capital Flow Dataset.

While a large literature has concentrated on net capital flows,<sup>14</sup> following Gelos et al. (2022), we use gross capital flows. More specifically, we use “non-resident” portfolio (debt and equity) inflows as our proxy for gross capital flows. We obtain gross portfolio debt and equity inflows (in USD) for India from the OECD Monthly Capital Flows Dataset (De Crescenzo and Lepers, 2024). Figure 7 plots portfolio equity (gray line) and debt capital flows (black line) into India between January 2004 to September 2023.<sup>15</sup> As pointed out in Gelos et al. (2022), non-resident portfolio inflows are the most volatile component of capital flows (compared to banking flows and FDI flows), and sensitive to

14. See Footnote 3. Net capital flows are defined as the difference between in gross capital flows, i.e., the net purchases of domestic assets by foreign agents minus the net purchases of domestic assets by foreign agents.

15. See Footnote 3. Gross inflows are net sales of domestic financial instruments to foreign residents. Gross capital inflows arise when the economy incurs more external liabilities (inflows with a positive sign) or the economy reduces its external liabilities (inflows with a negative sign) See Mehigan (2018).

external factors.<sup>16</sup> Hence, gross inflows are salient when it comes to financial stability considerations.<sup>17</sup>

More formally, for quantile  $q \in (0,1)$ , the quantile regression can be represented as

$$y_{t+h}^q = \beta_q X_t + \varepsilon_t^q \quad (1)$$

with horizon  $h$  and with the error term  $\varepsilon \sim N(0, \sigma)$ . The variable,  $y_t$ , refers to capital flows (total portfolio, debt, or equity inflows) and  $X_t$  is a set of covariates. From the quantile regressions, we generate empirical forward-looking probability density functions of capital flows. Following Adrian et al. (2019) and Gelos et al. (2022, p. 4), we fit a skewed t-distribution to the empirical distribution of predicted future flows. Azzalini and Capitanio (2003) provide the following skewed t-distribution:

$$f(y; \mu, \sigma, \vartheta) = \frac{2}{\sigma} \left( \frac{y-\mu}{\sigma}; \vartheta \right) T \left( \theta \frac{y-\mu}{\sigma} \sqrt{\frac{\vartheta+1}{\vartheta+\frac{y-\mu}{\sigma}}}; \vartheta + 1 \right) \quad (2)$$

with four parameters: the mean ( $\mu$ ), the standard deviation ( $\sigma$ ), skewness ( $\alpha$ ) and kurtosis ( $\nu$ ) and where  $dT(\cdot)$  and  $T(\cdot)$  denote the probability density functions and cumulative density function of the skewed t-distribution. Because of the flexibility of the skewed t-distribution, it allows one to be agnostic about the shape of the distribution of future flows.<sup>18</sup>

#### 4.1. Discussion of Data

Our analysis considers several covariates that seek to capture the effects of global (push) factors and domestic (pull) factors. A detailed listing of the data and sources are in Appendix A.<sup>19</sup> Global factors include global financial uncertainty, global monetary shocks, and foreign real output growth. The policy

16. Between January 2004 and September 2023, the coefficient of variation of equity flows is 2.96, for debt is 5.80, as compared to 0.77 for FDI.

17. Gross foreign portfolio inflows respond most sharply to financial shocks and display much greater volatility than foreign direct investment flows. For India, gross domestic portfolio outflows are restricted by capital flow management measures and are dominated by portfolio equity outflows. These are small and do not quantitatively influence the demand for precautionary reserves. In comparison to middle-income emerging markets, capital flight and retrenchment do not feature in the Indian response to global shocks.

18. See Gelos et al. (2022) for details. See Eguren Martin et al. (2021) for a discussion of bootstrapping standard errors, which provide Heteroskedasticity- and Autocorrelation-Consistent (HAC) standard errors for quantile regression coefficient estimators. See also Fitzenberger (1998).

19. The list of co-variates that we use in our analysis are: CBOE VIX (FRED); Term Premium India (10-year yield, Bloomberg, minus WACR, RBI); India – US Spread (WACR – Fed Funds Rate, FRED); India – US Growth Differential (Monthly GDP Data, IFS Interpolated minus Brave Butters Kelly); Reserves/GDP lagged; and the interaction terms: (a) VIX \* Reserves/GDP (lagged) (b) Spread \* Reserves/GDP (lagged); (c) India Term Premium \* Reserves/GDP (lagged). (See Appendix A).

variables for India include the RBI's policy interest rate, the term premium on 10-year G SEC bonds, and the stock of international reserves. Global financial conditions are measured by the CBOE VIX, which is highly correlated with contemporaneous foreign portfolio flows for India in monthly data, but lagged observations do not. Although there may well be lagged effects of the news contained in the VIX at a daily frequency, portfolio capital flows accumulated over the month suggest that uncertainty shocks are absorbed quickly. We, therefore, treat this index as a contemporaneous exogenous shock.

Our regressions use the spread between the RBI policy rate, measured by the Weighted Average Call Rate (WACR), and the U.S. Federal Funds Rate. This is lagged to account for the possible endogeneity of the call rate, as is the term premium for the 10-year G SEC over the WACR. The differential between real GDP growth rate for India and the U.S. is lagged by three months.

The regressors of interest measure the stock of reserves held by the RBI before the month over which portfolio capital flows are measured. These are a state variable determined by past reserve management policy actions. Because current changes in reserves (a flow) are policy choices that respond to foreign portfolio flows, reserves are lagged to account for reverse causality. In the reported results, reserves are lagged by a quarter so that the stock is measured three months before the first day of the month of capital flows used in the dependent variable.

In the main analysis, reserves are measured in US dollars, as reported by the RBI. USD denominated assets comprise the majority of reserves held. Using reserves denominated in foreign currency avoids including valuation effects due to conversion to rupees. Reserves in USD are scaled by nominal GDP for India. Nominal GDP in rupees is reported quarterly. Quarterly figures are linearly interpolated to monthly and converted to dollars using the average monthly rupee to dollar exchange rate. This is an imperfect solution to retain monthly variation in foreign portfolio flows and foreign reserves. To alleviate the problem of noise introduced by the exchange rate, we also report regressions using an alternative measure of reserves denominated in rupees divided by broad money (M3), reported monthly by the RBI. The drawback of the ratio of reserves to M3 is that the numerator is converted from foreign currency into rupees and includes valuation changes in reserves. The results using M3 are qualitatively similar and are reported in Appendix B (Table B2).

In sum, explanatory variables used in all the analysis are VIX, the term premium for India, the India-US policy interest rate spread, the India-US growth rate differential, and the reserves-to-GDP ratio. Reserves are included in alternative specifications as the reserves-to-GDP ratio, reserves to GDP interacted with the VIX, reserves to GDP interacted with the interest rate spread, and reserves to GDP interacted with the India term premium. In Appendix B, we show robustness with a six-month lag on reserves to GDP (Table B1).

The time period for the analysis is January 2004 through September 2023. The start date has been chosen to avoid the effects of major relaxations of capital controls. The rapid accumulation of foreign reserves as a share of GDP from the beginning of 2000 to the end of 2003 is correlated with a high growth rate of foreign portfolio inflows, with a 48 percent correlation. Including these trends would bias results in favor of our hypothesis. Thus, we excluded this period as well.

#### 4.2. Empirical Results

The results of regressions of Equation (1) include quantile regressions and a linear regression for different measures of the effect of the stock of reserves (lagged three months) on foreign portfolio flows.<sup>20</sup> Our baseline case regresses total FPI flows on the VIX, the term premium for India (India 10-year G-Sec–WACR), the India-US interest rate spread (India WACR–US Fed Funds Rate), the India-US monthly real GDP growth differential, and the reserves-to-GDP ratio lagged three months.<sup>21</sup> The results of the baseline quantile regression in Equation (1) are shown in Figure 8 and Table 3. In the figure of coefficient plots across quantiles, the black dotted line shows the estimated coefficient, and the shaded region indicates the 95 percent confidence interval. The solid gray line shows the coefficient estimate for the linear regression for means and the dotted gray lines indicate its 95 percent confidence interval.<sup>22</sup>

The global uncertainty shock, VIX, impacts FPI inflows into India negatively, and is statistically significant at all but the highest quantiles and shows that the risk of FPI outflows due to a rise in global uncertainty (VIX) is particularly strong in bad states of the world. As can be seen from Table 3, the coefficients for the ratio of reserves to GDP, lagged one quarter (three months), are positive and significant at the 0.05 quantile, the median, and the mean. These suggest that a larger prior stock of reserves increases foreign portfolio inflows unambiguously. In the presence of an adverse global shock, pre-existing reserves reduce capital flow reversals (events in the left tail of the distribution of flows). As can be seen in the coefficient plots for the ratio of reserves to GDP across quantiles in Figure 8, the coefficient on foreign reserves is positive and statistically significant at the lower quantiles.

---

20. Our regression results are robust to the exclusion of gold in reserves. We, therefore, run all quantile regressions on aggregate reserves as in Figure 1.

21. See Camara, Christiano, and Dalgic (2024) for a small open economy DSGE model that models the effects of US monetary contractions on non-US countries. Since US GDP data are available on a quarterly basis, they use monthly data by multivariate interpolation.

22. The term premium for India and the India-US interest rate spread are lagged by one month. The India-US monthly real GDP growth differential is lagged by three months. This is applicable for all regressions in this section.

**TABLE 3. Baseline Regression Results**

<i>Dependent Variable: Debt and Equity Flows</i>	<i>0.05 Quantile Regression</i>	<i>Median Regression</i>	<i>Mean Regression</i>
VIX	-0.327*** (0.058)	-0.117*** (0.027)	-0.153*** (0.026)
India 10-year term premium	-0.168 (0.270)	0.225 (0.186797)	0.090 (0.177)
India-US policy spread	-0.035 (0.159)	0.328*** (0.106)	0.245** (0.100)
India-US growth diff.	-0.021 (0.0208)	0.0216* (0.013)	0.029** (0.012)
Reserves/GDP	3.140*** (0.759)	1.450** (0.707)	1.767*** (0.669)
Constant	-4.950** (2.290)	-2.318 (1.736)	-1.995 (1.643)
Number of observations = 237		Adj R-squared = 0.133	

Source: Data sources are listed in Appendix A.

Note: Reserves/GDP are lagged three months. Standard errors in parentheses. \*, \*\*, \*\*\* refer to significance at 10, 5, and 1 percent levels, respectively.

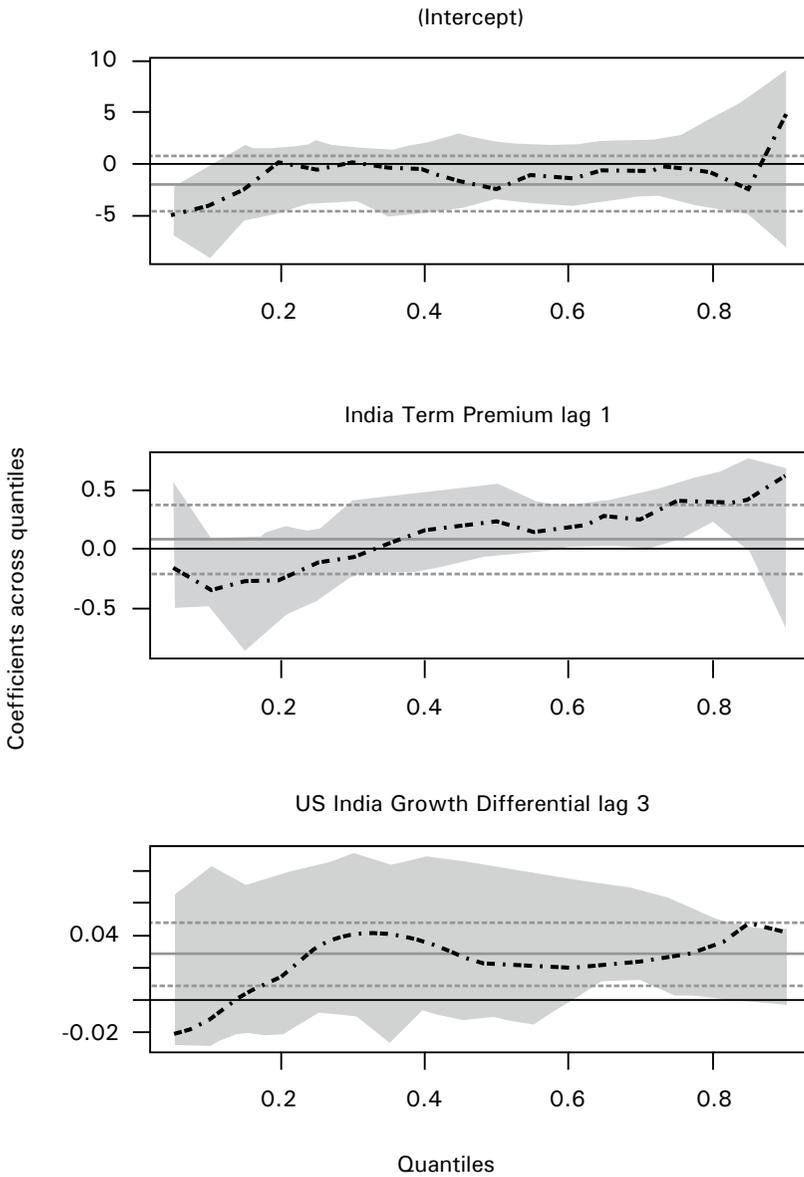
Table 3 shows that a larger stock of reserves relative to GDP lagged by one quarter reduces mean and median gross foreign portfolio inflows and has a stronger effect in left tail events. Prior holdings of reserves may positively influence capital inflows by signaling the capacity of the RBI to address capital outflows. By lagging this variable, we try to avoid conflating the accumulation of reserves from capital outflows with this role. For robustness, Table B.1 in Appendix B reports these regressions using the ratio of reserves to GDP lagged 6 months. The estimated coefficient on Reserves/GDP is very similar and remains significant at the 1 percent level for the 0.05 quantile regression.<sup>23</sup> Table B.2 in Appendix B reports the baseline regression replacing GDP as the denominator for reserves with broad money. The coefficient on Reserves/M3 lagged three months remains positive and significant at the 1 percent level.

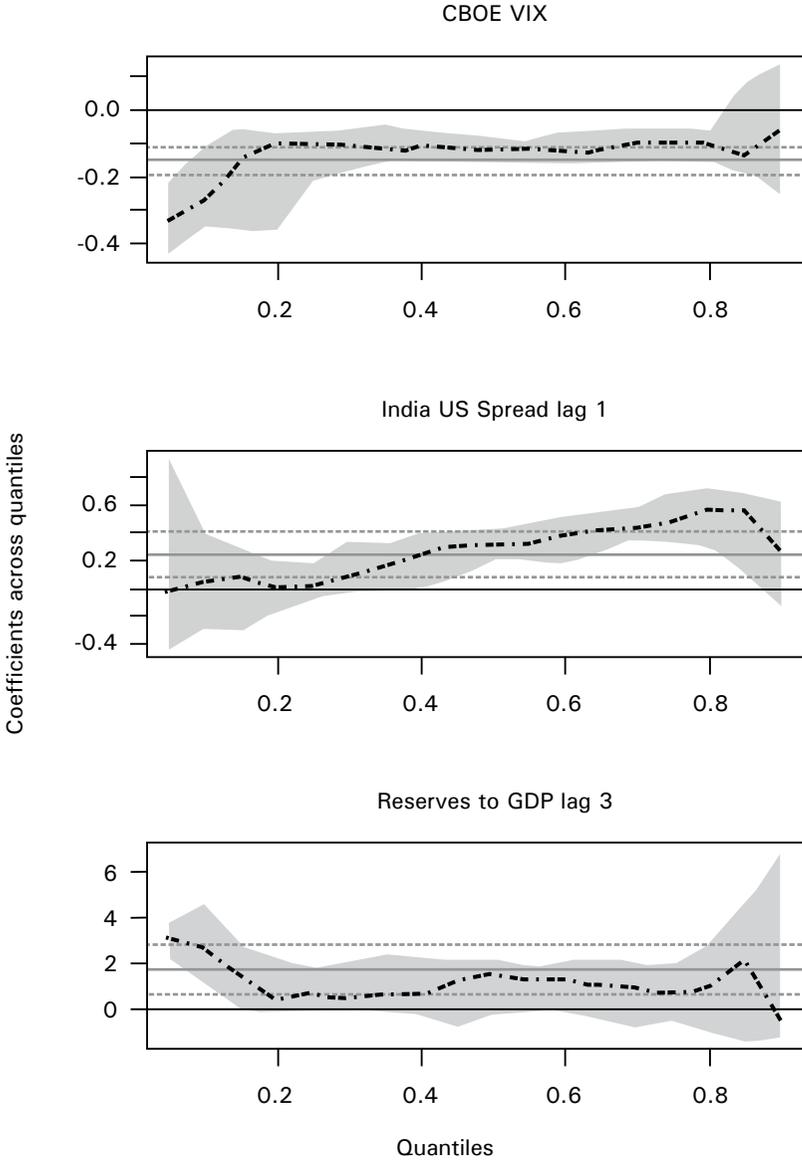
Figures B.1(a)–B.1(d) in Appendix B plot the empirical conditional density functions based on the quantile regression when VIX, the term premium, the interest rate spread, and the growth rate are shocked by one standard deviation.<sup>24</sup> In Figure B.1(a), a shock to global uncertainty, represented by a shock to VIX, shows that the conditional distribution of gross portfolio flows shifts to the left, with a fall in median flows. As seen in Figure B.1(a), the probability of (negative)

23. The mean estimate remains significant but at the 5 percent level.

24. Our use of the predicted empirical distributions is similar to Muduli, Behera, and Patra (2022).

**FIGURE 8. Baseline Quantile Regression Results—Dependent Variable = Gross FPI Flows**





Source: Authors' estimates; data described in Appendix A.

outflows in the lower quantiles increases. The probability of (positive) inflows in the upper quantiles falls.

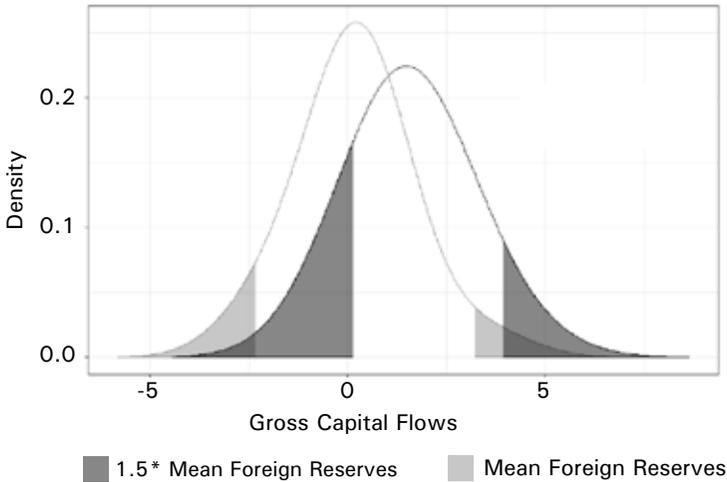
In contrast, a shock to the India term premium in Figure B.1(b), which corresponds to an increase in the steepness of the Indian yield curve (difference between the Indian 10-year G-Sec and the WACR) does not display a discernible impact on gross capital flows either at the tails or the median. However, a shock to the India-US rate spread (e.g., tightening of Indian monetary policy or loosening of US monetary policy), as seen in Figure B.1(c), leads to a small increase in median inflows. This is intuitive as a higher spread makes rupee-denominated debt instruments more attractive relative to the US. This shows up in a slight rightward shift in the empirical density function for gross flows. The probability of (positive) inflows in the upper quantiles (right tail) also increase.

Surprisingly, a shock to the India-US real GDP growth differential has no discernible effect on gross flows either at the median or the tails, though it has a small positive and significant coefficient in the mean regression.

We consider the counterfactual of a larger pre-determined stock of reserves. The counterfactual increases reserves by an amount equal to 50 percent of mean reserves over the sample. This increase approximates the reduction in the IMF reserve adequacy ratio made in 2023.<sup>25</sup> A larger stock of reserves as a share of GDP leads to a large rightward shift in the conditional distribution of gross flows, as seen in Figure 9 for an increase of 50 percent times over the sample mean ratio. While the probability of positive inflows increases, there is large reduction in the probability of large negative flows (outflows). What we take away from this exercise is that foreign exchange reserves play a significant role in shifting the empirical distribution of gross flows wherein the probability of large (negative) outflows is substantially reduced. At the 0.01 quantile (a bad shock), a 50 percent increase in mean reserves reduces the estimated FPI reversal in an event that occurs once every 8.33 months, rising from \$3.7 billion to \$1.3 billion each month. This represents a reduction in the sudden outflow of FPI by about 60 percent in extreme events.

---

25. We do not use a moment from the time series of reserves, such as the standard deviation, as we do for the VIX and other global shocks because changes in reserves about their trend reflect valuation changes, foreign exchange interventions, and fluctuations in capital flows. The counterfactual for reserves considers a different policy and not the effects of shocks on reserves.

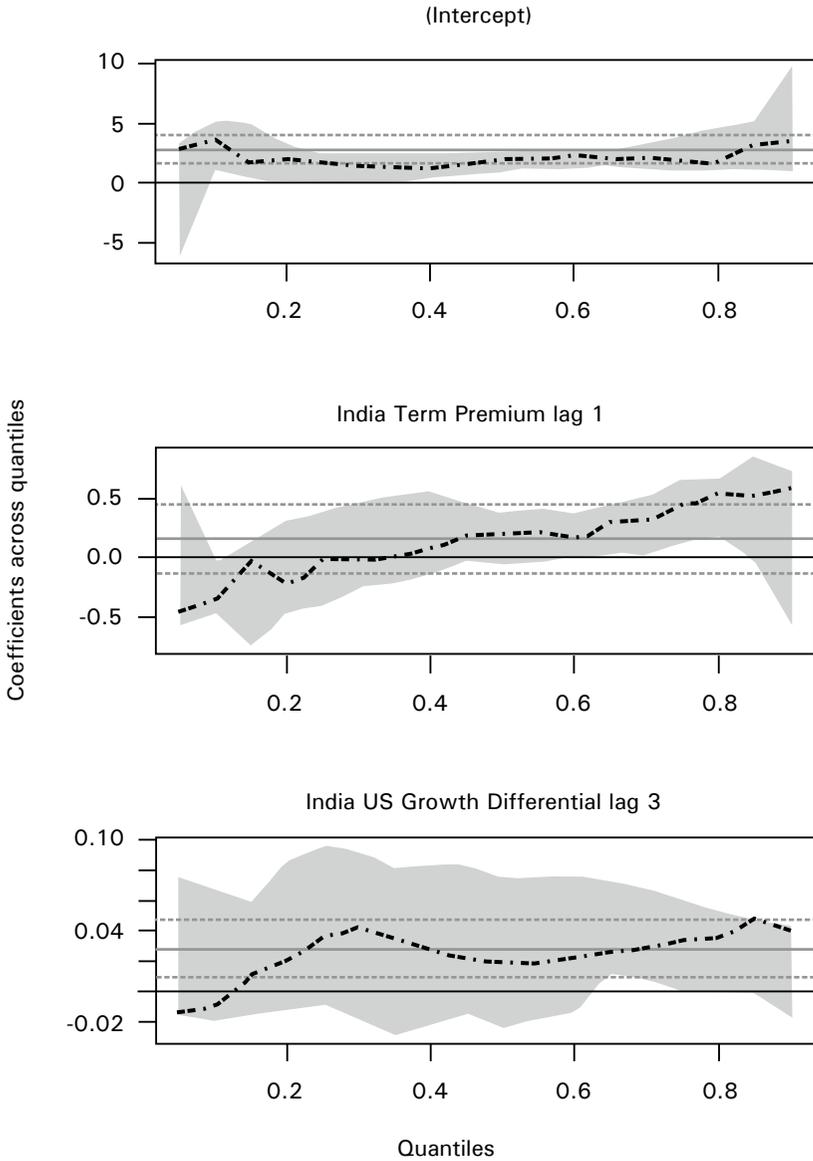
**FIGURE 9. An Increase in Reserves: Pre- and Post-Predicted Distributions**

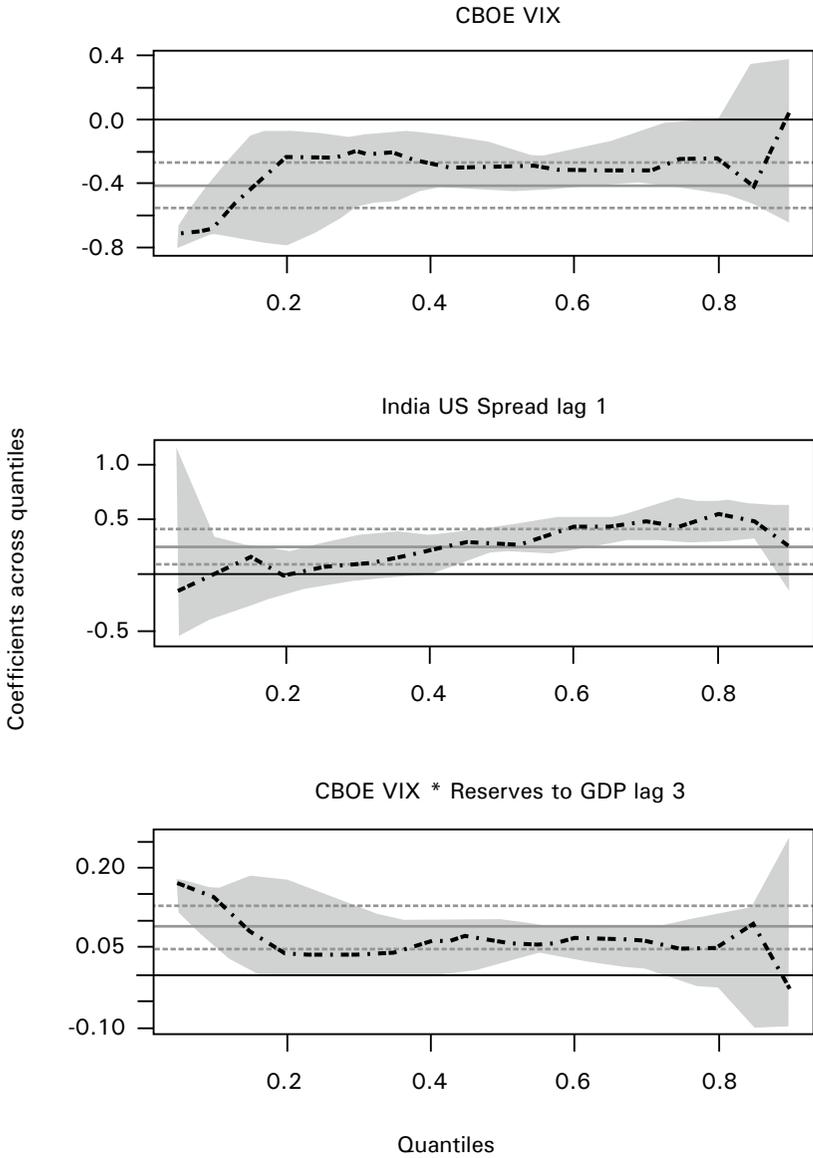
Source: Authors' estimates; data described in Appendix A.

When we estimate the quantile regression in Equation (1) by replacing reserves to GDP with an interaction variable that interacts VIX with reserves to GDP (lagged three months), we see that global uncertainty continues to have a negative and significant effect on gross portfolio flows into India. These impacts are smaller at the lower quantiles as compared to Figure 8 where there is no interaction and the ratio of reserves to GDP is a standalone independent variable. The regression results in Table 4 show that the interaction of VIX with reserves has positive significant effects on inflows at the 0.05 quantile, median, and mean.

The plots of the coefficients across quantiles of the quantile regressions for gross portfolio inflows with reserves interacting with VIX are displayed in Figure 10. Table 4 shows the regression results for the 0.05 quantile, median, and mean of foreign capital inflows. The coefficient on the interaction variable is significant with a positive sign in the lower quantiles suggesting that reserves counter the negative effects of VIX on outflows against adverse shocks. Figure 11 shows the effect of our counterfactual that the reserves to GDP ratio is 50 percent greater than its mean (a multiple of 1.5). This leads to a predicted 120 percent increase in median monthly inflows (by \$1.1 billion per month over the sample median of \$0.9 billion per month (Table 1)), and a substantial reduction in the probability of large (negative) outflows in the left tail of the distribution. Negative foreign portfolio inflows at the 0.01 quantile fall by 75 percent from \$4.0 billion to \$1.1 billion per month.

**FIGURE 10. Quantile Regression Results - Dependent Variable = Gross FPI Flows. Reserves Interacted with VIX**





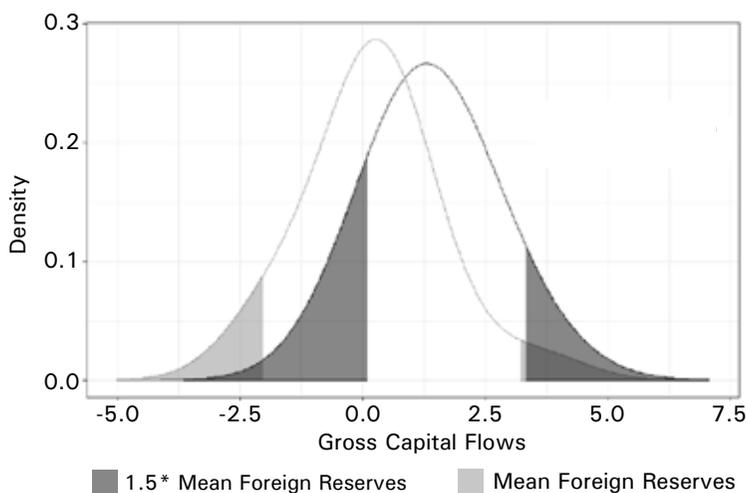
Source: Authors' estimates; data described in Appendix A.

**TABLE 4. Interaction of VIX with Reserves Regression Results**

<i>Dependent Variable: Debt and Equity Flows</i>	<i>0.05 Quantile Regression</i>	<i>Median Regression</i>	<i>Mean Regression</i>
VIX	-0.713*** (0.098)	-0.283*** (0.089)	-0.408*** (0.085)
India 10-year term premium	-0.450** (0.224)	0.195 (0.179)	0.160 (0.172)
India-US policy spread	-0.140 (0.166)	0.267** (0.103)	0.246** (0.098)
India-US growth diff	-0.014 (0.020)	0.020 (0.013)	0.028** (0.012)
VIX*Reserves/GDP	0.167*** (0.031)	0.059** (0.026)	0.0901*** (0.025)
Constant	2.98*** (0.937)	2.019** (0.789)	2.800*** (0.755)
Number of observations = 237		Adj R-squared = 0.153	

Source: Data sources are listed in Appendix A.

Note: Standard errors in parentheses. \*, \*\*, \*\*\* refer to significance at 10, 5, and 1 percent levels, respectively.

**FIGURE 11. Interaction of Reserves and VIX: Pre- and Post-Predicted Distributions for an Increase in Reserves**

Source: Authors' estimates; data described in Appendix A.

We next consider interactions between the India-US interest rate spread and ratio of reserves to GDP using portfolio debt and equity flows separately. The coefficient estimates on debt flows for the 0.05 quantile, median, and mean regressions are given in Table 5. The interaction of lagged reserves to GDP with the monetary policy rate differential leads to an increase in foreign portfolio debt inflows in the 0.05 quantile and at the mean. The absence of an effect on a higher prior stock of reserves on debt inflows at the median suggests that the positive effect in the mean regression depends on outliers. Reserves tend to alleviate gross foreign debt inflow reversals. The quantile coefficient estimates for this interaction is shown for gross portfolio debt flows in Figure 12. A shock to the difference between policy rates displays a negative effect by increasing debt outflows in the left tail, and a positive effect on debt inflows on the right tail. This suggests that an increase in the policy rate by India for a constant U.S. Fed Funds Rate raises the volatility of portfolio debt inflows. Figure 13 shows that the coefficient for the interaction term (the India-US spread times reserves to GDP) is positive and statistically significant for low quantiles (negative debt inflows). This means that an increase in reserves reduces the incidence of portfolio debt outflows in the presence of a positive shock to the spread of the WACR over the U.S. Federal Funds Rate.

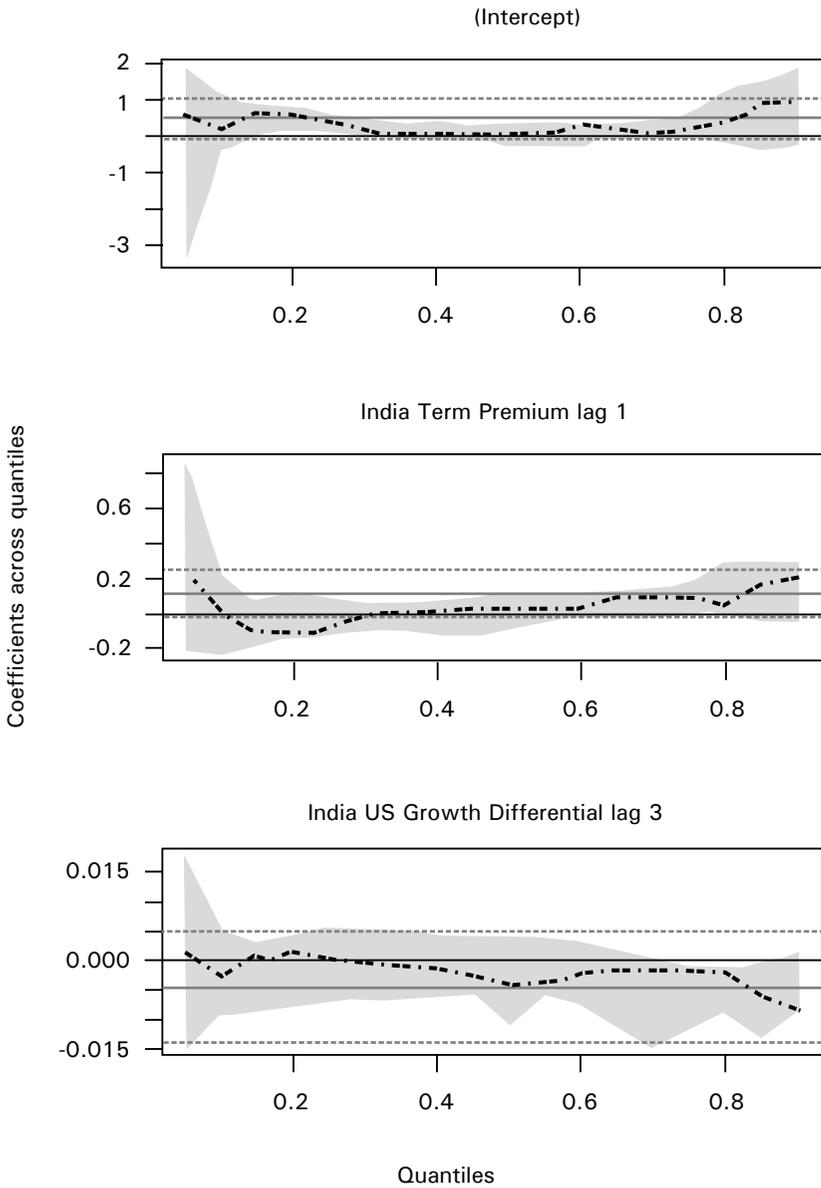
**TABLE 5. Interaction of India-US Policy Interest Rate with Reserves Regression Results – Debt Flows**

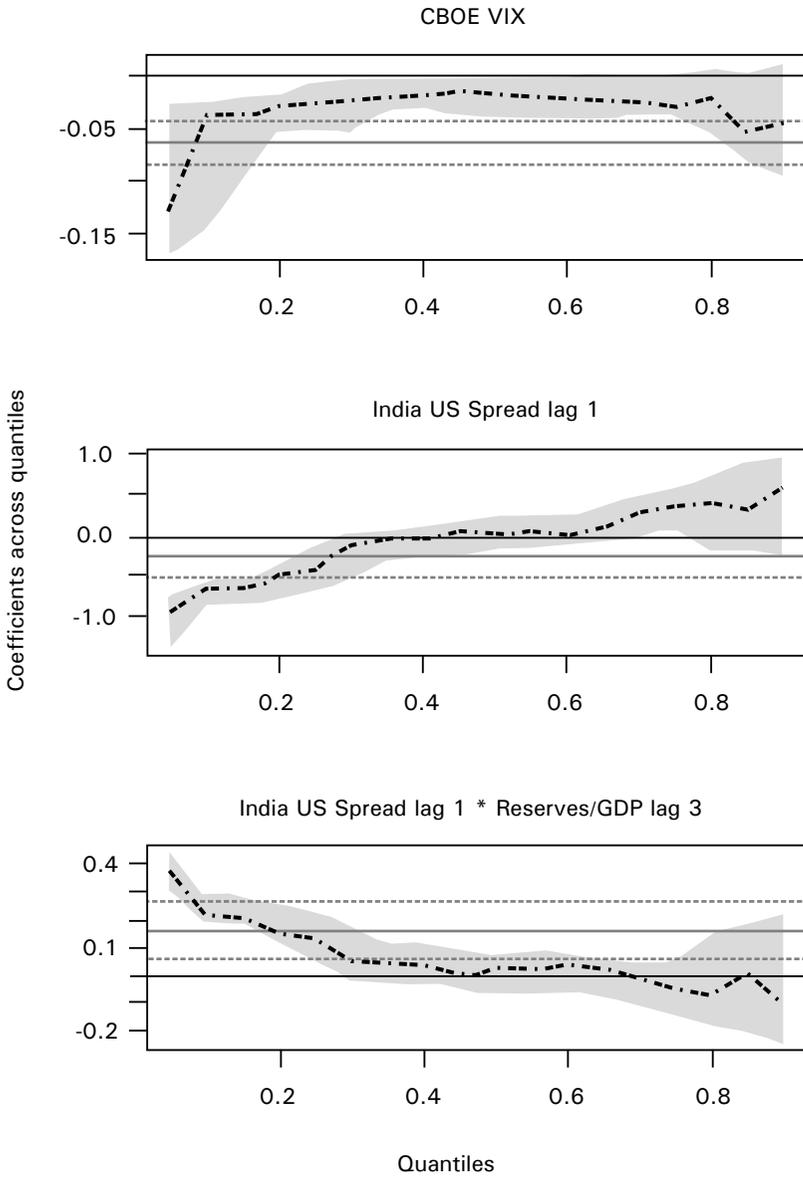
<i>Dependent Variable: Debt Flows</i>	<i>0.05 Quantile Regression</i>	<i>Median Regression</i>	<i>Mean Regression</i>
VIX	-0.127*** (0.038)	-0.017 (0.011)	-0.062*** (0.013)
India 10-year term premium	0.252* (0.149)	0.030 (0.068)	0.120 (0.080)
India-US policy spread	-0.938*** (0.177)	0.024 (0.130)	-0.254* (0.154)
India-US growth diff	0.001 (0.005)	-0.004 (0.014)	-0.004 (0.006)
Interest spread* Reserves/GDP	0.374*** (0.066)	0.027 (0.054)	0.170*** (0.063)
Constant	0.535 (0.440)	0.113 (0.292)	0.501 (0.345)
Number of observations = 237		Adj R-squared = 0.101	

Source: Data sources are listed in Appendix A.

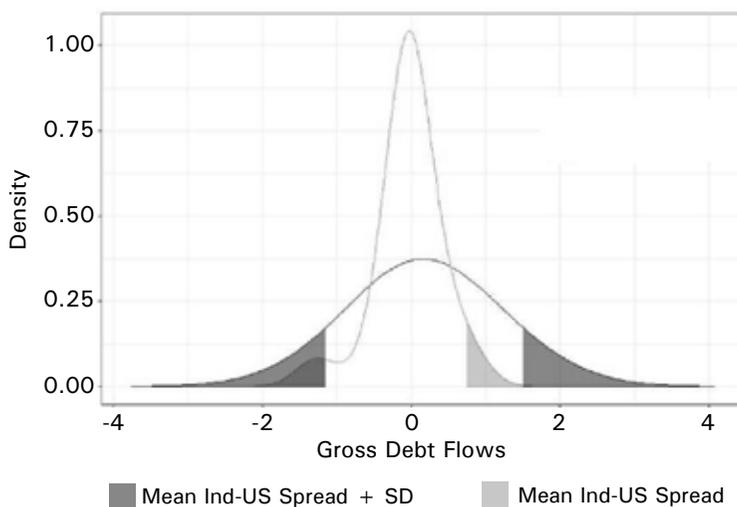
Note: Standard errors in parentheses. \*, \*\*, \*\*\* refer to significance at 10, 5, and 1 percent levels, respectively.

**FIGURE 12. Quantile Regression Results - Dependent Variable = Debt Flows Reserves Interacted with India-US Spread**





Source: Authors' estimates; data described in Appendix A.

**FIGURE 13. Interaction of Reserves and India-US Spread: Pre- and Post-Predicted Distributions for a Shock to India-US Spread**

Source: Authors' estimates; data described in Appendix A.

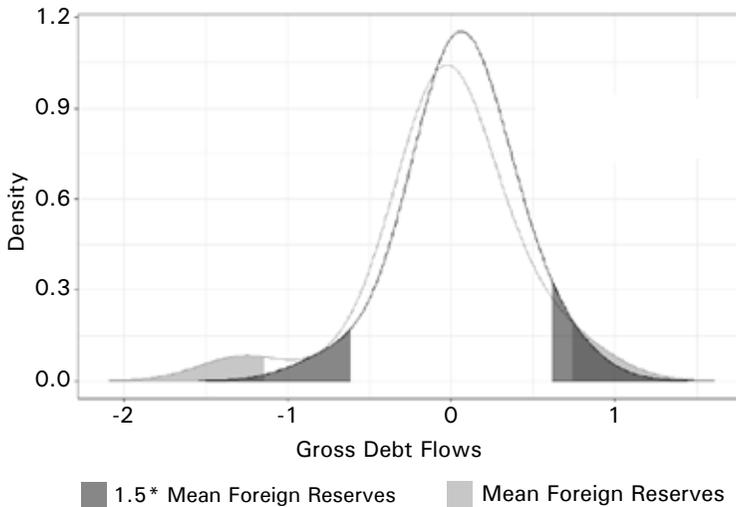
The effect of a shock to the India-US interest rate spread on the probability distribution of gross debt inflows is shown in Figure 13. When shocks lead to negative debt flows, relative monetary tightening increases outflows. These are typically events in which global shocks are negative, and the U.S. tends to reduce the Fed Funds Rate. Increases in global uncertainty are associated with retrenchment of capital flows back to the U.S. Conversely, in events in which portfolio debt inflows to emerging markets are high, increases in the WACR relative to the Fed Funds Rate should mitigate these inflows.

Figure 14 shows that the counterfactual of increasing lagged reserves by 50 percent tends to reduce the volatility of foreign portfolio debt flows in response to relative tightening of monetary policy for India vis-à-vis the U.S. Both tails contract towards the median, compressing the distribution. Large debt outflows in bad times are reduced and sharp debt inflows in good times are also reduced. Increases in reserves stabilize portfolio debt inflows. Portfolio debt outflows at the 0.01 quantile fall from \$2.4 billion to \$1.8 billion.

The effects on gross portfolio equity flows of the interaction effects between the India-US interest rate spread and the reserves to GDP ratio are reported in Table 6 and Figure 15. The coefficient for the interaction term for the spread with-reserves to GDP is significant at the 0.05 quantile, but not at either the mean or the median. The regression confirms the intuition that debt flows are more sensitive to relative policy rate changes than equity inflows, but reserves

tend to reduce gross equity inflow reversals. VIX is significant for both portfolio equity and debt inflows at low quantiles and the mean.

**FIGURE 14. Interaction of Reserves and India-US Spread: Pre- and Post-Predicted Distributions for an Increase in Reserves**



Source: Authors' estimates; data described in Appendix A.

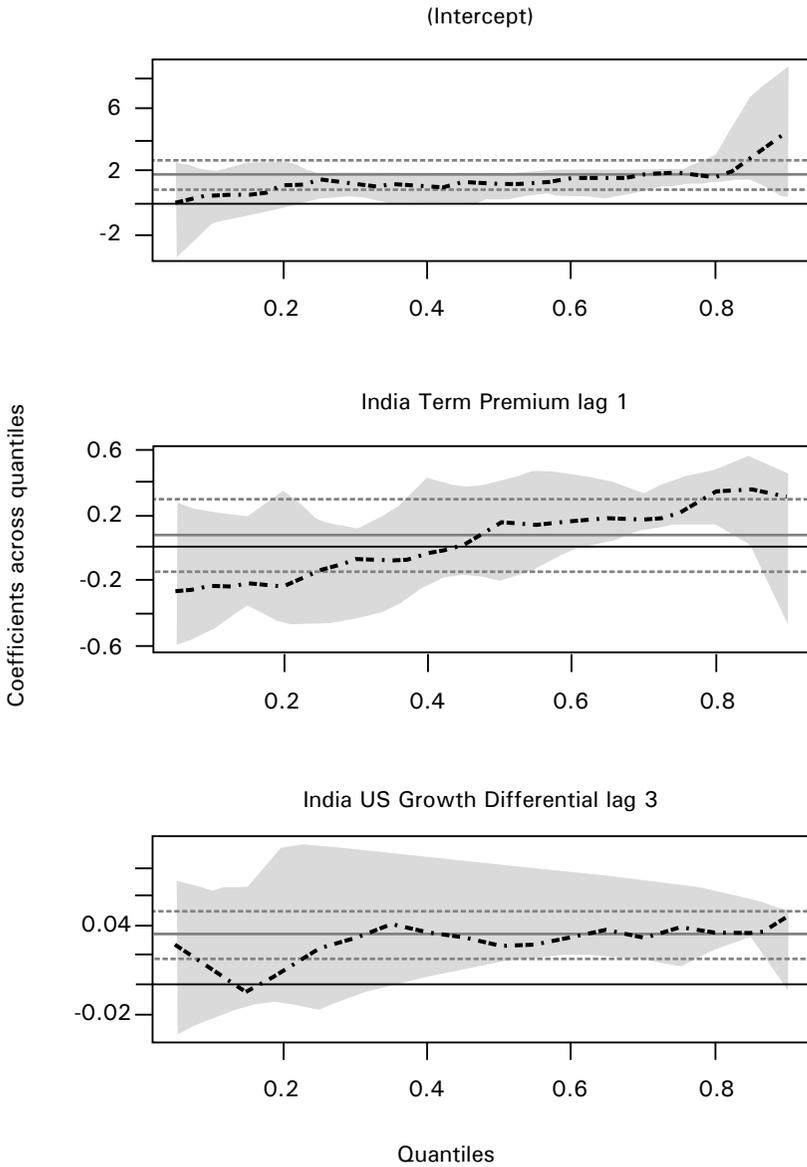
**TABLE 6. Interaction of India-US Policy Interest Rate with Reserves Regression Results – Equity Flows**

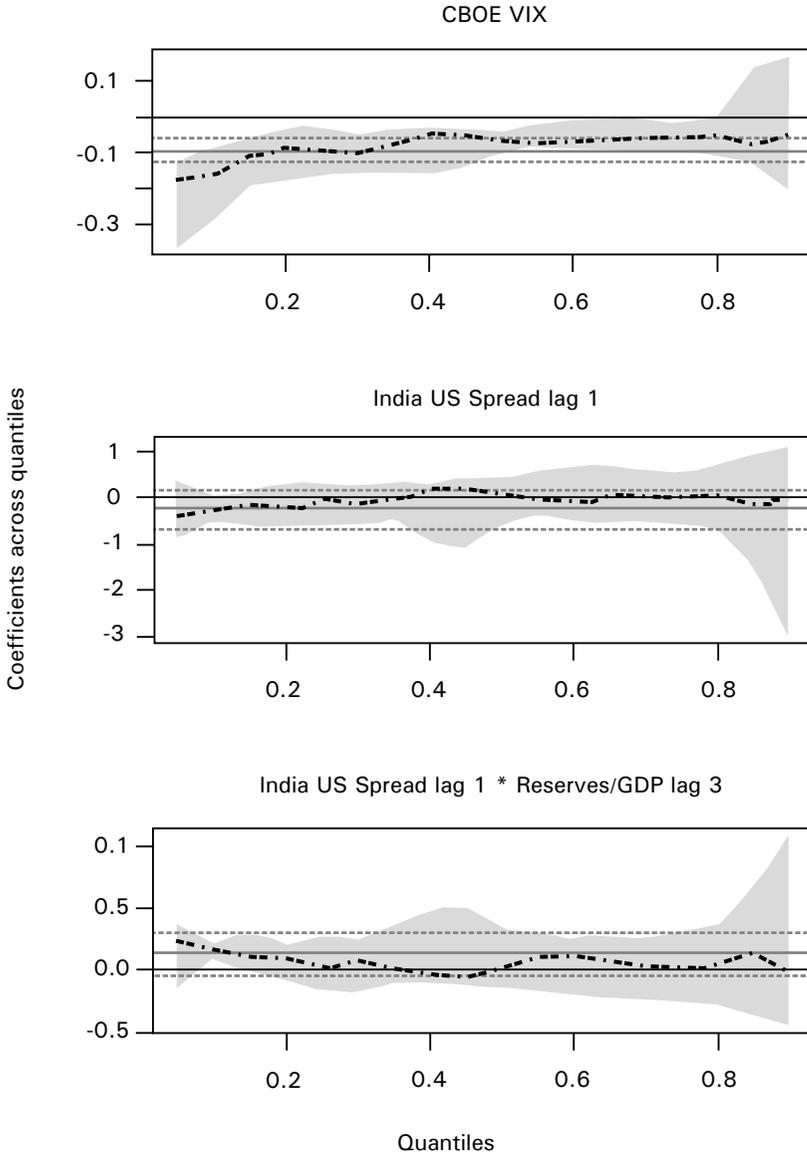
<i>Dependent Variable:</i> <i>Equity Flows</i>	<i>0.05 Quantile</i> <i>Regression</i>	<i>Median</i> <i>Regression</i>	<i>Mean</i> <i>Regression</i>
VIX	-0.177*** (0.050)	-0.062*** (0.023)	-0.092*** (0.022)
India 10-year term premium	-0.271 (0.195)	0.143 (0.143)	0.074 (0.137)
India-US policy spread	-0.386 (0.263)	0.080 (0.274)	-0.239* (0.261)
India-US growth diff	0.027 (0.049)	0.027 (0.010)	0.034*** (0.010)
Interest spread* Reserves/GDP	0.223** (0.101)	0.013 (0.113)	0.131 (0.063)
Constant	0.535 (0.440)	1.160 (0.615)	1.847 (0.587)
Number of observations = 237		Adj R-squared = 0.101	

Source: Data sources are listed in Appendix A.

Note: Standard errors in parentheses. \*, \*\*, \*\*\* refer to significance at 10, 5, and 1 percent levels, respectively.

**FIGURE 15. Quantile Regression Results - Dependent Variable = Equity Flows Reserves Interacted with India-US Spread**





Source: Authors' estimates; data described in Appendix A.

Finally, we estimate the quantile regressions for shocks to the India 10-year bond to WACR term premium for all three dependent variables—gross portfolio inflows, gross portfolio debt inflows, and gross portfolio equity inflows. The source of an increase in the term premium for India is ambiguous and could well differ qualitatively between events in the low quantiles and events in the high quantiles of gross portfolio inflows. An increase in expected inflation or in expected productivity growth can raise the term premium. A temporary decrease in the policy rate can increase the premium.

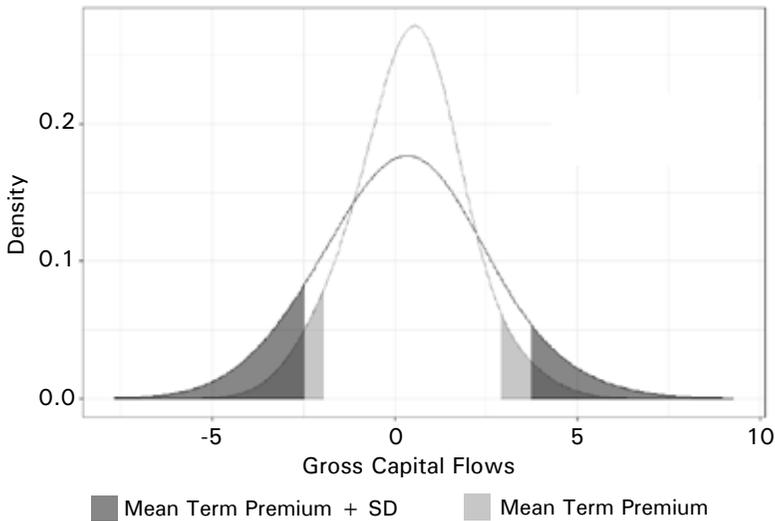
The regression coefficients for the total foreign portfolio inflows are reported in Table 7. The regression coefficients for gross portfolio debt and equity inflows plots are displayed in Figure B.2(a), B.2(b), and B.2(c) in Appendix B. The coefficients for the term premium and its interaction with reserves to GDP are significant and have expected signs in Table 7. The empirical predicted distribution for a shock to the term premium in Figure 16 reveals that a higher stock of reserves reduces the adverse effect of a rise in the India term premium on gross foreign portfolio debt and equity inflows.

**TABLE 7. Interaction of India 10-year Term Premium with Reserves Regression Results**

<i>Dependent Variable: Debt and Equity Flows</i>	<i>0.05 Quantile Regression</i>	<i>Median Regression</i>	<i>Mean Regression</i>
VIX	-0.327*** (0.066)	-0.106*** (0.023)	-0.121*** (0.022)
India 10-year term premium	-4.458*** (1.412)	1.856* (1.023)	-2.386** (0.987)
India-US policy spread	-0.172 (0.162)	0.217** (0.104)	0.160 (0.261)
India-US growth differential	0.021 (0.021)	0.020 (0.013)	0.029** (0.012)
India term premium* Reserves/GDP	1.601*** (0.505)	0.707** (0.342)	0.869*** (0.330)
Constant	3.591*** (1.139)	1.924** (0.782)	2.496 (0.755)
Number of observations = 237		Adj R-squared = 0.133	

Source: Data sources are listed in Appendix A.

Note: Standard errors in parentheses. \*, \*\*, \*\*\* refer to significance at 10, 5, and 1 percent levels, respectively.

**FIGURE 16.** Pre- and Post-Shock Predicted Distribution due to a Shock to the India Term Premium

Source: Authors' estimates; data described in Appendix A.

Figure B.2(a) shows that the coefficient for the interaction term between lagged ratio of reserves to GDP and the India term premium is significant and positive in the lowest quantiles for (negative) capital outflows. Median and mean gross portfolio inflows rise with an increase in reserves.

Separating portfolio debt and equity inflows reveals different effect of the term premium and reserves. Figure B.2(b) shows that an increasing India term premium raises the volatility of portfolio debt inflows. Shocks to the India term spread increase the absolute value of debt outflows at low quantiles (negative flows) and increase debt inflows at high quantiles (increase positive inflows). The interaction term between the term premium and reserves is significant only for portfolio debt flow reversals (low quantiles) indicating that larger reserves mitigate the impact of a higher term premium on portfolio debt outflows.

The effects of the India term premium on portfolio equity flows are shown in Figure B.2(c). Here, the coefficients on the interaction term between the term premium and reserves are significant at the median and in the mean regression. At low quantiles (left tail), having more reserves does not reduce the impact of shocks that raise the term premium on portfolio equity flows.

## 5. Cost of Holding Reserves

While reserves provide benefits in terms of self-insurance and exchange market intervention, they are costly to hold. Conceptually, the cost of reserves equals the difference between returns to reserve assets and the opportunity return to investments foregone. The cost of reserves is typically estimated by comparing the interest paid on a country's sovereign debt and that received on reserve assets of similar maturity. This measure of the cost of holding reserves combines the sovereign risk premium with a term premium expressed in a reserve currency. The purposes to which reserves are used as well as how they are accumulated can matter and deserve consideration.

For reserves held as a buffer stock for insurance against the impact of global financial shocks and domestic financial crises, the marginal cost of holding reserves should be determined by the marginal opportunity cost of the debt implicitly issued to purchase reserves net of the returns on reserve assets. Reserves can be exchanged for outstanding government debt in a sterilized sale by the central bank. A quasi-fiscal cost of reserves is incurred when a central bank uses open market operations to sterilize the expansionary impact of reserve accumulation on the money supply.<sup>26</sup>

If government debt is issued in foreign currency, its marginal cost equals the sovereign risk premium plus the risk-free rate of interest. The yield on U.S. treasury securities is typically chosen as an appropriate proxy for the risk-free return. For government debt issued in domestic currency, as in the case for India, the quasi-fiscal cost of reserves must account for exchange rate risk. The effect of currency risk on *ex ante* sovereign spreads can be measured by the market exchange rate risk premium on government debt. Because exchange rate losses and gains are not realized until reserve assets are sold, the quasi-fiscal cost of reserves should include the central bank's net losses on what are essentially carry trades.<sup>27</sup>

Reserve assets tend to be of shorter maturity than domestic sovereign debt. For the purpose of self-insurance, reserves need to be readily available in ample supply in the event of a financial crisis. This means that precautionary reserves ought to be held in reserve currency debt that remains liquid in times of global financial turbulence. Short-maturity bond yields need to be adjusted by term spreads to match the average maturity for sovereign debt. Estimates of the cost of holding reserves *ex ante* use term premiums to adjust yields. Changes in the valuation of the reserve asset portfolio are additional quasi-fiscal costs or benefits.

---

26. The concept of the quasi-fiscal cost of sterilization is introduced by Calvo (1991).

27. The cost of sterilized reserves discussed is sometimes labelled as the direct quasi-fiscal cost. Indirect cost refers to possible real effects of sterilized intervention that delay real exchange rate and current account adjustment. The effects of sterilized intervention are beyond the scope of this paper.

The way in which reserves are accumulated should affect the opportunity cost of reserves. Reserves can be accumulated through unsterilized purchases, issuance of foreign currency-denominated debt, and sales of domestic currency government debt. Raising precautionary reserves by issuing foreign currency debt can increase the risk of currency and debt crises exposing the economy to sudden stops.

Intervention countering exchange rate volatility results in positive or negative carry profits. Levy-Yeyati and Gomez (2022) point out that carry risk is an appropriate cost to consider when reserves are used for either unsterilized or sterilized intervention. When covered interest parity holds, the interest differential between foreign currency bonds and domestic currency bonds equals the forward premium. Carry profits for the RBI can be illustrated by calculating three-month carry trade return using daily data for the three-month forward premium for the rupee against the dollar and the three-month ex-post depreciation of the rupee against the dollar from the updated database from Du, Im, and Schreger (2018).<sup>28</sup> The average carry return to selling dollars forward for rupees for three months over the last full four years of their dataset (March 2017 through February 2021) was 2.04 percent. Expected valuation gains or losses also associated with holding reserves. Valuation changes are calculated by the RBI and published semi-annually, although reports do not consistently provide annual amounts. The average annual return to reserves due to valuation changes over the same fiscal years can be calculated from publicly available data. It was 0.84 percent.

The opportunity cost of holding a stock of reserves for India is not measured by the difference between the yield on liquid sovereign bonds issued in rupees and the class of foreign currency bonds held as reserve assets. We estimate the opportunity cost to the RBI of holding reserves by accounting for the exchange rate risk between Government of India bonds and reserve assets evaluated on identical tenor. Holding a rupee-denominated bond involves two risks relative to holding a risk-free bond in dollars: exchange rate risk and credit risk. For example, the spread for a 10-year Indian treasury bond (G-Sec) equals the 10-year U.S. treasury yield plus the price of exchange rate risk and of pure credit risk. The cost of carrying reserves in dollars is included in the term-adjusted spread. Currency risk is measured by the forward premium for the tenor of the bonds. Forward markets exist only for short-maturity contracts. For longer maturities, cross currency swaps can be constructed by combining dollar-rupee cross currency basis swaps with interest swaps in each currency as proposed by Du and Schreger (2016). We update the database from Du, Im, and Schreger (2018) to obtain yield spreads between treasury bonds in rupees for India and U.S. treasuries. The India-US spread is the simple difference between

---

28. See <https://sites.google.com/view/jschreger/CIP>.

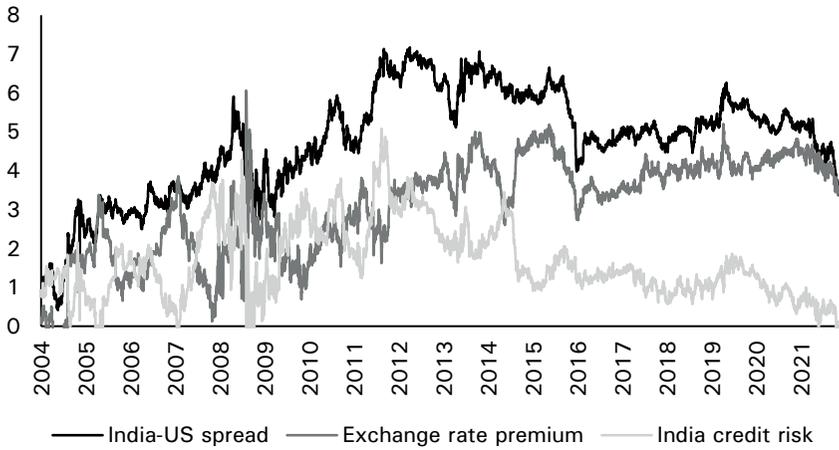
yields in each currency. By subtracting the cross-currency spread from this yield differential, Du, Im, and Schreger derive the rupee credit risk on Central Government debt. We use the series for India. They use this residual to study deviations from covered interest parity and the term structure of sovereign yields. We follow this interpretation by assuming that U.S. treasuries are risk-free and attribute deviations from covered interest parity on long-term bonds to pure credit risk.

The India-US spread and India-US credit risk are shown in Figure 17. The data series designated India credit risk is the spread between the 10-year G-Sec and the 10-year U.S. treasury in rupees. The cross-currency swap rate for these 10-year bonds converts U.S. dollar returns to risk neutral equivalent bond returns in rupees.

The average 10-year spread for May 2016 to September 2022 was 5.1 percent. Of this, currency risk was 4.0 percent and credit risk was 1.1 percent. This spread is an opportunity cost of holding the stock of reserves. The vast majority of the stock of reserve qualified assets issued by the Government of India is held domestically. The premium on bonds held by private domestic entities is an internal transfer. The net cost equals the spread times the amount of government liabilities held by foreign creditors.

In our analysis, we ask whether adding reserves reduces the spread between India and U.S. 10-year treasuries. If so, then the marginal cost of holding reserves falls below the interest differential. To the extent that higher reserves provide more self-insurance against global shocks and sudden capital outflows, spreads should fall with the reserves to GDP ratio. A higher external debt-to-GDP ratio increases the exposure of the economy to the same shocks, and a higher fraction of external debt denominated in domestic currency may reduce risk exposure and spreads.

Following Devereux and Wu (2022), we use the Du and Schreger (2016) calculations to estimate the effect of reserves as a share of GDP on the 10-year spread, currency risk, and credit risk for India, as in Equation (3). In our regression, we control for global uncertainty shocks using the VIX and the yield on U.S. 10-year treasuries. Domestic controls are the rate of real GDP growth and domestic credit-to-GDP ratio. The amount of government debt held by foreigners is proxied by total external debt denominated in rupees as recorded by the World Bank. Private external borrowing also exposes the economy to global shocks and sudden gross foreign capital outflows. The measure used to capture this exposure is a ratio of private non-guaranteed external debt for both non-financial and financial corporations to GDP in foreign currency. The adoption of inflation targeting may be associated with decreasing exchange rate risk. A dummy for inflation targeting starting in May 2016 is included in the regression.

**FIGURE 17. Daily 10-year India-U.S. Treasury Spreads**

Source: Du, Im, and Schreger (2018), and authors calculations using data from Bloomberg.

The regression equation for the sovereign bond spread has a conventional linear form given by

$$y_t = \alpha + \beta_1 \ln\left(\frac{\text{Reserves}}{\text{GDP}}\right)_{t-1} + \beta_2 \ln\left(\frac{\text{Rupee external debt}}{\text{GDP}}\right)_{t-1} + \beta_3 \ln\left(\frac{\text{Priv external debt}}{\text{GDP}}\right)_{t-1} + \beta_4 \text{IndiaGDPgrowth}_{t-1} + \beta_5 \ln\left(\frac{\text{Domestic credit}}{\text{GDP}}\right)_{t-1} + \beta_6 \ln \text{VIX}_t + \beta_7 \text{USyield}_{t-1} + \beta_7 \text{IT}_{t-1} + \varepsilon_t \quad (3)$$

The dependent variable  $y_t$  is an interest rate spread expressed in percent, and the financial stock ratios to GDP are in logarithms. The coefficient  $\beta_1$  gives the semi-elasticity of the spread to the ratio of reserves to GDP. The regressors with the exception of the log of the VIX are lagged, as in the quantile regressions for capital flows. Changes in the VIX affect GOI bond spreads contemporaneously and are unlikely to be endogenous to them.

Our data cover the period from January 2006 through September 2022. This time period was chosen because of the following two data limitations. Data for foreign currency denominated external debt and domestic currency denominated external debt stocks are available beginning in 2006. The basis and interest swap rates used to calculate the dependent variable measuring the currency risk component of bond yields are not reported by Bloomberg past September 2022. We used the calculation proposed by Du and Schreger to replicate and extend the estimation of the cross-currency swap rates using data from Bloomberg. We chose to use 10-year bond spreads because the market for the 10-year G-Sec

is the most liquid market for bonds issued by the Government of India. Data descriptions and sources are given in Appendix A.

The regression results are reported in Table 8. The first column in the table reports the results of the regression when the dependent variable is the India-U.S. 10-year spread in percent. The coefficient estimate for the logarithm of the reserves to GDP ratio is negative and significant. It suggests that an increase of 1 percent in the reserves to GDP ratio reduces the spread by 2.4 basis points. This reduction applies to the entire stock of reserves, so that the marginal cost of a 1 percent increase in foreign reserves is 2.4 percentage points less than the market spread on the 10-year G-Sec over the 10-year U.S. treasury. At the mean spread of 5.1 percent for the full sample, the estimated opportunity cost of accumulating an additional 1 percent of reserves equals 2.7 percent, not 5.1 percent.<sup>29</sup>

The coefficient for the India-U.S. bond spread on private external debt is significant and positive. The coefficient for the reserves-to-GDP ratio on the exchange risk premium is also significant and negative. The exchange risk premium displays a negative and significant coefficient to rupee-denominated external debt. This might be expected as higher local currency debt is often associated with a higher inflationary bias. The coefficient on reserves to GDP on the credit risk for government debt is also significant and negative. The coefficients for private external debt (our proxy for foreign currency debt) and rupee-denominated external debt are significant. While increasing foreign currency debt raises credit risk, rupee-denominated debt reduces it. An interesting finding is that global uncertainty has a positive effect on exchange rate risk and a negative effect on credit risk.

Increasing reserves appears to reduce the overall sovereign bond spread by reducing both currency risk and credit risk using the 10-year bond spread. The effect on currency risk is intuitive, but the effect on credit risk contradicts the panel data findings of Devereux and Wu (2022). Our result might be consistent with the argument of Obstfeld, Shambaugh, and Taylor (2010) that reserves can mitigate the risk of domestic-sourced financial crises because domestic collateral instruments lose value in crises. Rupee-denominated external debt may reduce pure credit risk as it raises currency risk.

The regressions show that inflation targeting is associated with a decrease in the overall 10-year yield spread and in the exchange rate risk premium. A decrease in the exchange rate risk premium is consistent with the experience of many emerging inflation targeting economies. The absence of significance for the inflation targeting dummy variable is also consistent with intuition. Our

---

29. The robustness of the regression results with respect to changes in the lag length for the ratios of reserves, foreign currency external debt, and rupee external debt was checked. The significance of the estimates is the same for lag lengths of one to at least three months. Point estimates change little. The results reported in Table 8 use three-month lags.

results suggest significant reductions in government borrowing costs due to higher reserves and to inflation targeting separately.<sup>30</sup>

**TABLE 8. The Impact of Foreign Reserves on Sovereign Bond Spreads**

	<i>India-US Spread (%)</i>	<i>Exchange-Rate Premium (%)</i>	<i>India-Credit Risk (%)</i>
$\ln\left(\frac{\text{Reserves}}{\text{GDP}}\right)$	-2.408*** (0.354)	-0.710* (0.402)	-1.698*** (0.447)
$\ln\left(\frac{\text{Rupee external debt}}{\text{GDP}}\right)$	0.023 (0.337)	2.458*** (0.382)	-2.435*** (0.425)
$\ln\left(\frac{\text{Private external debt}}{\text{GDP}}\right)$	1.320** (0.520)	0.233 (0.589)	1.088* (0.655)
<i>India GDP growth rate</i>	0.032 (0.195)	0.173 (0.221)	-0.141 (0.246)
<i>ln VIX</i>	0.035 (0.123)	0.313** (0.139)	-0.278* (0.155)
<i>US 10year bond yield</i>	-0.714*** (0.083)	-0.173* (0.094)	-0.541*** (0.104)
$\ln\left(\frac{\text{Domestic credit}}{\text{GDP}}\right)$	0.363 (1.129)	-0.241 (1.280)	0.604 (1.424)
<i>Inflation target</i>	-0.820*** (0.190)	-0.541** (0.215)	-0.279 (0.240)
<i>Constant</i>	10.270* (5.419)	2.155 (6.141)	8.115 (6.831)
<i>Number of observations</i>	200	200	200
<i>Adjusted R<sup>2</sup></i>	0.79	0.72	0.54

Source: Data sources are listed in Appendix A.

Note: Standard errors in parentheses. \*, \*\*, \*\*\* refer to significance at 10, 5, and 1 percent levels, respectively.

## 6. Conclusion

The holding of large stocks of foreign reserves by India provides resources that the RBI uses to alleviate adverse impacts on the financial and real sectors from global shocks. In part, reserves in the event of foreign capital flow reversals reduce pressures on the exchange rate that can affect both financial stability

30. We introduced interaction terms separating the impact of reserves on bond spreads before and after inflation targeting was adopted in May 2016. The coefficients on the two terms were insignificantly different and nearly identical.

and economic activity through relative price volatility. Intervention by the RBI also directly provides liquidity to financial markets to ease distress in crises or support market efficiencies. The role of reserves is not limited to having on hand the necessary liquidity for the worst events. A stock of reserves can have a deterrence effect on capital flows by signaling a capacity to respond to external shocks and reducing the size of capital flow reversals that may occur. To quantify the impact of reserves on international capital flows over the global financial cycle, we use quantile regressions for India to estimate the marginal effect of reserves as a share of GDP on gross capital flows across the distribution of external and internal shocks given global financial, growth, and monetary policy risks. We focus on (non-resident) gross capital inflows, which matter most for financial stability concerns, and amounted to about 1 percent of GDP in 2023.

Using portfolio capital flows data from 2004-2023 for India, our main result is that we find foreign exchange reserves play a significant role in shifting the empirical distribution of gross flows wherein the probability of large negative flows is substantially reduced. Higher reserves reduce both foreign capital inflows at the right tail of the distribution and outflows at the left tail. We also find a significant and large effect of reserves for reducing negative foreign portfolio flows in the event of shocks to global uncertainty. Additional reserves continue to reduce the magnitude of gross flow reversals during adverse global financial shocks and interest rate shocks. These results suggest that there are positive marginal benefits to accumulating reserves for financial stability functions. Our results are robust across a variety of specifications.

The counterpart of the benefit of reserves for reducing the impact of global shocks or the global financial cycle is the opportunity cost of holding a stock of reserves. The effect of reserves on sovereign spreads should be considered when estimating the cost of reserve hoarding. The estimation of the spread between Government of India and U.S. treasury yields shows that the ratio of reserves to GDP reduces the yield differential. Our regressions test the hypothesis that India's reserves, at the margin, reduce the insurance premium. Thus, the significance of the negative coefficient on the reserves-to-GDP ratio shows that additional reserves reduce currency risk, and that the sovereign interest rate spread over-estimates the marginal cost of reserves in India. We also show that inflation targeting is associated with a decrease in the overall 10-year yield spread and in the exchange rate risk premium.

The decomposition of this spread is conceptually valuable and may be useful for understanding how monetary policy frameworks and reserves affect exchange rate risk in future work.

## References

- Adler, G., K.S. Chang, R.C. Mano, and Y. Shao. 2024. “Foreign Exchange Intervention: A Data Set of Official Data and Estimates”, *Journal of Money, Credit and Banking*. <https://doi.org/10.1111/jmcb.13137>,
- Adrian, T., N. Boyarchenko, and D. Giannone. 2019. “Vulnerable Growth”, *The American Economic Review*, 109(4): 1263-1289.
- Aizenman, J. and J. Lee. 2007. “International Reserves: Precautionary Versus Mercantilist Views, Theory and Evidence”, *Open Economies Review*, 18(2): 191-214.
- Azzalini, A. and A. Capitanio. 2003. “Distributions Generated by Perturbation of Symmetry with Emphasis on a Multivariate Skew t-distribution”, *Journal of the Royal Statistical Society Series B: Statistical Methodology*, 65(2): 367-389.
- Barguelil, A., O. Ben-Salha, and M. Zmami. 2018. “Exchange Rate Volatility and Economic Growth”, *Journal of Economic Integration*, 33(2): 1303-1336.
- Beirne, J. and C. Friedrich. 2014. “Capital Flows and Macroprudential Policies-A Multilateral Assessment of Effectiveness and Externalities”, *Working Paper No. 2014-31*, Bank of Canada.
- Bhargava, A., R. Bouis, A. Kokenyne, M. Perez-Archila, U. Rawat, and R. Sahay. 2023. “Capital Controls in Times of Crisis—Do They Work?” *IMF Working Paper 2023(067)*: 1, Washington, D.C.: International Monetary Fund.
- Bianchi, J., J.C. Hatchondo, and L. Martinez. 2018. “International Reserves and Rollover Risk”, *American Economic Review*, 108(9): 2629-2670.
- Bianchi, J. and E.G. Mendoza. 2020. “A Fisherian Approach to Financial Crises: Lessons from the Sudden Stops Literature”, *Review of Economic Dynamics*, 37(2020): S254-S283.
- Broner, F., T. Didier, A. Erce, and S. L. Schmukler. 2013. “Gross Capital Flows: Dynamics and Crises”, *Journal of Monetary Economics*, 60(1): 113-133.
- Calvo, G.A. 1991. “The Perils of Sterilization”, *IMF Staff Papers*, 38(4): 921-926.
- Calvo, G., A. Izquierdo, and R. Loo-Kung. 2013. “Optimal Holdings of International Reserves: Self-insurance against Sudden Stops”, *Monetaria*, 35(1): 1-35.
- Calvo, G.A., L. Leiderman, and C.M. Reinhart. 1993. “Capital Inflows and Real Exchange Rate Appreciation in Latin America: The Role of External Factors”, *Staff Papers*, 40(1): 108-151.
- Camara, S., L. Christiano, and H. Dalgic. 2024. “The International Monetary Transmission Mechanism”, *NBER Macroeconomics Annual 2024*, Volume 39, Chicago: University of Chicago Press.
- De Crescenzo, A. and E. Lepers. 2024. “Extreme Capital Flow Episodes from the Global Financial Crisis to COVID-19: An Exploration with Monthly Data”, *Open Economies Review*, 36: 1-32.
- Devereux, M.B. and S.P.Y. Wu. 2022. “Foreign Reserves Management and Original Sin”, *Working Paper No. w30418*, Cambridge, M.A.: National Bureau of Economic Research.
- Du, W., J. Im, and J. Schreger. 2018. “The US Treasury Premium”, *Journal of International Economics*, 112, 167-181.
- Du, W. and J. Schreger. 2016. “Local Currency Sovereign Risk”, *The Journal of Finance*, 71(3): 1027-1070.

- Du, W., A. Tepper, and A. Verdelhan. 2018. "Deviations from Covered Interest Rate Parity", *The Journal of Finance*, 73(3): 915-957.
- Durdu, C.B., E.G. Mendoza, and M.E. Terrones. 2009. "Precautionary Demand for Foreign Assets in Sudden Stop Economies: An Assessment of the New Mercantilism", *Journal of Development Economics*, 89(2): 194-209.
- Eichengreen, B. 2007. "The Real Exchange Rate and Economic Growth", *Social and Economic Studies*, 56(4): 7-20.
- Eichengreen, B. and P. Gupta. 2013. "The Financial Crisis and Indian Banks: Survival of the Fittest?", *Journal of International Money and Finance*, Elsevier, 39(C), 138-152.
- Eichengreen, B., P. Gupta, and O. Masetti. 2018. "Are Capital Flows Fickle? Increasingly? And Does the Answer Still Depend on Type?", *Asian Economic Papers*, 17(1): 22-41.
- Eguren Martin, F., C. O'Neill, A. Sokol, and L. von dem Berge. 2021. "Capital Flows-at-Risk: Push, Pull and the Role of Policy", *ECB Working Paper No. 2021/2538*, Frankfurt: European Central Bank.
- Fitzenberger, B. 1998. "The Moving Blocks Bootstrap and Robust Inference for Linear Least Squares and Quantile Regressions", *Journal of Econometrics*, Elsevier, 82(2): 235-287.
- Forbes, K.J. and F.E. Warnock. 2012. "Capital flow waves: Surges, Stops, Flight, and Retrenchment", *Journal of International Economics*, 88(2): 235-251.
- Galati, G. and R. Moessner. 2018. "What do we know about the effects of macroprudential policy?", *Economica*, 85(340): 735-770.
- Gelos, G., L. Gornicka, R. Koepke, R. Sahay, and S. Sgherri. 2022. "Capital Flows at Risk: Taming the Ebbs and Flows", *Journal of International Economics*, 134(C): 103555.
- Gourinchas, P.O. and M. Obstfeld. 2012. "Stories of the Twentieth Century for the Twenty-first", *American Economic Journal: Macroeconomics*, 4(1): 226-265.
- GoI. 2023. *India's External Debt as at the End of June 2023*. New Delhi: External Debt Management Unit, Department of Economic Affairs, Ministry of Finance, Government of India. Available at: [www.dea.gov.in](http://www.dea.gov.in).
- Gupta, P. and D. Jain. 2021. "Emerging Market Sell-offs: India and the World", *Indian Public Policy Review*, 2(4): 1-42.
- Heller, H.R. 1966. "Optimal International Reserves", *The Economic Journal*, 76(302): 296-311.
- Hur, S. and I.O. Kondo. 2016. "A Theory of Rollover Risk, Sudden Stops, and Foreign Reserves", *Journal of International Economics*, 103(C): 44-63.
- IMF. 2024. *External Sector Report*, Washington, D.C.: International Monetary Fund.
- IMF. 2016. *Guidance Note on the Assessment of Reserve Adequacy and Related Considerations*, Washington, D.C.: International Monetary Fund.
- Jeanne, O. and R. Ranciere. 2011. "The Optimal Level of International Reserves for Emerging Market Countries: A New Formula and Some Applications", *The Economic Journal*, 121(555): 905-930.
- Jeanne, O. and D. Sandri. 2020. "Optimal Reserves in Financially Closed Economies", *Journal of International Money and Finance*, 104(2): 102178.
- Koepke, R. 2019. "What Drives Capital Flows to Emerging Markets? A Survey of the Empirical Literature", *Journal of Economic Surveys*, 33(2): 516-540.

- Levy-Yeyati, E. and J.F. Gómez. 2022. “Leaning-against-the-wind Intervention and the “Carry-trade” View of the Cost of Reserves”, *Open Economies Review*, 33(5): 853-877.
- Mehigan, C. 2018. “Measurement and Identification of Capital Inflow Surges”, *Review of the OECD Code of Liberalization of Capital Movements*, 2(1): 5. Paris.
- Muduli, S., H.K. Behera, and M. Patra 2022. “Capital Flows at Risk: India’s Experience”, *RBI Bulletin*, 76(6): 73-88.
- Nath, S., D.R. Chaudhari, V. Rajput, and G. Tiwari. 2024. “India’s Foreign Exchange Reserves in High Volatility Episodes - An Empirical Assessment”, *RBI Bulletin*, 78(4): 209-224.
- Obstfeld, M. 2015. “Trilemmas and Tradeoffs: Living with Financial Globalization”, *BIS Working Papers No. 480*, Basel: Bank of International Settlements.
- Obstfeld, M., J.C. Shambaugh, and A.M. Taylor. 2010. “Financial Stability, the Trilemma, and International Reserves”, *American Economic Journal: Macroeconomics*, 2(2): 57-94.
- Saleh, R.A. and A.K.Md.E. Saleh 2021. “Solution to the Non-Monotonicity and Crossing Problems in Quantile Regression”, E-print arXiv:2111.04805. DOI: 10.48550/arXiv.2111.04805.

To view the entire video of this IPF session and the General Discussion that ended the session, please scan this QR code or use the following URL:  
<https://www.youtube.com/watch?v=hsf7sCb94Yw>



## Appendix A: Data

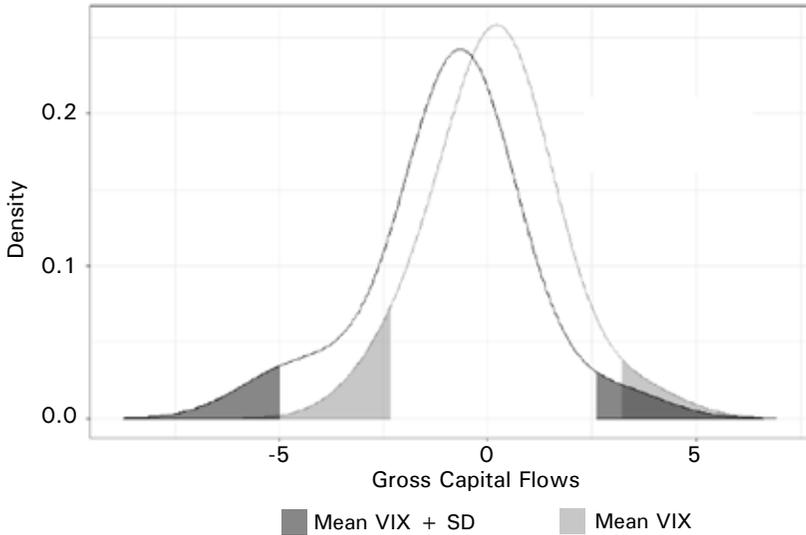
**TABLE A.1. Data**

<i>Variable</i>	<i>Definition</i>	<i>Frequency</i>	<i>Source</i>
Gross Capital Flows (USD Billions)	Sum of Portfolio Equity and Debt Flows	Monthly	OECD Monthly Capital Flows Dataset
Chicago Board Options Exchange (CBOE) Volatility Index (VIX)	Near term volatility of stock index option prices	Monthly	FRED, St. Louis Fed Database
Weighted Average Call Rate (WACR)	India short term call money rate	Monthly	Reserve Bank of India, Database on Indian Economy
Fed Funds Rate (USFFR)	US Effective Federal Funds Rate (overnight interbank lending)	Monthly	FRED, St. Louis Fed Database
India 10-year bond yield	India long term government bond yields (10 year)	Monthly	Bloomberg
US 10-year bond yield	US long term government bond yields (10 year)	Monthly	FRED, St. Louis Database
India Foreign Exchange Reserves	India Total Foreign Exchange Reserves in USD (FCA, Gold, Reserve Tranche position, SDRs)	Monthly	Reserve Bank of India, Database on India Economy
India GDP	India GDP, Current Rupees	Quarterly; interpolated monthly	IMF, International Financial Statistics
India GDP growth	India Real GDP, domestic currency (growth rate)	Quarterly; interpolated monthly	IMF, International Financial Statistics
US GDP growth (Brave Butters Kelley Index)	Brave Butters Kelly Real GDP Annualised % change monthly	Monthly	FRED, St. Louis Database
India-US 10-year spread	Difference between 10-year India and U.S. treasury bond yields	Daily; averaged to monthly	Du, Wenxin and Jesse Schreger updated calculations using Bloomberg
Exchange rate premium	Cross currency swap rate for 10-year India and U.S. treasury bond yields	Daily; averaged to monthly	Du, Wenxin and Jesse Schreger updated calculations using Bloomberg
India credit risk	India-US spread less cross currency swap rate	Daily; averaged to monthly	Du, Wenxin and Jesse Schreger updated calculations using Bloomberg
Private rupee external debt	Gross external debt position, domestic currency, all sectors, all maturities, domestic currency, USD	Quarterly	World Bank Quarterly External Debt Statistics, SDDS
Domestic credit to GDP	Credit from all sectors to private non-financial sector at market value, domestic currency	Quarterly	Bank for International Settlements

### Appendix B: Quantile Regression Results

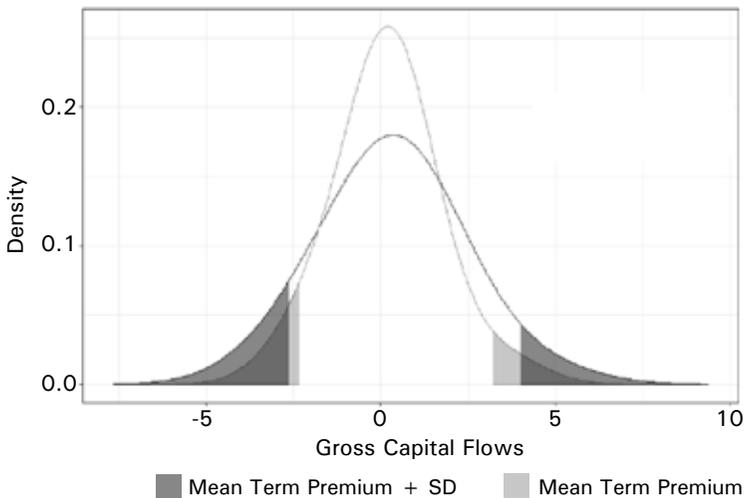
Figures B.1(a)-B.1(d): Pre- and post-probability density functions plots of total flows after a VIX shock, an India term premium shock, an India-US bond spread shock, an India-US growth differential shock, respectively.

**FIGURE B.1 (a).** Impact of VIX Shock on Total Capital Flows



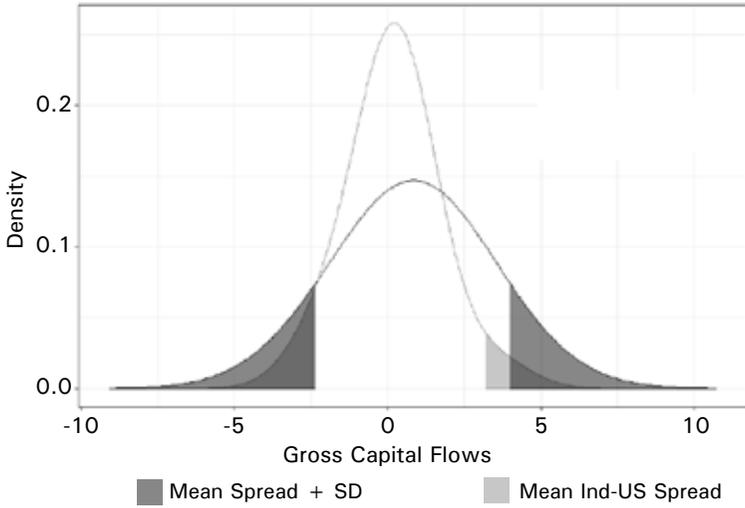
Source: Authors' estimates; data described in Appendix A.

**FIGURE B.1 (b).** Impact of India Term Premium Shock on Total Capital Flows



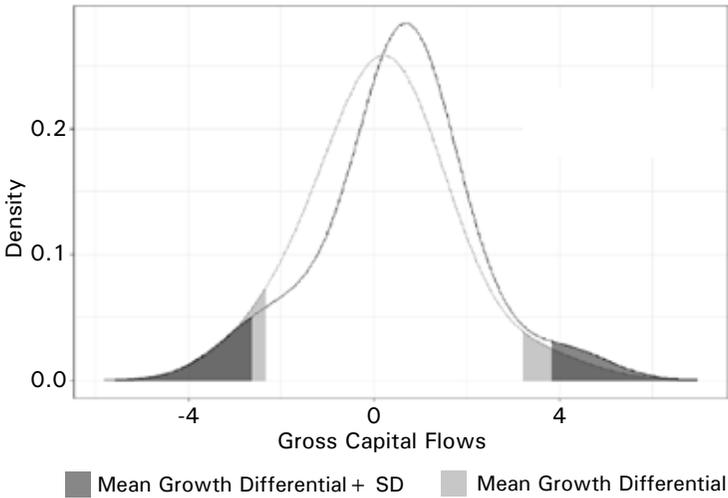
Source: Authors' estimates; data described in Appendix A.

**FIGURE B.1 (c).** Impact of India-US Spread Shock on Total Capital Flows



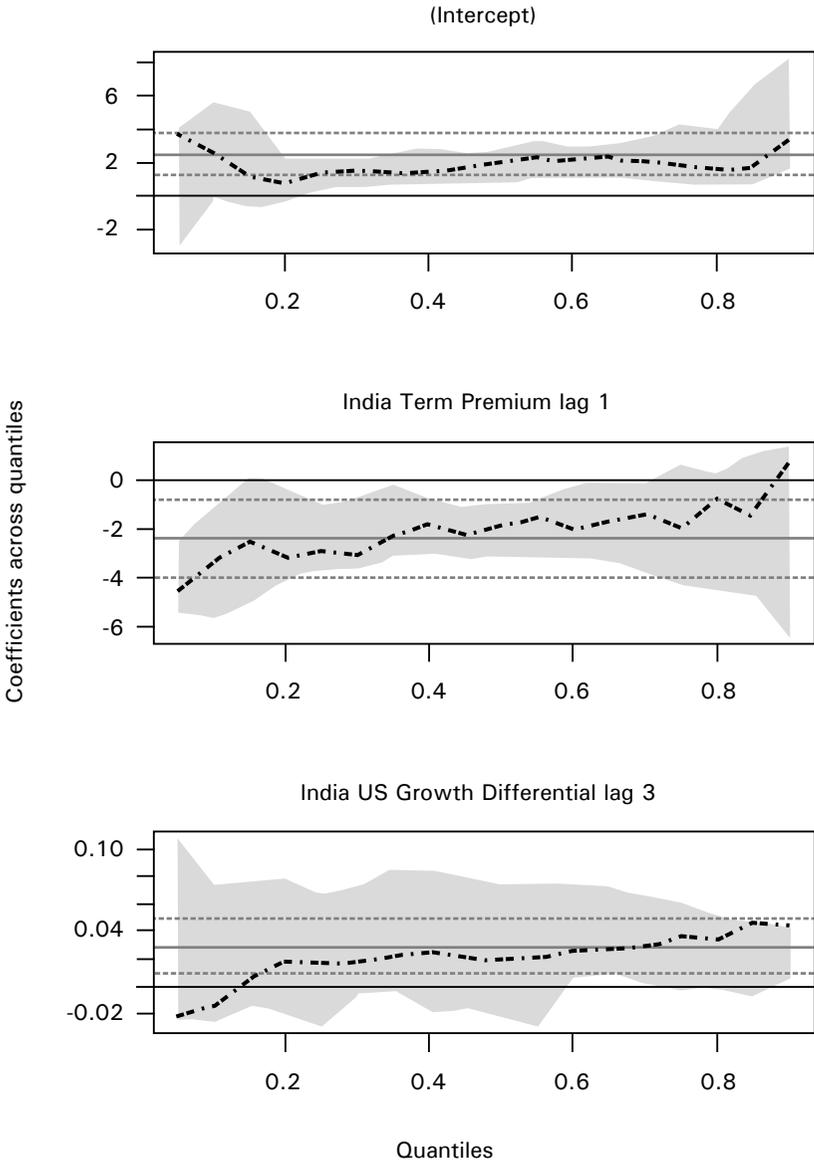
Source: Authors' estimates; data described in Appendix A.

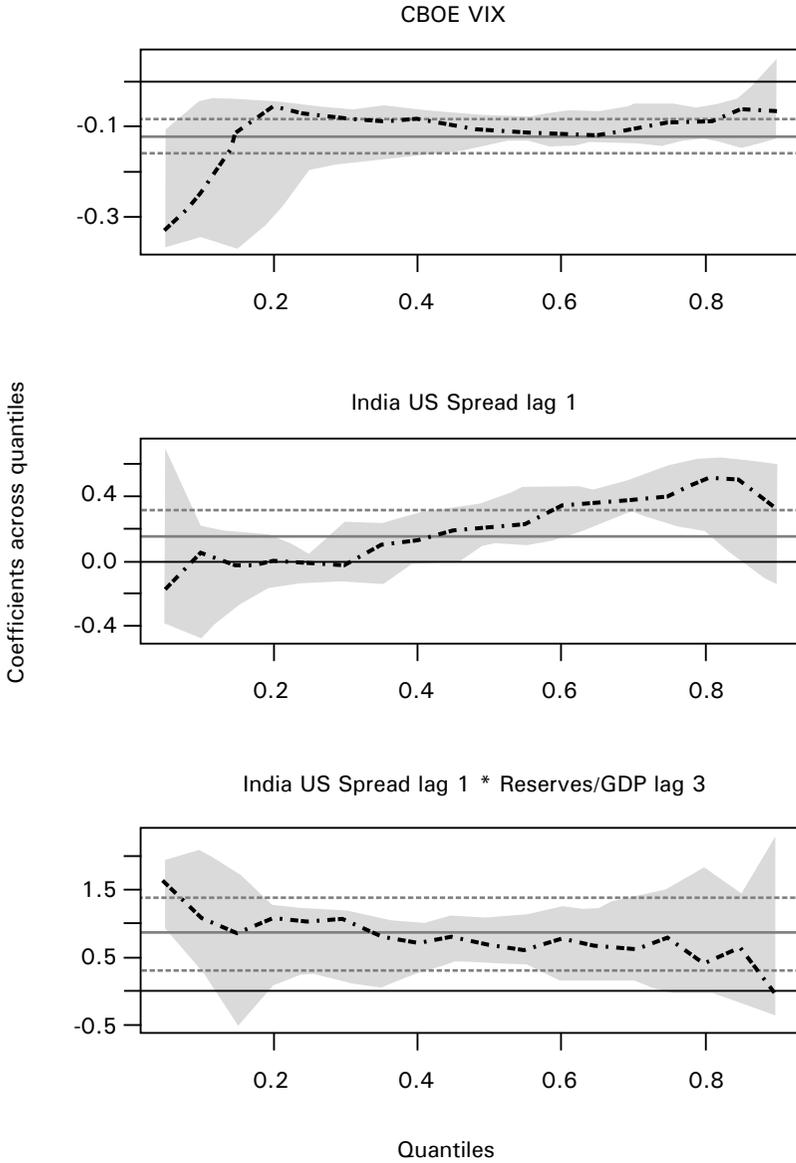
**FIGURE B.1 (d).** Impact of Growth Differential Shock on Total Capital Flows



Source: Authors' estimates; data described in Appendix A.

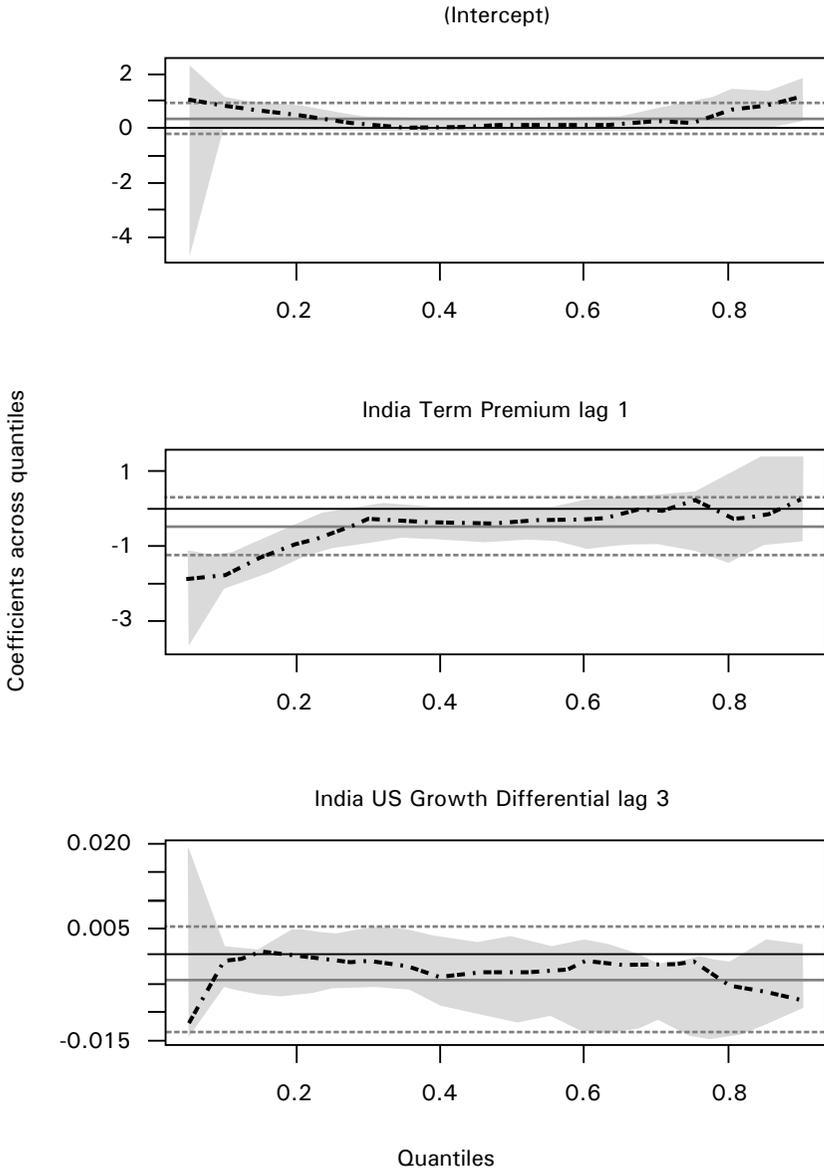
**FIGURE B.2(a). Quantile Regression Results - Dependent Variable = Gross Portfolio Flows. Reserves Interacted with India Term Premium**

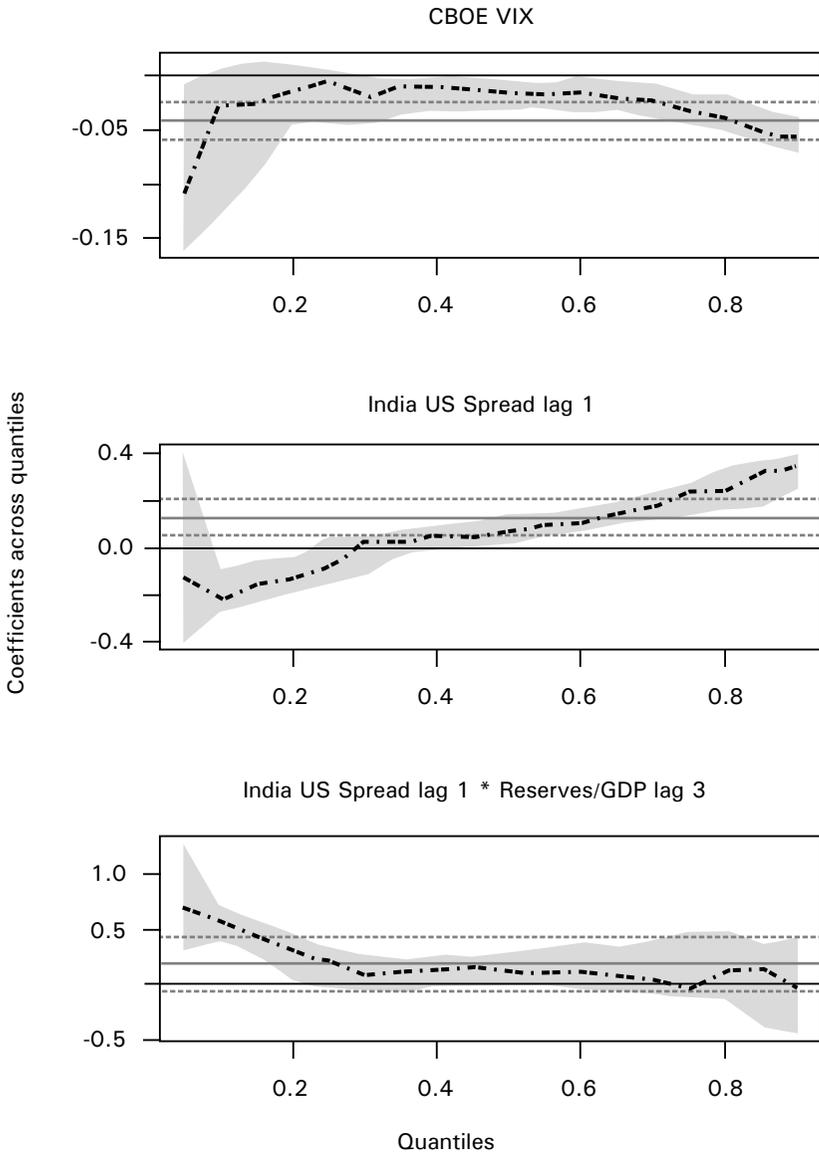




Source: Authors' estimates; data described in Appendix A.

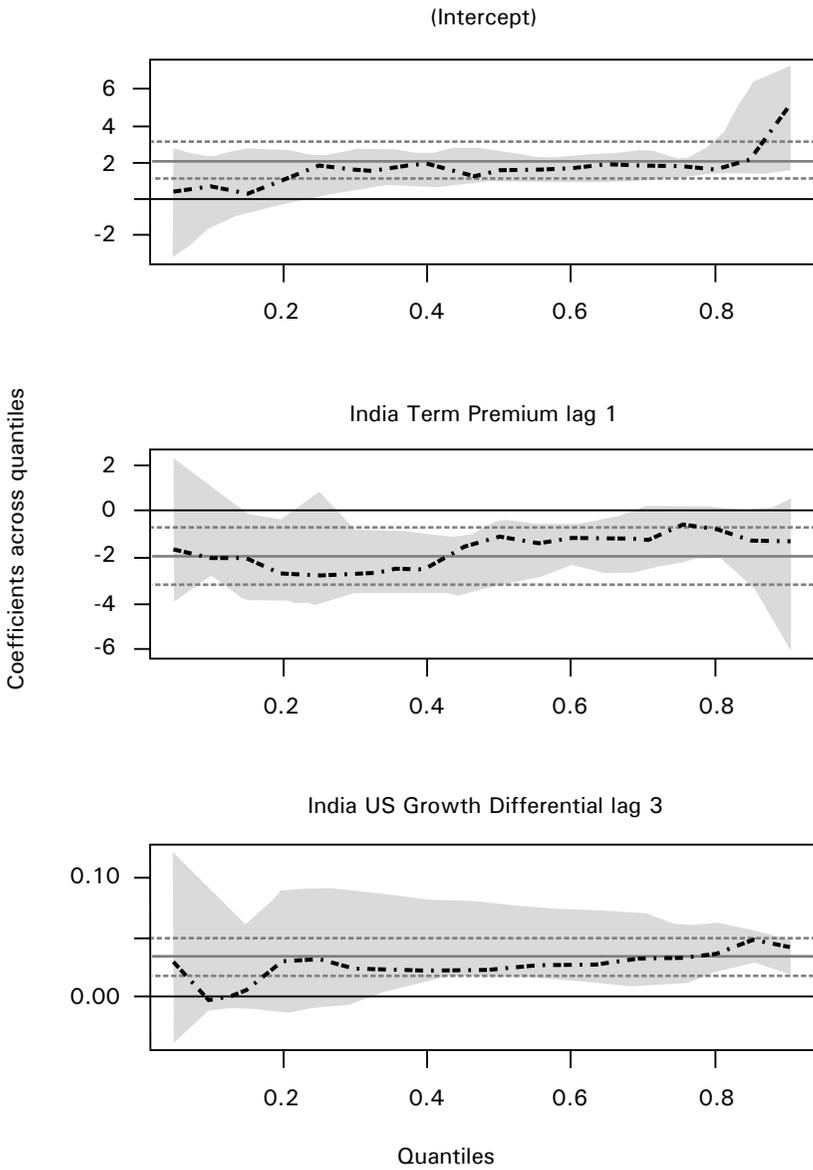
**FIGURE B.2 (b). Quantile Regression Results - Dependent Variable = Debt Flows. Reserves Interacted with India Term Premium**

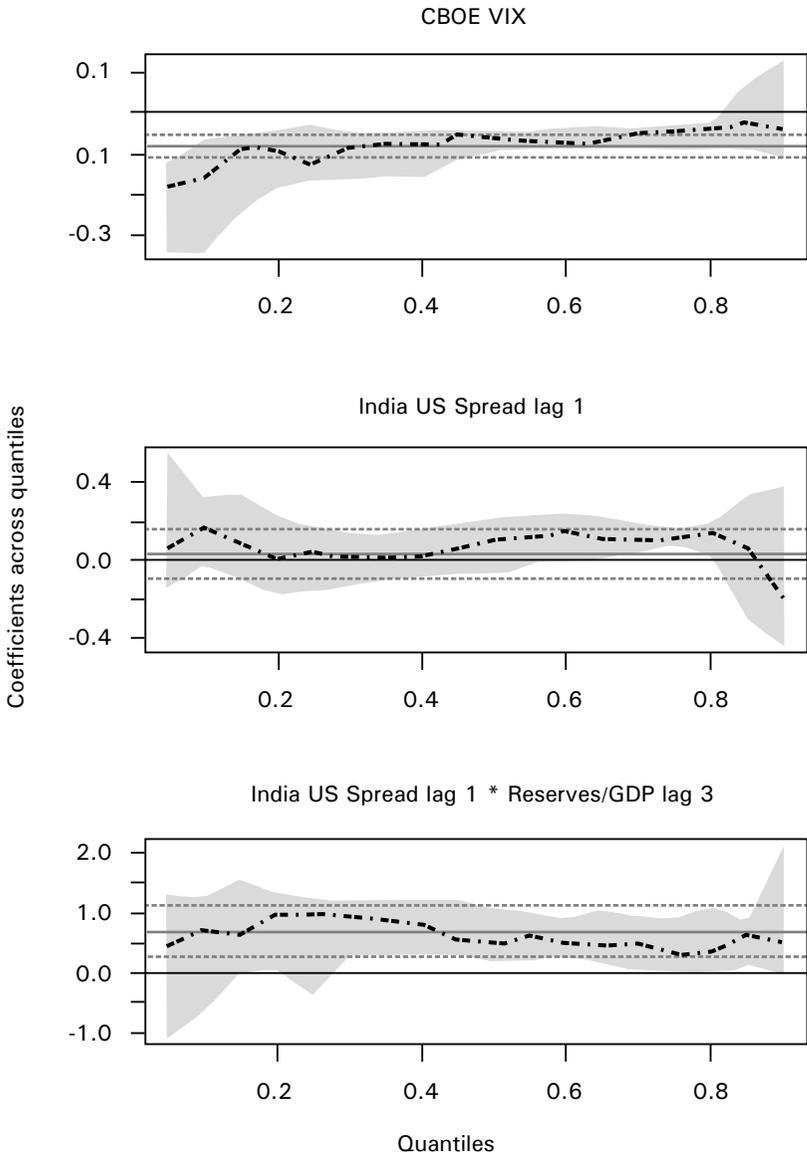




Source: Authors' estimates; data described in Appendix A.

**FIGURE B.2(c). Quantile Regression Results - Dependent Variable = Equity Flows. Reserves Interacted with India Term Premium**





Source: Authors' estimates; data described in Appendix A.

**TABLE B.1. Robustness of Baseline Regression with a 6-month Lag on Reserves to GDP**

<i>Dependent variable: Debt and Equity Flows</i>	<i>.05 Quantile Regression</i>	<i>Median Regression</i>	<i>Mean Regression</i>
VIX	-0.315*** (0.096)	-0.124*** (0.030)	-0.153*** (0.027)
India 10-year term premium	-0.457 (0.328)	0.214 (0.201)	0.064 (0.182)
India-US policy spread	0.050 (0.278)	0.318*** (0.111)	0.224** (0.101)
India-US growth diff	-0.02919 (0.044)	0.034** (0.014)	0.0223* (0.013)
Reserves/GDP	3.353*** (1.097)	1.214 (0.800)	1.727** (0.723)
Constant	-5.73486 (2.813)	-1.584 (1.869)	-1.720 (1.689)
Number of observations = 237		Adj R-squared = 0.128	

Source: Authors' estimates; data described in Appendix A.

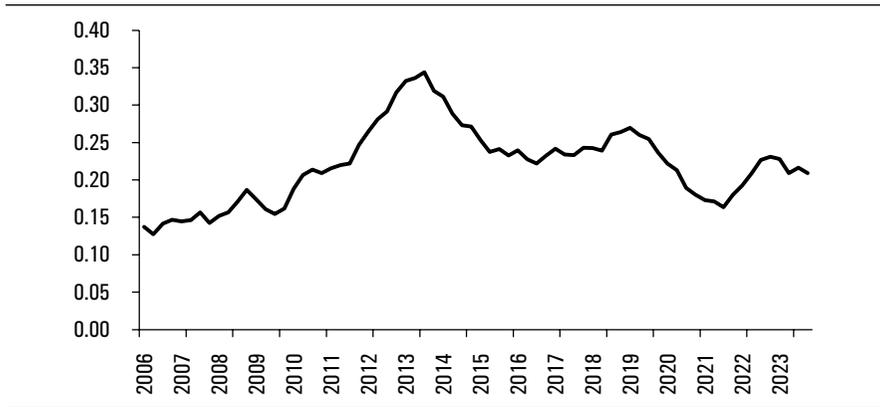
**TABLE B.2. Robustness of the Baseline Regression with the Ratio of Reserves to M3 for Reserves to GDP (lagged 3 months)**

<i>Dependent Variable: Debt and Equity Flows</i>	<i>.05 Quantile Regression</i>	<i>Median Regression</i>	<i>Mean Regression</i>
VIX	-0.300*** (0.060)	-0.101*** (0.025)	-0.124*** (0.023)
India 10-year term premium	0.449 (0.336)	0.198 (0.190)	0.209 (0.179)
India-US policy spread	0.155 (0.189)	0.253** (0.111)	0.243** (0.105)
India-US growth diff	0.018 (0.067)	0.033** (0.013)	0.031** (0.012)
Reserves/M3	0.089*** (0.021)	-0.0041 (0.015)	0.0174 (0.014)
Constant	-3.108 (2.012)	1.554 (1.040)	1.082 (0.979)
Number of observations = 237		Adj R-squared = 0.113	

Source: Authors' estimates; data described in Appendix A.

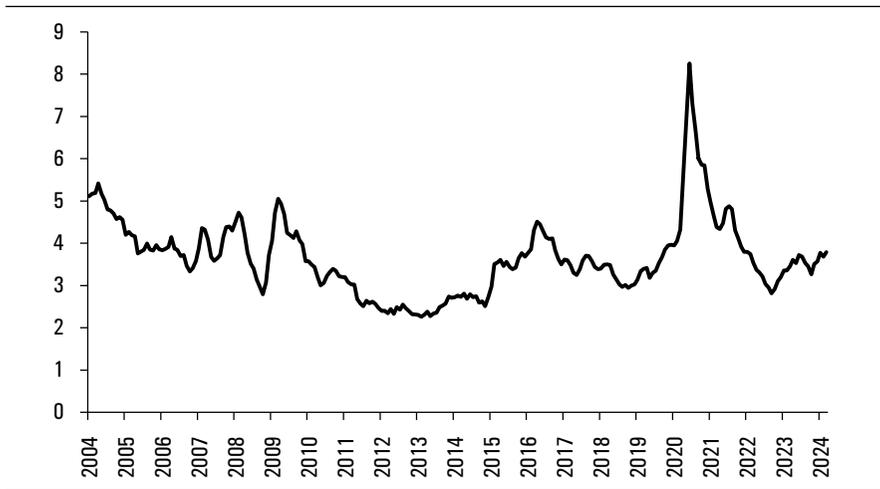
### Appendix C: Additional Figures

**FIGURE C.1. Short-term External Debt to Reserves (In Percent)**



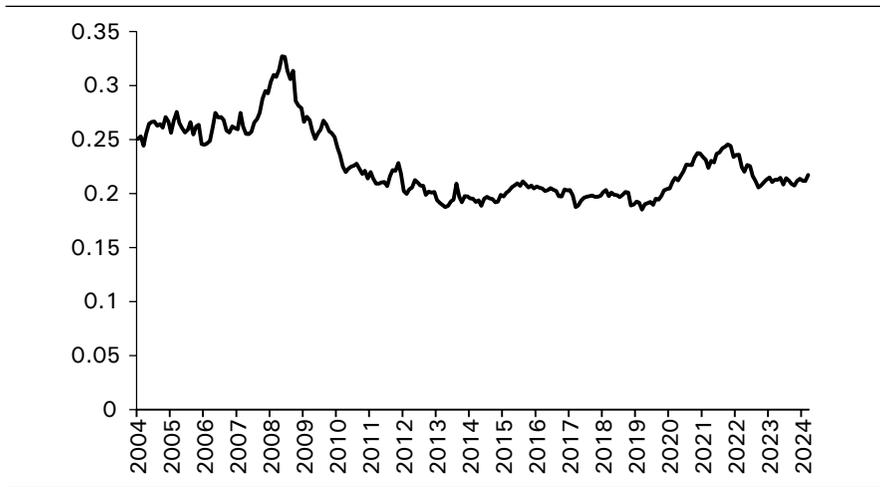
Source: World Bank, Quarterly External Debt Statistics, RBI.

**FIGURE C.2. Ratio of Reserves to 3-months Imports in India**



Source: IMF International Financial Statistics, RBI.

**FIGURE C.3. Ratio of Reserves to Broad Money (M3)**



Source: RBI.

# Comments and Discussion \*

Chair: **Suman Bery**

*NITI Aayog*

## **Poonam Gupta**

*NCAER*

The paper, ‘India’s Foreign Reserves and Global Risk’, by Chetan Ghatе, Kenneth Kletzer, and Mahima Yadav focuses on the important issue of management of foreign exchange reserves by the central banks of emerging markets. The issue has gained further salience in view of the fact that capital flows to large emerging market economies such as India have always been, and continue to remain, volatile.

I present my comments broadly in five parts.

First, the paper could acknowledge the fact that the nature of the external shocks afflicting emerging market economies through the capital account has changed. For the most part, these economies do not face old-fashioned sudden stops, be they country-specific, the kind India experienced in 1991, or regional in nature, such as the East Asian crisis in 1998. Instead, they have been increasingly experiencing what may be called the ‘emerging market sell-off’ episodes. These episodes of reversals of capital flows impact the entire asset class of emerging market economies *en masse*. Among these, the recent occurrences include the sell-off episodes in 2013, 2016, 2018, 2020, and 2022. Such events are very different from the sudden stop episodes in terms of the speed at which they occur, their correlates, their duration, and the way they need to be addressed. Currently, the paper does not account for these different kinds of events, and deals with them rather ambivalently.

Second, some of the key findings in the paper are at odds with the literature, and should be based on a better rationale and explanation. Eichengreen and Gupta (2014) have shown that larger reserves do not insulate countries against emerging market sell-off episodes. They used the “Taper Tantrum” episode of 2013 as the context for their paper, but the phenomenon has extended to all other subsequent episodes too. Recall that India was listed as one of the “fragile five”

---

\* To preserve the sense of the discussions at the India Policy Forum, these discussants’ comments reflect the views expressed at the IPF and do not necessarily take into account revisions to the conference version of the paper in response to these and other comments in preparing the final, revised version published in this volume. The original conference version of the paper is available on NCAER’s website at the links provided at the end of this section.

countries during that episode when its exchange rate seemed to be in a free fall, despite its access to a large stock of foreign reserves. The paper by Eichengreen and Gupta (2014) was the first of its kind in trying to explain the impact of the 2013 sell-off episodes across emerging markets. It established that most of the domestic economic fundamentals, including the level of reserves, did not insulate emerging market economies against the reversal of capital flows and its impact on the exchange rate.

Third, let me make a few important technical observations.

There are large variations in the time periods analyzed across different exercises throughout the paper, and mostly without any justification. The paper should strive to be consistent or explain the deviations.

According to my understanding, the quantitative shock in the paper pertains to 50 percent of the stock of reserves. This is an unusual and unreasonably large shock. The paper should confirm if the results have also been obtained for shocks of more reasonable, smaller magnitudes, for example, one or two standard deviations, or 10 percent of the stock, or something else.

For the scale of the shock that the paper has considered, the quantitative results seem very small. For an event at the 0.01 quantile (a bad shock), a 50 percent increase in the mean reserves lowers the estimated foreign portfolio outflows from \$3.7 billion to \$1.3 billion.

Besides, from what I understand, the quantile regressions have been estimated based on only 10 observations per quantile. In another uncommon treatment in the paper, quarterly GDP data has been converted into monthly data by interpolating the series. Both have the potential to yield spurious correlations. Besides, endogeneity is a more serious issue with monthly data.

As such then, the paper needs to add sensitivity analyses around different episodes and different time periods.

Fourth, I think one of the more interesting parts of the papers could have been to show how the Reserve Bank of India handled different episodes of emerging market sell-offs, for example those occurring in 2013, 2018, and 2022.

These events have had a significant impact on the exchange rate in India. The exchange rate overshot in 2013 and 2018, and then reversed in subsequent months. During 2022, the exchange rate was “allowed” to depreciate very gently, which prevented any overshooting.

In India, the burden of adjustment of reversals of capital flows has traditionally been shared between the exchange rate and reserves. However, the burden has been shifting more towards reserves in recent years. This leads to the following questions: Do the welfare impacts differ based on the impact on the exchange rate versus reserves? How does the volatility of the exchange rate impact the corporate sector, investment rate, or the GDP growth rate?

If an emerging market economy has to repeatedly spend large magnitudes of the reserves, it needs to first build the stocks. For this purpose, all emerging

markets have accumulated reserves. And when compared to the other emerging market economies, especially if scaled by their respective GDP figures, India is not an outlier by any means. Countries hold such levels of reserves because there are very few other global financial safety nets, including reliable and usable contingency lines of the IMF.

Here, we may assess the IMF's advice to India on the exchange rate volatility and the level of foreign reserves. We looked at the Article IV reports of the IMF on India during the last 20 years. During this period, the IMF published 17 reports on the Indian economy. In each one of them, with only a little variation in the assertiveness, the IMF has declared that India has sufficient or excessive reserves, and that it should allow the exchange rate to be the main shock absorber. The only exception to this recommendation was during the years preceding the Taper Tantrum, when India did not build its level of reserves further, and instead allowed the exchange rate to be more volatile than before. During that period, the exchange rate volatility increased significantly, the real exchange rate appreciated, the reserve buffer moderated, and India bore a large brunt of the Taper Tantrum.

This makes me reiterate that the emerging markets behave the way they do because it is rational for them to do so, especially because they have not found the IMF's advice and its facilities to be particularly useful.

Finally, a point that is highly relevant but fails to get adequate attention is the fact that the RBI, like the other central banks, does not only issue currency, but also has to back it up by holding assets on the asset side of the balance sheet. In practice, they hold a mix of foreign assets and domestic assets. This role of the foreign reserves is probably neither understood nor discussed fully.

If the central banks do not hold foreign assets, they would have to hold domestic assets. The questions that arise are: Which domestic assets should they then hold? Should they hold more government paper? Or should they lend directly to the corporate sector and hold their papers? Or a combination thereof?

The RBI's balance sheet has evolved as a percentage of GDP. In recent years, it has stabilized at about 25 percent of GDP. The share of net foreign assets in the total balance sheet has stabilized at about 70 percent of the total, with the rest being domestic assets. If we suggest that the RBI should hold fewer reserves, unless it shrinks its balance sheets, it will have to hold more domestic assets. Would that be a prudent shift? What would be the net payoff of such a shift? What kind of assets should the RBI hold? The paper would do well to address these questions in greater detail.

**Barry Eichengreen**

*University of California (Berkeley)*

It is a pleasure to comment on this paper co-authored by Professor Kenneth Kletzer of my undergraduate alma mater. What I know about this topic comes from work that Poonam Gupta and I have done together. I will be relatively brief in the hope that we will not repeat one another!

The authors' diagram on reserves makes the point that reserve accumulation is a prominent feature of the Emerging Markets the world over during the last quarter century, and that India is a case in point where reserves have risen quite strongly.

A look at these figures also leads me to ask a couple of questions. Nearly 80 central banks around the world report the composition of their foreign exchange reserves. Why not the RBI? And shouldn't we take gold out? When reserve managers buy gold, they buy it to hold it; they don't use it for the kind of interventions analyzed in this paper. Gold is clunky, it has to be vaulted below ground. It's a different kind of reserve, so I would argue that it should be removed.

The authors distinguish three reasons for holding reserves: as a buffer against capital flow reversals; to enable interventions in the foreign exchange market; and for mercantilist reasons (in other words, to keep the exchange rate down). So, my appetite was whetted. I was looking forward to an analysis of all three of these motives. In fact, the analysis is almost entirely about the first of the three.

Reserve accumulation is not uncontroversial. We saw how India holds way more reserves than normal, as normal is defined by the International Monetary Fund. And we know that reserves are not costless. Emerging Markets holding U.S. Treasuries earn low returns (maybe a little less low recently). They earn less on their reserves than they pay on the debt that they issue. Dani Rodrik already made this point a couple of decades ago.

I hoped to find in this paper a welfare evaluation of the overall, or total, costs and benefits of holding foreign exchange reserves and whether there is a justification for the unusually extensive reserve holdings of the RBI. The authors do contribute both on the cost and benefits. In terms of benefits, they show that reserves reduce the impact on capital flows of global shocks. In terms of costs, they suggest that these are a bit less than one might think, because if a country holds reserves it can issue domestic debt at a slightly lower interest rate, hence the differential it pays is more moderate.

This is a sophisticated and convincing empirical analysis. I am broadly on board with the conclusions, although I have a few questions. To repeat, the authors remind us that countries hold reserves for three reasons. But the authors don't say a lot about how we might quantify the benefits of forex market intervention; and how we quantify the returns to an undervalued exchange rate.

Other work already in the public domain can help us to address these issues. I could immodestly point to my own paper, “The Real Exchange Rate and Economic Growth” (written for the World Bank) showing that countries that have maintained a competitively valued exchange rate, moving resources into the exports sector, have done better in the medium term in terms of economic growth. Similarly, there is substantial literature negatively connecting exchange rate volatility to economic growth.

I have always found the focus in such empirical analyses on non-resident capital flows to be a bit peculiar. I had the office next door to Jeff Frankel when he wrote his paper on the Mexican Financial Crisis, where he showed using data for closed-end mutual funds that the domestic investors “ran” (engaged in capital flight) before foreigners. Evidently, whether it is appropriate to focus on non-resident flows depends on circumstances. Maybe this is appropriate for India because of capital controls that constrain the ability of the domestic investors to invest abroad. But I think, more generally, this focus on residents as always and everywhere the source of volatility is inappropriate. In a sense, though, I’m not criticizing the authors as I am criticizing the literature.

I am not a quantile regression guy. I would have used a little more guidance about how to interpret the dashed lines (in Figures 8, 10, 12, and 15) depicting these results. You can see for one that matters the most, that depicting the effect of reserves on capital flows, that the only place where the response is consistently outside the two-standard-error bounds around the zero line is way at the bottom, where there are large outflows. This leads the authors to suggest that reserves dampen portfolio outflows only in the very worst states of the world. That made me wonder again about the efficacy of the RBI’s large reserves. India hasn’t experienced the very worst capital-account states of the world. It hasn’t had a massive financial crisis or a big capital flow reversal, at least since 1991. It had experienced some mild pressure on its capital account during the various taper tantrums, but no more. If reserves are to be held to insure the country only against the worst states, then maybe India doesn’t need so many.

Finally, when I see regressions like these, I naturally wonder about reverse causality. When the government is more creditworthy, capital will flow in, leading to accumulation of reserves, as the authorities intervene to prevent the exchange rate from becoming seriously overvalued.

To conclude, I am still hungry to know whether India’s reserves are too high, too low or just right.

## Ranil Salgado

*IMF*

This is quite an interesting paper, in line with what the IMF does. I will clarify the IMF's views about India's reserves in my comments. The paper focuses on, as Barry (Eichengreen) mentions, optimal levels of reserves, basically looking at the precautionary motive balanced against the opportunity cost. It does mention other reasons: short-term volatility issues as well as mercantilism. Short-term volatility is a big issue for countries. For example, I was just working on Japan where they have been intervening to quell some of the short-term dollar-yen volatility over the past couple of years. There are a few other reasons for reserve accumulation or foreign exchange intervention, and these include consistency with monetary policy objectives such as inflation targets. And for some countries, there is an issue for long-term savings, especially if it's a resource-rich country besides intergenerational equity. My comments focus on some of the policy implications in the paper and especially how the IMF addresses reserve adequacy and more realistically the overall external position of a country and how this may apply to India. I do have a few technical issues which I shall share separately with the authors.

To start, we at the IMF would agree that foreign reserves, in conjunction with sound policies and fundamentals, would bring significant benefits by reducing the likelihood of a Balance of Payments crisis and preserving economic and financial stability. And this is broadly in line with what the first part of the paper tries to address.

At the IMF, we also set this against the cost of holding reserves, and there are multiple ways to do it. So, we examine this issue regularly in our consultations and even in our general surveillance. And the point I would like to make here is that it's a forward-looking discussion on reserve adequacy.

Although we have these various metrics, we also want to consider potential emerging external vulnerabilities. That's also something that you need to take into account for India.

In that context, we also try to make a broader assessment of the country's external position, including based on IMF projections as well as projections by the authorities. And given our (IMF's) global role, we also need to assess that not only against the implications for a country, but also global stability, something that Barry touched upon.

In terms of how we assess reserve adequacy, it's not as simple as has been discussed so far. It depends on country characteristics and circumstances, and any of these can change. A simple categorization is looking at it by development stage or income level, but I would also add financial market development. In other words, we use different analysis depending on whether a country is advanced, emerging, or low-income. And on emerging, you can think of countries that

have more advanced dynamics, more like an advanced country. And of course, there are other reasons for reserve-holding beyond precautionary reasons.

For example, for advanced economies, we don't really have the same metrics as for other types of countries. We do scenario analysis. With developed financial markets, you don't expect the country to need a lot of reserves because you can mobilize the domestic financial sector. I think Suman Bery mentioned at the beginning that Japan is one country that still holds a lot of reserves. That's more a legacy issue because they do have a substantial financial market to rely on.

For an emerging market like India, we typically look at what we call the assessment of reserve adequacy, or ARA metric. The main benefit of the ARA metric is that it's relatively simple and complete, and also allows for comparability across countries. The components are actually a little different than the ones the authors showed. Some are short-term debt and broad money. But we also look at other liabilities like non-resident equity as well as medium and long-term debt. And we look at exports as opposed to imports, because exports are a potential vulnerability. The metrics shown in the paper are more for what we call credit-constrained countries, or low-income countries. The weight in our metrics depends on the extent to which a country follows a fixed or floating rate regime, and that's going to matter for some of my comments on India, with relatively higher weights or needed reserves based on other liabilities, broad money, and exports for countries with relatively fixed exchange rate regimes.

There are other things to consider like the openness of the capital account—whether a country is commodity-intensive, whether it's dollarized, and so on. Just on the first one on openness, we could place a higher relative weight on broad money if the capital account tends to be more open because of the potential for domestic flight.

For emerging markets, we assess reserves as broadly adequate for precautionary reasons when they range between 100 and 150 percent of the metric.

So, my opening comment is that the reference that “India's reserves comparably surpass IMF's adequacy threshold” is not quite correct. For example, in the last Article IV Staff Report in December, we noted that at end-2022, reserves were about 106 percent of the ARA metric. That's really on the lower end of what we would consider adequate.

This gets to my comment about the exchange rate regime. What you may have noticed over the past year is that the nominal US dollar-INR exchange rate has been relatively tightly managed by the RBI in what is now considered a stabilized arrangement. We are considering India more like a fixed exchange rate regime. Even if you still consider India as having a flexible exchange rate regime, then possibly it will be a little above 150 percent of the metric, but I wouldn't say “very comfortably” above. The reason I wouldn't say “very comfortably” above is because you have to look at it in a forward-looking way

and the issue is that India is now in the process of being included in various global bond indices and we are likely to see increased debt inflows into India. In a forward-looking sense, one of those measures that we look at will now grow and therefore, the need for reserves will also grow.

Finally, just to end on the broader topic of potential opportunity cost, if you also look at how we assess India's overall position, we believe it is moderately stronger than the level implied by medium-term levels and desirable policies. In other words, we view India's current account deficit as somewhat smaller than would be implied by various things, particularly India's level of per capita income, demographic trends, development needs, and relatively favorable growth prospects. India is the largest fast-growing economy in the world. We assess the current account deficit, what we call a norm for India, at around 2.25 percent of GDP. India can comfortably finance a current account deficit at that level and in recent years, it has been closer to 1 percent and even in our near-term projections, it doesn't get up to 2 percent.

So, this gets into the broader potential opportunity cost because the counterpart to external current account balance is saving less investment. To an extent, this means that India may be underinvesting, and there seems to be a greater scope to increase investment.

And this gets back to Suman Bery's initial comments about the need for significant investments for India, including for green transformation.

## General Discussion

Martin Wolf started the general discussion by wondering whether the authors would comment on the important question of the safety of reserves. He said these are, to put it mildly, very uncertain assets issued by grossly irresponsible countries whose willingness to honor their commitments is increasingly in doubt. He said he would like to know whether the government is or should be considering seriously what assets it needs to hold and in particular, whether the liabilities of some of the government reserve-issuers are worth the paper they are printed on.

Udaibir Das expressed several reservations against the technical part of the paper, saying many had been articulated by Poonam Gupta and agreed with her completely. He pointed out three things. First, since the Asian crisis, a lot has changed in terms of the emerging markets' approach towards reserves. The whole notion of how much is needed for precautionary purposes is no longer the burden of the central bank. Disagreeing with Barry Eichengreen over the role of gold as reserve, Das said gold must be kept as it is being used by the emerging markets in a very tactful way and there are a number of transactions. Citing Russia and China, he pointed out that India had just bought gold because that's the way they are building up another portfolio of precaution. His second

point was the notion of sovereign risk tolerance which, he said, determines in the end how much reserves the country is going to keep and for how long. It is one of the elusive things as to how one can define India's risk tolerance because India has a second problem—the policy risk tolerance problem. He said the whole capital account framework implies a lot of reform and one of the reasons why reserves are being built up is because it has to make up its mind on what to do in terms of the exchange rate and capital account. He said both sovereign risk tolerance and policy risk tolerance determine the level (of reserves). On financial stability, he cited the Asian crisis saying that when systems went bust, banks did not have any buffers and a lot had to be done to bail out the banking system or the overall financial system. Over the last 16 years since the global crisis, emerging markets have much more reserves and much more cushion. He said there is a big debate going on today on what precautionary balances are needed by the state and that if one looks at the balance sheets of the financial systems, they are much stronger to take the first impact of outflows of volatility. It is all being reconsidered by a lot of central banks today because they need reserves for other types of exogenous things.

Lata Venkatesh said India started the reserves after the Asian crisis for security and as the paper itself says, more to ensure stability against volatile inflows and outflows. But after the inflows reached a certain level, it had clearly become a means of ensuring domestic competitiveness. She cited how in 2008-09, the Indian rupee was around 6-7 rupees to rmb (Chinese yuan) and now it's 10-11 rupees, and attributed this to India's increasing current account deficit with China. She said it is not only for protection against volatile flows but there is another reason why the currency is kept depreciated and even against specific import-export partners. On volatility, she said if the levels are comfortable, the RBI allows greater volatility to force importers and exporters to hedge.

Referring to Poonam Gupta's comments about 'sudden stops' and 'outflows', Ratna Sahay said the paper is just an exercise to say what would be the probability that there will be outflows. It's a distribution story. Defending the authors, she said they only pointed out that the probability that there will be outflows will be low. On the possibility of outflows even when there are reserves as pointed out by Gupta, Sahay said one needed to know what the counterfactual is. She said the paper uses the empirical evidence of the past and predicts what, at the two ends, the outflows and inflows would be and even more precisely what the risk is. Responding to Martin, she said the US dollar hugely dominates the financial flows and trade flows, and a look at the pattern over time in terms of the holdings of reserves by the central banks brings out that they have been diversifying. But there is no other volume of other assets in the world at all.

Responding to Barry Eichengreen, Kenneth Kletzer, one of the authors, said they did not feel comfortable giving the bottom line (of reserves), which possibly was the task given to them. On Barry noting relatively smaller effects on the spreads, Kletzer said the point estimate gives three base points for a

one percent increase in reserves, which means a marginal cost of three percent less than the percentage spread. So, it's a difference about the marginal cost and not the spread. He said the paper looks at the marginal cost of reserves. He stated that the dashed lines in the figures are slightly different. Those come from the linear regression, the mean regression, and they are at 95 percent confidence intervals for an estimate that is not a quantile regression. On the comment on effects of reserves in the 'worst states', he said it was the focus on the precautionary motive but not the same as benefits of reserves at the margins. As Ratna Sahay pointed out clearly, the paper's focus is on whether reserves raise capital inflows or reduce outflows in the 'worst states', and the benefits of reserves.

Kletzer also said that domestic capital outflows are smaller in magnitude and one of the reasons is restrictions on capital outflows. He said when one looks at capital outflows, there are relatively smaller effects and the paper was focusing on the larger effects. He pointed out that he was looking at Brazil or anywhere in Latin America for the possibility of capital flight entrenchment.

Referring to a paper by Ratna Sahay and Gaston Gelos, the second author, Chetan Ghate said that they actually had a policy measure and regressed on the previous variable with a bunch of controls and calculated the residuals. He said they tried to do the same for this paper but were not getting anything truly robust and hence the correction by lagging, which is a partial correction. On taking gold out, Ghate said they could take a look at it. On Ratna Sahay's question, he said both the US and India are in a tightening cycle and interest rates are low in both. He said the central bank's real motivation behind intervening is to correct any misalignment in the exchange rate. He said Barry talked of 'too many reserves' and Ranil said it is 'too little' on the ARA metric, based on whether one considers India having a fixed or flexible exchange rate. He thanked Ratna for summarizing properly that the paper is calculating probabilities of capital flight at risk, especially at the tails and that an interesting exercise would be to replace reserves with some proxy and seeing whether introducing those opposed to others have the same effects on some of these tail risks mentioned in the paper.

Referring to one of Poonam Gupta's comments about the IMF, Ranil Salgado said it was not correct to say that emerging markets don't have access to IMF contingent credit lines. The issue is why the Asian economies do not access it while Latin America does. He said perhaps it has a legacy of 25 years ago—the Asian financial crisis—and the stigma still remains.

On Martin's question, Barry said he and his co-authors had looked at the impact of sanctions imposed by the US, UK, Europe, and Japan on the currency composition level of foreign reserves and found no impact. He said they had found a modest positive effect on the demand for gold by central banks, but no evidence that the dollar's exorbitant privilege had no damage.

In his concluding remarks, Suman Bery, who chaired the session, said the world monetary system is a non-system and is not delivering the kind of stability or security that would evoke or support the investment boom that the world economy needs. He said if India becomes the largest economy at market prices by the end of the decade, it needs to appreciate some of the responsibilities that come with it. Agreeing with Poonam Gupta, Bery said outside the RBI, there is not much internal debate about what India wants from the global monetary system. He said what India wants for development does crucially depend on global finance, domestic finance, and how they are linked. Thus, the paper opens up a larger agenda.

The session video and all presentations for this IPF session can be accessed by scanning this QR code or going to:  
<https://ncaer.org/event/india-policy-forum-2024/>

