

# State of the Economy: An Analytical Overview and Outlook for Policy

*The inevitable never happens. It's the unexpected always*

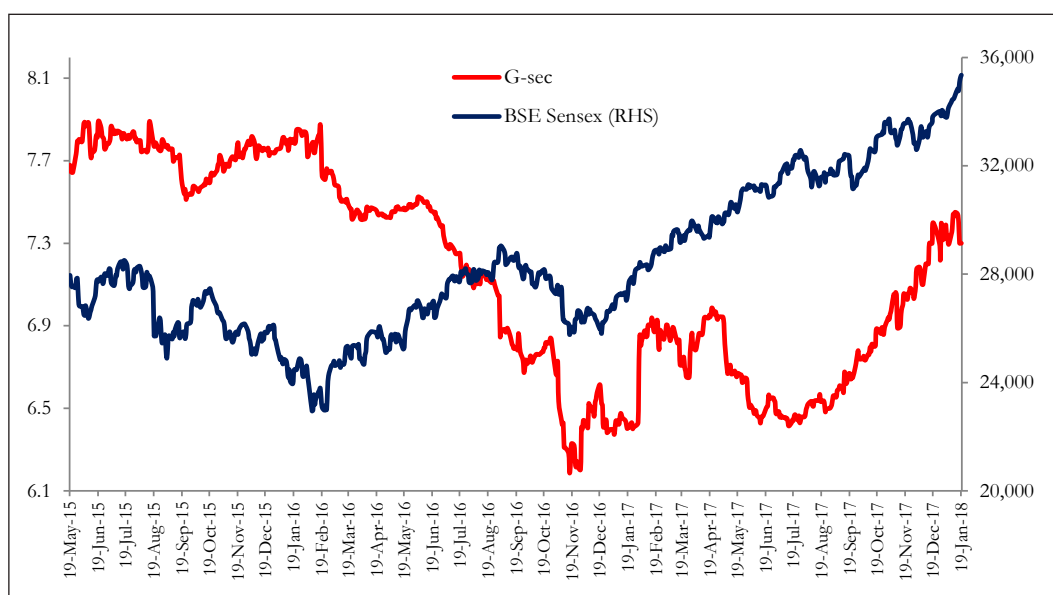
**John Maynard Keynes**

*Major reforms were undertaken over the past year. The transformational Goods and Services Tax (GST) was launched at the stroke of midnight on July 1, 2017. And the long-festering Twin Balance Sheet (TBS) problem was decisively addressed by sending the major stressed companies for resolution under the new Indian Bankruptcy Code and implementing a major recapitalization package to strengthen the public sector banks. As a result of these measures, the dissipating effects of earlier policy actions, and the export uplift from the global recovery, the economy began to accelerate in the second half of the year. This should allow real GDP growth to reach 6¾ percent for the year as a whole, rising to 7-7½ percent in 2018-19, thereby re-instating India as the world's fastest growing major economy. Against emerging macroeconomic concerns, policy vigilance will be necessary in the coming year, especially if high international oil prices persist or elevated stock prices correct sharply, provoking a "sudden stall" in capital flows. The agenda for the next year consequently remains full: stabilizing the GST, completing the TBS actions, privatizing Air India, and staving off threats to macro-economic stability. The TBS actions, noteworthy for cracking the long-standing "exit" problem, need complementary reforms to shrink unviable banks and allow greater private sector participation. The GST Council offers a model "technology" of cooperative federalism to apply to many other policy reforms. Over the medium term, three areas of policy focus stand out: Employment: finding good jobs for the young and burgeoning workforce, especially for women. Education: creating an educated and healthy labor force. Agriculture: raising farm productivity while strengthening agricultural resilience. Above all, India must continue improving the climate for rapid economic growth on the strength of the only two truly sustainable engines—private investment and exports.*

## OVERVIEW: SHORT TERM

1.1 The past year has been marked by some major reforms. The transformational Goods and Services Tax (GST) was launched in July 2017. With a policy change of such scale, scope, and complexity, the transition unsurprisingly encountered challenges of policy, law, and information technology systems, which especially affected the informal sector. Expeditious responses followed to rationalize and reduce rates, and simplify compliance burdens.

1.2 At the same time, decisive action was taken to grasp the nettle of the Twin Balance Sheet (TBS) challenge, arguably the festering, binding constraint on Indian growth prospects. On the 4 R's of the TBS—*recognition, resolution, recapitalization, and reforms*—recognition was advanced further, while major measures were taken to address two other R's. The new Indian Bankruptcy Code (IBC) has provided a resolution framework that will help corporates clean up their balance sheets and reduce their debts. And in another critical move, the government announced

**Figure 1. Two Assets, Two Messages**

Source: Survey calculations, Bloomberg.

a large recapitalization package (about 1.2 percent of GDP) to strengthen the balance sheets of the public sector banks (PSBs). As these twin reforms take hold, firms should finally be able to resume spending and banks to lend especially to the critical, but-currently-stressed sectors of infrastructure and manufacturing.

1.3 Macroeconomic developments this year have been marked by swings. In the first half, India's economy temporarily "decoupled," decelerating as the rest of the world accelerated – even as it remained the second-best performer amongst major countries, with strong macroeconomic fundamentals. The reason lay in the series of actions and developments that buffeted the economy: demonetization, teething difficulties in the new GST, high and rising real interest rates, an intensifying overhang from the TBS challenge, and sharp falls in certain food prices that impacted agricultural incomes.

1.4 In the second half of the year, the economy witnessed robust signs of revival. Economic growth improved as the shocks began to fade, corrective actions were taken, and the synchronous global economic recovery boosted exports. Reflecting the cumulative actions to improve the business climate, India jumped 30 spots on the

World Bank's Ease of Doing Business rankings, while similar actions to liberalize the foreign direct investment (FDI) regime helped increase flows by 20 percent. And the cumulative policy record combined with brightening medium-term growth prospects received validation (as argued for in Box 1 of last year's *Economic Survey*, Volume I) in the form of a sovereign ratings upgrade, the first in 14 years.

1.5 These solid improvements were tinged with anxieties relating to macro-economic stability. Fiscal deficits, the current account, and inflation were all higher than expected, albeit not threateningly so, reflecting in part higher international oil prices—India's historic macroeconomic vulnerability.

1.6 These dualities of revival and risk have been reflected in the markets, and in market analysis. For example, bond yields rose sharply, leading to an exceptionally marked steepening of the yield curve—even as stock prices continued to surge (Figure 1). Evidently, markets expect rapid growth, which would warrant the run-up in stock prices, but are also pricing in some macro-balance concerns. Similarly, even the ratings upgrade carried warnings of potential macro-economic challenges.

1.7 Despite major policy reforms and even in the absence of major new actions, the policy agenda remains full. Over the coming year, the government will need to focus on the 4 R's, ensuring that the process of resolving the major indebted cases and recapitalizing the PSBs is carried to a successful conclusion, while initiating reforms of the PSBs that will credibly shrink the unviable ones and signal greater private sector participation in the future. The government will also need to stabilize GST implementation to remove uncertainty for exporters, facilitate easier compliance, and expand the tax base; privatize Air-India; and stave off any nascent threats to macro-economic stability, notably from persistently high oil prices, and sharp, disruptive corrections to elevated asset prices.

1.8 If these objectives are achieved, the world economy maintains its growth momentum, and oil prices do not persist at current levels, the Indian economy should resume converging towards its medium-term growth potential that previous *Economic Surveys* have estimated to exceed 8 percent. India would then regain its status as the fastest growing major economy.

## OVERVIEW: THE MEDIUM TERM

1.9 The twilight of the government's current term is an appropriate juncture to step back and draw broader lessons for the Indian economy going forward.

1.10 First, India has created one of the most effective institutional mechanisms for cooperative federalism, the GST Council. At a time when international events have been marked by a retreat into economic nativism and the attendant seizing of control, Indian states and the center have offered up a refreshing counter-narrative, voluntarily choosing to relinquish and then pool sovereignty for a larger collective cause.

1.11 Cooperative federalism is of course not a substitute for states' own efforts at furthering economic and social development. But it is a critical complement, needed to tackle a wide array of difficult structural reforms that involve the states. For example, the "cooperative federalism technology" of the GST Council could be used to create a common agricultural market, integrate fragmented and inefficient electricity markets,

solve interstate water disputes, implement direct benefit transfers (DBT), make access to social benefits portable across states, and combat air pollution.

1.12 Second, the 2015-16 *Survey* highlighted in Chapter 2 that facilitating "exit" has been one of India's most intractable challenges, evoking the generalization that over the last 50 years India had gone from "socialism with limited entry to marketism without exit." The IBC resolution process could prove a valuable technology for tackling this long-standing problem in the Indian corporate sector. The recently proposed Financial Resolution and Deposit Insurance (FRDI) bill would do the same for financial firms.

1.13 In the case of the TBS challenge, exit has proved particularly intractable because the objectives are many, conflicting, and politically difficult. Policymakers have had to find a way to reduce the debts of stressed companies to sustainable levels. At the same time, they have had to minimize the bill to taxpayers, limit moral hazard, and avoid the perception of favoring controlling equity holders (promoters). The IBC aims to solve these problems through the expedient of transparently auctioning off stressed firms to the highest bidders, excluding those which are toxically blemished. This procedure is still a work in progress: ensuring that timetables are respected and the bidding outcomes are accepted by all parties in the early cases is critical for establishing its credibility.

1.14 Third, a major plank of government policy has been to rationalize government resources, redirecting them away from subsidies towards public provision of essential private goods and services at low prices, especially to the poor. Government data suggests that progress has been made in providing bank accounts, cooking gas, housing, power, and toilets (amongst others), holding out the prospect that the lives of the poor and marginalized will improve in meaningful ways (Box 1). The pace and magnitude of this improvement will depend upon the extent to which increased physical availability/provision is converted into greater actual use: toilet building into toilet use, bank accounts into financial inclusion, cooking gas connections into consistent gas offtake, and village electrification into extensive household connections.

### Box 1. Public Provision of Private Goods and Services

This Box “charts” the progress made in the government’s provision of some key private goods and services.

#### A. Sanitation (“Swachh Bharat”)

Table 1. Toilet Coverage and Usage

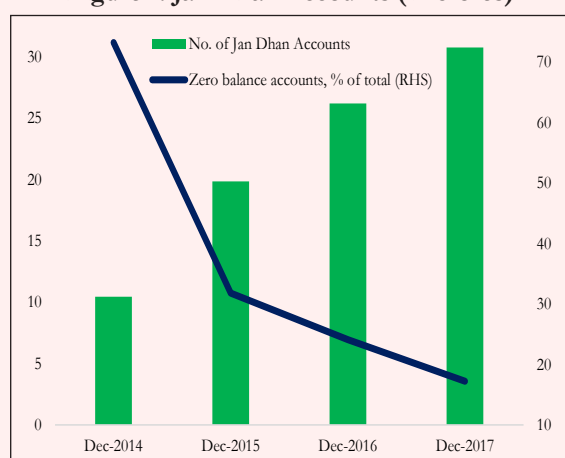
Data Source	Toilet Coverage (in percent of Households in Rural India)				Toilet usage (in percent of those with Toilets)
	Census 2011	NFHS 2015-16	QCI (2017)*	Nov-2017 (SBM-MIS)**	QCI (2017)*
All India - Rural	31	47	63	74	91

Source: Census, National Family Health Survey (NFHS) 2015-16; \* -Based on the Swachh Survekshan Gramin 2017 conducted by Quality Council of India as a third party assessment. 1.4 lakh rural households were surveyed across 4626 villages.

\*\*As reported by Swachh Bharat Mission MIS system.

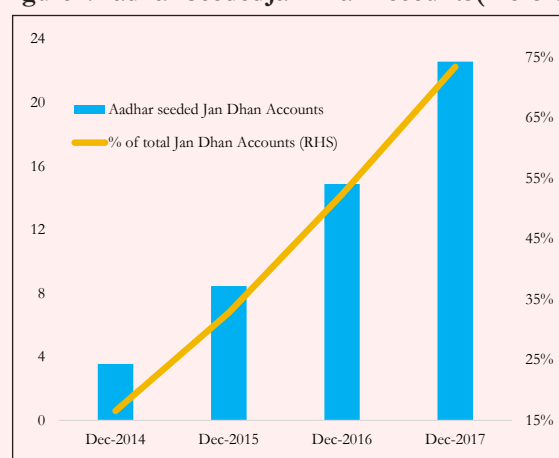
#### B. Bank Accounts

Figure 1. Jan Dhan Accounts (in crores)



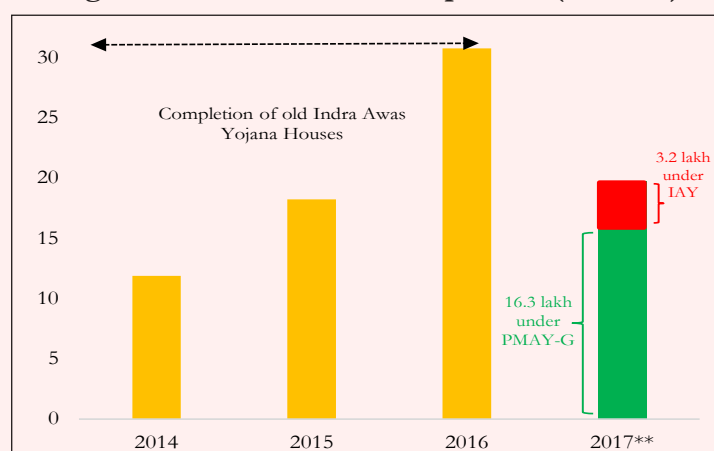
Source: Department of Financial Services, Survey calculations.

Figure 2. Aadhar-Seeded Jan Dhan Accounts (in crores)



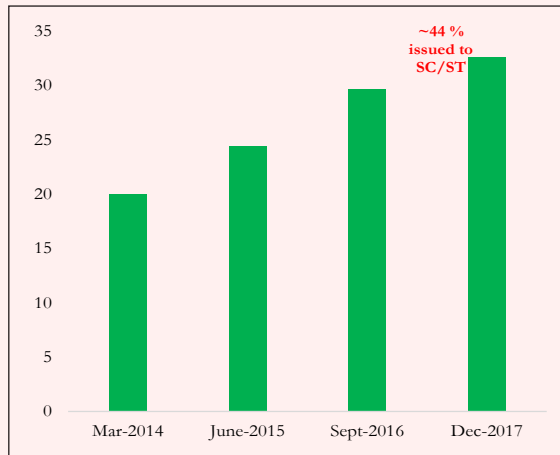
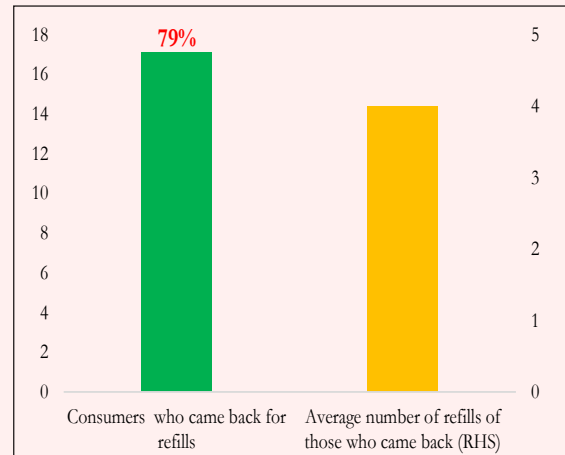
#### C. Housing – Pradhan Mantri Awas Yojana-Gramin

Figure 3. Rural Houses Completed\* (in lakhs)



Source: MoRD; Blocks in Yellow represent completed houses under the old Indra Awas Yojana (IAY); \*\*.The green block represents completed houses under the Pradhan Mantri Awas Yojana-Gramin (PMAY-G) as of 20<sup>th</sup> January 2018. PMAY-G was launched in November, 2016.



**D. Gas connections: Ujjwala****Figure 4. Ujjwala Connections Issued (Cumulative, millions)****Figure 5. Ujjwala Refills (total in millions and average\*)**

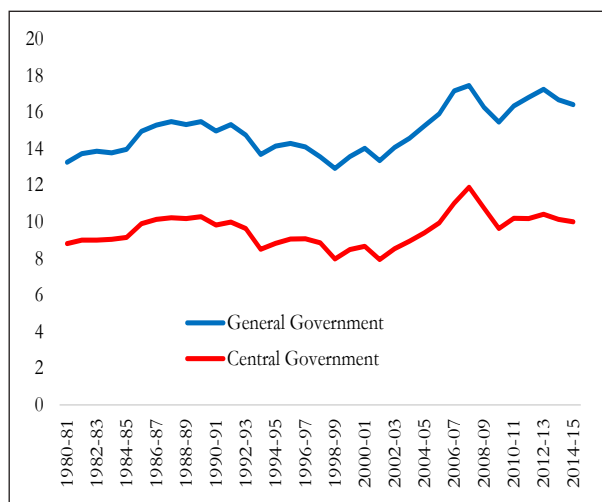
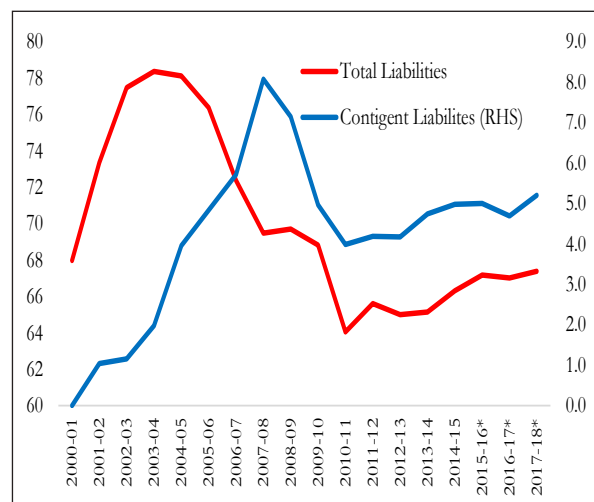
Source: Ministry of Petroleum &amp; Natural Gas.

\* Based on data of new connections issued between 1<sup>st</sup> May 2016 to 30<sup>th</sup> April, 2017.

1.15 Fourth, recent macroeconomic developments are a reminder that the battle for macro-economic stability is never won, that even major victories (such as those post-2014) are always provisional, and that vigilance is always needed.

1.16 India has two underlying macroeconomic

vulnerabilities, its fiscal and current accounts, both of which tend to deteriorate when oil prices rise. Overcoming the fiscal vulnerability requires breaking the inertia of the tax-GDP ratio. It is striking that the center's tax-GDP ratio is no higher than it was in the 1980s, despite average economic growth of 6.5 percent, the most rapid in India's history (Figure 2). The GST could help

**Figure 2. Tax Revenue (in percent of GDP)****Figure 3. Cumulative Contribution of Realized Contingent Liabilities\* to General Government Debt (in percent of GDP)**

Source: Budget documents, Survey calculations; \*- Estimated based on state and central government budgets. 2015-16 and 2016-17 includes UDAY, and 2017-18 includes proposed bank recapitalisation.

break this fiscal stasis, with positive spillovers for macro-economic stability. Also, there is evidence of a noteworthy increase in the number of tax filers in the demonetization-GST period (Box 2).

1.17 Overcoming the fiscal vulnerability also requires halting the steady conversion of contingent liabilities into actual ones (typically through the assumption of state discom debts and public sector bank recapitalization), which has impeded progress in debt reduction even in the face of solid growth and apparently favorable debt dynamics. Figure 3 shows that contingent liabilities have added about 5 percentage points of GDP to total government debt since 2000-01. Not only the central government but also state governments will need to address this challenge.

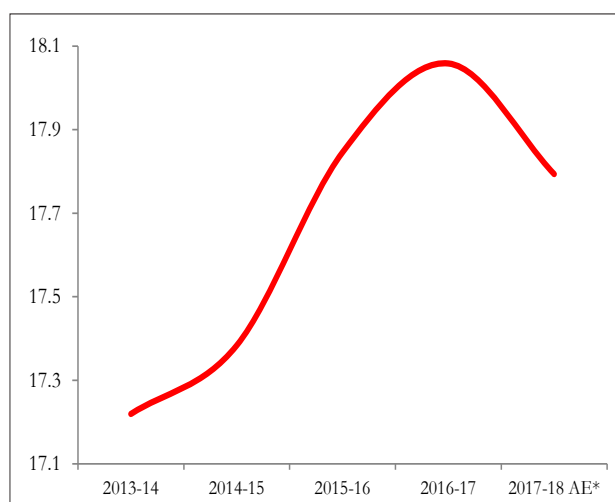
1.18 Addressing the current account vulnerability requires raising the trajectory of export growth. Here, an important lesson is the need for macroeconomic policy to support the development strategy. Reviving manufacturing and making the sector internationally competitive have been the twin goals of the Make in India program, underpinned by a strategy of

reducing the costs of doing business. As a result, the share of manufacturing in GDP has improved slightly (Figure 4). However, the international competitiveness of manufacturing has not made great strides, reflected in the declining manufacturing export-GDP ratio and manufacturing trade balance (Figure 5).

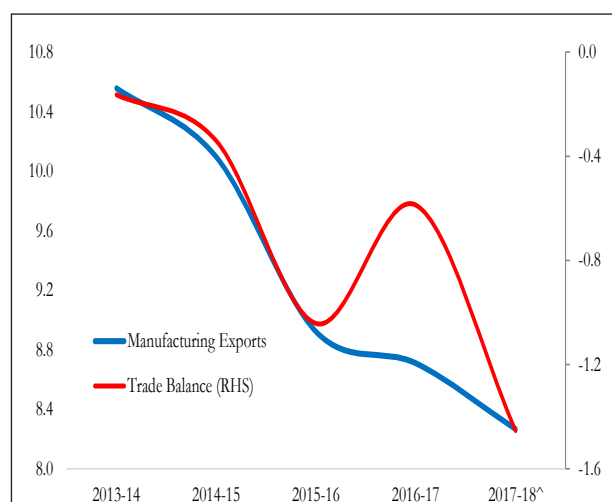
1.19 The Indian economy's competitiveness has had to contend with the real effective exchange appreciating about 21 percent since January 2014 (Figure 6). Policymakers have struggled to come to grips with the international trilemma, whereby an independent monetary policy and an exchange rate objective cannot co-exist with an open capital account (Rey, 2013; Gopinath, 2017).

1.20 The issue is that both competitive exchange rates and open capital accounts are helpful for growth. Changes in price competitiveness can make a major difference to export performance as highlighted in the government's export package for clothing (Box 3). At the same time, open capital accounts attract foreign saving, providing additional funds for investment, which can help

**Figure 4. Manufacturing Gross Value Added (GVA) (in percent of GDP)**



**Figure 5. Manufacturing Exports and Trade Balance (in percent of GDP)**



Source: DGCIS, Survey calculations.

\* AE – Advanced Estimates by CSO. Manufacturing exports exclude oil, gold and silver.

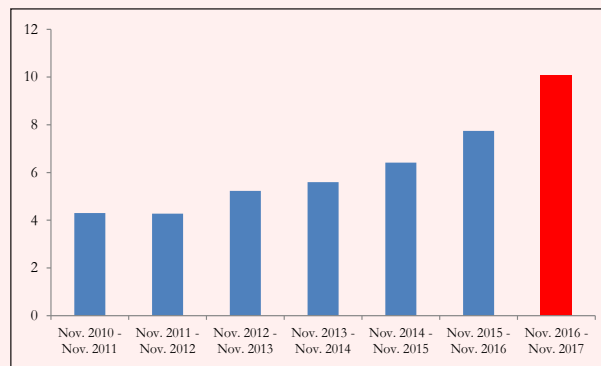
^The 2017-18 trade estimate annualizes April-November trade data, based on the average share of the first 8 months in the yearly total during the last three years.

### Box 2. The Increase in Taxpayers Post-Demonetization

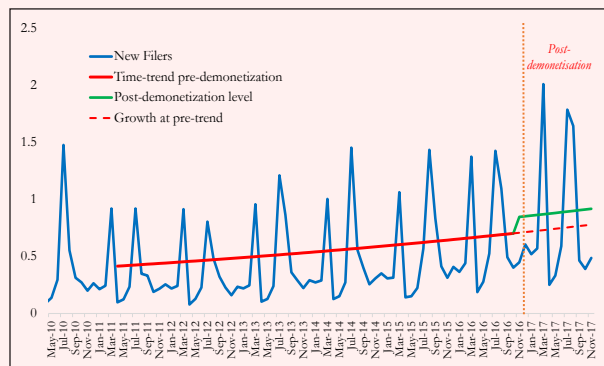
One of the aims of demonetization and the Goods and Services Tax (GST) was to increase the formalization of the economy and bring more Indians into the income tax net, which includes only about 59.3 million individual taxpayers (filers and those whose tax is deducted at source in 2015-16), equivalent to 24.7 percent of the estimated non-agricultural workforce. Has this happened and to what extent?

At first blush, there does seem to have been a substantial increase in the number of new taxpayers. Figure 1 compares the total number of new taxpayers in the 13 months since demonetization (November 2016 – November 2017) with previous 13-month time windows. After November 2016, 10.1 million filers were added compared with an average of 6.2 million in the preceding six years.

**Figure 1. New Tax Filers (in millions)**



**Figure 2. Monthly New Tax Filers (in millions)**



Source : Department of Revenue (CBDT), Survey calculations.

A rigorous assessment of the impact of demonetization, however, must account for the pre-existing trend growth in new tax filers. To address this, a regression analysis is undertaken. The result is depicted in Figure 2. Taking seasonality into account it is found that there is a 0.8 percent monthly trend increase in new tax filers (annual growth of ~10 percent). The level of tax filers by November 2017 was 31 percent greater than what this trend would suggest, a statistically significant difference.<sup>1</sup> This translates roughly into about 1.8 million additional tax payers due to demonetization-cum-GST, representing 3 percent of existing taxpayers.

Further analysis suggests that new filers reported an average income, in many cases, close to the income tax threshold of Rs. 2.5 lakhs, limiting the early revenue impact. As income growth over time pushes many of the new tax filers over the threshold, the revenue dividends should increase robustly.

growth. So how can policymakers choose between them?

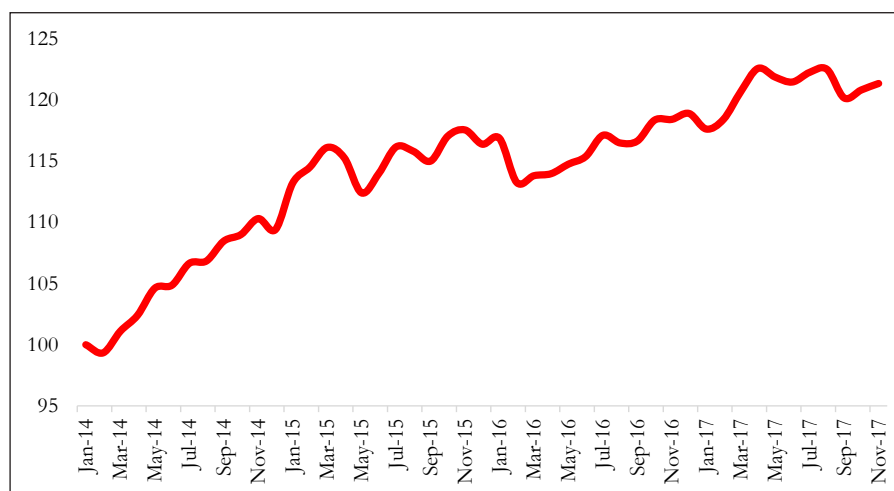
1.21 Chapter 3 presents some subtle findings from broader cross-country experience, suggesting that additional savings may not necessarily boost growth. Meanwhile, Rodrik (1998) provides evidence that a competitive exchange rate that boosts investment and growth will elicit its own saving. In other words, there is economic evidence suggesting competitive exchange rates are more important for export-led growth. At the same

time, Box 4 shows that the domestic political economy of exchange rates favors an open capital account and a stronger, less competitive exchange rate.

1.22 A fifth lesson is this: while there are significant social and economic benefits to attacking corruption and weak governance, addressing those pathologies entails challenges. In the case of the GST and demonetization, informal cash-intensive sectors of the economy were impacted. In the case of the TBS, the

<sup>1</sup> Specifically, we estimate the following regression:  $\text{Log } F_m = \alpha T + \beta (\text{D-GST}) + \text{FE}_m$  where  $F_m$  is the number of new filers in month  $m$ ,  $T$  is the time trend, D-GST is a dummy for the post-November 2016 period; and FE are month fixed effects to account for seasonality in tax filing. The coefficient  $\alpha$  indicates the trend growth in filers while  $\beta$  (or strictly speaking  $e^\beta - 1$ ) measures the extent to which the level of filers is greater post-November 2016 after accounting for the natural trend growth in new tax filing.

**Figure 6. Real Effective Exchange Rate (REER-IMF)  
(January 2014=100)**



Source : IMF, Survey calculations.

decision to ban promoters of firms with non-performing loans from the IBC auctions may have been necessary to minimize moral hazard going forward; otherwise firms would have an incentive to default on their loans, then offer to repay them at a discount. But it carried the possibility of fewer bidders and lower prices in the auctions of insolvent firms.

1.23 In the case of spectrum, coal, and renewables, auctions may have led to a winners' curse, whereby firms overbid for assets, leading to adverse consequences in each of the sectors; but they created transparency and avoided rent-seeking with enormous benefits, actual and perceptual.

1.24 The lesson is that policy design must minimize these costs wherever possible. More specifically, there should be: greater reliance on using incentives and carrots than on sticks; greater focus on addressing the flow problem (the policy environment that incentivizes rent-seeking) than the stock problem; and more recourse to calibrated rather than blunt instruments (such as bans, quantitative restrictions, stock limits, and closing down of markets, including futures markets).

1.25 The sixth lesson relates to the ongoing

international and national debate on the role of markets and states, private capital and public institutions. All over the world, there is a reassessment of the respective roles of the two with a clear tilt toward greater state involvement. The new international case is based on the need to redistribute to check growing inequality and cushion against the impact of globalization. It is also based on the need to regulate, for example, the financial sector to minimize risks and the technology sector to check growing market power and its misuse as a communications medium.

1.26 But India is in a grey zone of uncertainty on the role of states and markets. Limitations on state capacity (center and states) affect the delivery of essential services such as health and education. At the same time, the introduction of technology and the JAM (Jan Dhan—Aadhaar—Mobile) architecture, now enhanced by the Unified Payments Interface (UPI), holds the potential for significant improvements in such capacity.

1.27 The ambivalence relating to the private sector relates to the experience with Indian capital. The private sector has always had to struggle with the stigma that came with being midwived in the era of the license-quota-control Raj. Some of this stigma was washed away during

### Box 3. Do Export Incentives Work? The Clothing Package of 2016

The apparel sector has immense potential to drive economic growth, increase employment, and empower women in India. This is especially true as China's share of global apparel exports has come down in recent years. However, India has not, or not yet, capitalized on this opening. Instead, countries like Vietnam and Bangladesh are quickly filling the space left by China.

Thus, in June 2016, the Cabinet announced a Rs. 6,000 crore package for the apparel sector. The largest component of this package were rebates on state levies (ROSL) to offset indirect taxes levied by the states (the VAT) that were embedded in exports. This ROSL was over and above the duty drawbacks and other incentives (e.g., Merchandise Exports from India Scheme (MEIS)) that were given to offset indirect taxes embedded in exports. Prior to the package, duty-drawbacks were between 7.5 percent - 9.8 percent for apparels. After the package, the ROSL increased export incentives by between 2.8 percent - 3.9 percent.

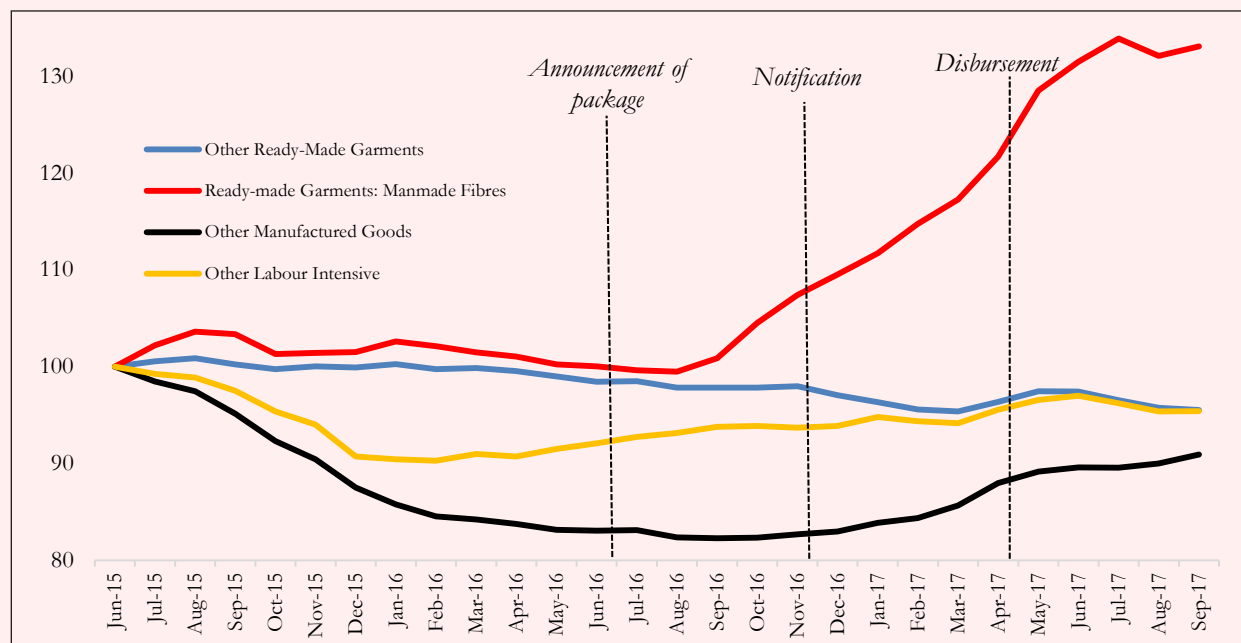
A key question is: did the package succeed? To answer this, we use a well-recognized Difference-in-Difference (DD) approach, which allows us to isolate, albeit imperfectly, the impact of the package. Essentially, the approach asks whether the gap between clothing and comparator group export growth increased after the package was introduced. *Annex I* explains the methodology in greater detail.

Three main findings emerge:

- The package increased exports of readymade garments (RMG) made of man-made fibres (MMFs)
- The package did not have a statistically positive impact on RMG made of other fibres (silk, cotton, etc.); and
- The impact on MMF-RMGs increased gradually over time; by September 2017, the cumulative impact was about 16 percent over other comparator groups.

The figure below shows the growth in clothing exports compared to other labor-intensive and manufacturing goods, which did not receive ROSL. The positive impact on RMGs made of MMF after the package emerges starkly.

**Figure 1. Exports of Ready Made Garments (RMGs) and Selected Other Groups**  
(Index; June 2015 = 100)



Source: Ministry of Commerce and Industry, Survey calculations.

A policy implication is that the GST Council should conduct a comprehensive review of embedded taxes arising from products left outside the GST (petroleum and electricity) and those that arise from the GST itself (for example, input tax credits that get blocked because of "tax inversion," whereby taxes further back in the chain are greater than those up the chain). This review should lead to an expeditious elimination of these embedded export taxes, which could provide an important boost to India's manufacturing exports.



the IT boom that started in the 1990s, because the sector had developed on intrinsic competitive merit rather than proximity to government, had adopted exemplary governance standards, listed on international stock exchanges, and thrived in the global market place. All these developments improved the credentials of Indian capital.

1.28 But then stigmatization was reinforced in the mid-late 2000s, because of the intense rent-seeking and corruption associated with the allocation of spectrum, coal, land, and environmental permits. The infrastructure boom of that period bequeathed the TBS problem of today. As a result, the public concluded that promoters had little skin in the game, that India had “capitalism without equity,” and that instead of limited liability there was very little liability, all further exacerbated the negative perception of Indian capital.

1.29 Now, even the IT sector is confronting governance challenges, as its model of providing low-cost programming for foreign clients comes under threat from rapid technological change. So, one might say that India had moved from “crony socialism to stigmatized capitalism.” It is that *zeitgeist* (or *Maabaul*) of stigmatized capitalism—an accumulated legacy inherited by the government—that made policy reforms so difficult and makes the recent progress in addressing the Twin Balance Sheet challenge noteworthy.

1.30 Finally, last year’s *Survey* (Volume 1, Chapter 2) identified the unfinished agenda in terms of three meta-challenges: addressing inefficient re-distribution; accelerating the limited progress in delivery of essential public services, especially health and education; and correcting the ambivalence toward property rights, the private sector, and price incentives.

1.31 In the light of new analysis done for this Survey and of a broader retrospective evaluation,

it is worth re-emphasizing one and adding two others. The issue that needs re-emphasizing is education. Looking at the looming technological headwinds, and the (small) risks of there being a stall in India’s convergence process, the education challenge cannot be addressed soon enough given India’s learning outcomes (see Box 1 in Chapter 5). Healthy and educated individuals, with the ability to adapt and learn on an ongoing basis, need to be the core of the future labor force. Those individuals must include high numbers of women; for this to happen, they will need to have a status and role comparable to men. Chapter 7 suggests that India lags behind on this dimension.

1.32 The first new issue—yet in some ways the oldest issue—is agriculture. Successful economic and social transformation has always happened against the background of rising agricultural productivity. In the last four years, the level of real agricultural GDP and real agriculture revenues has remained constant, owing in part to weak monsoons in two of those years (Figure 7). And the analysis in Chapter 6 suggests that climate change—whose imprint on Indian agriculture is already visible—might reduce farm incomes by up to 20-25 percent in the medium term. The government’s laudable objective of addressing agricultural stress and doubling farmers’ incomes consequently requires radical follow-up action, including decisive efforts to bring science and technology to farmers, replacing untargeted subsidies (power and fertiliser) by direct income support, and dramatically extending irrigation but via efficient drip and sprinkler technologies.

1.33 The other issue is the challenge of employment. The lack of consistent, comprehensive, and current data impedes a serious assessment (although Box 5 cites new evidence that suggests formal sector employment is substantially greater than hitherto believed). Even so, it is clear that providing India’s young and burgeoning labor force with good, high

#### Box 4. Political Economy of Interest and Exchange Rates

Policy decisions affect various groups differently. As a guide to readers, the table below lists below the preferences of different groups in relation to interest and exchange rates, as well as the underlying reasons. For example, strong exchange rates may be preferred by companies that sell non-tradeables and rely on imports for their inputs: the classic case here is power companies that sell electricity to domestic distribution companies and import their capital equipment. Conversely, services exporters such as IT companies will be keen on competitive exchange rates because they sell mainly abroad, while importing very little. A strong exchange rate is preferred by those who equate currency strength with broader national strength.

Group	Preference	Reasons
Manufacturers, services exporters, and farmers	Low interest rates, weak currency	Profits increase, even if some inputs are imported, since market share grows. This applies both to exporters (clothing) and firms producing for domestic market but competing with imports (steel, aluminium). Software exporters with high domestic value added will favor weak rupee.
Exception: Import-intensive manufacturers	No strong preference	Weaker rupee increases export revenues but increases import costs
Domestically oriented firms	Low interest rates	Profits increase; debt burden declines
Infrastructure companies (especially power and renewables)	Strong currency, low interest rates	Strong currency reduces costs without affecting revenues, which are earned in rupees. Costs fall because firms typically import capital equipment, financed with dollar loans. Low interest rates reduce debt service burden on domestic loans.
Households	High interest rates	Returns on savings increase. Household saving far outweighs household borrowing.
Equity investors -- Domestic	Low interest rates	Corporate profits increase, so returns rise.
Equity investors -- Foreign	Low interest rates, strong currency	Combination boosts dollar returns. Tension: low rates typically lead to weaker currency.
Bond investors -- Domestic	Falling interest rates	Generates capital gains. Banks prefer low rates; other investors (such as LIC) prefer high rates.
Bond investors -- Foreign	High but falling interest rates, strong currency	Combination maximizes dollar returns. Tension: falling rates weaken currency.
Government	Low interest rates	Low rates reduce debt service. Extra growth or inflation increases revenues.
Non-economic actors	Strong currency	Strong currency equated with national economic strength.

productivity jobs will remain a pressing medium-term challenge. An effective response will encompass multiple levers and strategies, above all creating a climate for rapid economic growth on the strength of the only two truly sustainable engines—private investment and exports.

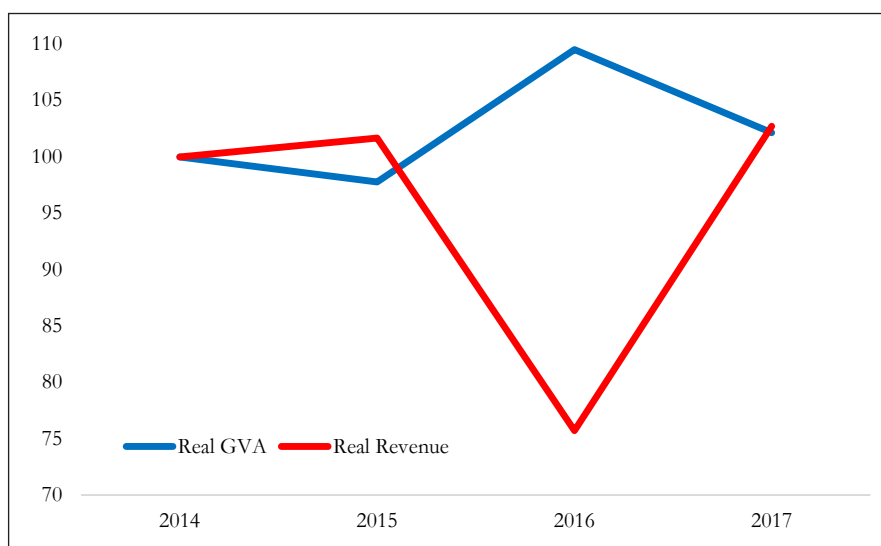
## RECENT DEVELOPMENTS

### The Global Outlook: Baseline and Risks

1.34 According to the International Monetary Fund (IMF), the global economy is experiencing

a near-synchronous recovery, the most broad-based since 2010. In 2017, roughly three-quarters of countries experienced improvements in their growth rates, the highest share since 2010. The latest World Economic Outlook (WEO) of the IMF shows global GDP growth accelerated to around 3.6 percent in 2017 from 3.2 percent in 2016, and the forecast for 2018 has been upgraded by 0.2 percentage points to 3.9 percent. Although rebounding, global growth is still well below levels reached in the 2000s.

**Figure 7. Agriculture: Real GVA and Real Revenue  
(Crops: 2014 = 100)**



Source: AGMARKNET, Survey calculations.

Note: Values for 2016 and 2017 Crop GVA estimated using real agriculture GVA to Crop GVA ratio for previous years. Real revenue (output times prices received by farmers and deflated by the CPI for agriculture) is a proxy for real incomes; Agriculture GVA is based on the financial year while real revenue is based on the calendar year.

1.35 One reason why the recovery has spread around the globe is that world trade in goods and services has finally emerged from its torpor, registering 4.7 percent real volume growth in 2017 compared with 2.5 percent in 2016. Another reason is that commodity producers such as Russia, Brazil, and Saudi Arabia, which for the past few years been suffering from depressed prices, have benefitted from the upswing in demand. Commodity prices increased smartly in 2017, led by petroleum, whose price rose by 16 percent to reach \$61 per barrel by the end of the year.

1.36 Even as global growth and commodity prices have surged, inflation has remained remarkably quiescent, remaining below 2 percent in the main advanced regions. Consequently, monetary policies in the US, Eurozone and Japan have remained highly accommodative despite a strong recovery. These unusual settings—rapid growth, ultra-low interest rates—at a late stage in the economic cycle have produced the rarest of

combinations: record-high high bond prices and stock market valuations, both at the same time.

1.37 The consensus forecast calls for these conditions to be sustained in 2018, as companies respond to buoyant demand conditions by stepping up investment, some governments (such as the US) embark on expansionary fiscal policies, while advanced country monetary policies remain stimulative and world trade continues to grow briskly.

1.38 What are the risks? Of course, there are the usual geo-political and geo-economic risks: war in the Korean peninsula; political upheaval in the Middle East; aggressive output cuts by Saudi Arabia (and Russia) in advance of the planned listing of the Saudi Arabian oil company, Aramco, which could force oil prices even higher; a final reckoning from China's unprecedented credit surge in the form of capital controls, slowdown in growth, and a sharply depreciating currency with consequences for the global economy (*Economic Survey*, 2016-17, Chapter 1); and trade tensions

### Box 5. New Estimates of Formal Sector Non-Farm Payrolls

Assessments of the employment challenge are hampered by a lack of timely data. Recognizing this, the government authorized the NITI Aayog to provide new guidelines for filling this lacuna, and the next comprehensive survey of employment is under way. In the meantime, the digitization of government data and the introduction of the GST have provided an opportunity to make some preliminary estimates of formal employment. Chapter 2 provides details; here the main findings are summarized.

Formal employment can be defined in at least two senses. First, when employers are providing some kind of social security to their employees. Second, when firms are part of the tax net. Accordingly, Table shows a 2x2 matrix of payrolls, based on these definitions. The NSSO's 73rd Survey Round is used to identify firms that are neither part of the tax or social security net. This is the pure informality cell in the sense that firms are outside both the tax and social security nets.<sup>2</sup>

**Table : Formal Non-Farm Payroll by Social Security and Tax Definitions**

Enrolled in EPFO/ESIC							
Number of Firms/Enterprises (lakh)				Employees (crore)			
		Yes	No	Total	Yes	No	Total
Registered under GST	Yes	4.0	88.3	92.3	4.5	6.7	11.2
	No	0.9	619.8	620.6	1.5	9.2	10.8
		4.9	708.1	712.9	6.0	15.9	22.0

The table shows that from a social security perspective formal employment amounts to 6 crores, to which we must add an estimated 1.5 crore of government workers (excluding defense), for a total of 7.5 crores. Since the non-agricultural workforce (again adding government to the figure in the table) is estimated at 24 crores according to the 68<sup>th</sup> Round (2011) of the NSSO Employment-Unemployment Survey, formal employment under this definition is equivalent to 31 percent of the non-agricultural workforce.

Meanwhile, from a tax perspective formal employment is 11.2 crores; adding government employment yields a total count of 12.7 crores. This implies that nearly 54 percent of the non-agricultural workforce is in the formal sector. Of course, not all the firms that pay GST are formal, in the common-use sense of the term. As Chapter 2 shows, many small, below-the-threshold firms have registered for the GST so they can secure tax credits on their purchases. Against this, the figure excludes many formal workers in sectors outside the GST such as health and education.

Notwithstanding the caveats regarding the specific numbers, the broad conclusion is likely to be robust: formal payrolls may be considerably greater than currently believed.

that could lead to skirmishes, and then spiral out of control.

1.39 But perhaps the main risks lie on the macro-finance front in advanced economies. These stem from three, inter-related, sources:

- Asset valuations (price-equity ratios) tend to revert to their mean. And the faster and higher they climb, especially so late in the economic cycle, the greater the risk of sharp corrections.

<sup>2</sup> The NSSO conducted a survey of unincorporated non-agricultural enterprises (excluding construction) between July 2015 and June 2016. Details of the methodology used in arriving at these estimates are discussed in Annex 1 of Chapter 2

- Simultaneously high valuations of both bonds and equities tend to be briefly lived because they suffer from an acute tension: if future earnings and economic growth are so bright, justifying high equity prices, interest rates cannot be forever so low.
- And if interest rates rise—or if markets even sense that central banks will need to shift their stance—both bond and equity prices could correct sharply. A plausible scenario would be the following. The IMF is now forecasting that advanced country output gaps will close in 2018 for the first time since the Global Financial Crisis. As this occurs, wages would start rising, eating into profits (which would prick equity valuations); and as inflation rises in tandem, policy makers would be forced into raising rates, deflating bond valuations and further undermining share prices.

1.40 What would happen to growth if asset prices correct? Surely, the impact would be far smaller than it was in 2007-09, because advanced countries are far less vulnerable than they were a decade ago. In particular, the leverage tied to these assets is much lower, which would minimize contagious propagation; while banks are much better buffered, with higher levels of capital and core deposits, and lower levels of risky assets.

1.41 Even so, there would be some consequences. For one, a large decline in wealth would force advanced country consumers to cut back on their spending, which in turn would lead firms to curtail their investments. And if this happens, monetary and fiscal policies would have much less room for expansionary manoeuvre since interest rates are already low while government debts are high. And the political implications of yet another decline in asset prices, the second in a decade, could also be significant, with effects that are difficult to imagine.

1.42 In sum, assessing future risks hinges on two calls: interest rate policy and asset valuations. On policy, extraordinarily low rates have, to paraphrase Paul Krugman, become “an obsession in search of a justification.” Initially justified by the dislocations caused by the Global Financial Crisis, then by large output gaps, they are now defended on the grounds that inflation remains weak, even as the slack in product and labor markets is disappearing rapidly. Will the gathering new evidence on closing output gaps and rising employment dispel that obsession?

1.43 On valuations, the prognosticator must navigate a narrow strait: steering clear of the “Cry of Wolf” trap (bond prices will finally, finally correct, having defied the prediction of correction in each of the last several years), without succumbing to the siren call of “This Time is Different” (stock valuations are sustainable this time because interest rates will remain at historic lows).

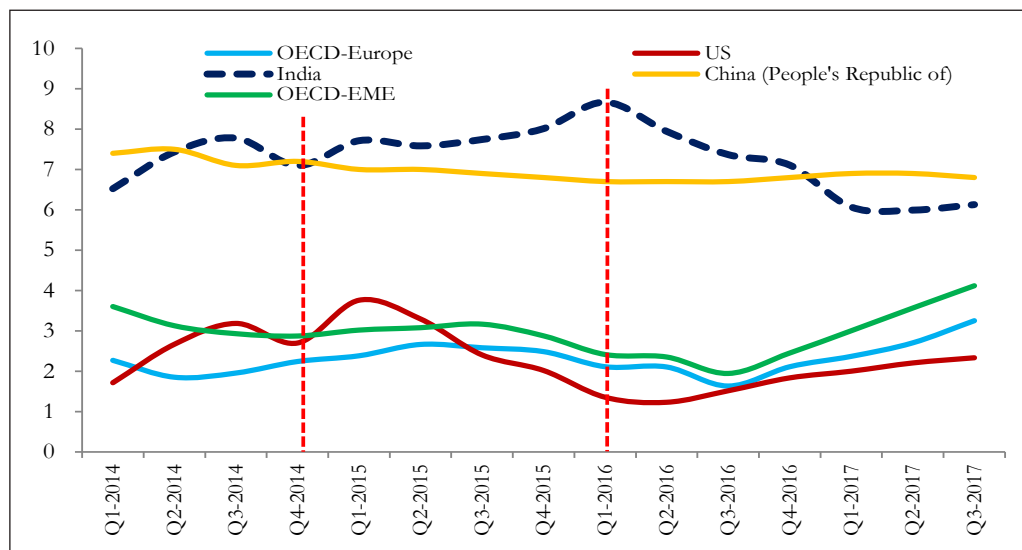
### **Understanding India’s (Temporary) “Decoupling”**

1.44 Projecting India’s growth for 2018-19 requires understanding what happened in 2017-18. The latter was unusual, especially when set against the international context. Figure 8 illustrates why.

1.45 Until early 2016, India’s growth had been accelerating when growth in other countries was decelerating. But then the converse happened. The world economy embarked on a synchronous recovery, but India’s GDP growth—and indeed a number of other indicators such as industrial production, credit, and investment—decelerated. Any explanation would need to explain this change in fortunes, this “decoupling” of Indian growth from global growth, identifying the factors that caused India to forge its unique path. Five explanations suggest themselves.

1.46 First, India’s monetary conditions decoupled

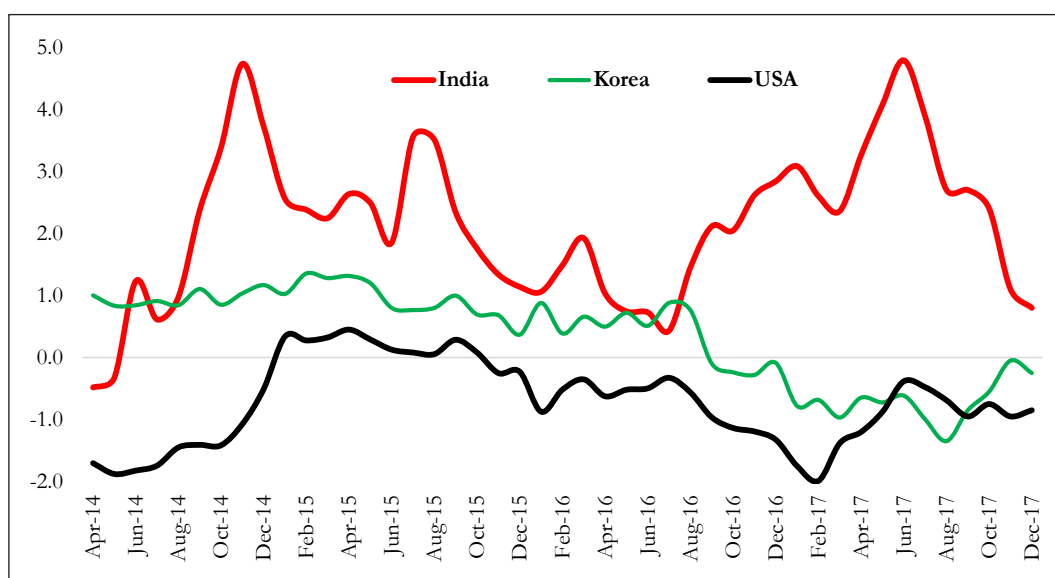


**Figure 8. India's Comparative Growth, 2014Q1-2017Q3**

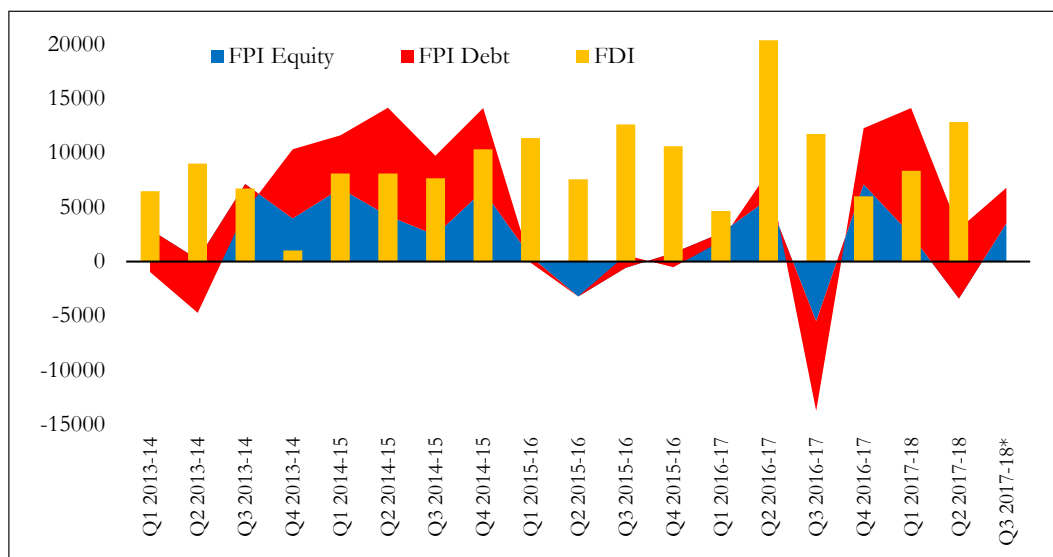
Source: OECD, Survey calculations. Growth rate of seasonally adjusted real GDP.

from the rest of the world. Figure 9 shows that until the middle of 2016, real policy interest rates were following the global trend downwards. Since then, the downward drift has continued in most other countries, with rates falling on an average by 1 percentage point between July and December 2016 in the US. But in India, for the same period, average real interest rates increased by about 2.5 percentage points.

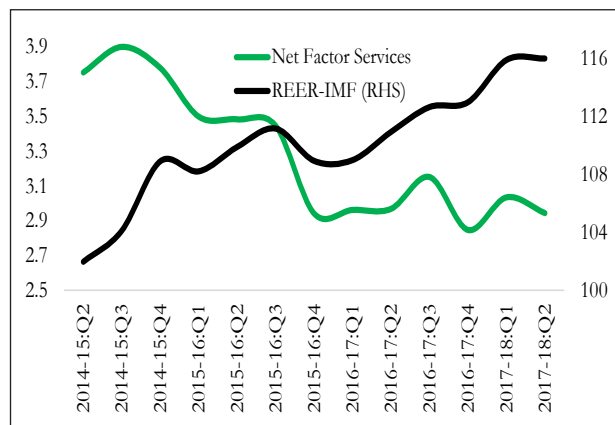
1.47 This tightening of monetary conditions contributed to the divergence in economic activity in two ways. First, it depressed consumption and investment compared to that in other countries. Second, it attracted capital inflows (Figure 10), especially into debt instruments, which caused the rupee to strengthen, dampening both net services exports (Figure 11) and the manufacturing trade balance (Figure 12). Between early-2016

**Figure 9. Real Policy Interest Rates in India and Selected Economies, Apr. 2016-Dec. 2017**

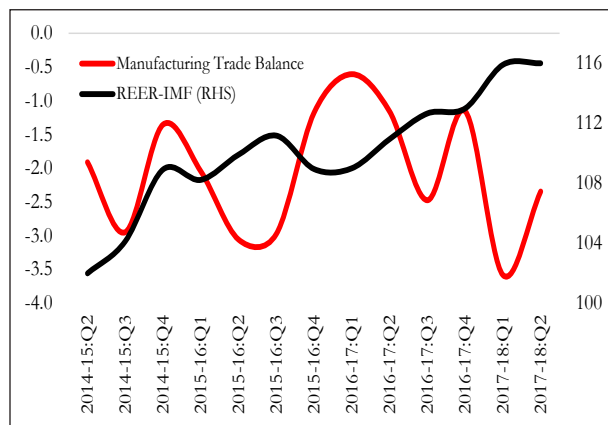
Source: Survey calculations.

**Figure 10. Net Capital Inflows (US\$ million)**

Source: RBI, Survey calculations.\*-Data for FDI is not available for Q3.

**Figure 11. Services Balance (in percent of GDP) and REER (3MMA, April 2014=100)**

Source: RBI, CSO, Survey calculations.

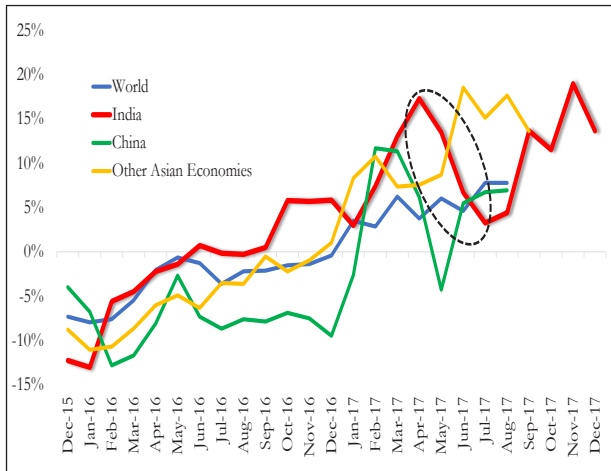
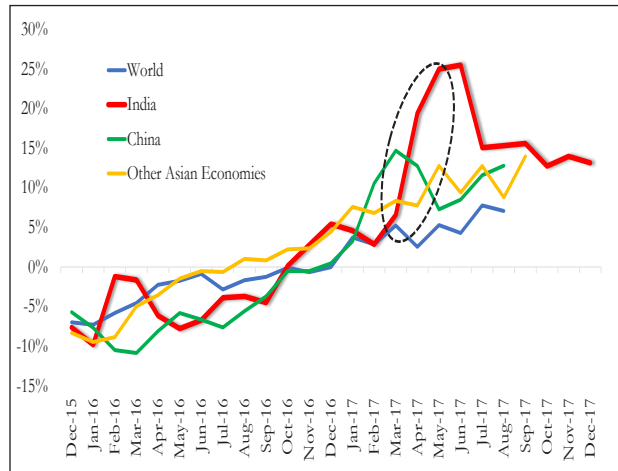
**Figure 12. Manufacturing Trade Balance (in percent of GDP) and REER (3MMA, April 2014=100)**

and November 2017, the rupee appreciated by another 9 percent in real terms against a basket of currencies (Figure 6).

1.48 The second and third factors were one-off policy actions: demonetization and GST. Demonetization temporarily reduced demand and hampered production, especially in the informal sector, which transacts mainly in cash. This shock largely faded away by mid-2017, when the cash-GDP ratio stabilized. But at that point

GST was introduced, affecting supply chains, especially those in which small traders (who found it difficult to comply with the paperwork demands) were suppliers of intermediates to larger manufacturing companies.

1.49 The previous *Economic Survey*, Volume 2, Chapter 1 had documented the impact of demonetization on the informal sector by measuring the increased demand for MNREGA employment. There is other evidence—indirect

**Figure 13. Growth of Manufacturing Export Value (Year-on-year, 3 month moving average)****Figure 14. Growth of Manufacturing Import Value (Year-on-year, 3 month moving average)**

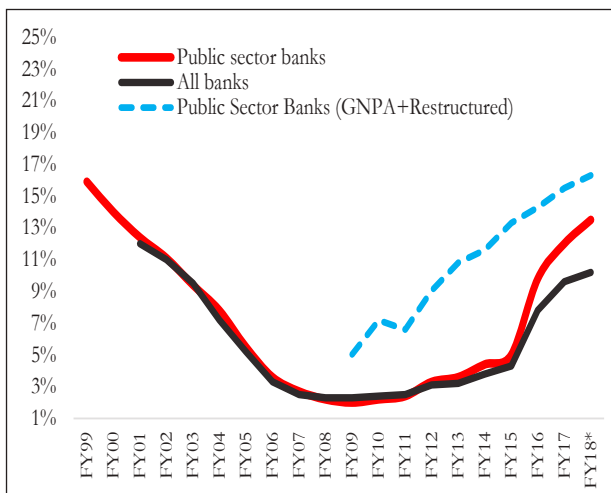
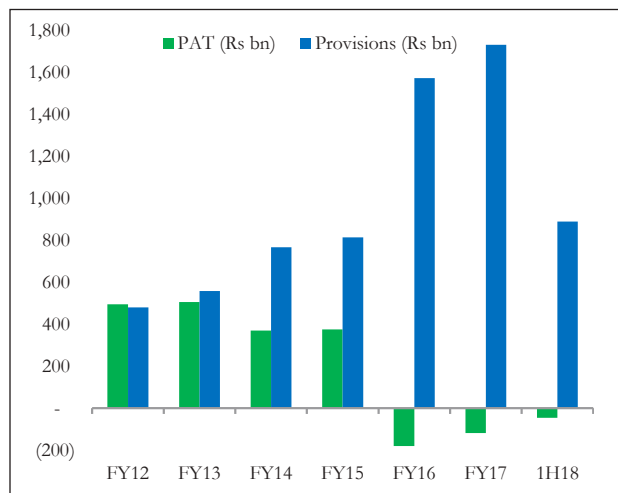
Source: International Trade Statistics (ITC) & DGCIS.

and not dispositive—that hints at the supply impacts from the combination of demonetization and GST.

1.50 Figures 13 and 14 plot the growth of manufacturing exports and imports. They show that beginning March-April 2017 until September 2017, export growth decelerated while import growth accelerated sharply, a pattern not observed in other Asian emerging economies

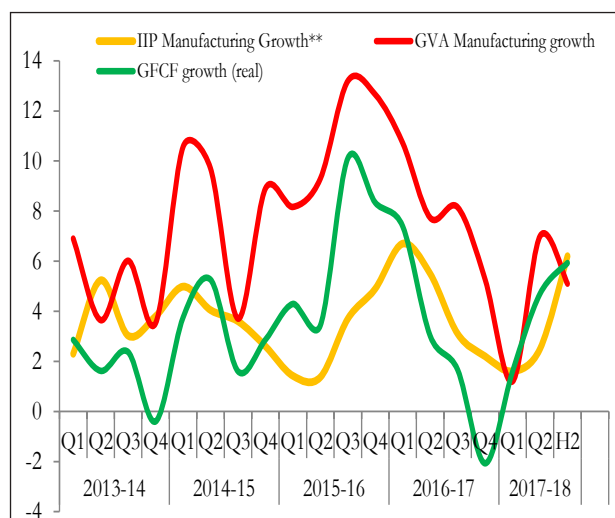
or the world as a whole. This suggests that the economy experienced a competitiveness impact in the demonetization/GST periods.

1.51 The fourth factor exerting a drag on the Indian economy was the TBS challenge. This has been a drag for some time and its effects have cumulated as the non-performing assets have increased, the financial situation of stressed firms and banks have steadily worsened. During the

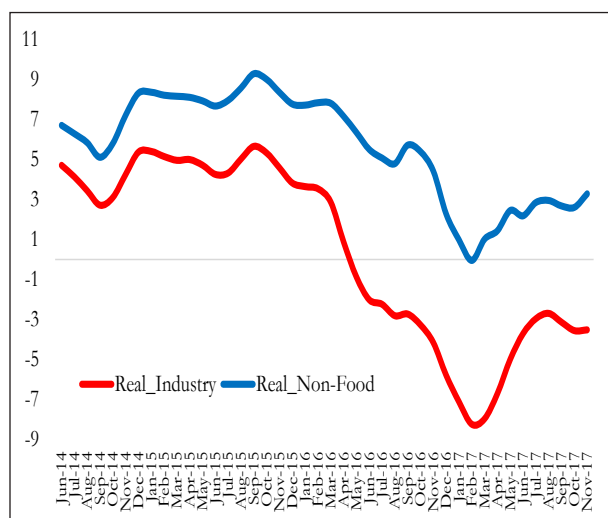
**Figure 15. GNPA ratio (in percent of gross advances)****Figure 16. Profitability and Provisioning of Public Sector Banks (Rs. billion)**

Source: RBI, Credit Suisse, Survey calculations; \*Number for FY18 is up to September 2017.

**Figure 17. GVA, GFCF and IIP  
(Year-on-year, percent)**



**Figure 18: Real Credit Growth\*\*\*  
(Industry and Non-Food Credit, 3MMA, YOY)**



Source: CSO, Survey calculations; \*-The last data points for GVA, GFCF based on data for H2. \*\*-IIP for Q3 is based on data from October and November; \*\*\*-Deflated using average of CPI and WPI.

past three years, profits of the PSBs have plunged into negative territory as provisioning against the bad loans increased substantially (Figures 15 and 16). This, in turn, has impaired banks' ability to supply credit to industry.

**Table 1: Oil Price Changes  
(Indian basket of crude)**

Period	\$/bbl	Rs/bbl
2014-15 over 2013-14	-10.1%	-9.1%
2015-16 over 2014-15	-46.2%	-42.7%
2016-17 over 2015-16	-11.4%	-7.9%
2017-18* over 2016-17	15.9%	11.5%

Source: Petroleum Planning & Analysis Cell (PPAC), Survey calculations. \* Change calculated as a nine-month year-on-year growth.

1.52 The final factor was oil prices. In the last three fiscal years, India experienced a positive terms of trade shock. But in the first three quarters of 2017-18, oil prices have been about 16 percent greater in dollar terms than in the previous year (Table 1). It is estimated that a \$10 per barrel increase in the price of oil reduces growth by 0.2-0.3 percentage points, increases WPI inflation

by about 1.7 percentage points and worsens the CAD by about \$9-10 billion dollars.

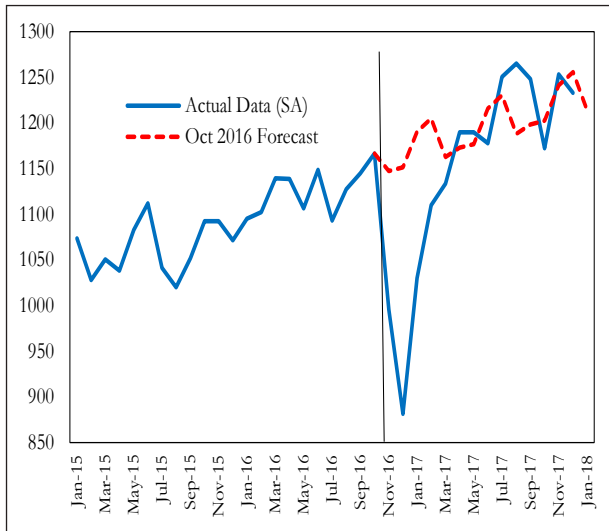
## OUTLOOK FOR 2017-18

### *Economic activity*

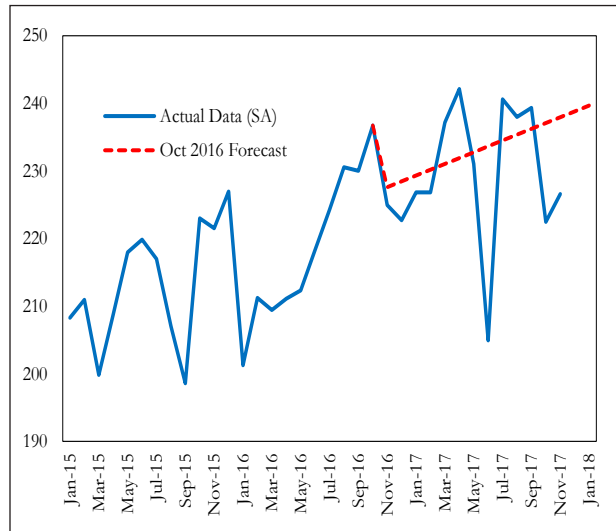
1.53 The key question going forward is whether the economy has troughed, and if so at what pace it will recover toward its medium term trend. High frequency indicators do suggest that a robust recovery is taking hold as reflected in a variety of indicators, including overall GVA, manufacturing GVA, the IIP, gross capital formation (Figure 17) and exports.

1.54 Similarly, real non-food credit growth has rebounded to 4 percent in November 2017 on a year-on-year basis, while the squeeze on real credit to industry is abating (Figure 18). Moreover, the flow of nonbank resources to the corporate sector, such as bond market borrowing and lending by NBFCs, has increased by 43 percent (April-December 2017 compared to the same period a year ago), substituting in part for weak bank credit. Rural demand, proxied by motor cycle sales, and auto sales, while not yet back to its

**Figure 19. Sale of Motorcycles**  
(Seasonally adjusted, in thousands)



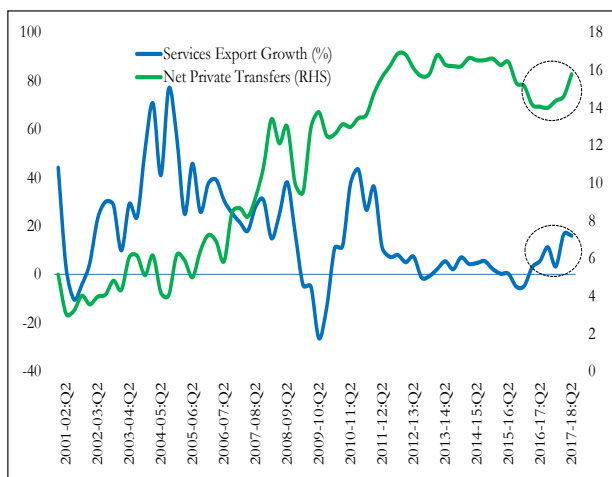
**Figure 20. Sale of Passenger Cars**  
(Seasonally adjusted, in thousands)



Source: Society for Indian Automobile Manufacturers, Survey calculations.

pre-demonetization trend, are recovering (Figures 19 and 20).

**Figure 21. Services Export Growth (percent) and Net Private Remittances (in US\$ billion)**



Source: RBI, Survey calculations.

1.55 Perhaps most significantly, the behavior of manufacturing exports and imports in the second and third quarters of this fiscal year has started to reverse. The re-acceleration of export growth to 13.6 percent in the third quarter of FY2018 and deceleration of import growth to 13.1 percent (Figures 13 and 14), in line with global

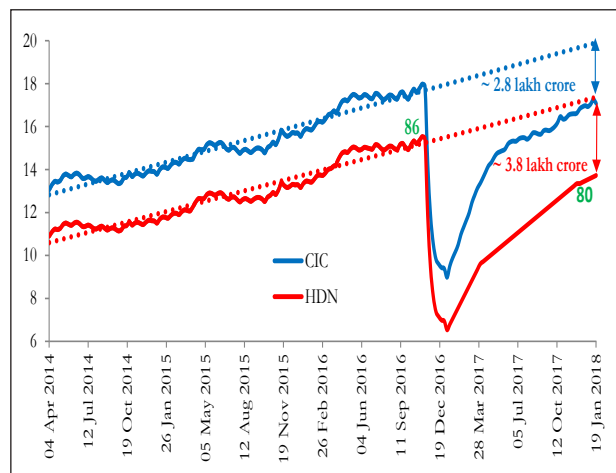
trends, suggest that the demonetization and GST effects are receding. Services export and private remittances are also rebounding (Figure 21).

1.56 On demonetization specifically, the cash-to-GDP ratio has stabilized, suggesting a return to equilibrium. The evidence is that since about June 2017 the trend in currency is identical to that pre-demonetization (Figure 22). The stabilization also permits estimation of the impact of demonetization: about Rs. 2.8 lakh crores less cash (1.8 percent of GDP) and about Rs. 3.8 lakh crores less high denomination notes (2.5 percent of GDP).

1.57 A final, important factor explaining the growth recovery is fiscal, which is providing a boost to aggregate demand. For reasons related to smoothening the transition, GST revenues will only be collected for 11 months, which is akin to a tax cut for consumers. Meanwhile, overall revenue expenditure growth by the central and state governments remains strong at 11.7 percent (April to November). Cyclical conditions may also lead to lower tax and non-tax revenues, which act as an automatic stabilizer.



**Figure 22. Currency in Circulation (CIC) and High Denomination Notes (HDN) (In Rs. lakh crore)**



Source: RBI, Survey calculations; Numbers in green denote HDN as share of CIC.

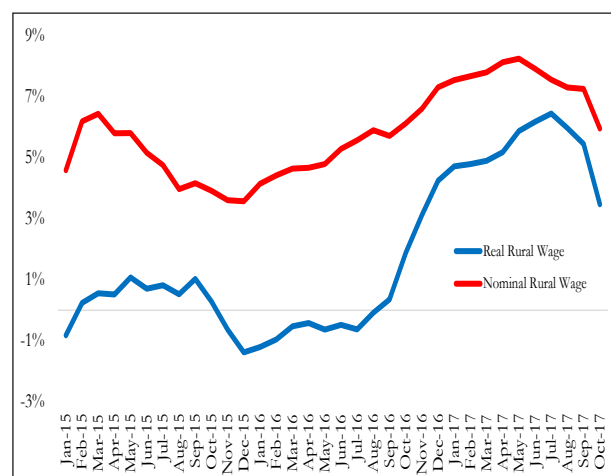
1.58 All this said, while the direction of the indicators is positive, their *level* remains below potential. IIP growth (April-November 2017 over same period in the previous year) is 3.2 percent, real credit growth to industry is still in negative territory, and the growth in world trade remains less than half its level of a decade ago. Moreover, even though the cost of equity has fallen to low levels, corporates have not raised commensurate amounts of capital, suggesting that their investment plans remain modest (Box 6). In other words, the twin engines that propelled the economy's take-off in the mid-2000s – exports and investment – are continuing to run below take-off speed.

1.59 Meanwhile, developments in the agriculture sector bear monitoring. The trend acceleration in rural wages (agriculture and non-agriculture), which had occurred through much of 2016 because of increased activity on the back of a strong monsoon, seems to have decelerated beginning just before the kharif season of 2017-18 (Figure 23) but it is still greater than much of the last three years. Three crop-specific developments are evident. Sowing has been lower

in both kharif and rabi, reducing the demand for labor. The acreage for kharif and rabi for 2017-18 is estimated to have declined by 6.1 percent and 0.5 percent, respectively. Pulses and oilseeds have seen an increase in sowing, but this has translated into unusually low farmgate prices (below their minimum support price, MSP), again affecting farm revenues. The so-called TOP perishables (tomatoes, onions, and potatoes) have meanwhile fluctuated between high and low prices, engendering income uncertainty for farmers.

1.60 The CSO has forecast real GDP growth for 2017-18 at 6.5 percent. However, this estimate has not fully factored in the latest developments in the third quarter, especially the greater-than-CSO-forecast exports and government contributions to demand. Accordingly, real GDP growth for 2017-18 as a whole is expected to be close to 6 <sup>3</sup>/<sub>4</sub> percent. Given real GDP growth of 6 percent in the first half, this implies that growth in the second half would rebound to 7.5 percent, aided by favorable base effects, especially in the fourth quarter.

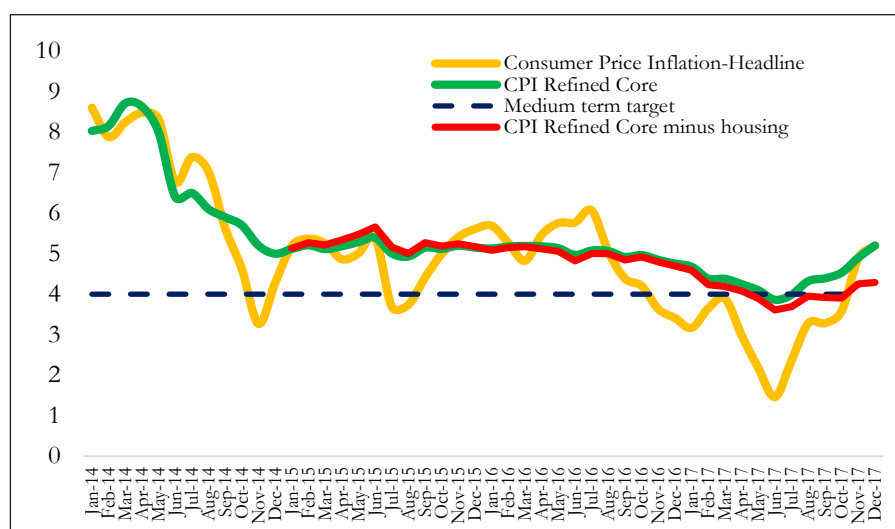
**Figure 23. Real and Nominal Rural Wages Growth (percent, 3 month moving average)**



Source: Labour Bureau, Survey calculations.

1.61 Average CPI inflation for the first nine months has averaged 3.2 percent and is projected to reach 3.7 percent for the year as a whole. This

**Figure 24. Inflation: CPI and Variants\***  
(percent, year-on-year)



Source: MoSPI, Survey calculations.

\*CPI Refined Core is obtained by stripping out the volatile food and fuel components.

implies average CPI inflation in the last quarter of 5 percent, in line with the RBI's forecast. Therefore, the GDP deflator is expected to grow by 3.6 percent for 2017-18, somewhat higher than the CSO's forecast of 2.8 percent. Consequentially, nominal GDP growth is estimated at 10.5 percent, compared with the CSO's 9.5 percent estimate.

### ***Macroeconomic indicators***

1.62 After 13 months of continuously under-shooting the inflation target by an average of 130 basis points, headline inflation for the first time crossed the RBI's 4 percent target in November, posting a rate of 5.2 percent in December 2017 (Figure 24). The recent upswing in inflation stems from rising global oil prices (not all of which has been passed on to consumers), unseasonal increases in the prices of fruits and vegetables, and the 7<sup>th</sup> Pay Commission housing rent allowances, which mechanically increase inflation. Stripped of all these factors, underlying inflation has been increasing at a more modest pace, reaching 4.3 percent at end-December—in part because

firms are passing the incidence of GST on to final consumers only gradually.

1.63 The current account deficit has also widened in 2017-18 and is expected to average about 1.5-2 percent of GDP for the year as a whole. The current account deficit can be split into a manufacturing trade deficit, an oil and gold deficit, a services deficit, and a remittances deficit (Figure 25). In the first half of 2017-18, the oil and gold balance has improved (smaller deficit of \$47 billion) but this has been offset by a higher trade deficit (\$18 billion) and a reduced services surplus (\$37 billion), the latter two reflecting a deterioration in the economy's competitiveness.

1.64 Despite these developments, the overall external position remains solid. The current account deficit is well below the 3 percent of GDP threshold beyond which vulnerability emerges. Meanwhile, foreign exchange reserves have reached a record level of about \$432 billion (spot and forward) at end-December 2017, well above prudent norms.

### Box 6. The Stock Market Boom and Equity Raising

Normally, when stock prices boom, as they have done in the past two years, firms issue more equity publicly, taking advantage of the reduced cost of capital to embark on new investment projects. This happened in the mid-2000s and again around 2010. In the last two years, especially in the first eight months of this year, there has once again been a pick-up in equity-raising activity. If current trends continue, the number of issues and their value could double the levels recorded in the previous six years (Table ).

**Table : Public and Private Equity Raising**

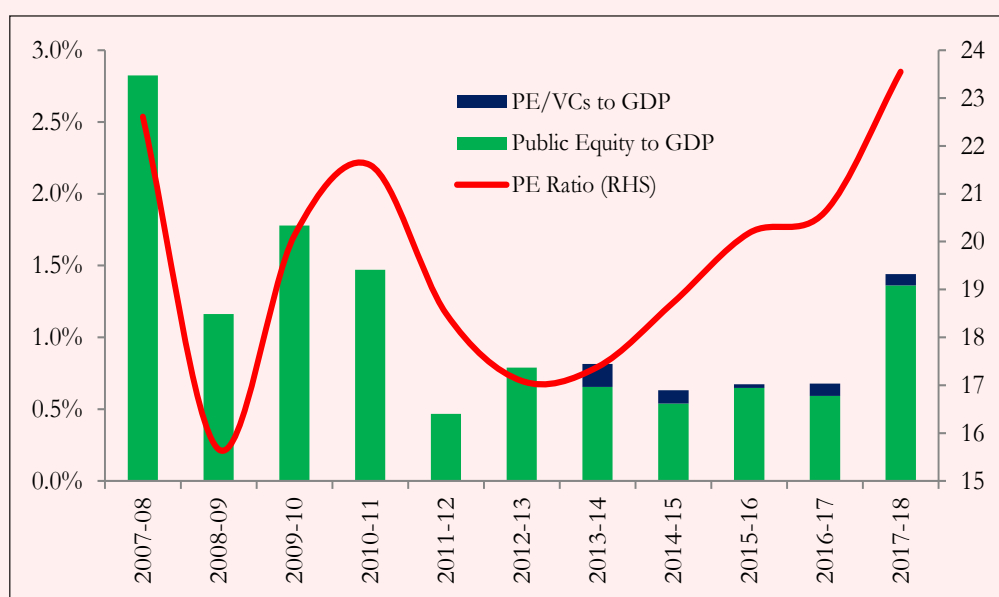
Year	No. of Issues (Public)	Value (Rs. Crore)		
		Total Public	Private	Total
2007-08	722	140,844	-	140,844
2008-09	677	65,439	-	65,439
2009-10	483	115,270	-	115,270
2010-11	504	114,529	-	114,529
2011-12	378	40,729	-	40,729
2012-13	514	78,408	-	78,408
2013-14	483	73,575	17,909	91,484
2014-15	534	67,151	11,348	78,499
2015-16	444	88,558	3,657	92,215
2016-17	540	89,994	12,952	102,946
2017-18 (8 months)	425	144,529	8,390	152,919

Source: RBI, SEBI and previous Economic Surveys. Public includes Public Issues (IPO), Rights Issues, Qualified Institutional Placement (QIP), Preference Issues, Follow-On Public Offer (FPO), and Institutional Placement Program (IPP). Private includes private equity and venture capital.

How do these magnitudes compare with the previous periods of stock market euphoria? Figure 1 illustrates total capital raised—through public and private placements—over the last decade as a percent of GDP to make the temporal comparison accurate. The red line depicts the price-earnings ratio.

The green bars show that capital raising this year has picked up substantially but remains below levels reached in 2007-08, the peak of the previous boom despite the fact that the cost of capital is at similarly low levels: a price-earnings ratio of 25 implies equity costs of roughly 4 percent (Figure).

**Figure. Capital Raising (in percent of GDP)**



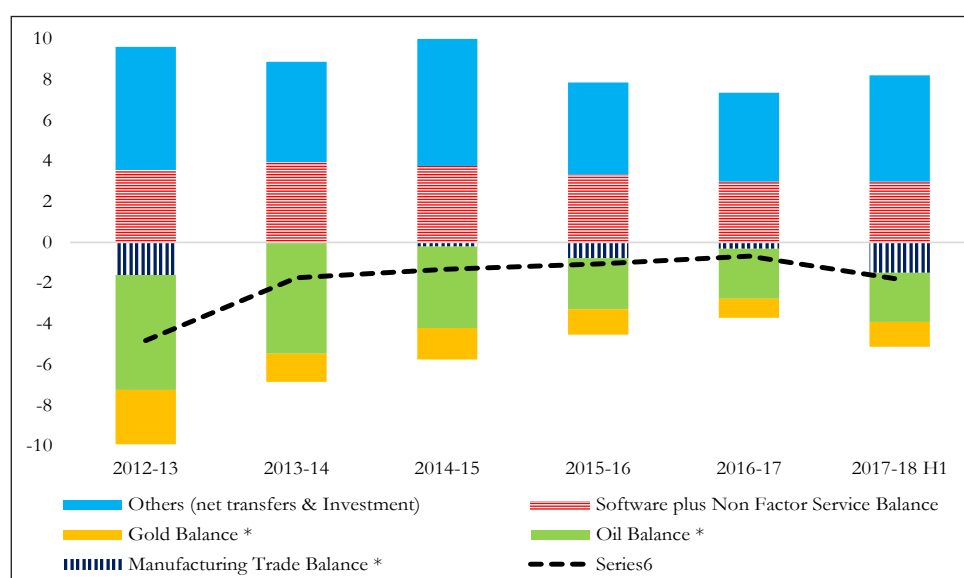
Source: RBI, BSE, past Economic Surveys.

Of course, there has been a similar experience in the US (of limited public offerings) but there is one crucial difference: the US private corporate sector is stashed with cash because of high profits and weak investment opportunities. Firms face a capital feast not famine. But this is not the case in India, as firms face significant capital needs, arising from low levels of profit and cash, and high leverage (debt-to-equity) ratios. That is the puzzle.

Some have argued that firms have stepped up their capital raising significantly, but not through public issues; they have instead tapped private equity (PE), venture capital (VC), and mergers and acquisitions (M&A). But Figure 1 which includes private capital (blue shaded bars) shows that while these have indeed gone up, they do not significantly alter overall magnitudes.

In sum, Figure 1 shows that the traditionally strong correlation between the P/E ratio and total capital raised has weakened. One possible implication is that while firms' assessments of growth and investment prospects have improved, they still remain subdued.

**Figure 25. Current Account Balance (in percent of GDP)**



Source: RBI, Survey calculations; \* - Based on Customs data.

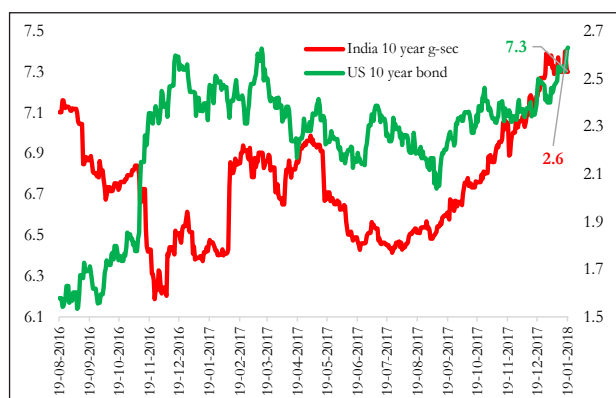
### ***Fiscal developments***

1.65 Bond yields have increased sharply (Figure 26) since August 2017, reflecting a variety of factors, including concerns that the fiscal deficit might be greater-than-budgeted, expectations of higher inflation, a rebound in activity that would narrow the output gap, and expectations of rate increases in the US. As a result, the yield curve has become unusually steep (Figure 27).

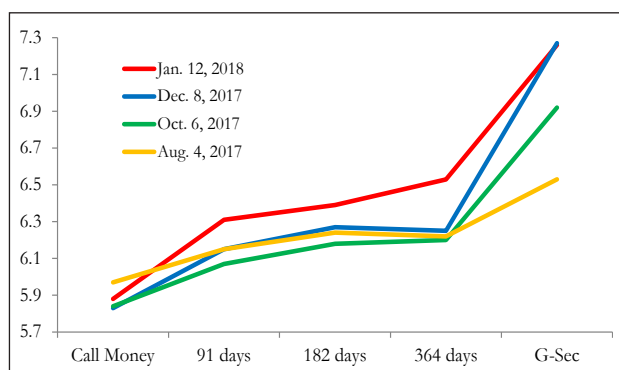
1.66 The fiscal deficit for the first eight months of 2017-18 reached 112 percent of the total for the year, far above the 89 percent norm (average of last 5 years), largely because of a shortfall in non-tax revenue, reflecting reduced dividends from government agencies and enterprises. Expenditure also progressed at a fast pace,

reflecting the advancing of the budget cycle by a month which gave considerable leeway to the spending agencies to plan in advance and start implementation early in the financial year. Partially offsetting these trends will be disinvestment receipts which are likely to exceed budget targets.

1.67 GST revenue collections are surprisingly robust given that these are early days of such a disruptive change (See Box 7). Government measures to curb black money and encourage tax formalization, including demonetization and the GST, have increased personal income tax collections substantially (excluding the securities transactions tax). From about 2 percent of GDP between 2013-14 and 2015-16, they are likely to rise to 2.3 percent of GDP in 2017-18, a historic high. Precise estimates of the government's contribution to this improvement vary depending

**Figure 26. 10-year G-sec Yields : India and US**

Source: Bloomberg; RBI.

**Figure 27. Yield Curve**

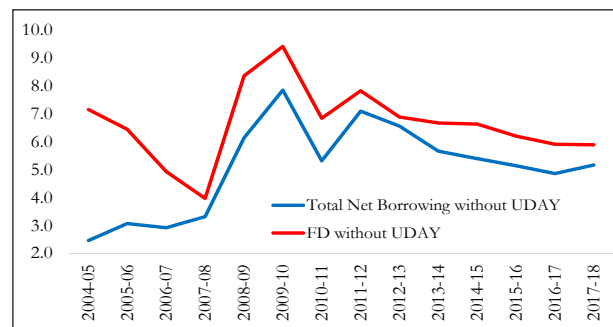
Source: Bloomberg; RBI, Survey calculations.

on the methodology used. An econometric exercise yields an estimate of Rs. 40,000 crores over the two fiscal years of 2016-17 and 2017-18.<sup>3</sup> Another based on comparing the difference in actual tax buoyancy in 2016-17 and 2017-18 over the previous seven-years' average buoyancy, yields an estimate of about Rs. 65,000 crores (both exclude the 25,000 crores collected under the Income Disclosure Scheme and Pradhan Mantri Garib Kalyaan Yojana). Thus, the sum of all government efforts increased income tax collections, thus far, between Rs. 65,000 and Rs. 90,000 crores. These numbers imply a substantial increase in reported incomes (and hence in formalization) of about 1.5 percent to 2.3 percent of GDP.

1.68 As a result of the budget overruns, the

central government's fiscal deficit until November 2017 was Rs. 6.1 lakh crore compared to the budgeted Rs. 5.5 lakh crore. In contrast, state governments seem to be hewing closely to their targeted fiscal consolidation – in part because the center has guaranteed them a large increase in their indirect tax take, as part of the GST agreement.

1.69 Reflecting largely fiscal developments at the center, a pause in general government fiscal consolidation relative to 2016-17 cannot be ruled out. In addition, the measured deficit for 2017-18 will include Rs. 80,000 crore (0.5 percent of GDP) in capital provided to public sector banks. But this will not affect aggregate demand, as reflected in international accounting practice which deems such operations as financing ("below-the-line") rather than expenditure.

**Figure 28. Total Net Borrowings and Fiscal deficit (General Government, percent of GDP)**

Source: Central and State government Budget documents, Survey calculations.

1.70 In the case of borrowing by the states, markets have perhaps inadequately taken into account the fact that higher market borrowings by them does not reflect higher deficits; rather about Rs. 50,000 crore or 0.3 percent of GDP of market borrowings is due to changes in the composition of financing, away from higher cost NSSF borrowings toward lower cost market borrowings. This lack of strict correspondence between the deficit and borrowings at the central and state levels (Figure 28) is discussed in greater detail in Box 8. For general government, about Rs. 40,000 crores represents greater market

<sup>3</sup> This estimate is based on an econometric exercise similar to the one in Box 2. Personal income tax receipts are regressed on GDP (quarterly) while controlling for seasonality. There is a statistically significant increase in revenues beginning 2016-17.



**Box 7. Understanding GST Revenue Performance**

Confusion, even anxiety, abounds about revenue performance so far after five months of collections under the new GST. This confusion is understandable given its newness and complexity. Confusion has also arisen because of the attempt to view this through the narrow lens of the states or the center; of uncertainty about the build-up of balances in the IGST and their sharing; and of the fact that only 11 months revenues will be collected.

To be sure, uncertainty will not be definitively lifted until the GST stabilizes later this year. But the provisional assessment is this: revenue collection under the GST is doing well, surprisingly so, for such a transformational reform.

Understanding revenue performance requires identifying all the taxes that the GST replaced from an All-India perspective: VAT for the states, and the excise and service taxes as well as the countervailing duties/special additional duty (SAD) on imports. Together these amounted to Rs 9.7 lakh crores in 2016-17 (Table).

**Table. Pre- and Post-GST Revenue Collections (in lakh crore)**

	2016-17		2017-18	
	Annual		Monthly Average of July-Nov (annualized)	Estimated Annual Steady State revenues
States	4.4	SGST	2.5	2.5
Center	5.3	CGST	1.7	2.5
Excise	1.4	IGST	5.4	4.9
Service	2.5	Cesses	0.9	0.9
CVD/SAD	1.4			
<b>Total</b>	<b>9.7</b>		<b>10.5</b>	<b>10.9</b>
<b>Estimated Growth of GST</b>				<b>12.0%</b>

In the first five months of GST, the actual collections by categories are shown in column 2. Thus far, collections are running at a rate of Rs. 10.5 lakh crore (five-month average, annualized). But at least two corrections need to be made to this number.

First, CGST (The Center's) collections are running well below SGST (The States') collections (they should be identical by construction) because of a large stock of unutilized credit available in respect of the old excise and service tax. This is expected to decline over time. In the steady state, CGST collections should be close to SGST collections. Against this, we need to adjust the IGST for a much higher steady-state level of refunds, estimated at an additional Rs. 50,000 crores.

Column 3 shows notional steady-state taxes after these corrections are made. They amount to Rs. 10.9 lakh crores, representing growth of 12 percent. Given nominal GDP growth of 10.5 percent projected in the *Survey*, buoyancy amounts to 1.14, above the historical buoyancy for indirect taxes of 0.9. In the initial phase of such a large disruptive change, this performance is noteworthy. The GST promises to be a buoyant source of future revenues.

borrowings that is not due to deficits—a fact which markets apparently have not internalized.

1.71 Another factor contributing to the rise in bond yields has been stepped-up Open Market Operations (OMO) by the RBI. This amounted to a net sale of about Rs. 90,000 crores during April-December 2017-18 (compared to a net redemption of Rs. 1.1 lakh crores during the

same period in 2016-17) to sterilize the impact of foreign flows, themselves induced by high interest rates (Figure 9).

**OUTLOOK FOR 2018-19**

1.72 The outlook for 2018-19 will be determined by economic policy in the run-up to the next national election. If macro-economic stability

### Box 8. Do Government Market Borrowings Reflect the Underlying Fiscal Deficit?

Since late July 2017, interest rates on 10-year government securities (g-secs) have been climbing steadily, rising from about 6.4 percent to 7.3 percent on January 1, 2018. Over that period, the outlook for policy rates has deteriorated as the RBI has shifted from rate-cutting to a more hawkish stance. But this shift would not seem to warrant a nearly 1 percentage point increase in long-term rates. Neither would the changes in international rates, which have only increased modestly. So, what explains the sudden rise in g-sec rates?

The key factor seems to be financial market concerns that government issuances of g-secs will be greater than earlier anticipated. Certainly, concerns that fiscal deficits of the general (central and state) government might be larger than targeted are real. But even if fiscal over-runs do occur, this does not automatically mean that market borrowings will be greater than anticipated; put differently, market borrowings do not necessarily reflect the underlying fiscal deficit. That's because in India market borrowings are determined not just by the fiscal deficits but also by a distinctively Indian arrangement, the National Small Savings Fund (NSSF).

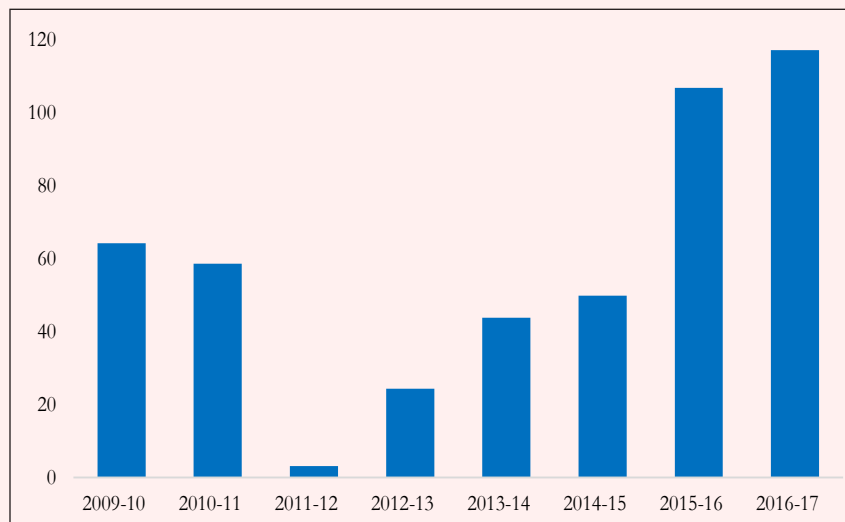
Essentially, the government gets deposits from the public—independent of its deficit-induced borrowings—in the form of various savings schemes to the public, encompassed in the NSSF. Currently, these schemes offer above-market rates, risk-free investment options, and favorable tax breaks, both at the time of deposit and withdrawal, not available in most regular savings schemes. The *Economic Survey* of 2015-16 had estimated the magnitude of the implicit subsidies to small savers under the NSSF. But what is relevant here is that the flows into the NSSF are autonomous, determined by their perceived attractiveness, rather than the size of the fiscal deficits. The following identity captures the idea.

$$\text{Net Market Borrowings} = \text{Fiscal Deficit} - \text{NSSF net flows}^5$$

If NSSF net flows increase, for any given fiscal deficit, market borrowings should decline; and vice versa. Market borrowings and hence the supply of g-secs are endogenous to these autonomous flows. So it's perfectly possible for market borrowing to increase, even when the fiscal deficit decreases or remains constant.

Net NSSF flows are large, amounting to Rs. 1.2 lakh crore in 2016-17 as Chart 1 shows, representing about 24 percent of that year's central government deficit.<sup>6</sup> In 2017-18, they could be larger still. Part of the reason is that an NSSF saving rates have fallen much more slowly than market rates (especially on deposits), while the income tax exemption limit for NSSF saving has been increased to Rs. 1.5 lakh under section 80C of the Income Tax Act.

**Chart 1. Annual NSSF Flow (Net, Rs. thousand crore)**



Source: Central Government budget documents, Survey calculations.

At the level of the central government, these additional flows have been so robust that the reliance on market borrowings has declined. For example, in 2016-17 central government market borrowings declined by about Rs. 90,000 crores even though the fiscal deficit remained broadly flat in rupee terms.<sup>7</sup> As a result, as Figure 2 shows, market borrowings have declined by 1.7 percent of GDP since 2013-14, even though the fiscal deficit has declined by only 1 percent of GDP.

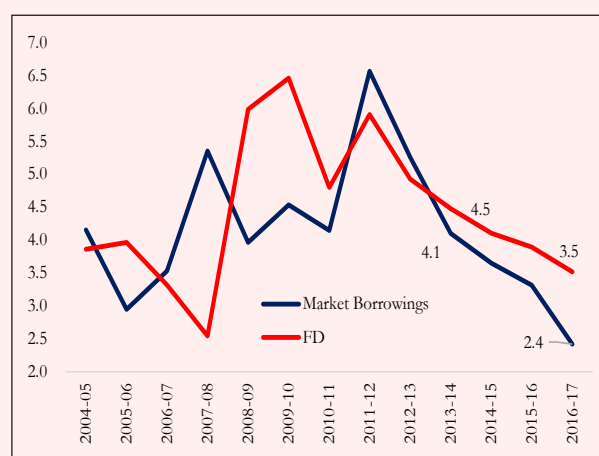
<sup>5</sup> Here NSSF includes net flows into other public accounts such as state provident funds and advances and deposits.

<sup>6</sup> The Fourteenth Finance Commission (FFC) had given an option to the states to opt out of NSSF financing.

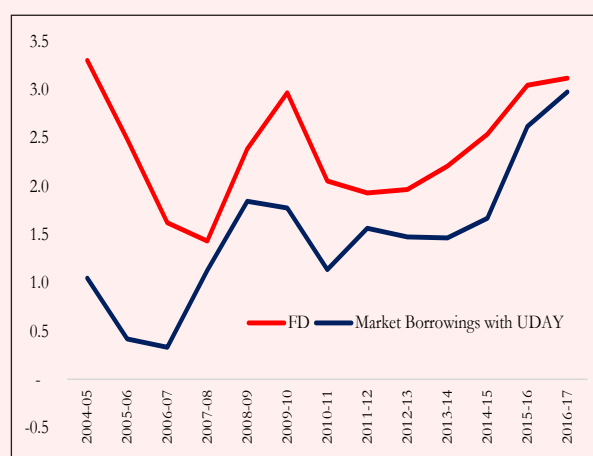
<sup>7</sup> Net market borrowing includes amounts under Major Head 6003, excluding securities to the NSSF and securities to international institutions.

At the level of the state governments, the converse has been true. The states have chosen to reduce their reliance on the NSSF in order to reduce their borrowing cost (market rates are substantially lower than NSSF rates). But the consequence has been to increase market borrowings. In 2016-17, market borrowings increased by about Rs. 83,000 crores even though the combined state government deficit increased by only around Rs. 47,000 crores, with the rest expected to go towards repayment of NSSF liabilities. Put another way, market borrowings *increased* by 0.2 percent of GDP more than the fiscal deficit. (Figure 3).

**Chart 2. Central Government Market Borrowing and Fiscal Deficit (In percent of GDP)**



**Chart 3. State Government Market Borrowing and Fiscal Deficit (In percent of GDP)**



Source: Central and States government budget documents, Survey calculations.

A final point is worth mentioning. Exogenous flows into the NSSF sometimes do not get fully offset by reductions in market borrowings and instead get reflected in accumulation of government cash balances or used for financing other government operations. In such a case, changes in liabilities will be at variance with fiscal deficit estimates. Similarly, some off-balance sheet transactions will add to government liabilities but not to the measured deficit.

is kept under control, the ongoing reforms are stabilized, and the world economy remains buoyant as today, growth could start recovering towards its medium term economic potential of at least 8 percent.

1.73 Consider the components of demand that will influence the growth outlook. The acceleration of global growth should in principle provide a solid boost to export demand. Certainly, it has done so in the past, particularly in the mid-2000s when the booming global economy allowed India to increase its exports by more than 26 percent per annum. This time, the export response to world growth has been in line with the long-term average, but below the response in the mid-2000s. Perhaps it is only a matter of time until exports start to grow at a healthy rate. Remittances are

already perking up, and may revive further due to higher oil prices.

1.74 Private investment seems poised to rebound, as many of the factors exerting a drag on growth over the past year finally ease off. Translating this potential into an actual investment rebound will depend on the resolution and recapitalization process. If this process moves ahead expeditiously, stressed firms will be put in the hands of stronger ownership, allowing them to resume spending. But if resolution is delayed, so too will the return of the private capex cycle. And if this occurs public investment will not be able to step into the breach, since it will be constrained by the need to maintain a modicum of fiscal consolidation to head off market anxieties.

1.75 Consumption demand, meanwhile, will encounter different tugs. On the positive side,

it will be helped by the likely reduction in real interest rates in 2018-19 compared to the 2017-18 average. At the same time, average oil prices are forecast by the IMF to be about 12 percent higher in 2018-19, which will crimp real incomes and spending—assuming the increase is passed on into higher prices, rather than absorbed by the budget through excise tax reductions or by the oil marketing companies. And if higher oil prices requires tighter monetary policy to meet the inflation target, real interest rates could exert a drag on consumption.

1.76 Putting all these factors together, a pick-up in growth to between 7 and 7.5 percent in 2018-19 can be forecasted, re-instating India as the world's fastest growing major economy. This forecast is subject to upside potential and downside risks.

1.77 The biggest source of upside potential will be exports. If the relationship between India's exports and world growth returns to that in the boom phase, and if world growth in 2018 is as projected by the IMF, then that could add another  $\frac{1}{2}$  percentage point to growth.

1.78 Another key determinant of growth will be the implementation of the IBC process. Here timeliness in resolution and acceptance of the IBC solutions must be a priority to kick-start private investment. The greater the delays in the early cases, the greater the risk that uncertainty will soon shroud the entire IBC process. It is also possible that expeditious resolution may require the government to provide more resources to PSBs, especially if the haircuts required are greater than previously expected, the ongoing process of asset quality recognition uncovers more stressed assets, and if new accounting standards are implemented.

1.79 Persistently high oil prices (at current levels) remain a key risk. They would affect inflation, the current account, the fiscal position and growth, and force macroeconomic policies to be tighter than otherwise.

1.80 One eventuality to guard against is a classic emerging market “sudden stall” induced by sharp corrections to elevated stock prices. (Box 9 suggests that India's stock price surge is different from that in other countries but does not warrant sanguine-ness about its sustainability.) Savers, already smarting from reduced opportunities in the wake of demonetization, from depressed gold prices, and from lower nominal interest rates, would feel aggrieved, leading to calls for action. Stock price corrections could also trigger capital outflows, especially if monetary policy unwinds less hesitantly in advanced countries and if oil prices remain high. Policy might then have to respond with higher interest rates, which could choke off the nascent recovery. The classic emerging market dilemma of reconciling the trade-off between macro-stability and growth could then play itself out.

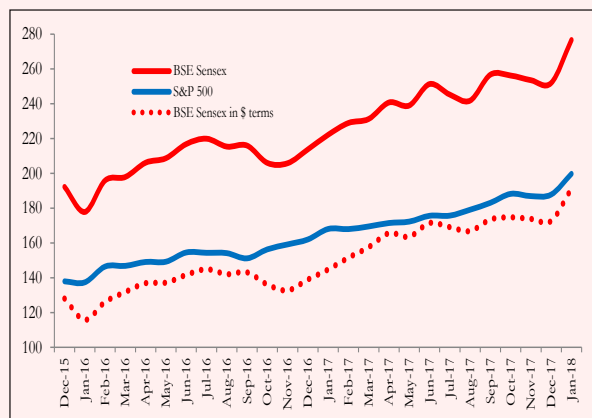
1.81 A key policy question will be the fiscal path for the coming year. Given the imperative of establishing credibility after this year, given the improved outlook for growth (and hence narrowing of the output gap), and given the resurgence of price pressures, fiscal policy should ideally have targeted a reasonable fiscal consolidation. However, setting overly ambitious targets for consolidation—especially in a pre-election year—based on optimistic forecasts that carry a high risk of not being realized will not garner credibility either. Pragmatically steering between these extremes would suggest the following: a modest consolidation that credibly signals a return to the path of gradual but steady fiscal deficit reductions.

1.82 Against this overall economic and political background, economic management will be challenging in the coming year. If the obvious pitfalls (such as fiscal expansion) are avoided and the looming risks are averted that would be no mean achievement.

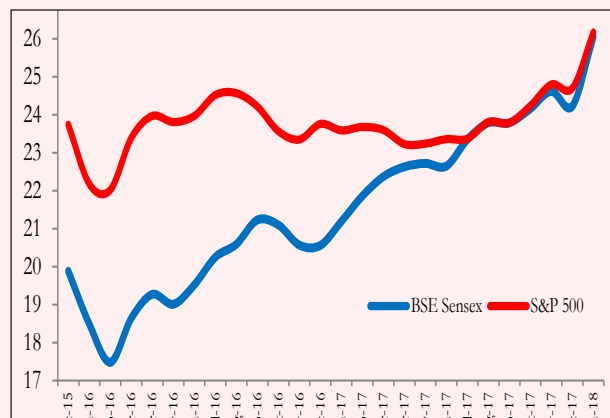
### Box 9 : Understanding the Stock Market Boom: Is India Different?

Over the past two fiscal years, the Indian stock market has soared, outperforming many other major markets. As Figure 1 shows, since end-December 2015, the S&P index has surged 45 percent, while the Sensex has surged 46 percent in rupee terms and 52 percent in dollar terms. This has led to a convergence in the price-earnings ratios of the Indian stock market to that of the US at a lofty level of about 26 (Figure 2). Yet over this period the Indian and US economies have been following different paths. So what explains the sudden convergence in stock markets?

**Figure 1. US and India Stock Market Performance, Dec. 2015-Jan. 2018**



**Figure 2. US and India Price-Earnings Ratios, Dec. 2015-Jan. 2018**

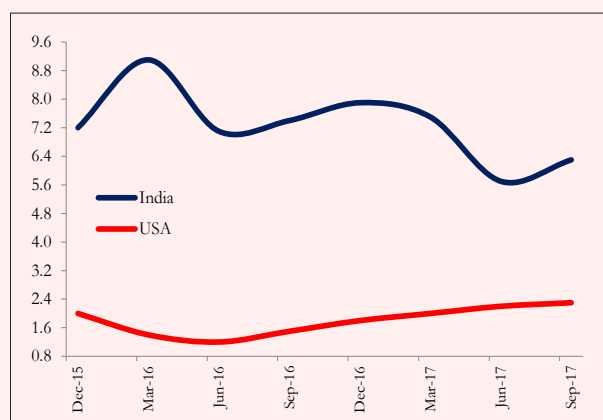


Source: BSE, Yahoo finance, Survey Calculations.

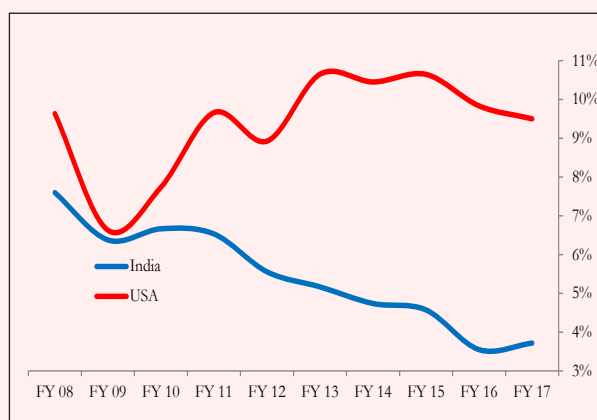
The paths of the Indian and US economies have differed in three striking ways:

- The stock market surge in India has coincided with a deceleration in economic growth, whereas US growth has accelerated (Figure 3).
- India's current corporate earnings/GDP ratio has been sliding since the Global Financial Crisis, falling to just 3½ percent, while profits in the US have remained a healthy 9 percent of GDP (Figure 4). Moreover, the recently legislated tax cuts in the US are likely to increase post-tax earnings.
- Critically, real interest rates have diverged substantially. Rates in the US have persisted at negative levels, while those in India have risen to historically high levels. Over the period of the boom, US real rates have averaged -1.0 percent, compared to India's 2.2 percent, a difference of 3.2 percentage points (Figure 5).

**Figure 3: US and India, Real GDP Growth end-Dec. 2015-end-Dec. 2017**

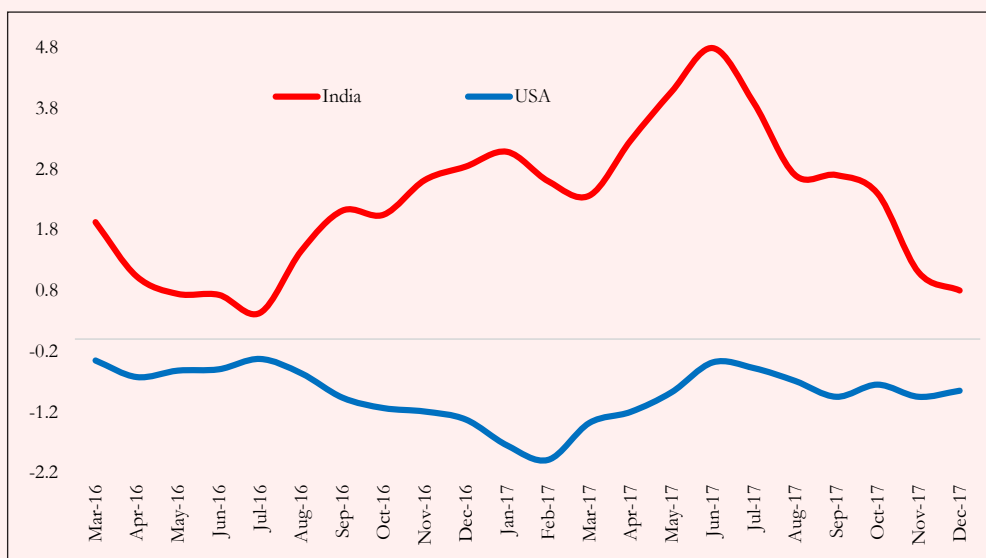


**Figure 4. US and India Corporate Profits (% of GDP)**



Source: RBI, Survey calculations.

Figure 5: Real Interest Rate: India &amp; US



Source : Survey Calculations.

What, then, explains the stock market convergence? Two factors seem to be at work. First, expectations of earnings growth are much higher in India. Indeed, it was such expectations that lie at the origin of the stock market boom. In early 2016-17, signs emerged that the long slide in the corporate profits/GDP ratio might finally be coming to an end. Investors reacted to this news with alacrity, bidding up share prices in anticipation of a recovery they hoped lay just ahead. Accordingly, the ratio of prices to current earnings rose sharply.

By 2017-18 signs began to accumulate that the profit recovery was not obviously around the corner. But at that point a second factor gave the market further impetus. That factor was demonetisation.

The price of an asset is not solely determined by the expected return on that asset. It is also determined by the returns available on other assets. As pointed out in last year's *Economic Survey*, the government's campaign against illicit wealth over the past few years—exemplified by demonetisation—has in effect imposed a tax on certain activities, specifically the holding of cash, property, or gold. Cash transactions have been regulated; reporting requirements for the acquisition of gold and property have been stiffened. In addition, rupee returns to holding gold have plunged since mid-2016, turning negative since mid-2017 (Figure 7). In addition, previously, stock prices had suffered because reporting requirements were higher on shares than purchases of other asset. But the attack on illicit wealth has helped to level the playing field.

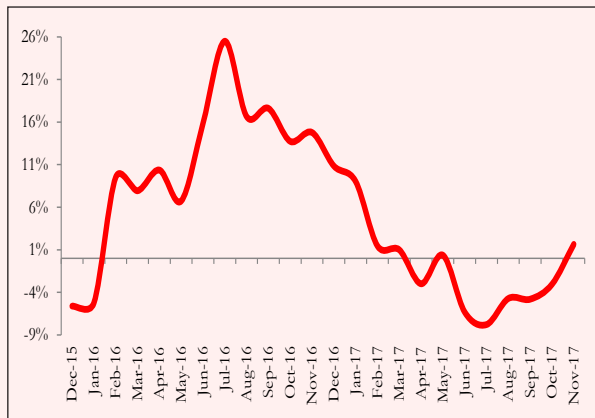
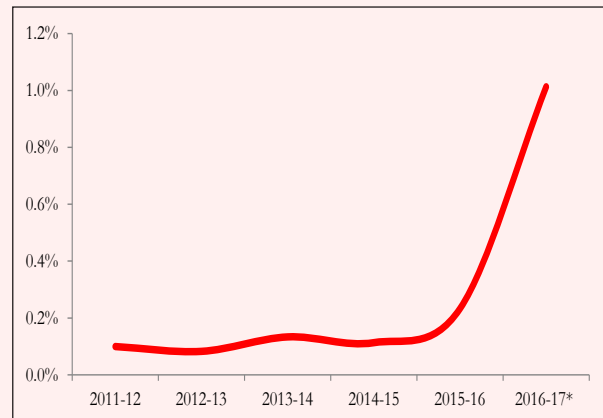
All of this has caused investors to re-evaluate the attractiveness of stocks. Investors have accordingly reallocated their portfolios toward shares, with inflows through stock mutual funds, in particular, amounting in 2016-17 to five times their previous year's level (Figure 8). Accordingly the equity risk premium (ERP, the extra return required on shares compared with other assets) has fallen (Figure 9).<sup>8</sup>

Does this imply that Indian P/E ratios have reached a higher “new normal”? Perhaps. It's possible that the portfolio shift set in train by the campaign against illicit wealth will result in a sustained reduction in the ERP. But it is worth recalling that a similar assessment was made in the US after its ERP fell sharply in the late 1990s-early 2000s. A few years later, the technology bubble collapsed, then the Global Financial Crisis occurred. The ERP surged to new heights and still hasn't reverted to its previous trough.

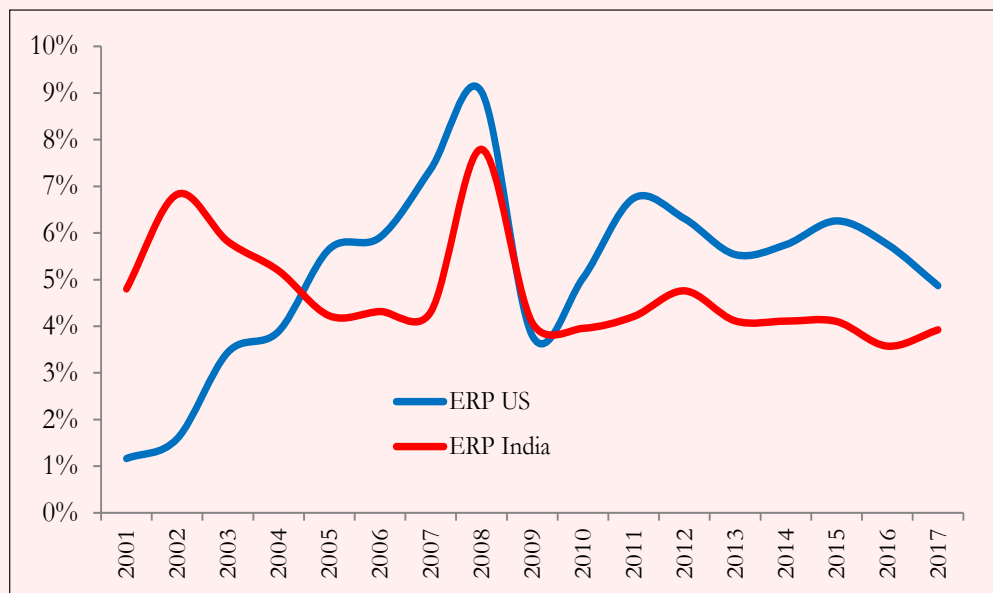
Beyond ERPs, sustaining current stock valuations in India also requires future earnings performance to rise to meet still-high expectations. And this outlook, in turn, depends on whether a significant economic rebound is this time well and truly around the corner.

<sup>8</sup> Equity Risk Premium (ERP) has been calculated using Ashwath Damodaran's model (“Equity Risk Premium (ERP): *Determinants, Estimation and Implications – The 2017 Edition*”, *Stern School of Business*) for the US. The net present value of the future cash flows from owning the portfolio of stocks has been calculated by dividing the future stream into two periods: an initial period of high growth for first five years followed by a second (infinite) period of steady-state growth rate. The cash flows are assumed to come from dividend payout or buyback of the stocks. Whenever ERP equals the NPV, the current stock price is equal to 0. For India, the initial period nominal growth rate is taken as 12 percent, and the steady state is a 5 years-moving average of past growth. For the USA, initial period nominal growth rate is taken as 5 percent. The India dividend payout is assumed to be 70 %.



**Figure 6: Returns from Gold (in percent)****Figure 7: Flows into Mutual Funds (percent of GDP)**

Source: RBI.

**Figure 8: US and India, Equity Risk Premiums**

Source: Survey Calculations.

In sum, the Indian stock market surge is different from that in advanced economies in three ways: growth momentum, level and share of profits, and critically the level of real interest rates. Low levels of the latter have been invoked to justify the high valuations in advanced economies. By that token, India's valuations should be much lower. So, what appears to be driving India's valuations are a fall in the ERP reflected in a massive portfolio re-allocation by savers towards equity in the wake of policy-induced reductions in the return on other assets.

But sustaining these valuations will require future growth in the economy and earnings in line with current expectations, and require the portfolio re-allocation to be semi-permanent. Otherwise, the possibility of a correction in them cannot be ruled out.

# A New, Exciting Bird's-Eye View of the Indian Economy Through the GST

*And then felt I like some watcher of the skies, When a new planet swims into his ken*

**John Keats, “On First Reading Chapman’s Homer”**

*As an information repository, the Goods and Services Tax (GST) embodies and heralds a radical alteration and enlargement in the understanding of the Indian economy. Preliminary analysis of this information yields the following feast of findings. There has been a fifty percent increase in the number of indirect taxpayers; and a large increase in voluntary registrations, especially by small enterprises that buy from large enterprises and want to avail themselves of input tax credits. The distribution of the GST base among the states is closely linked to the size of their economies, allaying fears of major producing states that the shift to the new system would undermine their tax collections. Data on the international exports of states (the first in India’s history) suggests a strong correlation between export performance and states’ standard of living. India’s exports are unusual in that the largest firms account for a much smaller share of exports than in other comparable countries. India’s internal trade is about 60 percent of GDP, even greater than estimated in last year’s Survey and comparing very favorably with other large countries. India’s formal sector, especially formal non-farm payroll, is substantially greater than currently believed. Formality defined in terms of social security provision yields an estimate of formal sector payroll of about 31 percent of the non-agricultural work force; formality defined in terms of being part of the GST net suggests a formal sector payroll share of 53 percent.*

## INTRODUCTION

2.1 Just for one reason, policymakers and researchers could soon share the sense of wonder that the poet expressed on first encountering the Greek epic, when he felt that a whole new world had suddenly opened up to him: the Goods and Services Tax (GST). The GST has been widely heralded for many things, especially its potential to create one Indian market, expand the tax base, and foster cooperative federalism. Yet almost unnoticed is its one enormous benefit: it will create a vast repository of information, which will enlarge and surely alter our understanding of India’s economy.

2.2 Data from the GST can help unveil some long-elusive and basic facts about the Indian economy. Some exciting new findings include:

- There has been a large increase in the number of indirect taxpayers; many have voluntarily chosen to be part of the GST, especially small enterprises that buy from large enterprises and want to avail themselves of input tax credits;
- The distribution of the GST base among the states is closely linked to their Gross State Domestic Product (GSDP), allaying fears of major producing that the shift to the new system would undermine their tax collections;

- New data on the international exports of states suggests a strong correlation between export performance and states' standard of living;
- India's exports are unusual in that the largest firms account for a much smaller share than in other comparable countries;
- Internal trade is about 60 percent of GDP, even greater than estimated in last year's *Survey* and comparing very favorably with other large countries;
- India's formal sector non-farm payroll is substantially greater than currently believed. Formality defined in terms of social security provision yields an estimate of formal sector payroll of about 31 percent of the non-agricultural work force; formality defined in terms of being part of the GST net suggests a formal sector payroll of 53 percent.
- Similarly, the size of the formal sector (defined here as being either in the social security or GST net) is 13 percent of total firms in the private non-agriculture sector but 93 percent of their total turnover.

2.3 These findings are explored below.

## TAXPAYERS

2.4 Table 1 shows that as of December 2017, there were 9.8 million unique GST registrants,<sup>1</sup> slightly more than the total indirect tax registrants under the old system.<sup>2</sup> But the two numbers are not comparable: registrants in the old system were not unique, since many taxpayers were registered under several taxes. Adjusting the base for double and triple counting, the GST has increased the number of unique indirect taxpayers by more than 50 percent—a substantial 3.4 million.

2.5 The profile of new filers is interesting. Of their total turnover, business-to-consumer (B2C) transactions account for only 17 percent of the total. The bulk of transactions are business-to-business (B2B) and exports, which account for 30-34 percent apiece (Table 2).

2.6 One of the many benefits of the GST was the voluntary compliance it would elicit. A few numbers highlight this phenomenon. There are about 1.7 million registrants who were below the threshold limit (and hence not obliged to register) who nevertheless chose to do so. Indeed, out of the total estimated 71 million non-agriculture enterprises, it is estimated that around 13 percent

**Table 1. Number of Indirect Tax Registrants, Pre- and Post-GST (in millions)**

	GST Registrants			Where GST Registrants' Came From			Type of GST Registration		
	Total	New	Old	Excise	Services	VAT	New	Composition	Regular
All India	9.8	3.4	6.4	.01	.60	5.8	3.4	1.6	8.2

Note: A company can have multiple registrations if the company operates across the states.

Source : Survey calculations based on GST data.

**Table 2. Estimated Turnover and its Type of the New Filers Under GST**

	B2B	B2C	Exports	Nil	Total
Share of turnover under different categories	34.0%	16.8%	29.8%	19.4%	100.0%

Note: NIL category includes supplies that are outside the scope of the GST such as petroleum, health, education, and electricity.

Source : Survey calculations based on GST data.

<sup>1</sup> This translates roughly into 9.2 million unique corporate/enterprise entities because the same entity may have obtained multiple registrations across states.

<sup>2</sup> About 2.6 million under the service tax and 0.4 million under the excise taxes (both levied by the Center) and 6.4 million under the Value-Added Tax (VAT, levied by the states).

are registered in the GST.<sup>3</sup>

2.7 Further, about 1.6 million taxpayers (17 percent of the total) are registered under the composition scheme, the current threshold for which is fixed at Rs. 1.5 crore. They pay a small tax (1 percent, 2 percent or 5 percent) on their turnover and are not eligible for input tax credits. This set up minimizes their administrative burden, but also makes it difficult for them to sell to larger firms, which would not be able to secure input tax credits on such purchases. For this reason, about 1.9 million (24 percent of total regular filers) of the registrants sized between the GST threshold of Rs 20 lakhs and the composition limit<sup>4</sup> who could have opted for the composition scheme chose not to do so and instead decided to file under the regular GST. Put differently, more than 54.3 per cent ( $1.9/(1.9+1.6)$ ) of those eligible to register under the composition scheme, chose instead to be regular filers. Why this is the case is discussed in Section 4 and Annex I.

2.8 Maharashtra, UP, Tamil Nadu and Gujarat are the states with the greatest number of GST registrants. UP and West Bengal have seen large increases in the number of tax registrants compared to the old tax regime.

## TAX BASE AND ITS SPATIAL DISTRIBUTION

2.9 Much of the discussions in the run-up to the GST centered on the size of the tax base, and its implications for the Revenue Neutral Rate (RNR).<sup>5</sup> The RNR Committee had estimated a base of Rs. 68.8 lakh crore and the GST Council had estimated a base of Rs. 65.8 lakh crore.<sup>6</sup>

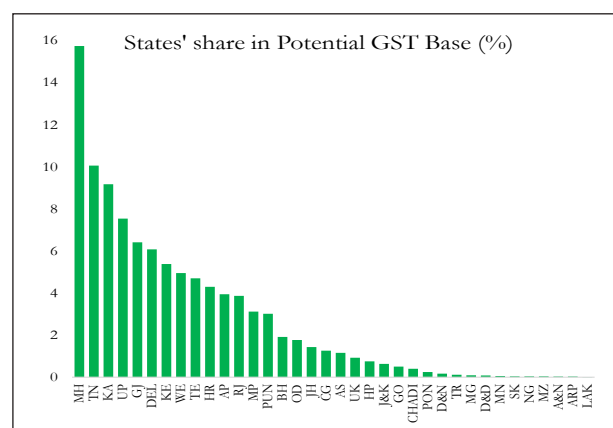
2.10 Current data suggest that the GST tax base (excluding exports) is Rs. 65-70 lakh crore, broadly similar to these two previous estimates.

Based on the average collections in the first few months, the implied weighted average collection rate (incidence) is about 15.6 percent. So, as estimated by the RNR committee, the single tax rate that would preserve revenue neutrality is between 15 to 16 percent.

2.11 In the run-up to the GST, there was anxiety amongst the manufacturing states that the switch to a destination and consumption-based tax would transfer the tax base toward consuming states. Has this happened?

2.12 Figure 1 provides data on the state-wise share of the total GST base. The top states are Maharashtra (16 percent), Tamil Nadu (10 percent), Karnataka (9 percent), Uttar Pradesh (7 percent), and Gujarat (6 percent). Figure 2 shows that each state's share in the GST base is almost perfectly correlated (coefficient of 0.95) with its share in overall GSDP. So the biggest tax bases still seem to be in the biggest producing states.

**Figure 1. State-Wise Distribution of the Tax Base**



Source : Survey calculations based on GST data.

2.13 One interesting question is whether the GST tax base is more closely correlated with

<sup>3</sup> This estimate is discussed later in Section 7 on Informality in India and Annex II.

<sup>4</sup> The turnover limit for the composition scheme was changed from Rs. 1 crore to Rs. 1.2 crore (in the October 2017, GST Council meeting) to Rs. 1.5 crore (in the November 2017 GST Council meeting). In order to maintain consistency across months, filers with annual turnover up to Rs. 1 crore are classified under the composition scheme.

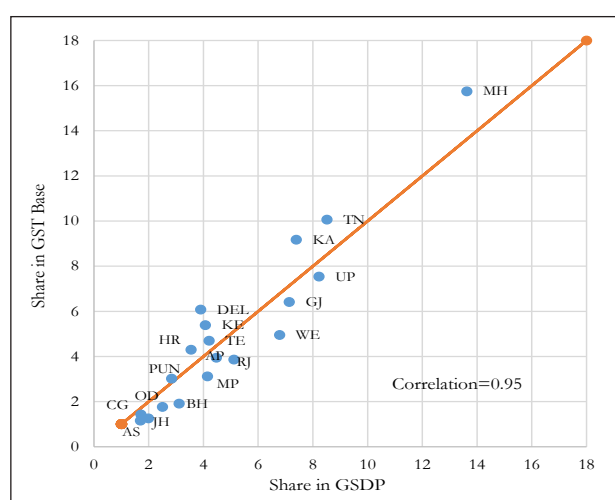
<sup>5</sup> Report on the Revenue Neutral Rate and Structure of Rates for the Goods and Services Tax (GST), submitted to the Government of India on December 4, 2015 and available at <http://www.gstcouncil.gov.in/sites/default/files/CEA-rpt-rnr.pdf>.

<sup>6</sup> Both the RNR committee and the GST Council had estimated the GST base for the year 2013-14. The number for 2017-18 is updated in line with nominal GDP growth since 2013-14.

manufacturing or overall GDP, including services.<sup>7</sup> Figures 2 and 3 plot (for the largest states), each state's share of the GST base against its share in GSDP, and aggregate manufacturing GVA.

2.14 It is true that the share of Maharashtra's and Gujarat's tax base under the GST is lower than their share of manufacturing (in Figure 3, they are to the right of the 45 degree line). But because these two states also have a significant presence in services, their tax base share remains in line with their share of GSDP. Overall, the data seem to suggest fairness and balance in the GST outcomes.

**Figure 2. Share in GST Base and GSDP**



Source : Survey calculations based on GST data and CSO.

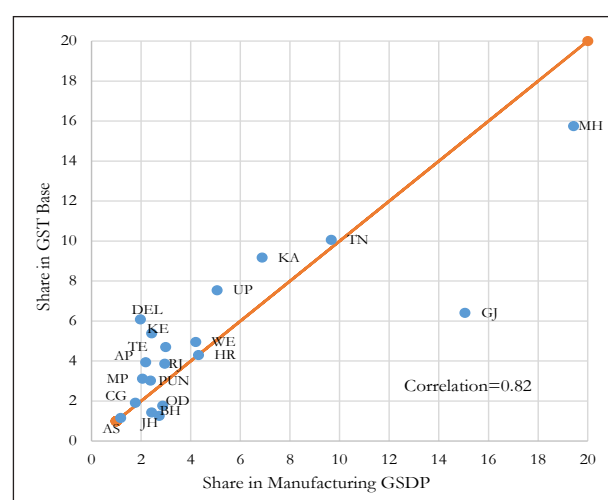
## SIZE DISTRIBUTION OF INTER-FIRM TRANSACTIONS

2.15 Knowing the nature of transactions between firms is critical to formulating policy, especially designing compliance procedures. Tables 3 and 4 offer insights.

2.16 Table 3 shows the transaction type by the size of the firm. All firms are placed in five categories based on their annual turnover:

- below-threshold, less than Rs. 20 lakhs;

**Figure 3. Share in GST Base and Manufacturing GSDP**



Source : Survey calculations based on GST data and CSO.

**Table 3. Monthly Turnover Distribution by Transaction Type and Turnover Group**

	Transaction Type					Share of Filed Returns	Share in Tax Liability
	B2B	B2C	Exports	Nil <sup>8</sup>	Total		
Below-Threshold	0.2%	0.2%	0.0%	0.0%	0.4%	32.2%	0.9%
Composition	1.2%	1.1%	0.0%	0.1%	2.4%	36.0%	4.4%
SME	3.8%	2.3%	0.1%	0.5%	6.8%	22.0%	10.5%
Medium	15.5%	4.3%	1.5%	2.8%	24.1%	9.2%	29.8%
Large	36.5%	4.9%	7.7%	17.1%	66.2%	0.6%	54.4%
<b>Total</b>	<b>57.3%</b>	<b>12.8%</b>	<b>9.4%</b>	<b>20.5%</b>	<b>100.0%</b>	<b>100%</b>	<b>100%</b>

Source : Survey calculations based on GST data.

<sup>7</sup> The GST tax base cannot be related to states' consumption base because the most recent data are for 2011-12 and, moreover, they suffer from significant under-reporting of consumption by richer households which would significantly influence the magnitudes and their state-wise distribution.

<sup>8</sup> This category consists of transactions reported by firms that are not part of GST, for example sales and purchases of petroleum products.

- below-composition limit, Rs. 20-100 lakhs (the current upper limit of the composition scheme is Rs. 150 lakhs);
- small and micro enterprises (SMEs), Rs. 1-5 crore;
- medium, Rs. 5-100 crore; and
- large firms above Rs. 100 crore.

2.17 This classification is shown both by number of enterprises and their turnover.

2.18 Unsurprisingly, the data show that the distribution of turnover is very skewed. The registered below-threshold firms account for 32 percent of total firms<sup>9</sup> but less than 1 percent of total turnover, while the largest account for less than 1 percent of firms but 66 percent of turnover, and 54 percent of total tax liability.

2.19 Registered smaller firms (the first three categories) seem to be equally involved in selling to consumers (B2C) and selling to other firms (B2B). Medium and large firms, in contrast, have a much greater presence in B2B than B2C transactions.

2.20 Before the GST was introduced, it was expected that small dealers who sell directly to consumers would choose the composition scheme while those who sell to bigger companies would opt (or be forced) into regular registration, because purchasing firms would not buy unless they could get input tax credits.

2.21 It turns out that about half the transactions of the below-threshold firms which nonetheless voluntarily chose to comply are actually in the B2C space. This suggests that there are, in fact, other motivations for participation, beyond simply being a supplier to larger companies.

2.22 Table 4 provides evidence that small B2C firms want to be part of the GST because they *buy* from large enterprises. In fact, 68 percent of their purchases (1.7/2.5, from the first column) are from medium or large registered enterprises, giving them a powerful incentive to register, so they could secure input tax credits on these purchases.

**Table 4. Cross-table of Supplier and Purchaser by Turnover Group**

		Purchaser Turnover Category					Total
		Threshold	Below composition	SME	Medium	Large	
Supplier Turnover Category	Threshold	0.0%	0.1%	0.1%	0.1%	0.1%	0.3%
	Below composition	0.2%	0.4%	0.5%	0.6%	0.4%	2.2%
	SME	0.5%	1.0%	1.6%	2.2%	1.3%	6.7%
	Medium	1.0%	2.0%	4.8%	10.9%	8.3%	27.0%
	Large	0.7%	1.1%	4.1%	17.3%	40.6%	63.8%
	Total	2.5%	4.6%	11.1%	31.1%	50.7%	100.0%

Source : Survey calculations based on GST data.

<sup>9</sup> Defined as those which filed non-zero GSTR3B returns in the first 5 months.



## INTERNATIONAL TRADE, INTER-STATE TRADE AND ECONOMIC PROSPERITY

2.23 Last year's *Survey* provided the first estimates of inter-state trade data in India based on tax data. Those estimates had to be backed out from payments of inter-state taxes (CST) under the pre-GST regime. This year GST returns provide direct data on inter-state trade and its many related dimensions.

2.24 Even more exciting is that for the first time in India's history it is possible to know the state-wise distribution of *international* exports of goods and services. Table 5 provides these data. Five states—Maharashtra, Gujarat, Karnataka, Tamil Nadu, and Telangana—in that order account for 70% of India's exports.

**Table 5. Share of States in Export of Goods and Services**

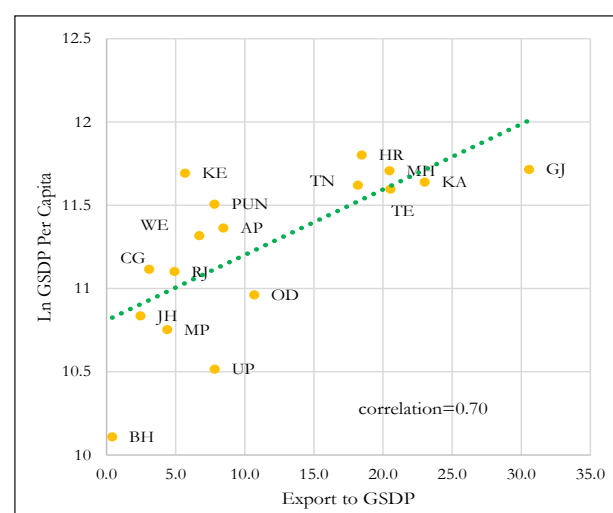
State	% share	Cumulative
MH	22.3%	22.3%
GJ	17.2%	39.5%
KA	12.7%	52.3%
TN	11.5%	63.8%
TE	6.4%	70.1%
HR	4.9%	75.0%
UP	4.8%	79.8%
WE	3.2%	83.0%
AP	2.8%	85.8%
OD	2.0%	87.8%
DEL	1.9%	89.7%
RJ	1.8%	91.5%
KE	1.7%	93.2%
PUN	1.7%	94.8%
MP	1.3%	96.1%
GO	0.9%	97.0%

Note: Export of Goods and Services exclude non-GST exports (such as petroleum).

Source : Survey calculations based on GST data.

2.25 Since these data are available for the first time, one can immediately answer the question of whether prosperity is related to export performance. Figure 4 shows that the conventional wisdom is correct: a state's GSDP per capita is highly correlated with its export share in GSDP (for the 20 major states).<sup>10</sup> The one major outlier in the chart is Kerala, but only because it is a large recipient of remittances. If remittances are added and created a broader globalization index for states, Kerala may not be an outlier.

**Figure 4. International Exports and States' Prosperity**



Source : Survey calculations based on GST data and CSO.

2.26 Last year *Survey* had estimated that India's inter-state trade in goods was between 30 and 50 percent of GDP, a relatively high number compared to other countries. GST data suggests that India's internal trade in goods and services (excludes non-GST goods and services) is actually even higher: about 60 percent of GDP.

2.27 Tables 6 provides data on inter-state trade:

- The five largest exporting states are

<sup>10</sup> The plot is very similar when extended to all the states.

Maharashtra, Gujarat, Haryana, Tamil Nadu and Karnataka;

- The five largest importing states are Maharashtra, Tamil Nadu, Uttar Pradesh, Karnataka and Gujarat;
- The states with the largest internal trade surpluses are Gujarat, Haryana, Maharashtra, Odisha and Tamil Nadu.

2.28 Two interesting questions arise. First, are the states that export the most also the ones that import the most? Relatedly, are the states that trade the most the ones that are the most competitive and run the largest trade surpluses? Figures 5 and 6 suggest that the answers are: yes and yes.

**Table 6. States' Share in Interstate Trade and their Net Exports**

State	Exports	State	Imports	State	Net Exports
MH	15.7	MH	13.7	HR	26.1
GJ	11.3	TN	7.8	GJ	20.1
HR	9.4	UP	7.8	OD	6.6
TN	8.4	KA	7.3	MH	5.0
KA	7.0	GJ	7.1	DEL	2.6
DEL	6.0	HR	6.9	TN	2.2
UP	5.6	DEL	5.7	CG	1.6
WE	4.0	WE	4.8	JH	0.3
RJ	3.8	RJ	4.7	AP	-1.2
AP	3.6	TE	4.7	KA	-1.3
PUN	3.2	AP	3.7	WE	-4.9
TE	3.0	PUN	3.7	RJ	-6.7
MP	2.4	MP	3.6	PUN	-7.0
OD	2.3	KE	3.1	UP	-9.6
JH	1.8	BH	2.0	MP	-10.4
CG	1.6	OD	1.9	TE	-14.7
KE	0.8	JH	1.7	KE	-20.1
BH	0.2	CG	1.6	BH	-23.6

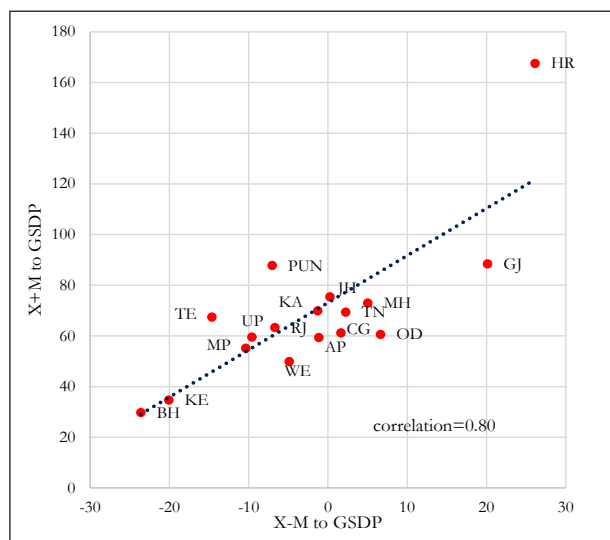
Note: 1. Inter-State trade of goods and service exclude non-GST goods.

2. Export and import are in percent of their respective totals; net exports is share of GSDP.

Source : Survey calculations based on GST data.

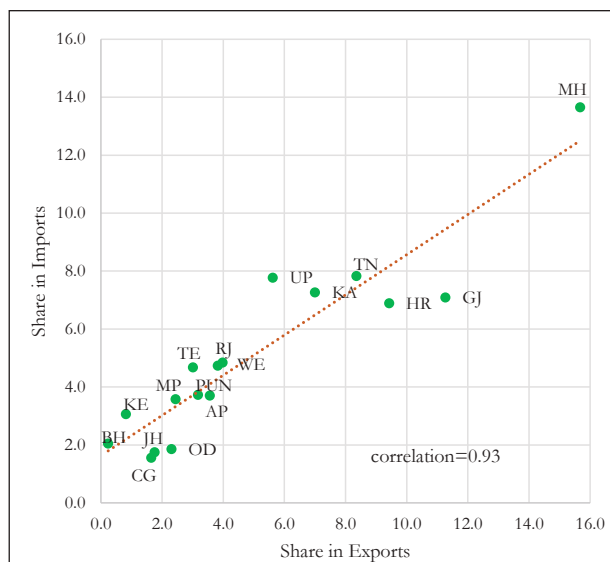
2.29 One can also ask whether internal trade is related to prosperity. Figure 7 plots the share of trade (exports plus imports) in a states' GSDP against its per capita GSDP. The interesting contrast is between Figures 4 and 7. The correlation of per capita GSDP with international exports is stronger than with inter-state trade. More research is required to see if this difference is significant and causally consequential.

**Figure 5. Gross and Net Inter-State Trade of States**



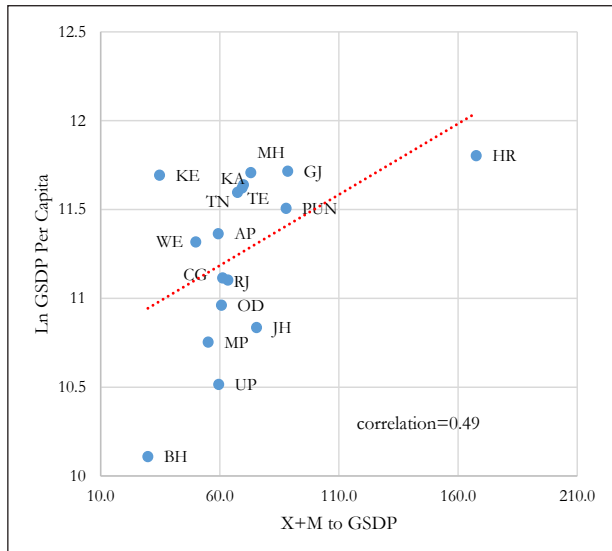
Source : Survey calculations based on GST data and CSO.

**Figure 6. Inter-State Exports and Imports of States**



Source : Survey calculations based on GST data and CSO.

**Figure 7. States' Internal Gross Trade and Prosperity**



Source : Survey calculations based on GST data and CSO.

### TRADING SUPERSTARS: INDIAN EXPORT EGALITARIAN EXCEPTIONALISM

2.30 There is a growing literature that documents the emergence of exports superstars—firms that account for a disproportionately large share of exports. For example, in a sample of 32 countries, Freund and Pierola (2013) find that the top 1 percent of exporting firms account for over 50 percent of exports. Further, it is argued that having and fostering bigness influences the sectoral composition of exports and also helps create comparative advantage and improve long-term prospects. This is in contrast to the more conventional, Schumacherian view that argues for the virtues of smallness, especially small and medium enterprises.

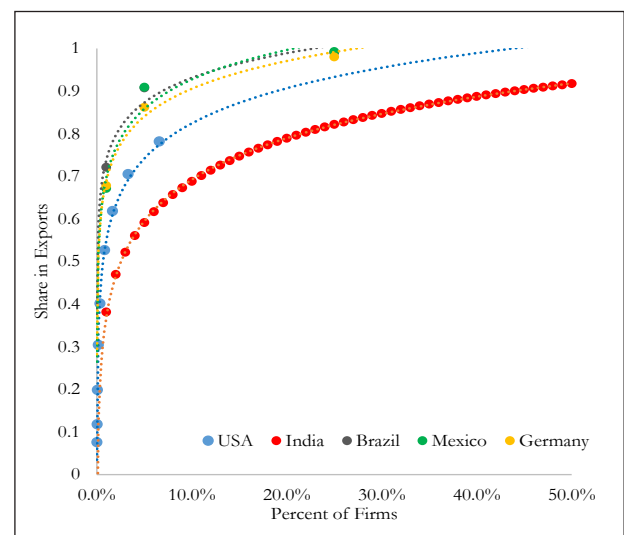
2.31 Until now, no such analysis has been possible for India because firm level export data are difficult to construct. (In principle, DGCIS and Customs have these data but they have not been systematically compiled or used by researchers.)

However, with the new GST data it is possible to construct firm-level exports.

2.32 New findings on firm level concentration of exports and compare them with a few other major countries is presented in Figure-8. The results are striking. Export concentration by firms is much lower in India than in the US, Germany, Brazil, or Mexico<sup>11</sup>. For example:

- the top 1 percent of firms accounted for 72, 68, 67, and 55 percent of exports in Brazil, Germany, Mexico, and USA respectively but only 38 percent in the case of India;
- the top 5 percent accounted for 91, 86, 91, and 74 percent in those countries, compared with 59 percent in India; and
- the top 25 percent of firms accounted for 99, 98, 99, and 93 percent in those countries, as opposed to 82 percent in India.

**Figure 8. Top Exporter Percentile by Cumulative Export Share**



Note: India's export of Goods and Services exclude non-GST exports (such as petroleum).

Source : Survey calculations based on GST data, World Bank's Export Dynamic Database and US Census.

<sup>11</sup> Petroleum and Petroleum products are not included in the data for Brazil, Mexico and Germany, nor for India. However, the US data (from the US census) does include companies in oil and gas extraction.

2.33 There is one caveat which could help explain the atypical Indian distribution: unlike in other countries, Indian data includes exports of services, where concentration ratios tend to be much lower than in manufacturing.

2.34 The implications of such an “egalitarian” Indian export structure are unclear. The evidence cited earlier argues in favor of superstars, because they are dynamic and their expansion can have spillover effects on other firms. But concentration can have disadvantages, including impeding competition.

## INFORMALITY OF THE INDIAN ECONOMY

2.35 Finally, the GST data throw up new data that allows a better re-examination of the extent of formality/informality in the Indian economy.

2.36 Informality or rather formality can be defined in at least two senses<sup>12</sup>. First, when firms are providing some kind of social security to employees. In India, government provides this for its employees, and the Employees’ Provident Fund Organization (EPFO) provides it to private sector employees in respect of pensions and provident funds; and the Employees’ State Insurance Corporation (ESIC) in respect of medical benefits.

2.37 The EPFO contribution is mandatory for industries employing greater than 20 workers, and whose monthly wage/salary is below Rs. 15,000. Above that level, contributions are voluntary. Of

the total active members (for whom the monthly contribution is deposited by the employer), 86 percent earn less than Rs 15,000, and about 98 percent have opted for a combination of the ‘provident fund-pension’ option. The ESIC contribution is mandatory for certain firms, employing greater than 10 workers, and for workers in these firms whose monthly wage/salary is below Rs. 21,000.

2.38 A second definition of formality is when firms are part of the tax net. Since new data on the GST is available, one can define tax formality as firms having registered under the GST.

2.39 Based on these definitions, the magnitude of formal sector firms, turnover, tax liabilities, tax paid, exports, and payroll can be estimated<sup>13</sup>. Table 7 below shows a 2x2 matrix for all these variables for different combinations of social security and GST formality. In this table the NSSO’s 73<sup>rd</sup> Survey Round is used to fill in the cell where a firm is neither part of the tax or social security net and annual turnover is less than GST threshold of 20 lakh. This is the pure informality cell in the sense that firms in them are outside the tax and social security net.<sup>14</sup>

2.40 The following are the key findings.

- About 0.6 percent of firms, accounting for 38 percent of total turnover, 87 percent of exports, and 63 percent of GST liability are what might be called in the “hard core” formal sector in the sense of being both in the tax and social security net.

<sup>12</sup> There are many different definitions of formality/informality. The most common ones are: (a) whether a worker has a formal contract; (b) whether a worker is a regular/salaried worker (as opposed to self-employed or casual); (c) whether a firm is registered with any branch of the government; (d) whether the firm pays taxes; and (e) whether a worker receives social security.

<sup>13</sup> Details are given in Annex II.

<sup>14</sup> The NSSO conducted a survey of Unincorporated Non-Agricultural Enterprises (Excluding Construction) in India between July 2015 and June 2016.



- At the other end, 87 percent of firms, representing 21 percent of total turnover, are purely informal, outside both the tax and social security nets.
- Around 12 percent of firms, accounting for 41 percent of turnover, 13 percent of exports, and 37 percent of tax liabilities are in the tax net but not the social security net. These firms are relatively smaller than those in both nets, since they have a lower average turnover and average tax rate, 7 percent compared with 16.3 percent.
- Finally, less than 0.1 percent of firms accounting for about 14 percent of turnover are in the social security net but not in the GST net. These are mostly firms that are in GST-exempted sectors (such as education, health, electricity), although there are many firms that appear to be outside the GST even though they are in the GST-included sectors. One possible reason is that they fall below the GST threshold, but there might be others.

### ***Non-Farm Payroll***

2.41 Turn next to formal and informal non-farm payroll.<sup>15</sup> Formal non-farm payroll from a social security perspective is estimated at about 7.5 crores, or 31 percent of the non-agricultural workforce. This estimate includes government non-farm payroll (center and states), which is roughly estimated at 1.5 crore (excluding defence personnel).

2.42 The tax-based numbers exclude government employees and also non-farm payroll that takes place in sectors currently outside the GST such as health and education, although if firms in these sectors register for other reasons, they will be part of estimated non-farm payroll.

2.43 Taking all these into account, and adding back government employment, the formal non-farm payroll from a tax definition is estimated at 12.7 million. This implies that nearly 53 percent of the non-agricultural workforce (240 million) is in the formal sector.

2.44 It is important to emphasize that these estimates are enterprise-based not household-based definitions of employment and also exclude the agricultural sector. With these caveats in mind, this striking conclusion follows. These estimates for formal non-farm payroll, ranging from 31 percent in the case of social security-defined formality and 53 percent in the case of tax-defined formality, are considerably greater than current beliefs about the size of formal sector non-farm payroll.

### **CONCLUSION**

2.45 This chapter is a mere sampler, giving a hint of the insights that analysis of the GST will be able to provide in the future. A whole new world has indeed opened up to followers of the Indian economy, and much exciting new research lies ahead.

<sup>15</sup> There have been few estimates of the informality of the Indian economy with the most comprehensive being the NSS 68<sup>th</sup> Round of Employment and Unemployment Survey 2011-12.



# Investment and Saving Slowdowns and Recoveries: Cross-Country Insights for India

## 03 CHAPTER

*Investment calls the tune, and profits dance accordingly*

Hyman Minsky

*India's unprecedented climb to historic high levels of investment and saving rates in the mid-2000s has been followed by a pronounced, albeit gradual, decline. This current episode of investment and saving slowdown is still ongoing. This chapter draws on cross-country experience to study the pattern of investment and saving slowdowns as well as recoveries in order to obtain policy lessons for India. One finding is that investment slowdowns have an impact on growth but not necessarily saving. Another is that recoveries from investment slowdowns, especially those associated with balance sheet difficulties--as in India--tend to be slow. Notably, mean reversion or some degree of automatic bounce-back is absent so that the deeper the slowdown, the slower and shallower the recovery. The policy conclusion is urgent prioritization of investment revival to arrest more lasting growth impacts, as the government has done with plans for resolution of bad debts and recapitalization of public sector banks.*

## INTRODUCTION

3.1 Since 2010, discussions of India's growth have centered on one simple question: how soon will the economy revert to 8-10 percent growth? The question is at times posed as if such a reversion is a *fait accompli*, a phenomenon just waiting to occur. Perhaps it is even just round the corner, given all the structural reforms the government has implemented in recent years.

3.2 Underlying this expectation is the firm belief that domestic saving and investment will soon start to accelerate. But this cannot be taken for granted. As Figure 1 shows, neither saving nor investment is unduly depressed. Investment (gross fixed capital formation) rate and gross

domestic saving rate are actually above the levels that prevailed throughout the 1990s. In fact, it was the boom of the 2000s that was exceptional, as India's climb to about 10 percent real GDP growth was accompanied by an unprecedented 9 percentage point pick-up in domestic saving and investment rates. The subsequent slide in investment and saving (as a percent of GDP) has merely brought these rates back towards normal levels. Specifically:

- The ratio of gross fixed capital formation to GDP climbed from 26.5 percent in 2003, reached a peak of 35.6 percent in 2007, and then slid back to 26.4 percent in 2017.<sup>1</sup>
- The ratio of domestic saving to GDP has

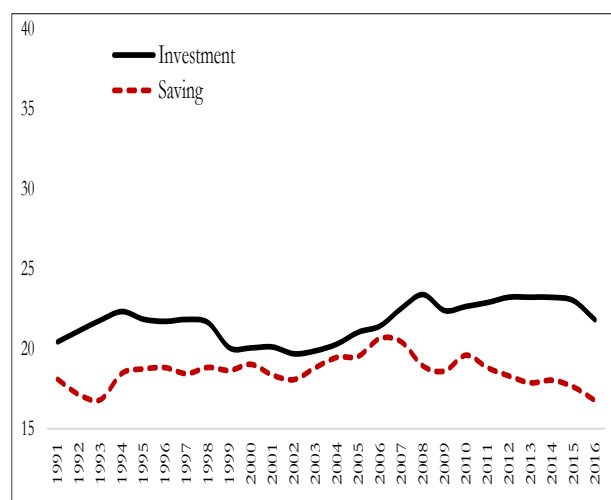
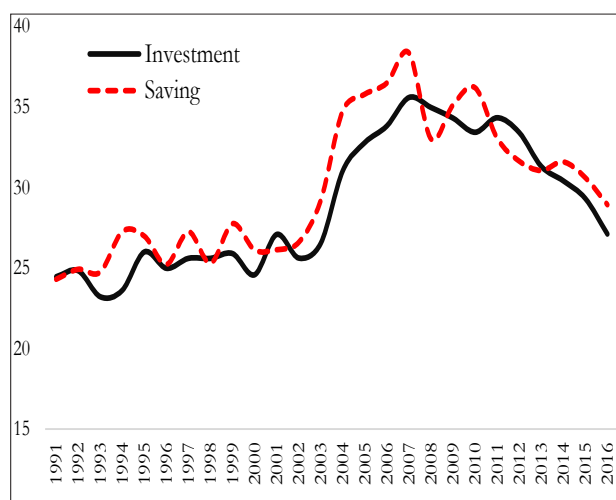
<sup>1</sup> Data, including for India, are from the World Bank's World Development Indicators (WDI). Gross fixed capital formation includes purchases of plant, machinery, and equipment; the construction of infrastructure (roads and railways, schools and hospitals, private residential dwellings, industrial buildings, etc.) and land improvement. These ratios are in nominal terms.

registered a similar evolution, rising from 29.2 percent in 2003 to a peak of 38.3 percent in 2007, before falling back to 29 percent in 2016.<sup>2</sup>

- The cumulative fall over 2007 and 2016 has been milder for investment than saving, but investment has fallen to a lower level.

global economy, no other country seems to have gone through such a large investment boom and bust during this period. The right hand panel of Figure 1 shows that in comparable countries the average increase in saving and investment prior to the crisis was modest, while subsequently only domestic saving has shown a pronounced decline. And while averages always conceal a variety of

**Figure 1. Investment & Saving (as percentage of GDP):**  
India (left panel) and average for sample economies (right panel)<sup>3</sup>



3.3 Such sharp swings in investment and saving rates have never occurred in India's history—not during the balance-of-payments crises of 1991 nor during the Asian Financial Crisis of the late 1990s. And while it is true that the past 15 years have been a special period for the entire

experiences, the only country that displays a similar pattern to India over the same time period is Brazil – and even in this case the parallel is far from exact.

3.4 Which sectors are responsible for the

**Table 1. Change in the Composition of Investment and Saving Rates (percentage points)**

	Change in Investment		Change in Saving	
	2004-05 to 2007-08	2007-08 to 2015-16	2004-05 to 2007-08	2007-08 to 2015-16
<b>Total</b>	9.1	-6.3	9.1	-7.7
<b>Public</b>	1.4	-1.3	3.9	-4.0
<b>Private</b>	7.6	-5.0	5.2	-3.8
Private corporate	8.9	-4.4	5.2	1.4
Household	-1.3	-0.6	0.0	-5.2

Note : The investment data is as per the 2011-12 series. The gross savings number is from the World Bank to which sectoral ratios from National Accounts Statistics are applied to estimate the sub-components.

Source : Central Statistics Office (CSO).

<sup>2</sup> This is the latest year for which data on saving is available.

<sup>3</sup> The sample consists of 55 economies, some low income (8) but mostly middle income (40), and a few high income (7). A few economies get excluded from subsequent analyses as they are oil exporters (Algeria, Ecuador, Iran, Trinidad & Tobago, Nigeria and Venezuela). This sample encompasses 23 major emerging market economies (Annex I).

saving/investment decline in India? Essentially, private investment and household/government saving (Table 1). Based on the break-up of investment and saving, that is available up to 2015-16, private investment accounts for 5 percentage points out of the 6.3 percentage point overall investment decline over 2007-08 and 2015-16. The fall in saving, by about 8 percentage points over the same period, has been driven almost equally by a fall in household and public saving. The fall in household saving has in turn been driven by a fall in physical saving, partly offset by an increase in the holding of financial assets. Within the latter, there has been a shift from currency and bank deposits towards market instruments, viz. shares and debentures, as discussed in Chapter 1 of *Economic Survey 2017-18*, Volume 2.

3.5 So, what can be expected going forward, for India's investment in particular—and for the country's prospects of reverting to sustained high growth rates? This chapter attempts to answer this question, taking its cue from saving and investment slowdown episodes witnessed over the past 40 years in other, including similar, countries. To investigate these issues, this chapter:

- Identifies episodes of saving and investment slowdowns;
- Studies their patterns;
- Examines how investment behaves in the aftermath of a slowdown; and
- Draws policy lessons for reversing India's investment slowdown and re-accelerating GDP growth.

3.6 In earlier and related literature Hausmann, Rodrik and Pritchett (2004) studied growth accelerations. Their results, among other things, indicate that standard determinants of economic growth (viz. greater investment, exports and a more competitive exchange rate) partly explain such accelerations. Rodrik (2000) examined cases in which countries underwent sustained saving

transitions, analyzing the relationship among saving, investment and growth during those periods. His main conclusion was that economic growth is aided by creating incentives for investment (rather than saving) and production.

3.7 Drawing upon the tools used in these papers, this chapter focuses on episodes of saving and investment slowdowns. The next section starts by defining such slowdowns.

## IDENTIFYING INVESTMENT AND SAVING SLOWDOWNS

3.8 Investment and saving slowdowns are defined using a specific set of conditions (filters). First, a “shortfall” is defined as the difference between (a) the average of investment (saving) in the slowdown year and subsequent two years; and (b) the average of the previous five years. Then, a “slowdown year” is defined as one where the shortfall in that year exceeds a certain threshold. If there are two or more consecutive slowdown years, this counts as a “slowdown episode”. Second: the average investment rate for the 5 years prior to the slowdown year is at least 15 percent of GDP.<sup>4</sup>

3.9 The thresholds considered are of 2, 3 and 4 percentage points. As noted in Rodrik (2000), the lower the threshold, the greater the risk of capturing episodes of temporary volatility rather than more enduring slowdowns. But because India's current investment (saving) slowdown has been so gradual it is best captured in the 2 percent threshold. Moreover, in most cases, the results for the 3 and 4 percent thresholds also hold for the 2 percent case.

3.10 The effective span over which slowdowns are captured is 1975 to 2014, with a sample of 55 countries, providing around 2,200 observations (Annex I).

3.11 Table 2 (for the 3 percent threshold) reveals that investment episodes are more frequent than saving episodes, while common episodes (where

<sup>4</sup> This rate ideally should be a little higher, say 20 percent, to limit the number of slowdown cases. At that rate, however, certain important economies will be excluded most prominently Israel, Ghana, and Egypt.

both investment and saving slow) are relatively unusual. This pattern, however, has reversed after 2008, with saving episodes catching-up with investment episodes. Presumably, the relatively lower number of investment episodes in the latest period reflects concerted efforts in emerging economies to revive investment after the Global Financial Crisis via stimulus and other policies. Similar trends hold for the 2 and 4 percent thresholds.

**Table 2. Number of Slowdown Episodes (3 percent threshold)**

	Saving	Investment	Common
1975-83	6	14	13
1984-97	12	19	8
1998-2007	9	15	5
2008-2014	9	10	1
<b>Total</b>	<b>36</b>	<b>58</b>	<b>27</b>

Note: This table includes episodes of oil exporters. These patterns hold even with such countries excluded.

3.12 Table 3 shows that that investment and saving slowdowns tend to be similar in duration. However, investment slowdowns are greater in magnitude. Magnitudes are the shortfalls (as defined above), cumulated over the entire slowdown episode. Measured in this way, the

magnitude of a typical investment slowdown (calculated as an average of slowdowns identified using the 2, 3 and 4 percent thresholds) is 33 percentage points, higher than the 22 percentage point average for saving slowdowns.

3.13 Duration is a simple count of the number of years that the shortfall in investment/saving exceeds the various thresholds. For example, if the shortfall persists for 5 years, but exceeds 2 percent only for 2 years, then the duration is termed as 2 years. Using this definition, both investment and saving slowdowns typically last around 4 years.

3.14 At the same time, Table 3 reveals some notable differences between investment and saving slowdowns. Investment is more prone to extreme events: there are 4 cases where the cumulative investment slowdown exceeded 50 percentage points, whereas there are hardly any cases of saving slowdowns of this magnitude. On the other hand, large saving slowdown episodes measuring between 30 and 50 percentage points tend to drag on for a year more on average than similarly-large investment slowdowns.

3.15 The table in annex III provides a complete cross-country list of investment and saving slowdowns. It reveals that slowdowns are quite frequent, appearing even in 'success stories', such as China (1988), Singapore (1985, 1999), and

**Table 3. Magnitude-wise Count and Duration of Slowdown Episodes (Percentage Points, Average of 2, 3, and 4 percent Thresholds)**

Cumulative Magnitude	Investment			Saving		
	Count	Avg. Magnitude	Avg. Duration (years)	Count	Avg. Magnitude	Avg. Duration (years)
50 to less than 70	4	65.4	6.1	--	--	--
30 to less than 50	14	39.0	5.4	11	38.7	6.5
10 to less than 30	42	19.0	3.7	27	18.6	3.5
Up to 10	15	7.8	2.1	13	8.0	2.1
<b>All</b>	<b>75</b>	<b>32.8</b>	<b>3.8</b>	<b>51</b>	<b>21.8</b>	<b>3.8</b>

Note: The table does not include oil exporters.

Mauritius (1981, 1995, 2012). In fact, Mauritius – along with Tunisia and Egypt – has experienced no less than 4 investment slowdowns over the past 40 years in the 2 percent threshold. Looked at another way, there is only one economy in the sample since the early 1980s that has not suffered from any slowdown: Bangladesh.

3.16 While frequent, slowdowns have tended to cluster in particular time periods (Figure 2). Most slowdowns in Latin America and Africa occurred during the 1980s, a period that became known as the ‘lost decade’ in those continents. The investment and saving slowdown in Mexico following the debt crisis of 1982 is captured in various thresholds, while the weakness of the Brazilian economy manifests as investment and saving slowdowns from the early 1980s to the early 1990s.

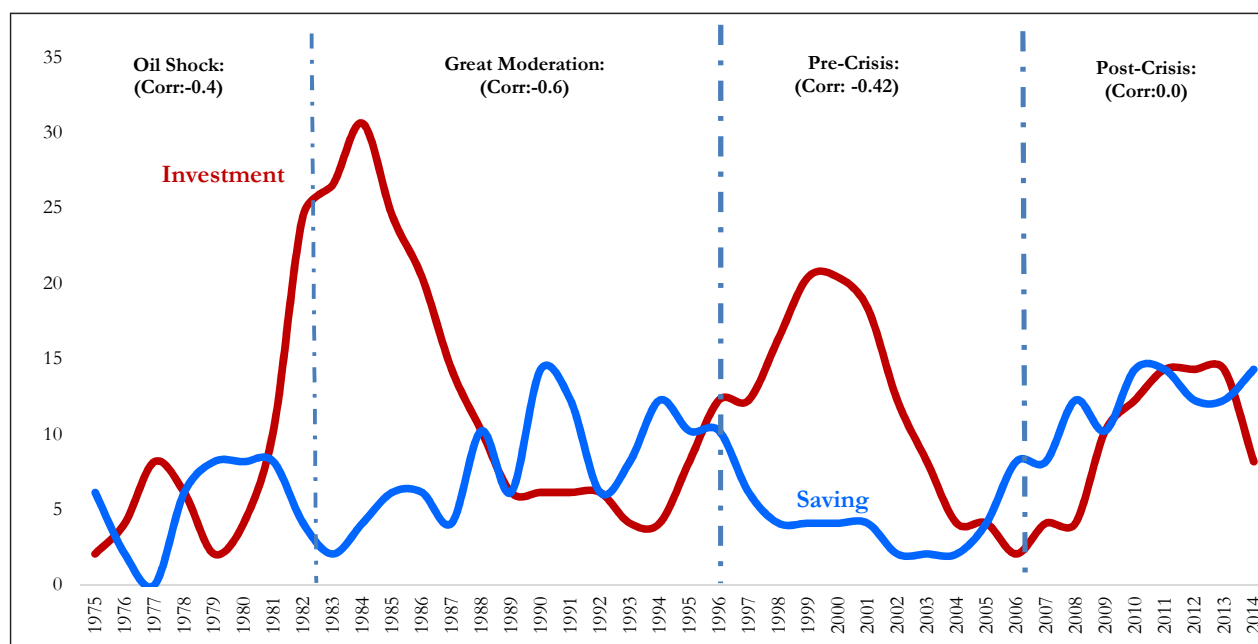
3.17 Meanwhile, Asian countries faced the largest number of slowdown episodes (10) following 1997. During that period, there were large investment slowdowns in Malaysia, Thailand, Indonesia and Korea, which of course is why this

period is known as the East Asian crisis—though the phenomenon extended to countries as far away as Turkey and Argentina.

3.18 Currently (after 2008), these economies are in the era of saving slowdowns, with the percentage of such countries at its peak, as Figure 2 shows. The fraction of countries with investment slowdowns has also increased, though to a limited extent. Curiously, this relationship between the two types of slowdown turns out to be unusual—from 1975 to 2007, the correlation in figure 2 between the number of countries experiencing an investment slowdown and those experiencing a saving slowdown that was negative—seems to be breaking down in the latest period. Saving are perhaps less prone to cycles because of being influenced by long term trends viz. demographics.

3.19 How does India fit into this broader picture? As so often occurs, it seems to be a special case. Until recently, India had not experienced either type of slowdown (as per the definitions used): not

**Figure 2. Percent of countries experiencing a slowdown (3 percent threshold)<sup>5</sup>**



Note : Does not include oil exporters. Source: WDI database and Survey Calculations.

<sup>5</sup> This excludes common episodes of investment and saving slowdowns.



during the ‘lost decade’, not during the East Asian crisis, not even after India’s own balance-of-payments crisis in 1991. As a result, the current slowdown – in which both investment and saving have slumped – is the first in India’s history. Even then, the slowdown is detected most fully only in the 2 percent threshold, largely because the slide has been gradual, unlike (for example) the sharp adjustments that occurred in East Asia after the 1997 crisis.

**Table 4. India Slowdown Years\***

	Investment	Saving	Common
2 per cent		2010	
		2011	
	2012	2012	2012
	2013	2013	2013
	2014	2014	2014
	2015		
	2016		
3 per cent		2011	
		2012	
	2013		
	2014	2014	2014
	2015		
4 per cent		2014	Nil
	2015		Nil
	2016		

Note: \*The terminal years mentioned in the table do not indicate the end-years of the slowdown. Data constraints limit the ability to detect slowdowns beyond those years.

3.20 Table 4 shows the years of India’s slowdown captured under different thresholds. The investment slowdown started in 2012 (when it surpassed the 2 percent threshold), subsequently intensified (surpassing the 3 percent and then the 4 percent thresholds in 2013 and 2014 respectively), and was apparently still continuing as of the latest date, that for 2016.<sup>6</sup> With the slowdown now having

lasted at least five years, it has already surpassed the typical duration of slowdown episodes; if it continued through 2017, as seems likely, it would have reached the six-year duration recorded in the exceptionally severe cases. Yet because the investment decline has been so gradual, the magnitude of the shortfall so far is relatively less severe – it remains a moderate 21 percentage points, well under the average magnitude.

3.21 Meanwhile, the saving slowdown started in 2010, and also seems to be still continuing. Owing to data limitations, however, the last year that can be captured as a slowdown year is 2014.<sup>7</sup> Even at that point, the slowdown episode had lasted for five years, though like its investment counterpart, its magnitude was a below-average 15 percentage points.

3.22 In other words, India’s current investment/saving slowdown episode has been lengthy compared to other cases – and it may not be over yet.

### SAVING VERSUS INVESTMENT: GROWTH CONSEQUENCES

3.23 The simultaneous slump in saving and investment gives rise to a question. Should policies that boost investment (viz. substantial infrastructure push, reforms to facilitate the ease of doing business or the ‘Make in India’ program) be given greater priority over those that boost saving? The issue is about relative importance and urgency. Both set of policies are crucial in the long run but which one needs to be prioritized at present?

3.24 The standard solution that is often prescribed is that both problems need to be tackled simultaneously.<sup>8</sup> Rodrik (2000) provides evidence that a simultaneous push may not be

<sup>6</sup> In line with the methodology discussed above, calculating the shortfall for 2016 requires estimates for the subsequent two years. Estimates for 2017 are taken from the CSO’s 1<sup>st</sup> Advance Estimate, released on January 5, 2018. Those for 2018 are based on an assumption that this year the slide in gross fixed capital formation is halted but not reversed.

<sup>7</sup> The data for saving for 2016-17 will be released by CSO on January 31, 2018.

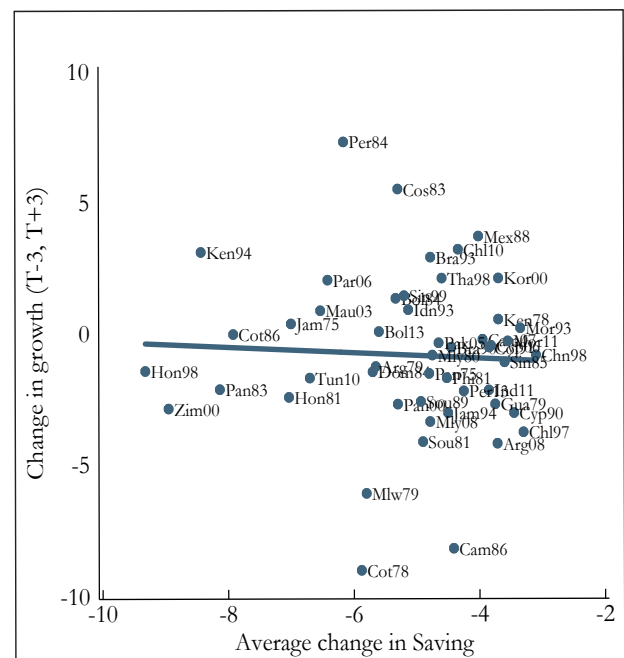
<sup>8</sup> For example, refer to the Report of the Parliamentary Standing Committee on Finance on ‘Current Economic Situation and Policy Options’, August, 2012.



3.25 Do similar conclusions follow from the present analysis? To answer this question, the behaviour of growth (measured as change in real

3.26 Given that a more intense slowdown (a larger negative value on the x-axis) should lead to a larger fall in real per-capita growth, the relationship between the two variables is expected to be *positive*. Indeed, the relationship for investment slowdowns is distinctly positive; with many of the East Asian crisis episodes associated

**Figure 3b. Change in Growth & Change in Saving (3 percent threshold)**



<sup>11</sup> The T+3 to T-3 year growth change result is reported here especially to capture the India slowdown starting 2013.

with large growth effects (Figure 3a). But the relationship for saving episodes is unclear, with many of the large saving episodes (e.g. Peru 1984, Kenya 1994, Mauritius 2003) not associated with sharp declines in growth (Figure 3b).

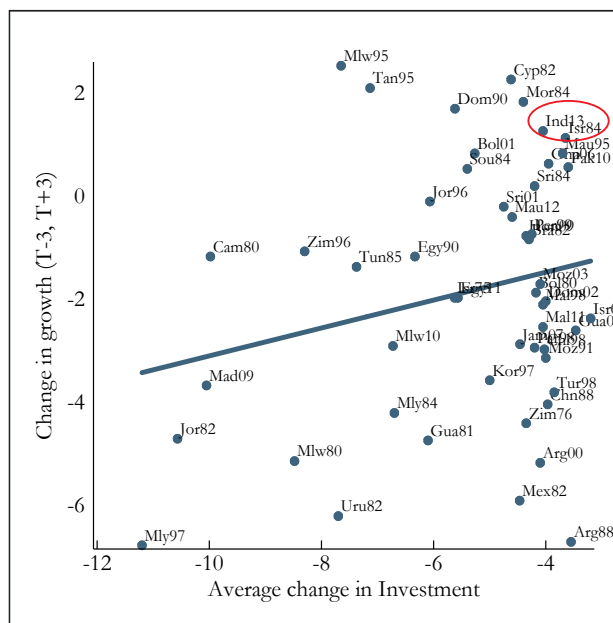
3.27 In Figure 3a India is above the line of best fit, though not an outlier, suggesting that the impact on growth has been relatively moderate than witnessed in comparable investment slowdowns in other countries.

3.28 Cross-country regression results confirm the visual impression: the relationship is significantly positive for investment episodes, but insignificant for saving. A one percentage point

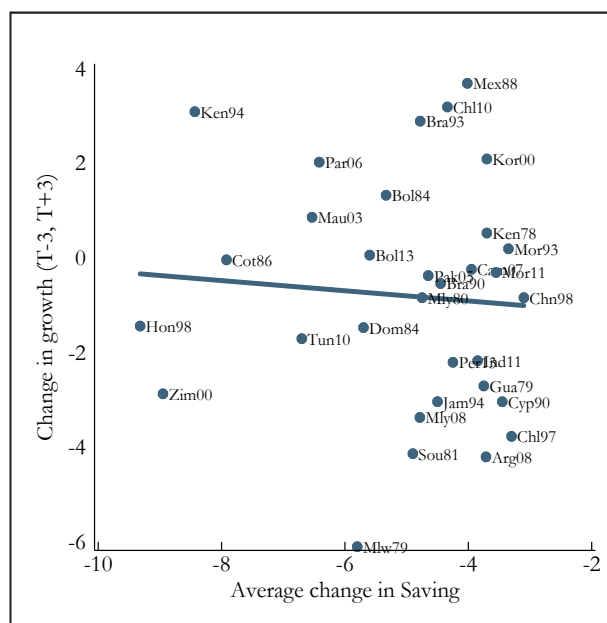
fall in investment rate is expected to dent growth by 0.4-0.7 percentage points. This of course gives the average result. These results are robust to different time periods and specifications.<sup>12</sup>

3.29 The difference between investment and saving slowdowns can be isolated in another manner. There are a few episodes across economies in which both investment and saving have slowed simultaneously.<sup>13</sup> Do the relationships in Figures 3a and 3b hold even excluding these common episodes? In fact, they do, as can be seen in Figures 4a and 4b. Even though the coefficient of investment weakens somewhat, it stays significant, especially in the 4 percent

**Figure 4a. Change in growth & change in Investment without common episodes\* (3 percent threshold)**



**Figure 4b. Change in growth & change in Saving without common episodes (3 percent threshold)**



Note: \*: This result is marginally insignificant if two outliers (Mauritius 1981 and Sierra Leone 2013) are excluded. This scatter is without these outliers.

<sup>12</sup> These results are robust to: (a) using a five (not three) year window for measuring the change in growth, (b) considering different variables: (i) measuring the cumulative (and not the average) fall in investment and saving (independent variable); and (ii) *average growth* over 3-5 years after the start of a slowdown rather than the *difference* in growth (dependent variable), (c) excluding outliers, and (d) measuring GDP growth in purchasing power parity (PPP from the Penn World Tables version 9.0) rather than market exchange rate terms.

<sup>13</sup> There are 21 common episodes in the 3 percent threshold: Argentina 1979, Cameroon 1989, Colombia 1998, Costa Rica 1983, Cote-de-Ivoire 1981, Cyprus 2010, El Salvador 1979, Honduras 1981, Indonesia 1997, Jamaica 1975, Nicaragua 1978, Panama 1977, 1983 and 2000, Peru 1984 and 1989, Philippines 1983, Singapore 1985 and 1999, South Africa 1991, and Thailand 1998.

threshold. The relationship of saving with growth not only remains insignificant but turns mildly negative.

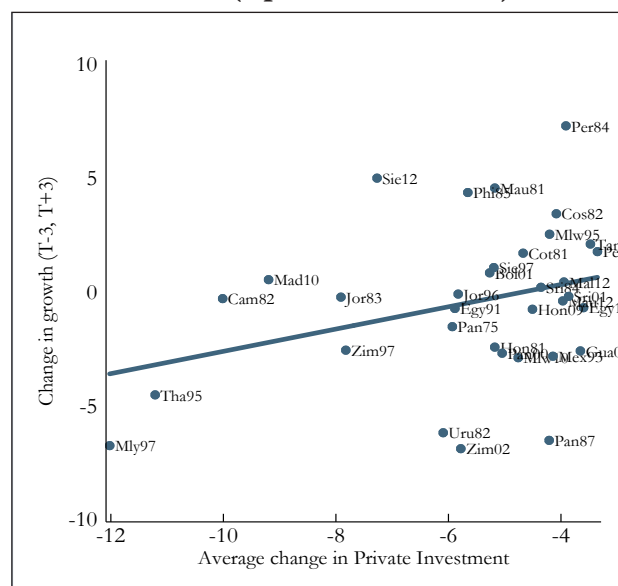
3.30 The table in annex IV summarizes the regression results for the 3 and 4 percent thresholds with and without the common (simultaneous investment and saving) episodes. In other words, not only are investment episodes followed by slower growth (unlike saving episodes), this is also true of ‘pure’ episodes of investment slowdowns, i.e. those not accompanied by slowdown in saving.

3.31 A further classification of the investment slowdowns can be attempted: those that are driven primarily by a fall in private investment and those that are not.

3.32 Data on the private investment component of aggregate gross fixed capital formation is available from the WDI database. Considering the residual as the public component and studying the contribution of each to the total fall in aggregate investment during an slowdown episode<sup>14</sup> it is clear that three-fifths of the episodes recorded in the 2 and 3 percent thresholds are caused by a fall in private investment.<sup>15,16</sup>

3.33 Does the relationship between the fall in investment and growth hold in case of private investment slowdown episodes? The filters were used to identify private slowdown episodes. Figure 4 depicts the relationship

**Figure 5. Change in Investment & Change in Growth (3 percent threshold)**



for the 3 percent threshold; it is positive and significant.<sup>17</sup>

## RECOVERY FROM ‘INDIA-TYPE’ INVESTMENT SLOWDOWNS

3.34 India’s investment slowdown is unusual in that it is so far relatively moderate in magnitude, long in duration, and started from a relatively high peak rate of 36 percent of GDP. Furthermore, it has a specific nature, in that it is a balance sheet-related slowdown. In other words, many companies have had to curtail their investments because their finances are stressed, as the investments they undertook during the boom have not generated enough revenues to allow them to service the debts that they have incurred.<sup>18</sup>

3.35 What do these characteristics portend for

<sup>14</sup> Private investment data is available for 60 out of 92 investment slowdown episodes for 2 percent threshold and 45 out of 74 investment slowdown episodes for 3 percent threshold for the sample excluding oil exporters.

<sup>15</sup> An episode is considered as a private slowdown episode if the fall in such investment contributes to more than 50 percent of the total fall in investment over the episode.

<sup>16</sup> However, the experience has varied across time. During the first two periods (the oil shock 1975-1983 and the great moderation 1984-1997) the share of public and private in aggregate investment declines are almost similar. Over the 1998-2014 period investment slowdowns are overwhelmingly led by private investment contractions.

<sup>17</sup> Results are robust using cumulative, rather than average, measure of slowdown and for the 4 percent threshold.

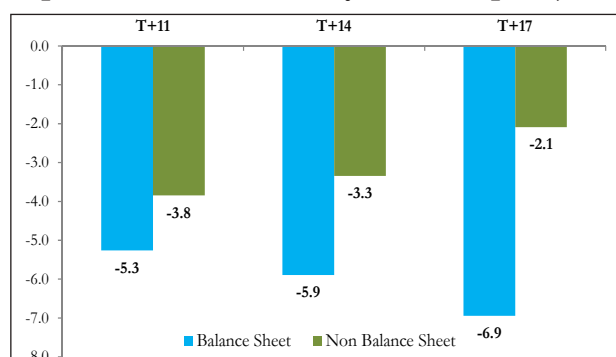
<sup>18</sup> For a fuller discussion refer to *Economic Survey* 2016-17, Volume 1, Chapter 4.

the extent of an eventual investment recovery? To answer this question, two types of international experience after slowdowns are considered: (i) balance sheet-related ones; and (ii) where investment fell by 8.5 percentage points peak-to-trough over 9 years.<sup>19</sup>

### *What happens after balance-sheet slowdowns?*

3.36 What tends to happen to investment rates in the aftermath of ‘balance sheet’ episodes? Allen *et. al.* (2002), Chamon *et. al.* (2010), Rosenberg *et. al.* (2005), and Chen *et. al.* (2015) discuss episodes of crises and balance sheet effects in emerging economies. Some of these episodes (11) are also captured as investment slowdown episodes in the sample.<sup>20</sup> The aftermath of these are then contrasted to episodes of slowdowns that are not primarily related to balance sheet difficulties (Figure 6).<sup>21</sup> Since India is now 11 years past its investment peak, investment rates are measured as deviations from peak levels for years 11, 14, and 17 after the peak dates.

**Figure 6. Extent of Investment Recovery after Slowdowns (percentage point fall from peak level, number of years after peak)#**



Note: #T is the peak time period : The graph shows that even after 14 years of attaining the peak investment remains depressed by about 6 percentage points in case of balance sheet - related slow downs. In contrast, in non balance sheet - related cases it remains depressed by 2 percentage points.

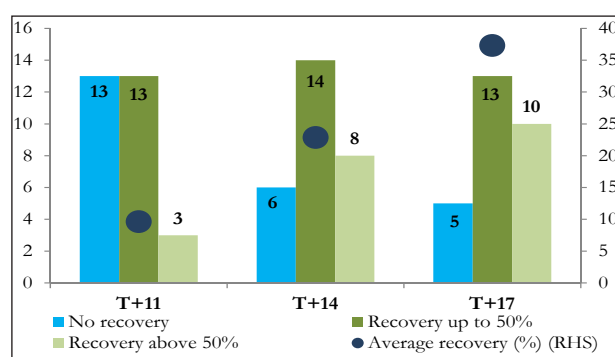
3.37 There are two take-aways from figure 6:

- Investment declines flowing from balance sheet problems are much more difficult to reverse. In these cases, investment remains highly depressed, even 17 years after the peak, whereas in case of non-balance-sheet slowdowns the shortfall is smaller and tends to reverse.
- India’s investment decline so far (8.5 percentage points) has been unusually large when compared to other balance sheet cases.<sup>22</sup>

### *What happens after similar investment falls?*

3.38 Accordingly, the experience of countries with similar investment declines is examined. Specifically, cases in which the rate of investment has fallen by at least 8.5 percentage points from its peak over a 9 year period are considered. The questions then asked is: what is the investment rate 11, 14 and 17 years after the peak?

**Figure 7. Count and Extent of Recovery from India-type Investment Decline\***



Note: \*T is the peak time period \*: A fifty percent recovery implies that the country attained an investment rate that reversed half of the 8.5 percentage point fall. The dots imply the percentage of the total fall that the median country managed to reverse.

<sup>19</sup> The year 2016 is strictly not a trough for India as the investment slowdown seems to be still continuing.

<sup>20</sup> Most of these episodes (appearing in both Allen *et. al.* [2002] and Chen *et. al.* [2015]) pertain to East Asian countries in the aftermath of the crisis in the late 1990s. Apart from these it also includes Malaysia 1984, South Africa 1983 and Turkey 1998.

<sup>21</sup> These includes 9 episodes; Mexico, Uruguay and Brazil 1982, Peru 1983, Argentina 1979 and 1988, China 1988, South Africa 1990 and Chile 1998.

<sup>22</sup> The others are crisis cases, whereas India did not experience a crisis.

3.39 There are 30 such cases in the sample.<sup>23</sup> Figure 7 shows the count of countries that recover over the three time periods. A ‘full’ recovery is defined as attainment of an investment rate that completely reverses the fall, while no recovery implies the inability to reverse the fall at all or worse.

3.40 The median country reverses only about 25 percent of the decline 14 years after the peak, and about 40 percent of the decline 17 years after the peak. If India conforms to this pattern, the investment-GDP ratio would improve by 2.5 percentage points in the short run. Of course, this is the median: if India situates itself in the upper quartile, it can recover by more than 4 percentage points. But India is already 11 years past the peak, and its current performance puts it below the upper quartile.

3.41 Given the large fall in investment that India has registered, it has paid moderate costs in terms of growth. Between 2007 and 2016, rate of real per-capita GDP growth has fallen by about 2.3 percentage points—that is lower than the above 3 percent decline in growth noticed, on average, in episodes in other countries that have registered investment declines of similar magnitudes and from roughly a similar peak (about 36 percent) (Annex V).

## CONCLUSION: POLICY LESSONS FOR INDIA

3.42 What lessons can be drawn for India from the above analysis? The notion that growth is constrained by saving has a long and illustrious pedigree going back to Ragnar Nurkse, Arthur Lewis, Rosenstein-Rodan and others. But the evidence presented here points in a different direction, albeit subtly.

3.43 First, it is clear that investment slowdowns are more detrimental to growth than saving slowdowns, a conclusion that was earlier reached by Rodrik (2000). So, policy priorities over the short-run must focus on reviving investment. Mobilizing saving, for example via attempts to unearth black money and encouraging the conversion of gold into financial saving or even courting foreign saving are, to paraphrase John Maynard Keynes, important but perhaps not as urgent as reviving investment. In any case, the share of financial saving is already rising in aggregate household saving—with a clear shift visible towards market instruments—a phenomenon that has been helped by demonetization.

3.44 Second, India’s investment slowdown is not yet over although it has unfolded much more gradually than in other countries, keeping the cumulative magnitude of the loss – and the impact on growth – at moderate levels so far.

3.45 But this leads to the third question: how will the investment slowdown reverse, so that India can regain 8-10 percent growth? There is both a bleak and a hopeful pointer from similar episodes in other countries. India’s investment decline seems particularly difficult to reverse, partly because it stems from balance sheet stress and partly because it has been usually large. Cross-country evidence indicates a notable absence of automatic bounce-backs from investment slowdowns. The deeper the slowdown, the slower and shallower the recovery. At the same time, it remains true that some countries in similar circumstances have had fairly strong recoveries, suggesting that policy action can decisively improve the outlook.

<sup>23</sup> These cases are not slowdown episodes and are not derived from the application of filters.

3.46 Taken together, the results suggest a clear—and urgent—policy agenda which the government has launched; first with the step-up in public investment since 2015-16; and now, given the constraints on public investment with policies to decisively resolve the TBS challenge. These steps will have to be followed up, along with complementary measures: easing the costs of doing business further, and creating a clear, transparent, and stable tax and regulatory environment.

3.47 In addition, creating a conducive environment for small and medium industries to prosper and invest will help revive private investment. The focus of investment-incentivizing policies has to be on the big and small alike. The ‘animal spirits’ need to be conjured back.

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# Reconciling Fiscal Federalism and Accountability: Is there a Low Equilibrium Trap?

## 04 CHAPTER

*The village of which the people come together to earn for themselves their food, their health, their education, to gain for themselves the joy of so doing, shall have lighted a lamp on the way to swaraj.*

**Rabindranath Tagore**

*Long-run institutional development co-evolves with fiscal accountability involving, perhaps requiring, a low and declining dependence on devolved resources and a high and rising share of direct taxes in total taxes. India's second and third tiers of government tend to under-perform relative to these standards. The extent of tax and functional devolution to these tiers is one possible explanation. However, one key finding is that these tiers under-collect direct taxes even relative to the powers that they have. Whether this could lead to a low equilibrium trap of weak direct tax collection leading to inadequate service delivery provision, back to weak collection and accountability, needs to be actively discussed.*

### INTRODUCTION

4.1 Taxation is not just a vehicle for raising state revenue. It can also be critically important for economic and political development. As Besley and Persson (2013) note, there is a social contract between citizens and the state. “The state's role,” they write, “is to create the conditions for prosperity for all by providing essential services and protecting the less well-off via redistribution. The citizen's part of the contract is to hold the state accountable when it fails to honor that contract.”

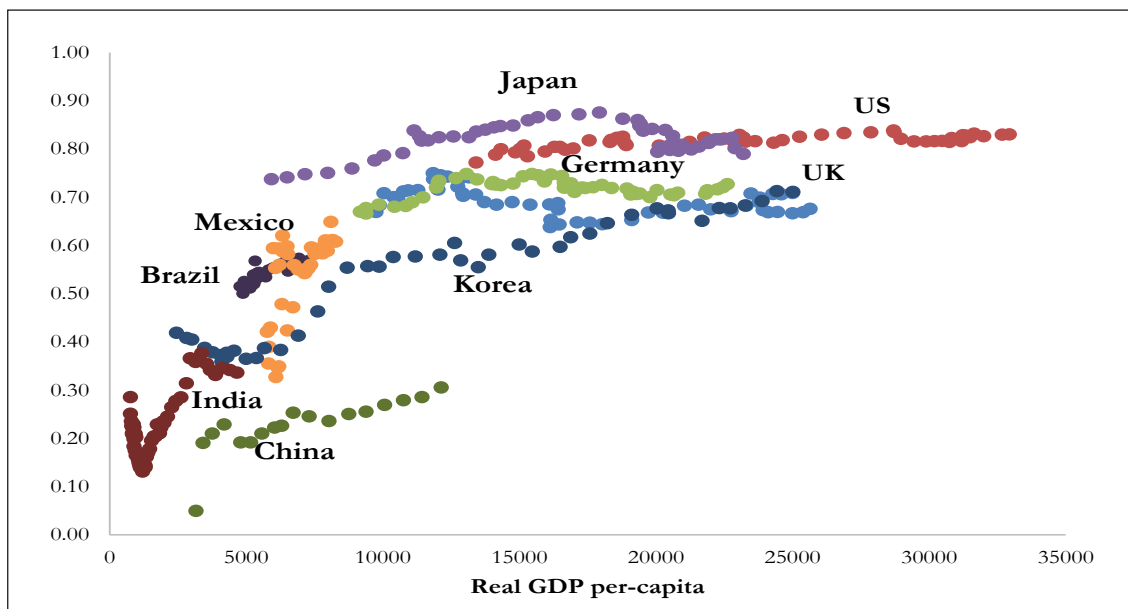
4.2 But a citizen's stake in exercising accountability diminishes if he does not pay in a visible and direct way for the services the state commits to providing. If a citizen does not pay, he becomes a free rider (using the service without

paying), and cannot complain if the state provides a poor quality service. If he exits (not using the service at all), he loses interest in holding the state accountable. Only if he pays and uses the service will he try to hold the state accountable. Hence the expression: no representation without taxation. In other words, taxation is the economic glue that binds citizens to the state in a necessary two-way relationship. (*Economic Survey* 2015-16, Chapter 7).<sup>1</sup>

4.3 The “aid” and “natural resource” curses illustrate what happens when countries rely on non-tax sources of government revenues: economic and institutional development is stunted (Easterly, 2003; Sala-i-Martin and Subramanian, 2003).

<sup>1</sup> To quote Weigel (2017), “Historically, when states began systematically taxing their populations to pay for wars, citizens protested fiercely, demanding public goods and political rights: “no taxation without representation.” This process triggered the co-evolution of tax compliance, citizen participation in politics, and accountable governance. Today, policymakers often promote taxation in developing countries to jumpstart this same virtuous cycle.”

**Figure 1a. Direct Taxes of the General Government as a ratio of its direct plus indirect taxes in “Development Time”**

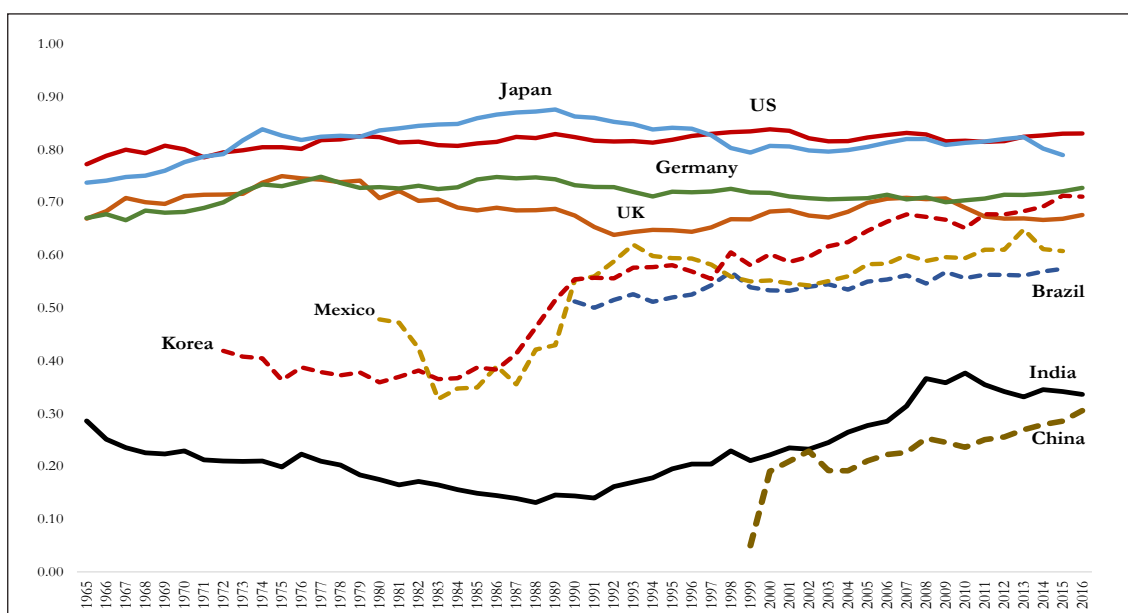


Source: OECD and Indian Public Finance Statistics (IPFS).

4.4 But does this glue rely on taxation broadly or on direct taxation in particular? It seems that a citizen's stake would be greater the more it “hurts” to pay taxes. As the name itself suggests, direct taxes are felt more by the taxpayer. Direct

taxes feel more like expropriation because they reduce citizens' disposable income, the earnings that they get to keep. With indirect taxes, citizens are burdened but that sense is leavened to the extent that citizens feel they are exercising choice.

**Figure 1b. Direct Taxes of the General Government as a ratio of its direct plus indirect taxes in “Chronological Time”**



Source: OECD and IPFS.

4.5 Two international stylized facts help motivate issues relating to fiscal federalism, taxation, and accountability.

### **Direct taxation and development: General Government**

4.6 First, economic and political development has been associated with a rising share of direct taxes in total taxes. Figures 1a and 1b illustrate this association for a group of advanced and emerging market countries using data from the Organization for Economic Cooperation and Development (OECD). Both these figures pertain to the general government and are plotted between 1965 and 2016. Figure 1a is plotted in development time: it shows how the share of direct taxes in total taxes evolved over time in these countries as they developed (proxied by PPP adjusted per capita GDP from the Maddison Project database). Figure 1b plots the same in chronological time for the same group since 1965.

4.7 These graphs reveal that advanced countries collect a substantially higher proportion of their taxes as direct taxes than do emerging markets. This proportion has also risen over time. Early on in the development process, import taxes (an indirect tax) and property taxes (an income tax) were the primary sources of revenue. Later, as the welfare states expanded in Europe and the US, government collections shifted toward income taxes, so that workers could contribute to their social insurance. Against this trend, Europe in the 1970s discovered the value added tax (VAT) as an important source of revenue, which led to a renewed rise in the share of indirect taxes. But even today direct taxes account on average for about 70 percent of total taxes in Europe.

4.8 Another striking feature of the graphs relates to India. Apart from China (which is the only non-democratic country in the chart), India has the lowest share of direct taxes in total taxes.

India is not an outlier: its direct tax share is similar to other countries at a comparable stage of development. However, unlike in other countries its reliance on direct taxes seems to be declining, a trend that will be intensified if the Goods and Services Tax (GST) proves to be a buoyant source of revenue.

### **Direct taxation and development: Sub-federal levels**

4.9 A second stylized fact relates to direct tax contributions at sub-federal (state and urban/rural local bodies) levels of government.

4.10 Fiscal decentralization is often embraced as not just a desirable economic but also as a political and philosophical principle, as Tagore envisaged. This is captured in the idea that spending and tax decisions must reflect local preferences as far as possible. To what extent is this principle followed? That is, what is the share of own revenues (compared to devolved sources) in total revenues at lower levels of government, and what is the relative contribution of direct taxes?

4.11 Before considering the data, an important issue must be noted. There is an important legal argument for the case that resources received by the states as part of successive Finance Commission verdicts are not “devolved” resources but shared resources. In this view, the Center is merely collecting the taxes in the divisible pool on behalf of the states, and sharing it with them. But this position must be assessed against the following realities:

- it is difficult to dispel the association (in the eyes of taxpayers) of the Center with the income taxes and customs duties that form a major part of the divisible pool.
- if the Center were a mere collecting agency the funds would be apportioned according to states’ tax bases; they would not have sizable

**Figure 2. Own Revenue and Direct Taxes of Lower Tiers**  
(In per cent of total revenue)



Source: For India, survey calculations for Rural Local Governmes (RLGs), while the Urban Local Government (ULG) data has been sourced from the “Annual Survey of Indian City-Systems, Janaagraha”; Ministry of Finance, Govt. of Germany; World Bank for cross country data.

Note: Tier 2=state, 3=urban local bodies and rural local bodies in India; tier 2=Estados (States) and tier 3=Municípios (Municipalities which contain both urban and rural areas) in Brazil; tier 2=Länder or Bundesländer (States) and tier 3=Bezirke in Germany.

For India, the RLG plot is based on data from 4 States—Andhra Pradesh, Karnataka, Kerala, and Uttar Pradesh while the ULG plot is based on data on 19 (17 in 2013-14) major cities of India.<sup>2</sup>

<sup>2</sup> Accounting patterns across States are different; for instance, Karnataka includes salaries of line departments as part of their resources, while Kerala does not. Total revenue, in this context, is defined as the sum of own resources and devolved funds from Central and State Governments, excluding (a) schematically tied transfers and (b) funds for salaries of line departmental staff.

redistributive components, as quantified in Chapter 13 of the *Economic Survey*, Volume 1, 2016-17;

- the new GST provides a sharp contrast in that it is clearly more “shared” because decisions and tax administration are done by both.

4.12 In sum, whatever their *de jure* status, *de facto* resources from the divisible pool to the states have the strong whiff of devolution.

4.13 Figure 2 provides data on own resources and direct taxes for three countries which have three tiers of government: Germany, Brazil, and India.

4.14 At the second tier, all countries are broadly comparable in their reliance on devolved resources, but India stands out as a country where the second tier (states) generate a very low share of its revenue from direct taxes: about 6 percent in India compared to 19 percent in Brazil in 2016 and a hefty 44 percent in Germany.

4.15 At the third tier, India’s rural local governments (RLGs) stand out on both counts. RLGs’ reliance on own resources is just 6 percent compared to 40 percent for third-tier governments in Brazil and Germany. And panchayats raise about 4 percent of their overall resource envelope in the form of direct taxes, compared with about 19 and 26 percent in Brazil and Germany respectively <sup>3</sup>.

4.16 India’s urban local governments (ULGs), meanwhile, are much closer to international norms. Their own revenues as a share of total revenues are actually higher than Brazil and Germany, while their direct tax share (about 18 percent of total revenues) is only marginally lower than Brazil (19 percent) and somewhat lower

than Germany (26 percent). This is evidence that ULGs have emerged more fiscally empowered than RLGs so far in India.<sup>4</sup> However in the Indian case, we have considered only selected large cities, for which data are available, and which may have larger own resource bases than smaller ones.

4.17 These two stylized facts provoke the obvious question: is the current system in India appropriate, and if not, can it be changed? This chapter sheds light on this question. Section 2 starts with a brief overview of local governments.

## LOCAL GOVERNMENTS: WHAT DO WE KNOW?

4.18 The famous 73<sup>rd</sup> amendment to the Constitution (1992) recognized panchayats as institutions of self-government. The simultaneous 74<sup>th</sup> amendment bestowed the same status on urban local governments.

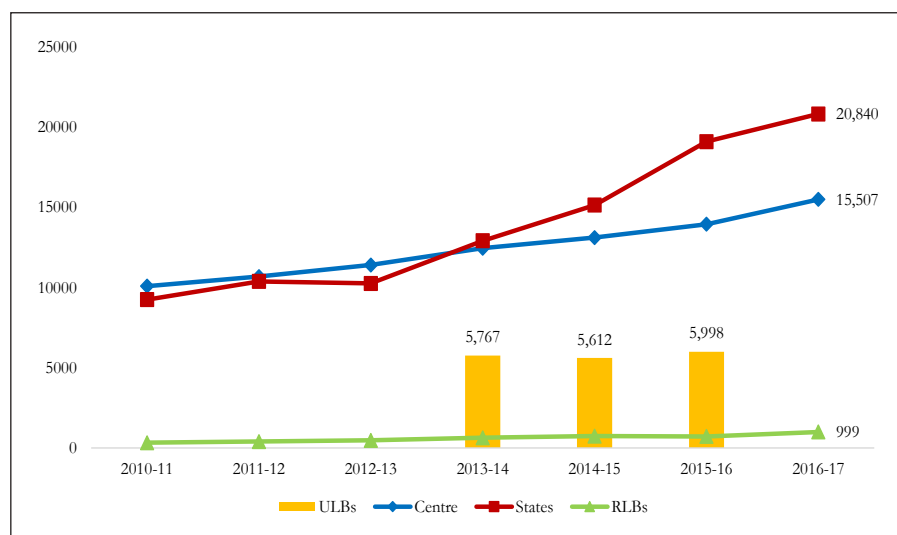
4.19 RLGs or panchayats were mandated to have three tiers (at the district, intermediate and village levels) in states with population of over 20 lakh.<sup>5</sup> States were mandated to devolve such functions and authorities to RLGs which would enable them to function as institutions of self-governance. Illustratively, the Constitution listed 29 matters which could be the focus of their governance, such as agriculture and land reforms, minor irrigation, small scale industries, rural communication, drinking water, poverty alleviation programmes.

4.20 States were also supposed to constitute a quinquennial State Finance Commission (SFC) to determine the share of their financial resources going to the local tiers, analogous to the Finance Commissions at the union level.

<sup>3</sup> Constitutionally, the third tier consists of local self-governments (LSGs), consisting of rural and urban local self- governments, which are called RLGs and ULGs respectively in this Chapter.

<sup>4</sup> Nonetheless, States generally have considerable influence over the staffing and spending of ULGs, with wide variations across States.

<sup>5</sup> This amendment is not applicable in some special areas and in the states like Nagaland, Mizoram, etc. and in areas where regional councils exist. States with lesser population may omit the intermediary tier.

**Figure 3. Per capita Expenditure at Central, State and RLG levels (In rupees)**

Source: For RLGs, Survey calculations based on data from Andhra Pradesh, Karnataka, Kerala and Uttar Pradesh.

Note: The calculations assume that expenditure of RLGs is equal to their receipts. ULG information has been sourced from the “Annual Survey of Indian City-Systems, Janaagraha”, based on 19 (18 in 2013-14) major cities of India.

4.21 Empowered in such a manner, ULGs and RLGs were mandated to prepare and implement plan(s) for economic development and social justice. Following the amendment, most states have constituted three levels of RLGs. Over the past two decades, local governments have gained prominence as institutions with substantial ‘say’ in grassroots development issues, albeit with significant spatial variations, and spaces of intense political contestability. However, the tied nature of a considerable part of resource flow constrains spending autonomy in RLGs.

4.22 Any policy prescription for the third tier must follow from an understanding of the performance of RLGs. But what do we really know about the efficacy in service delivery and accountability mechanisms in such institutions? There is an extensive and rich literature on fiscal decentralization with contributions by India’s eminent experts on fiscal federalism (Kelkar, 2016; Mathur and Peterson, 2006; Oommen, Wallace and Muwonge, 2017; Nagarajan, Mkhize and Meenakshisundaram, 2014; Pritchett and Aiyar, 2015; Rajaraman, 2003; Rajaraman and

Sinha, 2007; Rangarajan and Srivastava, 2011; Rao, 2013; Rao, Gupta, Raghunandan, Datta, Jena, and Amarnath 2011; Reddy, 2016; Vijayanand, 2009). This chapter builds on this body of work.

### **Expenditure patterns of different tiers of government**

4.23 Figure 3 plots per-capita expenditure of different tiers of government in India. The central and state governments spend on an average 15-20 times more per capita than do RLGs. ULGs spend about 3 times more. More importantly, this gap has persisted over time despite per capita spending by RLGs increasing almost four-fold since 2010-11.

4.24 What may be the reasons underlying the spending patterns visible in Figure 3? Are they related to revenue generation performance or total resource availability, including devolution?

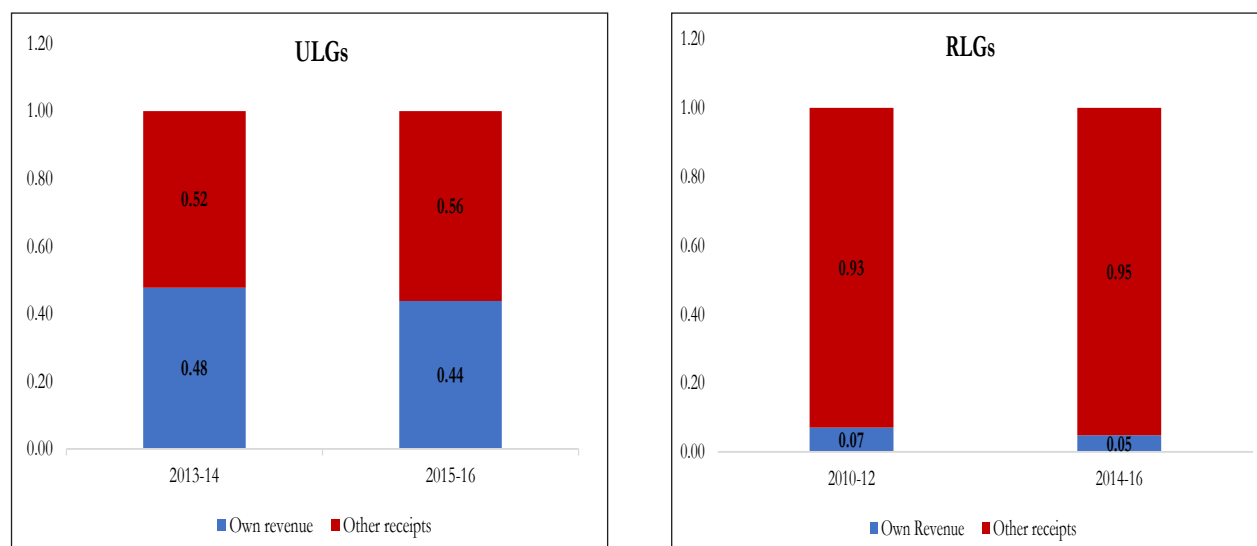
### **Overwhelming reliance on devolved funds**

4.25 From where do ULGs and RLGs derive their resources for spending? Analysis based on

<sup>6</sup> The time periods reported do not match for ULGs and ULGs due to data constraints.



**Figure 4. Own Revenue Generation\***  
(Share of total receipts)



Source: For RLGs, Survey calculations based on data from Andhra Pradesh, Karnataka, Kerala and Uttar Pradesh. ULG information has been sourced from the “Annual Survey of Indian City-Systems, Janaagraha”, based on 19 (17 in 2013-14) major cities of India.

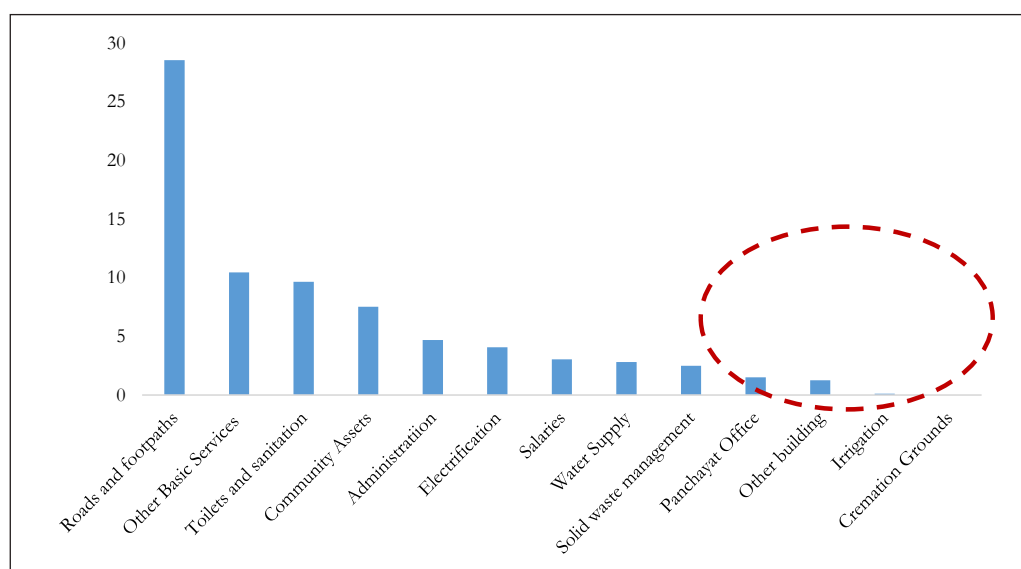
Note: \*: Other receipts include devolution from State and Central Governments, including schematically tied transfers.

available data confirms the following.<sup>6</sup>

**i. ULGs are different:** ULGs seem to be doing much better in terms of own revenue generation. They generate about 44 per cent of their total

revenue from own sources (Figure 4). RLGs, in contrast, rely overwhelmingly (about 95 percent) on devolution. Per capita own revenue collected by ULGs is about 3 per cent of the urban per

**Figure 5. Sectoral Share of GP Expenditure out of Devolved Funds (2014-16)**



Source: Survey calculations based on information furnished by Karnataka, Kerala and Uttar Pradesh.

<sup>7</sup> RLGs collect Rs. 59 per-capita as own resources. This number was about Rs. 16 around 2006 (based on Nagarajan, Mkhize & Meenakshisundaram, (2014).

capita income while the corresponding figure is only 0.1 per cent for RLGs.<sup>7</sup>

**ii. Variation across states:** Figure 4 depicts the situation on average. There is significant variation across states in the extent of own revenue generation. There are also vast differences between RLGs within each state (for instance, please refer to the data presented for Tamil Nadu GPs in Annex 5). Broadly, there are two categories—RLGs of those States that collect some direct taxes and own tax revenue (e.g. Kerala, Andhra Pradesh and Karnataka in our sample), in contrast to RLGs of states like Uttar Pradesh that almost entirely depend on transfers. This variation is much starker in case of RLGs than ULGs (more details in Annex 2).

4.26 Given the overwhelming reliance on devolved funds which, to a large extent, are tied to sectors and schemes, it is not surprising that gram panchayats (GP) spend the bulk of such funds on earmarked areas, such as roads, other basic services, sanitation and community assets.<sup>8</sup> The spending on purely local public goods like irrigation are not a priority out of such funds (Figure 5).

4.27 Institutional accountability is not readily measured. However, drawing from arguments presented in the first section, the trends in fiscal performance of local governments can broadly be considered as a proxy for local-level accountability. The better the performance in generating own revenue via taxes, the stronger accountability is expected to be.

### Other issues

4.28 Standard discourse, a quarter century after the landmark 73<sup>rd</sup> and 74<sup>th</sup> constitutional

amendments, seem to overwhelmingly focus on the extent of devolution of powers to panchayats. This has drawn attention away from the pressing questions relating the performance of RLGs in fiscal accountability and delivery of services. Discussions instead have primarily focused on the following:

- Has there been adequate tax and expenditure devolution to the RLGs by the states?
- Have State Finance Commission's recommendations been followed?

4.29 In many states, RLGs and ULGs have not been devolved enough taxation powers. Successive Devolution Reports of the Ministry of Panchayati Raj (MoPR) show that the share of revenues assigned to local governments in many states are much less vis-à-vis expenditure assignments.<sup>9</sup> From these reports, however, it seems that several states—notably Kerala, Maharashtra, Karnataka, Gujarat and West Bengal—are consistently improving on this front.<sup>10</sup>

4.30 On the second issue, even though most states have constituted SFCs, very few seem to have accepted their recommendations in full or even to a significant extent, especially those that carry financial implications for them. As per the latest MoPR Devolution Report (2015-16) the percentage of acceptance of such recommendations varies from as low as 11 percent in Karnataka to above 50 percent in West Bengal, Andhra Pradesh and Rajasthan to full acceptance in Kerala. The differences in the devolution formulae recommended by a few SFCs are encapsulated in Annex 1.

<sup>8</sup> As per data based on the four states, 46 per cent of total resources of RLGs during 2010-12 and 35 per cent of that during 2014-16 were tied transfers.

<sup>9</sup> Devolution Report, 2015-16, MoPR.

<sup>10</sup> As captured by their rank on the 'Aggregate Index of Devolution in Practice' in which, among major states, Kerala ranks at the top followed by Maharashtra, Gujarat, Karnataka, West Bengal and Telangana (Devolution Report 2015-16), MoPR Government of India.

4.31 Meanwhile, there is little data on how RLGs have fared over the past 25 years. There has been no comprehensive survey of how RLGs have fulfilled their mandates. And the only database on the effectiveness of RLGs in providing goods and services is the National Council of Applied Economic Research's (NCAER) Rural Economic and Demographic Database (REDS), which has not been updated since 2006-07.

### STATE AND LOCAL GOVERNMENTS: POSING AN ENTIRELY DIFFERENT QUESTION

4.32 Especially with the formation of the Fifteenth Finance Commission, which will re-assess issues related to fiscal federalism, it is perhaps time to pose a different—and complementary—question about the functioning of second and third tier institutions. Why is their own revenue collection, especially from direct taxes, so poor? Recall that RLGs collect less than 10 percent of their total resources from own revenues and ULGs around 45 percent.

4.33 A common answer is that higher levels especially the states have not devolved enough taxation powers to the Panchayats. For example, the permissible taxes for panchayats include property and entertainment taxes but not land taxes or tolls on roads (except local panchayat roads).

4.34 But much less examined has been a different question: given their powers to tax, how have they performed and have they collected revenues close to the potential conferred by these powers? These issues are examined in this section.

4.35 The property taxes collected at the second and third tiers of government are (a) land tax assessed and collected at the state level; and

(b) building tax, including property/house tax, collected at the municipality (ULG) and grama panchayat (RLG) levels<sup>11</sup>. Property taxes are the principal sources of direct tax revenue at the third tier of government, apart from professional taxes. The collections from these potentially buoyant sources of revenue are generally stacked at very low levels because of archaic base values—far below market values—applied to properties, low rates of taxes levied, and lack of powers to local bodies in some states like Odisha and Rajasthan.

4.36 This section examines the potential for these taxes (details in Annex 3).

### Land tax vis-à-vis potential : States

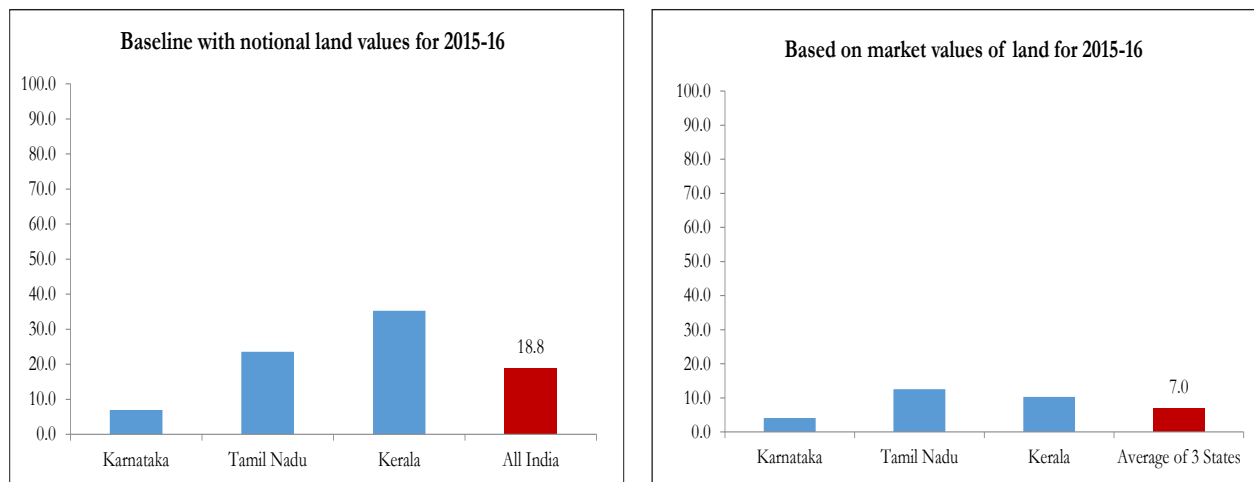
4.37 Different states follow different methodologies to assess land values and apply different rates of land tax. For estimating the potential for land revenue collections, this analysis exempts landholdings of 0.10 hectare and below from taxation and assumes rates of 0.1 per cent of land value for holdings between 0.1 and 1.0 hectare and 0.2 per cent for holdings above 1.0 hectare.<sup>12</sup> Figure 6 presents the land revenue collections as a percentage of the potential estimated separately based on notional values of land and market values of land in three states on which data on market values of land could be accessed online. The methodology employed for arriving at notional and market values of land, along with the collection of land revenue vis-à-vis potential for all States are at Annex 3.

4.38 The significant wedge between the two in Kerala is because the market values of land in the State are much higher than the underlying notional values. The all-India average is boosted by the collections in States like West Bengal and Gujarat which are doing much better in this regard.

4.39 The stark finding is that the states collect

<sup>11</sup> States derive their power to tax land from the Seventh Schedule of the Constitution. The third tier derives the power to tax properties from the respective State Panchayati Raj Act.

**Figure 6. States' Land Revenue Collection Relative to Potential  
(In per cent)**



Source: Survey calculations.

a small fraction of their potential: an all-India average of 19 per cent if unreasonably low land values are assumed, and about 7 per cent on more realistic land value assessments. Complaints about inadequate tax and revenue devolution are less persuasive under such conditions of serious under-collection.

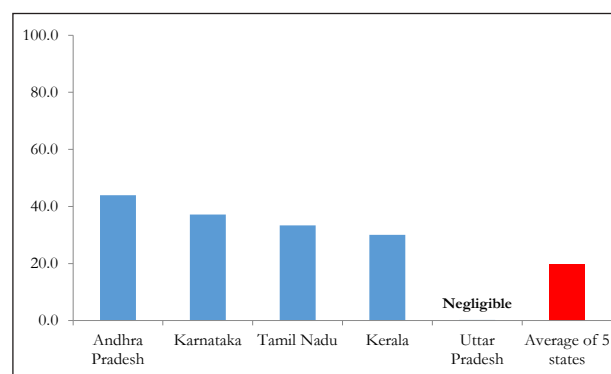
### House tax vis-à-vis potential : RLGs

4.40 RLGs are empowered to a much greater extent by states to collect taxes on house and commercial properties than land taxes of any kind. But while the population census (2011) gives an inventory of houses in the rural areas, there is no such data available for commercial properties in rural areas. Hence, in this analysis the total property tax collection of RLGs—including tax on houses and commercial properties—is set against their *house* tax potential. This procedure thereby overstates performance. The procedure for this estimation, including data sources and valuation, is outlined in Annex 4.

4.41 As with land taxation, states follow different methodologies to assess value of houses and the

land values embedded in a property; they also apply different rates of house tax. States such as Kerala apply unit rates of taxes on a given plinth area while states such as Karnataka and West Bengal apply *ad valorem* rates. For estimating the potential for land revenue collections, this analysis exempts dwelling units of no/one living room from house tax, and assumes rates of 0.1 per cent of the property value for households having 2 living rooms, 0.2 per cent for households having 3 to 5 living rooms and 0.3 per cent for households with more rooms. Figure 7 presents the house

**Figure 7. RLGs' House Tax Collection  
Relative to Potential (in per cent)**



Source: Survey calculations

Note : Figures for Tamil Nadu are for 2014-15 and only for house tax.

<sup>12</sup> These rates are progressive, with the base rate being similar to the rates presently applied in West Bengal.

tax collections of states (for which panchayat level property tax collections are available) as percentage of the estimated potential.<sup>13</sup>

4.42 Even in states viz. Kerala and Karnataka that are ahead of others in devolution of powers to RLGs, the collection vis-à-vis potential is only around one-third. And all these are upper bounds on tax collection vis-à-vis potential given the lack of data on commercial property taxes.

#### **Land tax vis-à-vis potential: Center**

4.43 It is worth asking how the Center itself has done at the third tier. There is a kind of natural experiment here because the Center does directly administer some parts of India. Of course, some Union Territories (UTs) such as NCT of Delhi and Puducherry have their own administrations, which take charge of land tax collection. But there are UTs where the central government assumes this responsibility, including Chandigarh, Dadra and Nagar Haveli, Daman and Diu, Lakshadweep, and Andaman and Nicobar Islands. In these UTs, the question can be legitimately asked about central government performance.

4.44 The previous analysis (on land tax potential estimation for the States) is extended to the UTs, recognizing that they have limited agricultural land.<sup>14</sup> The conclusions are broadly similar. Actual collection in these UTs is, on average, around 30 per cent of potential. For instance, there is no land tax realization in Chandigarh, which has about 923 hectares of some agricultural land (as per the Agricultural Census 2010-11). The collection from Dadra and Nagar Haveli was only Rs.0.19 crore as per the revised estimates for 2016-17 from its 21,856 hectares of agricultural land (the Agricultural Census 2010-11).

4.45 In sum, the under-collection of direct taxes relative to potential afflicts the Center as much as the other two tiers.

#### **CONCLUSION: A LOW EQUILIBRIUM TRAP?**

4.46 The 73<sup>rd</sup> and 74<sup>th</sup> amendments to the constitution in the early 1990s were watershed developments in India's federal structure, its governance and accountability. But twenty years on, it is necessary to realistically evaluate their performance. To do this, better data and evidence on the performance of these institutions is imperative. As discussed in Annex 2 to this chapter, severe data constraints handicap efforts to gauge the performance of RLGs and ULGs. Consequently, policy making is hampered.

4.47 That said, it is clear that state and local governments in India (federal tiers 2 and 3) do not conform to the cross-country trends discussed in the first section. In comparison with their counterparts in some other federal countries, they rely much more on devolved resources and much less on their own tax resources, and they collect less direct taxes. And the reason does not seem to be so much that they don't have enough taxation power. Rather, the bigger problem is that they are not fully utilizing the taxation powers they already possess.

4.48 But why would that be? Is under-collection a matter of capacity and resources, perhaps even related to expenditure? After all, there is little reason to collect more taxes if they cannot be spent efficiently. Or, is the problem a potential unwillingness to tax by the State, stemming possibly from the very proximity between state and citizens upon which decentralization is premised? Or, perhaps taxpayers/citizens are able but unwilling to pay more, because they are

<sup>13</sup> There is one source of significant overstatement of collection vis-à-vis potential in this analysis: inability to estimate the potential for taxes on commercial properties for lack of reliable information.

<sup>14</sup> The methodology is mainly based on the income capitalization approach detailed at Annexure 3.



dissatisfied with the quality of services they are receiving?

4.49 There is another possibility. The status quo can be an equilibrium desired by all actors with higher tiers (both Centre and states) using their devolution powers to control and influence lower levels; and the latter, unable and unwilling to tax their proximate citizens, need outside resources even if they are not always untied. But this is a low-equilibrium, perhaps even a trap.

4.50 Answers to these questions must inform future discussions of devolution and decentralization. For unless the underlying problems are identified and solved, local governments could remain stuck in a low equilibrium trap. That is, the fiscal model of the states and third tier institutions could forever be based on outside resources which—like foreign aid and natural resources or other forms of ‘redistributive resource transfers’ (*Economic Survey 2016-17 Volume I, Chapter 13*)—come with weak accountability mechanisms and weak own-resource generation capacity.<sup>15</sup>

4.51 In the context of growing decentralization of economic and political power, how to break this equilibrium could well be one of the more pressing issues confronting fiscal federalism going forward. Indian policy makers can perhaps no longer avoid this question: should vertical and horizontal resource devolution to second and third tier fiscal institutions be credibly linked to their performance in increasing reliance on own taxes, especially direct taxes?

4.52 This will, of course, raise the question of the Center’s own performance. The previous Section showed with respect to the Center’s collection of direct taxes in the UTs and the first Section highlighted on the broader performance of direct tax collections (Figures 1 and 2). So, it

is not obvious that the states and third tier fiscal institutions are the only ones unable or unwilling to collect direct taxes. To any suggestion of the Center incentivizing second and third tiers toward better direct tax performance, the natural rejoinder of these tiers could be: *Quis Custodiet Ipsos Custodes* (“who will guard the guardians themselves”)?

4.53 Perhaps there is a broader challenge—afflicting all tiers of government—in the limited ability to collect direct taxes. Given the quality of public service delivery, such taxes are often viewed as a “tribute” to a state rather than a contribution to and acknowledgement of the state in raising the quality of life (Aiyar and Pritchett, 2015). One consequence is middle-class exit to more privately-provided services (safety, health, and education) that only serves to exacerbate the problem. Breaking that self-reinforcing cycle of inadequate delivery-low direct taxes-weak accountability-inadequate delivery is perhaps the heart of the governance challenge in India.

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<sup>15</sup> Nagarajan et. al. (2014) estimate (based on survey based data of 1999 and 2006) that an increase in the proportion of devolved function by 10 per cent (approximately by 3 additional functions) raises per-capita revenue generation by about Rs. 6.



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# Is there a “Late Converger Stall” in Economic Development? Can India Escape it?

## 05 CHAPTER

*My dear, here we must run as fast as we can, just to stay in place.  
And if you wish to go anywhere you must run twice as fast as that*

**Lewis Carol, Alice in Wonderland**

*The first order fact about the developing world today is that this is an era of unprecedented prosperity. And that is true about India too which has been one of the most dynamic economic performers in the world. A major driver of these good times, is “economic convergence,” whereby poorer countries have grown faster than richer countries and closed the gap in standards of living. The convergence process has been broadening and accelerating for the last 20-30 years. However, while fears of a middle-income trap are overblown, could there be a slowdown in this process for lower-middle-income countries such as India.? The possibility of such a “Late Converger Stall” arises because of four possible headwinds in the post-Global Financial Crisis era that were largely absent for the early convergers such as Japan and Korea. These headwinds include: the backlash against globalization which reduces exporting opportunities, the difficulties of transferring resources from low productivity to higher productivity sectors (structural transformation), the challenge of upgrading human capital to the demands of a technology-intensive workplace, and coping with climate change-induced agricultural stress. India has so far defied these headwinds but can continue to do so only if the challenges are decisively addressed.*

## INTRODUCTION

5.1 For all the gloom pervading the world, these are the best of economic times for humanity and especially for those living in poorer countries. The global “bads” – war, violence, deprivation and poverty – are at unprecedentedly low levels (Pinker & Goldstein, 2016; Gates & Gates, 2014). Meanwhile, the global “goods” – standards of living, access to essential services, and material well-being more generally – have improved at a historically unprecedented pace to reach levels never witnessed in humanity’s history. This is particularly true of India, which has been one of the world’s most dynamic performers since 1980.

5.2 Economic convergence, the process of poorer countries “catching-up” with richer countries and closing gaps in standards of living, has been a big driver of some of these developments. Since the mid-1980s, the process of catch-up has broadened, as the number of poor countries growing faster than advanced economies has substantially increased. Furthermore, the rate of catch-up has also accelerated. In other words, there has been “convergence with a vengeance” (Subramanian, 2011).

5.3 To see this, compare the number of countries that have grown faster than the United States (a proxy for the “frontier country”)

between 1960 -1980 and 1980-2017. The exercise also allows comparisons of how much faster these converging countries have grown in the two periods (Table 1).

**Table 1. Convergence With a Vengeance; Catch-Up with the United States**

Period	1960 and 1980	1980 and 2017
<u>Broadening</u> : % of countries growing faster than US	43.7%	68.6%
<u>Acceleration</u> : Average excess growth rate over the US	1.4%	1.7%
Countries in sample	112	153

Source: Maddison Project; IMF World Economic Outlook.  
Notes: Sample excludes oil exporters and small countries (defined as population < 1 mn. in 2010).

5.4 India’s own move up the development ranks is instructive to track. In 1960, India was a low-income country with a per capita income (in 2011 purchasing power parity (PPP) terms) of \$1,033. This was equivalent to about 6 percent of U.S. per capita income at the time. However, India attained lower middle-income status in 2008 and today has a per capita income of \$6,538, which is 12 percent of the U.S.. If per capita income in India grows at 6.5 percent per year, India would reach upper-middle income status by the mid-to-late 2020s.

5.5 But, recently doubts about the convergence process have been articulated around the notion of a “middle income trap.” Definitions can themselves be traps so it is important to be careful about them. There was a genuine low-income “trap.” For a long time, many poor countries were not catching up at all; they were growing more slowly than richer countries, which Pritchett (1997) termed as “Divergence Big Time.”

5.6 Similarly, the middle income trap should, strictly speaking, have connoted that middle

income countries would grow more slowly than what would be expected given their level of income (i.e., slower than richer countries), impeding the transition from middle income to high income status.

5.7 The reasons for the trap/stall were supposed to be twofold, operating as a kind of pincer. On the one hand, as countries attained middle income status, they would be squeezed out of manufacturing and other dynamic sectors by poorer, lower-cost competitors. On the other hand, they would lack the institutional, human, and technological capital to carve out niches higher up the value-added chain. Thus, pushed from below and unable to grasp the top, they would find themselves doomed to, well, middle-income status.

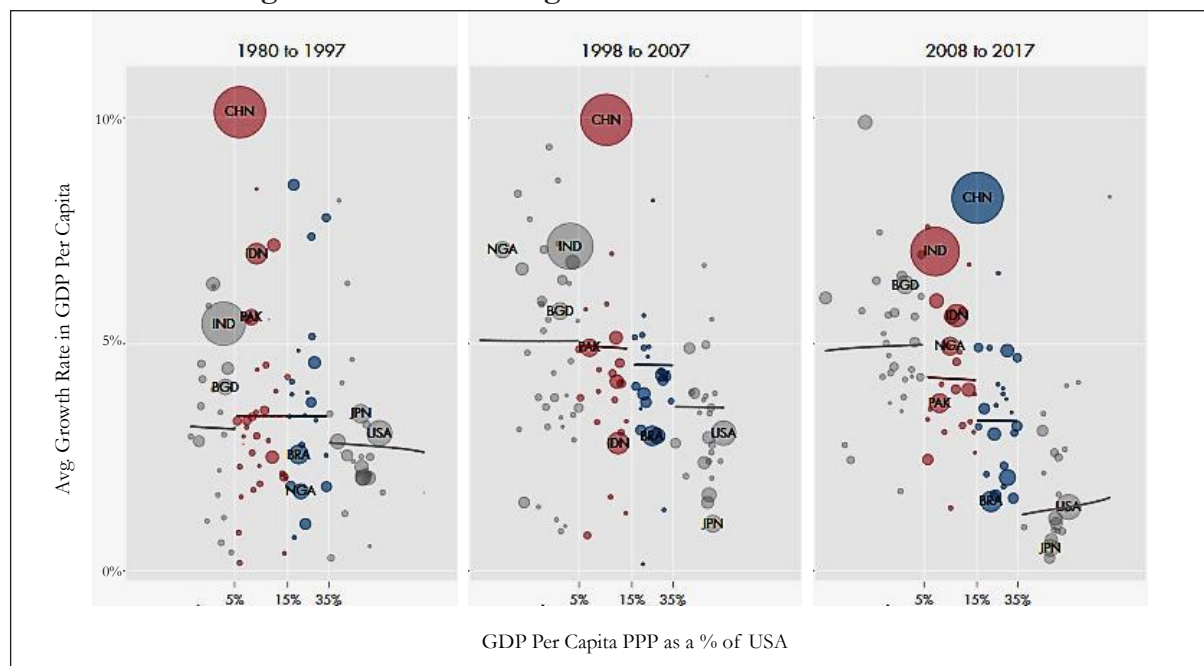
5.8 As it turned out, there was neither a middle income trap nor stall. Middle income countries as a group continued to grow as fast or faster than the convergence standard demanded (Aiyar, Duval, Puy, Wu, & Zhang, 2013; Pritchett & Summers, 2014; Roy, Kessler, & Subramanian, 2016). Indeed, some of them—for example, Korea, Portugal, Poland, and Latvia—graduated to high-income status. The convergence process remained strong even in the last decade.

5.9 This is shown in figure 1. The years from 1980 to 2017 are divided into three periods:

- 1980 to 1997, the era of divergence in which low-income countries fell further behind;
- 1998 to 2007, an early period of convergence running from the East Asian financial crisis until the Global Financial Crisis; and
- 2008 to 2017, the most recent period of “late convergence.”

5.10 In each period, growth rates for low-, lower middle-, upper middle-, and high-income countries are compared. Consistent with the focus on convergence to the rich-country frontier, these income groups are defined in terms of their relative position at the beginning of each period. Low-income countries are those with real per

**Figure 1. Convergence in log per capita GDP over three time periods: convergence continues, but growth is decelerating since the Global Financial Crisis**



Source: WEO; Penn World Tables.

Note: Lines show a local polynomial regression (i.e., the average relationship within groups of countries). Bubbles are proportional to initial population, but regressions and averages are unweighted.

capita GDP less than 5 percent of that in the U.S. in purchasing power parity terms; lower-middle income countries, those with per capita incomes 5-15 percent of the U.S.; and upper-middle income countries, 15-35 percent. High-income countries are all those above that line – including some above the United States' income level.<sup>1</sup>

5.11 In these panels, the lines indicate the average growth rate during the period for each of the four income groups. First, the good news. In the two periods after 1997 (the middle and right panels) the average poor, lower-middle income, and upper middle-income country all grew faster than their high-income counterpart. In that strict sense, there is no middle income trap in any period.

5.12 Furthermore, there is a general downward slope of the lines from around 1997 onward, with

the convergence process actually accelerating after 2008. The poorest have been growing faster than lower middle income countries, who have been growing faster than upper middle income countries who in turn have been growing faster than the richest.

5.13 The developing world continues to catch up, so rapidly that one could call the process “convergence with a vengeance”.<sup>2</sup>

### THE BUT ...

5.14 The focus of this chapter is on the convergence process of lower middle income countries such as India that are attempting to make the transition to middle income status. And late convergence refers to those attempting to do so after the watershed event of the global financial crisis (GFC).

<sup>1</sup> These lines, defined in relative terms, correspond roughly to the original divisions used by the World Bank to define country groups using Gross National Income (GNI) at market exchange rates in 1987.

<sup>2</sup> An unconditional convergence equation for the decade 1997-2007 and then 2007-2016, yield a convergence coefficient that is insignificant for the first period (sample of 143 countries) and strongly significant and negatively signed for the second (sample of 148 countries).

5.15 So, could gathering global trends adversely affect countries such as India that joined the convergence club later in the process? In other words, could there be a “late converger stall” in the process of economic development?

5.16 Prima facie evidence for this comes from comparing the convergence process in the periods before and after the Global Financial Crisis (GFC). The GFC represented a watershed event, marked by a sharp decline in rates of growth across the world. For example, world growth declined from 4.3 percent in the ten-year period prior to the GFC to 2.9 percent in the decade after the GFC. The corresponding numbers for the four major groups of countries were from 3.6 percent down to 1.4 percent for advanced economies, 4.5 to 3.3 percent for upper-middle income countries, 4.9 to 4.2 percent for lower-middle income countries and 5 percent per annum for low-income countries.

5.17 Note the growth declines in upper-middle income countries, by 1.2 percentage points between 1998-2007 and 2008-2017 and by .7 percentage points in lower-middle-income countries over the same period (middle and right panels in Figure 1). Underlying these slowdowns are some major developments that could not only damage growth over the long term, but eventually

even slow the process of convergence. To these developments we now turn.

### THE FOUR HEADWINDS (“HORSEMEN”)

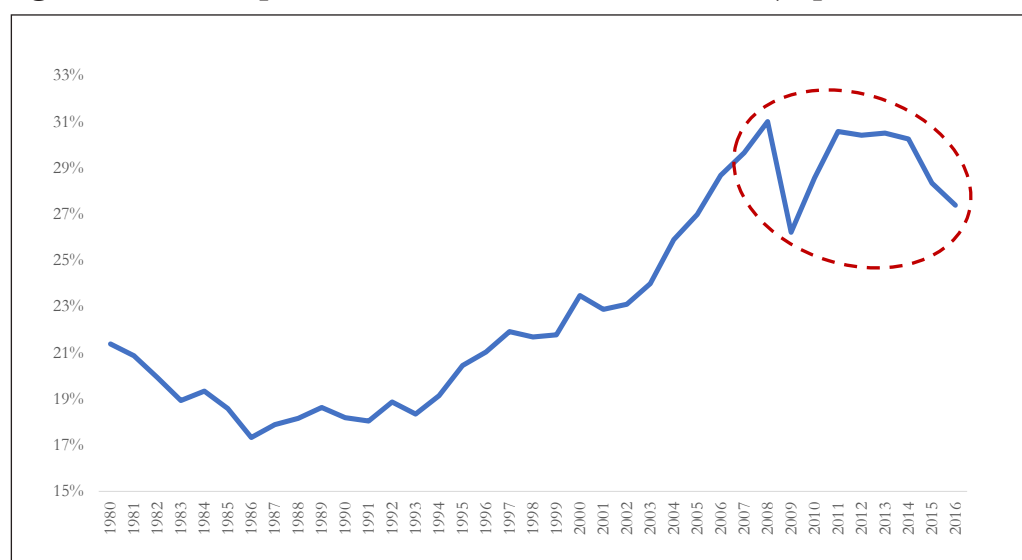
5.18 Even without succumbing to apocalyptic pessimism, the risk of a Late Convergence Stall needs to be taken seriously because of four headwinds: the hyper-globalization repudiation, thwarted/impaired structural transformation, human capital regression induced by technological progress, and climate change-induced agricultural stress.

#### A. Hyperglobalization repudiation

5.19 Developing countries that came late to convergence now face a very different global trading environment from their predecessors. Early convergers benefited from the process of rapid globalization or hyper-globalization, reflected in dramatic increases in the world trade-GDP ratio. As a result, Japan, South Korea and China were all able to post average export growth rates of over 15 percent for the thirty years of their convergence periods.

5.20 But this globalization has led to a backlash in advanced countries reflected in the decline in world trade-GDP ratios since 2011 (see figure 2). This means that the trading opportunities

**Figure 2. World Exports of Goods & Services, 1980-2016 (in per cent of GDP)**



Source: World Bank.



available to the early convergers, specifically the ability to export at double digit rates of growth for three to four decades consistently, may no longer be available.

5.21 One way of understanding the potential impact of the hyperglobalization repudiation is to seek recourse to the gravity model of trade. Basic gravity theory implies that smaller countries tend to trade more than larger ones. A world made up of two equal-size countries will experience more trade than a world in which the larger country accounts for 95 percent of world output. Over time, the world is becoming more equal in the distribution of the underlying output.<sup>3</sup> That is the consequence of convergence. Therefore, if there is convergence, the gravity model suggests there will also be increased trade.

5.22 For example, between 1970 and 2000 the world was constituted by about 7.0–7.5 country equivalents. In other words, during this time, it was as if there were 7.0 – 7.5 equally sized countries trading with each other according to the gravity model. Since 2000, as more countries have started catching up with the rich, world output has become more dispersed. Taking the list of top 50 countries (excluding oil exporters) and calculating the distribution of world output suggests that in 2016 there are about 9.6 country-equivalents in the world. During the period of hyperglobalization world trade-GDP rose by about 14 percentage points, from about 17 percent of world GDP to about 31 percent. About one-third could have been due to the process of economic convergence.

5.23 Going forward, it is illustrative to estimate what further convergence would imply for world trade and whether there will be political carrying capacity not just in advanced economies but also in countries such as China to sustain such globalization.

5.24 Now, for one or a few countries such as India, there need not be such an external

constraint on growth going forward but for lower and middle income countries as a whole as a whole there may well be.

5.25 A back-of-the-envelope calculation gives a sense of the challenge. If the current process of convergence continues and adds another country equivalent, the distribution of world output will become even more dispersed, resulting in an additional increase in the world's trade-GDP ratio of 1 percentage point. The question is whether politics, especially in advanced economies and China, might be able to sustain such an increase in trade. Recall that politics in advanced countries is moving defacto in the direction of seeking and forcing lower trade-GDP ratios.

#### *B. Thwarted structural transformation: good growth and sustainable growth*

5.26 Successful development requires two kinds of structural transformations: 1) a shift of resources from low productivity to high productivity sectors (as highlighted by Sir Arthur Lewis); and 2) a larger share of resources devoted to sectors that have the potential for rapid productivity *growth*. In many cases, however, resources do not shift in this way. They shift instead from informal, low productivity sectors to ones that are marginally less informal/more productive. These are cases of “thwarted structural transformation”.

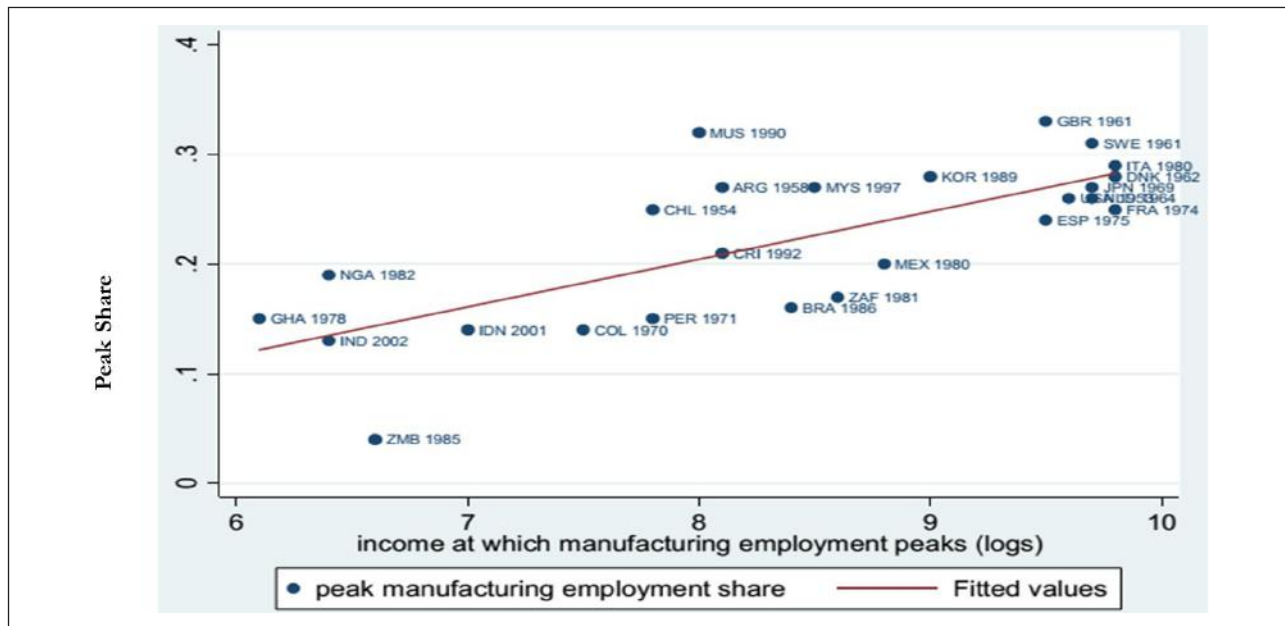
5.27 Rodrik (2015) identifies manufacturing as a critically important sector for ensuring successful transformations. This sector exhibits unconditional convergence toward the world frontier, so that it can become an escalator for rapid growth – if countries manage to get on to it. This is why “premature de-industrialization,” the tendency for manufacturing in late convergers to peak at lower levels of activity and earlier in the development process, is such a cause for concern.

5.28 Figure 3, below, from Rodrik (2015) plots the income level at which the manufacturing share of employment peaks (x-axis) against

<sup>3</sup> As (Anderson, 2011) shows, in a world without trade frictions, the share of trade in world output is given by  $1 - \sum (b_j)^2$ , where  $b_j$  is the share of a country in world output. Inverting the expression gives the number of country-equivalents in the world, which increases with convergence. Baier and Bergstrand (2001) find a statistically significant effect of convergence on trade.

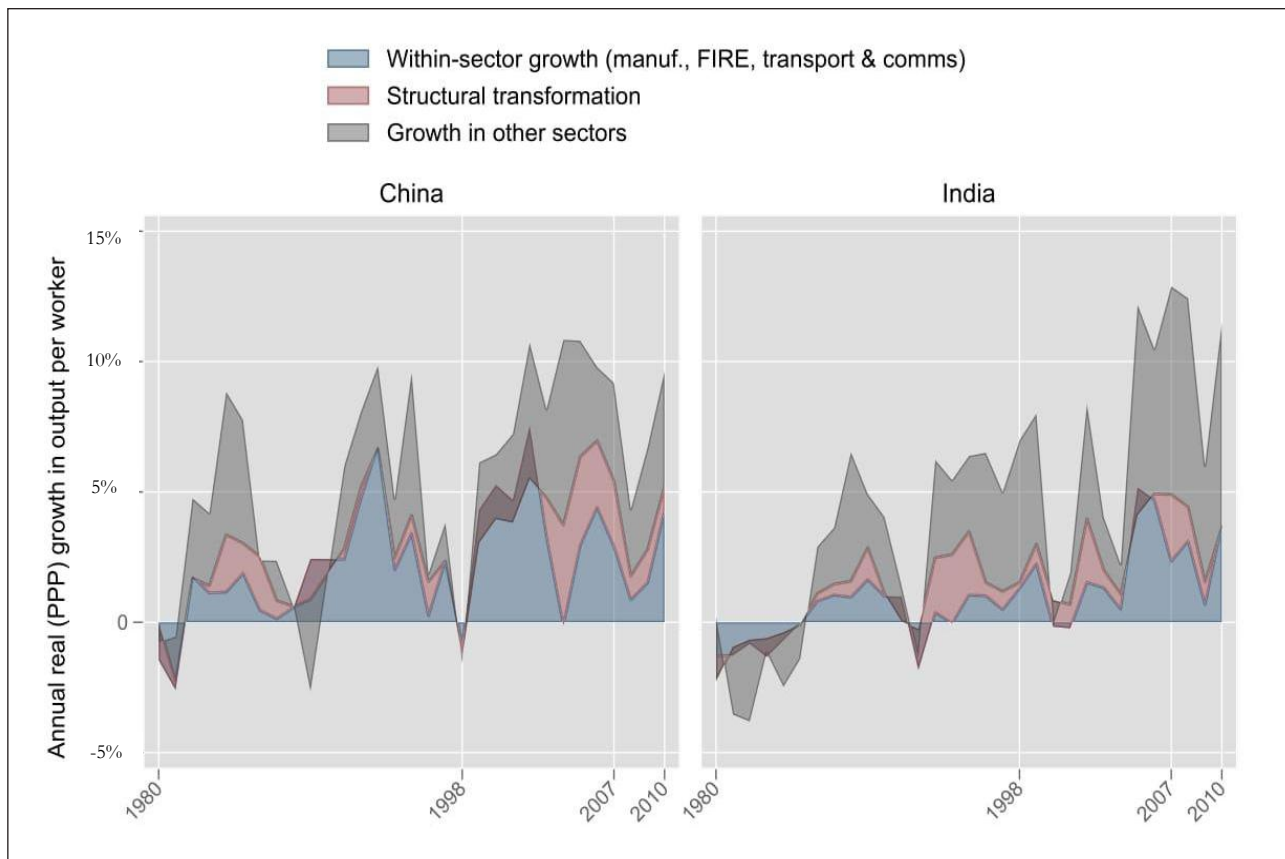


Figure 3. Premature De-Industrialization



Source: Rodrik (2015).

Figure 4. How Much of Growth is Explained by Structural Transformation? More in China Than in India



Source: Timmer et al (2014); GGDC database.

that peak share (y-axis). There is a solid positive relationship, suggesting that richer countries attained higher levels of peak manufacturing and earlier in the development process. Cain, Hassan and Mitra (2010) and Amirapu and Subramanian (2014) have documented this phenomenon for the states within India.

5.29 Are late convergers particularly vulnerable to thwarted transformation? To assess this, Rodrik's identification of structural transformation with manufacturing is broadened. In particular, based on the detailed study of India by Amirapu and Subramanian, dynamic sectors are those with high levels of productivity and potential for unconditional convergence. Such a list comprises manufacturing, finance, telecommunications, and professional services. The Groningen database (Timmer, de Vries, & de Vries, 2014) is then used to do the shift-share analysis of Rodrik and decompose overall productivity growth into "good" (i.e., involving desirable structural transformation) and "less good" growth (e.g., in hotels, restaurants, transport, etc.).<sup>4</sup> Therefore, good growth comprises growth accounted for by labor share shifts into these good sectors and their productivity growth. We then compute the share of this good growth in the total. See Annex for a description of this analysis.

5.30 Therefore, good growth comprises growth accounted for by labor share shifts into these good sectors and their productivity growth. See Annex for a description of this analysis.

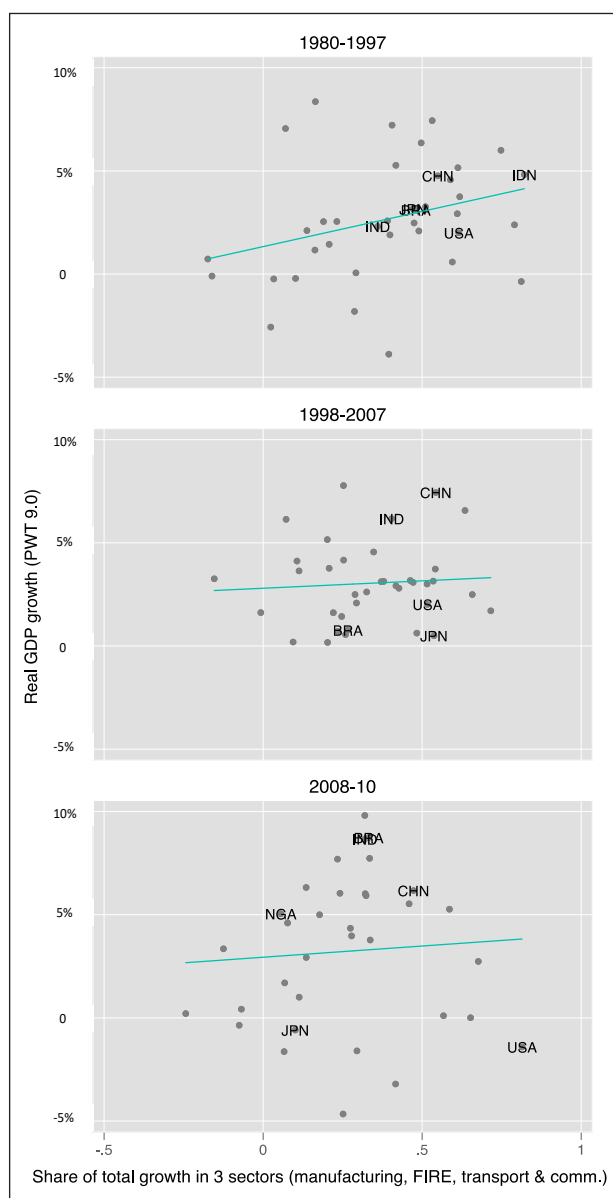
5.31 To motivate the argument before presenting the broader stylized facts, we compare good and less good growth in China and India since 1980.

5.32 In figure 4, the sum of the blue and red areas comprises good growth and the grey area the less good growth. For China, the average

share of good growth over the entire period is 53 percent while India's is 37 percent, falling to about 32 percent since the Global Financial Crisis.

5.33 Next, to check whether there is a difference

**Figure 5. Correlation Between the Share of "Good Growth" and Total Growth: The Share of Good Growth is Falling and the Correlation is Getting Weaker**



Source: Penn World Tables.

<sup>4</sup> The GGDC data distinguishes 10 sectors. For the purposes of this analysis, we associate structural transformation with three of those ten: (i) manufacturing; (ii) transport, storage and communication; and (iii) finance, insurance, real estate and business services.

<sup>5</sup> The figures include 38, 37, and 34 countries for the three time periods shown, respectively. The coefficient on the 'share of good growth' in the regression lines shown is about 0.4 in the first period, and falls to roughly 0.1 in the latter periods (and statistically indistinguishable from zero).

in the correlation between overall growth and “good growth” between the early and late convergers, figure 5 plots these relationships.

5.34 Two features are noteworthy. There is a general leftward shift in the share of good growth over time. This in a sense captures the more general version of the premature deindustrialization point. Second, in the early period of divergence, there was a positive correlation between growth and good growth; this association has weakened over time. Bear in mind, however, these data on sectoral employment are only available for a few dozen countries, and most developing countries are omitted from the sample.<sup>5</sup>

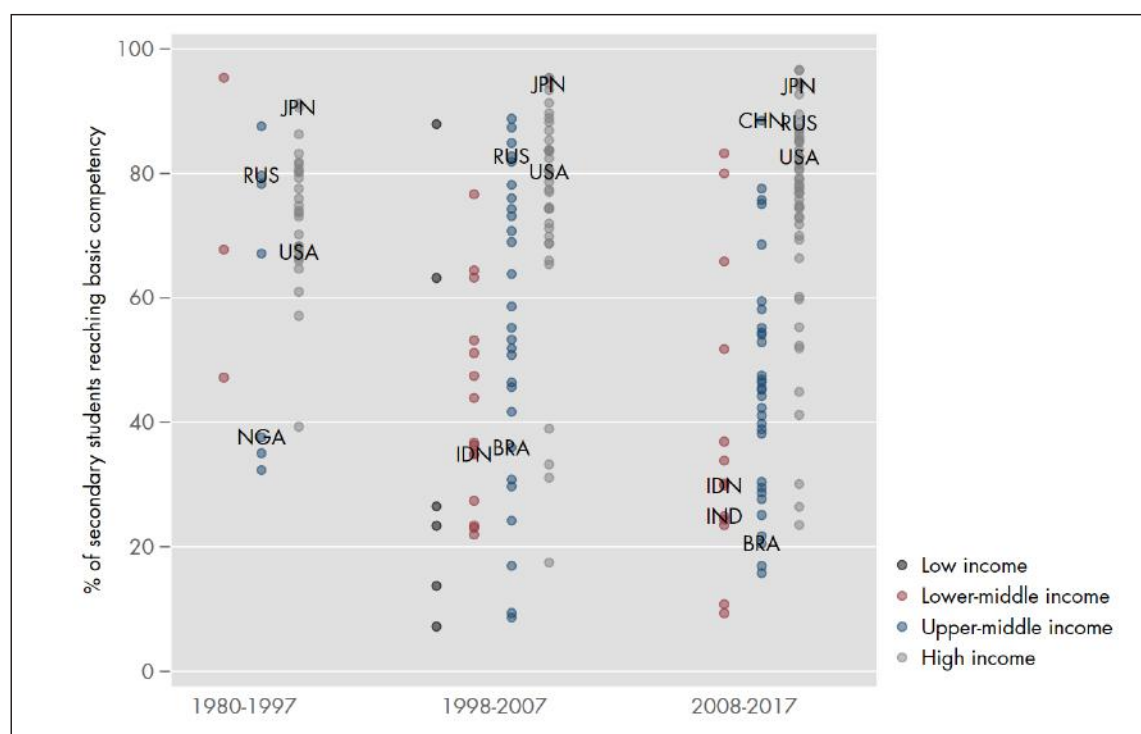
5.35 So, there is something to the thwarted structural transformation hypothesis. Interestingly, China’s good growth persists in both periods; India’s share of good growth declines in the second period. Both are of course positive outliers to the relationship itself, raising the possibility that while the general pattern

is that good growth is necessary for sustained growth, China and India might defy this pattern. However, it would more prudent not to rely on permanent exceptionalism.

### C. Human capital regression

5.36 In some ways, there is one key difference between early convergence based on manufacturing and late convergence against the strong headwinds of automation and the globalization backlash. And that relates to human capital. In early convergence, it was the alignment of human capital endowment (educated but relatively unskilled labour) with the sector associated with structural transformation, namely manufacturing, that allowed for the percolation and spread of dynamism to the rest of the economy. Shifts in labor, the so-called Lewisian transformation from farm to factory, were possible because of this co-incidence: growth and structural transformation based on comparative advantage.

**Figure 6. Learning levels of secondary students, by country income group and time period: middle-income countries are further behind today than in earlier periods.**



Source: Altinok et al. (2016).

5.37 The late convergers are doubly challenged. Not only have they failed to provide even the basic education necessary for some structural transformation, that failure will prove increasingly costly because the human capital frontier for the new structural transformation has probably shifted further away. Technology will increasingly favor skilled human capital, where the requisite skills will include adaptability and the ability to learn continually. One might argue that growth itself will be based less on comparative advantage and more on some absolute human capital attainment.

5.38 Figure 6 captures some of these observations. It plots the available data on learning outcomes for a group of advanced and emerging economies, drawing from Altinok *et al* (2016) who pool data from a variety of regional and international learning assessments. During the 1980s and 1990s, educational attainment of the middle income countries was below that of advanced economies. But the gap was smaller for

them then than it is for the lower middle income countries in the more recent period. If this gap persists or widens the kind of transformation enjoyed by the late convergers might prove more difficult for the late convergers, including India.

5.39 Sample selection explains part of this result. Poor and lower-middle income countries today are more likely to participate in international learning assessments – and more of the population is likely to go to school – than in the 1960 to 1997 period. Perhaps the early adopters of learning metrics were already on a path to growth. But the basic pattern is fairly stark. Middle-income countries who do participate in learning assessments today are further behind the rich world than they were in the first part of the 21st century, and much further behind than they were in the 20<sup>th</sup> century.

5.40 There is another India-specific perspective on the human capital challenge highlighted in the Box below.

### **Box 1 : The Learning Poverty Count (LPC) and Learning Poverty Gap (LPG) in Rural Primary Education**

Great strides have been made in India's primary school enrollment, which is now nearly universal for both boys and girls at elementary level. Yet, both cross-country evidence and evidence from India suggests that educational outcomes are incommensurate with years of schooling: learning lags attending, as it were (Pritchett, 2013; Das and Zajonc, 2010; Singh, 2014).

Here we present estimates of learning outcomes drawing parallels from the poverty measurement literature. Specifically, we estimate a learning poverty headcount (LPC) as well as a learning poverty gap (LPG). The LPC simply measures the number of children who do not meet the basic learning benchmark, whereas the LPG additionally takes into account *how far* each student is from the benchmark. In other words, the LPG measures the gap between the basic learning benchmark and the average scores of those students who did not meet the benchmark.<sup>a</sup>

Such estimates are rendered possible by the Annual Survey of Education Reports (ASER) that have over time tested a sample of children between the ages of 5 and 16, residing in rural India. Students are tested in terms of a set of tasks in reading and arithmetic, which have remained constant over time. In a sense, these tests amount to an absolutely minimal or basic level of educational attainment—akin to the poverty or subsistence line. Specifically, we chose this line as being able to read a simple story (in the local language), and being able to do subtraction – roughly meeting the passing standard for grade 3. For the present analysis, we focus on children between in grades 3 through 8.

Figures 1 and 2 illustrate how India has fared on these two metrics. The findings are stark. On math and reading, India's absolute LPC is between 40 and 50 percent: in other words, roughly 40-50 percent of children in rural India in grades 3 to 8 cannot meet the fairly basic learning standard (Figure 1). Discouragingly, this poverty count score rises over time, substantially in the case of math. There is some consolation that since 2014 has the trend started to show some improvement; and also consolation that at least there are no significant differences in the LPC for boys and girls.

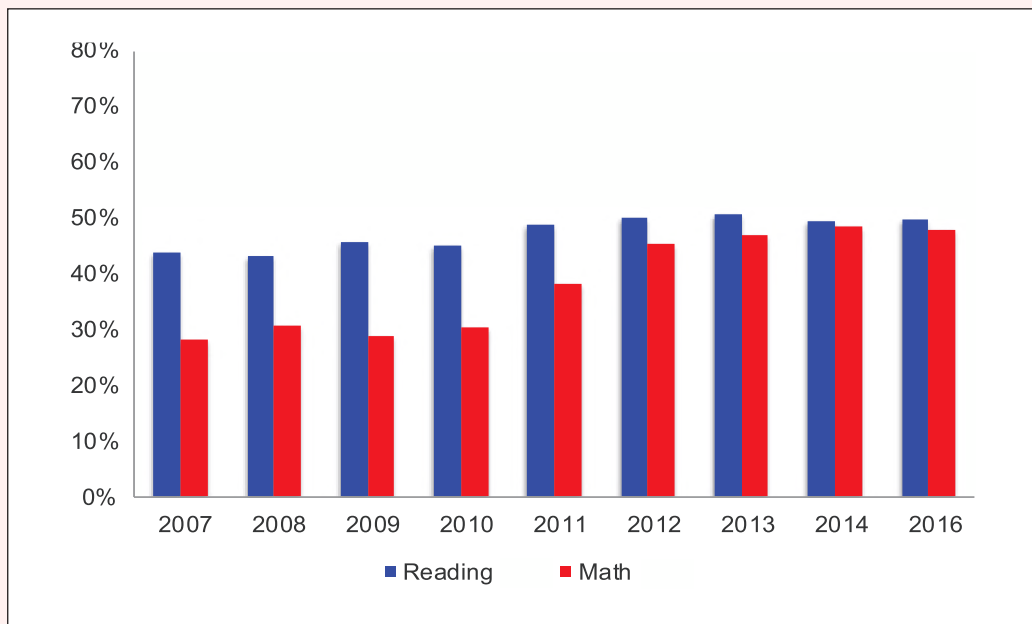
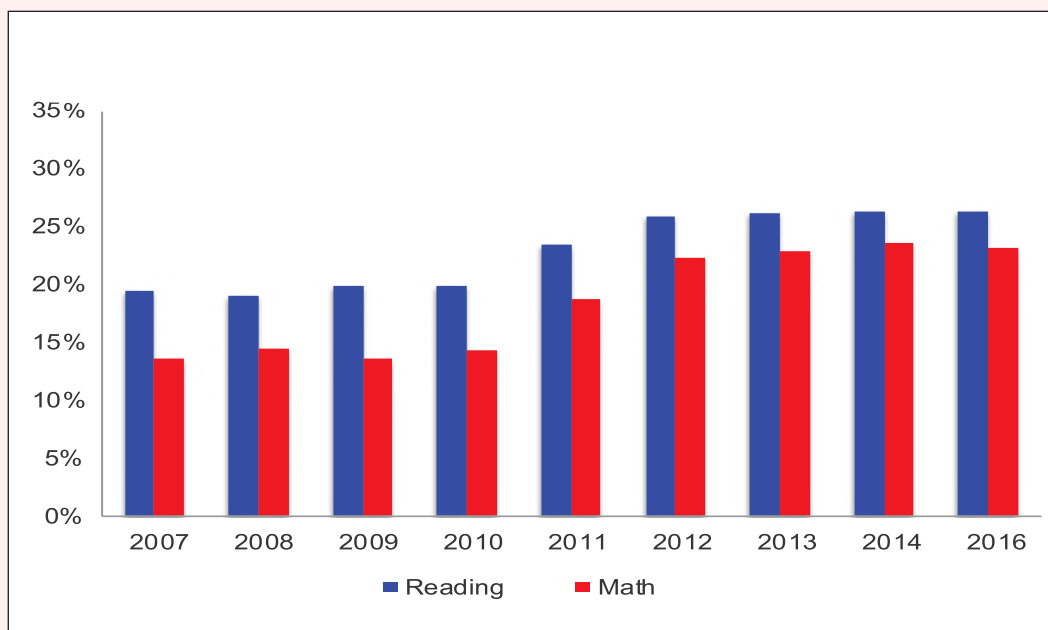
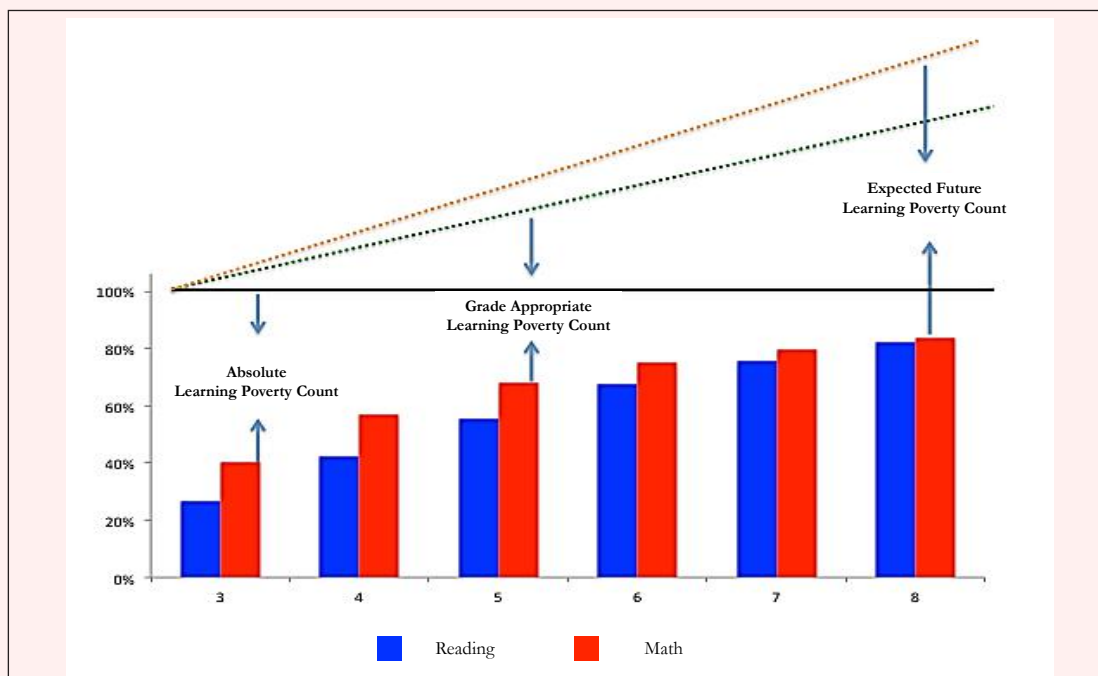
**Figure 1. Learning Poverty Count, 2007-2016**

Figure 2 presents the estimates for the learning poverty gap. The temporal patterns are similar to those of the LPC. The most recent level of the LPG is about 25 percent for reading and a little lower for math. One way of understanding this number is that on average, each child in grades 3 to 8 scores 2.2 compared to the score of 3 necessary to meet the second grade learning requirement.

**Figure 2. Learning Poverty Gap, 2007-2016**

**Figure 3. True Distance from Frontier**

How do students perform as they progress through grades? Figure 3 plots the proportion of students in each grade who meet the grade 2 learning benchmark (the vertical distance from the horizontal black line). Unsurprisingly, in higher grades a larger proportion of students meet this basic benchmark. However, as students move to higher grades, the learning benchmark should also increase. While the ASER data does not allow us to directly compute it, the dashed green line is a hypothetical representation of the grade specific benchmark. Using this grade-appropriate poverty line, it is clear that learning levels of children in rural India are far below where they should be.

It is sobering enough that learning poverty counts are around 40 percent, roughly where India's consumption poverty numbers were in the 1970s. But if technology going forward is going to be even more human capital intensive as current trends suggest (dotted yellow line), the wedge between the opportunities offered to the future labour force and the capabilities to take advantage of them will widen even further. That is the true magnitude of India's human capital challenge.

<sup>a</sup>We measure the Learning Poverty Count (LPC) as the proportion of children at any point in time who cannot meet this minimal level.

$$LPC = \sum_g N_g^* / \sum_g N_g$$

$N_g^*$  denotes the number of children at grade  $g$  (where  $g$  goes from 3 to 8) who meet the test.  $N_g$  is the total number of children in grade  $g$ .

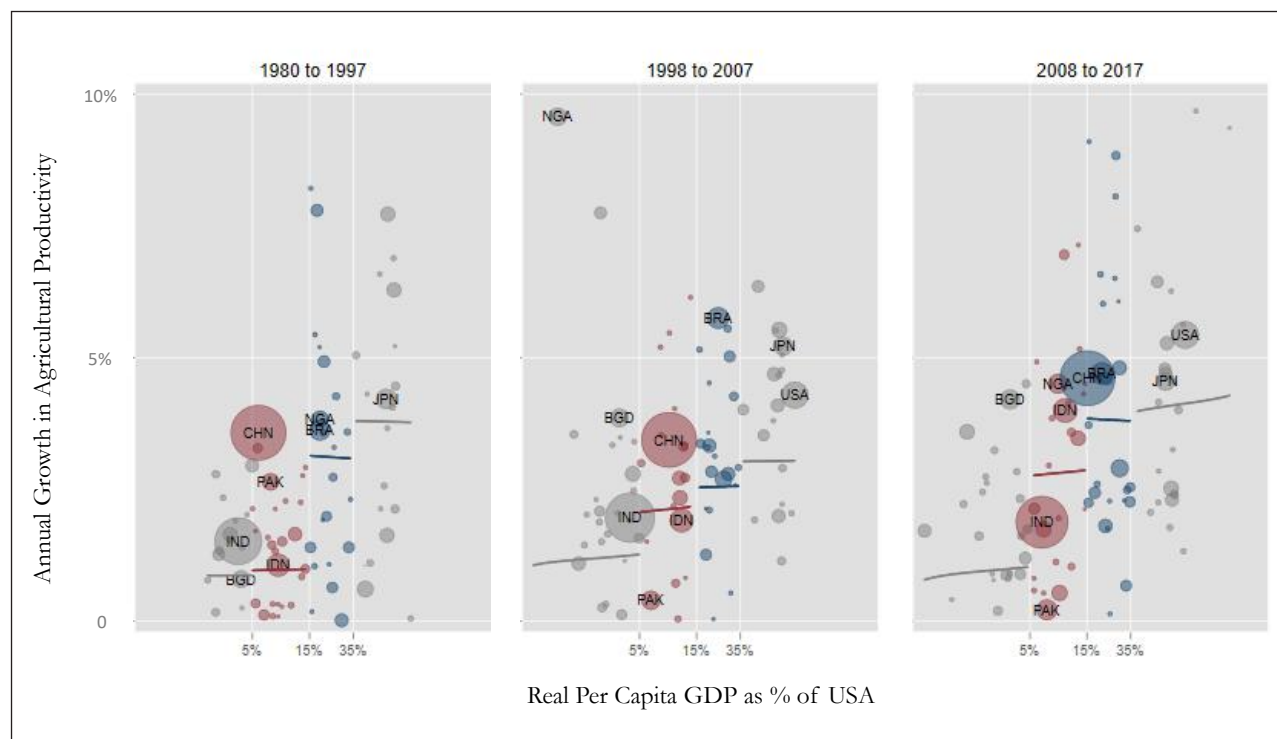
Analogously, the Learning Poverty Gap (LPG) is:

$$LPG = 1/N[\sum_i (PL - S_i)/PL]$$

$S_i$  is the score of child  $i$  and  $PL$  is the minimal learning standard, and  $I$  is an indicator function, which takes the value 1 if a student does not meet the learning standard, and 0 otherwise.



**Figure 7. Unlike GDP, agricultural productivity levels across countries are increasingly diverging, not converging**



Source: World Bank; Penn World Tables.

Note: Lines show a local polynomial regression. Bubbles are proportional to initial population, but regressions and averages are unweighted.

#### *D. Climate change-induced agricultural stress*

5.41 A final factor impeding late convergence relates to agriculture. It is often forgotten that Lewisian structural transformation required the release of resources into the modern sector under conditions of rising agricultural productivity. Part of the reason was the need to produce enough food to a growing population. That was only possible if agricultural labor productivity grew rapidly enough.

5.42 But has such growth characterized the convergence process? Figure 7 shows that there has been divergence big time on agricultural productivity. Growth rates for richer countries have been consistently greater than for developing countries (in each time period, the lines depicting average growth for country groups, increase in magnitude from poorest to richest groups).

5.43 For the poorest, these growth rates have even declined post-GFC. For example, Indian agricultural productivity growth has been stagnant, averaging roughly 3 percent over the last 30 years (see figure 8). A later chapter of this Survey shows that Indian agriculture is vulnerable to temperature increase and still heavily dependent on precipitation. The analysis there shows that if climate change raises temperatures and the variability of rainfall, farmer revenues could decline by up to 20 percent to 25 percent in non-irrigated areas. For the late convergers, agricultural productivity is critical not just for feeding people but for ensuring human capital accumulation in those who move from agriculture to the modern sectors. Agriculture could yet come back to haunt the structural transformation fortunes of the late convergers.

**Figure 8. Indian Agricultural Productivity Growth**

Source: Survey Calculations; numbers represent average growth for the relevant period in percent.

## LESSONS FOR INDIA

5.44 Since 1980, India has been rapidly catching up, posting an average per capita GDP growth rate of 4.5 percent, a rate substantially greater than registered previously, which is in the top quartile of countries over that period, and amongst the highest for continuous democracies. But this fast growth has occurred with limited transfer of labour resources from low productivity to high productivity and dynamic sectors, and despite relatively modest agricultural growth. The risk for India—as for the other late convergers—is that resources (especially labour) will move from low productivity, informal sectors to other sectors that are marginally less formal and only marginally more productive. That is the “late converger stall” that India must avoid.

5.45 Rapidly improving human capital—healthy individuals, including all women, with the basic education to continually learn and adapt—will be key to sustaining India’s dynamic growth trajectory. Rapidly improving agricultural productivity—against the headwinds of climate

change and water scarcity—will be another key to achieving good growth and hence sustainable growth. And, of course, the hyperglobalization backlash in advanced countries, over which India has little control, must recede to create a favorable external climate to sustain rapid growth. There is no Late Converger Stall, as yet, but it would be wise to act to head it off.

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# Climate, Climate Change, and Agriculture

*Mere desh ki dharti sona ugle ugle heerey moti*  
(My country's soil where crops grow like gold, diamonds, and pearls)

**Manoj Kumar, Upkaar**

*Kaa barakhaa, jab krishi sukhaanee*  
(What's the use of that untimely rain after the crop has dried up)

**Tulsidas, Ram Charit Maanas**

*Using district-level data on temperature, rainfall and crop production, this chapter documents a long-term trend of rising temperatures, declining average precipitation, and increase in extreme precipitation events. A key finding—and one with significant implications as climate change looms—is that the impact of temperature and rainfall is felt only in the extreme; that is, when temperatures are much higher, rainfall significantly lower, and the number of “dry days” greater, than normal. A second key finding is that these impacts are significantly more adverse in unirrigated areas (and hence rainfed crops) compared to irrigated areas (and hence cereals). Applying these estimates to projected long-term weather patterns implies that climate change could reduce annual agricultural incomes in the range of 15 percent to 18 percent on average, and up to 20 percent to 25 percent for unirrigated areas. Minimizing susceptibility to climate change requires drastically extending irrigation via efficient drip and sprinkler technologies (realizing “more crop for every drop”), and replacing untargeted subsidies in power and fertilizer by direct income support. More broadly, the cereal-centricity of policy needs to be reviewed.*

## INTRODUCTION

6.1 The bounty of Indian agriculture romanticized in that famous Manoj Kumar song—which also underlies the Prime Minister's goal of doubling farmers' incomes—increasingly runs up against the contemporary realities of Indian agriculture, and the harsher prospects of its vulnerability to long-term climate change.

6.2 The last few seasons have witnessed a problem of plenty: farm revenues declining for a number of crops despite increasing production and market prices falling below the Minimum Support Price (MSP). But in the medium to long term, the ghost of Malthus looms over Indian agriculture. Productivity will have to be increased, and price and income volatility reduced, against the backdrop of increasing resource constraints.

Shortages of water and land, deterioration in soil quality, and of course climate change-induced temperature increases and rainfall variability, are all going to impact agriculture. It is therefore opportune to analyze the effects of climate on Indian agriculture.

### ***Why Agriculture Matters: An Irony***

6.3 First, and foremost, agriculture matters in India for deep reasons, not least because the farmer holds a special place in Indian hearts and minds. The first salvo of satyagraha was fired by Mahatma Gandhi on behalf of farmers, the indigo farmers exploited by colonial rule. Not unlike in early, Jeffersonian America (Hofstadter, 1955), history and literature have contributed to the farmer acquiring mythic status in Indian lore: innocent, unsullied, hard-working, in harmony with nature; and yet poor, vulnerable, and the victim, first of the imperial masters and then of indigenous landlords and middlemen. Bollywood (and Kollywood and Tollywood) has also played a key role in creating and reinforcing the mythology of the Indian farmer (for example, in movies such as *Mother India*, *Do Beegha Zameen*, *Upkaar*, *Lagaan*, and more recently *Peepli Live*).

6.4 Agriculture also matters for economic reasons because it still accounts for a substantial part of GDP (16 percent) and employment (49 percent)<sup>1</sup>. Poor agricultural performance can lead to inflation, farmer distress and unrest, and larger political and social disaffection—all of which can hold back the economy.

6.5 The Nobel Prize winner, Sir Arthur Lewis (among others), argued that economic development is always and everywhere about getting people out of agriculture and of agriculture becoming over time a less important part of the economy (not in absolute terms but as a share of GDP and employment). The reason why agriculture

cannot be the dominant, permanent source of livelihood is its productivity *level*, and hence the living standards it sustains, can never approach—and have historically never approached—those in manufacturing and services. That, of course, means that industrialization and urbanization must provide those higher productivity alternatives to agriculture. But this must happen along with, and in the context of, rapid productivity growth in agriculture, to produce greater food supplies for the people, provide rising farm incomes, and permit the accumulation of human capital.

6.6 At the same time, Dr. Ambedkar warned about the dangers of romanticizing rural India. He famously derided the village as “a sink of localism, a den of ignorance, narrow mindedness and communalism,” thereby expressing a deeper truth—an Indian social complement to the Lewisian economic insight—that in the long run people need to move and be moved out of agriculture for non-economic reasons.

6.7 So the irony is that the concern about farmers and agriculture today is to ensure that tomorrow there are fewer farmers and farms but more productive ones. In other words, all good and successful economic and social development is about facilitating this transition in the context of a prosperous agriculture and of rising productivity in agriculture because that will also facilitate good urbanization and rising productivity in other sectors of the economy.

### ***Long run agricultural performance***

6.8 The focus on agriculture is warranted by its long run economic performance. Chand (2012) and Gulati (2009), among others have analysed the temporal and spatial performance of agriculture. Real agricultural growth since 1960 has averaged about 2.8 percent in India. The period before

<sup>1</sup> The International Labour Organization (ILO) estimates the agriculture share of employment at 44.3 percent.



the Green Revolution saw growth of less than 2 percent; the following period until 2004 yielded growth of 3 percent; in the period after the global agricultural commodity surge, growth increased to 3.6 percent (Figure 1). China's annual agricultural growth over the long run has exceeded that of India by a substantial 1.5 percentage points on average.

6.9 The volatility of agricultural growth in India has declined substantially over time: from a standard deviation of 6.3 percent between 1960 and 2004 to 2.9 percent since 2004. In particular, production of cereals has become more robust to drought.

6.10 But levels of volatility continue to be high and substantially higher than in China where the ups and downs have been virtually eliminated (Figure 2, circled area). An important contributing factor is that agriculture in India even today continues to be vulnerable to the vagaries of weather because close to 52 percent (73.2 million hectares area of 141.4 million hectares net sown area) of it is still un-irrigated and rainfed.<sup>2</sup>

6.11 Against this background, this chapter pursues three objectives - first, to document the changes in climatic patterns in temperature and rainfall over the past six decades.<sup>3</sup> Second, to estimate the effects of fluctuations in weather on agricultural productivity. And finally, to use these short-run estimates in conjunction with predicted changes in climate over the long-run to arrive at estimates of the impact of global warming on Indian agriculture. A number of distinguished Indian agricultural economists have analysed various aspects of agriculture [Chand (2007, 2010, 2012 2015), Gulati (1999, 2005,

2007, 2008, 2009, 2017), Ramaswami (2001, 2002, 2013), Swaminathan (2005, 2008, 2010)] but there have not been recent estimates of the impact of weather on agriculture at such a disaggregated level.

### ***Motivation***

6.12 But why re-invent the wheel, when there already is a burgeoning and serious body of research and analysis at the international level of the impact of climate on economic activity Deschênes, and Greenstone (2007 and 2011); Dell, Jones and Olken (2012 and 2014); IMF (2017); and Burke, Hsiang, and Miguel (2015)?

6.13 The answer is threefold. There is the standard worry that cross-country analysis might not apply to large, individual countries such as India, which is agrarian and is home to a great diversity of climate zones. A second, related point is that an India-specific analysis would be more granular, done at a spatially more disaggregated level than coarser cross-country analysis (although there are cross-country analysis that use such disaggregated data).

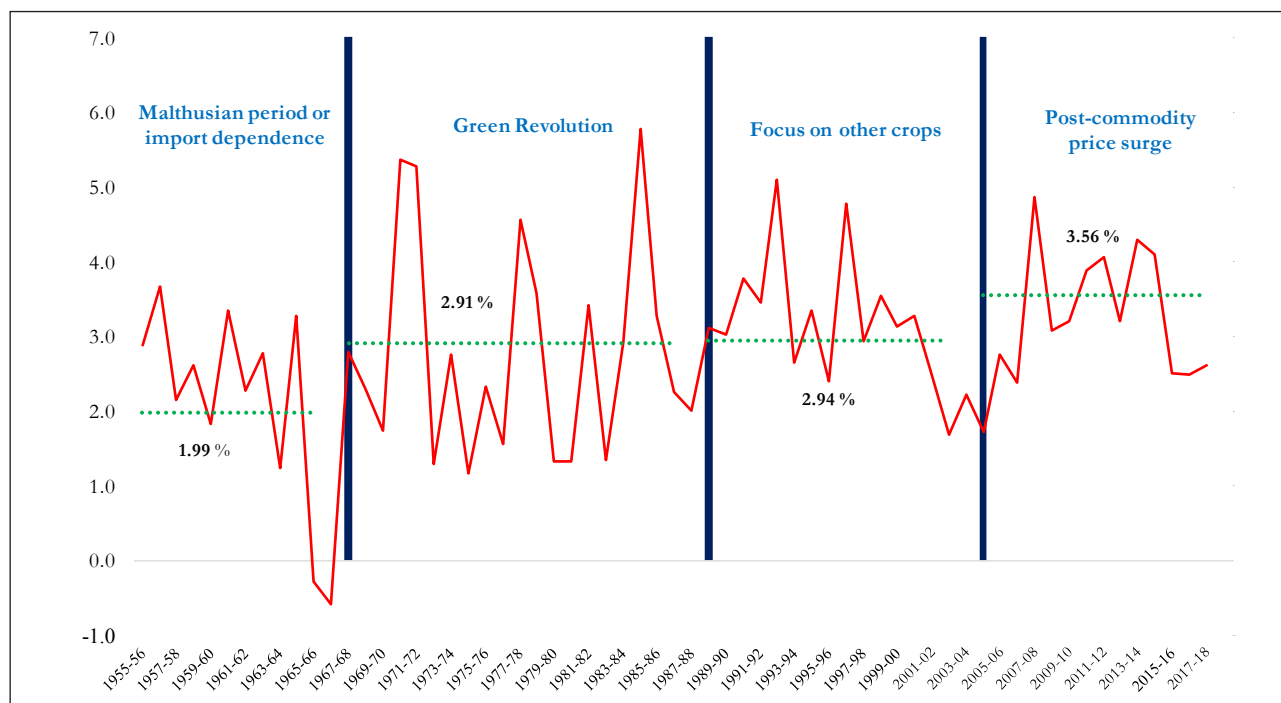
6.14 A final and important reason—with implications for research findings and hence policy input—has to do with data quality. Nearly all the available cross-country analysis use cross-country databases on temperature, weather, and extreme events. For example, Dell, Jones and Olken (2012, 2014) and IMF (2017) use a dataset created by the University of Delaware for temperature and precipitation. These databases rely on Indian data but with far fewer actual measurement points (“stations”) than available with the Indian Meteorological Department (IMD). The Delaware

<sup>2</sup> Annual Report, 2016-17, Ministry of Agriculture & Farmers Welfare.

<sup>3</sup> Throughout this chapter, “weather” is used to refer to annual realizations of temperature and precipitation, whereas “climate” refers to long-term patterns in these variables.



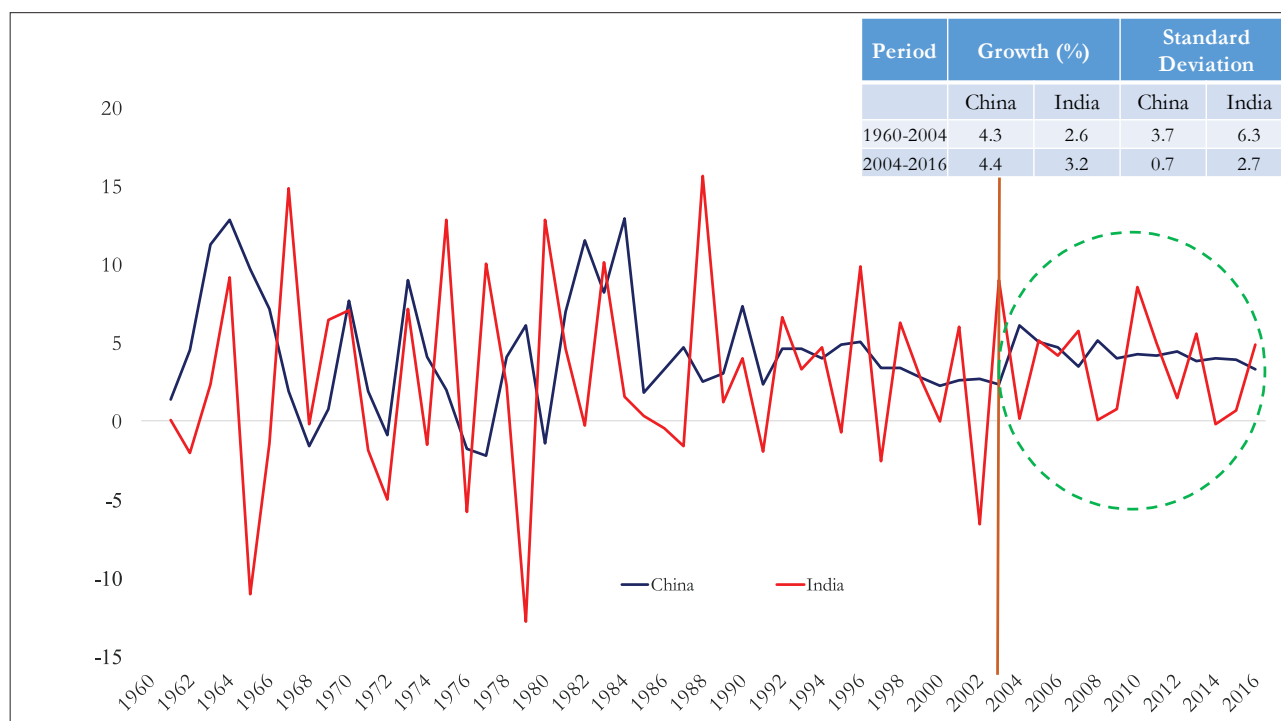
**Figure 1. Real Agricultural GVA Growth in India, 1960-2016**  
(in percent, 5 year moving average)



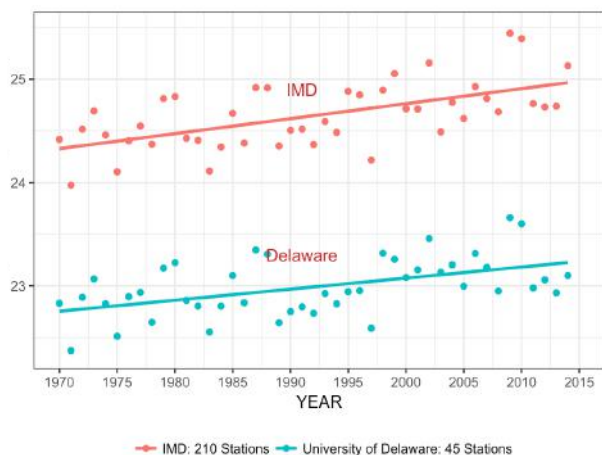
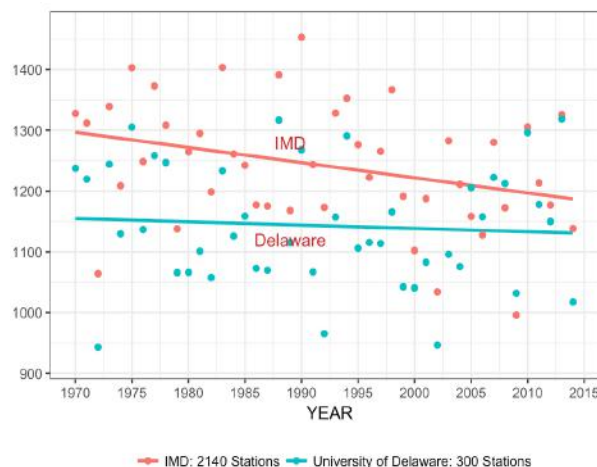
Source: Survey calculations.

Note: Numbers represent average agricultural growth rates for each period in percent.

**Figure 2. Real Agricultural GDP Growth, China and India, 1960-2016**  
(in percent)



Source: Survey calculations.

**Figure 3. Temperature and Rainfall : Comparison of Indian & International Data****Figure 3a. Average Annual Temperature****Figure 3b. Average Annual Rainfall**

Source: Survey calculations from IMD and University of Delaware data. For temperature, the annual average is estimated for each grid point, and then averaged across all grid points to obtain the all-India average. For rainfall, the total rainfall for each grid point is averaged across all grid points to obtain the all-India average.

temperature data base is gridded (to make it spatially representative) but based on 45 weather stations in India whereas the IMD data is gridded from 210 weather stations. Similarly, the Delaware database for precipitation relies on Indian rainfall data provided by 300 stations compared to an actual sample of 2140 stations (See Annex for a comparison of Indian and cross-country databases).

6.15 The divergences between the cross-country databases are illustrated in Figures 3a and 3b below for the average annual temperature and average annual rainfall data, respectively.<sup>4</sup>

6.16 In these figures, there are substantial differences in both levels and trends between the two datasets. For example, IMD data (in red) record much higher average<sup>5</sup> levels of temperatures than the Delaware dataset (by over 1 degree Celsius on average, in climate terms, the difference between disaster and nirvana). Similarly, the IMD data

shows higher levels of precipitation of about 100 millimetres on average (again a potential difference between deluge and drought) with a sharply declining trend since the 1970s unlike the Delaware data. These differences suggest that any analysis of long run climate impacts could be very different across these datasets.

6.17 Thus, armed with high quality, high resolution, temperature and precipitation data, this chapter proceeds to analyze patterns in temperature and precipitation in India, and the impact they have on agricultural productivity.

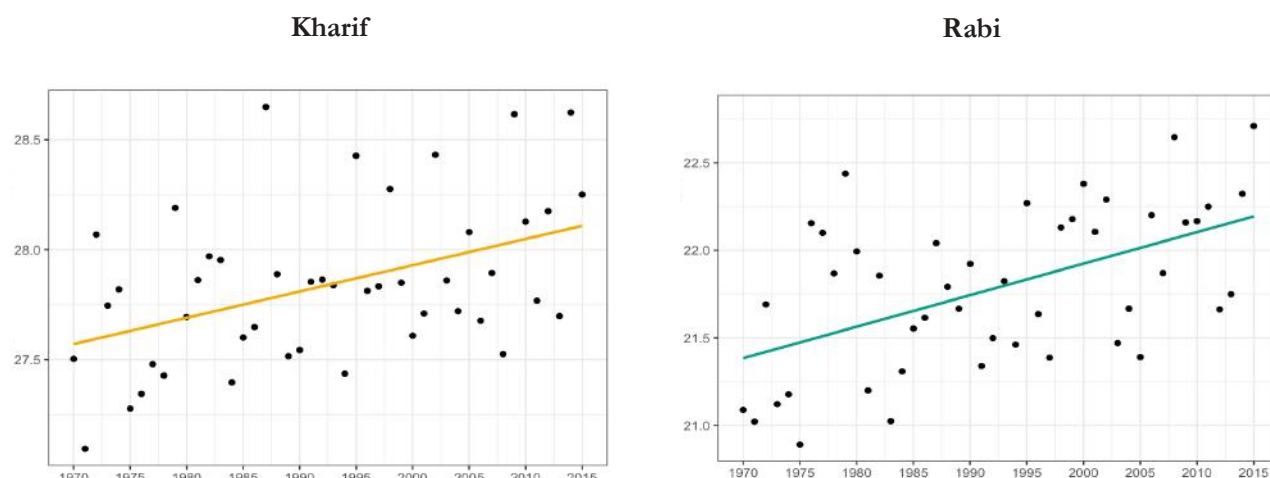
## TEMPORAL AND SPATIAL PATTERNS OF TEMPERATURE AND PRECIPITATION

6.18 Figure 4 plots average temperature by cropping seasons. The broad pattern of rising temperatures post 1970s is common to both seasons. The average increase in temperature between the most recent decade and the 1970s is

<sup>4</sup> Averages calculated over all grid points of Delaware and IMD datasets, which lie within the boundaries of India.

<sup>5</sup> So, the differences between the two databases could arise for two reasons: daily (IMD) versus monthly (Delaware) and 210/2140 (IMD) versus 45/300 (Delaware) collections points for temperature/rainfall. IMD datasets are more detailed and disaggregated.

**Figure 4. Average Temperature by Cropping Season: Kharif and Rabi**  
(degrees Celsius)



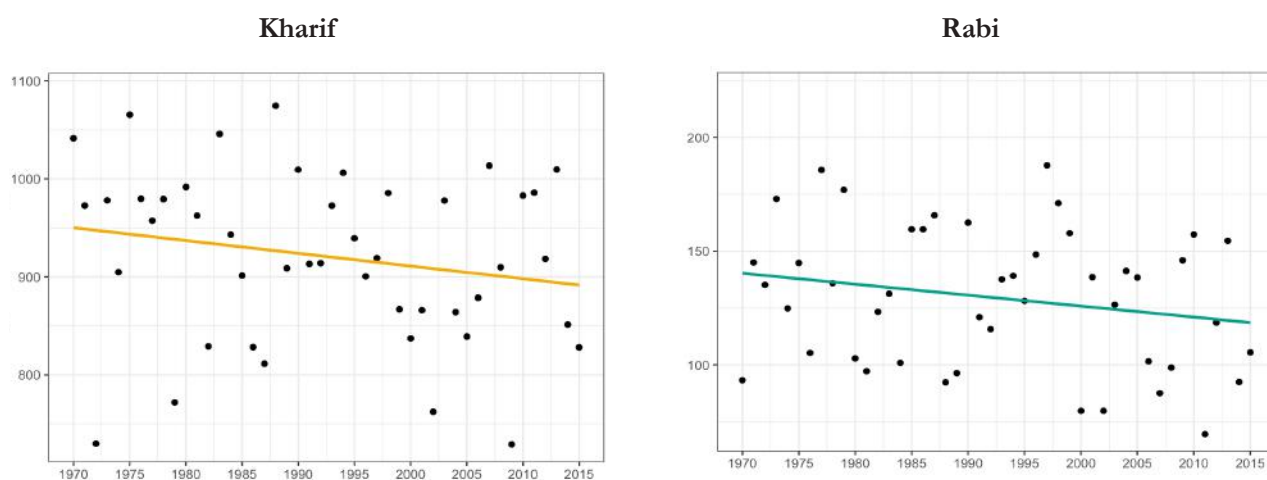
Source: Survey calculations from IMD data.

about 0.45 degrees and 0.63 degrees in the kharif and rabi seasons, respectively. These trends are consistent with those reported in Rajeevan (2013).

6.19 Figure 5 plots the rainfall patterns in the two seasons. Between the 1970s and the last decade, kharif rainfall has declined on average by 26 millimeters and rabi rainfall by 33 millimeters. Annual average rainfall for this period has on average declined by about 86 millimeters.

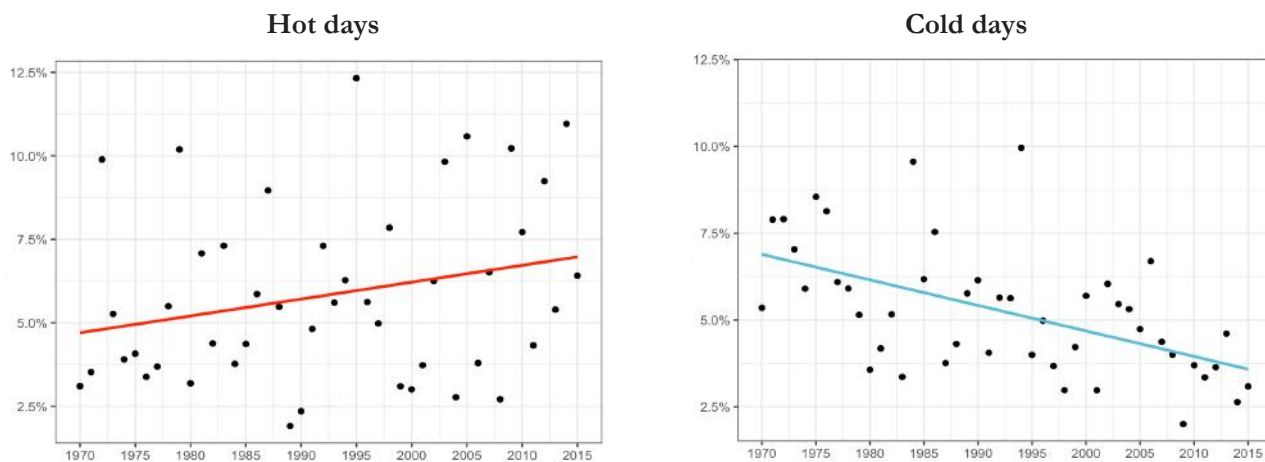
6.20 What about the number of days with extremely high and low temperatures? Figure 6 plots the proportion of days during the monsoon season in each year when the temperature was extremely high (defined as greater than the 95<sup>th</sup> percentile of the grid-point specific temperature distribution) and extremely low (less than the 5<sup>th</sup> percentile of the grid point specific temperature distribution). These figures are suggestive of a rise in the number of days with extremely high temperatures, and a corresponding decline in the number of days with low temperatures.

**Figure 5. Average Precipitation by Cropping Season: Kharif and Rabi**  
(Millimetres)



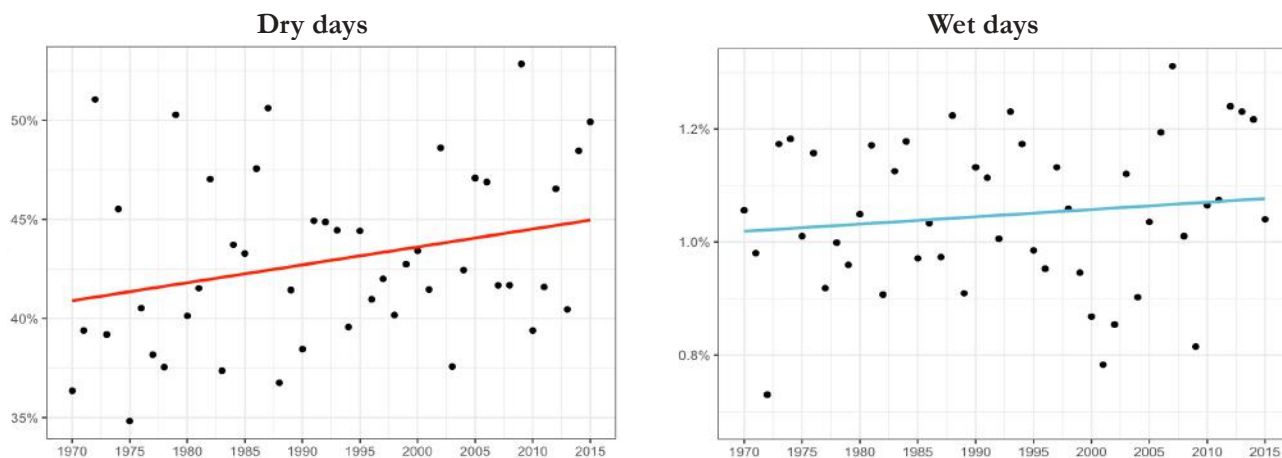
Source: Survey calculations from IMD data.

**Figure 6. Very Hot and Cold Days during the Monsoon**  
(percentage of total days)



Source: Survey calculations from IMD data.

**Figure 7. Dry and Wet Days during the Monsoon**  
(percentage of total days)



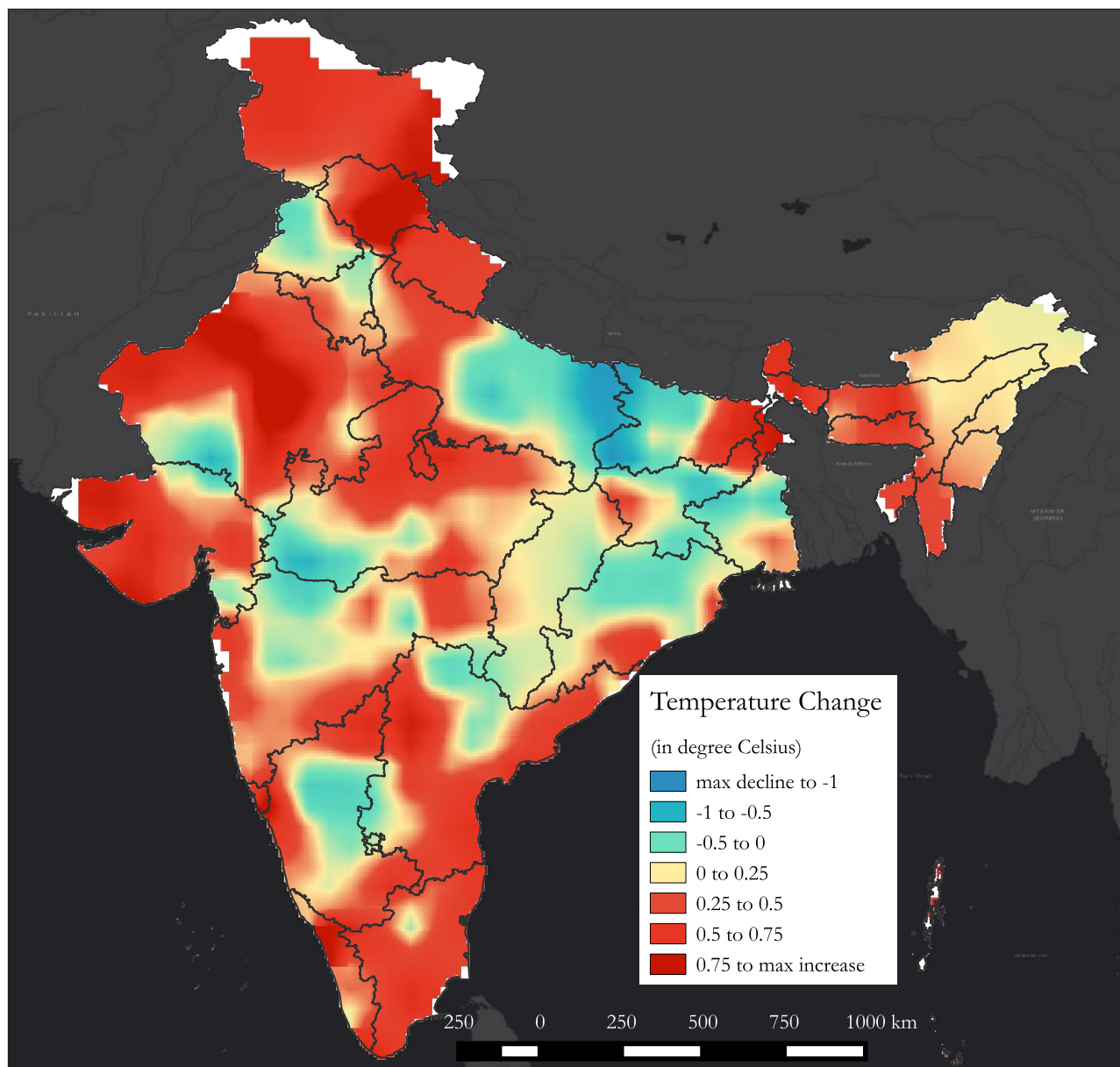
Source: Survey calculations from IMD data.

6.21 Turning attention to rainfall extremities, Figure 7 shows that the proportion of dry days (rainfall less than 0.1 mm per day), as well as wet days (rainfall greater than 80 mm per day) has increased steadily over time. Thus, the imprint of climate change is clearly manifest in the increasing frequency of extreme weather outcomes.

6.22 The spatial dimensions of changes in weather are displayed in Figure 8a (for temperature) and Figure 8b (for rainfall). They show, respectively, the difference in temperature

and rainfall between the last decade (2005-2015) and the period 1950-1980. Figure 8a illustrates the pattern of average warming with a large part of the map covered in red. Temperature increases have been particularly felt in the North-East, Kerala, Tamil Nadu, Kerala, Rajasthan and Gujarat. Parts of India, for example, Punjab, Odisha and Uttar Pradesh have been the least affected. In contrast, Figure 8b indicates that extreme deficiencies are more concentrated in Uttar Pradesh, North-East, and Kerala, Chattisgarh and Jharkhand. There

**Figure 8a. Spatial Changes in Temperature**  
(change in average temperature between the last decade and 1950-1980 period)



Source: Survey calculations from IMD data.<sup>6</sup> Red (blue) denotes rising (falling) temperature.

has actually been an increase in precipitation in Gujarat and Odisha and also Andhra Pradesh. What is interesting is that spatially temperature increases and rainfall declines seem to be weakly correlated.

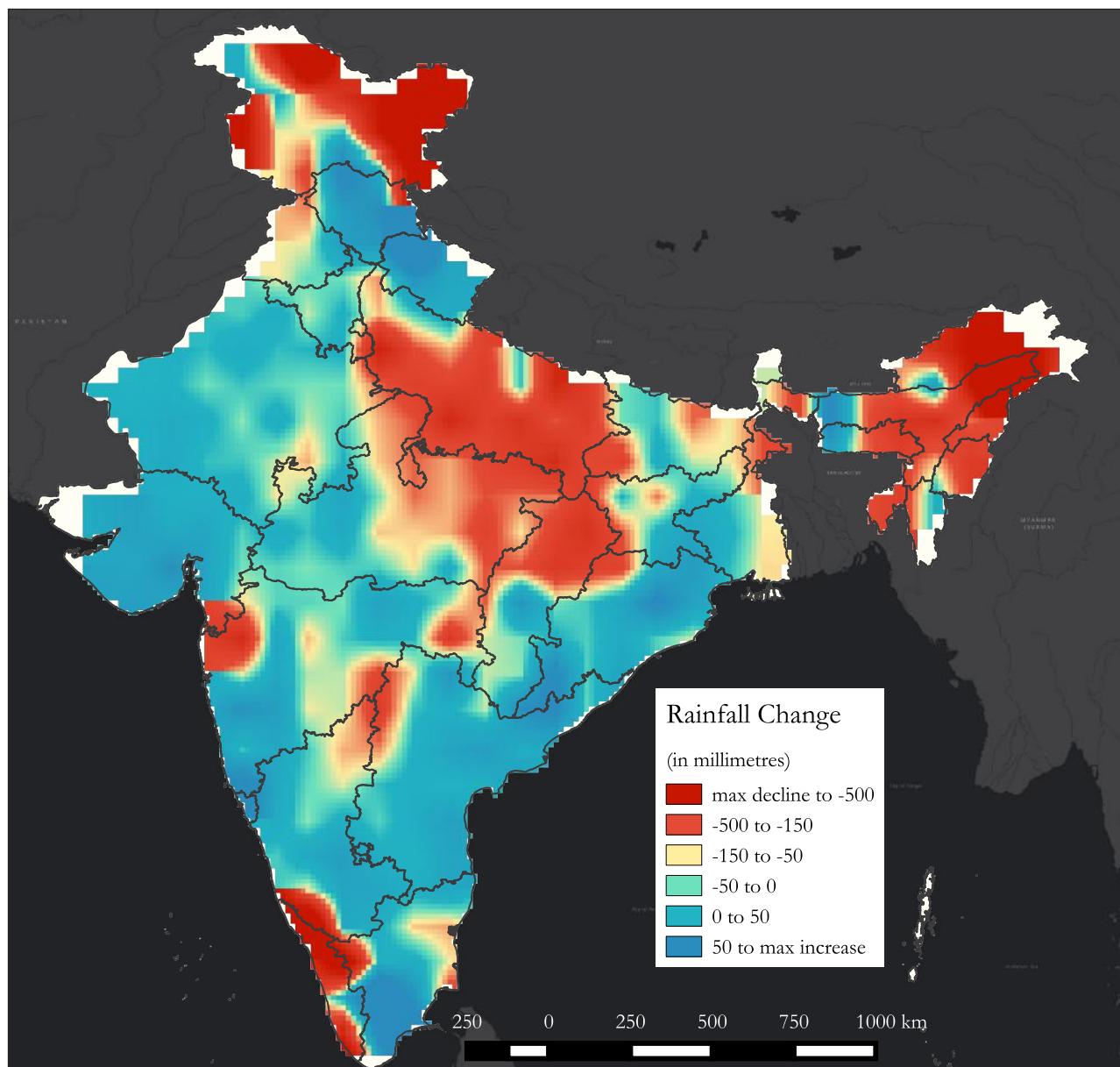
## IMPACT OF WEATHER ON AGRICULTURAL PRODUCTIVITY

6.23 Estimating the impact of temperature and climate on agriculture has become an increasing focus of economic research. Many of the

<sup>6</sup> Grid point weather data (1 degree grid for rainfall and 0.5 degree grid for temperature) was converted to raster and further disaggregated (using bilinear smoothening). Areas in white represent missing grids.



**Figure 8b. Spatial Changes in Rainfall**  
(change in average rainfall between the last decade and 1950-1980 period)



Source: Survey calculations from IMD data. Red (blue) denotes decreasing (increasing) rainfall.

concerns relate to developing countries because climate impacts seem to be either present only or disproportionately, in hotter and less rich parts of the world (IMF, 2017; Dell, Jones and Olken, 2012).

6.24 This chapter uses disaggregated data at the district level—on temperature, weather, and crop production, yields, and prices—to answer a number of important questions.<sup>7</sup> The analysis is conducted for the cropping seasons of kharif

<sup>7</sup> The impacts of CO<sub>2</sub> emissions and water transpiration have not been factored because of data limitations.



and rabi separately. A few main findings, supported by charts and tables, are highlighted here while the details of the methodology used and the regression analysis are discussed in the Annex.

*Stark heterogeneity: Extreme versus Moderate shocks; Irrigated versus Unirrigated Areas*

6.25 The present analysis yields two key findings. The first—and one with significant implications in the context of looming climate changes—is that the impact of temperature and rainfall is highly non-linear and felt almost only when temperature increases and rainfall shortfalls are extreme. The second is that these extreme shocks have highly divergent effects between unirrigated and irrigated areas (and consequently between crops that are dependent on rainfall), almost twice as high in the former compared with the latter.

6.26 These findings are first illustrated graphically. In Figures 9 and 10, the x-axis depicts deciles of temperature and rainfall, with the 5<sup>th</sup> decile being the middle category (normal temperature and rainfall) against which all comparisons are made. So, consider the left panel of Figure 9: if temperature was in the 10<sup>th</sup> decile of the temperature distribution (i.e. the

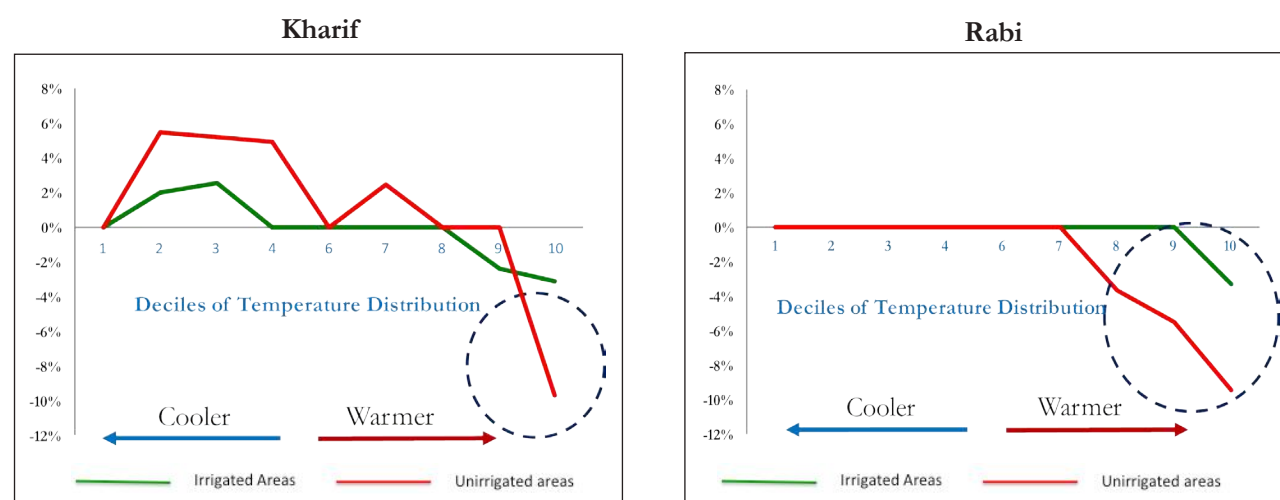
hottest possible), kharif yields in unirrigated areas (the red line) would be 10 percent lower than if temperature was normal, i.e. in the 5<sup>th</sup> decile.

6.27 Similarly, the left panel of Figure 10 shows that if rainfall were in the 1<sup>st</sup> decile (cases of drought and drought-like conditions), kharif yields would be 18 percent lower in unirrigated areas than if rainfall was normal (i.e. in the 5<sup>th</sup> decile).

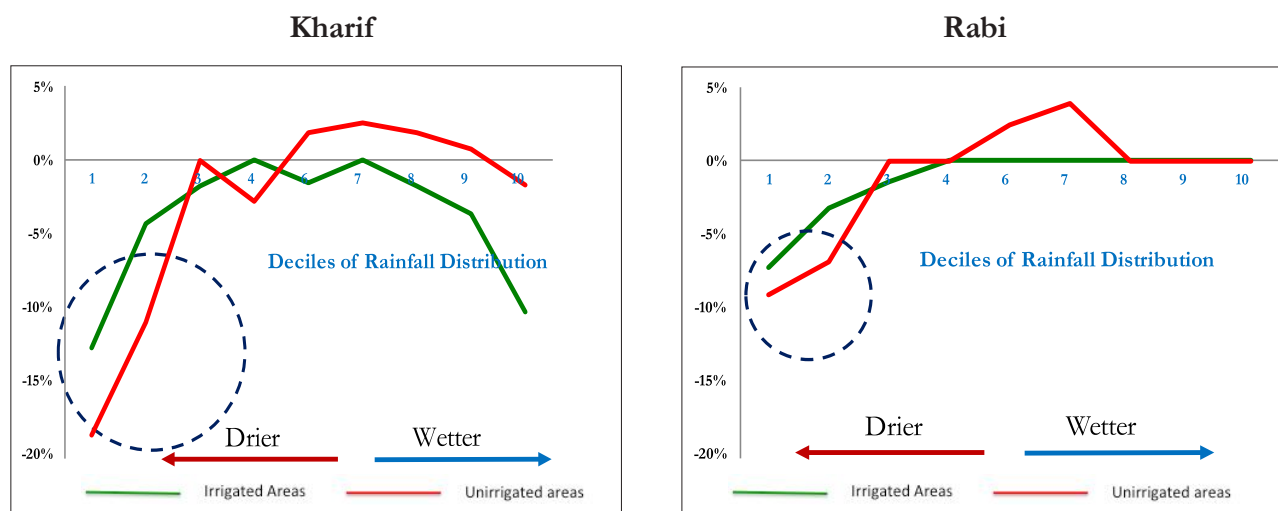
6.28 The first key finding that only high temperature shocks matter is reflected in the fact that the red line in the temperature graphs in Figure 9 (both panels) is very close to the x-axis for nearly the entire part of the distribution except toward the right corner. That is, under any condition of less-than-extreme heat, the impact is close to zero, and it is as if temperature is normal. Similarly, the fact that only extreme rainfall shortages matter is reflected in the fact that the red line in the rainfall graphs in Figure 10 is close to the x-axis except towards the left extreme.

6.29 A large literature focuses on the impact of a one-unit increase in temperature and a one unit decrease in rainfall on agricultural yields (e.g. Dell, Jones and Olken 2012). The analysis in this chapter suggests that in the Indian context, such marginal changes in weather have little or no

**Figure 9. Effects of Temperature on Yields**



Source: Survey calculations from IMD and ICRISAT data.

**Figure 10 : Effects of Rainfall on Yields**

Source: Survey calculations from IMD and ICRISAT data.

impact, and that the adverse effects of weather are concentrated in the extremes. These findings have important implications for the impact of climate change on agriculture (discussed later in this chapter), since most climate change models predict an increase in extreme weather events.

6.30 The second key finding that these shocks have a much greater effect on unirrigated areas compared to irrigated areas is reflected in the fact that in all panels of Figures 9 and 10, the green line (showing the impact on irrigated areas) tend to be closer to the x-axis (of zero impact) than the corresponding red lines.<sup>8</sup>

6.31 Table 1 provides a detailed quantitative break-up of the effects of temperature and rainfall shocks between irrigated and unirrigated areas in the kharif and rabi seasons. Using the insights gained from figures 9 and 10, the quantitative impact of extreme shocks on yields and revenues is estimated. Extreme temperature shocks, when a district is significantly hotter than usual (in the top 20 percentiles of the district-specific temperature distribution), results in a 4 percent

**Table 1. Impact of Weather Shocks on Agricultural Yields**

(percentage decline in response to temperature increase and rainfall decrease)

	Extreme Temperature Shocks	Extreme Rainfall Shocks
Average Kharif	4.0%	12.8%
Kharif, Irrigated	2.7%	6.2%
Kharif, Unirrigated	7.0%	14.7%
Average Rabi	4.7%	6.7%
Rabi, Irrigated	3.0%	4.1%
Rabi, Unirrigated	7.6%	8.6%

Source: Survey calculations.

decline in agricultural yields during the kharif season and a 4.7 percent decline in rabi yields.<sup>9</sup> Similarly, extreme rainfall shocks - when it rains significantly less than usual (bottom 20 percentiles of the district-specific rainfall distribution). The result is a 12.8 percent decline in kharif yields, and a smaller, but not insignificant decline of 6.7 percent in rabi yields.

<sup>8</sup> The one exception seems to be when there is an extreme excess of rainfall which seems to have a larger negative effect in irrigated areas than unirrigated areas (see the red and green lines in the right extreme of Figure 10, left panel).

<sup>9</sup> Based on ICRISAT data, the kharif crops considered in the analysis here are: Rice, Maize, Sorghum, Pulses, Cotton, Groundnut, Pearl Millet, Finger Millet and Soya. The rabi crops are: Wheat, Barley, Chickpea, Linseed, and Rape and Mustard Seed.

6.32 Unirrigated areas—defined as districts where less than 50 percent of cropped area is irrigated -- bear the brunt of the vagaries of weather. For example, an extreme temperature shock in unirrigated areas reduces yields by 7 percent for kharif and 7.6 percent for rabi. Similarly, the effects of extreme rainfall shocks are 14.7 percent and 8.6 percent (for kharif and rabi, respectively) in unirrigated areas, much larger than the effects these shocks have in irrigated districts.

6.33 Finally, the literature suggests that several factors over and above the *level* of rainfall matter for agricultural yields. In particular, it matters *when* it rains. The data put together for this chapter makes it possible to explicitly test for these alternative channels. The results indicate that even after controlling for the level of rainfall, the number of dry days (defined as days during the monsoon with rainfall less than 0.1 millimetres) exerts a significant negative influence on productivity: holding the amount of rainfall constant, each additional dry day during the monsoon reduces yields by 0.2 percent on average

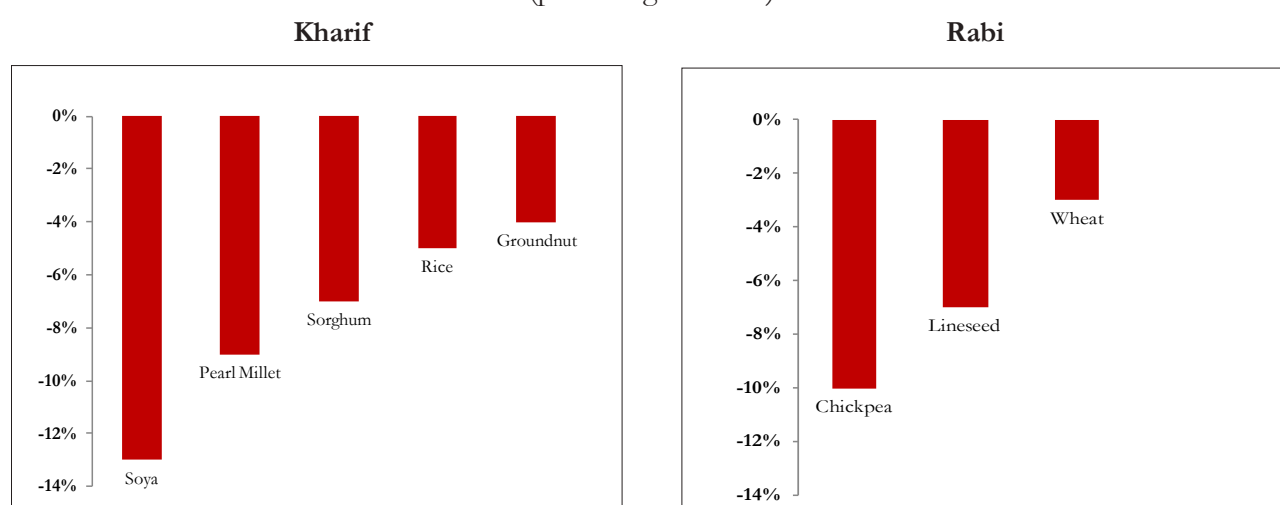
and by 0.3 percent in unirrigated areas.

### Crop impacts

6.34 A next finding relates to the varied susceptibility of different crops to temperature and precipitation. Figures 12 and 13 plot the effects of extreme temperature and rainfall shocks on the yields of individual crops<sup>10</sup>. The clear pattern that emerges is that crops grown in rainfed areas—pulses in both kharif and rabi—are vulnerable to weather shocks while the cereals—both rice and wheat—are relatively more immune.

6.35 Have the impacts changed over time? To answer this question, the analysis was redone by decade. In the last decade for which data is available (2004-2014), the impact of rainfall shocks in yields remains unchanged, but the effect of temperature shock increases threefold (relative to the first decade). However, since there is no secular trend in this impact, it cannot be ascertained whether the findings for the last decade are a one-off, or the start of a new long

**Figure 11. Effects of Extreme Temperature Increase on Crop Yields**  
(percentage decline)



Source: Survey calculations from IMD and ICRISAT data.

<sup>10</sup> These figures plot the coefficients on extreme temperature and extreme rainfall on individual crop level regressions. See Annex for a detailed description of the regression.

**Figure 12. Effects of Extreme Rainfall Decrease on Crop Yields**  
(percentage decline)



Source: Survey calculations from IMD and ICRISAT data.

run trend with dramatically adverse consequences for Indian agriculture.<sup>11</sup>

### IMPACT ON FARM REVENUE<sup>12</sup>

6.36 What do these numbers imply in terms of losses to farmers in the short and long run? Table 2 shows the impact of extreme shocks on farmer incomes, measured by value of production.<sup>13</sup> Extreme temperature shocks reduce farmer incomes by 4.3 percent and 4.1 percent during kharif and rabi respectively, whereas extreme rainfall shocks reduce incomes by 13.7 percent and 5.5 percent. Once again, these average effects mask significant heterogeneity, with the largest adverse effects of weather shocks being felt in unirrigated areas. Ex-ante it is not clear which direction farm revenues should move in – on the one hand, these shocks reduce yields, but on the other, the lower supply should increase local prices. The results here clearly indicate that the “supply shock” dominates – reductions in yields lead to reduced revenues.

**Table 2. Impact of Weather Shocks on Farm Revenue**

	Extreme Temperature Shocks	Extreme Rainfall Shocks
Average Kharif	4.3%	13.7%
Kharif, , Irrigated	7.0%	7.0%
Kharif, Unirrigated	5.1%	14.3%
Average Rabi	4.1%	5.5%
Rabi, Irrigated	3.2%	4.0%
Rabi, Unirrigated	5.9%	6.6%

Source: Survey calculations from IMD & ICRISAT data.

6.37 Another way to present the result (not shown in Table 1) is as follows: In a year where temperatures are 1 degree Celsius higher farmer incomes would fall by 6.2 percent during the kharif season and 6 percent during rabi in unirrigated districts. Similarly, in a year when rainfall levels were 100 millimetres less than average, farmer incomes would fall by 15 percent during kharif and by 7 percent during the rabi season.

<sup>11</sup>The impact of extreme temperature shocks is also high in the first decade of our sample.

<sup>12</sup>Value of production is measured as the product of yields per hectare and prices. ICRISAT data do not have data on farm profits (revenues minus costs).

<sup>13</sup>When temperature is in the top 20 percentiles of the district-specific temperature distribution.

6.38 How do these estimates compare with those in the literature? Existing studies for India typically analyse the impact of weather shocks on the productivity of individual crops. For example, Swaminathan et. al. (2010) show that a 1 degree Celsius increase in temperature reduces wheat production by 4 to 5 percent, similar to the effects found here. Turning attention to international studies, Kurukulasuriya & Mendelsohn, (2008) find similar effects for 11 African countries – a one degree increase in temperature reduces revenues by 6 percent on average. A study by the IMF, (2017) finds that for emerging market economies a 1 degree Celsius increase in temperature would reduce agricultural growth by 1.7 percent, and a 100 millimetres reduction in rain would reduce growth by 0.35 percent. Since these are results on growth, they are not strictly comparable with the calculations in this chapter.

6.39 What do the numbers from Table 2 imply for the impact of climate change on agriculture performance in the long run? Climate change models, such as the ones developed by the Intergovernmental Panel on Climate Change (IPCC), predict that temperatures in India are likely to rise by 3-4 degree Celsius by the end of the 21<sup>st</sup> century (Pathak, Aggarwal and Singh, 2012). These predictions combined with our regression estimates imply that in the absence of any adaptation by farmers and any changes in policy (such as irrigation), farm incomes will be lower by around 12 percent on an average in the coming years. Unirrigated areas will be the most severely affected, with potential losses amounting to 18 percent of annual revenue.

6.40 Climate change models do not have unambiguous predictions on precipitation patterns, Rajeevan (2013). But if the observed decline in precipitation over the last three decades (of over 86 millimetres) is applied to the estimates, it is found that in unirrigated areas, farm incomes will decline by 12 percent for kharif crops, and

5.4 percent for rabi crops.

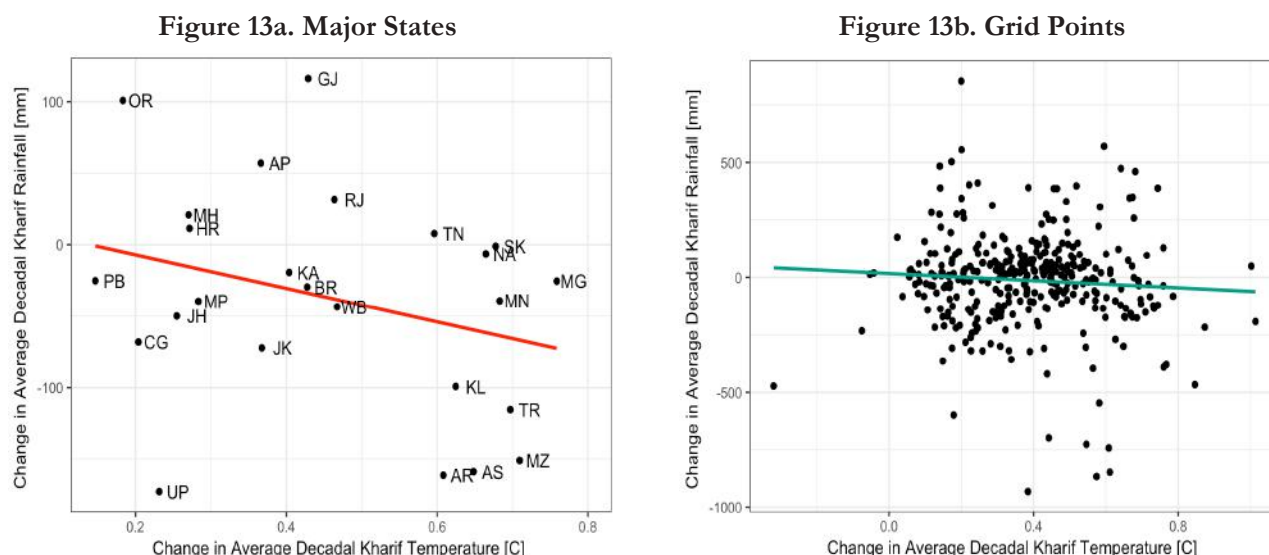
6.41 Finally, models of climate change also predict an increase in the variability of rainfall in the long-run, with a simultaneous increase in both the number of dry-days as well as days of very high rainfall. If the observed increase in the number of dry days over the past 4 decades are applied to the short-run estimates, this channel alone would imply a decrease in farm incomes by 1.2 percent.

6.42 Overall the analysis here suggests at least three main channels through which climate change would impact farm incomes – an increase in average temperatures, a decline in average rainfall and an increase in the number of dry-days. Of course, all three are likely to be correlated, and therefore the total impact of climate change will not be the simple sum of these individual effects.

6.43 To examine this potential correlation, Figure 13 plots differences in average temperature against differences in average rainfall for kharif, with the differences measured as the level in the most recent ten years (2005-2015) relative to first decade of the dataset (1950-80). The relationship is weakly negative both at state and weather station levels; at the state level the correlation is -0.30. What this suggests is that at least historically weather shocks have not offset each other, they may be mildly re-inforcing. If this holds true going forward, the three effects that are identified in this chapter could be mildly additive.

6.44 Taking these correlations into account, farmer income losses from climate change could be between 15 percent and 18 percent on average, rising to anywhere between 20 percent and 25 percent in unirrigated areas. These are stark findings, given the already low levels of incomes in agriculture in India. Even more worryingly, it is possible the estimates arrived at in this chapter might be lower than the true effects of climate change, given the potentially non-linear impact of future increases in temperature. The results in this chapter stand in contrast with similar studies both



**Figure 13. Difference in Average Temperatures and Rainfall for kharif**

Source: Survey calculations from IMD data.

Note: Excludes two potential outliers, Himacahal Pradesh and Uttarakhand.

globally and in India. For example, Deschenes and Greenstone (2007), find mild and even positive effects of climate change on agricultural profits in the United States. Kumar et al (2013) find that rice yields in unirrigated areas will only marginally be affected in the long run. Their estimates are based on climate change models that predict an increase in the average amount of rainfall.

6.45 At the same time, it is possible that these estimates overstate the true impact of climate change. The estimates in this chapter are derived using short-run variations in weather, and farmers may not be able to adapt to such fluctuations in the short-run. In the long-run, however, they may be able to change technologies or alter the crops they grow in response to sustained increases in temperature and changes in precipitation. Further it is possible that irrigation networks might expand, mitigating to some extent the adverse impacts of climate change.

## CONCLUSIONS AND POLICY IMPLICATIONS<sup>14</sup>

6.46 Based on newly compiled weather data and a methodology that has not been applied to Indian data so far, this chapter estimated the impact of temperature and precipitation on agriculture. The main findings are as follows:

- A key finding—and one with significant implications as climate change looms—is that the impact of temperature and rainfall is felt only in the extreme; that is, when temperatures are much higher, rainfall significantly lower, and the number of “dry days” greater, than normal.
- A second key finding is that these impacts are significantly more adverse in unirrigated areas (and hence rainfed crops such as pulses) compared to irrigated areas (and hence crops such as cereals).
- Applying IPCC-predicted temperatures and projecting India’s recent trends in precipitation, and assuming no policy responses, give rise to estimates for farm income losses of 15 percent to 18 percent

<sup>14</sup> In addition to the points noted below, there is a need to improve long term weather and crop forecasting and making them accessible to farmers and other relevant actors. For a recent example see TERI (2017).



on average, rising to 20 percent-25 percent for unirrigated areas. At current levels of farm income, that translates into more than Rs. 3,600 per year for the median farm household.

6.47 The policy implications are stark. India needs to spread irrigation – and do so against a backdrop of rising water scarcity and depleting groundwater resources. Figure 14 shows the increase in irrigation across time and space in India. In the 1960s, less than 20 percent of agriculture was irrigated; today this number is in the mid-40s. The Indo-Gangetic plain, and parts of Gujarat and Madhya Pradesh are well irrigated. But parts of Karnataka, Maharashtra, Madhya Pradesh, Rajasthan, Chattisgarh and Jharkhand are still extremely vulnerable to climate change on account of not being well irrigated.

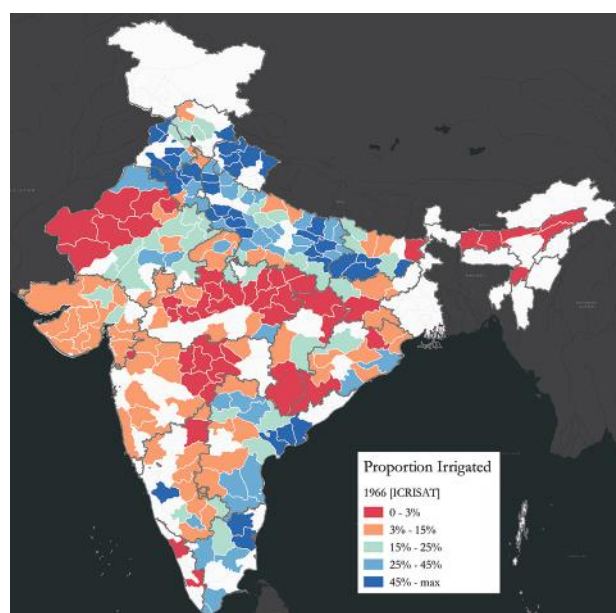
6.48 The challenge is that the spread of irrigation will have to occur against a backdrop of extreme

groundwater depletion, especially in North India. Figure 15a (Aeschbach, 2012) shows that India pumps more than twice as much groundwater as China or United States (Shah, 2008). Indeed global depletion is most alarming in North India (indicated by the “skyscrapers” in Figure 15a). Further analysis of groundwater stations reveals a 13 percent decline in the water table over the past 30 years, illustrated in Figure 15b.

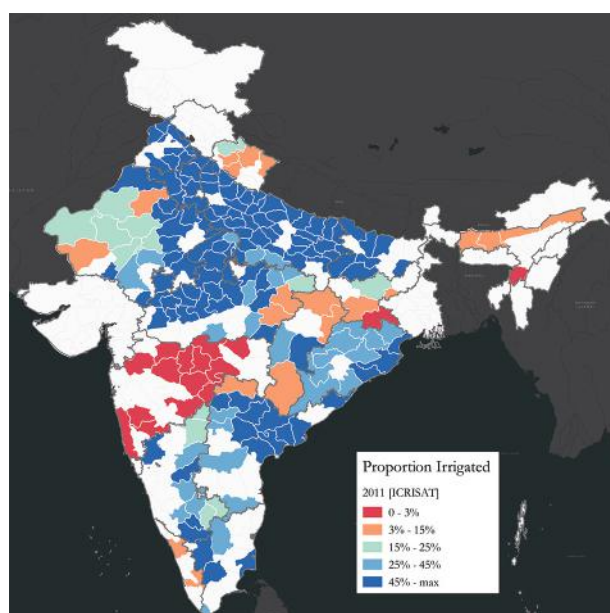
6.49 Fully irrigating Indian agriculture, that too against the backdrop of water scarcity and limited efficiency in existing irrigation schemes, will be a defining challenge for the future. Technologies of drip irrigation, sprinklers, and water management—captured in the “more crop for every drop” campaign—may well hold the key to future Indian agriculture (Shah Committee Report, 2016; Gulati, 2005) and hence should be accorded greater priority in resource allocation. And, of course, the power subsidy needs to be replaced by

**Figure 14. Spread of Irrigation over the Years**

**Figure 14a. Irrigated Proportion (1966)**



**Figure 14b. Irrigated Proportion (2011)**

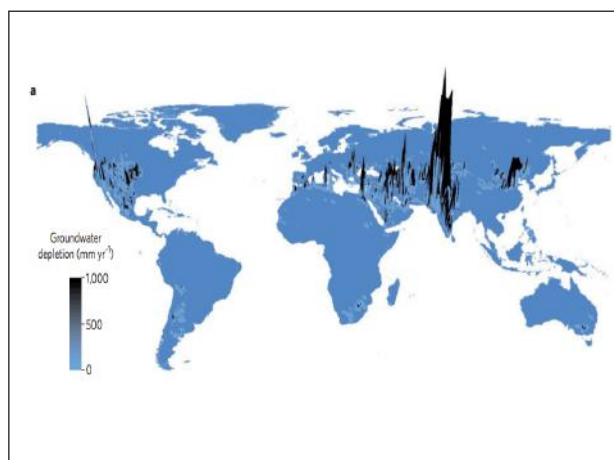


Source: Survey calculations from ICRISAT data.<sup>15</sup>

<sup>15</sup> Areas in white are missing in the ICRISAT database

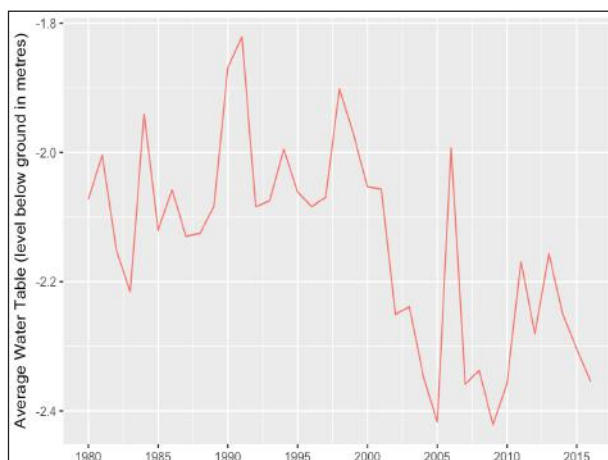
## Figure 15. Groundwater Depletion

**Figure 15a. World Depletion in Groundwater**



Source: Aeschbach-Hertig, et al, 2012.

**Figure 15b. Groundwater Depletion in India**



Source: Survey calculations from Ministry of Water Resources data.

direct benefit transfers so that power use can be fully costed and water conservation furthered.

6.50 Another conclusion is the need to embrace agricultural science and technology with renewed ardor. Swaminathan (2010) urged that anticipatory research be undertaken to pre-empt the adverse impact of a rise in mean temperature. Agricultural research will be vital in increasing yields but also in increasing reliance to all the pathologies that climate change threatens to bring in its wake: extreme heat and precipitation, pests, and crop disease. The analysis shows that research will be especially important for crops such as pulses and soyabean that are most vulnerable to weather and climate.

6.51 Of course, climate change will increase farmer uncertainty, necessitating effective insurance. Building on the current crop insurance program (Pradhan Mantri Fasal Bima Yojana), weather-based models and technology (drones for example) need to be used to determine losses and compensate farmers within weeks (Kenya does it in a few days).

6.52 While the findings in this chapter are

stark, they re-inforce a larger policy message on agriculture, elaborated in Subramanian (2017). In thinking about agricultural policy reforms in India, it is vital to make a clear distinction between two agricultures in India. There is an agriculture—the well-irrigated, input-addled, and price-and-procurement-supported cereals grown in Northern India—where the challenge is for policy to change the form of the very generous support from prices and subsidies to less damaging support in the form of direct benefit transfers.

6.53 Then there is another agriculture (broadly, non-cereals in central, western and southern India) where the problems are very different: inadequate irrigation, continued rain dependence, ineffective procurement, and insufficient investments in research and technology (non-cereals such as pulses, soyabeans, and cotton), high market barriers and weak post-harvest infrastructure (fruits and vegetables), and challenging non-economic policy (livestock).

6.54 It is easy to say what needs to be done. How this will happen given that agriculture is a state subject is an open political economy question.

Clearly, the Hirschmanian bottom-up forces of “voice” and “exit” along with benevolent-and-strategic top-down planning and reforms will all have to play a key part. The cooperative federalism “technology” of the GST Council that brings together the Center and States could be promisingly deployed to further agricultural reforms and durably raise farmers’ incomes.

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# Gender and Son Meta-Preference: Is Development Itself an Antidote?

Nimirndha nan nadai naer konda paarvaiyum  
Nilathil yaarkkum anjaatha nerigalum  
Thimirndha gnana cherukkum iruppadhaal  
Semmai maadhar thirambuvadhu illaiyaam

*Her head held high, and looking everyone in the eye,  
Unafraid of anyone because of innate integrity,  
Possessing assuredness born of courage of conviction,  
The Modern Woman never feels inferior to any*

**Subramania Bharati, “Pudumai Pen”**

अबला जीवन तेरी हाय यही कहानी !  
आंचल में है दूध और आंखों में पानी

*Woman, this is your life story  
Mothering your role, sadness your destiny*

**Maithlisharan Gupta**

**#MeToo**

*Over the last 10-15 years, India's performance improved on 14 out of 17 indicators of women's agency, attitudes, and outcomes. On seven of them, the improvement has been such that India's situation is comparable to that of a cohort of countries after accounting for levels of development. Encouragingly, gender outcomes exhibit a convergence pattern, improving with wealth to a greater extent in India than in similar countries so that even where it is lagging it can expect to catch up over time. However, on several other indicators, notably employment, use of reversible contraception, and son preference, India has some distance to traverse because development has not proved to be an antidote. Within India, there is significant heterogeneity, with the North-Eastern states (a model for the rest of the country) consistently out-performing others and not because they are richer; hinterland states are lagging behind but the surprise is that some southern states do less well than their development levels would suggest. The challenge of gender is long-standing, probably going back millennia, so all stakeholders are collectively responsible for its resolution. India must confront the societal preference, even meta-preference for a son, which appears inoculated to development. The skewed sex ratio in favor of males led to the identification of “missing” women. But there may be a meta-preference manifesting itself in fertility stopping rules contingent on the sex of the last child, which notionally creates “unwanted” girls, estimated at about 21 million. Consigning these odious categories to history soon should be society's objective. The government's Beti Bachao, Beti Padhao and Sukanya Samridhi Yojana schemes, and mandatory maternity leave rules are all steps in the right direction.*

## INTRODUCTION

7.1 Recognizing the long-run objective of elevating the role and status of women while also responding to prominent incidents of violence

against women, the government in January 2015 launched “Beti Bachao, Beti Padhao”. Translated roughly as “Save the Daughter, Educate the



Daughter”, it targeted the worsening Child Sex Ratio (CSR) in India through a mass campaign aimed at creating awareness and changing social norms. As the advanced world grapples with the fallout from the endemic harassment of women, and as the evidence grows about the intrinsic and instrumental value in raising the role and status of women in society (Elbhorg-Woytek et al., 2013; Jayachandran, 2015), it is time to ask: how is India faring and how much progress has been made? Is India the land of the empowered woman imagined by Subramania Bharati or the helpless, oppressed woman described by Maithlisharan Gupta?

7.2 The intrinsic values of gender equality are uncontested. But now there is growing evidence that there can also be significant gains in economic growth if women acquire greater personal agency, assume political power and attain public status, and participate equally in the labor force (Dollar and Gatti, 1999; Lagarde, 2016; Loko and Diouf, 2009). In developing countries, working women also invest more in the schooling of their children (Aguirre et al. 2012; Miller 2008). Recently at Davos, IMF chief Christian Lagarde, quoting IMF research, said that women’s participation in the workforce to the level of men can boost the Indian economy by 27 percent.

7.3 Another reason to take stock is to correct a possibly pervasive methodological problem afflicting assessments relating to gender and other social issues. The problem is one of conflating “development time” and “chronological time.” Gender indexes such as the Global Gender Gap Index of the World Economic Forum (WEF) or the Gender Inequality Index (GII) of the United Nations Development Program (UNDP) rank countries in chronological time.

7.4 But such simple cross-sectional comparisons are prone to a potential flaw. The role of women evolves with development. Scandinavia in the early 1900s was demonstrably

less well-disposed to women than Scandinavia today, and possibly less well-disposed than countries today that have attained a level of development not dissimilar to Scandinavia in the early 1900s (Borchorst, 2008).

7.5 Thus, unless this determinant of gender outcomes is accounted for, cross-sectional comparisons—as in the two gender indices noted—could be misleading: a case of passing judgment in “chronological time” oblivious of “development time.” Invoking “development time” is not to dismiss “chronological time” and not a ruse to succumb to the “soft bigotry of low expectations.” Rather, policy-making should be informed by both perspectives. Urgency of action should spring from assessments in chronological time but that must be leavened by the understanding that comes from assessments in development time.

7.6 This distinction is crucial for another reason: if a country’s performance is atypical in development time, the policy strategy will have to be far different from that if a country’s performance is typical. In the former, bleaker case, development itself cannot be counted upon to improve the role and status of women. The burden on government, civil society, and other stakeholders will correspondingly be greater.

7.7 The first part of this chapter is an attempt at assessments after taking account of the role that development itself plays in changing gender outcomes. Specifically, two kinds of assessments are made:

- Level: How did India fare on a set of gender outcomes relative to a set of developing economies in the late 1990s/early 2000s and in the most recent period (2015-16), controlling for the level of development?
- Change: Is there a kind of convergence effect? That is, are gender indicators more responsive

to improvements in household wealth in India than in other countries?

7.8 Gender equality is an inherently multi-dimensional issue. But, embracing multi-dimensionality indiscriminately can impede understanding. Accordingly, assessments in this chapter are made on three specific dimensions of gender:

- **Agency** relate to women's ability to make decisions on reproduction, spending on themselves, spending on their households, and their own mobility and health.
- **Attitudes** relate to attitudes about violence against women/wives, and the ideal number of daughters preferred relative to the ideal number of sons.
- **Outcomes** relate to son preference (measured by sex ratio of last child), female employment, choice of contraception, education levels, age at marriage, age at first childbirth, and physical or sexual violence experienced by women.

7.9 The dimensions that are focused on and the assessments that are made are neither comprehensive nor necessarily representative, but they attempt to take into account the following: what the literature has focused on (Jayachandran, 2015); other important features specific to India that might have been overlooked; and more practical considerations of data availability, so that India can be compared with a large enough sample of countries.

7.10 The analysis in this chapter is based on the Demographic and Health Survey (DHS) datasets from 1980 to 2016. The survey has datasets at household level; both women and men are asked detailed questions on gender-related attitudes,

agency and outcomes, among other issues. The India National Family Health Survey (NFHS) 2015-16, which feeds into the DHS survey, has been combined with international DHS datasets. Previous DHS/NFHS datasets for India are available for the following periods: 1992-93, 1998-99, and 2005-06.

7.11 Our main findings are as follows<sup>1</sup>:

- On 14 out of 17 indicators relating to agency, attitude, and outcomes, India's score has improved over time. On seven of them, the improvement is such that in the most recent period India's performance is better than or at par with that of other countries, accounting for the level of development.
- The progress is most notable in the agency women have in decision-making regarding, household purchases and visiting family and relatives. There has been a decline in the experience of physical and sexual violence. Education levels of women have improved dramatically but incommensurate with development.
- On 10 of 17 indicators, India has some distance to traverse to catch up with its cohort of countries. For example, women's employment has declined over chronological time, and to a much greater extent, in development time. Another such area is in the use of female contraception: nearly 47 percent of women do not use any contraception, and of those who do, less than a third use female-controlled reversible contraception. These outcomes can be disempowering, especially if they are the consequence of restrictions on reproductive agency. Whether women "choose" or acquiesce in their limited choices

<sup>1</sup> The "level" analysis (and the international comparison) is done after aggregating the variables of interest at country level, and at the level of states for the within-India comparison. To facilitate comparisons across time, states are defined by their 1995 borders. For the "change" analysis, household level data from NFHS 2015-16 has been used.

are important and deeper questions but beyond the scope of this chapter.

- Encouragingly, there is evidence of convergence. Analysis at household level indicates that on all but 2 measures, gender indicators improve as wealth increases. More importantly, from a development time perspective, nearly all gender dimensions respond to wealth to a greater extent in India than in other countries. This implies that even where India is lagging, it can expect to catch up with other countries as the wealth of Indian households increases.
- While there is considerable variation within the Indian states and across dimensions, the broad pattern is one of the North-Eastern states doing substantially better than the hinterland states even in development time; hinterland states are lagging, some associated with their level of development and some even beyond that; surprisingly, some southern states such as Andhra Pradesh and Tamil Nadu fare worse than expected given their level of development.
- Perhaps the area where Indian society—and this goes beyond governments to civil society, communities, and households—needs to reflect on the most is what might be called “son preference” where development is not proving to be an antidote. Son preference giving rise to sex selective abortion and differential survival has led to skewed sex ratios at birth and beyond, leading to estimates of 63 million “missing” women.
- But there is another phenomenon of *son meta-preference* which involves parents adopting fertility “stopping rules” – having children until the desired number of sons are born. This meta-preference leads naturally to the

notional category of “unwanted” girls which is estimated at over 21 million. In some sense, once born, the lives of women are improving but society still appears to want fewer of them to be born.

- Collective self-reflection by Indian society on son preference and son meta-preference is necessary. Initiatives such as *Beti Bachao Beti Padhao* and *Sukanya Samridhi Yojana* and the mandatory maternity leave rules inaugurated by this government are important steps focused on addressing the underlying challenge.

## INDIA AND OTHER COUNTRIES

### *Level: India's Performance*

7.12 Table 1 summarizes the main findings. For each gender dimension (corresponding to questions in the DHS and NFHS 4), columns 1 and 2 report the average values for India for two time periods (2005-06 and 2015-16) and column 3 reports the change (in percentage points) for India between them. Column 4 assesses whether India is an outlier relative to other countries given its level of development (in 2015).

7.13 The positive news here is that on 12 out of 17 variables, average levels in India have improved over time. For example, 62.3 percent of women in India were involved in decisions about their own health in 2005-06, which increased to 74.5 percent in 2015-16. Similarly, the percentage of women who did not experience physical or emotional violence increased from 63 percent to 71 percent. The median age at first childbirth increased by 1.3 years over ten years.

7.14 On 7 out of these 12 cases, India performs better than, or at par with the cohort of other developing countries even after accounting for levels of development.

**Table 1. Summary of Results**

			(1)	(2)	(3)	(4)
			India 2005-06	India 2015-16	Change (2)-(1)	Is India an Outlier for its level of wealth <sup>§</sup> in 2015?
Gender Dimension	Specific Issue <sup>#</sup> (Women's Responses)		(%)	(%)		
1	Agency	Involved in decisions about their own health	62.3	74.5	12.2	<b>8.2</b>
2	Agency	Involved in decisions about large household purchases	52.9	73.4	20.4	<b>9.6</b>
3	Agency	Involved in decisions about visits to family and relatives	60.5	74.6	14.1	<b>4.1</b>
4	Agency	Involved in decisions about their own earnings	82.1	82.1	-0.1	<b>-7.4</b>
5	Agency	Involved in decisions about contraception	93.3	91.6	-1.7	0.1
6	Attitude	Prefer more or equal number of daughters over sons	74.5	78.7	4.3	<b>-4.4</b>
7	Attitude	Wife beating is not acceptable	50.4	54.0	3.5	<b>-2.7</b>
8	Outcome	Using reversible contraception, if using any method of contraception	33.8	32.8	-1.0	<b>-51.6</b>
9	Outcome	Employed <sup>##</sup>	36.3	24.0	-12.3	<b>-26.0</b>
10	Outcome	Employed in non-manual sector <sup>##</sup>	18.9	28.2	9.3	<b>-19.8</b>
11	Outcome	Earning more than or equal to husband	21.2	42.8	21.6	<b>-7.4</b>
12	Outcome	Educated <sup>##</sup>	59.4	72.5	13.1	<b>-6.8</b>
13	Outcome	Not experiencing physical or emotional violence	62.6	70.5	7.8	0.3
14	Outcome	Not experiencing sexual violence	90.3	93.6	3.3	<b>1.7</b>
15	Outcome	Median age at first child birth*	19.3	20.6	1.3	<b>0.4</b>
16	Outcome	Median age at first marriage*	17.3	18.6	1.3	<b>-0.4</b>
17	Outcome	Sex ratio of last birth <sup>2</sup> (females per hundred births)	39.4	39.0	-0.4	<b>-9.5</b>

\* Age is in years and is for year 1998-99.

# All questions/responses are reported so that positive numbers denote greater female empowerment.

## These dimensions are calculated for the set of all women between 15-49. All other dimensions are calculated for married women between the ages of 15 and 49. In column 4, the numbers represent the extent to which India is an outlier, positive or negative. They derive from the regression equation estimated at household level in Annex I. All numbers represent percentage points difference from the average estimated relationship, except for the numbers in rows 15 and 16 where they refer to number of years.

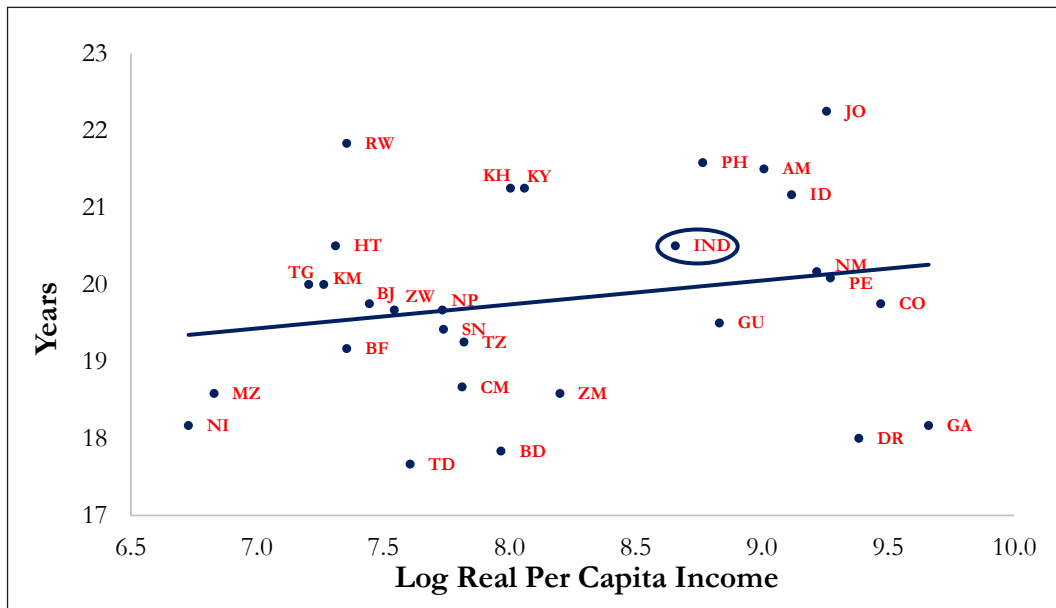
§ Numbers in bold are statistically significant.

Source: Survey calculations based on DHS and NFHS data.

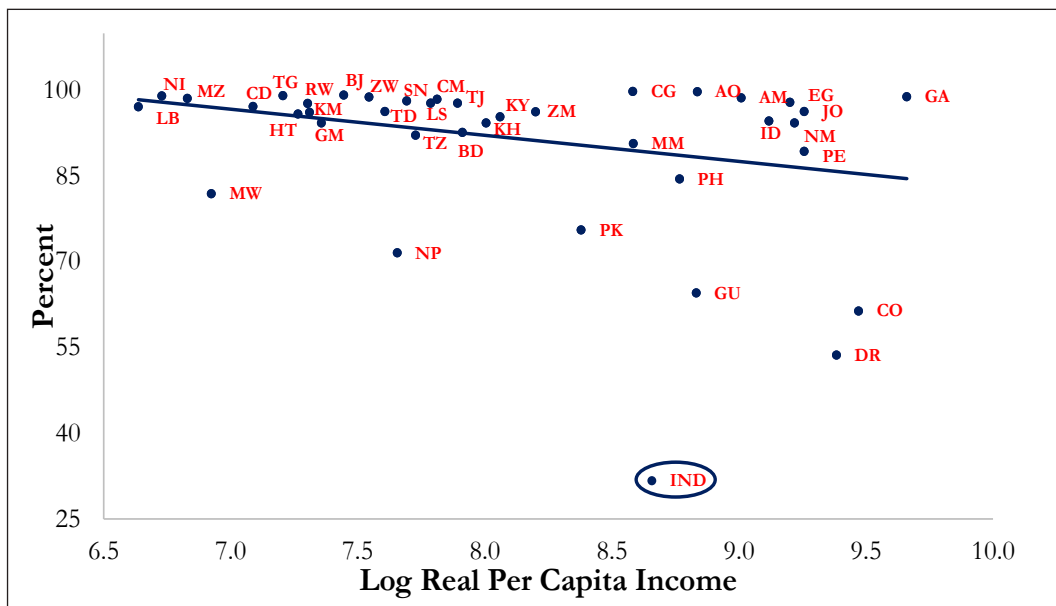
7.15 Figure 1 provides visual illustration of India's (represented by "IND") progress on one such dimension – age of female at first childbirth, which improves by 1.3 years (6.9 percent) between 2005-06 and 2015-16. The median age of first

childbirth for married women in these countries is plotted against log real per capita income. Given their level of wealth, Indian women perform better on age at first childbirth by 0.4 years.

<sup>2</sup> To construct this indicator, besides births by sex, it is also necessary to know if the most recent birth is likely to be the last. To overcome this problem, the sample is restricted to only those women who either have been sterilized or have completed biological fertility cycle (older than 40 years).

**Figure 1. Age of Female at First Childbirth in 2011-16**

Source: CSO & Survey calculations based on DHS and NFHS data.

**Figure 2. % of Women not Using Sterilization as a Contraception Method (2011-2016)**

Source: CSO & Survey calculations based on DHS and NFHS data.

7.16 India has some distance to traverse on several dimensions (10 out of 17) to be on par with other countries in development time. One such dimension is the use of reversible contraception methods. For their level of wealth, the use of reversible contraception methods among Indian women is 51.6 percentage points lower than it

should be.

7.17 Figure 2 explores this finding in greater detail. It plots the relationship between percentage of women not using sterilization as a contraception method (among women using any contraception method at all) and log real per capita income for the international sample. India is well below the



line of best fit. The number of married women in India who do not use any contraception method is high (46.5 percent). Among women using any contraception method at all, the percentage of Indian women using female-controlled reversible contraception is unusually low (32.8 percent).

7.18 These findings warrant attention: since not many women use methods of reversible contraception, they have little control over when they *start* having children, but only seem to have control over when they *stop* having children. This could affect other milestones early on in a woman's life; for example, women may not get the same access to employment that men do. Of course, these are important questions relating to how much true agency women have—whether they choose or acquiesce in their limited choices—but these are deeper questions beyond the scope of this chapter.

7.19 Another well documented finding relates to the percentage of women who work (row 9, Table 1), which has indeed declined over time (from 36 percent of women being employed in 2005-06 to 24 percent of women being employed in 2015-16). There is a long and contested literature on whether this decline is a cause for concern or will improve naturally with time and development. There is the more general phenomenon, documented by Goldin et. al. (1995), of a U-shaped behavior of female labor force participation with respect to development. India is on the downward part of the “U” but even more so than comparable countries.

7.20 On the supply side, increased incomes of men allows Indian women to withdraw from the labor force, thereby avoiding the stigma of working; higher education levels of women also allow them to pursue leisure and other non-work

activities all of which reduce female labor force participation. (Bhalla and Kaur, 2011; Kapsos, 2014; Klasen, 2015). On the demand side, the structural transformation of Indian agriculture due to farm mechanization results in a lower demand for female agricultural laborers (Chatterjee et al., 2015; Mehrotra et al., 2017). Evidence also points to insufficient availability of the types of jobs that women say they would like to do—regular, part-time jobs which provide steady income and allow women to reconcile household duties with work—and types of sectors that draw in female workers. (Kannan and Raveendran, 2012; Chand and Srivastava, 2014) This, interacted with safety concerns and social norms about household work and caring for children and elders, militates against women's mobility and participation in paid work (Pande et al., 2016; Prillaman et al., 2017).

7.21 Finally, the sex ratio of last birth is biased against females and is lower by 9.5 percentage points in 2015-16 in comparison to other countries. And this has remained stagnant in the last decade. The sections on son preference and son meta-preference discuss the implications of this finding in greater detail.

### *Is there a convergence effect?*

7.22 The next assessment undertaken is at the household level to see if gender related indicators improve with wealth both in India as well as other countries.<sup>3</sup> Table 2 summarizes the results (Annex I provides the details of the regression specification used for this analysis).

7.23 Column 1 shows the impact on the relevant gender indicator of one standard deviation increase in wealth in the typical country in the sample. For example, row 1 indicates that if wealth increases by one standard deviation in the average country, the number of women involved in decision making on their health increases by 5.5

<sup>3</sup> The wealth of a household comes from the wealth factor score provided by DHS/NFHS 4. This score is based on the number and type of assets owned. This wealth factor score is normalized for the size of the household by dividing it by the household size, giving a measure of average wealth at the individual level.

<sup>4</sup> One caveat is that the unit of wealth measured here is a relative not an absolute one so it may not represent comparable increases in wealth across countries.



Table 2. Responsiveness of Gender Dimensions to Wealth— India and other Countries\*

			(1) Effect of wealth <sup>§</sup> for other countries (%)	(2) Additional effect of wealth <sup>§</sup> in India (%)	(3) = (1) + (2) Total effect of wealth <sup>§</sup> in India (%)
Gender Dimension	Specific Issue (Women's Response)				
1	Agency	Involved in decisions about their own health	5.5	4.7	10.2
2	Agency	Involved in decisions about large household purchases	6.4	4.4	10.7
3	Agency	Involved in decisions about visits to family and relatives	5.5	8.2	13.6
4	Agency	Involved in decisions about their own earnings	3	7.2	10.2
5	Agency	Involved in decisions about contraception	0.5	6.6	7.1
6	Attitude	Prefer more or equal number of daughters over sons	1.9	25.3	27.2
7	Attitude	Wife beating is not acceptable	11.5	12.9	24.4
8	Outcome	Using reversible contraception, if using any method of contraception	-1.5	19.2	17.7
9	Outcome	Employed <sup>#</sup>	3.2	-19.9	-16.7
10	Outcome	Employed in non-manual sector <sup>#</sup>	20.6	52.4	72.9
11	Outcome	Earning more than or equal to husband	3	7.2	10.2
12	Outcome	Educated <sup>d</sup>	10.6	59.9	70.6
13	Outcome	Not experiencing physical or emotional violence	2.1	31.3	33.5
14	Outcome	Not experiencing sexual violence	1.2	8.2	9.4
15	Outcome	Median age at first child birth**	1.2	1.7	2.9
16	Outcome	Median age at first marriage**	1.4	2.6	4.0
17	Outcome	Sex ratio of last birth (females per hundred births)	0.5	-2.2	-1.7

\*Numbers indicate the improvement in score with a 1 standard deviation increase in household wealth.

\*\*Median Age in years for 1998-99.

<sup>#</sup>These dimensions are calculated for the set of all women between 15-49. All other dimensions are calculated for married women between the ages of 15 and 49. They derive from the equation estimated at household level in Annex I. All numbers represent percentage points difference from the average estimated relationship, except for the numbers in rows 15 and 16 where they refer to number of years.

<sup>§</sup>Numbers in bold are statistically significant.

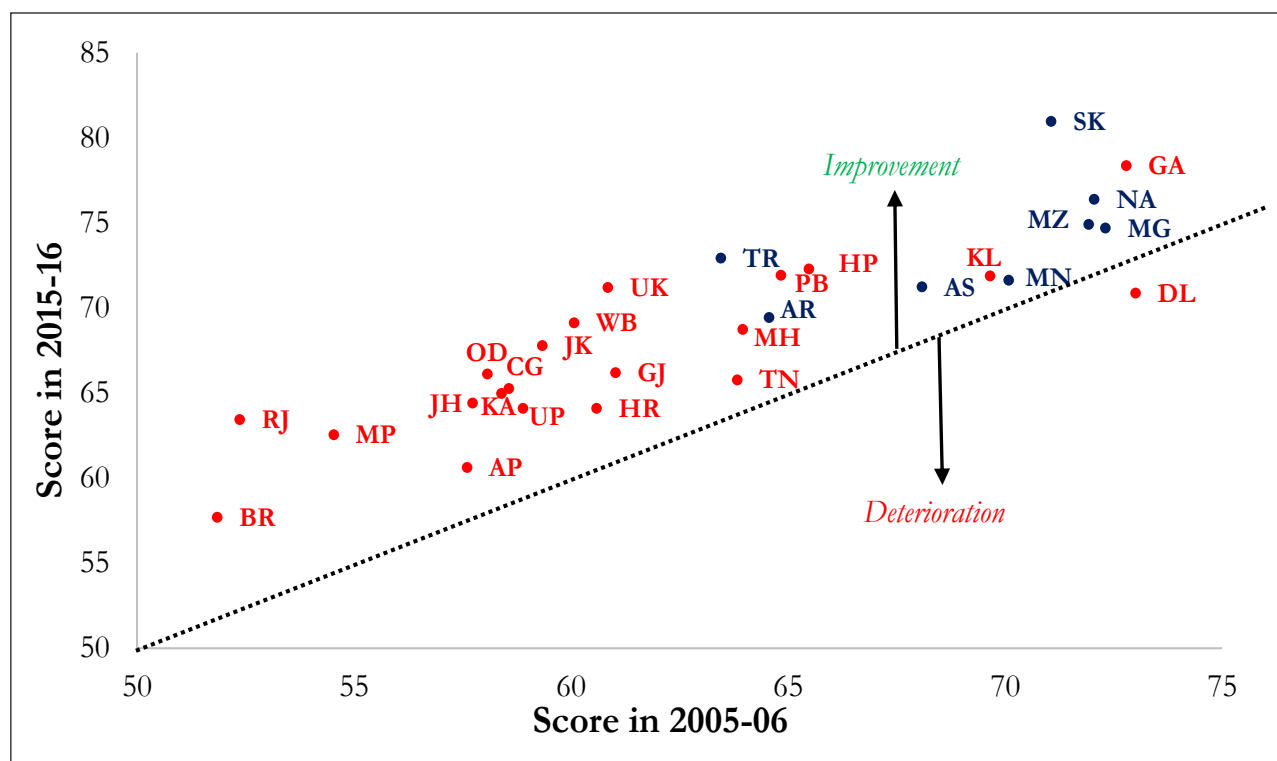
Source: Survey calculations based on DHS and NFHS data.

percentage points. Column 2 shows that in India, the number of women having agency on health matters increases by a further 4.7 percentage points for a one standard deviation increase in wealth. Column 3 shows the overall effect in India, in this case a 10.2 percentage point increase (4.7+5.5) for one standard deviation increase in wealth.

7.24 The key finding from Table 2 is that in 15 out of 17 cases, gender indicators are more responsive to wealth in India than they are in the typical country (15 out of 17 coefficients in column 2 are positive).<sup>4</sup> This suggests that even if India is lagging in development time, it can expect to catch up with other countries as household wealth increases.<sup>5,6</sup>

<sup>5</sup> Strictly speaking, this convergence effect would hold only if India's wealth coefficient is greater than that of the richer countries in the sample. That does turn out to be true and statistically significant (results not reported).

<sup>6</sup> In some cases, India might artificially seem to outperform other countries (in terms of responsiveness) because the level of certain variables may be closer to the maximum limit in other countries to begin with, therefore leaving them little or no scope for improvement with wealth.

**Figure 3. Average Gender Score for Indian States**

Source: Survey calculations based on NFHS 4 data.

7.25 It is notable that the only two cases where such a convergence effect is not visible and where India appears to be falling behind even in development time (where the effect of wealth in India is negative in column 3) is on women's employment and sex of last child. The low numbers of female last children are explored in greater detail in sections on son preference and son meta-preference.

## PERFORMANCE OF THE INDIAN STATES

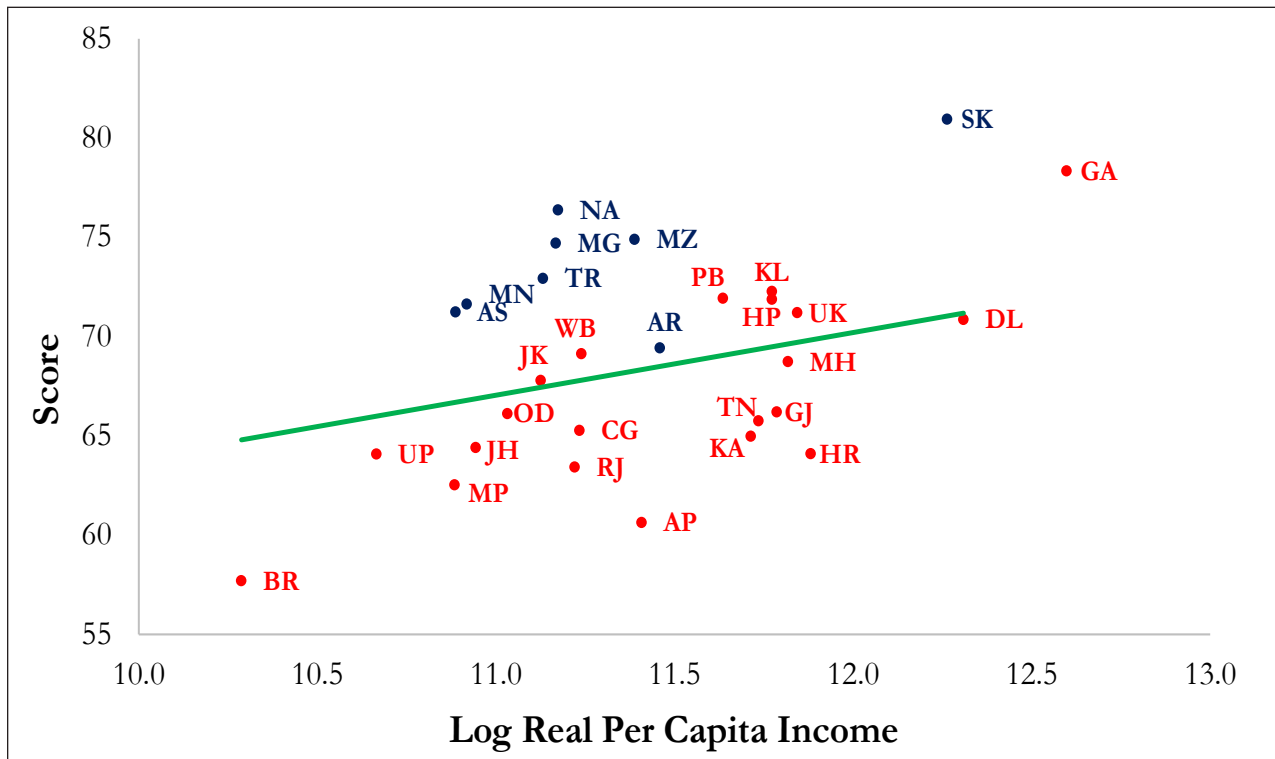
7.26 How do the Indian states perform relative to each other and relative to their level of development? To shed some light on this, the scores of the Indian states across all the dimensions are averaged.<sup>7</sup> Figure 3 shows the average score of each state in the two time periods. The variables are calibrated such that the maximum score is

100 percent. The scores of the states in 2005-06 are on the x-axis and the score in 2015-16 are on the y-axis, with the 45-degree line helping in the understanding of movements over time. North-Eastern states have been colored blue. All the other states are colored red.

7.27 A few patterns emerge. All states (with the exception of Delhi) are above the 45-degree line, underscoring the earlier results that there is improvement over time. Indeed, there is also a "convergence" effect in that the poorer performers in the earlier period improve their score more over time (the dots at the lower end have shifted up to a greater extent relative to the 45-degree line compared with dots at the upper corner).

7.28 Second, most North-Eastern states (with the exception of Tripura and Arunachal Pradesh)

<sup>7</sup> To arrive at a score for each state, the state-wise percentage for each one of these variables in attitude, agency, and outcome is first calculated. For the age-related variables (age at first marriage and age at first birth), the state-level median ages are calculated and normalized with respect to the average age of marriage and first birth in Sweden (33 years and 29 years, respectively). For the percentage of females in the labor force, the current benchmark is placed at 72 per cent of the female population, which is the Swedish national average of female labor force participation, and Indian responses are normalized.

**Figure 4. Gender Score vs. Per Capita Income for Indian States in 2015**

Source: Survey calculations based on NFHS 4 and CSO data.

and Goa occupy the North-East quadrant, indicating that they are the best performers at all points of time. Kerala is the next best performer. The lagging performers are Bihar, Rajasthan, Madhya Pradesh, Uttar Pradesh, Jharkhand and, surprisingly, Andhra Pradesh. Delhi's performance actually worsens in a decade, and it falls from having the highest score in 2005-06 (going from 73 in 2005-06 to 70.9 in 2015-16).

7.29 Finally, since there is a theoretically perfect score of 100, the distance of the Indian states from their absolute frontier can be assessed. The worst Indian score is 57.6 (Bihar) and the best is 81 (Sikkim) with most of India scoring between 55 and 65 (about 40 per cent away from the frontier). Indian states have some distance to traverse to reach the theoretical frontier.

7.30 Figure 4 plots the gender score for Indian states in 2015 against log per capita income, and hence conveys how states are performing in

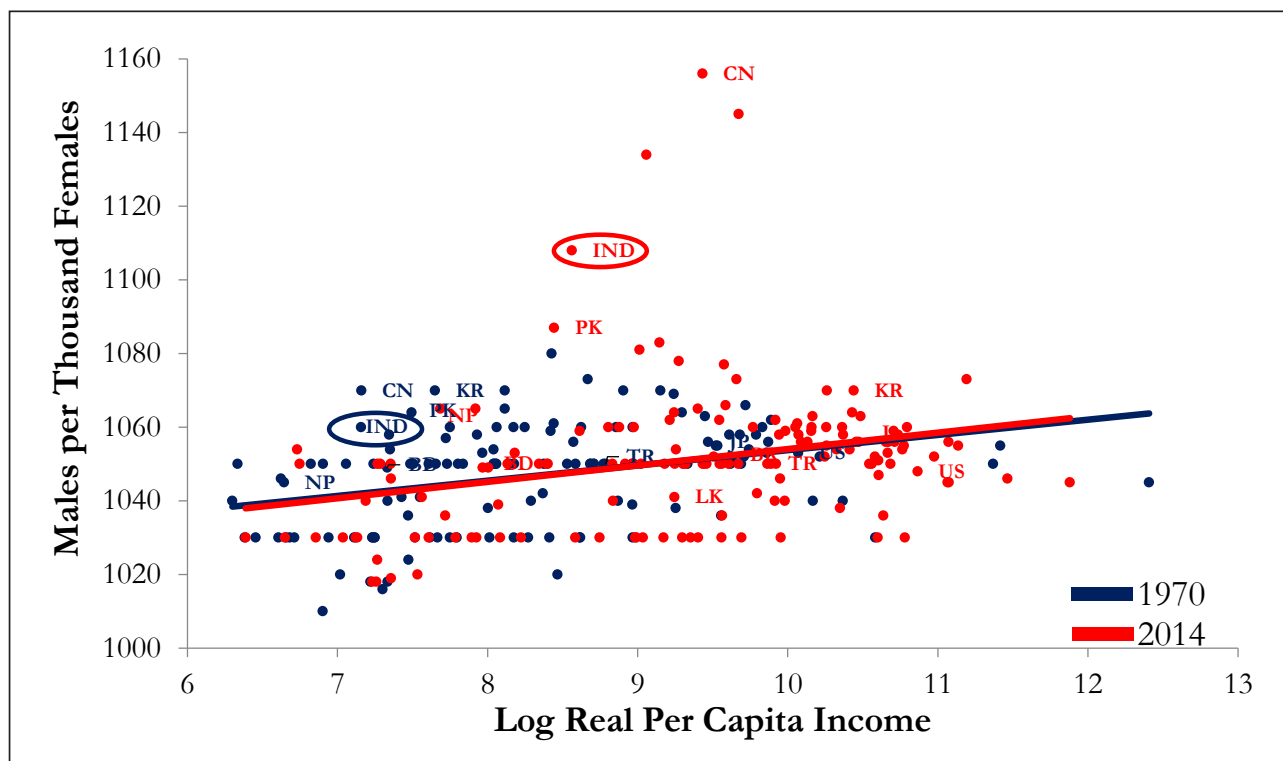
“development time.” Here, the North-Eastern states have much better gender scores given their levels of income (they are well above their line of best fit). On the other hand, accounting for their levels of income, Andhra Pradesh, Haryana, Bihar and Tamil Nadu perform less well.

### **SON PREFERENCE: SKEWED SEX RATIO AT BIRTH (SRB)**

7.31 Issues relating to son preference are a matter for Indian society as a whole to reflect upon. Because it is a long-standing historical challenge, all stakeholders are collectively responsible for its existence and for its resolution. Figure 5 plots the Sex Ratio at Birth (SRB) for countries in 1970 and 2014 against their level of real per capita income. India and China are well above the regression line, suggesting that there are many more males to females after accounting for development levels.

7.32 The biologically determined natural sex ratio at birth is 1.05 males for every female.<sup>8</sup> Any

**Figure 5. Sex Ratio at Birth and Real Per Capita Income (1970 and 2014): International Comparison**



Source: World Development Indicators and Penn World Tables.

significant deviation from this is on account of human intervention – specifically, sex-selective abortion. In the case of China, the one-child policy interacted with the underlying son-preference to worsen the sex ratio from 1070 in 1970 to 1156 in 2014. India's sex ratio during this period also increased substantially even without the one-child policy from 1060 to 1108 whereas if development acted as an antidote, it should have led to improvements in the sex ratio.

7.33 Figure 6 plots the sex ratio for the different states in India in 1991 and in 2011. It is striking that there is a general upward drift in sex ratio and the regression line is also upward sloping, indicating a negative correlation between income and sex ratio (a worsening in development time). Most striking is the performance of Punjab and Haryana where the sex ratio (0-6 years) is

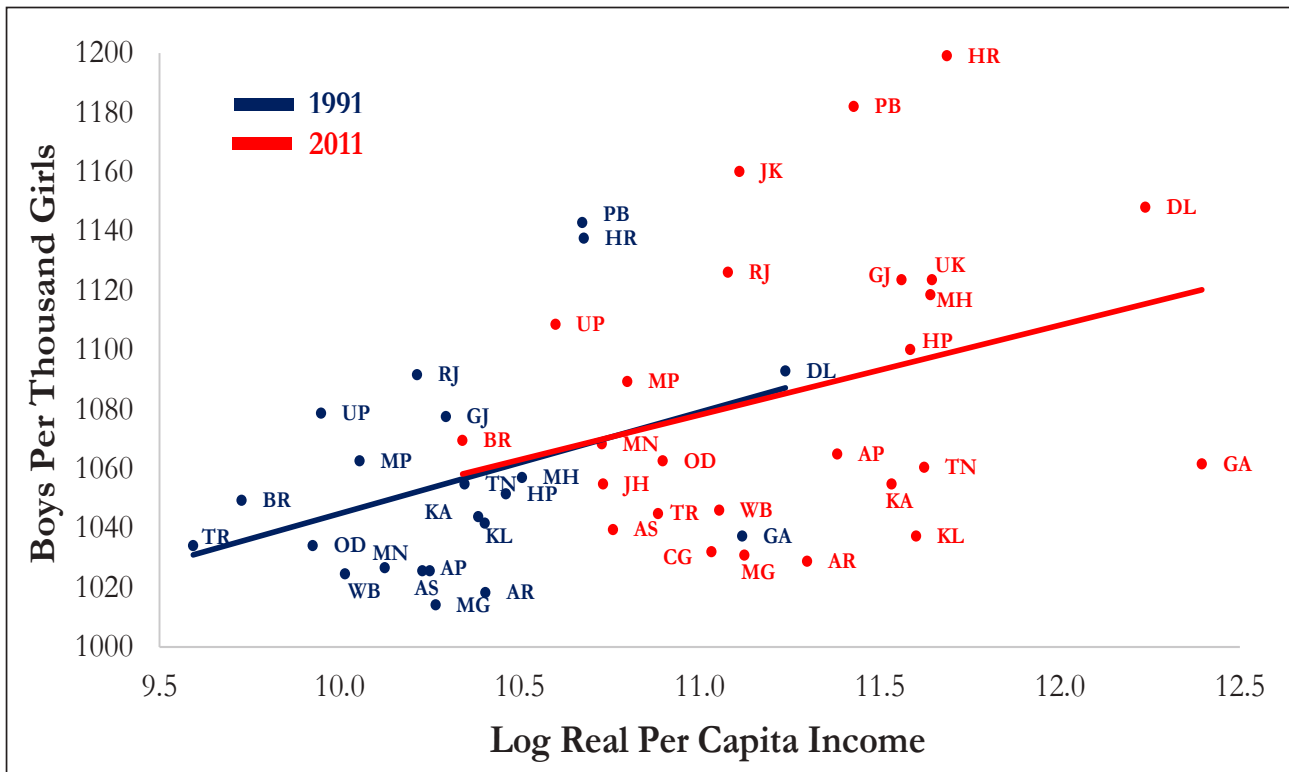
approaching 1200 males per 1000 females, even though they are amongst the richest states.

7.34 Several decades ago, Sen (1990), noting the skewed ratio of females to males, estimated that nearly 100 million women were missing in the world (almost 40 million in India alone). A large part of this is driven by a combination of sex-selective abortion as well as neglect of the girl child after birth.

7.35 Using the methodology of Sen (1990) and Anderson & Ray (2010, 2012), the total stock as well as the flow of “missing women” in India are updated. The stock of missing women as of 2014 was nearly 63 million and more than 2 million women go missing across age groups every year (either due to sex selective abortion, disease, neglect, or inadequate nutrition).

<sup>8</sup> Evolutionarily, boys have a slightly lower probability of survival in infancy, and are therefore born at a slightly higher rate. Together, these ensure that the sex ratio in adulthood is 1:1 in accordance with Fisher's principle.

Figure 6. Sex Ratio (0-6 years) and Real Per Capita Income For Indian States



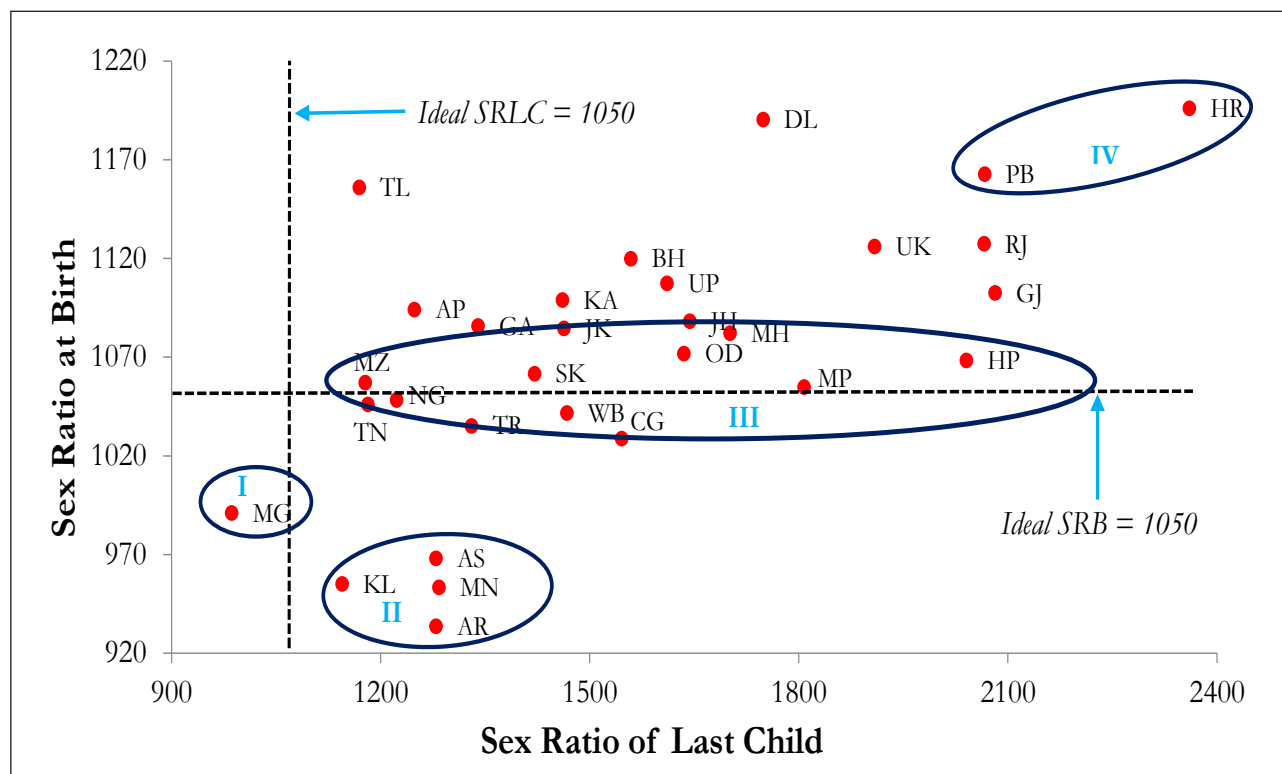
Source: Census of India & CSO.

### SON “META” PREFERENCE: SEX RATIO OF LAST CHILD (SRLC) AND “UNWANTED” GIRLS

7.36 While active sex selection via fetal abortions is widely prevalent, son preference can also manifest itself in a subtler form. Parents may choose to keep having children until they get the desired number of sons. This is called son “meta” preference. A son “meta” preference – even though it does not lead to sex-selective abortion – may nevertheless be detrimental to female children because it may lead to fewer resources devoted to them (Jayachandran & Pande, 2017). The important thing to note is that this form of sex selection alone will not skew the sex ratio – either at birth or overall. Therefore, a different measure is required to detect such a “meta” preference for a son. One indicator that potentially gets at this is the sex ratio of the last child (SRLC). A preference for sons will manifest itself in the SRLC being heavily skewed in favor of boys. On the other hand, an SRLC of close to 1.05:1 would

imply that parents’ decisions to continue having children is uncorrelated with previous birth being a son or a daughter. Families continue to have children until they get the desired number of sons. This kind of fertility stopping rule will lead to skewed sex ratios but in different directions: skewed in favor of males if it is the last child, but in favor of females if it is not (see the two panels on India below). Where there is no such fertility stopping rule, the sex ratio will be 1.05 regardless of whether the child is the last one or not.

7.37 India after outlawing sex selection (via the implementation of Pre-Natal Diagnostic Techniques (PNDT) Act, 1994) saw a stabilization of its sex ratio at birth (see Annex II), albeit at an elevated level. However, it is not clear whether it resulted from changes in societal preferences or due to increased state regulation of sex-detection technology. SRLC helps us better understand and decompose the underlying factors (Yoo et al., 2016).

**Figure 7. Sex Preference – “Malign” and “Meta” (Male Per Thousand Females)**

Source: Survey calculations based on NFHS 4.

7.38 Figure 7 plots the SRLC against the SRB for Indian states. The dashed vertical and horizontal lines represent the “ideal” benchmark with no son preference. Meghalaya stands out as an ideal state because both sex ratio at birth and sex ratio of last child are close to the benchmark. States in circle II and circle III, such as Kerala, do not seem to practice sex selective abortions (since their sex ratios at birth are close to the biological benchmark) but indicate some son “meta” preference (skewed SRLC). Punjab and Haryana, on the other hand, exhibit extremely high son preference and meta preference – the overall sex ratios are significantly above the biological benchmark, and the sex ratio of the last child is heavily male skewed, implying parents are unlikely to stop after having a daughter.

7.39 This son “meta” preference is depicted in Figures 8a and 8b. All the left-hand panels show the sex ratio for each birth order among families that had strictly more than one child (i.e. which continued having children after the first birth). So, in India (top left panel), the sex ratio of the first

child for households that have strictly more than 1 child is 1.07. Similarly, 0.86 is the sex ratio of the second child among families that had strictly more than 2 children.

7.40 In contrast, the top panel of Figure 8b shows the sex ratio of the last child by birth order. For India, the sex ratio of the last child for first-borns is 1.82, heavily skewed in favor of boys compared with the ideal sex ratio of 1.05. This ratio drops to 1.55 for the second child for families that have exactly two children and so on. The striking contrast between the two panels conveys a sense of son meta preference. This contrast is even more stark when seen against the performance of Indonesia (middle panels) where the SRLC is close to the ideal, regardless of the birth order and whether the child is the last or not.

7.41 What do these figures imply? Families where a son is born are more likely to stop having children than families where a girl is born. This is suggestive of parents employing “stopping rules”



Figure 8a. Sex Ratio by Birth when Child is not the Last

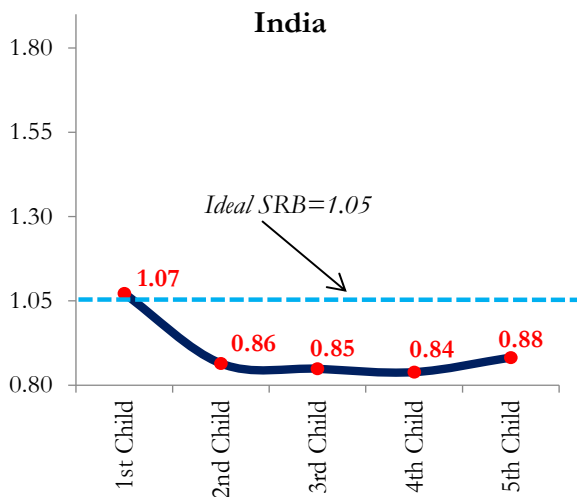
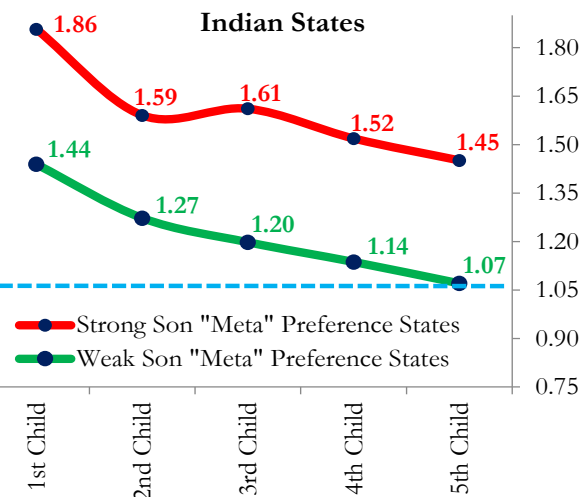
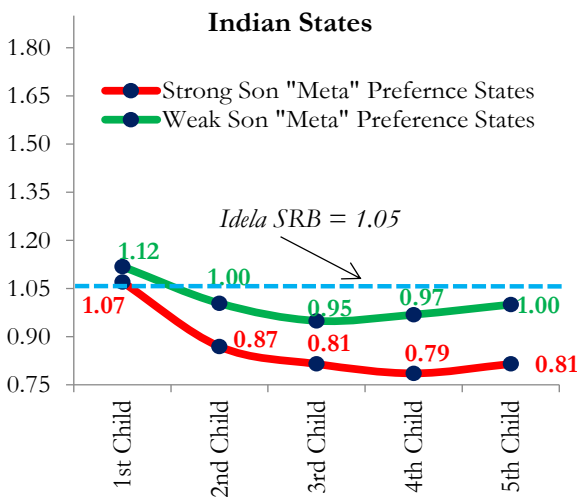
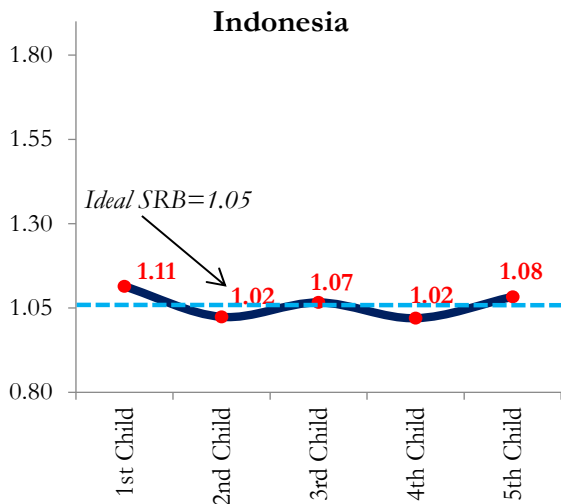
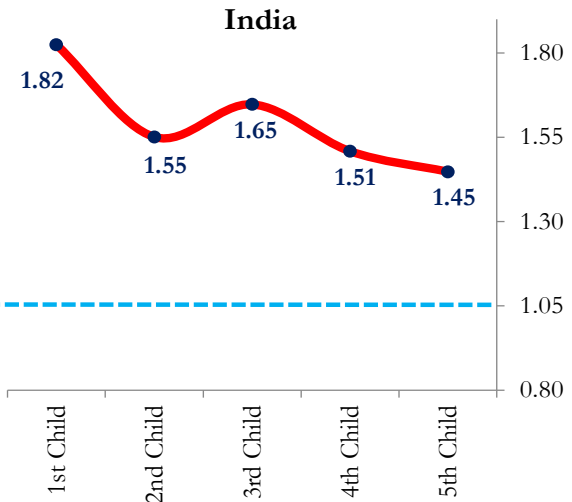


Figure 8b. Sex Ratio by Birth when Child is the Last



Source: Survey calculations based on DHS and NFHS 4.

– having children till a son is born and stopping thereafter. The only exception to this pattern is with regards to the first child. Even parents who have a first-born son are likely to continue having children, which reflects a pure family size preference – Indian parents, on average, want to have at least two children.

7.42 Jayachandran (2015) lists a number of reasons for such a son preference, including patrilocality (women having to move to husbands' houses after marriage), patrilineality (property passing on to sons rather than daughters), dowry (which leads to extra costs of having girls), old-age support from sons and rituals performed by sons.

7.43 The bottom panels are for the Indian states, distinguishing between states that exhibit strong son “meta” preference, such as Punjab and Haryana (red line) and the states that exhibit weak son “meta” preference, such as the North-Eastern states (green line). There is again a striking contrast in meta preference for sons within India between states.

7.44 Such meta preference gives rise to “unwanted” girls—girls whose parents wanted a boy, but instead had a girl. This chapter presents the first estimate of such notionally “unwanted” girls. This is computed as the gap between the benchmark sex ratio (dotted line) and the actual sex ratio among families that do not stop fertility (in the left panel of Figure 8a; see Annex III for details). This method yields the number of unwanted girls as 21 million.<sup>9</sup>

## CONCLUSION

7.45. Analysis of multiple rounds of the Demographic Health Survey (DHS) and National Family Health Survey (NFHS) data indicates that over the last 10-15 years, India's performance has improved on 14 out of 17 indicators of women's agency, attitudes, and outcomes. On seven of them, the improvement has been such that India's situation is comparable to, or better than, that in a

cohort of countries after accounting for levels of development.

7.46. On several dimensions, employment and use of reversible contraception in particular, India has some distance to traverse to catch up with other countries because development on its own has not proved to be an antidote.

7.47. Encouragingly, gender outcomes exhibit a convergence pattern, improving with wealth to a greater extent in India than in similar countries so that even where it is lagging it can expect to catch up over time.

7.48. Within India, there is significant heterogeneity, with the North-Eastern states (a model for the rest of the country) consistently out-performing other states and not because they are richer; hinterland states are lagging behind but the surprise is that some southern states do less well than their development levels would suggest.

7.49. Because the challenge is historical and long-standing, no one stakeholder is responsible for creating it or solving it. On gender, society as a whole—civil society, communities, households—and not just any government must reflect on a societal preference, even meta-preference for a son, which appears inoculated to development. The adverse sex ratio of females to males led to 63 million “missing” women. But the meta-preference manifests itself in fertility-stopping rules contingent on the sex of the last child, which notionally creates “unwanted” girls, estimated at about 21 million. Tellingly, for example, skewed sex ratios characterize families of Indian origin, even in Canada (Srinivasan, 2017).

7.50. Given these observations, the state and all stakeholders have an important role to play in increasing opportunities available for women in education and employment. Understanding the importance of its role, the government has launched the *Beti Bachao Beti Padhao* and *Sukanya Samridhi Yojana* schemes. It has also made 26 weeks maternity leave mandatory for women employed

<sup>9</sup> This is the stock of unwanted girls for the 0-25 age group in the population currently.

in the public and private sectors. Further, every establishment that has more than 50 employees is now required to offer creche facilities. These steps will offer support to women in the workforce. In this somewhat unequal contest between the irresistible forces of development and the immovable objects that are cultural norms, the former will need all the support it can get – and then some.

7.51. Just as India has committed to moving up the ranks in the ease of doing business indicators, it should perhaps do so on gender outcomes as well. Here, the aim should be broader. Many of the gender outcomes are manifestations of a deeper societal preference, even meta-preference for boys, leading to many “missing” women and “unwanted” girls. So, Indian society as a whole should perhaps resolve—the miles to go before society can sleep in good conscience—to consign these odious categories to history soon.

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# Transforming Science and Technology in India

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*We need a spirit of victory, a spirit that will carry us to our rightful place under the sun, a spirit which can recognize that we, as inheritors of a proud civilization, are entitled to our rightful place on this planet. If that indomitable spirit were to arise, nothing can hold us from achieving our rightful destiny*

**C. V. Raman**

*Innovations in science and technology are integral to the long-term growth and dynamism of any nation. The pursuit of science also creates a spirit of enquiry and discourse which are critical to modern, open, democratic societies. Historically, India can point to many contributions to global scientific knowledge and technological achievement. However, India under-spends on research and development (R&D), even relative to its level of development. A doubling of R&D spending is necessary and much of the increase should come from the private sector and universities. To recapture the spirit of innovation that can propel it to a global science and technology leader—from net consumer to net producer of knowledge—India should invest in educating its youth in science and mathematics, reform the way R&D is conducted, engage the private sector and the Indian diaspora, and take a more mission-driven approach in areas such as dark matter, genomics, energy storage, agriculture, and mathematics and cyber physical systems. Vigorous efforts to improve the “ease of doing business” need to be matched by similar ones to boost the “ease of doing science.”*

## WHY SCIENCE

8.1 Science, technology, and innovation have instrumental and intrinsic value for society. They are key drivers of economic performance and social well-being. But they are also important for deeper reasons: a scientific temper, with its spirit of enquiry, the primacy accorded to facts and evidence, the ability to challenge the status quo, the adherence to norms of discourse and the elevation of doubt and openness. The open

spirit of inquiry that is fundamental to science can provide a bulwark against the darker forces of dogma, religious obscurantism, and nativism that are threateningly resurfacing around the world.

8.2 As India emerges as one of the world's largest economies, it needs to gradually move from being a net consumer of knowledge to becoming a net producer. Its historical contributions to science have been many, ranging from one of the most important innovations in the history of



mathematics – the first use of zero – as revealed in the Bakhshali manuscript (carbon dated to AD 200–400), to important contributions made (amongst others) by Aryabhata, Brahmagupta, Bhaskara, Madhava of Sangamagrama, and to the stellar contributions made by names such as CV Raman, S. N. Bose, Srinivasa Ramanujan in the last century.

8.3 And, independent India has chalked up many accomplishments: from the nuclear energy program, the hybrid seeds program that underpinned the Green Revolution to the space program, including the *Mangalyaan* mission which highlighted India's niche of doing cost-effective, high-technology research. Most recently, India's important participation (involving three major Indian research institutions) in the Laser Interferometer Gravitational-wave Observatory (LIGO) experiment successfully detected the existence of gravitational waves. And India's vaccines and generic-drugs have saved millions of lives the world over.

8.4 However, a country cannot rest on its past laurels. Given the dizzying pace and expansion of scientific research and knowledge on the one hand, and a generally higher importance given to careers in engineering, medicine, management and government jobs amongst India's youth on the other, India needs to rekindle the excitement and purpose that would attract more young people to the scientific enterprise. Doing so would lay the knowledge foundations to address some of

India's most pressing development challenges in addition to maintaining a decent, open society. Investing in science is also fundamental to India's security: the human security of its populations; the resilience needed to address the multiple uncertainties stemming from climate change; and the national security challenges stemming from new emerging threats, ranging from cyberwarfare to autonomous military systems such as drones.

## INPUTS AND OUTPUTS: SOME EVIDENCE

### *Research and Development Expenditures*

8.5 Investments in Indian science, measured in terms of Gross Expenditure on R&D (GERD), have shown a consistently increasing trend over the years. GERD has tripled in the last decade in nominal terms – from Rs. 24,117 crores in 2004-05 to Rs. 85,326 crores in 2014-15 and an estimated Rs.1,04,864 crores in 2016-17 – and double in real terms (Table 1). However, as a fraction of GDP, public expenditures on research have been stagnant – between 0.6-0.7 percent of GDP – over the past two decades. Public expenditure is dominant, although its share has come down from three-fourths of all expenditures to about three-fifths.

8.6 About three-fifths of the public investment is spread over the key government science funding agencies like Atomic Energy, Space, Earth Sciences, Science and Technology and Biotechnology (Table 2). Given the country's

**Table 1. R&D Expenditure (Rs. Crores and per cent of Nominal GDP in parentheses)**

Year	Public Investment in R&D	Private Investment in R&D	Total
2004-05	18078 (0.5%)	6039 (0.2%)	24117 (0.7%)
2008-09	32988 (0.5%)	14365 (0.2%)	47353 (0.7%)
2012-13	46886 (0.4%)	27097 (0.2%)	73983 (0.6%)
2016-17*	60869 (0.4%)	43995 (0.3%)	104864 (0.7%)

Source: Dept. of Science & Technology (DST); World Bank.

Note: Public Investments in R&D = Central Government Ministries/Department + Public Sector/joint sector industries+ State Government + Higher Education.



**Table 2. Expenditure of Principal Science Government Agencies (Rs. Crores)**

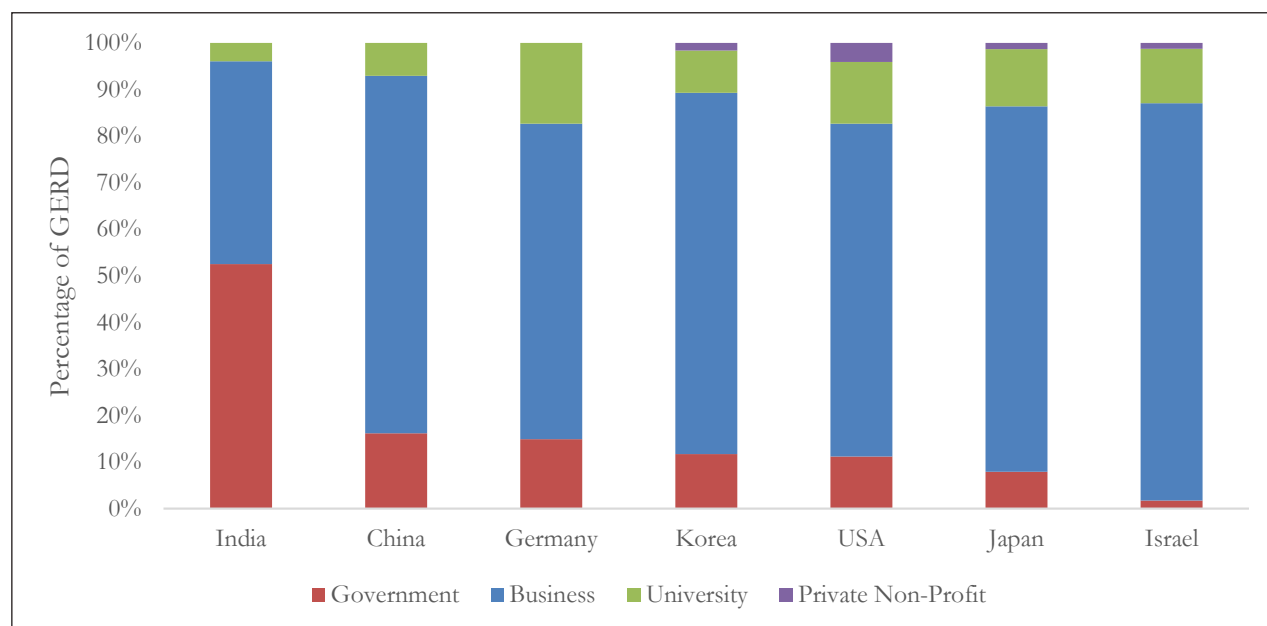
Agency	2010-11	2012-13	2014-15
1. Council of Scientific & Industrial Research (CSIR)	2929	2910	3335
2. Defense Research & Development Org. (DRDO)	10149	9895	13258
3. Department of Atomic Energy (DAE)	2855	3191	4075
4. Department of Biotechnology (DBT)	921	1031	1021
5. Department of Science & Technology (DST)	2133	2378	2701
6. Department of Space (DOS)	4482	4856	5818
7. Indian Council of Agricultural Research (ICAR)	3182	3569	3983
8. Indian Council of Medical Research (ICMR)	679	808	843
<b>Total</b>	<b>27330</b>	<b>28636</b>	<b>35034</b>

Source: DST.

severe health challenges, the low – and virtually stagnant in real terms – budget of the ICMR is striking.

8.7 India's spending on R&D (about 0.6 percent of GDP) is well below that in major nations such as the US (2.8), China (2.1), Israel (4.3) and Korea (4.2). It is also unique in how dominant government is in carrying out R&D. In most countries, the private sector carries out the bulk of research and development even if

government must play an import funding role. However, in India, the government is not just the primary source of R&D funding but also its the primary user of these funds (Figure 1). Even more, government expenditure on R&D is undertaken almost entirely by the central government. There is a need for greater State Government spending, especially application oriented R&D aimed at problems specific to their economies and populations.

**Figure 1. GERD on R&D by Performer Share in 2015**

Source: United Nations Educational, Scientific, and Cultural Organization (UNESCO).

8.8 Private investments in research have severely lagged public investments in India. According to one analysis (Forbes, 2017) there are 26 Indian companies in the list of the top 2,500 global R&D spenders compared to 301 Chinese companies. 19 (of these 26) firms are in just three sectors: pharmaceuticals, automobiles and software. India has no firms in five of the top ten R&D sectors as opposed to China that has a presence in each of them.

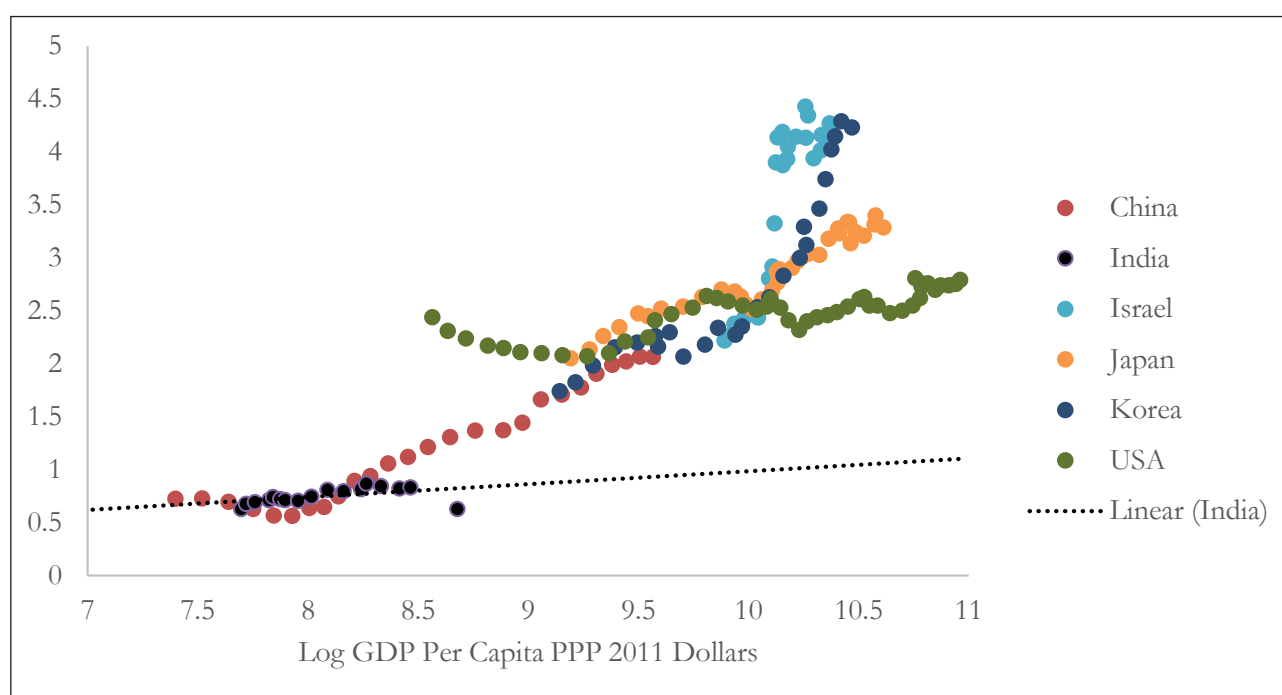
8.9 India is also distinctive in another dimension: its universities play a relatively small role in the research activities of the country. Universities in many countries play a critical role in both creating the talent pool for research as well generating high quality research output. However, publicly funded research in India concentrates in specialized research institutes under different government departments. This leaves universities to largely play a teaching role – a decision that goes back to the 1950s. It is now widely acknowledged that whatever the merits of the decision at the time, this disconnection has severely impaired both teaching as well as the research enterprise in the country.

8.10 One way of assessing if India spends enough is to compare R&D expenditures in “development time”: that is, how does India fare today compared with other countries at a similar development level, and whether the Indian trajectory today will allow it to catch up with other countries.

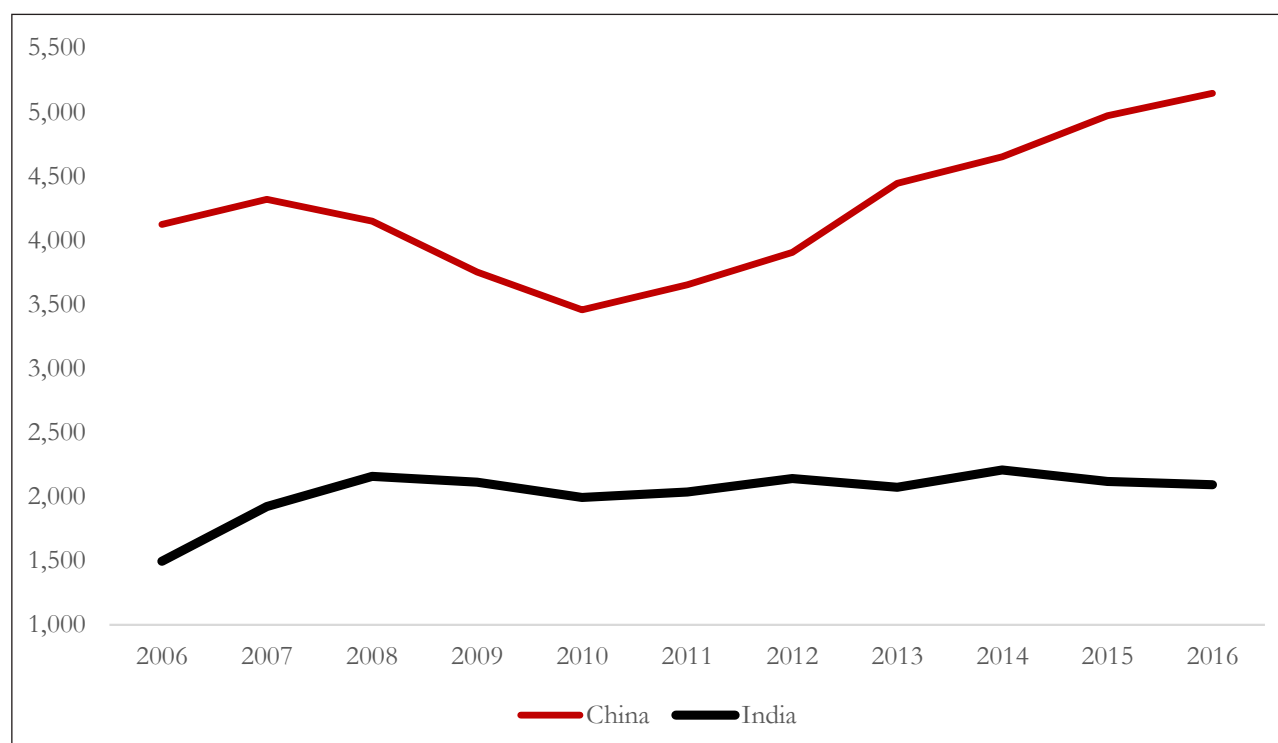
8.11 Figure 2 plots R&D as a share of GDP against per capita GDP for a set of comparable countries. It shows that India was, at one point, spending more on R&D as percentage of GDP than countries like China at the same level of GDP per capita. As a lower middle-income country, it is not surprising that India’s spending on R&D lags upper-middle income and high-income countries such as China, Israel, and the U.S. However, it currently underspends even relative to its income level.

8.12 In addition, most other countries, especially East Asian countries like China, Japan, and Korea, have seen dramatic increases in R&D as a percentage of GDP as they have become richer. India, on the other hand, has only seen a slight increase. In fact, in 2015, there was a sizeable

**Figure 2. R&D Expenditure as a Percentage of GDP (Development Time)**



Source: UNESCO, World Economic Outlook (WEO), National Science Foundation(NSF).

**Figure 3. Indian and Chinese PhDs in STEM in the US**

Source: National Science Foundation

decline in R&D spending even as GDP per capita continued to rise. At its current rate, India would just barely reach GERD of 1 percent of GDP by the time it was as rich as the USA.

### ***Ph.Ds. in Science, Technology, Engineering, and Mathematics (STEM)***

8.13 The other critical input for R&D is a well-trained workforce among which Ph.D. students

play an especially important role. Indian Ph.D. students obtain their degrees either within India or abroad, especially in the US. There are less than half as many Ph.D. students in STEM from India in the US as from China (figure 3). It appears that fewer Indian students have been enrolling in recent years for such degrees, whether due to more attractive options after a master's degree or rising work visa challenges.

**Table 3. Investments in R&D, 2015**

	U.S.A	ISRAEL	CHINA	INDIA
R&D Spending (PPP Billion Dollars)	479	12.2	371	48.1
Of which				
- Business	341	10.3	286	17
- Government	54	0.2	59	29
- Universities	64	1.5	26	2
- Private NP	20	0.1	--	--
R&D Spending (% of GDP)	2.8	4.3	2	0.8
Researchers per million population	4,231	8,255	1,113	156

Source: UNESCO

8.14 On the other hand, there has been an increase in Ph.D. enrollments in India. In 2015-16 126,451 students were enrolled in Ph.D. programs in India, of which 62 percent were in STEM fields (AISHE 2015-16). This increase is in part the result of concerted efforts by the government, including a substantial increase in the number and quantum of fellowships (such as the Prime Minister Research Fellowships at the IITs). Overall, though, India has far fewer researchers than other countries (Table 3).

## OUTPUTS

### *Publications*

8.15 Looking at publications and patents in India can help assess the productivity and quality of Indian research. In 2013, India ranked 6th in the world in scientific publications. Its ranking has been increasing as well. Between 2009-2014, annual publication growth was almost 14 percent. This increased India's share in global publications from 3.1 percent in 2009 to 4.4 percent in 2014 as per the Scopus Database.

8.16 Broadly, the publication trends reveal that India is gradually improving its performance as measured by an important metric – publications. However, there is a downside to the increase in publications. There are many journals that publish non- peer-reviewed manuscripts for a substantial fee. The major catalyst for their explosive growth is “the demand created by increasing emphasis on the number of research publications as an important determinant

of the academic performance of a faculty/scientist being considered for appointment or promotion”(Lakhotia, 2017).

8.17 But in addition to increasing publications, trends in quality (as measured by highly cited articles in table 3) are also slowly improving. The Nature Index (which publishes tables based on counts of high-quality research outputs in the previous calendar year covering the natural sciences) – ranked India at 13 in 2017. But there is still a considerable lag in levels between India and the other two large countries, and the rate of improvement in China between 2001 and 2011 is dramatically better than India's (table 4).

### *Patents*

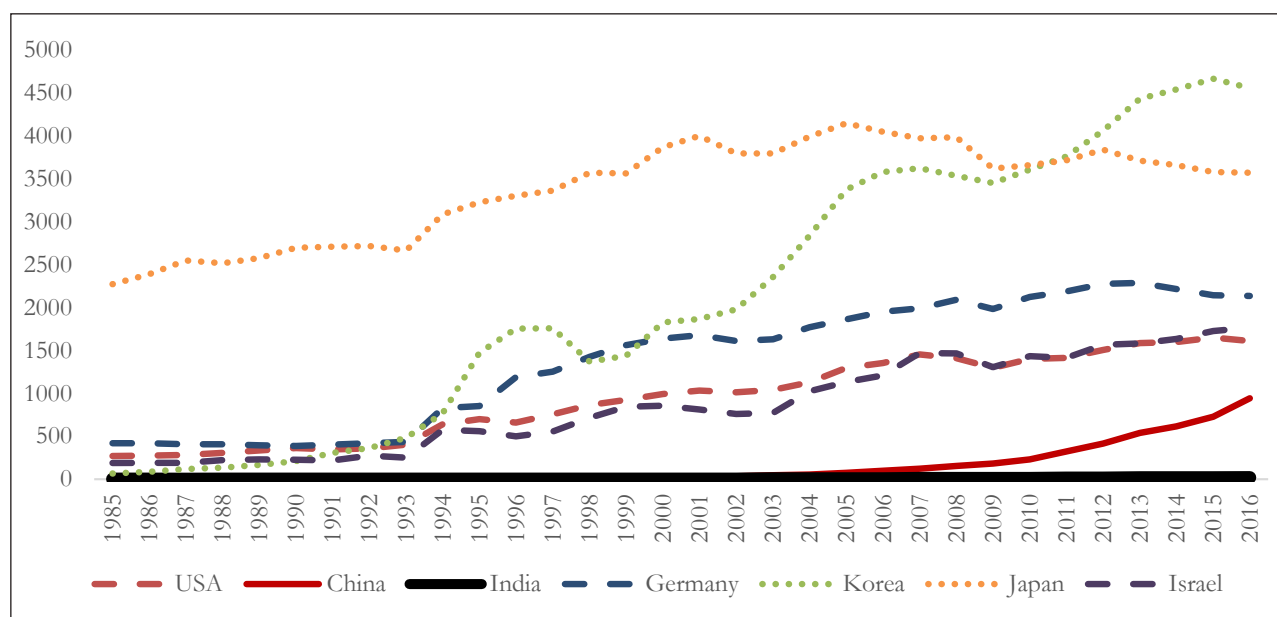
8.18 If journal publications reflect a country's prowess in science, patents reflect its standing in technology. According to the WIPO, India is the 7<sup>th</sup> largest Patent Filing Office in the World. In 2015, India registered 45,658 patents in comparison to China (1,101,864), USA (589,410), Japan (318,721), Republic of Korea (213,694), and Germany (91,726). However, India produces fewer patents per capita (Figure 4).

8.19 Even in development time, the story is mixed. On one hand, much of India's low patent output could be due to its lower middle-income status. However, patents have grown much faster with income in countries like China, Korea, and Japan (Figure 5). Unless there is a greater focus on R&D, rising income alone will not allow India to catch up in the near future.

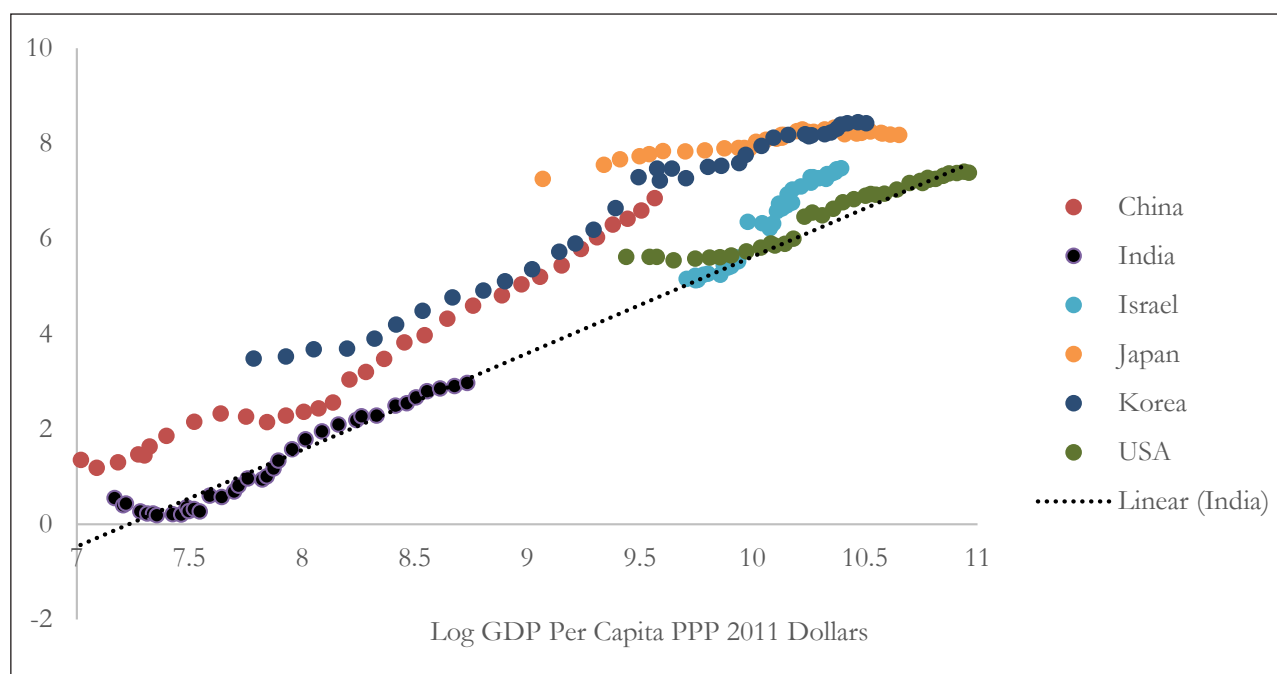
**Table 4. Publication Output Trends in China, India, and USA**

YEAR	CHINA		INDIA		UNITED STATES	
	No. of publications	No. of highly cited articles	No. of publications	No. of highly cited articles	No. of publications	No. of highly cited articles
1990	6,104		12,346		130,559	
2001	25,730	174	15,522	103	150,817	2894
2011	122,672	980	36,456	191	184,253	3137

Source: Xiea (2014).

**Figure 4. Patents Per 1 Million Population**

Source: UNESCO

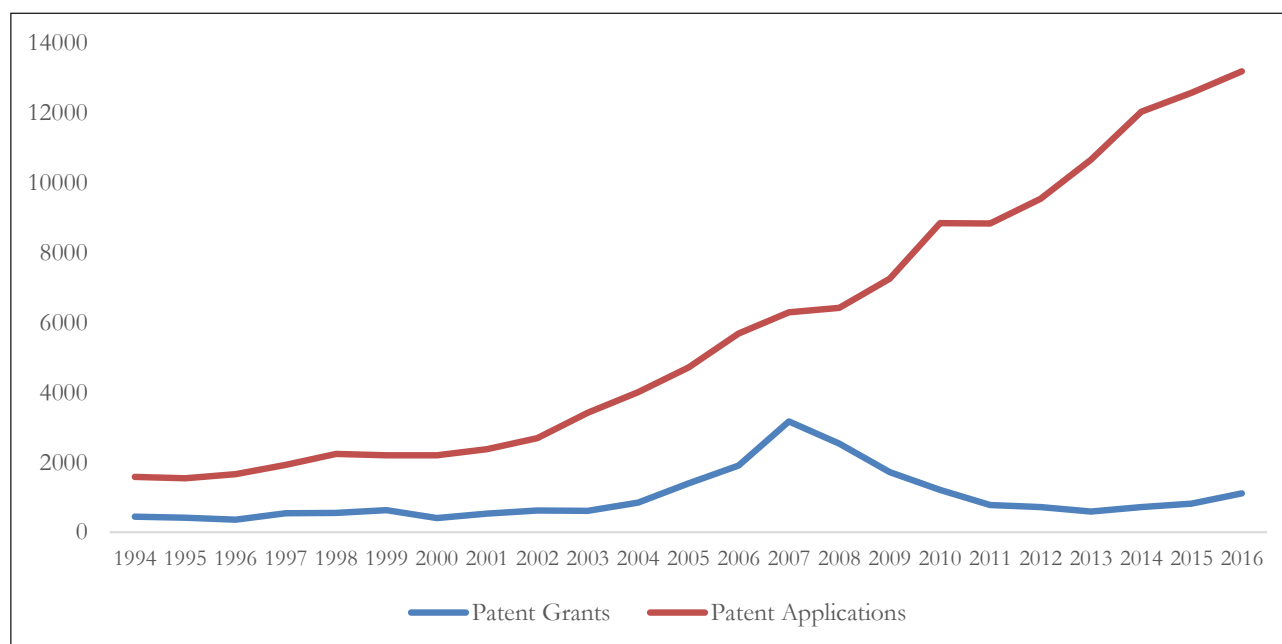
**Figure 5. Log Total Patents Per 1 Million Population (Development Time)**

Source: WIPO; WEO

Note: Applications from country residents in both domestic and foreign jurisdictions using equivalent counts as per WIPO

8.20 One major challenge in India has been the domestic patent system. While India's patent applications and grants have grown rapidly in foreign jurisdictions, the same is not true at home. Residential applications have increased substantially since India joined the international

patent regime in 2005. However, the number of patents granted fell sharply post 2008 and has remained low (Figure 6). While Indian residents were granted over 5000 patents in foreign offices in 2015, the number for resident filings in India was little over 800.

**Figure 6. Resident Patents Applied vs. Granted**

Source: WIPO

8.21 The decrease in grants could have been due to a stricter examination process. But evidence suggests that there is a severe backlog and high rate of pendency for domestic patent applications. Reports indicate that due to manpower shortages there is a backlog of almost 2 lakh patents pending examination. In 2016-2017, there were only 132 examiners for all patent applications in India. This has meant that patent examination and granting can take 5 or more years (Chatterjee 2017). Given the rapid rate of technological obsolescence, the inordinate delays in processing patents penalizes innovation and innovators within the country.

8.22 The government's recent hiring of over 450 additional patent examiners and creation of an expedited filing system for Indian residents in 2017 will therefore be a welcome and crucial intervention to help fix the existing patent system (Jain 2017). Chapter 9 discusses the problems that pendency in patent litigation have had on innovation and business. Having addressed issues on the patent filing side, addressing patent litigation

issues will also be crucial to ensuring that the patent system effectively rewards innovation.

### EXPANDING R&D IN INDIA: THE WAY FORWARD

8.23 While the data discussed above presents a mixed view, many observers point to a more troubling picture. For example, a report submitted by a group of scientists has been quoted as saying: "The stature of Indian science is a shadow of what it used to be ... because of decades of misguided interventions. We have lost self-confidence and ambition and the ability to recognize excellence amongst our own. In a false sense of egalitarianism, we often chose the mediocre at every level" (Koshy 2017).

8.24 Clearly, India needs to redouble its efforts to improve science and R&D in the country first and foremost by doubling national expenditures on R&D with most of the increase coming from the private sector and universities. But the metrics also need to go beyond papers and patents to a broader contribution to providing value for society. What might these efforts entail? Some ideas are discussed below:



### ***I. Improve math and cognitive skills at the school level***

8.25 No country can create a vibrant super-structure of R&D with weak foundations of primary and secondary education for so many of its young. While India has made considerable strides in improving access to primary and secondary education, as discussed in Chapter 5, learning outcomes have been weak. This weakness denies India access to the intellect and energies of millions of young people.

### ***II. Encourage Investigator-led Research***

8.26 India needs to gradually move to have a greater share of an investigator-driven model for funding science research. A step in this direction occurred in 2008, with the establishment of the Science and Engineering Research Board (SERB), a statutory body of DST. This body has sanctioned about three and half thousand new R&D projects to individual scientists. It is a promising start that needs to expand with more resources and creative governance structures.

### ***III. Increase funding for research from private sector as well as from state governments***

8.27 The private sector should be incentivized to both undertake more R&D but to also support STEM research through CSR funds. Current tax law already favors CSR investment into R&D, but the types of R&D activities eligible can be expanded. Government can also work with the private sector to create new R&D funding opportunities which are also in line with private sector interests. Efforts like the 50:50 partnership with SERB for industry relevant research under the Uchatar Avishkar Yojana (UAY) is a good example of what could help make such partnerships fruitful.

8.28 State governments too need to recognize the need to invest in application oriented research aimed at problems specific to their economies and populations. This would both strengthen state universities as well as provide much needed knowledge in areas such as crops, ecology and

species specific to a state.

### ***IV. Link national labs to universities and create new knowledge eco-systems***

8.29 The separation of research from teaching has been an Achilles heel for Indian science. Universities have students but need additional faculty support, while research institutes have qualified faculty but are starved of bright young students brimming with energy and ideas. A closer relationship between the two in specific geographic and spatial settings would help nurture research in areas reflecting the fields of science in which the national research centers have strengths. Together they can link up with the commercial sectors and help develop industrial clusters in those areas that draw on these research strengths and lay the foundations of innovation driven “smart cities.”

8.30 If success in research requires a deep commitment to excellence, commercial success requires speed and nimbleness. Government rules such as those requiring L1 for procurement are simply not geared to providing the flexibility that is needed at the frontiers of research where speed, product quality and reliability make all the difference between success and failure.

### ***V. Take a mission driven approach to R&D***

8.31 India has the potential to be a global leader outright in a number of areas if it is willing to invest. However, this will require a deliberate focus in a few key areas. The potential missions given below were chosen for their strategic importance and potential for societal impact. This is an illustrative list which should be periodically revisited by the scientific community, government and other stakeholders.

#### ***A. National Mission on Dark Matter***

8.32 India needs at least one mission that is directed towards the basic sciences. India is one of the leading countries in high energy physics and relevant mathematics. The payoffs from this research will have implications on space missions

of the future, quantum computing, newer solutions to energy problems etc. This mission can build on the strong foundation of astronomy and astrophysics research institutes in the country.<sup>1</sup> Furthermore, research in this area has some of the strongest international collaborative possibilities including those stemming from India's ongoing participation in the LIGO, Neutrino, CMS/LHC projects.

#### *B. National Mission on Genomics*

8.33 Genomic research lies at the heart of the future of the life sciences. Currently several countries have launched ambitious national genomic research projects e.g. UK Biobank Study; Finnish Birth Cohort Study; Partners HealthCare Biobank; China Kadoori Biobank. These studies are collecting detailed phenotype information, as well as blood and tissue samples, to study the determinants and life-course of biological pathways and disease. India already has a strong foundation of life science research institutes<sup>2</sup> which together can make significant contributions in this area.

#### *C. National Mission on Energy Storage Systems*

8.34 Renewable energy is the future and India has made a major commitment to investment in renewable energy. Energy storage technologies (e.g., batteries) help in energy management and power quality in electric power systems. India has lagged in manufacturing renewable energy generation systems. Substantial investments in energy storage systems will ensure that India can be a leader in manufacturing energy storage systems. For India, this will be especially helpful to provide round-the-clock electricity to villages

using off-grid renewable energy systems.

#### *D. National Mission on Mathematics*

8.35 Mathematics has two special advantages for India: i) it is not capital intensive; ii) standards of excellence are universal. A National Mission of Mathematics will improve mathematics teaching at all levels of higher education, seek to establish five institutes of mathematical sciences within existing institutions, conduct annual district, state and national math Olympiad competitions with sizeable scholarships for all winners, with the overall goal of rapidly increasing India's human capital and research profile in mathematics within a decade.

#### *E. National Mission on Cyber Physical Systems*

8.36 The term Cyber Physical System (CPS) refers to machine based communication, analysis, inference, decision, action, and control in the context of a natural world ("Physical" aspect). This is hugely multidisciplinary area including deep mathematics used in Artificial Intelligence, Machine Learning, Big data Analytics, Block Chains, Expert Systems, Contextual Learning going to integration of all of these with intelligent materials and machines, control systems, sensors and actuators, robotics and smart manufacturing. Together these are the building blocks of future industry that will throw up both new challenges and opportunities.

#### *F. National Mission on Agriculture*

8.37 Improving Indian agricultural productivity, which still lags other countries such as China, as well as creating resilience to the looming challenges in terms of rising temperatures,

<sup>1</sup> These include the Indian Institute of Astrophysics (IIA), Bangalore; Inter-University Centre for Astronomy and Astrophysics (IUCAA), Pune; Aryabhata Research Institute of Observational Sciences (ARIES), Nainital; Tata Institute of Fundamental Research (TIFR), Mumbai; National Centre for Radio Astrophysics (NCRA-TIFR), Pune; Indian Institute of Science (IISc), Bangalore; Raman Research Institute (RRI), Bangalore; Physical Research Laboratory (PRL), Ahmedabad; Harish-Chandra Research Institute (HRI), Allahabad

<sup>2</sup> TIFR, IISc, IISERs, Center for Cellular and Molecular Biology, National Institute of Immunology, Institute of Genomics and Integrative Biology, National Center for Cell Science, National Center for Biological Sciences (NCBS) in Bangalore

variable precipitation, water scarcity, increase in pests and crop diseases requires a major thrust in agricultural science and technology. A national mission could help overcome the weaknesses in existing institutions of agricultural research and technology.

### ***VI. Leverage scientific diaspora***

8.38 There are today more than 100,000 people with PhDs, who were born in India but are now living and working outside India (more than 91,000 in the U.S. alone). From 2003 to 2013, while the number of scientists and engineers residing in the US rose from 21.6 million to 29 million, the number of immigrant scientists and engineers went from 3.4 million to 5.2 million. Of this, the number from India increased from just above half million in 2003 to 950,000 in 2013.

8.39 However, with the strength of India's economy and growing anti-immigrant atmosphere in some Western countries, India has an opportunity to attract back more scientists. There has been an increase in the number of Indian scientists returning to work in India during the last five years, but the numbers are still modest (from 243 during 2007-12 to 649 in 2012-17) (Press Trust of India 2017).

8.40 There are a number of government programs such as the Ramanujan Fellowship Scheme, the Innovation in Science Pursuit for Inspired Research (INSPIRE) Faculty Scheme and the Ramalingaswami Re-entry Fellowship, that provide avenues to qualified Indian researchers residing in foreign countries, to work in Indian institutes/universities, and the Visiting Advanced Joint Research Faculty Scheme (VAJRA). These schemes could be enhanced to take advantage of opportunities to recruit in a way to build whole research groups; the inducements should be such as to allow them to do good research (laboratory resources, ability to hire post-docs, housing etc.) rather than financial, to ensure that home grown talent has a level playing field.

### ***VII. Improve the culture of research***

8.41 Indian science and research institutes need to inculcate less hierarchical governance systems, that are less beholden to science administrators and encourage risk-taking and curiosity in the pursuit of excellence. While the age of peak productivity of scientists has shifted upwards over the 20th century, it is still less than fifty. Great achievements in the sciences decline after middle age, and youth, conceptual achievement, and scientific revolutions are linked (Jones et. al. 2014). Hence it is imperative that there be greater representation of younger scientists in decision-making bodies in their areas of expertise.

### ***VIII. Greater public engagement of the science and research establishment***

8.42 If science is to garner greater support from society, it will require scientists to engage more vigorously with society. Much of science is – and should be – a public good, and hence that will always require substantial public funding. But the need for publicly funded science means that national laboratories and other publicly funded R&D institutions need to make much stronger efforts to engage with the public and not make their research centers quintessential ivory towers. This will require much greater efforts at science communication whether through the media or through regular tours and lectures for school and college students as well the general public. Scientists need to create broad public support for their work and not treat it as an entitlement, given the many claims on the public purse. And if they do that, they will find a receptive and supportive public.

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# Ease of Doing Business' Next Frontier: Timely Justice

*For who would bear the Whips and Scorns of time,  
The Oppressor's wrong ...  
... the Law's delay*

**Hamlet**

*The government's efforts to make business and commerce easy have been widely acknowledged. The next frontier on the ease of doing business is addressing pendency, delays and backlogs in the appellate and judicial arenas. These are hampering dispute resolution and contract enforcement, discouraging investment, stalling projects, hampering tax collections but also stressing tax payers, and escalating legal costs. Coordinated action between government and the judiciary-- a kind of horizontal Cooperative Separation of Powers to complement vertical Cooperative Federalism between the central and state governments-- would address the "Law's delay" and boost economic activity.*

## INTRODUCTION

9.1 The now iconic scream of *Tarikh-par-Tarikh*, *Tarikh-par-Tarikh* ("dates followed by dates followed by dates") by Sunny Deol was Bollywood's counterpart to Shakespeare: two different expressional forms--the one loud and melodramatic, the other brooding and self-reflective--but both nevertheless united in forcefully articulating the frustrations of delayed-and-hence-denied justice.

9.2 India jumped thirty places to break into the top 100 for the first time in the World Bank's Ease of Doing Business Report (EODB), 2018. The rankings reflect the government's reform measures on a wide range of indicators. India leaped 53 and 33 spots in the taxation and insolvency indices, respectively, on the back of administrative reforms in taxation and passage of the Insolvency and Bankruptcy Code (IBC), 2016 (See Box No. 3.1 and 3.2 in Chapter 3 of Volume 2 of the *Economic Survey*). It also made strides on protecting minority investors and

obtaining credit, and retained a high rank on getting electricity, after a 70 spot rise in EODB, 2017 due to the government's electricity reforms. This year's report did not cover other measures such as the Goods and Services Tax (GST), which are expected to further boost India's ranking in the coming years.

9.3 This striking progress notwithstanding, India continues to lag on the indicator on enforcing contracts, marginally improving its position from 172 to 164 in the latest report, behind Pakistan, Congo and Sudan (See Annex I).

9.4 The importance of an effective, efficient and expeditious contract enforcement regime to economic growth and development cannot be overstated. A clear and certain legislative and executive regime backed by an efficient judiciary that fairly and punctually protects property rights, preserves sanctity of contracts, and enforces the rights and liabilities of parties is a prerequisite for business and commerce.<sup>1</sup>

<sup>1</sup> See North (1990); Engerman and Sokoloff (2000); Acemoglu, Johnson and Robinson (2001); Rodrik, Subramanian and Trebbi (2004); Acemoglu and Johnson (2005); La Porta et al. (1998, 1999); On India, see Kapur and Mehta (2007); Kapur, Mehta and Vaishnav (2017) and Chemin (2012).



9.5 The government has taken a number of actions to expedite and improve the contract enforcement regime. For example, the government: scrapped over 1000 redundant legislations; rationalized tribunals; amended The Arbitration and Conciliation Act, 2015; passed The Commercial Courts, Commercial Division and Commercial Appellate Division of High Courts Act, 2015; reduced intra-government litigation; and expanded the Lok Adalat Programme to reduce the burden on the judiciary. The government has also advanced a prospective legislative regime to ensure legal consistency, reducing chaos due to unpredictable changes in regulations. The judiciary has simultaneously expanded the seminal National Judicial Data Grid (NJDG) and is close to ensuring that every High Court of the country is digitized, an endeavor recognized in EODB, 2018. However, economic activity is being affected by the realities and long shadow of delays and pendency across the legal landscape. This chapter is a preliminary stab at quantitatively highlighting these developments based on new data that has been compiled for the *Economic Survey*.<sup>2</sup>

9.6 The finds are simple and stark :

- (i) Delays and pendency<sup>3</sup> of economic cases are high and mounting in the Supreme Court, High Courts, Economic Tribunals, and Tax Department, which is taking a severe toll on the economy in terms of stalled projects, mounting legal costs, contested tax revenues, and reduced investment more broadly;
- (ii) Delays and pendency stem from the increase in the overall workload of the judiciary, in turn due to expanding jurisdictions and the use of injunctions and stays; in the case of tax litigation, this stems from government persisting with litigation despite high rates of failure at every stage of the appellate process; and
- (iii) Actions by the Courts and government

acting together can considerably improve the situation.

## PENDENCY AND DELAY: FACTS

### *Economic Tribunals*

9.7 Analysis of six prominent appellate tribunals that deal exclusively with high stakes commercial matters reveal two patterns. First, there is a high level of pendency across the six tribunals, estimated at about 1.8 lakh cases (Figure 1). Second, pendency has risen sharply over time. As Figure 2 shows, nearly every tribunal started with manageable caseloads, disposing instituted cases every year, but that soon spiraled out of control. Compared to 2012, there is now a 25 percent increase in the size of unresolved cases. The average age of pending cases across these tribunals is 3.8 years. It is noteworthy that in two cases—telecommunications and electricity—the explosion in pendency resulted from interventions by the Supreme Court (See Annex II).

### *High Courts*

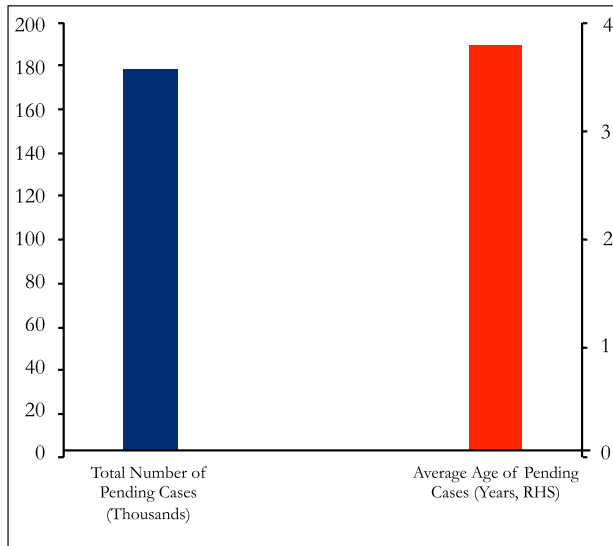
9.8 Further, the creation of tribunals at different points in time did not alter pendency at the High Courts of the country nor their ability to deal with other economic cases. Three sets of economic cases pending at five High Courts were studied for the *Economic Survey*: company cases, arbitration cases and taxation cases. The overall pendency of the High Courts (Annex III), and the case-wise pendency of these economic cases at High Courts (Figure 4) continue to increase. The total backlog in High Courts by the end of 2017 as per the National Judicial Data Grid was close to 3.5 million cases. While the volume of economic cases is smaller than other case categories, their average duration of pendency is arguably the worst of most cases, nearly 4.3 years for 5 major High Courts. The average pendency of tax cases is particularly acute at nearly 6 years per case (Figures 3 and 4).

<sup>2</sup> The data relate to the Supreme Court, five of the major High Courts (Delhi, Madras, Bombay, Calcutta, and Allahabad), and six of the arguably most significant economic tribunals: telecommunications (Telecom Dispute Settlement and Appellate Tribunal- TDSAT), electricity (Appellate Tribunal for Electricity- APTEL), environment (National Green Tribunal- NGT), consumer protection (National Consumer Disputes Redressal Commission- NCDRC), central income tax (Income Tax Appellate Tribunal- ITAT), and central indirect taxes (Customs, Excise and Service Tax Appellate Tribunal- CESTAT).

<sup>3</sup> For the purpose of this chapter, the expression “pendency” denotes all cases instituted but not disposed of, regardless of when the case was instituted. The chapter does not separately calculate the life of “delayed” cases i.e. a case that has been in the judicial system for longer than the normal life of a case (See Report No. 245 Arrears and Backlog: Creating Additional Judicial (wo)Manpower, Law Commission of India (2014).



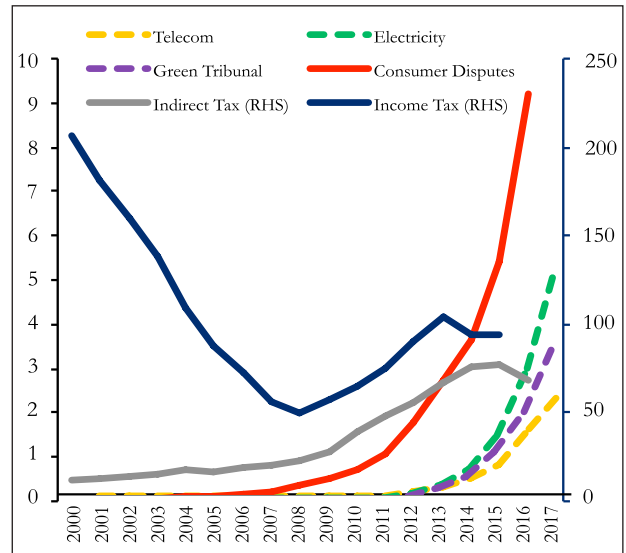
**Figure 1. Pending Cases: Stock  
(6 Appellate Tribunals, as on 31.10.2017)**



Source: Data from 6 Appellate Tribunals and Daksh.

9.9 Reductions in pendency, if any, were achieved either due to changes in the counting methodology of pending cases, or due to changes in pecuniary jurisdictions that led to a mass transfer of cases from the original side of the High Courts to District Courts. After such changes, the

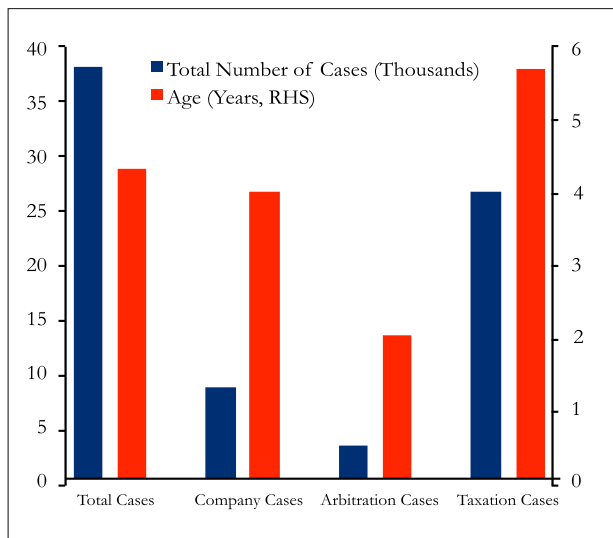
**Figure 2. Pending Cases: Flow (6 Appellate Tribunals, 2000- 2017 in Thousands, as on 31.10.2017)**



Source: Data from 6 Appellate Tribunals and Daksh.

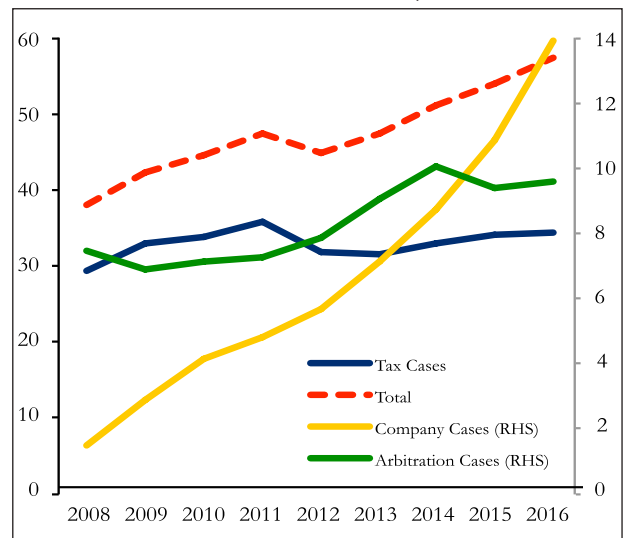
new stock of pending cases continued to grow at previous, if not higher rates (See Annex III). Intervening measures like the setting up of the National Judicial Data Grid and creation of tribunals have helped, but more is needed to improve the situation.<sup>4</sup>

**Figure 3. Pending Economic Cases: Stock  
(5 High Courts, as on 31.10.2017)**



Source: Data from 5 High Courts and Daksh.

**Figure 4. Pending Economic Cases: Flow  
(5 High Courts, 2008- 2016, in Thousands, as on 31.10.2017)**



Source : Data from 5 High Courts.

<sup>4</sup> In the case of the Bombay High Court, which has a critical role to play in economic and commercial cases, total pendency has soared from 23 lakh cases in 1993 to nearly 41 lakh cases in 2016 (See Annex III).

## PENDENCY AND DELAY: POSSIBLE REASONS

### *High Courts: Burden from Expansion of Discretionary Jurisdictions*

9.10 One reason for the rising pendency of economic cases at the High Courts could simply be the generalized overload of cases. Further, economic and commercial cases are usually complex, require economic expertise in their handling and disposal, and hence, require more judicial time. In some instances, however, this increased overload is due to the expansion of discretionary jurisdictions by Courts, without any countervailing measures that either balance the scope of other jurisdictions or improve overall administration and efficiency.<sup>5</sup>

9.11 For example, Articles 226 and 227 of the Constitution of India empower High Courts with carefully circumscribed writ jurisdiction.<sup>6</sup> In practice, however, High Courts have permissively and expansively interpreted this provision over a period of time, which has resulted in a substantial increase in Article 226 cases.<sup>7</sup> There are currently one million Writ Petitions pending at the 6 High Courts studied, constituting between 50-60%

of the Court backlog, with average pendency fluctuating between 3-10 years (See Annex IV). Data available for 2008- 2013 for 5 High Courts captures the continued rise in the pendency of Writ Petitions even in recent years, which is crowding out judicial time for other cases<sup>8</sup> (Annex V).

### *High Courts: Burden from Original Side Jurisdiction*

9.12 Some High Courts of the country retain a unique original jurisdiction, under which the High Court, and not the relevant lower court, transforms into the Court of first instance for some civil cases.<sup>9</sup> These cases occupy a significant share of the Court's docket. The Delhi and Bombay High Courts have original jurisdictions that occupy nearly 10-15% of their workload (Annex VII). In 2014, the share of original side cases was as high as 30% for the Delhi High Court. Data compiled for the *Economic Survey* suggests that the High Courts take longer to clear civil suits as compared to their district court counterparts. The average pendency of civil suits at the Delhi High Court is 5.84 years, while that at the lower courts of Delhi is 3.66 years (Table 1).<sup>10</sup>

**Table 1. Average Pendency of Civil Suits in Bombay and Delhi**

Court Name	Pending Cases	Average Pendency (in years)
Delhi High Court	19,740	5.8
Delhi Lower Judiciary	15,223	3.7
Bombay High Court	16,099	6.1
Maharashtra Lower Judiciary*	1,02,931	5.6

Source: Daksh.

\* Details unavailable for Greater Bombay cases which constitute original jurisdiction of Bombay High Court.

<sup>5</sup> The higher judiciary has transformed into Courts of first rather than last resort, and have consistently fused constitutional law and tort law, dissolving traditional distinctions between public and private law. The immediate fallout of this expansion has been the steady de-legitimization of the capacity of lower courts' private law mechanisms (Balganesh, 2016).

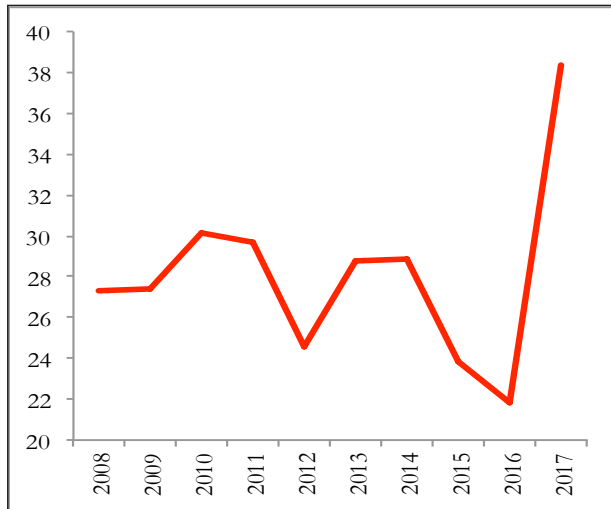
<sup>6</sup> The Supreme Court in 1958 limited this jurisdiction to seeing that courts and tribunals "do not exercise their powers in excess of their statutory jurisdiction, but correctly administer the law within the ambit of the statute creating them or entrusting those functions to them" (G. Verrappa Pillai v. Raman & Ramon Ltd, AIR 1952 SC 192). The Supreme Court warned against exercising appellate powers under writ jurisdiction, and held that "so long as those Authorities function within the letter and spirit of the law, the High Court has no concern with the manner in which those powers have been exercised" (Nagendra Nath Bora v. Commissioner of Hills Division and Appeals, Assam, AIR 1958 SC 398).

<sup>7</sup> Several of these writ petitions pertain to administrative law, service law, taxation law, labour law, and orders of tribunals.

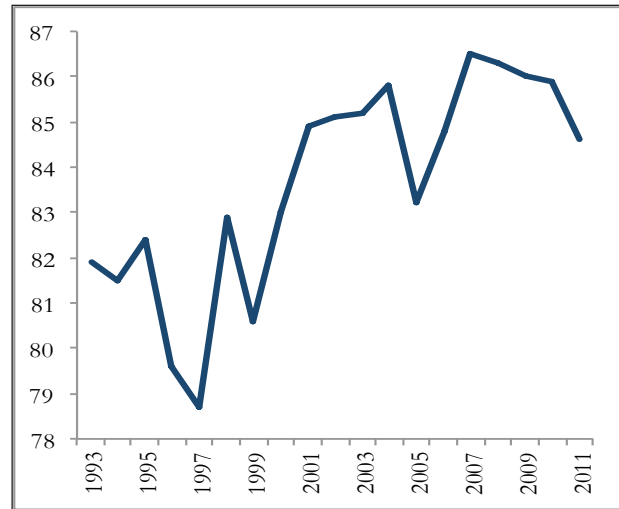
<sup>8</sup> Annex VI captures the expansion of Writ Jurisdiction and criminal quashing jurisdiction over a longer period of time, from 1980- 2016, on the basis of the number of High Court judgments that rely on Article 226 of the Constitution of India and Section 482 of the Code of Criminal Procedure.

<sup>9</sup> A Single Judge hears the cases; registrars conduct their trials; and an appeal from them lies before the Division Bench within the same High Court. The proportion of original side cases in these Courts has fluctuated with increases in pecuniary jurisdiction. For instance, in the case of the Delhi High Court, pecuniary jurisdiction was increased from 5 to 20 lakh in 2003, and from 20 lakh to 2 crores in 2016.

<sup>10</sup> The Supreme Court of India is currently monitoring delays in disposal of civil suits by the High Court of Delhi in Re: Case Management of Original Suits Suo Moto Writ Petition (Civil) No. 8/2017. Pursuant to the said case, the High Court of Delhi notified the Delhi High Court (Original Side) Rules, 2018, due to come in force on March 1, 2018.

**Figure 5. Percentage Share of cases in which SC Granted Leave**

Source: Supreme Court of India.

**Figure 6. Percentage Share of SLP Jurisdiction in SC's Admission Docket**

Source: Supreme Court of India and Robinson (2013).

### ***Supreme Court: Expansion of Special Leave Petition (SLP) Jurisdiction***

9.13 The Supreme Court, like the High Courts, has less capacity to deal with mounting economic cases because of rising overall pendency (See Annex VIII). In the case of the SC, the burden derives in part from Special Leave Petitions under Article 136 of the Constitution of India, which empowers any party to approach the Supreme Court directly from any court or tribunal. Initially invoked only in “exceptional circumstances”, SLPs are now an overwhelming feature of practice at the Supreme Court.<sup>11</sup>

9.14 As Figure 5 shows, the rate at which the

Supreme Court admits Special Leave Petitions under Article 136 of the Constitution increased from around 25% in 2008 to nearly 40% in 2016. In contrast, the Supreme Court of the United States of America and Canada admit 3% and 9% respectively of the cases filed before it (See Annex IX). This rising tendency to grant special leave has fundamentally altered the nature of the Court and created a high level of pendency, nearly 85% of which are SLP cases (Figure 6).<sup>12</sup> The Court's SLP jurisdiction does not include other cases like transfer and review petitions, each of which occupies nearly 4-6% of the Court's docket (Annex X)<sup>13</sup>. Simultaneously, the share of writ cases has gone down from 7% in 1993 to under 2% in 2011.<sup>14</sup>

<sup>11</sup> In 1950, the Court observed that it would “not grant special leave, unless it is shown that exceptional and special circumstances exist, that substantial and grave injustice has been done and that the case in question presents features of sufficient gravity to warrant a review of the decision appealed against” (Pritam Singh v. State, 1950 SCR 453; AIR 1950 SC 169). This high standard has been relaxed over decades, leading the Court to observe in 2004 that “in spite of the clear constitutional overtones that the jurisdiction is intended to settle the law so as to enable the High Courts and the courts subordinate to follow the principles of law propounded and settled by this Court and that this Court was not meant for redeeming injustice in individual cases, experience shows that such self-imposed restrictions placed as fetters on its own discretionary power under Article 136 have not hindered the Court from leaping into resolution of individual controversies” (Jamshed Hormusji Wadia v. Board of Trustees, Port of Mumbai (2004) 3 SCC 214).

<sup>12</sup> A Division Bench of the Supreme Court of India in Mathai @ Joby v George (2016) 7 SCC 700 had referred a case to a constitution bench to review the criterion for granting leave under Article 136 to reverse its transformation into a regular appellate court. However, on January 11 2016, a five-Judge constitution bench refused to reduce the scope of Article 136 either by issuing guidelines or by limiting the types of cases that could be granted special leave to appeal.

<sup>13</sup> Evidence also shows that this enhanced workload is largely from those with money, the government, and appellants geographically situated closer to New Delhi. (Robinson 2013).

<sup>14</sup> Interestingly, this precise concern of an increased SLP workload had been foreseen and debated during the Constituent Assembly Debates: “The question of possible congestion of work in the Supreme Court has included many honourable Members to oppose the provisions of these amendments... The fear of creating a serious congestion in that Court and also the fear that we will have to employ more Judges to deal with those cases is behind this opposition. I submit, however, that this fear is unjustified. So far as the question of law is concerned, it is only a ‘substantial question of law’, which will enable a party successfully to obtain a certificate or special leave” Constituent Assembly Debate dated 14th June 1949. The debates clarified that SLP jurisdiction would be invoked only in case of “a serious breach of some principle in the administration of justice, or breach of certain principles which strike at the very root of administration of justice as between man and man.” In light of the relaxation of standards of access to SLP jurisdiction, it is perhaps time for the Court to reconsider the scope of Article 136 of the Constitution, and lay down criteria similar to the Australian Judiciary Act, 1903 or the US Supreme Court Rules, for the sake of curbing not just the pendency of economic and other cases at the Court, but for preserving its character as the highest constitutional court of the country.

### Recourse to Injunctions and Stays

9.15 Rising pendency also results from the injunction of cases by Courts. For example, in the case of Intellectual Property Rights (IPR) cases shown in Table 2 below, injunctions have led to about 60 percent of cases being stayed, whose average pendency is 4.3 years.<sup>15</sup> Lengthy interim orders, ex parte ad interim stays, increasing rate of pendency of cases at final arguments, and few final judgments in IPR cases<sup>16</sup> are common traits of IPR practice across different High Courts. Nearly 50% of these cases are pending at the stage of pleadings, which is the stage at which parties are required to complete formal requirements before hearing (Annex XI and Annex XII). See Chapter 8 of the *Economic Survey* for details on delays and pendency in filing and grant of patents.

9.16 Another 12% of these cases are pending for final disposal. The average age of cases waiting for final judgment is inordinately high at 7.9 years, showing that more attention needs to be given to cases pending at the stage of final disposal (Figure 7).

**Table 2. Pending IPR Cases- Stock (Delhi HC)**

S. No.	Category	Total Cases	Stayed Cases	% of Stayed Cases
1.	Copyright	172	120	69.8%
2.	Patents	98	40	40.8%
3.	Trademarks	1219	704	57.8%
4.	Others	66	38	57.5%
<b>Total</b>		<b>1555</b>	<b>902</b>	<b>58%</b>

Source : High Court of Delhi.

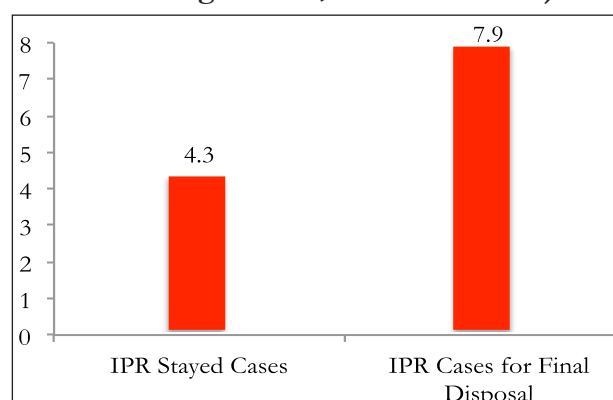
### PENDENCY AND DELAY: COSTS

#### Costs of delay

9.17 It is difficult to estimate the costs of pendency and delays. But some illustrative data are instructive in conveying a sense of potential magnitudes involved. Table 3 provides the number and value of government projects in six infrastructure ministries that are *currently* stayed by court injunctions, as well as the average duration of their stays. It does not include other central government projects or the multitude of state level projects that are similarly stalled by Court injunctions, nor past projects that suffered delays due to injunctions but were subsequently allowed to resume operations. The project costs (stocks) of stayed projects—at the time they were originally stayed—amounted close to 52,000 crores.

9.18 The Ministries of Power, Roads and Railways have been the hardest hit. Since project costs were predominantly debt-financed, it is likely that project costs have increased by close to 60 percent given the average duration of stay. Data collected from the State Bank of India (Table 4) revealed a similar picture for private sector infrastructure projects that sought extensions under Para 4.3.15.3 of an RBI Master circular due

**Figure 7. Average Age of Pending Cases-Stock (Stayed and Final Disposal IPR Cases, Delhi High Court, as on 31.10.2017)**



Source : High Court of Delhi.

<sup>15</sup> The increasing tendency (See Annexure 10) to grant injunctions at the interim stage has fundamentally altered the nature of IPR litigation before the High Courts, which led the Supreme Court in a recent case to ask “if the High Court had thought it proper to write such an exhaustive (interim) judgment only because of acceptance of the fact that the interim orders in Intellectual Property Rights (IPR) matters in the Delhi High Court would govern the parties for a long duration of time and disposal of the main suit is a far cry.” *M/s AZ Tech (India) & Anr. v. M/s Intex Technologies (India) Ltd. & Anr.*

<sup>16</sup> <https://spicyip.com/2017/06/143-patent-infringement-lawsuits-between-2005-and-2015-only-5-judgments.html>.

**Table 3. Stayed Projects- Stock (6 Ministries, as on 31.10.2017)**

Ministry	Stayed Projects	Total Value (Rs Crores)	Duration of Stay (Years)
Shipping	2	2620	5.9
Power	11	23,913	3
Road	30	11,216	3
Petroleum	2	342	0.9
Mines	12	106	4.5
Railways	12	13,882	3
<b>Total</b>	<b>52</b>	<b>52,081</b>	<b>4.3</b>

Source : Data from six Ministries.

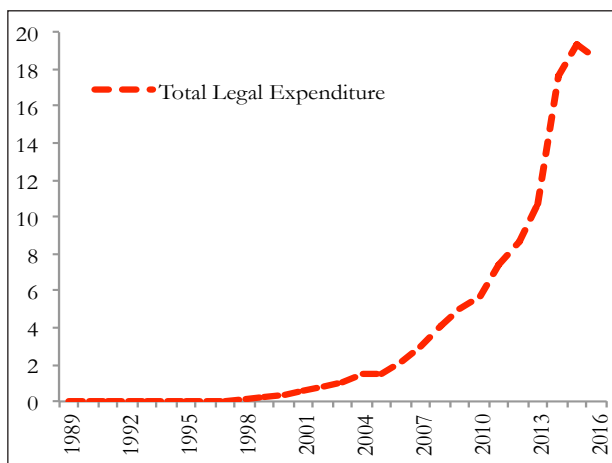
**Table 4. Projects Financed by SBI That Sought RBI Extensions- Last 3 Years**

Total Number of Projects	Total Project Value (Rs Crores)	Number of Extensions Sought
11	33540	28

Source : State Bank of India.

to arbitration proceedings or court cases (Annex XIII).

9.19 The overall impact of rising pendency at Appellate Tribunals, High Courts and the Supreme Court, coupled with the rising use of injunctions and other blunt instruments has led

**Figure 8. Legal Expenses of Corporate India: Flow (1988- 2016, in thousand crores)**

Source : Prowess Database of the Centre for Monitoring Indian Economy Pvt. Ltd. (CMIE).<sup>17</sup>

to spiraling legal expenses of Corporate India, as shown in Figure 8.

### CENTRAL GOVERNMENT TAXES: A CASE STUDY

9.20 Pendency, arrears and delays are not just a feature of courts and tribunals, but also the Tax Departments and their multi-layered process.<sup>18</sup>

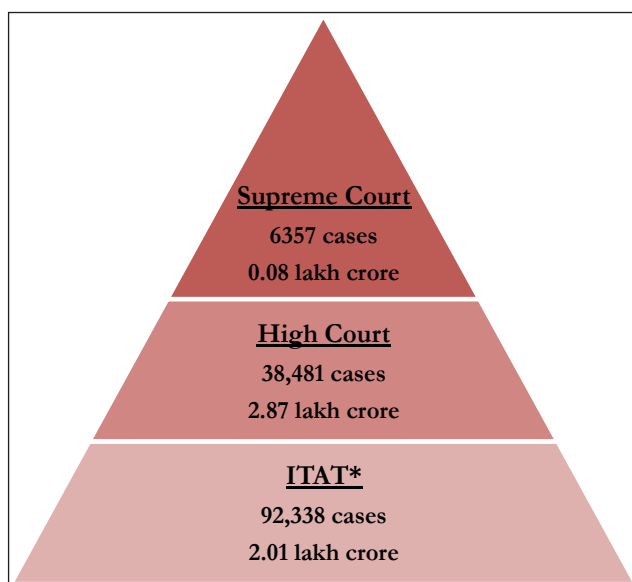
9.21 As of March 2017, there were approximately 1,37,176 direct tax cases under consideration at the level of ITAT, High Courts and Supreme Court (Figure 9). Just 0.2% of these cases constituted nearly 56% of the total demand value; and 66% of pending cases, each less than Rs. 10 lakhs in claim amount, added up to a mere 1.8% of the total locked-up value of pending cases.

9.22 The picture is not dissimilar in the case of indirect taxes shown in Figure 10. As of the quarter ending March 2017, a total of 1.45 lakh appeals were pending with the Commissioner (Appeals), CESTAT, HCs and the SC together, that were valued by the Department at 2.62 lakh crores. Together, the claims for indirect and

<sup>17</sup> Prowess is a database of the financial performance of over 27,000 companies. It includes all companies traded on the National Stock Exchange and the Bombay Stock Exchange, thousands of unlisted public limited companies and hundreds of private limited companies. It also includes a number of important business entities that are not registered companies.

<sup>18</sup> After scrutiny, the Department or assesses have the option of approaching the Commissioner of Income Tax-Appeals (CIT-A), the Income Tax Appellate Tribunals (ITAT), the High Courts (HC) and finally the Supreme Court of India (SC). Similarly, in the case of indirect tax litigation, the Department and assessee have the option of approaching the Commissioner (Appeals), the Customs, Excise and Service Tax Appellate Tribunal (CESTAT), the High Courts and the Supreme Court of India.



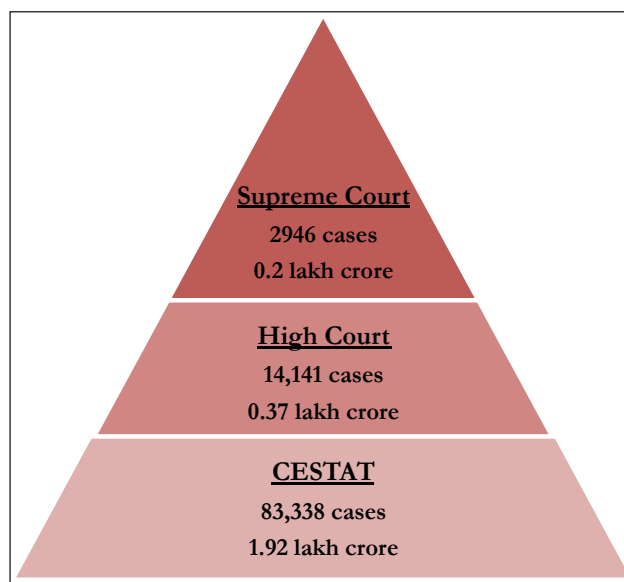
**Figure 9. Direct Taxes, as on 31.03.2017**

Source: Survey calculations.

\* Provisional estimates.

direct tax stuck in litigation (Appellate Tribunal and upwards) by the quarter ending March, 2017 amounted to nearly 7.58 lakh crores, over 4.7 percent of GDP. For the Department, these numbers, especially the value of amounts involved have been rising sharply over time (See Annex XIV).

9.23 What is interesting is that the success rate of the Department at all three levels of appeal-- Appellate Tribunals, High Courts, and Supreme Court-- and for both direct and indirect tax litigation is under 30%. In some cases it is as low as 12% (See Table 5). The Department unambiguously loses 65% of its cases. Over a period of time, the success rate of the Department

**Figure 10. Indirect Taxes, as on 31.03.2017**

Source: Survey calculations.

has only been declining, while that of the assesseees has been increasing (Annex XV).

9.24 Nonetheless, the Department is the largest litigant. As Table 5 shows, the Department's appeals constitute nearly 85% of the total number of appeals filed in the case of direct taxes, though that number seems to have improved in the case of indirect taxes. Of the total number of direct tax cases pending by the quarter ending March, 2017, the Department initiated 88% of the litigation at ITATs and the Supreme Court and 83% of the litigation pending at High Courts.

9.25 The picture that emerges over a period of time is the following: even though the Department's

**Table 5. Petition Rate and Success Rate of the Tax Department, as on 31.03.2017**

Direct Tax Cases			Indirect Tax Cases	
Court	Success Rate <sup>19</sup>	Petition Rate <sup>20</sup>	Success Rate	Petition Rate
Supreme Court	27%	87%	11%	63%
High Courts	13%	83%	46%	39%
ITAT/CESTAT	27%*	88%*	12%	20%

Source: Survey calculations.

Source: Survey calculations.

\* Provisional estimates.

<sup>19</sup> The success rate of the Department is calculated as the proportion of cases in which the respective court or tribunal rules totally or partially in favour of the Department. Cases that are set aside by the judicial authority are excluded from this calculation.

<sup>20</sup> The Petition Rate of the Department is the percentage of the total number of appeals filed by the Department. The remaining appeals are those filed by the assesseees.

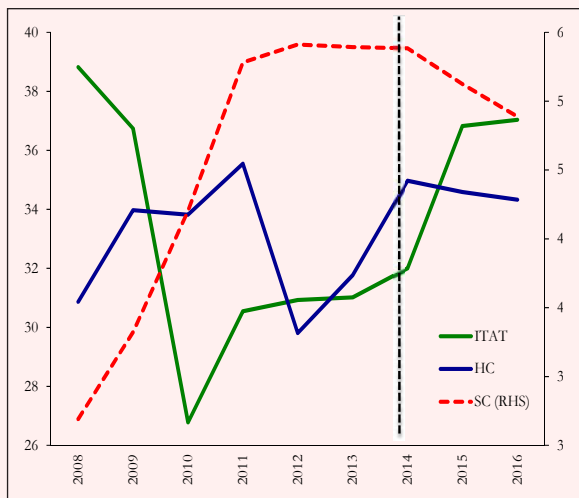


### Box 1. Supreme Court's Successful Management of Tax Litigation

The Supreme Court is the highest court of the land that deals with a wide array of cases. When not dealing with substantial questions of law or constitutional issues requiring the constitution of special-sized benches, the Court sits in benches comprising of two judges to decide cases from High Courts and other forums of the country. The benches are expected to hear and decide cases from a wide range of subject matters inter alia constitutional law, criminal law, civil law, commercial law, and taxation.

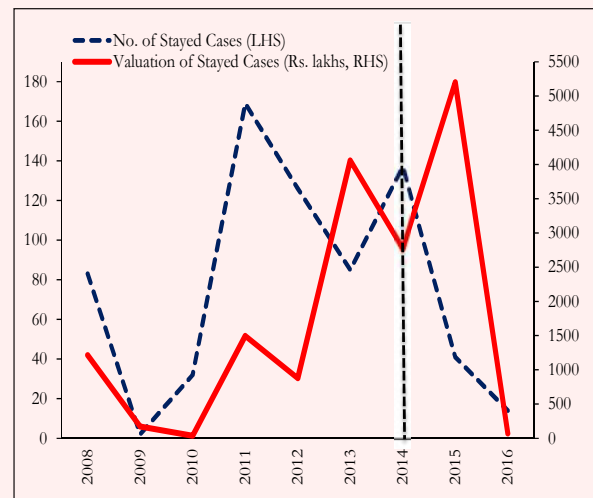
However, the Court's recent experiment with constituting an exclusive bench for taxation produced impressive results, which may be replicated for other subject matters, and emulated by other High Courts that do not have special rosters for daily hearings. Figure 1 shows that since the constitution of the tax bench in 2014, the Supreme Court has been able to reverse the trend of burgeoning pendency of tax cases. It is noteworthy that during this period, the SC reduced its reliance on staying claims of the Department, and focused on hearing and disposing cases, as evident from Figure 2.

**Figure 1. Pendency of Tax Cases at ITAT, HC and Supreme Court (in thousands)**



Source: Survey Calculations.

**Figure 2. Details of Stayed Tax Cases in the Supreme Court**



Source: Survey Calculations.

Besides reducing pendency and backlog, this phase of the Supreme Court saw a large number of judgments on law, and permitted the Court to discharge its envisaged role of clarifying and settling legal questions. The special bench authored 197 judgments in 2015, nearly three times as many passed in the previous three years.<sup>1</sup>

There are other profound benefits of dedicated subject-matter benches. Such benches ensure that the Supreme Court speaks in one voice, and there is continuity and consistency of legal jurisprudence. Further, they create efficiencies by allowing the judge to focus on the specialized branch of law placed before her. The model may be replicated for other commercial and economic areas of law as and when necessary at the Supreme Court, and should be replicated by every High Court of the country.

The Supreme Court's experience also confirms that Courts can take steps within existing design and capacity constraints to ameliorate pendency, particularly through specialized treatments of cases. For instance, there may be merit in handling different stages of cases also through specialized benches. Currently, most High Court judges hear cases in the following order: supplementary matters (new cases), advanced matters (admitted cases), and regular matters (cases listed for final disposal). Every judge starts the day with fresh cases, and reaches old cases only during the second half of the day, if at all. The experience of the SC's management indicates that it may be more prudent to create category-wise benches that exclusively deal with cases at the stage of final hearing for the entire working week, so that they are given the attention that the IPR data (Table 2) show are necessary.

<sup>1</sup> <http://www.livemint.com/Politics/EFALB5X66jz0i2KkiE7WeL/The-apex-courts-tax-bench-experiment.html>.

**Table 6. Positions and Vacancies in High Courts and the Supreme Court**

Total Number of Positions	No. of Vacancies	Vacancies as % o Total Capacity	Current Working Capacity
1079	392	36.3%	63.6%

Source: Ministry of Law and Justice.

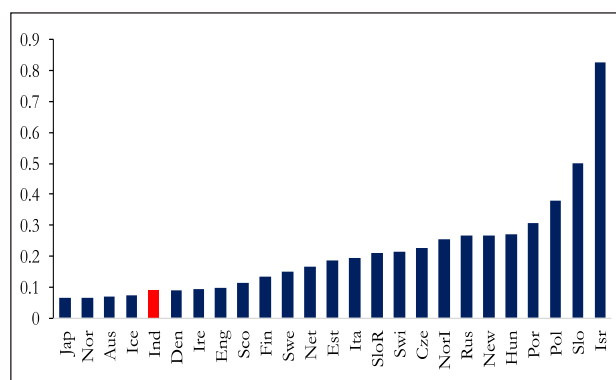
strike rate has been falling considerably over a period of time, it is undeterred, and persists in pursuing litigation at every level of the judicial hierarchy (See Annex XV and Annex XVI). Since tax litigation constitutes a large share of the workload of High Courts and the Supreme Court, Courts and the Department may gain from a reduction in appeals pursued at higher levels of the judiciary. Less might be more.

### EXPENDITURE ON ADMINISTRATION OF JUSTICE

9.26 Total spending on Administration of Justice by States and the Centre constitutes approximately 0.08- 0.09% of GDP which is low when compared to other countries, especially common law countries (Figure 11). Research shows that while general spending on the judiciary may not impact pendency, spending on modernization, computerization and technology leads to shorter average trial lengths.<sup>21</sup>

9.27 The Government may consider including efforts and progress made in alleviating pendency

**Figure 11 : Budget Allocated to Courts as a Percentage of GDP**



Source : OECD Economics Policy Papers and Ministry of Finance.<sup>22</sup>

<sup>21</sup> Judicial performance and its determinants: a cross-country perspective, OECD Economic Policy Papers No. 5, June 2013.

<sup>22</sup> Jap- Japan, Nor- Norway, Aus- Australia, Ice- Iceland, Ind- India, Den- Denmark, Ire- Ireland, Eng- England and Wales, Sco- Scotland, Fin- Finland, Swe- Sweden, Net- Netherlands, Est- Estonia, Ita- Italy, SloR- Slovak Republic, Swi- Switzerland, Cze- Czech Republic, NorI- Northern Ireland, Rus- Russia, New- New Zealand, Hun- Hungary, Por- Portugal, Pol- Poland, Slo- Slovenia, Isr- Israel.

in the lower judiciary as a performance-based incentive for States. Further, expenditure may be prioritized for filing, service and other delivery related issues that tend to cause the maximum delays. Data compiled for the *Economic Survey* reveals that nearly 30% of a case's life is taken up by formal proceedings like service of summons and notices (See Annex XVII), issues that may be easily resolved through technological upgradation for filing and service mechanisms.

9.28 However, building additional judicial capacity may not be effective unless existing capacity is fully utilized. The higher judiciary is currently operating at 63.6% of existing capacity (Table 6). Experience from the 1990s confirms that increasing judicial capacity in the case of Income Tax Appellate Tribunals in the mid-1990s substantially reduced pendency (See Annex XVIII).

### POLICY IMPLICATIONS

9.29 Pendency, delays and injunctions are overburdening courts and severely impacting the progress of cases, especially economic cases, through the different tiers of the appellate and judicial arenas. The Government and the Courts need to both work together for large-scale reforms and incremental improvements to combat a problem that is exacting a large toll from the economy. Some of the following steps may be considered:

- (i) Expanding judicial capacity in the lower courts and reducing the existing burden on the High Courts and Supreme Court;
  - For a smooth contract enforcement regime, it may be imperative to build capacity in the lower judiciary to particularly deal with

economic and commercial cases, and allow the High Courts to focus on streamlining and clarifying questions of law. For the same, amendments to the Code of Civil Procedure, Commercial Courts Act and other related commercial legislations should be considered (See Annex XIX). These measures must be buttressed by efforts to train judges, particularly in commercial and economic cases by judicial academies;

- Downsizing or removing original and commercial jurisdiction of High Courts, and enabling the lower judiciary to deal with such cases. Early results from the Delhi High Court suggest that reducing the size of original side jurisdiction in 2016 allowed the court more time to reduce its overall pendency (See Annex XX);<sup>23</sup>
  - Courts may revisit the size and scale of their discretionary jurisdictions and avoid resorting to them unless necessary, to reclaim the envisaged constitutional and writ stature of the higher judiciary;
  - Existing judicial capacity ought to be fully utilized.
- (ii) The tax department exercising greater self-restraint by limiting appeals, given its low success rate. This could either take the form of *ex ante* rules limiting appeals, for example, to no more than one in four High Court verdicts or no more than one in three arbitration cases; or, given the long shadow of the 3 Cs (CBI, CVC, and CAG) in inducing bureaucratic risk-aversion, perhaps an independent Panel could be created to decide on further appeals of tax verdicts against the Department. Further, the number of tiers of scrutiny may be limited to three forums for taxation cases.

(iii) Substantially increasing state expenditure

on the judiciary, particularly on their modernization. The Government may consider incentivizing expenditure on court modernization and digitization. This needs to be supported with greater provision of resources for both tribunals and courts. Moreover, legislations (and perhaps even judicial decisions that expand or introduce new jurisdictions) should be accompanied by judicial capacity and public expenditure memorandums, which adequately lay out the necessary provisions required to address increasing judicial requirements, and ensure their adequate funding. The amounts required may be negligible but the returns enormous;

- (iv) Building on the success of the Supreme Court in disposing tax cases, creating more subject-matter and stage-specific benches that allow the Court to build internal specializations and efficiencies in combating pendency and delay;
- (v) Reducing reliance on injunctions and stays. Courts may consider prioritizing stayed cases, and impose stricter timelines within which cases with temporary injunctions may be decided, especially when they involve government infrastructure projects; and
- (vi) Improving the Courts Case Management and Court Automation Systems.<sup>24</sup> The EODB, 2018 identified specific issues with India's poor Court Management and Court Automation systems, which may be used as a template by Courts and the Government (See Annex XXI). To free up judicial time, initiatives like the Crown Court Management Services of the UK that are dedicated to the management and handling of administrative duties, may be considered.

9.30 Discussions that dominate public discourse about relations between the judiciary and other branches of government are to some extent moot. The point is not which side is right, but that the

<sup>23</sup> The government taskforce formed to discuss reform measures for ease of doing business noted: "Measures introduced to streamline commercial disputes under the Commercial Courts Act has had no impact on the indicator's data. As Mumbai and Delhi High Courts have original jurisdiction, commercial courts have not been established at the district level, rather commercial divisions of High Courts have been established. In this regard, the High Courts of Delhi and Mumbai are being consulted and inputs from the Department of Legal Affairs has been sought."

<sup>24</sup> Devesh Kapur and Milan Vaishna, Strengthening India's Rule of Law <http://www.livemint.com/Opinion/N3pY337lNtBRtXQs7GO3O/Strengthening-Indias-rule-of-law.html>.

legitimacy and effectiveness of each depend on the lack thereof of the other. According to public perception, there is some Law of Constant Overall Legitimacy and Effectiveness, with one side's loss being the other's gain. However, this should probably give way to the Law of Mutually Reinforcing Legitimacy and Effectiveness. It is perhaps also true that the judiciary, especially the High Courts and Supreme Court, are still considered fair and final arbiters. The lament of increasing judicialization must contend with that perception.

9.31 Recent experience with the GST has shown that vertical cooperation between the center and states--Cooperative Federalism--has brought transformational economic policy changes. Perhaps there is a horizontal variant of that--one might call it the Cooperative Separation of Powers--that could be applied to the relationship between the judiciary on the one hand, and the executive/legislature on the other. There are, of course, clear lines of demarcation and separation of powers between the two to preserve independence and legitimacy. Even while respecting these lines, it should be possible and desirable for these branches to come together to ensure speedier justice to help overall economic activity.

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