Reserve Bank of India
OCCASIONAL PAPERS
Vol.39 - No. 1&2 2018 ISSN 0972 - 7493

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Book Reviews

RESERVE BANK OF INDIA

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VOLUME 39 - NO.1&2 2018

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Price : Inland : ₹ 200
₹ 250 (inclusive of postage)
Foreign : US $ 18 (inclusive of air mail courier charges)

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Agricultural Loan Waiver: A Case Study of Tamil Nadu's Scheme

Deepa S. Raj and Edwin Prabu A.*

This paper examines the impact and implications of Tamil Nadu's agricultural loan waiver scheme of 2016, based on data collected through a field survey of seven districts of the state as well as farm loan transactions data obtained from select primary agricultural co-operative credit societies. The state government's loan waiver scheme was applicable only to agricultural loans availed by small and marginal farmers, while other farmers with land holdings of above 5 acres were not eligible for the waiver benefit. Empirical findings using Regression Discontinuity Design (RDD) suggest that in the immediate post-waiver period near the cut-off acreage of 5 acres, the probability of obtaining credit was higher for non-beneficiary farmers than for beneficiary farmers. However, the differentiation in post-waiver access to credit to the beneficiary farmer and the non-beneficiary farmer comes down as the supply of funds for agricultural loans normalises.

JEL Classification : G20, G28, Q14, Q18

Keywords : Agricultural loan waiver, credit, small and marginal farmers, regression discontinuity design

Introduction

Farmers in India take recourse to debt, both from formal and informal sources, not only to meet their investment needs but also to smoothen

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consumption in the face of adverse income shocks. At very high levels of debt, apart from the inability to repay it, the loss of creditworthiness no longer acts as a deterrent for non-repayment of loans, particularly those acquired through formal channels (Chakraborty and Gupta, 2017a). Debt relief/waiver schemes are, therefore, used by governments as a quick means to extricate farmers from their indebtedness, helping to restore their capacity to invest and produce. The costs and benefits of such debt relief schemes are, however, widely debated in the literature (Patel, 2017). Apart from adding to the financial stress of governments whose fiscal space may already be constrained, they may work against the borrowing farmers if lending institutions refrain from extending loans to defaulters by construing that they are likely to default again. Borrowers' expectation of repeated bailouts by the government may vitiate credit culture among farmers and may further constrict farm lending (De and Tantri, 2016).

Empirical research on agricultural debt waivers in India are mostly centred around the Agricultural Debt Waiver and Debt Relief Scheme (ADWDRS) 2008 of the Government of India (GoI), under which ₹525.16 billion of agricultural debt issued by commercial and cooperative banks were waived.[1] Past research found mixed evidence of the impact of ADWDRS on agricultural households (Annex 1). On the borrower's side, while debt relief was found to help reduce the overall household debt (Giné and Kanz, 2017; Kanz, 2016), there appears to be differential impact on distressed beneficiaries who benefit significantly from it compared to non-distressed beneficiaries whose loan performance worsens after the waiver (Mukherjee *et al.*, 2017). Although agricultural debt waivers aim to increase investment and productivity of beneficiary households, empirical evidence does not support it (Kanz, 2016). Waiver impact on beneficiary farmers' consumption and savings indicates that while the level and pattern of consumption remained unaffected, there was a rise in precautionary savings in the form of increased investment in jewellery, likely due to anticipation of higher credit constraints in the post-waiver period (Mishra *et al.*, 2017). There appears to be no evidence of improvement in the *ex post* repayment behaviour of the waiver beneficiaries. In fact, an expectation of similar debt relief in future generates moral hazard and strategic loan default, *i.e.,* loan defaults become sensitive to the electoral cycle after debt relief (Giné and Kanz, 2017).

[1] The Scheme covered all agricultural loans issued between 1997 and 2007 which were overdue at the end of 2007 and remained in default until February 28, 2007.

On the credit supply side, post-waiver lending slowed down in districts where the exposure to waivers was high, as banks shifted credit to observably less risky regions (*ibid.*). While this indicates improvement in efficiency of credit allocation post-waiver, on the flip side, restricted lending to backward districts could widen regional disparities. Difficulties in obtaining formal credit post-waiver could lead farmers to factor in future credit constraints and hence shift to informal sources of credit (Kanz, 2016). Consequently, loan waivers can have a dampening impact on lending by rural credit institutions (RBI, 2018).

Against the backdrop of several state governments announcing agricultural loan/debt waiver schemes in the recent past, this study has taken up Tamil Nadu's agricultural loan waiver scheme of 2016 as a case study. This is the second instance when the state has waived farm loans, the first being in 2006, even before the central government's ADWDR scheme of 2008. The study differs from the existing literature on agricultural loan/debt waivers in India—it examines the impact and implications of a state-level debt waiver scheme, taking into account policies which are more specific to the state[2], unlike most other studies which have largely concentrated on the impact of the central government's debt waiver scheme.

Like most other agricultural loan/debt waivers, Tamil Nadu's scheme was implemented in fulfilment of an electoral promise, but the structure of the scheme differed significantly from other schemes (Annex 2). First, the scheme was applicable only to agricultural loans taken from rural co-operative institutions and not to loans from commercial banks[3]. Second, it was restricted to loans taken by small and marginal farmers with landholdings of 5 acres or less. Third, the scheme did not make a distinction between running loans and overdue loans. Hence, all the farmers who had an outstanding loan (as on March 31, 2016) were entitled to the waiver. Fourth, although there was no explicit ceiling on the waiver amount per farmer, the average loan size per farmer did not exceed ₹100,000 since lending by co-operatives was based on scale of finance. Fifth, although the farmers were provided loan/debt relief by the co-operative institutions on the year of the implementation, the state

[2] The only other study on a state-level agricultural debt waiver scheme in India is Chakraborty and Gupta (2017b) on Uttar Pradesh government's Rin Maafi Yojana, 2011.

[3] Based on Basic Statistical Returns data from RBI, outstanding loans extended by commercial banks in Tamil Nadu, meant for direct financing of agriculture, were to the tune of ₹1,025.38 billion as at end-March 2016. In contrast, the outstanding loans of small and marginal farmers from co-operative institutions which were waived by the state government amounted to ₹53.19 billion.

government spread the reimbursement of the same to these institutions over a five-year horizon, thereby reducing its fiscal burden.

Given the structure of the waiver scheme, as elucidated above, it is clear that the fiscal cost of the agricultural loan waiver is not too high for Tamil Nadu. The focus of this study, therefore, is on the ramifications of the waiver on farmers and co-operative institutions. With regard to farmers, the study seeks to find the major sources of funding to meet repayment obligations in the absence of the waiver. It also attempts to ascertain whether there has been an increase in the number of new borrowers post-waiver indicating moral hazard associated with debt waivers. With regard to co-operatives, it examines whether the waiver has affected the ability and willingness to lend to beneficiary farmers *vis-à-vis* non-beneficiary farmers.

The remainder of the paper is organised as follows. Section II provides an overview of agricultural credit extended by co-operatives in Tamil Nadu and discusses in detail the agricultural loan waiver schemes, both by the central government and the Tamil Nadu government, including the latest scheme of 2016. Section III sets out the empirical strategy covering data sources, descriptive statistics of the study, and the methodology for the empirical exercise using Regression Discontinuity Design (RDD). The results of the empirical exercise and the discussion thereof are explored in Section IV. Section V presents the concluding observations and sets out the way forward.

Section II

Agricultural Credit by Co-operatives in Tamil Nadu

Co-operative Credit Structure in Tamil Nadu

Short-term rural credit structure in the state consists of three tiers: (a) Tamil Nadu State Apex Co-operative Bank Ltd (TNSCB) at the state level; with 47 branches, (b) 23 district central co-operative banks at the district level, with 855 branches; and (c) 4,462 primary agricultural co-operative societies at the village level. The long-term credit structure consists of the Tamil Nadu Co-operative State Agriculture and Rural Development Bank at the state level and 180 primary co-operative agriculture and rural development banks at the *taluk*/block level. The urban co-operative banks provide banking services to the people in the towns and cities.

Agricultural credit by the co-operative sector is extended through primary agricultural cooperative credit societies/banks (PACCS) with resources from

the district central co-operative banks (DCCBs) for issuing both short-term and medium-term agricultural loans to the farmers. Apart from their own resources, the DCCBs also avail credit from TNSCB which, in turn, utilises its own funds as well as channelises the refinance from National Bank for Agriculture and Rural Development (NABARD), for agricultural purposes and for activities allied to agriculture.

The short-term loans, also known as crop loans, with a maturity period of less than 15 months, are issued by PACCS for agricultural purposes depending on the crop cultivated. PACCS do not use their own funds but extend these loans from the funds provided by the DCCBs, TNSCB and NABARD. Crop loans upto ₹100,000 are provided against standing crops on personal surety. The farmers can obtain crop loans above ₹100,000 by providing adequate security in the form of property mortgage or by pledging jewellery for the loans. Medium-term loans with a maturity of three to five years are provided to members who are farmers, for undertaking allied activities such as dairying, sheep rearing and poultry farming. Primary agricultural co-operative societies, which have a sound financial position, also sanction loans for purposes such as purchase of tractors, power tillers and other agricultural implements.

Overview of Agricultural Debt Waiver Schemes in the State

Agricultural Loan Waiver Scheme, 2006

In an unprecedented step, the Government of Tamil Nadu waived off agricultural loans taken by farmers from co-operative banks/societies and outstanding as on March 31, 2006. This differs strinkingly from all the previous occasions, wherein the Tamil Nadu government had only waived off the interest/penal interest to be paid by the farmers (Table 1). To ensure continued services of co-operative institutions in providing loans to the farmers, the state government decided to reimburse the co-operatives, the entire amount which was to be waived off in five equal instalments between 2006–07 and 2010–11, with an interest of 8 per cent per annum. The government also took over the liabilities of the TNSCB and Tamil Nadu Co-operative State Agriculture and Rural Development Bank that was owed to NABARD.[4] While the state government had disbursed four instalments in full, the last instalment was only partially disbursed in 2010–11 due to administrative reasons.

[4] Out of the total loan waiver of ₹53.70 billion, short-term and medium-term loans constituted ₹43.84 billion and long-term loans amounted to ₹9.86 billion.

Table 1: State Government Measures for Agricultural Loans from Co-operative Institutions

Year of announcement	Policy measures	Extent of relief borne by the Government	Cost to the exchequer (₹ million)
1	2	3	4
1996	Waiver of penal interest rate on agricultural loans	3 per cent on overdue loans	200
1999	Interest waiver for prompt payment within due date for crop loans taken from July1, 1999 to June 30, 2000	7 per cent on outstanding loans	360
2001	Waiver of interest and penal interest for farmers who had paid their dues before November 30, 2001 with respect to overdue outstanding as on June 30, 2000		2,560
2003	Conversion of short-term loans to medium term loans for loans issued from April 1, 2002 to September 30, 2002	Waiver of interest	200
March 2004	Interest waiver for prompt payment within due date for crop loans taken from April 1, 2003 to March 31, 2004		610.5
September 2004	Rescheduling of crop loans as on March 2004		6,450
2006	Waiver of principal and interest/penal interest on all agricultural loans taken by farmers from co-operative banks/ societies as on March 31, 2006	Principal and interest on outstanding loans, interest @ 8 per cent for staggered payment over five years	65,263
2009	Full interest waiver for prompt payment of all crop loans	6 per cent	1,400
2016	Waiver of principal and interest/penal interest on all outstanding agricultural loans as on March 31, 2016 taken by marginal and small farmers from co-operative banks/societies	Principal and interest on outstanding loans, interest @ 8 per cent for staggered payment over five years	60,950

Source: Compiled from various budget documents of the Tamil Nadu government and S. Vydhianathan (2006).

Although the waiver helped farmers who could not repay loans due to successive droughts, there were certain complaints regarding issuance of loans by banks in some districts. Crop verification as well as cross-verification of landholdings were not done at the time of issue of loans. At the same time, loans for certain crops were issued in regions where cultivation of such crops was not tenable in the first place.

Agriculture Debt Waiver and Debt Relief Scheme, 2008

The Government of India (GoI) announced the ADWDRS, 2008 in the Union Budget for 2008–09. The scheme sought to mitigate the distress of the farming community in general, and small and marginal farmers in particular, to de-clog institutional credit channels, to catalyse flow of credit to agriculture and to enhance agricultural production and productivity. The scheme covered direct agricultural loans disbursed by commercial banks and co-operative societies between March 31, 1997 and March 31, 2007 which were overdue as on December 31, 2007 and remained unpaid until February 29, 2008. The scheme made a distinction between loans taken by small and marginal farmers and other farmers. With respect to small and marginal farmers, the scheme covered their short-term production loans (subject to a ceiling in respect of plantation and horticulture) and installments of investment loans which were overdue. However, in the case of other farmers, the scheme provided for a one-time settlement, under which a rebate of 25 per cent of the eligible amount was given on the condition that the farmer repaid the balance 75 per cent in three instalments.

Out of the total beneficiary farmers of 1.76 million in Tamil Nadu, 1.43 million small and marginal farmers were given a debt waiver and 0.33 million other famers were given debt relief (GoI, 2014). Tamil Nadu accounted for 5.2 per cent of the total amount provided by GoI as debt waiver/relief and 4.8 per cent in terms of the number of beneficiary farmers under the scheme. Out of the total outstanding debt of ₹33.5 billion waived off for small and marginal farmers in Tamil Nadu, only ₹1.25 billion constituted the outstanding debt from co-operative institutions. Debt relief for other farmers who had borrowed from co-operative institutions in the state amounted to ₹0.18 billion.

Agricultural Debt Waiver Scheme, 2016

The Government of Tamil Nadu waived off all crop loans, as well as medium-term and long-term agricultural loans availed by small and marginal farmers from co-operative societies that were outstanding in their books as on March 31, 2016. As per the scheme, the principal and interest on all outstanding loans would be reimbursed to the co-operative institutions, while the institutions themselves would have to bear penal interest and other charges on overdue loans. As the reimbursement will be spread over five years, the state government is paying an interest of 8 per cent on reduced balance for the staggered reimbursements. Thus, although the loan waiver benefit to the farmers was ₹ 53.19 billion, the total cost to the state exchequer on account of the debt waiver scheme amounts to ₹ 60.95 billion (Table 2).

Table 2: Details of Agricultural Loans Waived in 2016

Amount in ₹ Billion

Loan type	No. of beneficiary farmers	Principal waived	Interest waived	Penal interest on outstanding loans	Other charges	Total amount waived	Amount to be borne by the co-operatives	Interest @ 8 % for staggered payment	Amount to be borne by the state government*
1	2	3	4	5	6	7=3+4+5+6	8=5+6	9	10
Crop loans and Medium Term Agricultural Loans	11,99,535	48.81	3.77	0.34	0.04	52.95	0.38	7.55	60.67
Long term loans	2,540	0.13	0.10	0.01	0.00	0.23	0.01	0.05	0.28
Total	12,02,075	48.93	3.87	0.34	0.04	53.19	0.38	7.61	60.95

*: Includes commitment to NABARD

Source: Department of Co-operation, Food and Consumer Protection, Government of Tamil Nadu.

Section III

Empirical Strategy

Governments, in general, grant loan waivers to reduce debt overhang and help spur agricultural investment. However, as can be seen in Table 2, the penal interest on outstanding loans at the time of the loan waiver was very low, reflecting the low overdue status of existing loans. This begs the following question: How do farmers repay the loans when they continue to face financial stress, as is widely reported? Furthermore, one of the major criticisms raised against the grant of loan waivers by governments is that it affects credit discipline, thereby limiting future access of waiver beneficiaries to institutional credit. Against this backdrop, our study attempts to test the following hypotheses:

Hypothesis 1: Why is agricultural loan default low despite farmers facing financial stress and what are the sources of funds for repayment?

In order to test this hypothesis we use data collected from field surveys conducted on beneficiary and non-beneficiary farmers in the selected districts.

Hypothesis 2: Post-waiver access to short-term agricultural credit is higher for non-beneficiary farmers compared to beneficiary farmers.

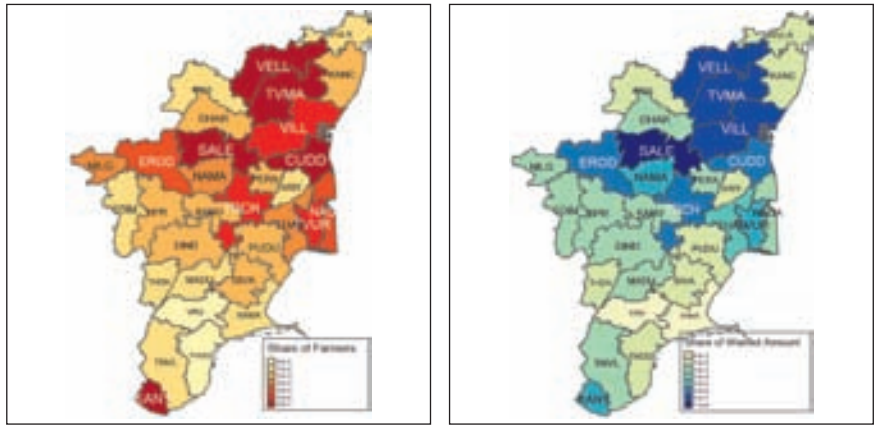
RDD using loan transaction-level data obtained from the selected PACCS is employed to test this hypothesis.

Data Sources

(i) ***Primary Data Collection through Survey***

A field survey was conducted in seven districts of Tamil Nadu, namely Salem, Namakkal, Tiruchirappalli, Thanjavur, Vellore, Thiruvannamalai and Ramanathapuram. While the selection of these districts was largely governed by their relative share in the number of beneficiary farmers and the amount of debt waived off, care was also taken to cover four out of the seven agro-climatic zones of the state (Chart 1). These include the Cauvery Delta region (Thanjavur and Tiruchirappalli districts), the moderately drought-prone, north-western region (Salem and Namakkal districts), semi-arid districts of the north-eastern region (Vellore and Thiruvannamalai districts) and the arid terrain of Ramanathapuram. Although the state receives maximum rainfall during the north-east monsoon season, districts of Salem and Namakkal also receive significant quantum of rainfall during the south-west monsoon season.

Chart 1: Agricultural Loan Waiver – Spatial Distribution of Beneficiaries and Amount Waived



The rainfall pattern during the monsoons in the three years prior to the waiver is given in Annex 3.

Twenty-two PACCS were selected for the survey, with 10 PACCS from the north-western region which had the maximum number of waiver beneficiaries, five each from the Cauvery Delta region and the semi-arid north-eastern region and two from the arid terrain. We randomly selected around 50 farmers who had loans outstanding as of end-March 2016, *i.e.*, the period reckoned for the waiver, in each of the selected PACCS. Out of the selected total 1,100 farmers, responses were obtained from 1,018 farmers. The sample included both beneficiary farmers (less than or equal to 5 acres) and non-beneficiary farmers (above 5 acres). The survey was conducted during the period June–October 2017 through a questionnaire. The questionnaire covered various aspects such as cost of cultivation, income, formal and informal debt. The findings of the survey are given in Annex 4.

(ii) Cooperative Bank Data

To analyse the supply-side impact of debt waiver, this study used transaction-level data from the selected 22 PACCS in the seven districts, taking into consideration short-term agricultural credit[5] given to small and marginal farmers (less than or equal to 5 acres) and other farmers (more than

[5] Short-term credit constituted 95 per cent of the total agricultural credit extended to beneficiary farmers by the selected PACCS. It may be noted that the share of short-term credit in the overall amount waived for all farmers in Tamil Nadu is around 88 per cent.

Table 3: Summary Statistics – Agricultural Loan Amount

	No. of observations	Mean	Median	Standard deviation	Minimum	Maximum
Agricultural loan amount in log terms	6813	10.8	10.8	0.658	8.17	12.6
Treated [acres ≤ 5]	5713	10.6	10.7	0.630	8.17	12.6
Control [acres >5]	1100	11.3	11.4	0.514	9.21	12.6

5 acres) for three years, *i.e.,* 2015–16, 2016–17 and 2017–18 (up to December 15, 2017). The summary statistics show that the number of small and marginal farmers (treatment group) were more than five times the number of other farmers (control group) (Table 3).

The characteristics of cooperative agricultural lending during 2016–17, the year of implementation of the waiver, as given in Table 4, underlines the following:

(i) There is a positive relationship between short-term agricultural loan and acreage, in line with the scale of finance. It may be mentioned that besides acreage, scale of finance is also determined by cost of cultivation for various crops.

(ii) In terms of share in the respective groups, more than half of the non-beneficiary farmers got credit as compared to around 46 per cent for small farmers and 44 per cent for marginal farmers.

Methodology for Empirical Exercise using RDD

Given the features of the debt waiver programme discussed above, *i.e.,* loan waiver benefit extended only to farmers with less than or equal to 5 acres, but not to farmers with more than 5 acres, we use the RDD strategy to test

Table 4: Agricultural Loan Characteristics – Farmer Type

Farmer Type	Average Acre	Average Loan Amount (₹)	Average Interest Rate (Per cent)	Post-waiver Credit in 2016–17		
				No	Yes	Per cent
Marginal Farmers	1.60	36,243	7	1655	1296	43.9
Small Farmers	3.73	65,966	7	1487	1275	46.2
Other Farmers	7.35	91,764	7	499	601	54.6

hypothesis 2, *i.e.,* whether post-waiver access to short-term agricultural credit was higher for non-beneficiary farmers as compared to beneficiary farmers. In this design, acre (x) is the running variable as it determines whether the farmer gets the debt waiver or not. The treatment D_i is equal to 1 if the farmer has acreage less than or equal to 5 (small and marginal farmers) and D_i is equal to 0 if the farmer has more than 5 acres. $Y_i(1)$ is the outcome under treatment and $Y_i(0)$ is the outcome under control. The observed outcome can be depicted as:

$$Y_i = \begin{cases} Y_i(0): x > 5 \\ Y_i(1): x \leq 5 \end{cases}$$

However, the problem is that the same individual cannot be observed on both sides of the cut-off. RDD states that under the assumption that $Y_i(0)$ and $Y_i(1)$ are functions of acre (x) and are continuous at the cut-off (*i.e.,* acreage at 5), we can measure the average treatment effect between the small farmers *vis-à-vis* large farmers near the cut-off, *i.e.,*

$$\mathbb{E}\left[Y_i(1) - Y_i(0) \mid X_i = \bar{x}\right] = \lim_{x \downarrow \bar{x}} \mathbb{E}\left[Y_i \mid X_i = x\right] - \lim_{x \uparrow \bar{x}} \mathbb{E}\left[Y_i \mid X_i = x\right]$$

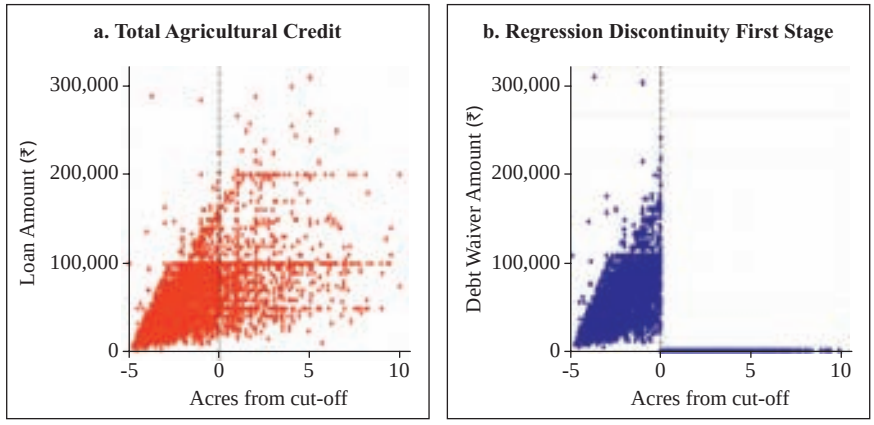
The average treatment, *i.e.,* obtaining credit after a debt waiver is estimated using the local linear probability model (p = 1) with triangular kernel weights (Cattaneo *et al.*, 2017) to avoid overfitting. In order to capture the treatment effect, two separate regression functions were fitted above and below the cut-off. The difference between the intercept of these two equations, *i.e.,* above-the-cut-off equation and below-the-cut-off equation, gives the probability of obtaining credit post-waiver for the non-beneficiary farmers *vis-à-vis* the beneficiary farmers. The major issue in the estimation of RDDs is the selection of bandwidth around the cut-off (at 5 acres), as the results of the treatment effect are crucially determined by the bandwidth chosen to estimate the model. A wider bandwidth increases the number of observations for estimation but also increases potential bias due to the influence of far end observations on average treatment effect. On the contrary, if the bandwidth is small, the variance of the average treatment may be high. For our estimation model, we use the Coverage Error Rate (CER) optimal bandwidth given by Calonico *et al.,* (2018). As a robustness check, we use several other bandwidths, including a manual bandwidth of 1 acre on both sides of the cut-off.

RDD Validity Checks

Chart 2a shows that the loan amount obtained by farmers increases in line with the size of landholdings. To simplify, we have subtracted 5 from the acre so that small and marginal farmers are represented as less than zero and other farmers as greater than zero. Chart 2b shows the impact of the waiver on beneficiary farmers (<=5 acres) and non-beneficiary farmers (>5 acres). The debt waiver amount is positive on the left side of Chart 2b while it is zero on the right side, indicating no waiver for non-beneficiary farmers. The determination of the beneficiary on the basis of acreage is a classic case of sharp RDD analysis.

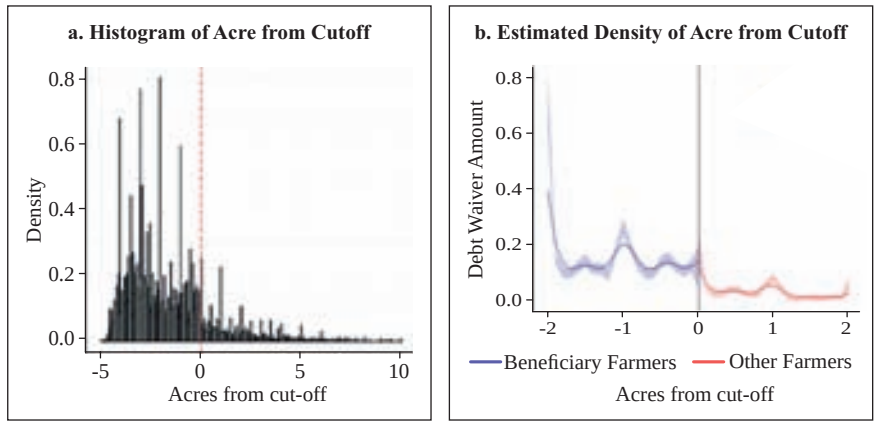
One major assumption of RDD is that the density of the forcing variable, which in our case is acreage, is continuous at the cut-off (McCrary, 2008). Basically, the test tries to see if any non-beneficiary farmers are able to manipulate their landholdings around the cut-off acre to become eligible for debt relief. While Chart 3a shows the histogram of acreage for the entire range, Chart 3b shows the estimated density test of Calonico *et al.*, 2015. The charts show some reduction in the bins near the cut-off as beneficiary farmers are more than three-fourth of the total farmers in Tamil Nadu as a whole. The estimated statistic of the density test is -0.306 at the p-value of 0.759, thereby failing to reject the null hypothesis of no difference in the treated and control observations at the cut-off.[6]

Chart 2: Agricultural Credit Loan Amount and Debt Relief



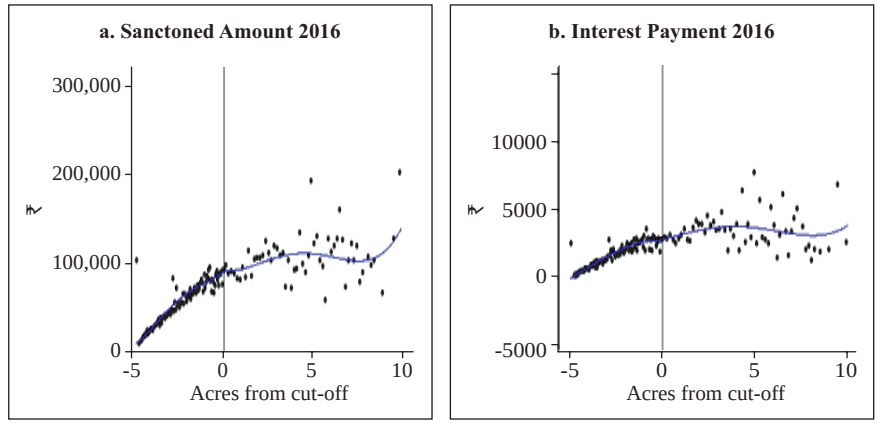
[6] McCrary Density Test (estimated p=0.698) also confirms the finding.

Chart 3: Density Test



Another validity check of the RDD is that the treatment should not have impacted the pre-treatment variables. If the treatment, *i.e.*, loan waiver, has impacted the variables which are determined before the debt waiver announcement, then the RDD is not valid. Chart 4 presents this validity result, *i.e.*, balance covariate test on the control variables, which indicates that the treatment has no impact on the sanctioned amount and on interest payment, which are predetermined before the announcement of debt waiver. These tests confirm that none of the design assumptions of RDD analysis are violated.

Chart 4: Balance Covariate Test



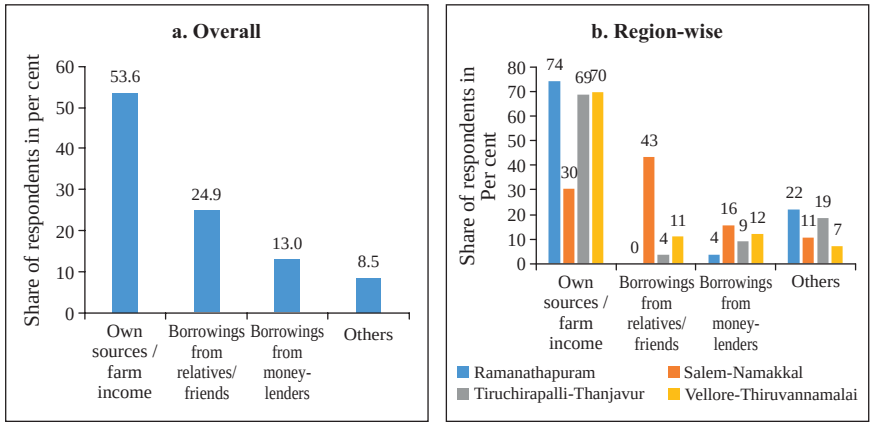
Section IV
Empirical Results

Major Findings

Hypothesis 1: Why is agricultural loan default low despite farmers facing financial stress and what are the sources of funds for repayment?

Loan default in agricultural loans taken from co-operatives was found to be low among the surveyed farmers at the time of the waiver, *i.e.*, as at end-March 2016. Overdues in crop loans availed during 2015–16 accounted for merely 0.5 per cent of total crop loans for small and marginal farmers and 2 per cent for other farmers. One of the stated reasons was the impact of loan defaults on credit history, which would hamper their future access to credit. Furthermore, prompt repayment of crop loans obtained from co-operatives gets the benefit of full interest relief by the state government (see Annex 5 for details). Co-operatives, therefore, encouraged farmers to pay on time as this would not only enable them to avail interest rate relief but also make them eligible for fresh crop loans which were, in general, higher than the retired loans, in keeping with periodic revisions in the scale of finance. Thus, given the past experience of waiver benefit being extended to both overdue and running loans, the farmer would stand to gain if and when such waiver schemes are implemented. Reputation risk and the fear of losing their collateral, in case of crop loans extended against the pledge of jewels, also influenced farmers' repayment behaviour. However, the survey found that farmers who paid from their own sources constituted around half of the total number of farmers interviewed (Chart 5). Although 25 per cent of the

Chart 5: Repayment of Loans to Co-operatives



respondents stated that they relied on relatives and friends to provide funds for repayment, the high interest rates observed for these loans indicate that such loans could have also been obtained from moneylenders/traders. So more than a third of the repayment funds come from informal sources, often at very high costs. These loans get settled as soon as the co-operatives extend fresh loans to the farmers which, in most cases, is within a month from repaying the earlier loan. Hence, despite having to borrow at high interest rates in order to repay crop loans on time, the overall cost of borrowing for the farmer is low, considering that such prompt repayment of loans from co-operatives renders the loans virtually interest-free.

Region-wise analysis shows greater reliance of farmers in Salem–Namakkal districts on informal, high-cost borrowings for repayment of loans from co-operatives, with only 30 per cent of the surveyed farmers stating that they relied on their own sources for repayment. Although sole reliance on cultivation income is low, with over 90 per cent of the surveyed farmers also earning income from livestock (Annex 4), often this was just sufficient to take care of their sustenance in case of crop failure, as was the case in 2015–16 and 2016–17. Reputation risk was found to play an important role in farmers of this region resorting to such high-cost means, albeit for a short time period, as explained earlier, to ensure prompt repayment of their crop loans. Farmers in Tiruchirapalli–Thanjavur districts were found to rely less on borrowings from informal sources to repay their loans. About three-fourths of the surveyed farmers in these districts stated that they were able to settle their loans from their own sources, using the returns on their farm produce when the crop is good and from crop insurance claims, when there is crop damage. Insurance also plays an important part in mitigating the risks faced by farmers from Ramanathapuram district. As this region is more drought prone, most farmers were found to have taken insurance cover. In fact, the farmers in this district access co-operatives more for crop insurance purposes and less for agricultural loans. With relatives of many farmers here working in the Gulf, remittances are also an important source of income as well as means of repayment for agricultural loans.

Hypothesis 2: Post-waiver access to short-term agricultural credit is higher for non-beneficiary farmers as compared to beneficiary farmers.

Having satisfied the preconditions for using RDD analysis through the validity checks as described in Section III, we proceed to see if there

is any difference between beneficiary and non-beneficiary farmers in accessing credit in the post-debt waiver period. For this analysis, we have used transaction-level data of all the farmers who have obtained crop loans in 2015–16. The dependent variable is 1 if the farmers have subsequently obtained credit from the co-operatives either in 2016–17 or in 2017–18, and 0 otherwise. The empirical results based on local linear RDD estimates using Coverage Error Rate (CER) optimal bandwidth (Calonico *et al*., 2018) show that the probability of obtaining credit post-waiver is higher for farmers just above the cut-off acreage than for beneficiary farmers just below the cut-off (Chart 6). As a robustness check, we also estimated the average treatment effect using other bandwidths suggested in existing literature, *viz.*, Mean Squared Error (MSR) optimal bandwidth and Imbens–Kalyanaraman bandwidth (Calonico *et al*., 2015; Imbens and Kalyanaraman, 2012). We have also conducted the RDD test by manually restricting the bandwidth to 1 acre on either side of the cut-off. We find that our results hold across estimates obtained using different bandwidths.

Chart 6: Average Treatment Effect: Probability of Obtaining Credit Post-Waiver

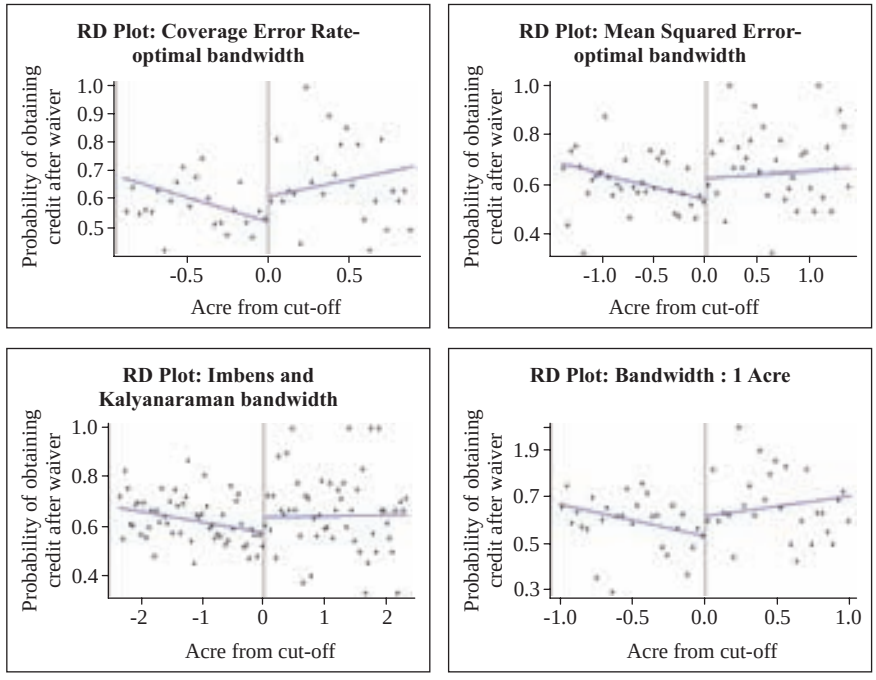


Table 5: Regression Discontinuity Effect of Obtaining Credit after Debt Waiver in 2016–17 or 2017–18#

	CER – Optimal Bandwidth		MSE – Optimal Bandwidth		Imbens – Kalyanaraman Bandwidth		Bandwidth – 1 Acre	
Average Treatment Effect (ATE)	0.083***	0.076***	0.084***	0.066***	0.062***	0.062***	0.085	0.062***
Standard Error	0.048	0.047	0.049	0.045	0.039	0.045	0.056	0.045
Pr(>|Z|)	0.082	0.082	0.087	0.096	0.077	0.083	0.123	0.083
Clustered	No	Yes	No	Yes	No	Yes	No	Yes

#: Up to December 15, 2017.

Note: *, ** and *** represents significance at the standard 1 per cent, 5 per cent and 10 per cent confidence interval.

Table 5 reports the RDD analysis for various bandwidths with robust estimator for variance-covariance estimator as well as clustered at different regional levels. The optimal bandwidth chosen based on CER with local polynomial order results in a bandwidth of 0.89 acre on either side of the cut-off. MSE optimal bandwidth was estimated at 1.39 acres and the Imbens–Kalyanaraman bandwidth results in a longer bandwidth of 2.37 around the cut-off. All the results for these bandwidths show that the probability of obtaining credit post-debt waiver is higher for non-beneficiary farmers than for beneficiary farmers and these results are significant at the 10 per cent level.

In order to understand whether the differential treatment of beneficiary farmers and non-beneficiary farmers in obtaining credit post-waiver persisted over time, we did two separate RDD analyses for credit obtained in 2016–17 and 2017–18, respectively. Table 6 shows a statistically significant result for 2016-17, *i.e.,* the probability of obtaining credit, was very high for non-beneficiary farmers as compared with beneficiary farmers in the year after the debt waiver. This result holds across different bandwidths with robust estimators as well as when controlled for clusters at the regional level and were found to be significant at 1 per cent level.

However, our results did not hold when we ran the RDD on the transaction data for credit obtained in 2017–18, indicating that there is no differential treatment in obtaining credit between the beneficiary farmers and

Table 6: Regression Discontinuity Effect of Obtaining Credit after Debt Waiver in 2016–17

	CER – Optimal Bandwidth		MSE – Optimal Bandwidth		Imbens – Kalyanaraman Bandwidth		Bandwidth – 1 Acre	
Average Treatment Effect (ATE)	0.187*	0.186*	0.190*	0.181*	0.134*	0.134*	0.182*	0.134*
Standard Error	0.054	0.048	0.052	0.046	0.04	0.041	0.056	0.041
Pr(>|Z|)	0	0	0	0	0	0	0.004	0
Clustered	No	Yes	No	Yes	No	Yes	No	Yes

Note: *, ** and *** represents significance at the standard 1 per cent, 5 per cent and 10 per cent confidence interval.

non-beneficiary farmers. The coefficients turned from positive to negative and the estimators were not significant (Table 7).

Discussion on the Findings

Cognisance of the following factors may be taken in understanding and interpreting the empirical results presented above.

Verification of Accounts Eligible for Loan Waiver

Loan waivers in the past were fraught with allegations of misuse and misappropriation of funds. Hence, the state government engaged the

Table 7: Regression Discontinuity Effect of Obtaining Credit after Debt Waiver in 2017–18#

	CER – Optimal Bandwidth		MSE – Optimal Bandwidth		Imbens– Kalyanaraman Bandwidth		Bandwidth – 1 Acre	
Average Treatment Effect (ATE)	-0.01	-0.017	-0.01	-0.019	-0.01	-0.01	0	-0.01
Standard Error	0.037	0.077	0.039	0.076	0.039	0.071	0.055	0.071
Pr(>|Z|)	0.921	0.943	0.935	0.946	0.991	0.991	0.82	0.991
Clustered	No	Yes	No	Yes	No	Yes	No	Yes

#: Up to December 15, 2017.

Note: *, ** and *** represents significance at the standard 1 per cent, 5 per cent and 10 per cent confidence interval.

administrative machinery to verify the accounts eligible for loan waiver to ensure that only intended farmers are benefitted. This slowed down the sanctioning and disbursal of loans to beneficiary farmers, *i.e.,* small and marginal farmers, during the first half of 2016–17. Further, loan disbursement to both beneficiary and non-beneficiary farmers during November–December 2016 was adversely affected by the withdrawal of specified bank notes (SBNs) and the consequent cash withdrawal limits. As PACCS were maintaining individual accounts with DCCBs, they could not withdraw more than ₹24,000 per week during this period for onward lending to farmers.

Role of Relationship Banking

Recovery problem was noticed in a few cases of loans extended to non-beneficiary farmers, after announcement of the waiver by the Tamil Nadu government, as they deferred payments in anticipation of the state government extending the waiver scheme to them. Since the co-operatives work on the basis of relationship banking principle, wherein they develop a close relationship with their member borrowers over time, they encouraged the non-beneficiary farmers to make prompt payment on crop loans in order to avail interest relief, with the promise of fresh loans at the earliest.

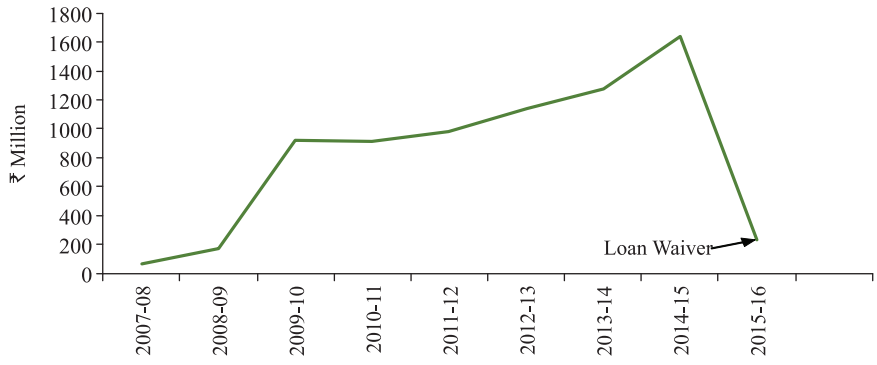
Reduction in Recyclable Funds

Prompt repayment of crop loans was incentivised by the state government through the provision of interest relief from 2007–08 onwards. Interest incentive payments increased sharply in 2009–10, consequent to the state government granting full interest relief. Since then the interest incentive payout has been steadily increasing. It had reached the highest in 2014–15, the year prior to loan waiver, indicating that crop loans were, in general, paid on time (Chart 7). Interest incentive fell sharply in 2015–16, the year reckoned for the waiver. Hence, for those co-operatives which were receiving prompt repayments from farmers, the waiver entailing staggered reimbursement from the government, reduced their recyclable funds.[7]

Further, loanable funds of DCCBs were affected by the delay in receiving reimbursement from the government. It may be noted that agricultural loans are disbursed by PACCS with funds from NABARD, TNSCB and DCCBs. As

[7] The waiver could have helped those co-operatives which had recovery problems as they would now be receiving the money from the government.

Chart 7: Interest Incentive for Prompt Repayment of Crop Loans



Source: Tamil Nadu State Apex Co-operative Bank.

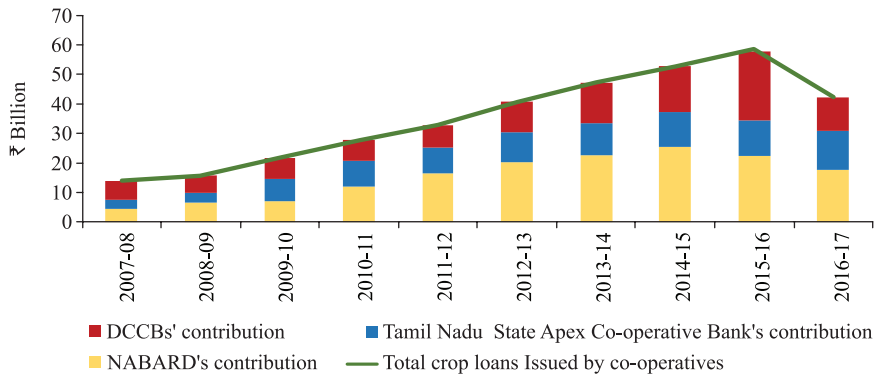
TNSCB is the channel for NABARD funds, which are paid as and when due, reimbursement of NABARD funds was first given by the state government in 2016–17.[8] Reimbursement of loans waived by the co-operatives, which was to be staggered over a five-year period, commenced only in 2017–18, with the payment of both the instalments for 2016–17 and 2017–18 along with interest due. Reflecting this, the share of funds from DCCBs in the total crop loan given by co-operative institutions declined to 27 per cent in 2016–17 from around 40 per cent in 2015–16 (Chart 8).

New Borrowers after Debt Waiver: Indicative of Moral Hazard?

At the time of undertaking the survey, post-waiver loans were not due for repayment. Hence, repayment behaviour of the beneficiary farmers could not be studied to check for moral hazard stemming from the debt waiver. We, therefore, tried to see if there was an increase in new borrowers post-waiver. We found that there were many new borrowers, mostly from the marginal and small farmers' categories. These borrowers could have joined in anticipation of future loan waivers. Anecdotal evidence also suggests that some large farmers had divided their landholdings amongst family members in order to become eligible for any future agricultural loan-waiver scheme. This can not only lead to fragmentation of landholdings but also create a moral hazard problem.

[8] Out of the total waiver amount due from the state government, the share of DCCBs was the highest (44.13 per cent), followed by NABARD (34.95 per cent) and TNSCB (20.45 per cent). The State Agricultural and Rural Development Bank, which extends long-term loans to farmers, had a share of only 0.47 per cent.

Chart 8: Crop Loans Extended by Co-operative Institutions



Source: Tamil Nadu State Apex Co-operative Bank.

Section V

Concluding Observations and the Way Forward

The Tamil Nadu agricultural loan waiver scheme, 2016 was effectively implemented, as is evident from all surveyed farmers who were eligible for the loan waiver being given the benefit by September 2016, *i.e.,* within three months of the issuance of the circular to this effect. However, co-operatives faced funding constraints in the year of implementation, *i.e.,* 2016–17, due to the combined impact of loan waiver and cash withdrawal limits placed during the period of SBN withdrawal, which affected their lending. Our study attempted to test the hypothesis that post-waiver credit access for non-beneficiary farmers is more than that for beneficiary farmers near the cut-off acreage. Based on transaction-level data from the surveyed PACCS, we found that near the cut-off acreage, the probability of non-beneficiary farmers getting loans from the co-operatives was higher than beneficiary farmers in the immediate period post-waiver, *i.e.,* 2016–17. However, this differential impact was not evident in the subsequent year, with the easing of the constraint on funds, consequent to the receipt of reimbursement from the state government. Hence, the waiver seems to have affected the ability of lending institutions to extend loans rather than their willingness to do so.

The state government's loan waiver scheme has helped to reduce rural indebtedness of small and marginal farmers to a limited extent, insofar as their outstanding borrowings from co-operatives were written off in full as on the

identified date. However, the overall indebtedness of farmers to formal as well as informal sectors, continues to remain high. According to data from the All India Debt and Investment Survey (AIDIS) 2013[9], Tamil Nadu has a higher share of farmer households availing credit from formal channels than the all-India average, but their reliance on informal sources of credit, particularly on professional moneylenders, also continues to be high (38 per cent). This was also confirmed in our field survey findings which show that although overdue loans were low at the time of the waiver, more than a third of the funds for repaying the agricultural loans taken from the co-operatives came from informal sources, often at a very high cost. Moreover, the increase in new borrowers post-waiver, and indications of land division among family members in expectation of future waivers, indicates the moral hazard of having repeated debt waivers. Thus, debt waivers to ameliorate the problems faced by farmers can provide only a temporary relief and not a lasting solution to rural indebtedness.

Based on the suggestions received during the discussions with the farmers and domain experts, a holistic approach to address the difficulties faced by the farmers must include the following:

(i) *Wider Coverage of Crop Insurance*: Our survey findings indicated that some of the crops which were widely cultivated in certain regions were not covered under the crop insurance scheme due to lack of crop-cutting experiments on which these yield-based insurance schemes are usually based. Hence, there is a need for comprehensive coverage of major crops. There is also a need to simplify the insurance application procedure, which is presently time-consuming, and also to reduce delays in settlement of claims.

(ii) *Reduction in the Reliance on Informal Sources of Credit:* Most farmers covered in our survey stated that the crop-wise scale of finance provided by the co-operatives was inadequate to meet their farming operations. This forces them to borrow from moneylenders at very high costs or pledge their forthcoming produce to traders at very low prices, thereby reducing their pricing power. Enhancing the scale of finance could help in reducing their reliance on informal sources, improving pricing of their produce and thereby increasing their income.

[9] National Sample Survey Organisation (NSSO), 70th Round.

(iii) *Diversification of Crops:* Farmers, particularly in areas which are rain-fed, need to move away from crops which are water-intensive and adopt cropping patterns more suited for the agro-climatic conditions of the region.

(iv) *Technological Advancements:* Better irrigation practices, improved seeds, mechanisation wherever possible and use of innovative farming practices can help reduce costs and improve yields.

(v) *Increasing Farmers' Direct Access to Agricultural Markets:* Despite various measures taken by the government and non-governmental agencies, agricultural marketing continues to remain weak. In this regard, there is a need to increase farmer producer organisations (FPOs) in the state[10] and strengthen them in order to facilitate direct linkage between consumers and farmers and help them to get a remunerative price for farm produce. Farmers may also be trained in post-harvest processing, packing and marketing which would reduce their dependence on private traders.

Together with these measures, steps to strengthen agricultural extension services and promotion of greater awareness among farmers about their entitlements under various central and state government schemes would fortify the agrarian economy.

[10] The Government of Tamil Nadu has launched a programme for organising small and marginal farmers into farmer producer groups in 2017–18, allocating ₹1 billion for it. The scheme, which envisaged setting up of 2,000 farmer producer groups to cover 0.2 million farmers during the year, was to be scaled up to benefit 0.4 million farmers over a period of five years.

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Annex 1: Empirical Literature on Agricultural Debt Waiver and Debt Relief Scheme, 2008

S. No	Authors	Objective of the study	Econometric methodology	Key findings
1	Kanz, M. (2016)	To study the impact of debt relief on the economic decisions of recipient households.	Regression Discontinuity Analysis (RDD). Data: (i) Primary data collection from four districts of Gujarat; (ii) bank lists on all debt relief accounts in the sample districts.	• No evidence that debt waiver will lead to access to new loans to finance productive investment, as only 23 per cent of the households in the sample applied for a new loan in the year after the waiver. • Households that have received larger compensation have reduced their investment in agricultural inputs, mainly due to absence of new bank credit and shift towards more expensive informal credit.
2	Giné, X. and Kanz, M. (2017)	To estimate the impact of debt waiver on the credit market and the real economy.	Difference in difference (DID) estimation. Data: Panel dataset covering 489 (of 593 total) districts of India from 2001 to 2012.	• Although household debt was reduced and banks increased their overall lending, there was no evidence of greater investment, consumption or increased wages as a result of the bailout. • Slowdown in post-waiver lending in districts with higher exposure to the waiver scheme, as banks shifted credit to observably less risky regions.
3	Mukherjee *et al.*, 2017)	To study the causal effect of debt relief on the loan performance of distressed and non-distressed farmers.	RDD and DID Data: Detailed loan-level data for the period May 2005–February 2012 provided by a public sector bank covering three states, *viz.*, Andhra Pradesh, Karnataka and Maharashtra.	• Distressed beneficiaries benefit significantly from debt waiver, but the loan performance of the non-distressed beneficiaries worsens after the waiver.

Annex 1: Empirical Literature on Agricultural Debt Waiver and Debt Relief Scheme, 2008 *(Contd.)*

S. No	Authors	Objective of the study	Econometric methodology	Key findings
4	De and Tantri (2016)	To estimate the effects of *ex post* loan repayment behaviour of the debt relief recipients and their access to new credit.	RDD and DID Data: Detailed loan-level data for the period October 2005–May 2012 from four districts of the state of Andhra Pradesh.	• No evidence of improvement in *ex post* behaviour of the waiver beneficiaries. • Indirect evidence of credit rationing by the loan officers who anticipate adverse borrower behaviour.
5	Mishra *et al.* (2017)	To estimate the impact of debt waiver on beneficiaries' savings and consumption.	RDD. Data: 64th, 66th, and 68th round of the NSSO consumption survey.	• Household consumption level and pattern are unaffected by the waiver. • However, the beneficiary farmer households have increased the precautionary savings, *i.e.*, increased investment in jewellery in anticipation of higher credit constraints during the post-waiver period.
6	Christopher, R. (2012)	To estimate the impact of debt waiver on beneficiaries' wealth and well-being.	RDD. Data: Primary data collection from four districts of Gujarat.	• The marginal effect of income due to debt relief on life satisfaction is found to be positive. • However, it also has a countervailing negative effect due to social stigma.

Annex 2: Recent Loan/Debt Waiver Schemes of State Governments: A Comparison

States/Year of implementation	Farmer category	Institutions	Loan category	Period of loan	Limit per farmer	Payment of waiver amount to lending institutions	Cost to the state exchequer (₹ Billion)
1	2	3	4	5	6	7	8
Tamil Nadu (2016)	Small and marginal farmers	Rural co-operative credit institutions excluding UCBs	All short-term, medium- term and long-term agricultural loans	All loans outstanding as on March 31, 2016	No limit	Phased reimbursement over five years	60.95
Andhra Pradesh (2014)	All farmers	SCB,RRBs and rural co-operative credit institutions	Short-term crop loans, including those issued against gold and those converted to MT loans due to calamities	Loans outstanding as on March 31, 2014	Up to ₹150,000; only one loan per farmer	Phased reimbursement over five years	240.00
Telangana (2014)	All farmers	SCBs, RRBs and rural co-operative credit institutions (including UCBs)	Short-term crop loans, including those issued against gold and those converted to MT loans due to calamities	Loans outstanding as on March 31, 2014	Up to ₹100,000; only one loan per farmer	Phased reimbursement over 4 years	170.00

Annex 2: Recent Loan/Debt Waiver Schemes of State Governments: A Comparison (*contd.*)

States/Year of implementation	Farmer category	Institutions	Loan category	Period of loan	Limit per farmer	Payment of waiver amount to lending institutions	Cost to the state exchequer (₹ Billion)
1	2	3	4	5	6	7	8
Karnataka (2017)	All farmers	Rural co-operative institutions	Crop loans	Loans outstanding as on June 20, 2017	Up to ₹50,000 per farmer; only one loan per farmer	Payment by June 2018 or as and when the claim is raised by the lending institutions	around 80
Karnataka (2018)	All farmers	SCBs, RRBs,Co-operative credit societies/banks excluding UCBs	Crop loans	Crop loans from SCBs/RRBs sanctioned on or after April 1, 2009 and classified as NPA/ restructured/overdue and outstanding as on December 31, 2017 (incentive up to ₹ 25,000 would be paid to farmers who have repaid their crop loans within time); crop loans from co-operatives outstanding as on July 10, 2018	Up to ₹ 200,000 for overdue loan from SCBs per farmer; up to ₹ 100,000 for outstanding loans from co-operatives	Phased reimbursement in four instalments	around 400

Annex 2: Recent Loan/Debt Waiver Schemes of State Governments: A Comparison (*contd.*)

States/Year of implementation	Farmer category	Institutions	Loan category	Period of loan	Limit per farmer	Payment of waiver amount to lending institutions	Cost to the state exchequer (₹ Billion)
1	2	3	4	5	6	7	8
Uttar Pradesh (2017)	Small and marginal farmers	SCBs and RRBs, Co-operative credit societies/ banks excluding UCBs	Crop loans including those converted to MT loans due to calamities but excluding loans given by self-help groups and joint-liability groups	All loans outstanding as on March 31, 2016, reduced by repayments/credit received from the farmer during 2016–17	Loans up to ₹100,000; all NPA loans of small and marginal farmers up to ₹100,000	Payment of entire waiver amount within the year	360.00
Maharashtra (2017)	Small and marginal farmers	SCB,RRBs, Grameen banks and DCCBs	Crop loans and term loans	Loans availed after April 2009 and which were in default as on June 30, 2016	Up to ₹150,000 per farmer; incentive up to ₹25,000 for farmers who have paid their loans by July 31, 2017	Payment of entire waiver amount within the year	345.00

Annex 2: Recent Loan/Debt Waiver Schemes of State Governments: A Comparison (*contd.*)

States/Year of implementation	Farmer category	Institutions	Loan category	Period of loan	Limit per farmer	Payment of waiver amount to lending institutions	Cost to the state exchequer (₹ Billion)
1	2	3	4	5	6	7	8
Punjab (2017)	Small and marginal farmers	Co-operative credit institutions (including UCBs); public sector banks and private sector banks in that order	Crop loans	Outstanding liability (principal and interest) as on March 31, 2017. Interest relief for the period April 1, 2017 till October 19, 2017 (date of notification)	Up to ₹200,000 for crop loans for small and marginal farmers; flat rate of ₹200,000 for other loans taken by marginal farmers	Phased reimbursement to banks starting with co-operative institutions	100.00
Rajasthan (2018)	(a) Small and marginal farmers (b) Other farmers	Rural co-operative institutions and primary land development banks	Crop loans	Overdue loans and loans outstanding up to September 30, 2017	For small and marginal farmers, loans up to ₹50,000 to be waived; for other farmers, loan waiver to be worked out on proportionate basis linked to the prescribed land holding of small farmers (2 hectares), subject to the limit of ₹50,000.	₹20 billion has been provided. The government has in principle agreed to pay the rest in equal instalments in next 3 years.	80.00

Note: 1. SCBs: Scheduled Commercial Banks; RRBs: Regional Rural Banks; UCBs: Urban Cooperative banks; MT: Medium Term.
2. Compiled on the basis of available information up to December 15, 2018.

Annex 3: Rainfall Pattern

S. No	Districts	2013–14		2014–15		2015–16	
		SW Monsoon	NE Monsoon	SW Monsoon	NE Monsoon	SW Monsoon	NE Monsoon
		Particulars	Particulars	Particulars	Particulars	Particulars	Particulars
1	Namakkal	N	D	D	N	N	D
2	Ramanathapuram	D	D	D	E	N	N
3	Salem	N	D	N	N	D	D
4	Vellore	N	D	N	D	N	LE
5	Tiruvannalamalai	N	D	N	D	N	N
6	Thanjavur	N	D	D	N	D	E
7	Tiruchirappalli	D	D	D	D	D	N

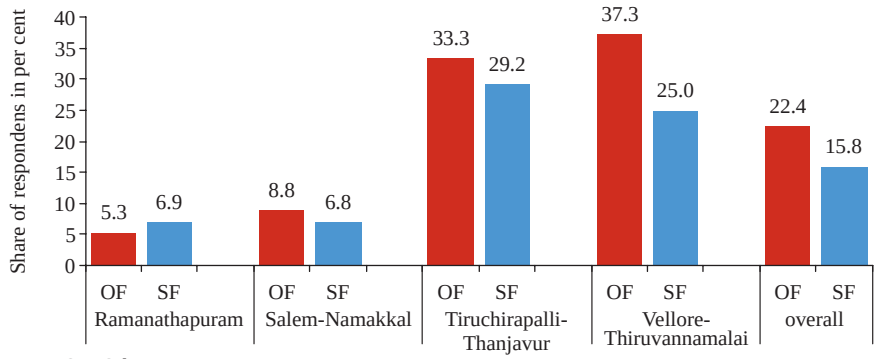
Note: LE - Large Excess : Range (+60 per cent and above)
E - Excess : Range (+20 per cent to +59 per cent)
N - Normal : Range (+19 per cent to -19 per cent)
D - Deficient : Range (-20 per cent to -59 per cent)
LD - Large Deficient : Range (-60 per cent to -99 per cent)
No Rain : Range (-100 per cent)

Annex 4: Field Survey Findings

The salient features of the field survey are given as follows. Among the surveyed farmers, around 20 per cent of the farmers relied solely on cultivation. Further, in all the surveyed districts it was found that the reliance on cultivation alone, for income, was higher for non-beneficiary farmers then for beneficiary farmers. Region-wise analysis shows that less than one-tenth of farmers in Salem, Namakkal and Ramanathapuram districts relied only on cultivation income, indicating that these farmers undertook other activities to augment their income (Chart A4.1).

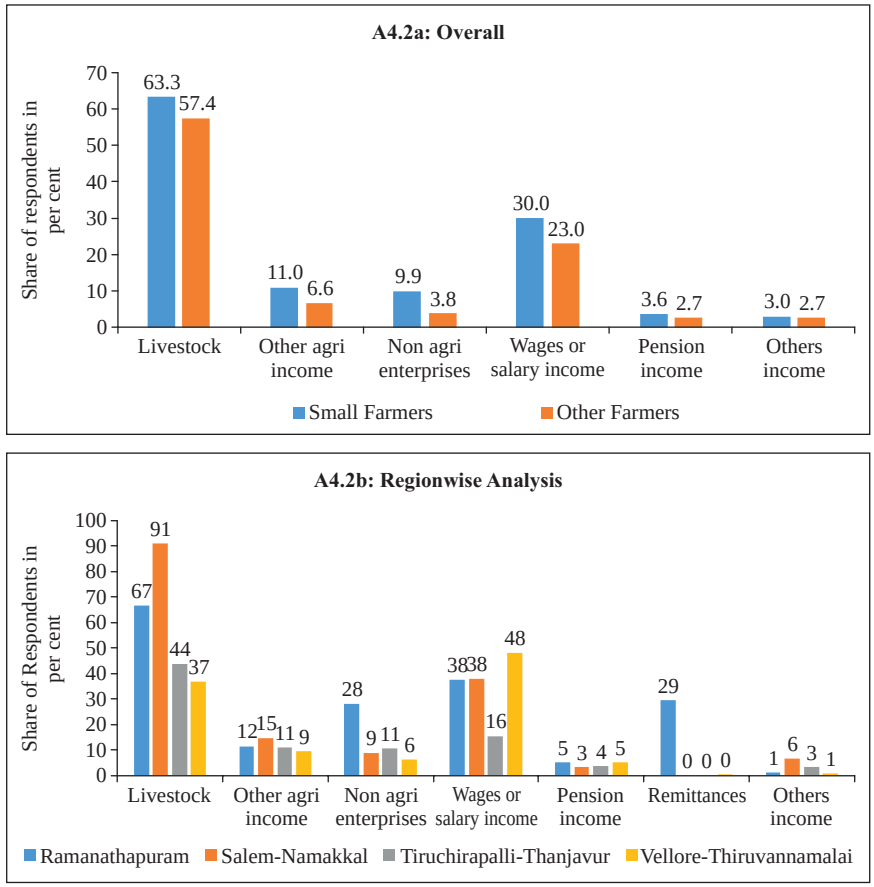
Animal husbandry was the main source of supplementary income in all the surveyed districts, and in a drought year like 2016–17 it was the primary source of income for many farmers as they suffered extensive crop damage. The Mahatma Gandhi Rural Employment Guarantee Act (MNREGA) scheme provided the second highest income source to small and marginal farmers (Chart A4.2a). Region-wise analysis of sources of non-cultivation income shows considerable diversity. Over 90 per cent of farmers in Salem and Namakkal relied on livestock to augment their incomes. Wages and salaries provided the maximum supplementary income for farmers in Vellore and Thiruvannamalai. Besides livestock, non-agricultural enterprises and remittances from abroad were the other main sources of non-cultivation income for farmers in Ramanathapuram (Chart A4.2b).

Chart A4.1: Patterns in Farm Income – Dependence only on Cultivation Income



Note: OF: Other Farmers
SF : Small and Marginal Farmers

Chart A4.2: Patterns in Farm Income – Income from Sources other than Cultivation



A comparison of cost *vis-à-vis* income for the two farmer groups indicates that agricultural incomes for both groups in 2016–17 were not commensurate with their costs (Chart A4.3). This was more stark in the case of other farmers wherein the proportion incurring cost below ₹50,000 was less than one-fourth of the total in that category, but the proportionate earning income of less than ₹50,000 was around 58.7 per cent. As cost for other farmers are higher than for small and marginal farmers, the impact of a drought has been more severe on their incomes.

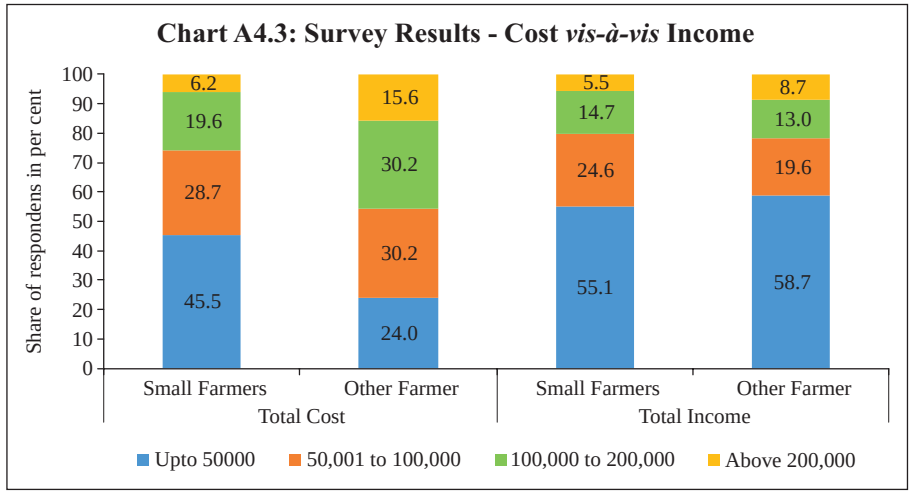


Chart A4.3: Survey Results - Cost vis-à-vis Income
Share of respondens in per cent
100
90
80
70
60
50
40
30
20
10
0
6.2
19.6
28.7
45.5
15.6
30.2
30.2
24.0
5.5
14.7
24.6
55.1
8.7
13.0
19.6
58.7
Small Farmers
Other Farmer
Total Cost
Small Farmers
Other Farmer
Total Income
Upto 50000
50,001 to 100,000
100,000 to 200,000
Above 200,000

Annex 5: Interest Incentive Scheme for Prompt Repayment of Crop Loans

With a view to encourage credit discipline, the state government started providing interest incentive to farmers from 2007–08 for prompt repayment of their crop loan up to ₹ 3,00,000. This incentive, which was initially 2 per cent in 2007–08 and 2008–09, worked out to 6.0 per cent (after adjusting for prompt repayment incentive of 1 per cent provided by the Government of India) in 2009–10, when the state government decided to waive the entire interest for crop loans which are paid on time (Table A5.1). With the Government of India progressively raising the interest incentive component to 3 per cent since 2011–12, the net interest incentive given by the Tamil Nadu government works out to 4 per cent.

Table A5.1: Interest Incentive Scheme for Prompt Repayment of Crop Loans obtained from Co-operatives

Year	Interest rate on crop loans up to ₹ 300,000	Interest incentive for prompt repayment		Effective interest rate to farmers for prompt repayment of crop loans from co-operatives
		Government of India	Government of Tamil Nadu	
1	2	3	4	5=2-3-4
2007-08	7.0	-	2.0	5.0
2008-09	7.0	-	3.0	4.0
2009-10	7.0	1.0	6.0	Nil
2010-11	7.0	2.0	5.0	Nil
From 2011-12 onwards	7.0	3.0	4.0	Nil

Source: Authors' compilation from various budget documents of Government of India and Government of Tamil Nadu.

Reserve Bank of India Occasional Papers
Vol. 39, No. 1&2, 2018

Does Fiscal Policy Matter for Growth? Evidence from Emerging Market Economies

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In the wake of greater fiscal activism advocated globally to revive economies after the 2008 financial crisis, we examine the efficacy of fiscal policy in stimulating economic growth of 20 major Emerging Market Economies (EMEs) using dynamic panel estimation for the period 2000–16. Our findings, based on the fiscal stance derived from the Structural Balance (SB) approach of the International Monetary Fund (IMF), provide some revealing insights. For the full sample period, the results indicate the ineffectiveness of fiscal expansion in stimulating growth. Controlling for financial factors that caused the growth slump and truncating the sample in terms of pre- and post-crisis years, the impact of fiscal stimulus turns out to be positive and statistically significant in the latter period. These findings, which are robust to alternative measures of stimulus, indicate that the observed slump in growth in the post-crisis period would have been much sharper in the absence of stimulus, implying that fiscal activism pursued by these EMEs was successful in arresting the downslide of growth.

JEL Classification : E60, E62, E32, F41

Keywords : Fiscal stimulus, structural balance, dynamic panel estimation, emerging markets

Introduction

Fiscal policy, as a prime lever of economic stabilisation policy, seeks to influence the level of aggregate demand in the economy in pursuit of the larger societal goals of higher economic growth, full employment and price stability. In the first half of the twentieth century, fiscal policy came to the centre stage of economic policy with its ascendancy attributed to the Keynesian

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policy prescription that deficiency of aggregate demand could be overcome by expansionary fiscal policy – through higher government spending. It became the principal tool in fighting wide-scale unemployment caused by the Great Depression of the 1930s and rebuilding the war-ravaged economies of Europe and Japan after the Second World War. Subsequently, fiscal activism (through tax cuts) undertaken by the Kennedy and Johnson administration helped in stimulating the American economy during the 1960s.

The primacy of fiscal policy was challenged in the early 1970s by (i) the breakdown of the Bretton Woods Agreement; (ii) the OPEC oil shock of 1973; and (iii) mounting inflationary pressures in the United States (US). In this milieu, economists of the new classical persuasion argued that discretionary fiscal (and monetary) policy leads to market distortions and recommended the adoption of rule-based policies that help in avoiding expectation mismatches and uncertainty of outcomes. It was argued that fiscal policy was not sufficiently flexible for stabilisation purposes as it is often driven by exogenous political factors (Blanchard and Fischer, 1989); thus, the role of macroeconomic stabilisation is best left to the central bank. In this framework, fiscal policy was reduced to being a mere demand shock to be addressed through monetary policy (Kuttner, 2002).

Against the background of rising deficit and debt problems circumscribing the fiscal space for policy activism, monetary policy gradually became the dominant theme in the general discourse on stabilisation policy during the 1990s. In a world of free capital flows, brought about by rapid deregulation and the development of financial markets worldwide, greater flexibility in exchange rates ensured that monetary policy supplanted fiscal policy as the prime instrument for achieving stabilisation objectives.[1] In this regard, the adoption of the inflation targeting (IT) framework by many central banks and the subsequent easing of inflation pressures – coined as the 'Great Moderation' – provided credible evidence and intellectual succour for the dominance of monetary policy till the onset of the global financial crisis (GFC) in 2008.

In the immediate aftermath of the GFC, the global economy experienced major deflationary shocks as aggregate demand plummeted owing to the loss of confidence in the financial system. Notwithstanding concerted and coordinated efforts undertaken to deal with both liquidity and solvency problems in major economies, the global economy stared at the prospect of

[1] In the early 1960s, the Mundell – Fleming model demonstrated that monetary policy was an effective stabilisation instrument under flexible exchange rates.

severe depression worldwide. Despite the best efforts of major central banks in reducing interest rates to unprecedented levels (the 'zero lower bound') followed by the adoption of quantitative easing (QE) measures, credit conditions remained tight resulting in large-scale unemployment in many countries. With monetary policy rendered ineffective at the zero lower bound, attention once again turned to fiscal policy in stemming the rot. In typical Keynesian spirit, it was forcefully argued that government spending could provide the necessary stimulus to the economy to prevent the slide towards depression.[2]

While fiscal intervention turned out to be larger and of longer duration than initially envisaged, its success in reinvigorating economic activity has not been decisively established. While extensive literature is available which assesses the effectiveness of fiscal stimulus in advanced economies (AEs) (Baker and Rosnick, 2014; Coenen *et al*., 2012) and the subsequent 'growth *versus* austerity' debate sparked off by unfettered stimulus (Haltom and Lubik, 2013; Ortiz, 2012), similar work on EMEs are few and far between (*e.g*., Kandil and Morsy, 2010; Hory, 2016). EMEs, as a case study, are particularly interesting as they are distinctly different from AEs for several reasons. First, the fiscal space in several EMEs is usually much less as they are already saddled with high debt burden. Second, fiscal policy is generally procyclical in EMEs (Ilzetzki and Vegh, 2008) as against being countercyclical in AEs (IMF, 2009). Finally, the effectiveness of fiscal stimulus in EMEs gets negated to a large extent since policy credibility in these countries is usually weaker than in AEs.

In this paper, we assess the effectiveness of fiscal stimulus on growth in 20 major EMEs *vis-à-vis* monetary and exchange rate policy. Although our paper is similar in spirit to Kandil and Morsy (2010), it is distinctly different in terms of the research question, data and methodology. While the former examines the cyclicality of the fiscal impulse and its impact on growth of real output in 34 (major and small) EMEs from the perspective of underlying conditions that enable fiscal stimulus to be successful, we study the efficacy of fiscal policy *vis-à-vis* monetary and external sector policies in stimulating growth using more recent data (2000-16). Moreover, we use SB as the measure of fiscal stance – a superior measure on methodological grounds as discussed later – in contrast to the cyclically-adjusted measure of government

[2] In 2009, the strength of the stimulus varied from Italy's near zero (0.1 per cent of GDP) to a high in Korea (3.0 per cent of GDP) with the average stimulus for 20 countries at 1.6 per cent of GDP (CEA, 2009).

revenue and spending used by Kandil and Morsy to capture discretionary policies. Furthermore, we use the dynamic panel estimation method to examine the effectiveness of fiscal stimulus while Kandil and Morsy study the short- and long-run impact of such stimulus and its underlying conditions through a Vector Error Correction Model (VECM). Our results indicate that expansionary fiscal policy was ineffective in stimulating economic growth for the full sample period. The results, however, undergo a sharp change in the post-crisis period (2008–16), if controlled for financial factors that caused the growth slump suggesting that the slide in growth would have been more severe in the absence of fiscal stimulus.

The rest of the paper is structured as follows: Section II provides a brief review of the theoretical underpinnings and the related empirical literature on the relationship between fiscal stimulus and growth, while Section III sets out the data and methodology of the empirical exercise. Section IV presents the results while some observations on the findings are discussed in Section V. Concluding remarks are set out in Section VI.

Section II
Review of Literature

Theoretical Underpinnings

The relevance and efficacy of fiscal policy as an instrument of macroeconomic stabilisation has generated a wide-ranging debate, both on theoretical grounds and empirical evidence. For instance, economists of the Keynesian tradition argue that the government spending multiplier is greater than one in contrast to neoclassical economists who are of the view that it is less than unity. Various extensions of the Keynesian model demonstrate that the magnitude of the spending multiplier is, however, not necessarily greater than one but depends on (i) the extent of monetary policy accommodation, (ii) the prevailing exchange rate regime, (iii) the degree of trade openness in the economy, and (iv) the extent of financial development (Tang *et al*., 2013). Illustratively, in a flexible exchange rate regime, higher interest rates caused by an increase in government spending may lead to greater capital inflows leading to an appreciation of the domestic currency. This may deteriorate the current account balance which is likely to depress the multiplier below unity. Similarly, the leakage from aggregated demand (spurred by higher government

spending) through imports will be higher in a relatively more open economy, causing the multiplier to be small. On the other extreme, forward-looking households may save more during tax cuts to bear the burden of higher taxes in future; in fact, the tax multiplier would be zero resulting in no changes in output under strict Ricardian equivalence (Barro, 1974).

There is another strand of literature that questions the basic direction of the multiplier and argues that it is, in fact, negative. This explanation is based on several ideas such as (i) fiscal credibility, (ii) uncertainty, (iii) debt sustainability, and (iv) risk premium which is largely drawn from empirical work (Giavazzi and Pagano, 1990; Alesina and Perotti, 1997; Alesina and Ardagna, 1998; 2009). Against a background of high levels of debt, early fiscal consolidation could augment households' lifetime wealth by reducing the uncertainty of more costly and painful adjustments later (Blanchard, 1990). In a world of greater uncertainty and in which the government's credibility is questionable, any fiscal expansion is likely to strengthen precautionary behaviour of households and firms which will make the multiplier negative (Hemming *et al*., 2002).

Empirical Evidence

Structural macroeconomic or vector autoregression (VAR) models often generate fiscal multipliers in a wide range (from negative to greater than four) depending on (i) underlying assumptions, (ii) fiscal instruments used, (iii) country specific factors, and (iv) sample periods (Spilimbergo *et al*., 2008). In studies based on structural macroeconomic models, the short-run multiplier is often positive, the spending multiplier is greater than the tax multiplier, and both are higher when monetary policy is accommodative. In the long term, however, crowding out effects can cause the multiplier to be negative. Based on the IMF Multimod model, the OECD Interlink model and the McKibbin-Sachs (MSG) model, research on US, Germany and Japan suggests that the short-term spending and tax multipliers are in the range of 0.6-1.4 and 0.3-0.8, respectively (Hemming *et al.*, 2002). Findings from the IMF Global Integrated Monetary and Fiscal Model (GIMF) suggest that during periods of globally coordinated policy on fiscal stimulus, the world spending and tax multiplier is about 1.7 and 0.3, respectively (Freedman *et al*., 2009). Nevertheless, an increase in the world debt-gross domestic product (GDP) ratio consequent to fiscal expansion could lead to a permanent contraction in world GDP in the long run.

Research based on the VAR approach suggests that while the multipliers are generally positive, both the spending and tax multipliers' value is less than one with the latter being even lower than the former. While a structural vector autoregression (SVAR) model for the US yields a spending and tax multiplier of 0.9 and 0.7, respectively (Blanchard and Perotti, 2002), a sign restriction VAR produces even lower values at 0.6 and 0.3, respectively, for the two multipliers (Mountford and Uhlig, 2009). Empirical investigation of five OECD countries (including the US) over two sample periods found that the spending multiplier in the pre-1980 period for only the US was greater than unity although, over time, the value of the multiplier declined for all countries in the sample (Perotti, 2004). A comprehensive exercise on 20 advanced and 25 developing countries found that the impact spending multipliers were consistent with theory. For instance: (i) AEs recorded a higher multiplier than developing countries (0.24 as against 0.04); (ii) economies operating under fixed exchange rates showed a positive multiplier (0.2) in contrast to those having flexible exchange rates (-0.04); and (iii) closed economies had a positive multiplier (0.26) as against a negative one in open economies (-0.05). Furthermore, the spending multiplier for more indebted developing countries (debt–GDP ratio above 50 per cent) turned negative after four quarters (Ilzetzki *et al*., 2013). In contrast, based on quarterly data of 17 AEs for the period 1960-2015 and using a panel VAR approach, empirical evidence suggests that both the cumulative government consumption and investment multipliers are significantly higher than one at the effective lower bound (Bonam *et al*., 2017).[3] These findings remain robust if (i) the eurozone is excluded from the sample or (ii) the business cycle is taken into account. In a similar vein, a recent study found that fiscal stimulus can reduce interest rates and credit default swap (CDS) spreads on government debt while improving fiscal sustainability in developed countries, especially during periods of economic slack (Auerbach and Gorodnichenko, 2017).

Based on a cyclically-adjusted measure of government revenue and spending of 34 EMEs and using a VECM framework, a study suggested that fiscal policy tends to be procyclical in practice (implying stronger fiscal impulse, on average, during expansions *vis-a-vis* downturns), although the scope of countercyclical policy increases with increase in the level of foreign exchange reserves (Kandil and Morsy, 2010). Adequate reserve availability also enhances the credibility and effectiveness of fiscal policy. High inflation

[3] The effective lower bound is defined as interest rates being below one per cent for at least four consecutive quarters.

erodes policy credibility and offsets the effectiveness of fiscal stimulus in the short run, while fiscal expansion, if undertaken against the backdrop of a high debt burden, has an enduring negative impact on growth. In the context of 10 Asian developing countries, a study using the Mountford and Uhlig sign restrictions VAR framework found evidence of expansionary fiscal contraction (in terms of a positive tax shock) on output in China, Singapore, Taiwan, and Thailand (Jha *et al*., 2010).

Empirical evidence suggests that the size of the fiscal multiplier is much smaller in EMEs compared to AEs. In this regard, the potential sources of difference between AEs and EMEs can be attributed to five key determinants, *viz*. (i) degree of trade openness; (ii) health of public finances; (iii) savings rate; (iv) capacity utilisation rate; and (v) the level of financial development in the economy. While higher levels of imports, public debt and savings reduce spending multipliers, unemployment and financial development increase their impact, both in EMEs and AEs. The size of the impact of each determinant is relatively more important in EMEs than in AEs, but the small magnitude of fiscal multipliers in EMEs suggest that governments in these countries must improve efficiency of fiscal policy. Moreover, such efficiency is nearly insignificant at low levels of public debt in EMEs thereby suggesting that a reduction in debt is not sufficient to improve policy effectiveness. Furthermore, spending multipliers become negative in relatively more open EMEs which is symbolic of crowding out of private demand (Hory, 2016). In this context, EMEs need to augment their policy credibility by improving the quality of their institutions in order to establish a stable macroeconomic environment and enhance the efficacy of fiscal policy (Lane, 2003).

Section III
Methodology and Data

We empirically test the relative impact of fiscal policy, monetary policy and external sector developments on economic growth of EMEs through fiscal stimulus, broad money and real effective exchange rate (REER), respectively. While growth in broad money (a commonly used proxy for the extent of monetary accommodation) is representative of monetary policy in a cross-country perspective, changes in REER are indicative of external sector developments. Fiscal impulse, our measure of fiscal activism, is more

balanced than both the spending and the tax multipliers (which are commonly used in the literature to represent fiscal proactiveness) as it takes a composite view of both the revenue and expenditure position of the government. Fiscal impulse, which is a derived measure from overall government balance, is discussed below.

Measuring Fiscal Stimulus

Conventional wisdom suggests that fiscal policy could act as a stabilisation instrument through (i) the automatic stabilisers that makes fiscal policy expansionary during recessions and contractionary during booms, and (ii) the discretionary channel by which changes in government spending and taxation respond to changes in economic activity (Weil, 2008). As a result, conclusions drawn from the overall fiscal balance about the fiscal policy stance can often be misleading. In view of this, cyclically adjusted balances (CAB) *i.e*., the fiscal balance adjusted for the business cycle has gained traction both in empirical work and policy debates.

Moreover, any adjustment that corrects for transitory factors apart from the business cycle, such as terms-of-trade shocks or one-off factors (large windfall revenue gains, sales of concession rights, write-offs related to recapitalisation of banks, changes in asset prices, *etc*.) generates the SB. Thus, while the CAB corrects for cyclical effects of revenue and expenditure, the SB further adjusts for temporary revenue and expenditure items and factors that are not closely related to the business cycle (Bornhorst *et al*., 2011)[4]. In the case of countries whose fiscal revenues are significantly dependent on commodity exports, one common adjustment that is usually made is the effect of terms-of-trade shocks (Ghosh and Misra, 2016). Illustratively, adjusting for this factor is particularly appropriate for export-oriented economies such as Chile (a copper exporter) whose government spending may be highly correlated with movement in copper prices. In recent years, several AEs and some EMEs have incorporated SBs in their fiscal rules as it improves fiscal

[4] The first step in computation of SB involves identification and removal of one-off fiscal operations as large non-recurrent items are likely to distort the underlying fiscal position of a government. Next, an assessment is made of the impact of the business cycle on government revenue and expenditure, either through (i) an aggregate method (when elasticities are used to measure the sensitivity of total revenue and expenditure to the output gap), or (ii) a disaggregated method (when elasticities specific to various revenue and expenditure components are used to measure the responsiveness of government revenue and expenditure to the output gap). The cyclical components of revenue and expenditure, thus estimated, are then netted from total revenue and expenditure, respectively, to obtain cyclically adjusted revenue and expenditure. The SB estimates are then obtained by subtracting the cyclically adjusted expenditure from cyclically adjusted revenue. In the final step, the standard cyclical adjustment may be further fine-tuned by provisioning for large movements in asset or commodity prices (IMF, 2011).

transparency and enhances the stabilising properties of the rule (Misra and Trivedi, 2016).

In this study, the fiscal impulse (FI), *i.e.,* the addition or withdrawal of fiscal stimulus by the government is derived from the incremental change in fiscal stance (FS) over time. The FS measures the discretionary component of fiscal policy. In other words, the FS provides a quantification of aggregate demand management through fiscal policy which can be (i) expansionary (if fiscal balance is negative); (ii) contractionary (if fiscal balance is positive); and (iii) neutral (if fiscal balance is zero). The most commonly used indicators of FS include (a) CAB, (b) SB, (c) Primary Balance (PB), and (d) neutral balance.[5]

In our analysis, FS of each of the 20 EMEs has been estimated based on SB by using the following formula:

$FS_t = (-SB_t)$ ..... (1), where

$SB_t < 0 \Rightarrow$ Expansionary policy ($FS_t > 0$)

$SB_t > 0 \Rightarrow$ Contractionary policy ($FS_t < 0$)

$SB_t = 0 \Rightarrow$ Neutral policy ($FS_t = 0$)

Our preference for choosing SB over CAB for estimating FS is based on superiority of SB over CAB as mentioned before: SB is a further refinement over CAB as it corrects for a broader range of factors.[6]

The change in FS amounts to FI, which measures the addition or withdrawal of fiscal stimulus. Accordingly, FI is estimated in the second stage based on the formula:

$FI = FS_t - FS_{t-1}$ …… (2)

A positive FI implies that the FS is getting more expansionary, *i.e.*, accommodative over time and *vice versa*.[7] FI, thus estimated, is expressed as a proportion of GDP to ensure scale neutrality across countries. The derived estimates reveal that there is significant variation in FI across the select group of EMEs, though most of them embarked on an expansionary fiscal policy during the GFC or in its immediate aftermath (Figure A1, Annex).

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[5] Indicators of FS implicitly assume that the impact of different policy measures (*viz.,* revenues, public expenditures and transfers) are identical.

[6] Many of the countries in our sample are commodity exporters.

[7] The net impact of the FI on economic activity is dependent on (i) expectations of the private sector; (ii) the mode of financing the deficit; and (iii) the composition of the change in fiscal policy.

Data

In contrast to Kandil and Morsy, we leave out the relatively smaller EMEs from the sample and concentrate on the major ones (20) which account for around 80 per cent of GDP of all EMEs. The select group of countries include Argentina, Brazil, Chile, China, Colombia, Egypt, Hungary, India, Indonesia, Malaysia, Mexico, Peru, Philippines, Poland, Romania, Russia, South Africa, Thailand, Turkey and Uruguay for whom data are available for all the relevant variables. Our estimation is based on annual data for the period 2000-16 which is more recent than Kandil and Morsy's unbalanced panel (1963-2008).

While real GDP have been sourced from the IMF's World Economic Outlook (WEO) database, fiscal impulse is estimated from the SB which is also obtained from the WEO database. Broad money and REER are sourced from the IMF's International Financial Statistics (IFS) and the Bruegel datasets, respectively.

While real GDP growth is the dependent variable, the explanatory variables in the model are the fiscal impulse (as proportion of GDP), growth in broad money and changes in the real effective exchange rate. Real GDP growth for most of the EMEs lies in the range of 2-6 per cent for the sample period, except for China and India whose growth rates have been significantly higher. There are substantial variations across countries in terms of monetary stimulus, with average broad money growth exceeding 20 per cent in the case of Argentina, Russia and Turkey, and being less than 10 per cent for Hungary, Malaysia, Poland and Thailand (Table A1, Annex). Most of the EMEs recorded small appreciation in REER during the period with few exceptions.

Diagnostics

The time series characteristics (stationary properties) of the variables *viz*., real GDP growth, fiscal impulse, monetary growth and changes in real effective exchange rate are verified through panel unit root tests (Im *et al.*, 2003; Levin *et al.*, 2002; Maddala and Wu, 1999). In comparison to the unit root test applied on a single series, panel unit root tests are considered to be more powerful as the information content of the individual time series gets significantly enhanced by that contained in the cross-section data within a panel set up (Ramirez, 2006). The results of panel unit root tests reject the null hypothesis of a unit root for each of the four series indicating all the four variables are stationary (Table 1).

Table 1: Results of Panel Unit Root Test

Variables	LLC t Statistics	IPS W Statistics	Maddala & Wu PP- Fisher Chi Square
Growth in real GDP (Δ y)	-5.58***	-4.20***	124.40***
Fiscal impulse as proportion to GDP (FI)	-11.70***	-7.89***	186.89***
Growth in Broad Money (Δ BM)	-2.48***	-2.42***	113.72***
Change in REER (Δ REER)	-7.33***	-5.80***	150.06***

Note: 1. LLC: Levin, Lin, Chu; IPS: Im, Pesaran, Shin.
2. The statistics are asymptotically distributed as standard normal with a left side rejection area.
3. ***: indicates the rejection of the null hypothesis of non-stationarity (LLC, IPS and Maddala & Wu) at 1 per cent level of significance.
4. Automatic selection of lags through Schwarz Information Criteria (SIC).
5. All panel unit root tests are defined by Bartlett Kernel and Newey-West bandwidth.

Section IV
Estimation and Results

Estimation Technique

Economic policy interventions (both fiscal and monetary) usually entail a dynamic adjustment process. In empirical analysis of policy interventions, policy variables are usually not strictly exogenous but simultaneously determined with the outcome variable (Besley and Case, 2000). Even when the covariates are not simultaneously determined, they may still be influenced by past values of the outcome variable.

Linear dynamic panel models, which include past (lagged) values of the dependent variable as explanatory variables, contain some unobserved panel-level effects, which can be fixed or random. By construction, the unobserved panel-level effects are correlated with the lagged dependent variables in a dynamic panel set-up, which make the standard errors inconsistent. To address this problem, a consistent generalised method of moments (GMM) estimator for this model was developed by Arellano and Bond (1991), which, however, performs poorly if (a) the autoregressive parameters are too large; or (b) the ratio of the variance of panel-level effect to the variance of idiosyncratic error is too high. Overcoming this shortcoming, Arellano and Bover (1995)

subsequently developed a system estimator that uses additional moment conditions.[8] In this methodology, it is assumed that there is no autocorrelation in the idiosyncratic errors and requires the initial condition that panel-level effects are uncorrelated with the first difference of the first observation of the dependent variable.[9]

Results

In view of the above, the following model is estimated in a dynamic panel framework with annual data from 2000-16 for the select group of EMEs mentioned above.

$$\Delta y_{it} = \beta_1 \Delta y_{i,t-1} + \beta \Delta X_{it} + \Delta \varepsilon_{it} \quad \text{..... (3)}$$

In this equation, real GDP growth (Δy) is the dependent variable while its one period lagged value has been taken as an explanatory factor in the model. X is the matrix of explanatory variables: i (i = 1....N), t (t = 1…..T), where i indicates country and t represents year. The other explanatory variables include fiscal impulse, growth in broad money and changes in real effective exchange rate. Model estimation is done through GMM as the data used for this analysis constitutes a wide panel involving larger number of cross sections and relatively shorter time period. The endogeneity problem is addressed by using both Arellano-Bond (1991) and Arellano-Bover (1995) estimation methodology. The country fixed effects are removed by transforming the variables through first difference in case of the former and through orthogonal deviations for the latter. The efficiency of the GMM estimator depends on the validity of its instruments; in this case, lagged values of the dependent variable are used as instruments for the GMM which captures the persistence of both GDP and fiscal impulse. White period GMM weighing matrix has been used which assumes that innovations have time series correlation structure that varies by cross section. Robustness of the models are examined through Sargan-Hansen J test and Arellano-Bond serial correlation test.

The empirical results are presented in Table 2. For Model 1, the Arellano–Bond serial correlation test accepts the null hypothesis that the errors in

[8] Based on the work of Arellano and Bover (1995), Blundell and Bond (1998) proposed further refinements by developing a system estimator that uses moment conditions in which lagged differences are used as instruments for the level equation, in addition to moment conditions of lagged levels as instruments for the differenced equation.

[9] stata.com : xtdpdsys – Arellano-Bover/Blundell–Bond linear dynamic panel-data estimation.

Table 2: Dynamic Panel Estimation Results (2000–16)

Explanatory Variables	Estimated Coefficients	
	Model 1 Arellano-Bond	Model 2 Arellano-Bover
GDP (-1)	0.07	0.10*
	(0.24)	(0.09)
FI	-0.37***	-0.38***
	(0.00)	(0.00)
BM	0.16***	0.17***
	(0.00)	(0.00)
REER	0.18***	0.18***
	(0.00)	(0.00)
Observations	279	279
Sargan-Hansen J-test	(0.63)	(0.38)
Arellano-Bond Serial Correlation Test	(0.88)	

Note: 1. Figures in the parentheses represent respective p-values.
2. *, **, *** denote significance at 10 per cent, 5 per cent and 1 per cent level, respectively.

the first-differenced equation do not exhibit second order serial correlation (p-value of AR(2) is 0.88) and thus ensures consistent parameter estimates for the model. The results of the Sargan–Hansen J test for both the models (acceptance of the null) indicate that the instruments are valid.

The results of the two models are similar, both in sign and magnitude. In both the models, the coefficients of all the explanatory variables (except the lagged dependent variable) are found to have strong statistical significance. The estimation results reveal that real growth is positively impacted by past GDP growth, growth in broad money and changes in REER (implications are discussed in Section V). Contrary to *a priori* expectations, however, fiscal impulse seems to have a strong negative impact on real growth implying expansionary fiscal contraction in our sample. These results are consistent with other findings about fiscal expansion having a negative impact on real growth of EMEs in the short run (Jha *et al.*, 2010; Kandil and Morsy, 2010).

As an alternative methodology, a panel autoregressive distributed lag (ARDL) model was estimated to capture the dynamic influence of the explanatory variables on real GDP growth with identical time period (2000-

16) covering the same set of countries.[10] In a panel ARDL approach, the unit root test is applied to exclude the possibility of I(2) variables (Pesaran *et al*., 2001). In this case, all the variables are I(0) and thus suitable for application of panel ARDL technique (Table 1). The optimal number of lags was selected using the Akaike Information Criterion (AIC). The long-run estimation results are presented in Table A2 in the Annex. The results are broadly similar to that of the dynamic GMM. The coefficients of broad money growth and REER are positive and significant, whereas the fiscal impulse has a negative impact on growth.

Anatomy of a Negative Fiscal Impact

The counter-intuitive result of a negative fiscal effect on growth is somewhat paradoxical given the large stimulus programmes undertaken during the crisis. While the direction of the estimated equation (Equation 3) runs from fiscal stimulus to growth, it was the slump in growth in the post-crisis period which warranted the fiscal stimulus in the first place. The fall in growth was caused by several financial factors. Consequent to the global financial meltdown after the crisis, credit markets were in seizure as banks exhibited extreme risk aversion in lending. Beside the direct impact through the credit channel, growth in EMEs also suffered from the collapse of global trade, commodity prices, investment and remittances sent by migrant workers. Thus, the slump in growth was the disease for which the fiscal stimulus was touted as the cure. These financial factors, however, are not captured by the model (equation 3). Omission of such variables (mis-specification errors) could lead to inaccurate estimates which may be misleading from a policy perspective. To address this problem and get more robust estimates, we augment our model with time-specific fixed effects.

While correcting for the omitted variable bias, the time-fixed effects also capture the influence of aggregate time series trends. Controlling for time effects (by using a dummy variable for each period) removes the influence of aggregate trends which have nothing to do with the causal relationship

[10] We are grateful to the anonymous referee for this suggestion. As the results are similar, it strengthens the robustness of our findings. The ARDL method, however, has not been pursued subsequently as we feel that dynamic GMM method is preferable as the data used for this analysis constitute a wide panel involving large number of cross sections and relatively shorter time period. In contrast, panel VAR and panel ARDL methods are more appropriate for longer time periods and relatively smaller cross-section observations.

Table 3: Dynamic Panel Estimation Results with Period Dummies (2000-2016)

Explanatory Variables	**Estimated Coefficients –** Arellano-Bover
GDP (-1)	0.24***
	(0.00)
FI	0.61
	(0.41)
BM	0.01
	(0.85)
REER	0.09
	(0.47)
Observations	279
Sargan-Hansen J-test	(0.10)

Note: 1. Figures in the parentheses represent respective p-values.
2. *, **, *** denote significance at 10 per cent, 5 per cent and 1 per cent level, respectively.

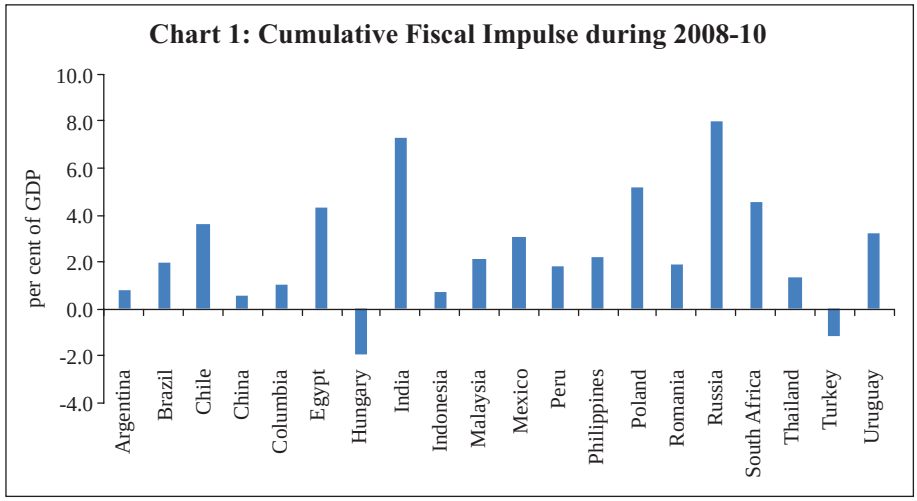
between the dependent and explanatory variables. An estimation of equation 3 after controlling for the time effects generates results which are in sharp contrast with the earlier ones.[11] Although the coefficient of lagged dependent variable continues to remain significant with a positive sign, the impact of fiscal impulse, monetary growth and REER are rendered insignificant after the introduction of period dummies (Table 3). The sign of the fiscal impulse, however, now turns positive.

Did Fiscal Stimulus Matter in the Post-GFC Period?

While the findings of the previous exercise refute the idea of fiscal stimulus accelerating growth over the full sample period, an interesting proposition to investigate is whether the stimulus undertaken during the GFC and its immediate aftermath were effective in reviving growth thereafter, particularly in view of its widespread acceptability among economists and policymakers not only in AEs but also in EMEs.

The full impact of the GFC was first realised at the beginning of 2009 after the global financial market meltdown of October 2008 with the collapse of Lehman Brothers. To counter its adverse impact on the economy, many countries favoured an aggressive fiscal stance in the wake of

[11] Results for Arellano–Bond (1991) estimates with time-fixed effects for the full sample are not reported as the diagnostics were not found to be robust. The coefficients of the period dummies are not reported in the paper. They are, however, available from the authors on request.



monetary policy being ineffective at the zero lower bound. It was hoped that fiscal stimulus through government spending and tax cuts could resurrect aggregate demand and lift the economy from sliding into a deep and prolonged depression.

Similar to AEs, EMEs also embarked on a path of stimulus which was mostly concentrated during 2008-10. During this period, the average cumulative stimulus in our sample was around 2.5 per cent of GDP, with 18 countries undertaking positive stimulus in the range of 0.7-8.0 per cent of GDP (Chart 1).

Equation 3 is re-estimated separately for the pre-crisis (2000-07) and post-crisis (2008-16) periods, using the Arellano-Bover methodology with time-fixed effects. The estimated results for the pre- and post-GFC periods are presented in Table 4. The results of the Sargan-Hansen J test for both periods suggest that the instruments are valid. The coefficients of the explanatory variables in the two sub-periods are now strikingly different from each other. For the pre-GFC period, the coefficients of lagged GDP, monetary growth and real effective exchange rate growth turned out to be positive and significant. Past GDP has a positive impact on real growth confirming persistence. Monetary growth stimulates real GDP positively as does exchange rate appreciation (see explanations in Section V). The coefficient of fiscal impulse, on the other hand, was insignificant, implying relative ineffectiveness of fiscal policy in

Table 4: Dynamic Panel Estimation Results for Pre- and Post-GFC Periods with Period Dummies

Explanatory Variables	Estimated Coefficients	
	Pre-GFC (2000–07) Arellano-Bover	**Post-GFC (2008–16)** Arellano-Bover
GDP (-1)	0.14***	0.15
	(0.00)	(0.60)
FI	-0.26	0.76**
	(0.11)	(0.02)
BM	0.09***	0.04
	(0.00)	(0.48)
REER	0.17***	-0.00
	(0.00)	(0.98)
Observations	100	179
Sargan–Hansen J test	(0.42)	(0.26)

Note: 1. Figures in the parentheses represent respective p-values.
2. *, **, *** denote significance at 10 per cent, 5 per cent and 1 per cent level, respectively.

stimulating aggregate demand. The picture, however, changes dramatically in the post-GFC period. The coefficient of fiscal impulse turns positive and significant during this period, whereas all other explanatory variables are rendered insignificant. Thus, the results are indicative of the resurgence of fiscal policy in stimulating growth in the post-GFC period. Before the crisis, the role of fiscal stimulus was on the wane as fiscal discipline- enforced through the introduction of fiscal rules- was taking centre stage in several countries. After the outbreak of the crisis, adherence to such rules became questionable given that growth concerns remained paramount in public policy debates. The extraordinary fiscal expansion undertaken by the EMEs to combat the crisis, however, gave rise to the apprehension that monetary policy will have no choice but to accommodate higher government borrowings in the medium term (RBI, 2013).

The positive and statistically significant impact of fiscal stimulus in the post-crisis period basically indicates that after controlling for the unobserved factors, the relationship between fiscal stimulus and economic growth turns

out to be positive. In other words, the observed slump in growth in the post-crisis period would have been much sharper in the absence of fiscal stimulus. From that perspective, the post-crisis stimuli undertaken by these EMEs have been able to arrest the downward spiral of growth.

Robustness

To verify the strength of the results, equation 3 is re-estimated using the Arellano-Bover methodology with time-fixed effects for the select group of EMEs with fiscal impulse derived from CAB rather than SB. There is, however, one limitation for this dataset as CAB data for four countries, *viz.* Chile, Egypt, Indonesia and Romania are not available before 2004 resulting in an unbalanced panel. Nevertheless, the estimation results in Table 5 suggest a similar direction of impact (with marginal change in magnitude) to that obtained from the analysis using SB thus validating our earlier findings in Table 4.

A closer look at the headroom available for fiscal and monetary policy operations in the selected set of EMEs reveals that the policy rates were much higher than the 'zero lower bound' for all the EMEs in the pre-GFC period

Table 5: Dynamic Panel Estimation Results for Pre- and Post-GFC Periods with Period Dummies and CAB

Explanatory Variables	Estimated Coefficients	
	Pre-GFC (2000–07) Arellano–Bover	Post-GFC (2008–16) Arellano–Bover
GDP (-1)	0.12***	0.31
	(0.00)	(0.35)
FI	-0.20	0.80***
	(0.32)	(0.00)
BM	0.08**	0.02
	(0.02)	(0.68)
REER	0.20***	-0.15
	(0.00)	(0.23)
Observations	100	179
Sargan-Hansen J-test	(0.33)	(0.66)

Note: 1. Figures in the parentheses represent respective p-values.
2. *, **, *** denote significance at 10 per cent, 5 per cent and 1 per cent level, respectively.

Table 6: Fiscal and Monetary Headroom for select EMEs

Countries	Average Policy Rate (per cent)			General Government SB (per cent of GDP)		
	2006/07	2008/09	2010/11	2006/07	2008/09	2010/11
Argentina	7.7	12.3	9.5	1.4	-0.4	-2.1
Brazil	13.5	11.2	10.9	-3.2	-2.8	-3.8
Chile	5.2	4.5	3.2	0.7	-2.9	-1.8
China	6.3	6.2	5.9	-0.4	-1.1	-0.2
Colombia	7.7	7.7	3.6	-1.6	-1.7	-2.6
Egypt	--	--	--	-8.0	-7.3	-8.9
Hungary	7.3	8.6	5.8	-8.7	-4.4	-4.3
India	7.3	6.5	6.5	-5.7	-9.1	-8.7
Indonesia	10.2	7.9	6.5	-0.2	-0.8	-1.0
Malaysia	3.5	2.8	2.7	-2.7	-4.5	-3.6
Mexico	7.2	6.7	4.5	-0.8	-2.6	-3.9
Peru	4.5	4.6	3.1	0.9	0.4	0.4
Philippines	7.1	4.9	4.2	-0.4	-1.2	-1.3
Poland	4.3	4.7	3.9	-4.0	-5.5	-6.2
Romania	8.0	9.4	6.3	-4.1	-8.2	-4.8
Russia	10.9	11.1	8.0	6.3	-0.5	-0.7
South Africa	8.7	9.9	5.9	0.6	-2.2	-3.4
Thailand	4.2	2.4	2.2	0.8	-0.5	-0.7
Turkey	16.5	12.4	6.4	-3.6	-3.6	-1.8
Uruguay	--	--	--	0.9	-0.5	-2.4

Note: -- indicates unavailability of data.
Source: BIS and IMF.

(2006-07) (Table 6). Post-GFC (2010-11), policy rates generally declined in all countries, reflecting monetary easing by the central banks to arrest fears of a liquidity crunch. In contrast, there was limited fiscal headroom in many of the EMEs in the pre-GFC period; in Brazil, Egypt, Hungary, India, Poland, Romania and Turkey, the general government structural deficit exceeded 3 per cent of GDP. As expected, the average government balance in most of these countries deteriorated in the post-GFC period. It is pertinent to note that despite less headroom for manoeuvrability in these EMEs, fiscal stimulus was undertaken which essentially reflects the desperation of the authorities to get the economy back on track.

Section V
Observations

For the full sample period, our empirical findings can be interpreted in the following manner. While the positive coefficient of the lagged dependent variable confirms the persistence of real GDP growth, monetary expansion stimulates growth; perhaps, through greater availability of resources leading to lower cost of funds which facilitate higher investment and capacity creation in the economy. The positive impact of REER, however, runs contrary to common perception. It is important to note that EMEs witnessed large capital inflows before the crisis, basically in search of higher yields. Such flows resulted in easy monetary conditions and an appreciating REER in these countries. Since EMEs were experiencing higher growth in the pre-crisis period, its coexistence with an appreciating REER is not surprising.[12] As mentioned earlier, the negative (but statistically significant) fiscal impact can be attributed to factors such as: (i) low policy credibility; (ii) reserve inadequacy; (iii) more open economy; and (iv) more indebtedness. Controlling for omitted variables in the model, the impact of fiscal impulse on growth turns positive (although statistically insignificant) which is similar to that of monetary policy and REER.

After truncating the sample, the results from the pre- and post-crisis periods reveal starkly contrasting outcomes. For the pre-crisis period, the impact of monetary policy and REER on growth turns out to be positive (and significant) while fiscal impulse is negative (but insignificant). In the immediate aftermath of the GFC, many EMEs embarked on a path of sustained stimulus hoping that government spending could resurrect the economy from sliding into depression. Our results for the post-crisis period suggest that fiscal stimulus arrested the slide in growth (positive and significant impact) implying that the growth slump could have been much more severe in the absence of stimulus. The results also reflect the potency of fiscal policy in arresting the growth slowdown *vis-à-vis* other instruments.

The smaller impact of fiscal stimulus on growth (less than one) warrants some explanation. As mentioned before, there are some key determinants of the fiscal multiplier which vary significantly between AEs and EMEs,

[12] Moreover, REER appreciation may sometimes be supportive of growth in EMEs by reducing the cost of imported inputs such as capital goods and oil. Since the import component of exports in EMEs is usually high, the benefit of cheaper imports may reflect in lower cost of production and, therefore, potential terms of trade gains which may outweigh the negative impact arising from lower export competitiveness.

resulting in more modest multipliers for the latter *vis-à-vis* the former. First, greater trade openness is expected to have a negative impact on the fiscal multiplier as higher imports are a leakage from aggregate demand. Second, against the backdrop of persistent concerns on debt sustainability, any fiscal expansion can crowd out private demand in EMEs due to the absence of alternative modes of financing and endemic credit constraints. Along with the possibility of forward-looking agents increasing current savings to bear higher tax burden in future, these two effects, cumulatively, could depress the multiplier (Sutherland, 1997). Third, the extent of capacity utilisation in the economy is an important determinant of the size of the multiplier which is at its maximum when (a) the inventory level is insignificant; and (b) there is existing excess capacity in the economy which can respond to the rise in demand without stoking inflation pressures (Baum and Koester, 2011; Baum *et al*., 2012). Finally, the level of financial development – often proxied by the credit-to-GDP ratio – also matters in determining the multiplier's magnitude. For instance, a weak credit-GDP ratio can signify credit-constrained economic agents who, being less forward-looking, cannot undertake consumption smoothing. As such, the sensitivity of EMEs to these various factors crucially depends upon the relative phase of their financial development (Hory, 2016).

Our findings may also be reflective of the diversity in our sample, ranging from large semi-open economies (*e.g.,* China, India) to the much smaller but largely open economies (*e.g.,* Hungary, Malaysia). Exploring the determinants, size and sign of the fiscal multiplier in each country would require a more nuanced approach which would recognise the heterogeneity in the level of financial development and the prevailing country-specific institutional features and practices.

Section VI
Conclusion

This paper investigates whether fiscal policy is an effective macroeconomic stabilisation tool in EMEs – a topic which has received relatively limited attention in the empirical literature. Judging from the active use of discretionary fiscal policy in several EMEs, especially after the GFC, policymakers had unequivocal confidence in its efficacy. Our empirical findings suggest that the disruption of growth could have been much more severe had stimulus measures not been undertaken by these EMEs.

Despite limited headroom, particularly in EMEs, fiscal policy measures can sometimes be effective under specific circumstances. Yet, differences in the stage of economic development and inherent fiscal strengths/weaknesses of each country can provide contrasting results. As mentioned before, greater diversity in country-specific characteristics and heterogeneity in the level of financial development among EMEs calls for a more nuanced approach in assessing the impact of fiscal policy rather than straightjacketing them in some benchmarks which are more appropriate for AEs. Admittedly, this is an area for more focussed research in future.

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Annex

Table A1: Average changes during 2000–16 (per cent)

Country	GDP Growth	Broad Money Growth	Change in REER
Argentina	3.6	22.2	-4.7
Brazil	2.8	16.8	1.0
Chile	3.9	14.2	-0.3
China	9.6	16.8	2.4
Colombia	4.3	14.3	-0.1
Egypt	4.1	14.2	0.8
Hungary	2.0	8.5	1.8
India	7.2	16.0	1.8
Indonesia	5.3	12.8	2.4
Malaysia	4.9	8.9	-0.1
Mexico	2.2	13.8	-1.3
Peru	5.3	10.4	0.7
Philippines	5.1	11.3	2.1
Poland	3.6	9.5	0.6
Romania	3.7	18.1	1.6
Russia	3.7	26.6	3.2
South Africa	3.0	12.8	-0.3
Thailand	3.1	7.9	1.4
Turkey	4.1	23.8	1.1
Uruguay	3.3	13.8	1.8

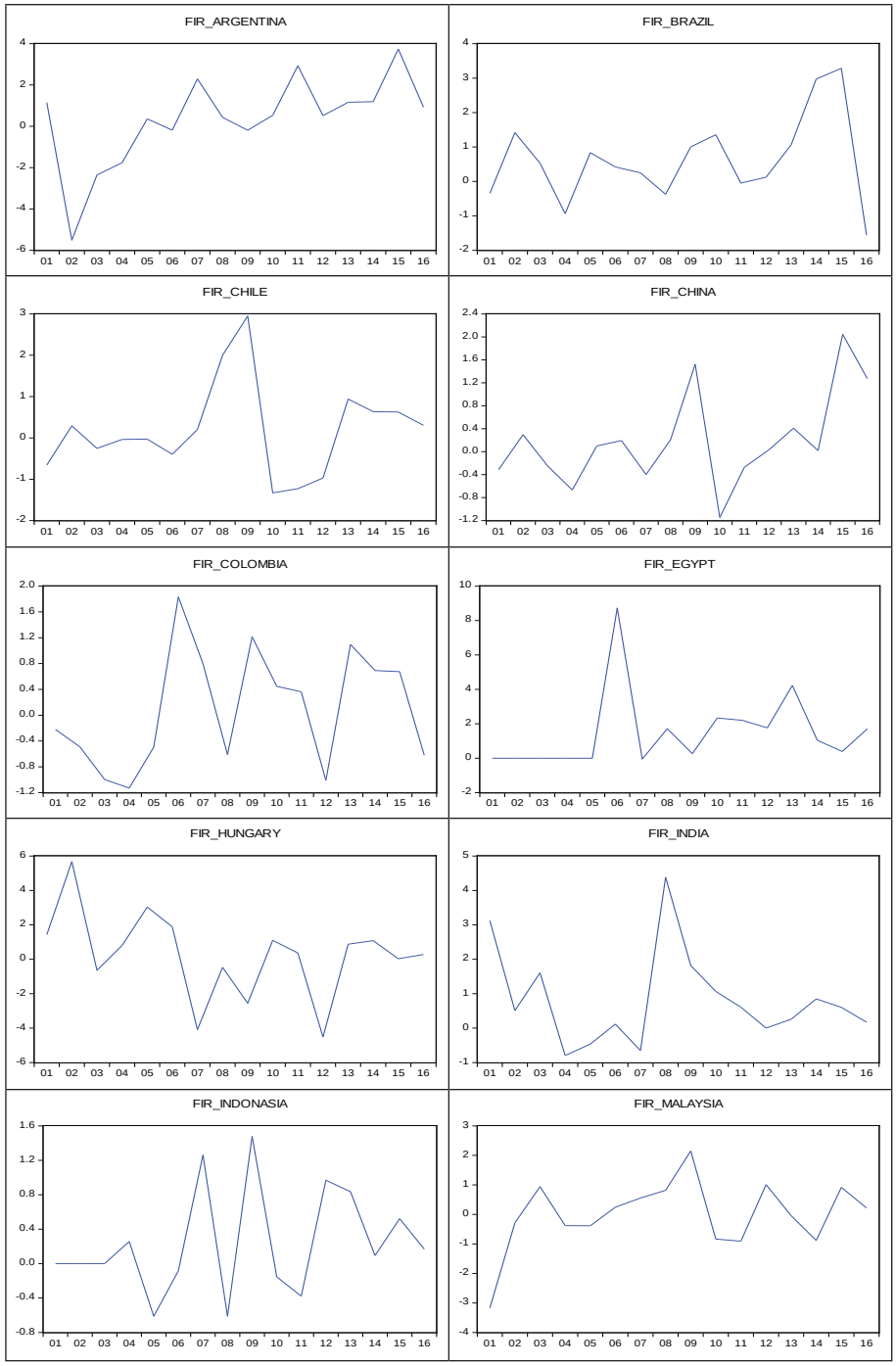
Source: Calculated from IMF's WEO, IFS and Bruegel databases.

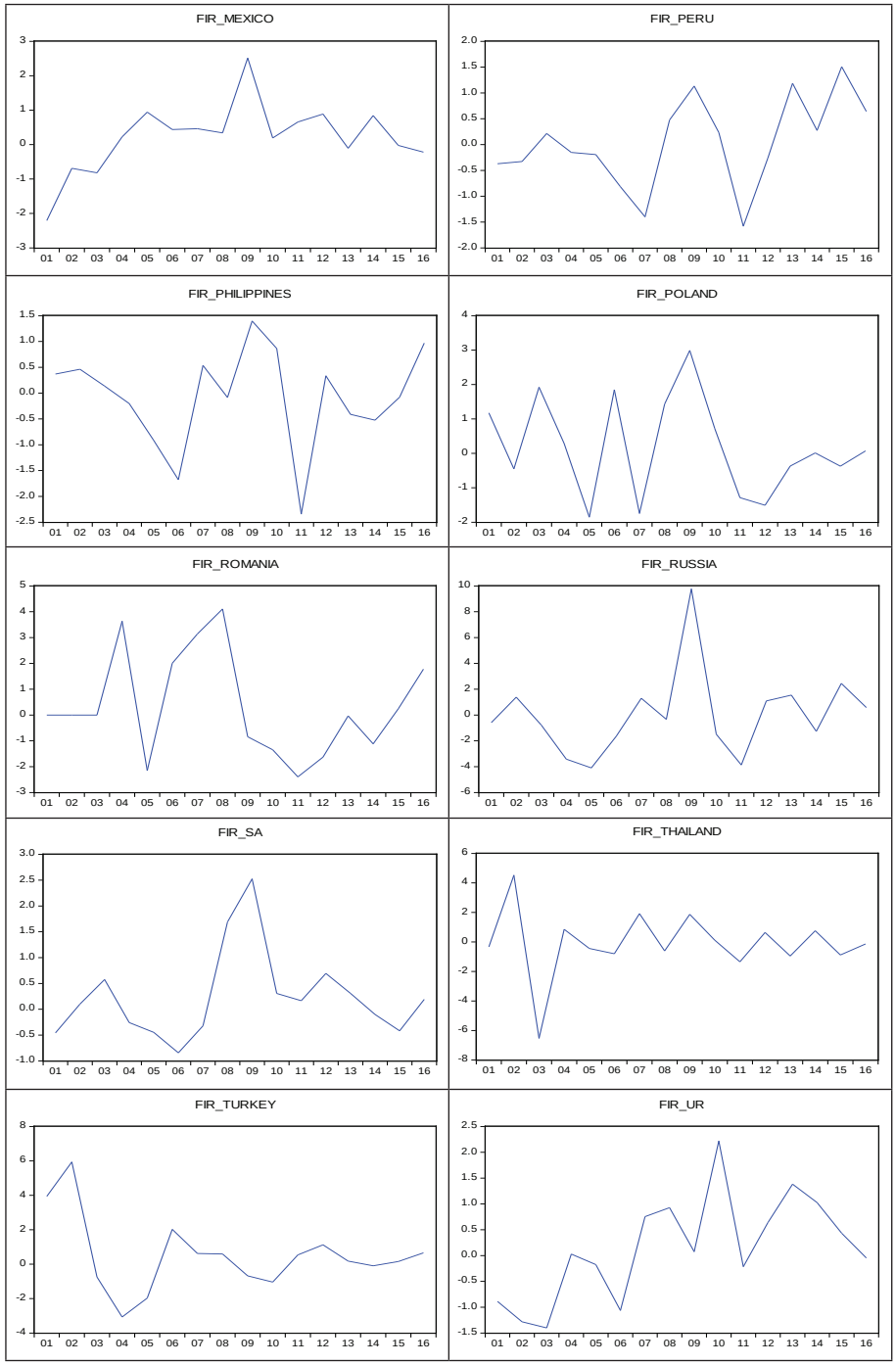
Table A2: Panel ARDL (1,2,2,2) Long-run Estimation Results

Dependent Variable Real GDP Growth	
Explanatory Variables	**Estimated Coefficients**
FI	-0.42***
	(0.00)
BM	0.19***
	(0.00)
REER	0.05***
	(0.00)
Observations	279

Note: 1. Figures in the parentheses represent respective P values.
2. *, **, *** denote significant at 10 per cent, 5 per cent and 1 per cent level, respectively.

Figure A1: Fiscal Impulse (per cent of GDP)




FIR_MEXICO
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FIR_TURKEY
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Reserve Bank of India Occasional Papers
Vol. 39, No. 1&2, 2018

Operating Performance of Initial Public Offering (IPO) Firms after Issue in India: A Revisit

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This paper makes an assessment of how the operating performance of Indian firms change after their initial public offerings (IPOs). It finds that there is no deterioration in the operating performance post IPO, if a performance indicator like 'profit' is normalised by sales volumes (*i.e.*, return on sales) rather than assets (*i.e.*, return on assets). Unlike a distinct decline in return on assets reported in similar other studies, this paper finds a stable return on sales. The paper highlights the importance of choice of right variables for matching and normalisation purposes.

JEL Classification : O16, G32, G39

Keywords : Initial public offers, return on assets, turnover ratio, promoters' shareholding and agency relationship

Introduction

In the life of a firm, transition from a privately-owned to a public-owned firm through an initial public offering (IPO) is probably the most important event (Pagano *et al*., 1998). The existing economic and financial literature has studied a number of issues relating to firms' performance after an IPO, such as under-pricing of IPOs (Ibbotson, 1975; Ritter, 1984), firms' underperformance post issuance (Ritter 1991, Loughran and Ritter 1995), and firms' operating performance after going public (Bruton *et al.*, 2010; Cai and Wei, 1997; Jain and Kini, 1994; Kim *et al*., 2004; Mikkelson *et al*., 1997). These studies have

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concluded that IPO firms' profitability, measured as a ratio of operating profit to total assets, was lower in the post-issue period than in the pre-issue period. In the Indian context also, Janakiramanan (2008), Kohli (2009), Bhatia and Singh (2013) and Mayur and Mittal (2014) have concluded that return on assets (ROA) of IPO firms decline post-issuance.

Most of the studies in the Indian context have covered a period after the 1990s. Since the initiation of economic reforms in the early 1990s, the Indian capital market has witnessed a spate of reforms. The initial phase of reforms comprised mainly of liberalisation and consolidation, while reforms in the 2000s aimed at putting a robust regulatory structure in place and increasing the integrity of both markets and institutions. Important reforms implemented during this period were related to introduction of fit and proper criterion for public issuers, Clause 49 relating to rules of listing, book building norms, and submission of annual and quarterly financial statements, among others. Marisetty and Subrahmanyam (2010) have termed the period after 2000 as the reformed regulated era of the Indian capital market. Consequent upon these reforms and policy changes, the Indian IPO market has increased in complexity and size. It has emerged as one of the most important markets for global investors among emerging market economies.

In this backdrop, it is worthwhile to revisit post-issue performance of Indian firms to analyse changes in firms' behaviour in the reformed regulated era. Various reforms were intended to increase the entry and survival of good firms over firms with poorer credentials. An analysis of post-issue operating performance of firms will indicate whether regulation has resulted in any distinctive shift in their performance. Majority of studies focusing on this area, particularly those relating to advanced economies, have generally concluded that IPO firms underperform post-issue *vis-à-vis* their pre-issue performance.

In this study, we have analysed the operating performance of IPO firms in the long run after controlling for firms' ownership structure and size using univariate and difference-in-differences regression (DID) method. The findings of our study indicate that IPO firms' ROA and turnover ratios (TOR) record decline after issue while the ratio of net operating cash flows to total assets (RCFA) declines in the first-year post-issuance but recovers in

subsequent years. At the same time, return on sales[1] (ROS) does not show any statistically significant decline. We find that faster expansion of asset base of IPO firms immediately after issue largely explains the decline in asset-scaled performance variables such as ROA. The decline is not observed when profit is scaled by sales. Furthermore, when IPO firms are matched on the basis of pre-issue performance, as suggested by Barber and Lyon (1996), decline in ROA is smaller. This study contributes to the existing literature in two important ways: first, the study finds that ROS of Indian IPO firms does not decline after issue and, second, the decline in asset-scaled variables is moderate when firms are matched in terms of ROA. As majority of the literature, following Jain and Kini (1994) has focused on ROA, the finding of a stable ROS is important. To our knowledge, this is the first study analysing the performance of IPO firms floated during the post-reforms regulated era. Furthermore, apart from asset-scaled variables, the study analyses sales-scaled variables, hence controlling for natural bias.

The rest of the paper is structured as follows. Section II covers theoretical underpinnings and literature survey. Section III explains research methodology and data along with data sources; Section IV discusses descriptive statistics. Section V outlines univariate analysis, followed by a narrative on regression results in Section VI. Conclusions are given in Section VII.

Section II

Theoretical Underpinnings and Literature Survey

The focus of this paper is to examine the impact of a firm's decision to go public on its operating performance. There is a large body of literature analysing the post-issue performance *vis-à-vis* pre-issue performance of a firm (Cai and Wei, 1997; Jain and Kini, 1994; Kao *et al*., 2009; Kim *et al*., 2004; Mikkelson *et al*., 1997; Pagano *et al*., 1998). Literature indicates that IPO firms' post-issue performance relative to their pre-issue performance declines mainly due to *agency cost* (Bruton *et al.*, 2010; Jain and Kini, 1994), *entrenchment behaviour* (Kim *et al*., 2004) and *window of opportunity behaviour* (Cai and Wei, 1997; Loughran and Ritter, 1995). Lyandres *et al*. (2007) support an investment-based explanation of decline in performance, whereby firms go

[1] ROS = Ratio of operating profit with net sales.

for aggressive physical investment after the issue. In the investment-based explanation, firms are not able to exploit their new investment efficiently and hence make relatively lower profits.

Agency cost arises due to 'separation of ownership and control', or 'principal-agent problem' in a public firm (Jensen and Meckling, 1976). According to the agency theory, agency cost may manifest in the form of increased consumption of non-pecuniary benefits by firm managers or lower efforts to maximise its value. An IPO leads to a reduction in ownership of existing owner-managers which results in agency problem between owner-managers and new shareholders leading to an increase in agency cost. This predicts a linear relationship between managerial ownership and operating performance of a firm (ibid.). Entrenchment hypothesis, on the other hand, indicates that convergence of interest between a firm and its owner-manager occurs at lower and higher levels of ownership by the firm's managers (Morck *et al*., 1988). This suggests that a firm's performance initially deteriorates as managerial ownership increases, and then tends to improve as their ownership increases further. Besides, we may observe a decline in the post-issue operating performance if firms time their issue. Firms going for an IPO have an incentive to time it when their performance is at its peak so as to get the highest possible return. Firm managers also time the market to bring the issue at the peak of the market. This hypothesis is known as 'window of opportunity' hypothesis (Ritter, 1991; Loughran and Ritter 1995).

One of the early empirical studies on this topic, Jain and Kini (1994), found that IPO firms exhibit a decline in post-issue operating performance due to an increase in agency cost. They found a positive and linear relationship between promoters'[2] share in equity holding of a firm and its performance. Mikkelson *et al*. (1997) also concluded that the operating performance of IPO firms declines post-issuance. However, unlike Jain and Kini (1994), they did not find any relationship between firms' operating performance and retained ownership of the owner-manager. They attributed the decline in post-issue performance of IPO firms to their relatively younger age and smaller size, which disables them from sustaining their competitive advantage, as they lack adequate managerial skills and economies of scale.

[2] By 'promoter' we mean an initial investor who has set up the business and one who stays invested for a longer period either himself or through his/her family members.

In a relatively underdeveloped market structure of the Thai economy, Kim *et al.* (2004) tested the entrenchment hypothesis by using a cubic function and concluded that there was a curvy-linear relationship between ownership share of owner-manager and firm performance. Use of cubic function by Kim *et al.* (2004) allows for "three levels of managerial ownership". They found that managerial ownership between 0–31 per cent and 71–100 per cent leads to an increase in post-issue performance, while it decreases for firms with managerial ownership between 31 and 71 per cent. Their findings on Thai IPO firms support the entrenchment theory of Shleifer and Vishny (1989) and Morck *et al*. (1988).

Recent literature has focused on the impact of large-block shareholding on post-issue operating performance of IPO firms (Bruton *et al.*, 2010; Jain and Kini, 1995; Krishnan *et al.*, 2011; Rindermann, 2004). Agency relation literature has considered 'block holding' as an important governance mechanism as it contains agency cost in multiple ways. A large block shareholding signifies alignment of managers' interests with that of the firm's, leading to reduced adverse selection (Leland and Pyle, 1977). It also reduces coordination cost among dispersed owners. However, in the case of divergence in economic goals, block shareholders may pose conflicting agency problems. Analysing performance of IPO firms of the United Kingdom (UK) and France, Bruton *et al.* (2010) concluded that venture capital (VC) funds, whose goal is to earn a high return within a short period of time, adversely affect IPO firms' performance, while long-term angel funds affect their performance favourably (Annex).

Corporate governance literature emphasises that unlike advanced economies that are characterised by principal-agent problems, emerging economies manifest principal-principal conflict which is attributed to concentrated ownership and control, poor institutional protection to minority shareholders and weak governance structure (Young *et al.*, 2008). Cai and Wei (1997) argued that financial institutions in Japan, such as banks and insurance companies, are permitted to own sizeable share in a firm's equity and are allowed to have representation in the board, which reduces the agency problem and managerial entrenchment behaviour in Japanese firms. Pagano, *et al.* (1998) argued that post-issue decline in investment and profitability of the IPO firm points towards a window of opportunity.

In a tad different financial set up in China, where state-controlled firms go for public issue, Wang (2005) found coexistence of agency conflicts, management entrenchment and large shareholders' expropriation. In another study on newly-privatised firms in China, Fan *et al.* (2007) found that the post-issue decline in operating performance is more pronounced in firms where the chief executive officer (CEO) is politically connected, and, which have weak corporate governance structure.

Barber and Lyon (1996) have criticised event studies relating to IPOs and have argued that in the case of IPO firms, performance variables such as ROA give biased results as asset size of firms changes significantly post-issuance. According to them, literature has generally ignored this fact while selecting control firms. They suggested that instead of size, firms should be matched by the relevant variables. They favoured use of profit scaled by sales. Supporting the hypothesis of Barber and Lyon, Brav and Gompers (1997) and Kothari *et al.* (2005) found that post-issue decline of performance was concentrated in small firms. Lyandres *et al*. (2007) matched IPO firms using investment to asset ratio and concluded that IPO firms invest heavily in real assets and exhaust higher net present value opportunity leading to lower return afterwards.

Though India has a thriving IPO market, there are not many studies on post-issue performance of IPO firms. During the late 1990s and early 2000s, India witnessed a number of capital market reforms (Goswami, 2001; Marisetty and Subrahmanyam, 2010) putting in place a world-class regulatory and governance regime in the country. Most studies focus on the period immediately after or prior to the reforms, but do not adequately cover the reformed regulated era, *i.e.,* the period after the 2000s.

Results of studies on operating performance of IPO firms in India are mixed. Ghosh (2005) did not find any decline in post-issue performance of Indian banks. Kohli (2009), on the other hand, found that post-issue operating performance of IPO firms decline, both with and without industry adjustment. The main goal of this study was to compare the allocative efficiency of resources in a market-based system (stock market) *vis-à-vis* a bank-based system. Kohli attributed the decline in ROA of IPO firms to the relative inefficiency of the market-based structure in India. He did not attempt

to find out the causes of decline in firm performance. Mayur and Mittal (2014), following the methodology of Kim *et al.* (2004), found the presence of entrenchment behaviour of controlling managers in India. In line with the existing literature, studies in India have mainly focused on asset-scaled variables. Though literature survey indicates a near unanimity on decline of operating return in IPO firms after issue; there is no agreement on causes of such a decline.

Section III

Data and Methodology

Data

This study is based on a sample of non-financial private firms in India, which had floated their IPOs during April 1, 2000 to March 31, 2011. The study focuses on their long-term operating performance, for which it uses a minimum of three years post-issue data. Thus, the data upto end of March 2011 allows assessment of performance up to 2014. The data are extracted from Prowess database maintained by the *Centre for Monitoring Indian Economy (CMIE).* Our sample consists of 413 IPO firms. There is considerable amount of variability in terms of numbers of issuances during the studied period. Largest numbers of issues were floated in 2000-01 followed by 2007-08 (Table 1).

Table 1: Year-wise Distribution of Issues

Financial year	No. of issues
2001	91
2002	4
2003	3
2004	14
2005	18
2006	53
2007	50
2008	78
2009	20
2010	36
2011	46
Total	**413**

The study employs ROA, RCFA, ROS, asset turnover ratio (TOR) and sales growth as indicators of operating performance. Multiple variable approach was preferred, as a single variable gives only partial information about performance. ROA was calculated as a ratio of profit before depreciation, interest, taxes and amortisation (PBDITA) to total assets. As operating income is based on accrual accounting, it is prone to manipulation (Barber and Lyon, 1996). This can be addressed by use of operating cash flows. Difference between net operating cash flow and PBDITA is that the latter does not take into account changes in working capital and capital expenditure. Net operating cash flow is the amount which the owner can take out from the company in the form of dividend or other distributions. It is used for calculating net present value (NPV) of a project, which is an important criterion for future capital expenditure by firms. Furthermore, around 80 per cent of chief financial officers (CFOs) globally and around 65 per cent in India use NPV as a criteria for investment (Anand, 2002; Brealey *et al.*, 2014; Graham and Harvey, 2001).

ROA and RCFA are based on historic valuations of assets but some part of total assets could be non-operating. This problem can be overcome by considering ROS or operating profit margin of the firm instead (Barber and Lyon, 1996). Profit margin is unaffected from post-issue increase in assets – used as denominator in some performance indicators. Ratio of sales to total assets, known as TOR, is used to estimate efficiency of assets of a firm.

ROA, ROS and TOR are related to each other. Through Du Pont[3] analysis, one can ascertain the variable contributing to a firm's performance measured by ROA (Brealey *et al.*, 2014). Besides these ratios, the study also examines growth rates of sales and capital expenditure as they indicate growth opportunities for the firm.

Methodology

We use both univariate and multivariate approaches to analyse the change in performance of IPO firms. Change in operating performance is calculated as the median change in performance in post-issue years over the year immediately before issue, *i.e.,* operating performance in year [t] minus

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3 $ROA = \frac{PBDITA}{TotalAssets}$; $ROS = \frac{PBDITA}{Sales}$; *and* $TOR = \frac{Sales}{TotalAssets}$

Hence, $ROA = ROS \times TOR$.

operating performance in year [-1], where [t] represents financial year after the issue year. The use of median is preferred over mean because of its relative immunity to extreme values. Industry-adjusted operating performance is adjusted with median firm's and matched firm's performance at 5-digit national industrial classification (NIC)[4]. A matched firm is selected using Mahalanobis[5] distance criterion. For the purpose of hypothesis testing, we use the Wilcoxon signed-rank test in line with literature.

For ascertaining causes of change in performance, most of the studies have employed ordinary least squares (OLS) regression as the principal technique with retained ownership of owner-manager as an explanatory variable. Such models, however, only show average change in performance without providing information on break-up of change in performance due to IPO and industry trend. This approach also suffers from self-selection and endogeneity. These problems can be addressed to some extent by using difference-in-differences (DID) estimator method (Card and Krueger, 1994; Wooldridge, 2007). We, therefore, use DID method for ascertaining the causal effect of IPOs on firms' post-issue performance. IPO firms have been used as treatment firms, whereas matched firms have been used as control/comparison firms. To estimate the causal effect using DID method, we estimate the following equation:

$$y = \beta_0 + \beta_1 IPO + \delta_0 d2 + \delta_1 d2.IPO + \gamma X + \varepsilon \ldots. (1)$$

Here *IPO* is the dummy variable for IPO firms; it captures possible difference in operating performance of IPO firms and control firms. *d*2 is the time dummy; which captures aggregate changes in operating performance in absence of issue. Interaction term *d*2.*IPO* is equal to one for issue firms after IPO.

Coefficient of *d*2.*IPO* is the DID representing effect of IPO on the post-issue operating performance of IPO firms after controlling for the industry effect.

$$\hat{\delta}_1 = (\hat{y}_{IPO,2} - \hat{y}_{IPO,1}) - (\hat{y}_{match,2} - \hat{y}_{match,1}) \ldots. (2)$$

[4] Alternatively, the same exercise was performed at 2-digit NIC. Results do not change.

[5] Mahalanobis distance of an observation $x = (x_1, x_2, x_3 \ldots \ldots \ldots x_N)^T$ from a set of observations with mean $\mu = (\mu_1, \mu_2, \mu_3, \ldots\ldots, \mu_N)^T$ and covariance matrix S is defined as $D^2 = (x - \mu)^T S^{-1} (x - \mu)$
If the covariance matrix is an identity matrix, then Mahalanobis distance approaches to Euclidean distance.

Following Mikkelson *et al.* (1997), Lukose and Rao (2003), Kim *et al.* (2004), Wang (2005) and Rajan and Zingales (1995), size and debt-equity ratio of firms are used for identifying matching firms. Alternatively, as suggested by Barber and Lyon (1996), firms have also been matched using ROA, size, debt-equity ratio; ROA and size; and, debt-equity ratio, ROA and price to book ratio (PB) of firms. The standard errors of estimates are corrected using cluster robust following Bertrand *et al.* (2004).

Section IV
Descriptive Statistics

Summary statistics relating to IPO firms are set out in Table 2. Mean (median) issue size of sample firms was ₹2163.0 million (₹584 million). Mean (median) return on the listing day was 20.4 per cent (13.7 per cent), indicating very high underpricing by many firms. Median shareholding of promoters and promoter groups in firms declines to 49.7 per cent post-issuance, from 70.4 per cent prior to issuance which is lower than what has been reported by Jain and Kini (1994) and Mikkelson *et al.* (1997) in case of the United States (US). Median age of IPO firms was 11 years at the time of issue.

Table 2: Descriptive Statistics of IPO Firms

Variables	Mean	Standard Deviation	Median	Min	Max
1	2	3	4	5	6
Offer price (₹)	139.1	164	82.0	10.0	1310.0
Size of Issue (₹ Million)	2163	7540	584.3	15.0	98040.0
Shareholding of promoter before issue (%) (280)	69.7	22.8	70.4	10.0	100.0
Shareholding of promoters after issue (%) (273)	49.7	17.4	49.7	2.5	90.0
Age of the firm at the time of IPO (in years)#	12.0	10.1	11.0	0	92.0
PE ratio (262)	100.8	761.0	14.5	0.63	10125.0

#: Age of the firm is difference between issue year and year of incorporation as available in Prowess database.

Notes: i. Promoters post-issue shareholding immediately after the issue; figures in parentheses are number of companies; ii. Calculated by the authors on basis of data collected from prospectuses of IPO firms; iii. Data for promoters' shareholding and PE ratio has been hand collected from prospectuses of the IPO companies.

Source: CMIE Prowess database.

Section V

Univariate Analysis of Operating Performance

IPO firms are not able to maintain high ROA post-issuance, however, it remains above the industry median (Table 3). RCFA declines sharply in year [0] but recovers thereafter and converges to industry median indicating a tendency of convergence in IPO firms' performance with the industry average. IPO firms witness a sharp expansion in capital expenditure and assets size in the post-issue period[6].

In comparison with matched firms, IPO firms report higher ROA throughout the sample period but somewhat lower RCFA. Median turnover ratio of IPO firms is almost similar to matched firms in the year [-1]; however, it declines post issuance and difference widens in post-issue years. As against asset-scaled variables, ROS – profit scaled by sales – does not show any significant post-issue decline; it remains steady and significantly higher than industry median and the matched firm. Steady ROS is in contrast with the ostensible view that IPO firms' performance declines post-issuance.

The ensuing discussion provides detailed analysis of post-issue change in these indicators. Change in performance is adjusted for industry median and matched firm's performance. Median change in operating returns of IPO firms post-issuance relative to year [-1] was (-) 3.0 per cent, (-) 4.4 per cent, (-) 5.6 per cent and (-) 6.2 per cent in years [0], [1], [2] and [3], respectively. Industry-adjusted operating returns also showed a similar trend. Median industry-adjusted operating returns in year [0], [1], [2] and [3] *vis-à-vis* year [-1] declined by 2.5 per cent, 2.7 per cent, 3.9 per cent and 3.5 per cent, respectively (Table 4).

Operating performance measured by RCFA also declined during the post-issue period. The decline, however, was muted in the first and the second-year post-issuance and it improved in the third year. Industry median-adjusted and Mahalanobis distance matched firm-adjusted RCFA also showed the same trend in a statistically significant manner indicating that IPO firms do not face post-issue cash flow problems. These results are in contrast with Jain and Kini (1994).

[6] It is not surprising, given the fact that capital expenditure is the stated goal of a majority of issues. Around 250 out of 285 firms, which brought issues from April 2005 to March 2011, have indicated capital expenditure as an objective of the issue.

Table 3: Median Values of Important Operating Performance Parameters

(Per cent)

Year	IPO Firm	Industry Median	Match Firms' Median
1	2	3	4
ROA			
-1	15.6	10.7	10.4
0	12.6	10.4	9.8
1	10.9	9.4	9.5
2	9.7	8.7	9.1
3	9.4	8.4	9.1
Ratio of net cash flow with total assets (RCFA)			
-1	3.2	2.8	4.6
0	-3.3	1.8	2.9
1	1.6	2.7	4.4
2	3.0	2.5	3.0
3	3.8	2.9	4.2
ROS			
-1	18.3	14.5	13.5
0	19.7	14.7	14.0
1	17.6	15.0	13.3
2	16.0	14.7	13.0
3	16.9	14.1	13.3
Turnover Ratio			
-1	84.8	71.7	85.3
0	63.6	63.2	83.3
1	60.3	87.0	74.3
2	55.4	87.8	76.3
3	52.7	54.5	68.8
Sales Growth			
-1	31.1	18.6	17.8
0	38.1	21.8	15.1
1	21.5	13.0	7.7
2	14.5	10.2	9.9
3	12.0	9.6	8.7
Total Assets Growth			
-1	37.5	12.3	9.9
0	65.5	14.9	10.8
1	17.2	8.7	6.3
2	12.8	7.1	6.0
3	10.7	5.8	3.6
Growth of Capital Expenditure			
-1	19.8	2.6	
0	34.0	4.4	57.4
1	22.2	1.3	34.2
2	5.3	0.0	-1.9
3	2.1	-0.3	11.3

Notes: 1. Firms are matched at NIC 5-digit level using total assets and debt equity ratio.
2. PBDITA is operating profit of the firm, *i.e.,* profit before depreciation, interest, taxes and amortisation. ROA is ratio of PBDITA to total assets. ROS is ratio of PBDITA to sales. Turnover ratio is ratio of sales to total assets.

Source: Authors calculation on the basis of CMIE Prowess database.

Table 4: Median Change in the Performance Variables over the Year Prior to Issue

(Per cent)

Measure of Operating Performance	Financial Year relative to Year [-1]			
	From -1 to 0	From -1 to 1	From -1 to 2	From -1 to 3
1	2	3	4	5
ROA				
IPO firm	-3.0***	-4.4***	-5.6***	-6.2***
Median industry adjusted	-2.5***	2.7***	-3.9***	-3.5***
Match firm adjusted	-2.8***	-3.9***	-4.7***	-5.3***
RCFA				
IPO firm	-5.0***	-1.0	-0.1	1.0 *
Median industry adjusted	-3.0***	0.0	0.3	0.9
Match firm adjusted	-4.0***	-1.3	0.6	3.0*
Asset turnover ratio				
IPO firm	-19.2***	-23.3***	-26.1***	-26.3***
Median industry adjusted	-16.0***	-17.1***	-17.7***	-20.7***
Match firm adjusted	-12.6***	-27.2***	-27.4***	-28.1***
ROS				
IPO firm	0.6***	-0. 3	-1.4***	-1.1***
Median industry adjusted	0.6***	0.0	0.0	0.3
Match firm adjusted	0.01**	0.0	0.0	0.0*
Sales growth				
IPO firm	36.3***	55.1***	70.2***	86.9***
Median industry adjusted	14.5***	17.1***	21.0***	24.0***
Match firm adjusted	19.4***	34.7***	41.1***	40.4***
Capital Expenditure				
IPO firm	64.4***	94.8***	119.4***	151.4***
Median industry adjusted	0	18.2	61.9	18.4
Match firm adjusted	-9.7	70.9***	80.2	44.6***

*, **, ***: Indicates significance at 10 per cent, 5 per cent and 1 per cent levels, respectively.
Notes: 1. Change for year [t] is calculated as difference of performance in year [t] and performance in year [-1]. Issue year is used as the base year, *i.e.* year [0].
2. Test of significance is based on Wilcoxon signed-rank test.
Source: Authors calculation based on Prowess database.

Interestingly, though change in ROS was negative for IPO firms, adjusted ROS - for industry median as well as matched firms - did not show any decline; in fact, it increased marginally in year [3] post-issuance. IPO firms maintained higher sales growth post-issue *vis-à-vis* industry median and

also higher growth in capital expenditure (Table 4). Nevertheless, IPO firms witnessed decline in the asset turnover ratio suggesting that issue firms were not able to exploit their assets fully. As univariate results are not controlled for confounding variables, we conduct a multivariate analysis, controlling for firms' sales promotion expenditures, R&D expenses, short-term liquidity, business group affiliations, promoters' ownership, and executive directors' ownership.

Section VI
Multivariate Analysis

For multivariate analysis, we use difference-in-differences (DID) approach to estimate the impact of IPO on firms' post-issue performance relative to pre-issue period, using operating returns as dependent variable. In addition to a dummy for IPO, year dummies and interaction terms [*IPO dummy* × *Year dummy*], we use control variables such as size of firm, advertisement intensity, R&D intensity, slack ratio and retained shareholding of promoters of the firm post-issue. Logarithm of sales is used as a proxy for size of the firm. Advertisement, R&D intensity and slack variables are taken as ratios to total sales of the firm. Slack is calculated as difference between current assets and current liabilities of a firm. Advertisement intensity and R&D intensity indicate firm's efforts to augment its operations, while slack indicates availability of liquidity.

Results indicate a consistent decline in ROA in the three years post-issuance compared to the matched firms. TOR also shows a similar decline. RCFA, however, shows decline only in the first-year post-issuance. The decline in ROS is statistically insignificant[7]. It may, thus, be concluded that the primary reason for the decline in the operating performance is increase in assets of an IPO firm (Table 5).

Theoretical prepositions, such as agency theory and entrenchment theory are tested in the Indian context using multivariate regressions. To test agency cost, we regress ROA, RCFA, TOR and ROS on promoters' retained shareholding in firm. We also regress change in performance of firm *i* in *year* [*t*] relative to *year* [–1] on promoters' residual ownership. Regressions are controlled by advertisement intensity, R&D ratio, slack ratio, ownership group

[7] As DID results in respect of ROA, ROS, TOR and RCFA are not in same direction, DID was conducted on absolute values of performance and it indicates that IPO firms continue to outperform matched firms even after the IPO.

Table 5: Difference-in-differences (DID) Estimates of IPO Firms' Performance after IPO

Dependent Variables	ROA	ROS	TOR	RCFA
1	2	3	4	5
IPO	0.0430***	-2.2242	-0.1264	-0.0158
	(0.012)	(2.004)	(0.118)	(0.014)
Year[0]	-0.0145	-2.1257	-0.0908**	0.0079
	(0.009)	(2.082)	(0.042)	(0.013)
Year[1]	-0.0285***	-2.2585	-0.0925***	0.0085
	(0.009)	(2.070)	(0.029)	(0.012)
Year[2]	-0.0195	-2.2198	-0.1285***	0.0061
	(0.014)	(2.069)	(0.042)	(0.014)
Year[3]	-0.0339***	-2.3409	-0.1840***	0.0080
	(0.009)	(2.072)	(0.068)	(0.011)
IPO× Year[0]	-0.0381***	2.9460	-0.2308***	-0.0813***
	(0.012)	(2.256)	(0.043)	(0.017)
IPO× Year[1]	-0.0498***	3.6323	-0.2922***	-0.0253
	(0.013)	(2.524)	(0.038)	(0.016)
IPO× Year[2]	-0.0744***	2.1755	-0.2960***	-0.0123
	(0.017)	(2.292)	(0.045)	(0.017)
IPO× Year[3]	-0.0802***	2.8112	-0.2702***	-0.0009
	(0.020)	(2.487)	(0.064)	(0.015)
Log of sales	0.0191***		0.1342***	0.0088***
	(0.004)		(0.020)	(0.002)
Ad intensity	0.0012	17.7388***	0.0057	0.0024***
	(0.001)	(0.112)	(0.004)	(0.001)
R&D ratio	-0.0020	-2.2038*	-2.5829***	0.0137
	(0.140)	(1.225)	(0.488)	(0.119)
Slack ratio	-0.0000	0.0275	-0.0000	-0.0000
	(0.000)	(0.026)	(0.000)	(0.000)
Constant	0.0133	3.9361	0.2673***	-0.0153
	(0.024)	(4.048)	(0.058)	(0.014)
Observations	3,086	3,086	3,086	2,933
R-squared	0.108	0.631	0.106	0.060

Notes: Cluster robust standard errors in parentheses.

*, **, ***: Indicates significance at 10 per cent, 5 per cent and 1 per cent levels, respectively.

1. IPO is treatment dummy indicating that firm is an IPO firm. Year[t]s are time dummies, while IPO× Year[t]s are interaction between IPO dummy and time dummies.
2. Year dummies are proxies for year [0], [1], [2] and [3] post-issuance.
3. IPO×Year[t]s are interaction terms for treatment and year dummies.
4. Ad intensity, R&D ratio and slack ratio have been calculated as ratio of advertisement expenditure, R&D expenditure and slack (current assets – current liabilities) with sales.

dummy and family firm dummy (Tables 6, 7, 8 and 9). Promoters' retained shareholding has a positive and statistically significant coefficient for ROA and RCFA. However, its impact on TOR and ROS is statistically insignificant. Thus, the results are inconclusive to either reject or support agency relationship

Tables 6: Regression Results of ROA

Variables/ specifications	**I**	**II**	**III**
1	2	3	4
Shares held by Promoters	0.0008***	0.0010***	0.0010***
	(<0.001)	(<0.001)	(<0.001)
Log of Sales	0.0204***	0.0234***	0.0234***
	(0.004)	(0.004)	(0.004)
Ad Intensity	0.0020**	0.0035***	0.0036***
	(0.001)	(0.001)	(0.001)
R&D Ratio	0.231	0.142	0.171
	(0.371)	(0.390)	(0.388)
Slack Ratio	-<0.001	<0.001	<0.001
	(<0.001)	(<0.001)	(<0.001)
Ownership Dummy		0.0430***	0.0442***
		(0.014)	(0.014)
Family Firms			-0.00646
			(0.010)
Constant	-0.117***	-0.189***	-0.186***
	(0.036)	(0.049)	(0.048)
Observations	832	832	832
R-squared	0.299	0.327	0.328
Industry Fixed Effect	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes

Notes: Cluster robust standard errors in parentheses.

*, **, ***: Indicates significance at 10 per cent, 5 per cent and 1 per cent levels, respectively.

1. Controlling variables are advertising intensity (ratio of advertisement expense with sales), R&D ratio (ratio of R&D expenses with sales), slack ratio (ratio of slack with sales. Slack = current assets – current liabilities) and log of sales.
2. *Ownership dummy* = 1, if IPO firm does not belong to a business group, which pre-owns a listed firm.
3. *Family firm dummy* = 1, if one or more than one executive directors of firm are also promoters of the firm.

Table 7: **Regression Results of RCFA**

Variables/ specifications	**I**	**II**	**III**
1	2	3	4
Shares held by Promoters	0.0012***	0.0012***	0.0013***
	(0.0003)	(0.0003)	(0.0003)
Log of Sales	0.0099**	0.0106**	0.0104**
	(0.004)	(0.004)	(0.004)
Ad Intensity	0.0034***	0.0038***	0.0039***
	(0.001)	(0.001)	(0.001)
R&D Ratio	0.6760**	0.6550**	0.703**
	(0.273)	(0.277)	(0.279)
Slack Ratio	-<0.001	-(<0.001	-(<0.001
	(<0.001)	((<0.001)	((<0.001)
Ownership Dummy		0.0101	0.0120
		(0.015)	(0.015)
Family Firms			-0.010
			(0.0105)
Constant	-0.241***	-0.258***	-0.253***
	(0.047)	(0.056)	(0.054)
Observations	827	827	827
R-squared	0.215	0.216	0.218
Industry fixed effect	Yes	Yes	Yes
Time fixed effect	Yes	Yes	Yes

Notes: Cluster robust standard errors in parentheses.
*, **, ***: Indicates significance at 10 per cent, 5 per cent and 1 per cent levels, respectively.

1. Controlling variables are advertising intensity (ratio of advertisement expense with sales), R & D ratio (ratio of R&D expenses with sales), slack ratio (ratio of slack with sales. Slack = current assets – current liabilities) and log of sales.
2. *Ownership dummy* = 1, if IPO firm does not belong to a business group, which pre-owns a listed firm.
3. *Family firm* = 1, if one or more than one executive directors of firm are also promoters of the firm.

Table 8: **Regression Results of TOR**

Variables / specifications	**I**	**II**	**IIII**
1	2	3	4
Shares held by Promoters	0.0021	0.0021	0.0022
	(0.002)	(0.002)	(0.002)
Log of Sales	0.147***	0.149***	0.149***
	(0.035)	(0.032)	(0.032)
Ad Intensity	0.0139*	0.0150**	0.0154**
	(0.008)	(0.007)	(0.008)
R&D Ratio	-5.061	-5.125	-4.984
	(3.57)	(3.58)	(3.52)
Slack Ratio	-(<0.001)	-(<0.001)	-(<0.001)
	(<0.001)	(<0.001)	(<0.001)
Ownership Dummy		0.0313	0.0373
		(0.107)	(0.108)
Family Firms			-0.0318
			(0.062)
Constant	0.346	0.293	0.308
	(0.402)	(0.387)	(0.381)
Observations	832	832	832
R-squared	0.452	0.453	0.453
Industry fixed effect	Yes	Yes	Yes
Time fixed effect	Yes	Yes	Yes

Note: Cluster robust standard errors in parentheses.

*, **, ***: Indicates significance at 10 per cent, 5 per cent and 1 per cent levels, respectively.

Table 9: Regression Results of ROS

Variables/ specifications	**I**	**II**	**III**
1	2	3	4
Shares held by Promoters	0.0263	0.0163	0.0132
	(0.0214)	(0.0167)	(0.0160)
Ad Intensity	17.75***	17.70***	17.67***
	(0.0670)	(0.101)	(0.120)
R&D Ratio	0.297	4.494	-3.702
	(3.955)	(6.788)	(6.918)
Slack Ratio	0.0297	0.0297	0.0297
	(0.0265)	(0.0263)	(0.0263)
Ownership Dummy		-3.145	-3.526
		(2.390)	(2.683)
Family Firms			1.909
			(1.631)
Constant	-1.369	2.319	1.588
	(1.456)	(1.933)	(1.554)
Observations	832	832	832
R-squared	0.823	0.824	0.825
Industry fixed effect	Yes	Yes	Yes
Time Fixed effect	Yes	Yes	Yes

Note: Cluster robust standard errors in parentheses.

*, **, ***: Indicates significance at 10 per cent, 5 per cent and 1 per cent levels, respectively.

Table 10: Regression of change in ROA and RCFA over retained ownership of promoters

Variables/ specifications	ROA	RCFA
1	2	3
Promoters' shareholding	-0.0002	0.0002
	(0.0003)	(0.0003)
Age	0.0001***	0.0003
	(0.0003)	(0.0003)
Log of sales	0.0020	0.0006
	(0.002)	(0.002)
Constant	-0.0180	-0.0182
	(0.021)	(0.022)
Observations	1,306	1,266
	264	264
R-squared	0.037	0.023

Note: Cluster robust standard errors in parentheses.
*, **, ***: Indicates significance at 10 per cent, 5 per cent and 1 per cent levels, respectively.

hypothesis. Following Jain and Kini (1994) and Kim *et al.* (2004), change in operating ratios were regressed over retained shareholdings of the promoters; none of the coefficients were found to be statistically significant (Table 10).

Following Mikkelson *et al.* (1997), managerial entrenchment was measured by residual personal holdings of members of board of directors retained post issuance. Regression results indicate statistically insignificant coefficient of the management ownership which are in line with Mikkelson *et al.* (1997). Alternatively, following Kim *et al.* (2004), we replaced personal shareholding of directors/managers of the firm with overall shareholding of the promoters but does not find statistically significant results. Thus, our findings do not support entrenchment hypothesis either (Table 11).

As regression results on agency relationship and entrenchment hypotheses were inconclusive, we matched control firms using ROA within the same industry at 2-digit NIC[8]. Decline in ROA was substantially muted when IPO firms were matched with the same operating variable (Table 12).

[8] Alternatively, firms were matched on the basis of asset size, debt-equity ratio and ROA as well as asset size, debt-equity ratio, ROA and price to book ratio of firms. Results did not change significantly.

Table 11: Regression Results of Entrenchment Hypothesis Testing

Variables/ specifications	ROA	ROS	RCFA	TOR
1	2	3	4	5
Executive Directors' share	0.00165	0.00830	-0.000697	0.00395
	(0.00128)	(0.0527)	(0.00126)	(0.00861)
Executive Directors' share^2	-<0.001	-<0.001	<0.001	-<0.001
	(<0.001)	(<0.001)	(<0.001)	(<0.001)
Executive Directors' share^3	<0.001	-<0.001	-<0.001	-<0.001
	(<0.001)	(<0.001)	(<0.001)	(<0.001)
Advertising Intensity	0.00154*	17.76***	0.00361***	0.0126
	(0.000875)	(0.0606)	(0.000911)	(0.00810)
R&D Ratio	0.573	3.136	0.581	-6.115*
	(0.434)	(5.105)	(0.429)	(3.297)
Slack Ratio	-<0.001	0.0295	-<0.001	-<0.001
	(<0.001)	(0.0264)	(<0.001)	(<0.001)
Log of Sales	0.0194***		0.0102**	0.144***
	(0.00385)		(0.00402)	(0.0323)
Constant	-0.0528	-0.383	-0.151***	0.682*
	(0.0385)	(0.756)	(0.0457)	(0.378)
Observations	1,047	1,047	1,036	1,047
R-squared	0.256	0.822	0.138	0.425
Industry FE	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes

Note: Cluster robust standard errors in parentheses.

*, **, ***: Indicates significance at 10 per cent, 5 per cent and 1 per cent levels, respectively.

This indicates that decline in performance of high-performance firms is rather a common phenomenon and not limited to IPO firms only.

Table 12: DID Results when IPO Firms are Matched by ROA at NIC 2-digit

Variables	ROA	ROS	TOR	RCFA
1	2	3	4	5
IPO	0.0127	-0.6979*	-0.1286	-0.0535***
	(0.009)	(0.419)	(0.084)	(0.012)
Year[0]	-0.0131	-0.2158	-0.1070*	-0.0084
	(0.017)	(0.505)	(0.060)	(0.017)
Year[1]	-0.0244***	0.4854	-0.1626***	-0.0156
	(0.008)	(0.512)	(0.062)	(0.012)
Year[2]	-0.0366***	-0.0968	-0.2062***	-0.0377***
	(0.007)	(0.829)	(0.065)	(0.011)
Year[3]	-0.0368***	-0.3905	-0.2355***	-0.0223**
	(0.007)	(0.532)	(0.067)	(0.009)
IPO*Year[0]	-0.0391**	0.6570	-0.1924***	-0.0738***
	(0.018)	(0.613)	(0.065)	(0.019)
IPO*Year[1]	-0.0515***	0.4859	-0.1868***	-0.0020
	(0.011)	(1.036)	(0.068)	(0.015)
IPO*Year[2]	-0.0526***	-0.0979	-0.1650**	0.0332**
	(0.011)	(0.850)	(0.072)	(0.014)
IPO*Year[3]	-0.0665***	0.7167	-0.1650**	0.0254*
	(0.015)	(0.903)	(0.073)	(0.014)
Log of Sales	0.0164***	-0.2826	0.1161***	0.0094***
	(0.003)	(0.315)	(0.009)	(0.001)
Slack Ratio	-0.0000	0.0281	-0.0000	-0.0000
	(0.000)	(0.025)	(0.000)	(0.000)
R&D Ratio	-0.1284	-8.0130	-3.4464***	-0.2501
	(0.180)	(5.282)	(0.713)	(0.210)
Advertisement Ratio	0.0001	16.7633***	0.0004	0.0017
	(0.001)	(0.264)	(0.003)	(0.001)
Constant	0.0580***	2.0273	0.3802***	0.0218*
	(0.020)	(2.195)	(0.087)	(0.012)
Observations	3,423	3,423	3,423	3,288
R-squared	0.089	0.714	0.170	0.079

Note: Cluster robust standard errors in parentheses.
*, **, ***: Indicates significance at 10 per cent, 5 per cent and 1 per cent levels, respectively.

Section VII

Conclusion

This study revisited the post-issue performance of IPO firms in India. One distinct feature of the study *vis-à-vis* earlier studies is that instead of confining to asset-scaled performance variables, it also analysed variables scaled by sales. In addition to return on assets and ratio of operating cash flow to total assets, it analysed turnover ratio, return on sales and growth of sales to assess the performance.

The analysis indicated that the post-issue operating performance of IPO firms measured as return on asset and turnover ratio recorded a sharp decline. However, contrary to the findings of extant literature, we found that the decline in ratio of operating cash flow to total assets was confined to the issue year and year after the issue only. Initial decline in the ratio of operating cash flow to total assets could be on account of enlarged capital expenditures, which firms resort to after the IPO. We also found that return on sales and sales growth didn't show a statistically significant change after issue.

The study also found that IPO firms continue to outperform matched firms from the same industry when compared in terms of change in relevant operating variables. A battery of tests conducted after controlling for firms' various attributes such as family-control, business group ownership, size, R&D expenditure, advertisement expenditure and liquidity, indicated that decline in performance could not be completely explained by agency relationship and entrenchment hypothesis. We also found that the major cause for decline in asset-scaled operating ratios after an IPO was sharp expansion of the balance sheet size (more than industry average) and consequential increase in assets of IPO firms. Therefore, normalisation of the operating performance variables by sales rather than assets would be more appropriate.

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Annex: Survey of Extant Literature on Post-Issue Operating Performance of IPO Firms

Sr. No	Title and year of publication	Country	Author(s)	Main Hypothesis	Dependent Variables	Independent Variables	Principal Conclusions
1	2		3	4	5	6	7
1	The Post-Issue Operating Performance of IPO Firm (1994)	US	Bharat A. Jain & Omesh Kini	Positive relationship between post-issue operating performance and retained ownership of original entrepreneurs.	Return on asset, ratio of net operating cash flow with total assets.	Retained ownership, under-pricing, and MV and PE ratio.	Linear relationship between retained ownership of original entrepreneur and firm's post-issue operating performance.
2	Ownership and Operating Performance of Companies that go Public (1997)	US	Wayne H. Mikkelson, M. Megan Partch, Kshitij Shah	Post IPO long-run operating performance of firms.	Industry-adjusted operating performance. Operating performance was measured by ROA and industry-adjusted ROA.	Change in officers' and directors' stake, majority corporate block-holder, venture capital backing, fraction of outside board of directors at the offering, secondary sales of shares, size and age of firm	Post-issue performance of IPO firms is unrelated to ownership of officers and directors.
3	The Investment and Operating Performance of Japanese Initial Public Offerings (1997)	Japan	Jun Cai, K.C. John Wei	Positive relationship between ownership structure and post-issue performance.	Long-run stock performance.	Size, ownership share of owner-manager, growth of size.	Deterioration of operating performance cannot be attributed to reduced managerial ownership. IPO firms follow window of opportunity while going public.

Sr. No	Title and year of publication	Country	Author(s)	Main Hypothesis	Dependent Variables	Independent Variables	Principal Conclusions
4	Ownership structure pre- and post-IPOs and the Operating Performance of JASDAQ Companies (2002)	Japan	Kenji Kutsuna, Hideo Okamura, Marc Cowling	Positive relationship between post-issue performance and retained ownership of owner-manager.	Net sales, ordinary profit, net profit and their respective profits (data five years prior to issue and four years post issue have been used).	Change in shareholding, year and sector dummy, age, firm size, market capitalization.	Operating performance varies according to managerial ownership, in addition to the age and size of the firm.
5	Operating Performance of the Firms Issuing Equity through Rights Offer (2003)	India	P.J. Jijo Lukose, S. Narayan Rao	Study examines post-rights' issue performance of firms. It tests relationship between firm size, ownership and directors' share in the company.	Cash flow variables like Jain and Kini (1994).	Ownership group, promoters' share, asset size, age, leverage, year dummy, etc.	The decline in performance is due to inefficiency in utilization of assets and not due to decrease in profit margins.
6	Ownership and Operating Performance in an Emerging Market: Evidence from Thai IPO Firms (2004)	Thailand	Kenneth A. Kim, Pattanaporn Kitsabunnara, John R. Nofsinger	Relationship between post-issue ownership of firm and operating performance.	Operating return on total assets (EBIT/TA), operating cash flow (CF/TA), sales to total assets ratio and capital expenditure.	Industry-adjusted EBIT/TA (measured as our post-IPO sample EBIT/TA less the industry median EBIT/TA, ownership share along with quadratic and cubic terms.	A curvilinear relationship between managerial ownership and the post-IPO change in performance.

Sr. No	Title and year of publication	Country	Author(s)	Main Hypothesis	Dependent Variables	Independent Variables	Principal Conclusions
7	Initial Public Offerings in Hot and Cold Markets (2004)	US	Jean Helwege, Nellie Liang		Industry-adjusted ROA	Pre- and post-issue performance by matching of industry firms	
8	Corporate Governance, Insider Ownership and Operating Performance of Australian Initial Public Offerings (2004)	Australia	M.C. Balatbat, S.L. Taylor, T.S. Walter	Relationship between institutional ownership and post-issue performance.	Matched firm-adjusted ROA.	Ownership structure, board structure and leverage.	No relationship between block-holder ownership and performance.
9	The Post-Offering Performance of IPOs in the Banking Industry (2005)	India	Saurabh Ghosh	Post-IPO long-run underperformance of Indian banks.	Buy and hold return, profitability and efficiency indicators.	ROA, operating profit, interest income, non-performing assets (NPAs), profit per employee, capital adequacy ratio and size.	Due to various macroeconomic and regulatory changes Indian banks did not underperform after IPO.

Sr. No	Title and year of publication	Country	Author(s)	Main Hypothesis	Dependent Variables	Independent Variables	Principal Conclusions
10	Ownership and Operating Performance of Chinese IPOs (2005)	China	Changyun Wang	Positive relationship between ownership structure and post-issue performance.	ROA, operating income and sales to assets.	Size, age, share of legal owner and leverage.	Neither state ownership nor concentration of ownership is associated with performance changes, however, there is a curvilinear relation between legal entity ownership and performance changes (legal entity ownership?).
11	The Conflict Between Agency Theory and Corporate Control on Managerial Ownership: The Evidence from Taiwan IPO Performance (2005)	Taiwan	Anlin Chen, Lanfeng Kao	Positive relationship between operating performance and institutional ownership and stock performance and managerial ownership. Stock performance is positively related to operating performance.	Annualised stock return and ROA.	Institutional share ownership, managerial ownership and shares owned by the directors.	Linear relationship between retained ownership of pre-offering shareholder and firm's post-issue operating performance.

Sr. No	Title and year of publication	Country	Author(s)	Main Hypothesis	Dependent Variables	Independent Variables	Principal Conclusions
12	Block-holder Ownership, Family Control and Post-Listing Performance of French IPOs (2007)	France	Salim Chahine	Examines entrenchment hypothesis in presence of family control.	Buy and hold excess return (BHER) and buy and hold abnormal return in first year after listing.	Ownership share of controlling family, block holder and venture capital.	Firm performance has cubic relationship with ownership of controlling family, negative relationship with block-holder ownership and no significant relationship venture capital ownership.
13	The Post-issue Operating Performance of IPOs in an Emerging Market: evidence from Istanbul Stock Exchange (2008)	Turkey	Ahmet Kurtaran, Bunyamin Er	Post-issue operating performance of firms decline and there is a positive linear relationship between firm's performance and retained ownership share.	Operating performance such as sales, operating profit, operating cash flow/total assets.	Ownership, age, size, under-pricing.	Findings are in line with Jain and Kini (1994).

Sr. No	Title and year of publication	Country	Author(s)	Main Hypothesis	Dependent Variables	Independent Variables	Principal Conclusions
14	Venture Capital Reputation, Post-IPO Performance and Corporate Governance (2009)	US	C. N. V. Krishnan, Vladimir I. Ivanov, Ronald W. Masulis, Ajai K. Singh	Presence of venture capital (VC) in IPO firm should manifest in the long run, superior post-IPO performance.	ROA, market-to-book equity ratio, listing survival, long-run abnormal stock returns.	Venture Capital's (VC) reputation and firm-specific variables. Dummy variable for presence or absence of VC in IPO firms, under-writers' reputation index, natural log of offer size, issuer's MV ratio, industry and year fixed effects, age of VC.	Association of venture capital has positive relationship with post-issue performance; VC's reputation is also positively associated with post-issue performance.
15	Entrepreneurial Learning, the IPO Decision, and the Post-IPO Drop in Firm Profitability (2009)	US	Lubos Pastor, Lucian A. Taylor, Pietro Veronesi	Firm's profitability should decline after going public.	Return on equity for robustness, return on asset.	Price reaction after earnings announcement.	Decline of performance is sharper in those firms where earnings volatility is higher.
16	Do Stock Market allocate Resources Efficiently? An Examination of Initial Public Offerings (2009)	India	Vineet Kohli	IPO firms underperform compared to non-IPO firms.	Similar variables as used by Jain and Kini (1994).	Industry performance	Financially weak firms go for public issue while financially strong firms go for bank debt.

Sr. No	Title and year of publication	Country	Author(s)	Main Hypothesis	Dependent Variables	Independent Variables	Principal Conclusions
17	Regulations, Earnings Management, and Post-IPO Performance: The Chinese Evidence (2009)	China	Jennifer L. Kao, Donghui Wu, Zhifeng Yang	Regulation, earnings management and post-issue performance.	ROA and first-day stock return.	Various firm-level variables and regulation dummies.	Due to pricing regulation, IPO firms inflate their earnings and that leads to lower post-issue performance.
18	Governance, Ownership Structure, and Performance of IPO Firms: The Impact of Different Types of Private Equity Investors and Institutional Environments (2010)	UK, France	Garry D. Bruton, Igor Filatotchev, Salim Chahine, Mike Wright	Multiple agency theory	Percentage price premium (defined as (offer price - book value per share)/ offer price), which observes investors optimism about future value of the IPO firms. ROA measured at the end of the IPO year.	Ownership concentration as a Herfindahl-Hirschman Index (HHI) of retained ownership of block holders, share of VC and business angels in post-issue shareholding and dummy and interaction variables for country-specific institutional differences.	Support for the agency theory argument that concentrated ownership improves IPOs' performance.
20	Is there still a Berlin Wall in the post-issue operating performance of European IPOs (2017)	European countries	Tiago P. Pereira, Miguel Sousa	Post-issue operating underperformance of firms varies across geographies.	Operating performance in line with Jain and Kini (1994).		Performance of firms located in emerging economies is worse than that of firms located in advance economies.

Sr. No	Title and year of publication	Country	Author(s)	Main Hypothesis	Dependent Variables	Independent Variables	Principal Conclusions
21	Agency Problems and Operating Performance in an Emerging Market: Evidence from Indian IPOs (2013)	India	Manas Mayur	No relationship between promoters' share ownership and operating performance. Tests quadratic and cubic relationship between promoters' ownership and performance.	Operating return on total assets (EBIT/TA) and operating cash flow (CF/TA)	Promoter directors' share in the firm	Curvi-linear relationship between post-issue performance and retained ownership of owner-managers
22	Ownership structure and operating performance of IPOs in India (2013)	India	Shikha Bhatia, Balwinder Singh	Relationship between ownership structure and post-issue performance.	ROA, ROE, etc.	Ownership share. Controlled by age, size, leverage and capital expenditure.	Post-issue IPO firms' performance decline.
23	Ownership Structure and Performance: Evidence from Public Float in IPOs (2014)	US	Allen Michel, Jacob Oded, Israel Shaked	Relationship between IPO firm's post-issue performance and public float of firm's shares	ROA	Public float	Non-linear relationship between public float and long-run return
24	Intended Use of Proceeds and the Post-Issue Operating Performance of IPO Firms: A quantile regression approach (2013)	Indonesia	Andriansyah Andriansyah, & George Messinis	Relationship between intended use of issue proceeds and IPO firms' performance.	ROA, NI/TA and net sales/TA.	Intended use of issue proceeds.	

Reserve Bank of India Occasional Papers
Vol. 39, No. 1&2, 2018

Financial Outreach and Growth in India: Interactions at the Sub-national Level

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Financial outreach has assumed greater significance in the narrative on inclusive economic growth. It has become more relevant in the Indian context after dedicated policy initiatives undertaken by the government to expand the outreach of formal financial services. Against this backdrop, this paper attempts to analyse the relationship between financial outreach and economic growth at the sub-national level in India over the period 1996–2015. The banking outreach index, computed across states, depicts improving trends but with widening divergence at the sub-national level over the study period. Further, the study finds a positive and statistically significant impact of financial outreach on per capita income growth. The role of development expenditure and social development indicators in propelling growth is also found to be significant.

JEL Classification : G21, G28, G29, O23, R51

Keywords : Sub-national, economic growth, financial deepening, banking outreach, financial intermediation, developmental expenditure, social indicators

Introduction

Financial outreach has assumed a significant place in the narrative on inclusive economic growth, especially in emerging market economies (EMEs), over the last few decades. Financial outreach, which aims at bringing excluded

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segments of society into the mainstream economy, leads to reallocation of resources through financial intermediation, thereby contributing to equitable growth. It is a well-established fact that finance/capital is one of the key factors of production and financial outreach would provide access to this factor to the economically excluded segments. Demirguc-Kunt and Levine (2009) make a similar argument and underline that financial system could also affect the allocation of capital and bridge the gap between the rich and poor by influencing certain capabilities such as entrepreneurship, education, *etc.* Financial outreach could lead to more allocation of credit to the excluded segment and provide them an opportunity to become an innovator, eventually leading to more productive economic activities by this group of people. Along similar lines, Townsend and Ueda (2006) highlight the changes in the financial system that can affect both aggregate production and the share of credit, which may shift the demand for low and high-skilled workers with commensurate implications for distribution of income[1]. Financial outreach also inculcates saving habit in the masses and enhance national savings and investment.

India embarked on the banking outreach journey way back in the 1970s, with the nationalisation of 14 commercial banks in 1969, when branch opening by the commercial banks was regulated with special dispensation for the unbanked and rural areas. Banking outreach, however, got a renewed fillip in the second half of the 2000s when the Reserve Bank of India (RBI) urged banks in its mid-term review of the 'Annual Policy Statement for 2015–16' to make available a basic banking 'no frills' account either with 'nil' or very low minimum balances as well as with low charges that would make such accounts accessible to vast sections of the population and ensure greater financial inclusion. Another milestone in banking outreach was the announcement of the *Pradhan Mantri Jan Dhan Yojana* (PMJDY) by the Government of India in 2014 aimed at providing basic financial services (such as banking/savings and deposit accounts, remittance, credit, insurance, pension) to the masses in an affordable manner. These efforts have changed the landscape of banking outreach with monumental success both in terms of bank accounts and deposits accrued.

1 For example, a boost to the demand for low-skilled labour due to improvements in finance would lead to re-distribution of income, and expand and equalise economic opportunities.

In theory, various models show that financial intermediaries, instruments and markets help to reduce transaction costs and encourage saving habits, investment decisions and promote economic growth. Another set of theoretical literature shows the dynamic interactions between finance and growth where the financial system influences economic growth, and the economic growth transforms development of financial system. Miller (1988) argues that financial markets contribute to economic growth, while Bagehot (1873), Schumpeter (1911), Gurley and Shaw (1955), Goldsmith (1969), and McKinnon (1973) have all supported the idea that finance leads to economic growth. Despite the fact that there is a substantial literature demonstrating that financial outreach and economic growth assumes a positive relationship, there are however, a couple of papers that question the relationship (Ardic and Domar, 2006).

Against this backdrop, this study attempts to analyse the nexus between banking outreach and economic growth at the sub-national[2] level in India. Several researchers (Chakraborty, 2010; Giri and Mohapatra 2012; Kumar, Sarkar and Bonnerjee, 2014; Pradhan *et al.,* 2014) have studied various aspects of banking outreach in India in some form or other. A study by Ghosh (2011) examines the impact of financial outreach on per capita income growth at the sub-national level in India during 1973 to 2004. Thereafter, two important policy interventions (*i.e.,* no-frills account and PMJDY) have taken place and, therefore, a re-examination of the financial outreach in the recent period makes eminent sense. This study differs from Ghosh (2011) both in terms of coverage of period as well as explanatory variables. This study covers the sample period of 1996–2015. It has also considered state-level control variables including fiscal and human development indicators, which are different from the control variables (share of manufacturing in GSDP) used by Ghosh (2011). Financial outreach and banking outreach terms have been used interchangeably in the study.

Although there is no clear distinction in the literature between financial outreach and financial deepening, most studies have taken number of bank branches, Automated Teller Machines (ATMs) and number of accounts as financial outreach/access variables. Credit and deposit, which indicate

2 'Sub-national' has been used as a substitute for 'States'.

borrowing and saving, respectively, are used as financial deepening indicators. Five variables have been used for construction of the Banking Outreach Index (BOI). These are standard variables considered in the literature for measuring banking and economic development. One thing that is common amongst all these variables is that an increase in their values indicates an improvement in banking outreach. The presence of a bank branch in the vicinity acts as an important indicator of banking development as it can facilitate people to do banking, *i.e.*, save and deposit money in their account and also avail credit. In recent times, the advancement of mobilephones, finternet banking and presence of e-wallets have helped to overcome the hassle of having a physical (brick and mortar) branch. The data on the technology driven banking services, however, are not available for the entire sample period, as these technologies have gained momentum recently. Besides, taking branches in terms of population (*i.e.*, number of branches per lakh population) may not be the appropriate indicator for some of the sparsely populated states of the country, especially the north-east where branches per geographical unit of area (say, per 1,000 sq. km.) may be a more appropriate indicator. But for the sake of uniformity, we have considered number of bank branches per lakh population as the indicator of financial outreach in this study.

The number of credit and deposit accounts standardised with population have limitations as the indicators of financial outreach, as these not always reflect the intensity of banking activity. Thus, at times, the credit-deposit ratio is regarded as a better indicator of banking development. However, with a view to ascertaining the effects of credit and deposit on economic growth separately, both the variables have been considered instead of one (credit-deposit ratio). The paper measures the impact of the banking outreach variables, *viz.,* number of credit accounts per lakh population, per capita credit, per capita deposits, and number of deposit accounts per lakh population on per capita income growth. It also examines the impact of per capita development expenditure and literacy rate of the states on economic growth.

The paper is divided into six sections: Section II draws lessons from the existing literature; stylised facts on banking outreach in India are given in Section III; data and methodology are explained in Section IV; Section V explains the empirical findings; and the concluding observations are presented in Section VI.

Section II

Learning from the Existing Literature

It is generally acknowledged that the financial system contributes to economic growth by facilitating efficient allocation of resources among competing uses. The conceptual link between finance and growth were highlighted a century back by two seminal contributions (Bagehot, 1873 and Schumpeter, 1911). The classical economic growth theorists, such as Ricardo (1891), focussed on scarcity of physical factors of production such as land and capital (*e.g.,* machinery), as constraints on economic growth, but not the financial intermediation and financial markets. It was Schumpeter who brought financial intermediaries and innovation in the economic growth narrative. Financial markets play an important role in the growth process by channelling funds to the most efficient sectors and fostering entrepreneurial innovation (Schumpeter, 1911). Even after the works of Schumpeter, several development theorists ignored the role of financial markets. But McKinnon (1973) and Shaw (1973) advocated the importance of a successful financial system for economic development and, thus, brought back finance into the development theory discourse. Stiglitz (2010) also noted an important contribution of financial markets to economic growth. At the same time, some economists do not subscribe to the idea of positive contribution of finance to growth. For example, Robinson (1952) explains that economic prosperity indirectly leads to financial development in response to the growing demand for funds. Lucas (1988) also does not accept the finance-growth nexus and advocates that finance is an 'over-stressed' determining factor of economic growth. Zingales (2015) argues that the excessive growth of finance in the absence of a proper rule-based framework could degenerate into rent-seeking activity affecting long-term growth adversely. Thus, there are broadly two schools of thought with differing views on the role of finance/financial markets in economic growth.

In India, after the initiation of economic reforms in 1991, a transformed financial sector led to increased financial outreach accompanied by reduction

in the cost of funds and thereby improved economic activities in the economy. Growing empirical work has shown strong linkages between financial development, economic growth and reduction of poverty in India. The access to finance has played a critical role in enabling people to rise above poverty by way of improving productivity (Banerjee and Newman, 1993). Binswanger and Khandker (1995) and Eastwood and Kohli (1999) investigate the impact of Indian rural banks' expansion programme and find that the programme has resulted into decline in rural poverty and increase in non-agricultural employment. A similar positive impact on poverty reduction is also echoed by Burgess, Pande and Wong (2005) in India between the 1970s and the 1990s when banks were required to open four branches in unbanked locations for every new branch opened in an urban area. During this period, about 30,000 rural bank branches were established. A study by the World Bank provides direct evidence that this expansion of bank branch network had a positive impact on financial inclusion, thereby leading to a considerable decline in rural poverty (World Bank, 2014). A study by Ghosh (2011) using data for major states in India from 1973 to 2004, finds a significant impact of financial outreach on economic growth with demographic outreach having a stronger impact than geographical outreach.

Empirical studies find positive impact of financial outreach on economic growth in case of other emerging markets and developing economies as well. For example, Kidanemariam and Daniel (2015) make an assessment of financial inclusion in 26 Asian countries using dynamic panel data analysis and find positive and statistically significant contribution of financial inclusion to the gross domestic product (GDP) per capita. Another study by Odhiambo (2015) finds positive impact of financial deepening on economic growth in Kenya.

Apergis, Filippidis and Economidou (2007), using panel integration techniques for a dynamic heterogeneous panel of 15 OECD and 50 non-OECD countries from 1975 to 2000, find the existence of a long-term equilibrium relationship between financial deepening and economic growth. Ndebbio (2004) examines the role of financial development in the African countries

and advocates for improvement in financial development/intermediation by increasing real money balances through elimination of fiscal deficit and removal of hindrances in resource allocation by financial institutions in order to promote growth. Ardic and Domar (2006), based on provincial data of Turkey for the period 1996–2001, evaluate the effects of financial sector outreach on economic growth. In contrast with the earlier literature, this study finds a negative relationship between financial deepening and economic growth, which is attributed to crowding out of private investment as banks financed the Turkish Treasury. Bangake and Eggoh (2009), covering nearly 71 countries consisting of both developed and developing economies, find a positive relationship between financial development and economic growth but the degree of such relationship depends on income level.

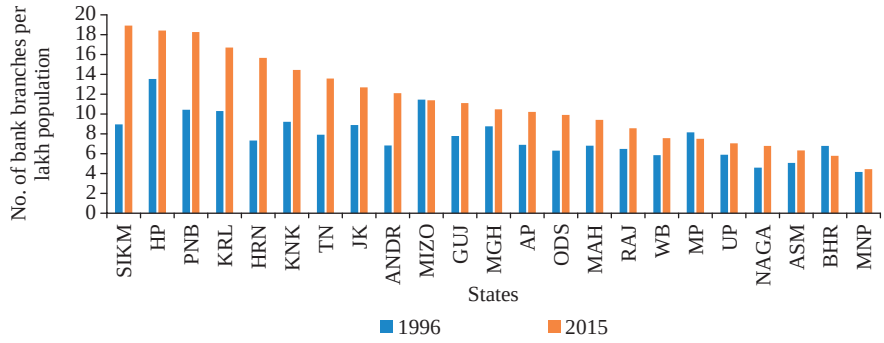
It can be seen from the review of literature that debate on impact of financial outreach on growth is not settled. The bone of contention being that financial outreach may not always have a positive impact on growth. Rather there are studies, which have found the impact to be opposite. Thus, this study attempts to re-examine the issue at sub-national level of governments in India, in a situation where a whole lot of initiatives have been taken on financial outreach.

Section III

Stylised Facts on Financial Outreach in India

The banking sector in India has made rapid strides in scaling business and financial outreach both demographically and geographically, especially over the last two decades. With the entry of new private sector banks, competition in the banking sector has increased significantly. At the same time, both the Reserve Bank of India and the Government of India have been relentlessly pursuing the policies aimed at improving financial outreach, such as bank branch opening in unbanked areas, no frills accounts, and PMJDY. Consequently, all banking outreach indicators have shown significant improvement during 1996-2015. The number of bank branches per lakh population at the national

Chart 1: Bank Branches across States

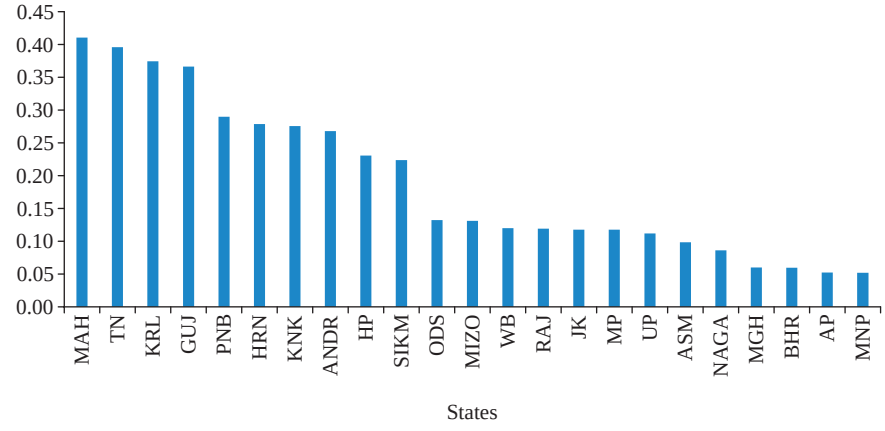


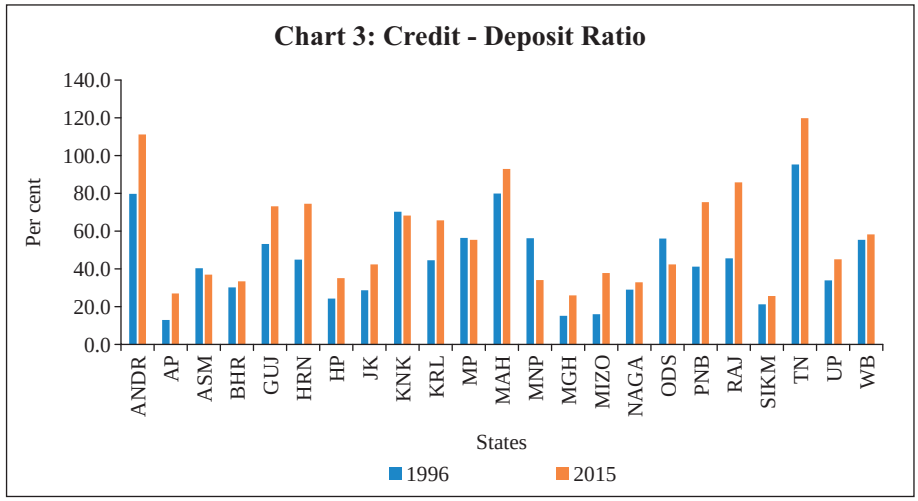
Note: here ANDR: Andhra Pradesh, AP: Arunachal Pradesh, ASM: Assam, BHR: Bihar, GUJ: Gujarat, HRN: Haryana, HP: Himachal Pradesh, JK: Jammu and Kashmir, KNK: Karnataka, KRL: Kerala, MP: Madhya Pradesh, MAH: Maharashtra, MNP: Manipur, MGH: Meghalaya, MIZO: Mizoram, NAGA: Nagaland, ODS: Odisha, PNB: Punjab, RAJ: Rajasthan, SIKM: Sikkim, TN: Tamil Nadu, UP: Uttar Pradesh, WB: West Bengal.

level improved significantly during 1996-2015. There has been a remarkable improvement across states (barring Bihar and Madhya Pradesh) in the number of bank branches (Chart 1).

A similar improvement is seen in the banking outreach index over the above-mentioned period (Chart 2). Looking at the growth of other financial outreach variables, it can be seen that they have also improved substantially over the period. The banking outreach can also be seen in the form of rise in credit-deposit ratio over the same period in majority of states (Chart 3).

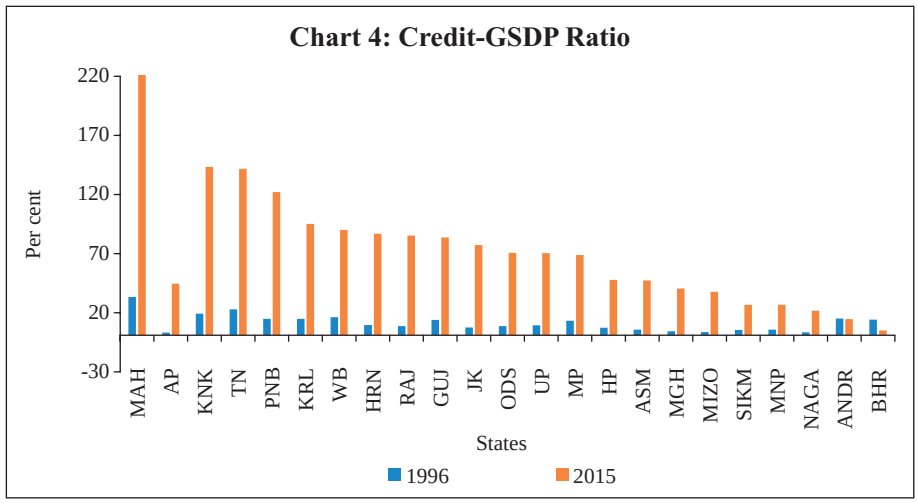
Chart 2: Change in Banking Outreach Index (2015 over 1996)

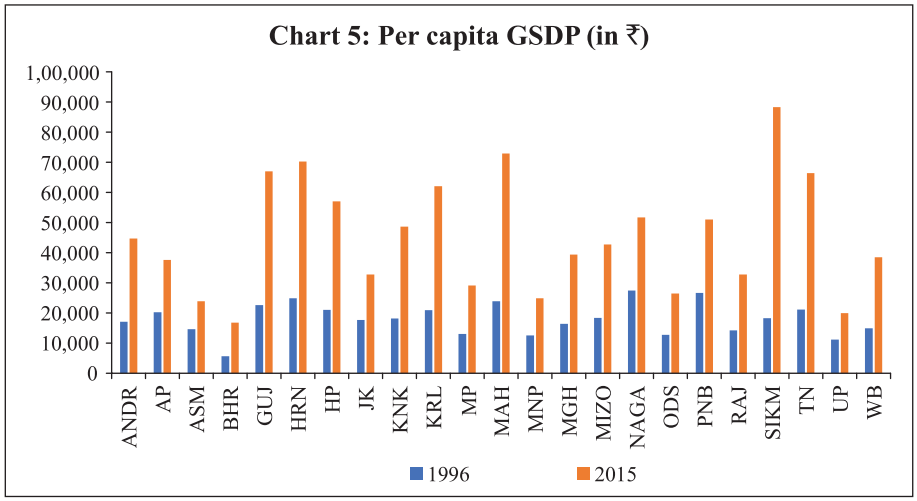




The credit to GSDP ratio is considered as a major indicator to assess financial outreach, and it shows growth in the sample period, indicating improvement in financial outreach at the state level (Chart 4). Along with rapid progress in various financial outreach indicators, some states have shown tremendous improvement in per capita income while others have grown at a moderate pace (Chart 5).

The stylised facts presented above in the charts *prima facie*, indicate a positive association between progress in financial outreach and per capita income over the last two decades. However, this relationship needs further empirical investigation to arrive at a firm conclusion.





Section IV

Data and Methodology

Data

We have used three sets of variables in this study. The first set includes per capita GSDP of 23 states, including Jharkhand, Chhattisgarh and Uttarakhand. Adjustment has been made in other variables for these states and Bihar, Madhya Pradesh and Uttar Pradesh. The second set mainly contains banking outreach variables, *i.e.,* number of bank branches per lakh population; number of deposit accounts per lakh population; per capita deposits; number of credit accounts per lakh population; and per capita credit. The banking outreach variables pertain to the commercial banks. In order to ensure robustness of empirical exercise, some additional control variables, *i.e.,* per capita development expenditure of state governments (representing state government efforts to promote growth rate of the state), and literacy rate are used in the analysis. The sources for data include the Central Statistics Office (CSO), Government of India, *Handbook of Instructions Basic Statistical Returns 1 and 2* and *Handbook of Statistics on Indian States (2005–2016)*, Reserve Bank of India and the Census of India. A brief description of the above-mentioned variables is given in Table 1.

Table 1: Variables and Expected Outcomes

Variables	Notation	Description	Expected impact on Income
Income	PCGSDP	Per capita income at the sub-national level	negative
Bank Branches	Branches	Bank branches per lakh population	positive
Deposit Accounts	AcDeposits	Number of deposit accounts per lakh population	positive
Deposits	PcDeposits	Per capita deposits	positive
Credit Accounts	AcCredit	Number of credit accounts per lakh population	positive
Credit	PcCredit	Per capita credit	positive
Literacy	Literacy	Literacy rate	positive
Development expenditure	Devexp	Per capita development expenditure	positive

Methodology

Two indices have been constructed to measure banking outreach. The first banking outreach index (BOI-1) is constructed by normalising the variables and applying equal weights. The banking outreach variables are normalised by dividing the series with the highest value of the given indicator in the series. Finally, all normalised series are added together and divided by the number of variables (five in this case), implying equal weights to all the indicators. The principal component analysis (PCA) is also used to assign weights to the banking outreach variables to calculate alternative form of BOI (BOI-2). Although some banking outreach variables depict convergence across states, the overall banking outreach index shows divergence over the sample period.

The BOIs are presented below:

BOI_1 = ∑Normalised Outreach Variables / Number of Outreach Variables (n)

BOI_2 =∑(Normalised Outreach Variables * Weights derived from PCA)

In order to empirically assess the relationship between growth in per capita income and banking outreach indicators, the generalised method of

moments (GMM) model has been used keeping in view its superiority in handling the endogeneity problem. The dependent as well as independent and control variables are used in log form. The advantage of using log form in the estimation is that the coefficient of each variable can be read as the elasticity of per capita income growth with respect to the respective variable.

Most of the studies on financial inclusion fail to account for the problem of endogeneity (Allen *et al.*, 2012; Sarma and Pais, 2011). The application of GMM methodology on panel data is expected to control for the potential endogeneity of all explanatory variables (Roodman, 2009). GMM estimators by Arellano and Bond (1991) has been used for the dynamic panel data. As all variables in log form have been found to be integrated of order one, *i.e.,* I(1) process (see appendix Table A.4), the estimation is carried out in first difference (indicated by *D*1). The model specification is as follows:

$$D1.ln\text{PCGSDP}_{it} = \beta_0 + \beta_1\, D1.ln\text{PCGSDP}_{it(-1)} + \beta_2\, D1.ln\text{Branches}_{it} + \beta_3\, D1.ln\text{PcDeposits}_{it} + \beta_4\, D1.\text{lnAcDeposits}_{it} + \beta_5\, D1.ln\text{PcCredit}_{it} + \beta_6\, D1.ln\text{AcCredit}_{it} + \beta_7\, D1.ln\text{PcDevexp}_{it} + \beta_8\, D1.ln\text{Literacy}_{it} + \eta_i + \varepsilon_{it} \quad (1)$$

Where η *is* an unobserved state-specific effect, ε is the error term and *i* and *t* represent state and time period, respectively. One of the major criticisms often received in model estimation by taking variables in their first difference is the loss of critical information. In order to overcome this shortcoming and also to ensure the robustness of the empirical results, we have also applied panel cointegration regression for estimating the long-term relationship between growth of per capita GSDP and banking outreach variables. Model specification for the panel cointegration is presented below:

$$ln\text{PCGSDP}_{it} = \beta_i + \delta_{it} + \beta_1\, ln\text{Branches}_{it} + \beta_2\, ln\text{PcDeposits}_{it} + \beta_3\, ln\text{AcDeposits}_{it} + \beta_4\, ln\text{PcCredit}_{it} + \beta_5\, ln\text{AcCredit}_{it} + \beta_6\, ln\text{PcDevexp}_{it} + \beta_7\, ln\text{Literacy}_{it} + \varepsilon_{it} \quad (2)$$

The parameters β_i and δ_{it} indicate any possible member specific effect and deterministic trend, respectively.

Section V
Empirical Results

An assessment of banking outreach index constructed using five banking outreach variables (Appendix Table A.1) indicates that the average BOI across states more than doubled over the period 1996 to 2015. The BOI-1 increased from 0.156 in 1996 to 0.346 in 2015, while BOI-2 edged up from 0.164 to 0.365 during this period. The disparity across states has, however, widened as exhibited by increase in the coefficient of variation (CoV) of BOI-1, from 29.5 in 1996 to 44.1 in 2015. Notably, the disparity in per capita GSDP has also increased among states, as suggested by increased CoV from 29.5 in 1996 to 42.2 in 2015 (Appendix Table A.2).

Further, the simple correlation to get a preliminary sense of association between the dependent variable and explanatory variables is computed (Appendix Table A.3). The correlation values indicate a wide range in degree of association across variables.

Taking the analysis forward, the first difference GMM model is applied to the panel data following Arellano and Bond (1991). The results of the estimation show positive association between most of the banking outreach variables and the growth of per capita GSDP (Table 2). Only the coefficient

Table 2: Effects of the Banking Outreach Variables on Growth

Difference GMM Results

Dependent variable: per capita GSDP

Variables	Coefficient	p-value
Constant	0.0024	0.00***
Per capita GSDP $_{(t-1)}$	-0.0287	0.00***
Bank branches per lakh population	0.2034	0.02**
Deposit accounts per lakh population	0.0358	0.49
Per capita deposits	0.0848	0.05**
Credit accounts per lakh population	0.0902	0.10*
Per capita credit	0.1017	0.00***
Per capita development expenditure	0.0357	0.06**
Literacy rate	0.1637	0.00***
Sargan Test (p-value)	0.74	
A-B test for AR(2) (p-value)	0.82	

Note: ***, **, and * denote significance at 1 per cent, 5 per cent and 10 per cent confidence levels, respectively. All variables are in log form and in 1st differences.

Table 3: Economic Growth and Banking Outreach Index Relationship

Dependent variable: Per capita GSDP

Variables	GMM Dynamic Panel Estimation			
	Specification I		Specification II	
	Coeff.	p- value	Coeff.	p- value
Constant	0.0014	0.00***	0.0014	0.00***
Per Capita GSDP $_{(t-1)}$	-0.0288	0.00***	-0.0309	0.00***
BOI-1	0.2508	0.00***		
BOI-2			0.2559	0.00***
Per Capita Development Expenditure	0.0864	0.00***	0.0848	0.00***
Literacy Rate	0.2617	0.00***	0.2503	0.00***
Sargan Test (p-value)	0.54		0.54	
A-B test for AR(2) (p-value)	0.87		0.88	

Note: ***, **, and * denote significance at 1 per cent, 5 per cent and 10 per cent confidence levels, respectively. All variables are in log form and in 1st difference.

of the deposit accounts per lakh population is statistically insignificant. The control variables, *viz.,* per capita development expenditure and literacy rate are also found to affect the growth of per capita GSDP positively and are statistically significant.

In the next step, banking outreach variables are replaced with BOI in the dynamic panel GMM regression estimation. The results confirm the positive impact of banking outreach on per capita income growth (Table 3). The control variables *i.e.*, per capita development expenditure and education have also positive effect on growth of per capita GSDP.

The panel cointegration test is carried out to corroborate the results of panel GMM model. All variables in log form are found to be integrated of order one, *i.e.,* I(1) process. The Kao test confirmed that variables under consideration share cointegrating relationship (Table 4).

Table 4: Kao Residual Co-integration Test

	t-Statistic	Prob.
ADF	-1.90	0.03

Note: Residual-based ADF test.

Table 5: Panel Fully Modified Ordinary Least Squares (FMOLS)

Dependent variable: Per capita GSDP

Variables	Coefficient	p-value
Bank Branches per lakh population	0.34	0.00***
Deposit Accounts	-0.06	0.26
Per Capita Deposits	0.11	0.00***
Credit Accounts	0.06	0.12
Per Capita Credit	0.07	0.00***
Literacy Rate	-0.09	0.66
Per Capita Development Expenditure	0.17	0.00***
R^2 0.96	Mean dependent variable	4.41
Adjusted R^2 0.95	S.D. dependent variable	0.21
S.E. of Regression 0.041	Sum squared residuals	0.6939

Note: ***, **, and * denote significance at 1 per cent, 5 per cent and 10 per cent confidence levels, respectively. All variables are in log form.

The long run association of banking outreach variables with economic growth is examined by estimating a fully modified ordinary least squares panel model (FMOLS). The results of panel FMOLS indicate that all banking outreach variables, except deposit accounts and credit accounts, have statistically significant positive impact on the growth of per capita GSDP (Table 5). Even the additional control variable, *i.e.,* per capita development expenditure, has been found positively impacting the growth of per capita GSDP.

The panel FMOLS is re-estimated by substituting banking outreach variables with BOI, which yield more or less similar results, *i.e.,* banking outreach impacts the growth in per capita income at sub-national level positively (Table 6). Overall, the results corroborate the findings of the panel dynamic GMM estimation.

Section VI
Conclusion

Financial outreach in India has expanded considerably over the last two decades as evident from the rapid improvement in various banking outreach variables as well as the overall banking outreach index across states.

Table 6: Panel Fully Modified Ordinary Least Squares (FMOLS)

Dependent variable: Per capita GSDP

Variables	Specification			
	Specification I		Specification II	
	Coefficient	p-value	Coefficient	p- value
BOI-1	0.39	0.00***		
BOI-2			0.37	0.00***
Per Capita Development Expenditure	0.25	0.00***	0.25	0.00***
Literacy Rate	0.22	0.31	0.20	0.36
R^2	0.9580		0.9573	
Adjusted R^2	0.9554		0.9547	
S.E. of Regression	0.0434		0.0437	
Mean dependent variable	4.4138		4.4138	
S.D. dependent variable	0.2058		0.2059	
Sum Squared Residuals	0.7752		0.7882	

Note: ***, **, and * denotes significance at 1 per cent, 5 per cent and 10 per cent confidence levels, respectively. All variables are in log form.

Nonetheless, the overall banking outreach index shows increasing divergence across states. Along with the banking outreach, per capita GSDP also shows increasing divergence across states. The banking outreach variables, *viz.* number of credit accounts per lakh population, per capita credit, and per capita deposits displayed positive and statistically significant impact on per capita income growth. Besides, the impact of additional control variables, *viz*., per capita development expenditure was also found positive and statistically significant. The findings of the study point to large potential to accelerate the pace of growth by enhancing financial outreach across states in India. Additionally, convergence in financial outreach across the states especially by way of improving the level in those states which are lagging behind, would help in reducing state-level disparity in the per capita income. The role of the government in propelling growth is also important as evident from the coefficient of development expenditure. Thus, the level of development expenditures of governments across states also explain the divergence in income level across states, besides financial outreach and other factors.

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APPENDIX

Table A.1: Banking Outreach Index (BOI)

Year	BOI-1	BOI-2	Average BOI	Standard Deviation	Coefficient of Variation
1996	0.156	0.164	0.16	0.05	29.5
1997	0.154	0.161	0.16	0.05	30.6
1998	0.150	0.157	0.16	0.05	32.5
1999	0.150	0.157	0.16	0.05	33.6
2000	0.146	0.153	0.15	0.05	36.0
2001	0.146	0.152	0.15	0.06	36.6
2002	0.148	0.154	0.15	0.06	38.1
2003	0.149	0.156	0.16	0.06	38.9
2004	0.153	0.159	0.16	0.07	41.1
2005	0.160	0.167	0.17	0.07	41.8
2006	0.169	0.176	0.18	0.07	42.4
2007	0.179	0.187	0.19	0.08	42.5
2008	0.195	0.203	0.20	0.09	44.3
2009	0.208	0.217	0.22	0.10	43.8
2010	0.225	0.235	0.23	0.10	43.5
2011	0.241	0.252	0.25	0.11	43.9
2012	0.263	0.276	0.28	0.12	44.2
2013	0.288	0.302	0.30	0.13	43.8
2014	0.321	0.338	0.34	0.15	43.8
2015	0.346	0.365	0.36	0.16	44.1

Source: Authors' calculations.

Table A.2: Per Capita GSDP

Year	Average Per Capita GSDP	Standard Deviation of Per Capita GSDP	Coefficient of Variation
1996	18042.0	5319.3	29.5
1997	18804.6	5574.0	29.6
1998	19322.7	5648.6	29.2
1999	19898.0	5698.5	28.6
2000	20586.9	5831.0	28.3
2001	20804.9	6135.8	29.5
2002	21509.3	6373.2	29.6
2003	21962.2	6837.0	31.1
2004	23335.1	7132.6	30.6
2005	24879.2	7795.8	31.3
2006	26543.4	8905.7	33.6
2007	28524.1	9894.4	34.7
2008	30442.5	10905.9	35.8
2009	32091.7	11048.3	34.4
2010	34973.2	13466.1	38.5
2011	37581.1	14940.5	39.8
2012	39403.5	16069.7	40.8
2013	40551.0	17260.7	42.6
2014	43232.2	18117.9	41.9
2015	45569.6	19210.6	42.2

Source: Authors' calculations.

Table A.3: Correlations Amongst Dependent and Independent Variables

Variables	Per Capita GSDP	Bank Branches per lakh population	Deposit Accounts	Per Capita Deposits	Credit Accounts	Per Capita Credit	Per Capita Development Expenditure
Per Capita GSDP	1						
Bank Branches per lakh population	0.6464	1					
Deposit Accounts	0.7223	0.7823	1				
Per Capita Deposits	0.5179	0.233	0.3862	1			
Credit Accounts	0.5447	0.4522	0.6473	0.1683	1		
Per Capita Credit	0.7216	0.4103	0.6581	0.4418	0.6405	1	
Per Capita Development Expenditure	0.542	0.3371	0.2422	0.1402	0.0519	0.1893	1

Source: Authors' calculations.

Table A.4: The estimated summary of panel unit root test

Variable	PP - Fisher Chi-square (p-values)	ADF-Fisher Chi-square (p-values)
log(pcGSDP)	1.00	1.00
D1.log(pcGSDP)	0.00	0.00
log(BBPLP)	1.00	1.00
D1 log(BBPLP)	0.00	0.00
log (DPOACPLP)	1.00	1.00
D1.log (DPOACPLP)	0.00	0.00
log(PCDEPO)	1.00	1.00
D1.log(PCDEPO)	0.00	0.00
log(CRDACPLP)	1.00	1.00
D1.log(CRDACPLP)	0.00	0.00
log(PCCRED)	1.00	1.00
D1.log(PCCRED)	0.00	0.00
log(EDUCLIT)	1.00	1.00
D1.log(EDUCLIT)	0.00	0.00
log (PCDEVEXP)	1.00	1.00
D1.log (PCDEVEXP)	0.00	0.00

Reserve Bank of India Occasional Papers
Vol. 39, No. 1&2, 2018

States' Social Sector Spending and Sustainable Development Goals

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This paper focuses on the role of social sector spending in improving developmental outcomes. It situates India in a cross-country assessment of the progress made with regard to sustainable development goals (SDGs). It reviews trends in states' social sector expenditure and SDG outcomes, in particular, education and health, while drilling down into spatial distribution patterns. Analytical findings support the growth enhancing role of human capital formation and the important role that education and health expenditures play in improving primary enrolments and in reducing infant mortality rates. Spending through certain centrally sponsored schemes has also been productive in improving the SDG outcomes, particularly in the current decade. The paper also provides evidence on convergence which augurs well for sustainable growth. Going forward, the focus of education and health expenditures should be on improving secondary enrolment, learning levels among students and quality of health services so as to eliminate the existing gap with respect to SDG target. While persevering with fiscal consolidation, channelising spending towards SDGs coupled with improving the efficiency of such expenditures may be crucial to meet the financing gap.

JEL Classification : H5, H72, I20, I10, Q01

Keywords : Social sector expenditures, public spending, education, health, sustainable development goal

Introduction

With the global economy experiencing a broad-based strengthening of growth, the narrative is shifting towards anchoring fiscal policy to medium-

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term sustainability. This is sought to be achieved by re-orienting public expenditure towards growth-enhancing capital and social sector expenditures, particularly for countries with limited fiscal space (IMF, 2018). The overall objective is to entrench macroeconomic stability by harvesting benefits for medium-term growth through accumulation of physical and human capital and mitigating inequality.

Human capital development is investment-intensive, and returns are not immediate. Theoretically, public provision of merit goods like education and health services is justified on the basis of externalities and the difference between private and social returns (Musgrave, 1996). It is this non-rivalry and non-excludability characterising consumption and investment of human capital which makes it a core responsibility of the public sector. Besides, there is no guarantee of an equitable provision of these basic services under the market mechanism. In India, the interface of fiscal policy with the citizenry is the maximum at the sub-national level, and it is in this context that this paper derives its motivation.

Investing in human capital has now become a global priority. The Addis Ababa Action Agenda[1] (AAAA) provided a global framework for financing sustainable development. With the year 2015 marking the end of the 15-year window for achieving the Millennium Development Goals (MDGs), the United Nations General Assembly adopted on September 25, 2015 a new set of 17 Sustainable Development Goals (SDGs) and 169 associated targets to be achieved by 2030. While the MDGs have been described as 'the greatest anti-poverty push in history', the SDGs are envisaged as agents for transforming the world (UNDP-World Bank, 2016). Addressing people, the planet, peace, prosperity, and partnership, the SDGs embrace the view that development needs to be economically, socially and environmentally sustainable. Unlike the MDGs, the SDG framework does not distinguish between developed and developing nations. Beginning with the Chinese Presidency in 2016, the G20 has committed itself to aligning its work with the 2030 Agenda in its efforts to achieve sustainable, balanced and inclusive growth.

The Indian economy has been undergoing structural transformation over the past three decades as it steps up its trajectory of growth, with its

[1] The agenda was agreed upon by 193 Member States of the United Nations (UN) in the third international conference on Financing for Development held in Addis Ababa in July 2015.

average GDP growth rising from 5.5 per cent during the 1990s to above 7 per cent during 2001-2018.[2] Yet, its progress with respect to the human development index (HDI) score has been modest, especially in education (SDG 4) and health (SDG 3). Investment in these sectors is critical for enhancing the effectiveness of income distribution policies and reaping the demographic dividend. The investment required, however, is substantial. In particular, for India, the social investment required for implementing the SDG agenda could be up to 10 per cent of the gross domestic product (GDP) (UNESCAP, 2017).

Against this backdrop, this paper addresses the role of social sector expenditures, dwelling analytically on specific facets of this common thread that impinge on the quality of economic development in India. Section II covers the international perspective, with cross country comparisons, particularly for various SDG targets and human development indices. Section III offers a detailed analysis of trends in social sector expenditure in India, including centrally sponsored schemes (CSS) and SDG outcomes across states. While Section IV explores the nature of the link between social sector expenditure and the different SDG outcomes, evidence supporting convergence across states with respect to social sector expenditures and SDG outcomes is provided in Section V. Taking stock of the gap *vis-a-vis* SDG targets for India, Section VI provides estimates of financing gaps in health and education expenditures by 2030. Concluding observations are set out in Section VII.

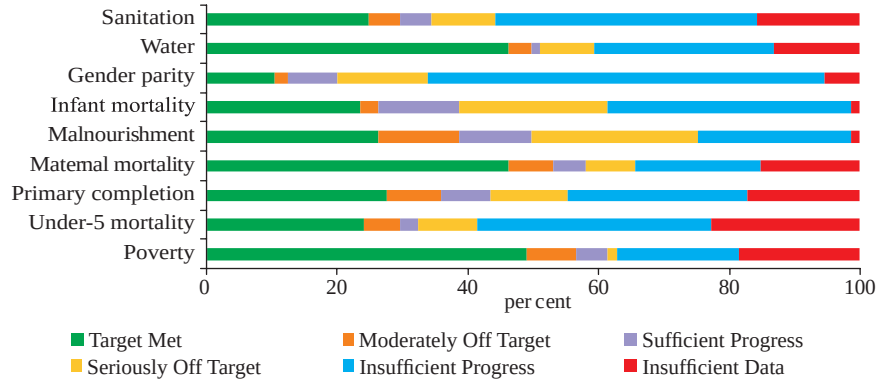
Section II
International Comparison

With the adoption of MDGs for the period 2000-2015, many countries mainstreamed them into their national and sub-national development plans and strategies. Whereas about 50 per cent of the countries have met the MDG target for poverty reduction (Chart 1)[3], countries have been less successful in ameliorating non-income deprivations such as access to quality education or basic health services that can lay the ground for sustained poverty reduction and shared prosperity. Addressing capability deprivation and mitigating the

[2] In 2018-19, India's real GDP growth is projected by the Reserve Bank of India at 7.4 per cent.

[3] This is based on World Bank data for 145 countries for 2015 (UNDP-World Bank, 2016).

Chart 1: Target Achieved under MDGs (2015)



Source: UNDP-World Bank, 2016.

vulnerability of falling back into poverty have become pressing issues in many countries, especially those in which the bottom 40 per cent of the population saw a decline in their incomes. Other issues have also emerged such as combining growth with reduction in the level of environmental externalities and carbon emissions which were not conceived as part of the MDGs.

From MDGs to SDGs

SDGs (2015-2030) offer a transformative, universal framework to address three interlinked dimensions of global existence – people; the planet; and prosperity – while laying out an inclusive and robust development path for the world to follow over the next 15 years. They are applicable for developed and developing countries alike, with monitoring frameworks at three different levels – global; regional; and national. While global and regional partnerships are being pursued, countries have started taking concrete steps at the national level to integrate SDGs into their policy frameworks and mechanisms (Annex 1).

In India, the responsibility for overseeing SDG implementation has been assigned to the National Institution for Transforming India (NITI Aayog), which has mapped goals and targets to various nodal ministries as well as flagship programmes. State governments are also engaged in developing roadmaps for achieving the SDGs, with several of them having already published their plans. Draft indicators for tracking the SDGs have been developed and placed in the public domain by the Ministry of Statistics and Programme Implementation for wider consultation.

SDG Index and Progress of SDGs among Countries

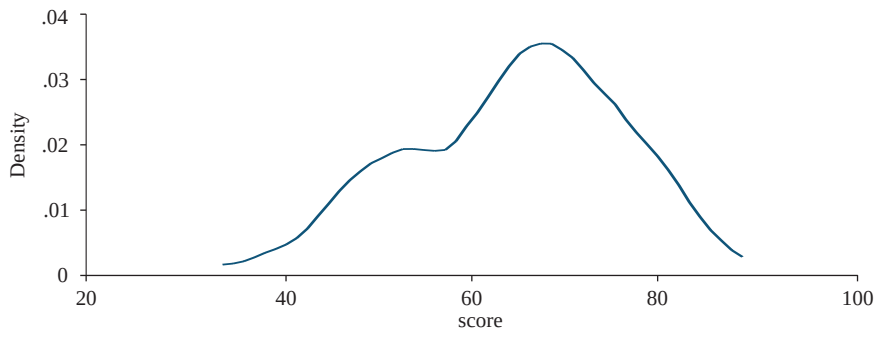
The UN Sustainable Development Solutions Network (SDSN) has created a prototype index that measures the performance of 149 countries in achieving SDGs, with a baseline measurement taken in 2015. Three Scandinavian countries (Sweden, Denmark and Finland) top the SDG Index, but their scores remain below the maximum score of 100 due to less than satisfactory scores on at least one SDG, the climate change and other environmental SDGs. The distribution of scores is bi-modal, with a fat left tail reflecting concentration of countries with scores below the median score of 66 (Chart 2).

SDG and India

India ranks 113th with a score of 58.1 on the SDG index underlining the serious need for concerted efforts to achieve the SDGs (Table 1).

India's progress towards the 17 SDG targets is uneven across goals, with the individual SDG indices ranging from 33.1 to 93.4.[4] While India fares well in terms of eliminating poverty (SDG 1), responsible consumption and production (SDG 12) and Climate Action (SDG 13), among others, its score remains below 50 with regard to eliminating hunger (SDG 2), gender equality (SDG 5) and infrastructure (SDG 9) (Chart 3). With regard to quality education (SDG 4) and good health (SDG 3), India's score remains modest.[5]

Chart 2: Kernel Density of Scores Measuring SDG Attainment



Note: Kernel= Epanechnikov; bandwidth=3.5357
Kernel density estimation is a non-parametric method of estimating the probability density function (PDF) of a continuous random variable. It is non-parametric because it does not assume any underlying distribution for the variable.

[4] SDG indices take values between zero and 100.

[5] It may be noted that as per the Human Development Report 2016, India's rank remained relatively low at 130 in the human development index (HDI) with some of the intrinsic factors that have culminated in India's low achievement scores being geographic differences in health services, and differences in quality of service across public and private sectors, and poor targeting of beneficiaries of services.

Table 1: SDGs Index Ranking

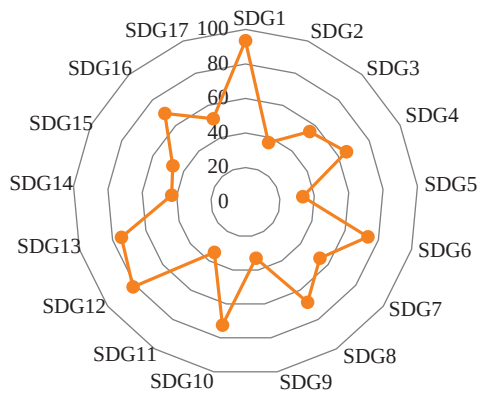
Country	Rank	Score*
1	2	3
Sweden	1	85.6
Denmark	2	84.2
Japan	11	80.2
United Kingdom	16	78.3
Canada	17	78.0
USA	42	72.4
Israel	52	70.1
Brazil	56	69.5
Russian Federation	62	68.9
China	71	67.1
Sri Lanka	81	65.9
Bhutan	83	65.5
Nepal	104	61.6
South Africa	107	61.2
India	113	58.1
Bangladesh	117	56.2
Pakistan	119	55.6
Afghanistan	146	46.8
Liberia	148	42.8
Chad	150	41.5

*Arithmetic Mean of SDG scores of each country.
Source: Sachs *et.al.*, 2017.

Social Sector Expenditure – A Comparison

Social sector performance is often linked to financial investments in the sector (De and Endow, 2008; Jung and Thorbecke, 2003). In terms of

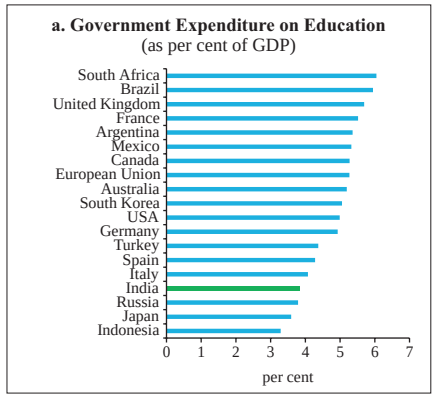
Chart 3: Progress of India in terms of SDG Indices



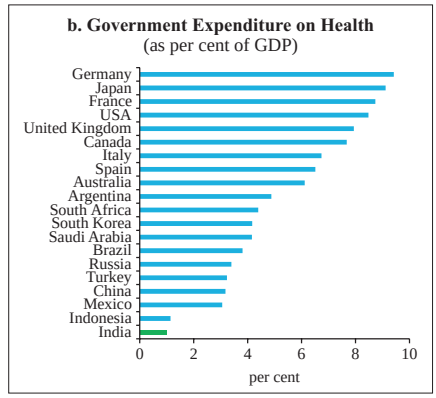
SDG 1	No Poverty
SDG 2	Zero Hunger
SDG 3	Good Health and Well-Being
SDG 4	Quality Education
SDG 5	Gender Equality
SDG 6	Clean Water and Sanitation
SDG 7	Affordable and Clean Energy
SDG 8	Decent Work and Economic Growth
SDG 9	Industry, Innovation and Infrastructure
SDG 10	Reduced Inequalities
SDG 11	Sustainable Cities and Communities
SDG 12	Responsible Consumption and Production
SDG 13	Climate Action
SDG 14	Life Below Water
SDG 15	Life on Land
SDG 16	Peace and Justice Strong Institutions
SDG 17	Partnerships to achieve the Goals.

Source: Sachs *et al.*, 2017.

Chart 4: Expenditure on Education and Health as per cent of GDP - G20 Countries



Source: World Development Indicators (Data for the year 2014, except South Korea, India and Mexico).



Source: Global Health Expenditure Database, World Health Organisation (Data for the year 2015, except USA and Germany).

financial resources allocated to the social sector, developed economies allocate, on average, a fifth of their GDP to the sector. The benefit-to-cost ratio of social programmes between 2011 and 2014 in Asia (excluding India) and Latin America (excluding Chile) was, however, higher than that of Africa and developed countries – 0.21 as opposed to 0.15 in developed countries and 0.10 in Africa. India spends about 8 per cent of GDP on the social sector. A comparison across the G20 countries shows that there is scope for improvement in India's expenditure on education and health and the gains from additional spend could potentially be substantial (Chart 4).

Section III

State Finances and SDG Outcomes: Trends

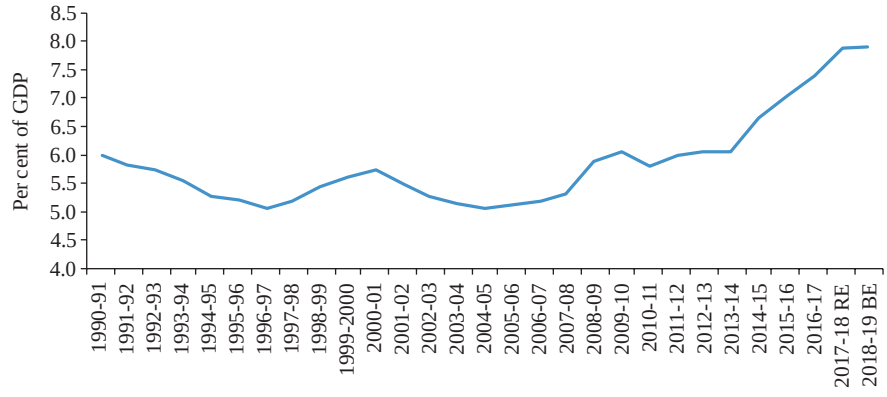
Recognising the role of human capital in achieving sustainable development and taking cognisance of the relatively low rankings for India with respect to SDG goals, this section examines trends in social sector expenditures, in particular education and health, their productivity and SDG outcomes across states.

Trends in Social Sector Expenditure

States' social sector expenditure (SSE)[6] averaged 5.4 per cent of GDP in India in the pre-global financial crisis period, rising since 2010-11 to about 8.0 per cent of GDP in 2017-18 (RE) (Chart 5).

[6] The social sector in India consists of social services consisting of education, health, water, sanitation, family welfare and social sector expenditure comprising of rural development, storage and warehousing.

Chart 5: Social Sector Expenditure



Source: RBI.

The Constitution entrusts the primary responsibility of health and education to states, with about 80 per cent of the national expenditure on these heads being incurred by them. The Union Government began actively spending on health and education from the late 1990s and early 2000s, providing specific purpose transfers and grants under centrally sponsored schemes (CSS) on areas that have inter-state externalities.[7]

Expenditure on education and health services (including medical, public health and family welfare) witnessed a decline as percentage of GDP in the 2000s *vis-a-vis* the 1990s (Table 2). In line with increase in overall social sector expenditures, expenditure on education and health have also risen since 2010-11, but at a moderate pace that could only compensate for the decline (as a percentage of GDP) in the 2000s. Furthermore, while social sector spending has been acyclical in India at the state level, education spending turns out to be pro-cyclical and pronouncedly so during periods of negative output gaps and for bigger states (Kaur *et al.,* 2013).

At a disaggregated level, there are large variations across states. Only for about 13 states, social sector expenditures have risen in the period 2010-2018 over the 1990s. (Chart 6).

States tend to devote much less financial resources to health expenditure than they do to education: health spend was in the range of 0.5-4.0 per cent

[7] These include elementary education, rural health services, roads, rural housing and rural employment.

Table 2: Composition of Social Sector Expenditure (as per cent of GDP) - All States

Item	1990-91 to 1999-2000	2000-01 to 2009-10	2010-11 to 2017-18 (RE)
1	2	3	4
Total Social Sector Expenditure	**5.5**	**5.4**	**6.6**
1. Education	2.5	2.3	2.6
2. Medical and Public Health	0.7	0.5	0.6
3. Family Welfare	0.1	0.1	0.1
4. Water Supply and Sanitation	0.4	0.4	0.3
5. Housing	0.1	0.1	0.2
6. Urban Development	0.1	0.3	0.4
7. Welfare of SCs, STs and OBCs	0.3	0.3	0.4
8. Labour and Labour Welfare	0.1	0.0	0.1
9. Social Security and Welfare	0.2	0.3	0.6
10. Nutrition	0.1	0.1	0.2
11. Relief on Natural Calamities	0.1	0.2	0.2
12. Food Storage and Warehousing	0.1	0.1	0.1
13. Rural Development	0.7	0.6	0.8
14. Others	0.1	0.1	0.1

Source: Budget Documents.

of GSDP as against 1.6-8.4 per cent of GSDP for education in 2017-18. Furthermore, within social sector expenditures, education and health expenditures have risen in the current decade *vis-à-vis* 1990s for only about 9 states (Chart 7a and 7b).

Grants and Centrally Sponsored Social Sector Schemes

Another vital source of financial resources for states is grants-in-aid from the centre[8] which addresses issues relating to horizontal equity given differentials in tax bases of states. The fourteenth Finance Commission (FC-XIV) award being a milestone in the history of resource transfers to states led to a substantial rise in untied or unconditional transfers to states,

[8] Article 280(2)(b) of the Indian Constitution entrusts the Finance Commission with the duty of recommending to the President of India, the principles that should govern the grants-in-aid of the revenues of the states out of the Consolidated Fund of India. Furthermore, article 275 of the Constitution empowers the Parliament to provide for the disbursements of grants-in-aid to states enabling them to meet the costs of developmental schemes undertaken with the approval of the Central Government for the welfare of scheduled tribes or to strengthen the level of administration of the scheduled areas of the state.

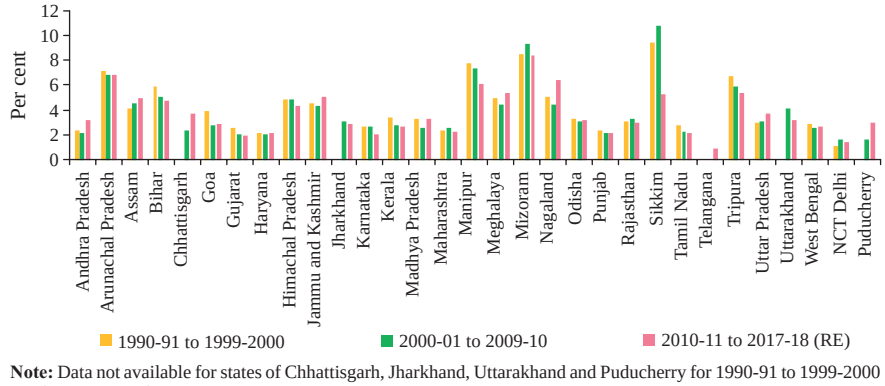
Chart 6: Social Sector Expenditure as per cent of GSDP (decadal average)

Note: Data not available for states of Chhattisgarh, Jharkhand, Uttarakhand and Puducherry for 1990-91 to 1999-2000 and for Telangana for 1990-91 to 1999-2000 and 2001-01 to 2009-10.
Source: RBI.

facilitating flexible decision-making consistent with their own priorities. In terms of outlay, the growth in aggregate resource transfer to states in nominal terms (both statutory, as recommended by the Finance Commissions, and non-statutory) has decelerated in 2017-18 (RE) after peaking in 2016-17, although as a proportion to GDP it has been rising since 2015-16 (Chart 8).

An important source of non-statutory transfers is the centrally sponsored schemes (CSS)[9]. Notwithstanding the progressive reduction in the number of

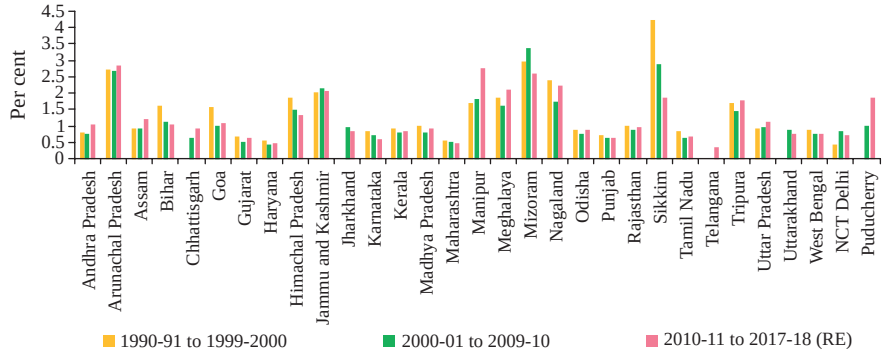
Chart 7a: Education Expenditure as per cent of GSDP (decadal average)



Note: Data not available for states of Chhattisgarh, Jharkhand, Uttarakhand and Puducherry for 1990-91 to 1999-2000 and for Telangana for 1990-91 to 1999-2000 and 2001-01 to 2009-10.
Source: RBI.

[9] CSS are development schemes implemented by the state governments but predominantly funded by the central government.The centre has introduced several schemes of national priority under health, education, agriculture, skill development, employment, urban development and rural infrastructure.

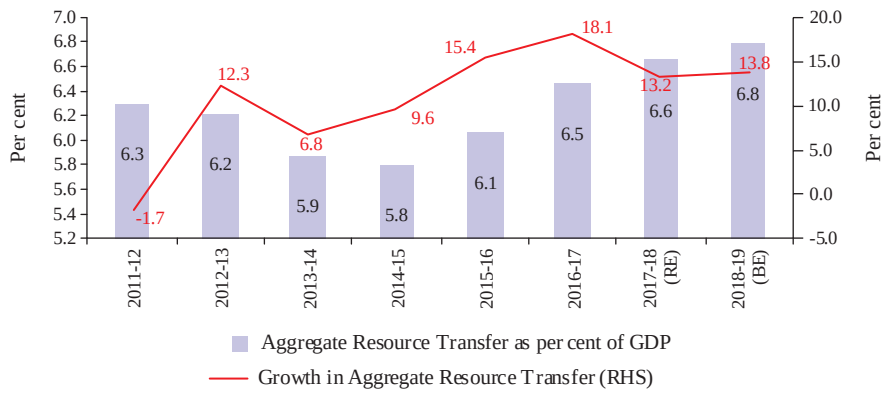
Chart 7b: Health Expenditure as per cent of GSDP (decadal average)



Note: Data not available for states of Chhattisgarh, Jharkhand, Uttarakhand and Puducherry for 1990-91 to 1999-2000 and for Telangana for 1990-91 to 1999-2000 and 2001-01 to 2009-10.
Source: RBI.

CSS programmes over the years from a high of 360 by the end of the Ninth Plan in 2002 to 66 after the restructuring in 2013-14[10] and further to 28 in

Chart 8: Aggregate Resource Transfer to States



Source: Union Budget Documents.

[10] Restructuring of CSS was based on recommendations of the Committee on Restructuring of Centrally Sponsored Schemes [Chairman: Shri B.K. Chaturvedi, GoI, (2011)].Transfer of funds from the centre to the states under the CSS, which was made both through the treasury route as well as the agency route till 2013-14, is being routed through the state budgets only from 2014-15 onwards.Central assistance to major schemes, *viz.*, *Sarva Shiksha Abhiyan* (SSA), National Rural Health Mission (NRHM), Integrated Child Development Services (ICDS), Mid Day Meal Scheme (MDMS), National Rural Drinking Water Programme (NRDWP), *Swachh Bharat Mission* (SBM), National Social Assistance Programme (NSAP) and *Pradhan Mantri Awas Yojana* (PMAY) grew between 2015-16 and 2017-18 (Annex 2). This assistance is budgeted to decline for a few schemes, *viz.*, NRHM, NRDWP, SBM and PMAY in 2018-19, while it is budgeted to increase for SSA, ICDS and *Pradhan Mantri Sadak Yojana* (PMSY).

2016-17[11], the outlays under these schemes have been steadily increasing from 0.4 per cent of GDP in 2001-02 (RE) to 1.7 per cent of GDP in 2017-18 (RE).

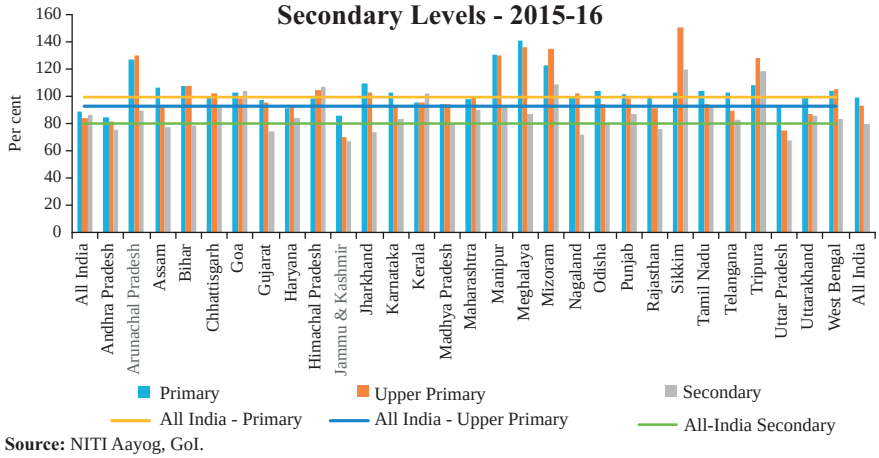
SDG Indicators: Trends

Against the backdrop of these social sector expenditure trends across states, SDG outcome indicators have been examined in brief in a state-wise framework. This analysis speaks of the issues of large-scale inter-state inequalities and geographic differences in provision of health and education services that have been highlighted as major contributory factors to India's low human development (HDR 2016).

Gross Enrolment Ratio (GER)[12]

In terms of gross enrolment, which is the most widely used education indicator (SDG 4), enrolment at primary and upper primary levels at present is high among most states and it significantly exceeds that of secondary enrolment levels in almost all of them (Chart 9). While there has been a

Chart 9: Gross Enrolment Ratio at Primary, Upper Primary and Secondary Levels - 2015-16



Source: NITI Aayog, GoI.

[11] In line with the recommendations of the Sub-Group of Chief Ministers on Rationalisation of Centrally Sponsored Schemes (2015), of the 28 schemes (Annex 3), 6 have been categorised as 'core of the core', 20 as core schemes and the remaining two as optional schemes, with matching funding requirements from the states stipulated at 30 per cent, 40 per cent and 50 per cent, respectively.

[12] Number of students enrolled in a given level of education, regardless of age, expressed as a percentage of the official school-age population corresponding to the same level of education. For the tertiary level, the population used is the 5-year age group starting from the official secondary school graduation age.

movement towards higher enrolment in secondary levels in recent years, its level at around 80, on an average, causes states to fall short of the SDG target of full enrolment. Inadequate faculty resources, poor school facilities at higher education levels, low access to inexpensive support services, inadequate vocational training options and uncertain benefit-to-cost ratios in comparison to the effort needed results in absenteeism and discontinuation at higher levels of education.

Considering the slow-moving nature of the outcome variables, the decadal averages have been analysed across states. While primary GER has shown maximum improvement during the 1990s, enrolment at the upper primary levels has improved during 2000s[13] (Chart 10). The secondary GER that had remained close to 50 till the 2000s has shown significant improvement during the current decade.

Enrolment levels are often not a true reflection of actual education standards and learning among students. Despite high enrolment ratios, particularly at primary levels, absenteeism and low retention rates are a common feature leading to lower learning levels as well. The proportion of children in Standard V who can read a Standard II text is below 50 per cent for many states, with the ratio declining between 2014 and 2016 for some of them (ASER 2016) (Chart 11).

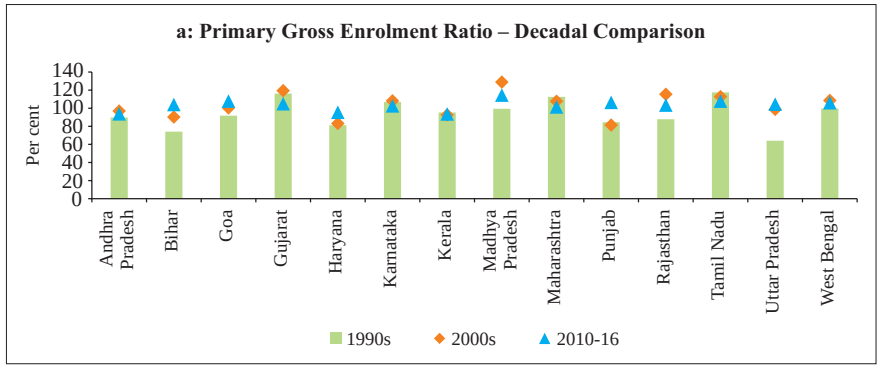
Infant Mortality Rate[14]

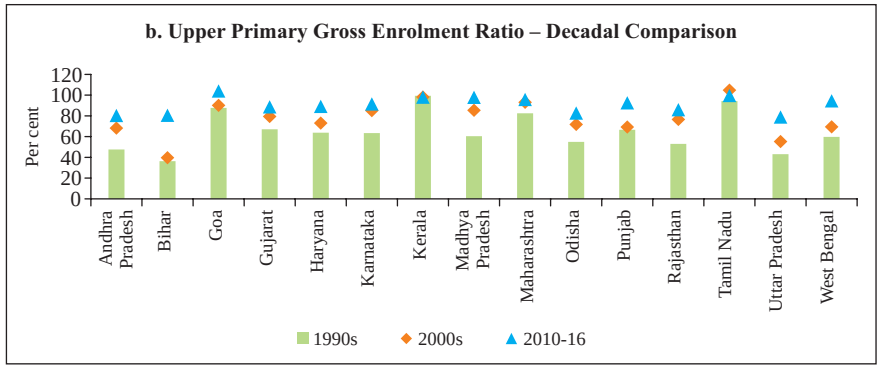
The infant mortality rate (IMR) is the indicator that captures various administrative and social lacunae in the provision of pre and post-natal care for mother and child, lack of proper paramedical resources, medical negligence and lack of family planning. As such, it is an important indicator to assess SDG 3 on good health and well-being. No major changes have been observed in the trends in this indicator across the first two decades – the 1990s and the 2000s – for most states; however, in the current decade so far, there is perceptible improvement (Chart 12). A few states (Kerala, Manipur and Nagaland) remain close to the SDG target of 12 per 1000 live births.

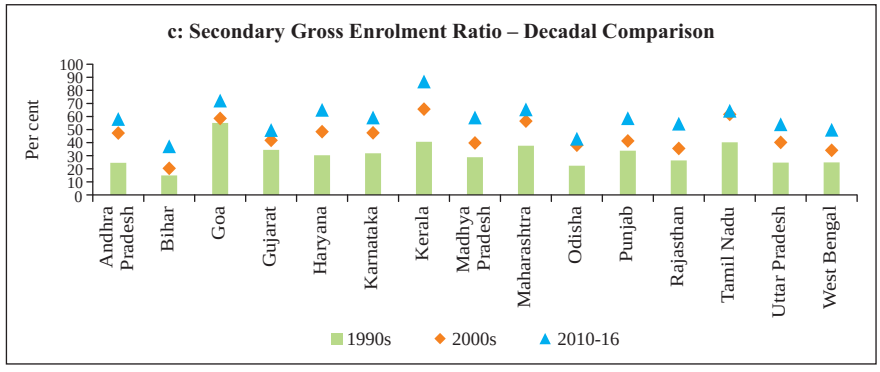
[13] Data for 1990s pertain to averages for 1990-91 to 1999-2000. Data for 2000s pertain to 2000-01 to 2009-10.

[14] Data on infant mortality rate are taken from Handbook of Statistics on Indian States, RBI (2018).

Chart 10: Gross Enrolment Ratio (GER) – Primary, Upper Primary and Secondary: Decadal Comparison





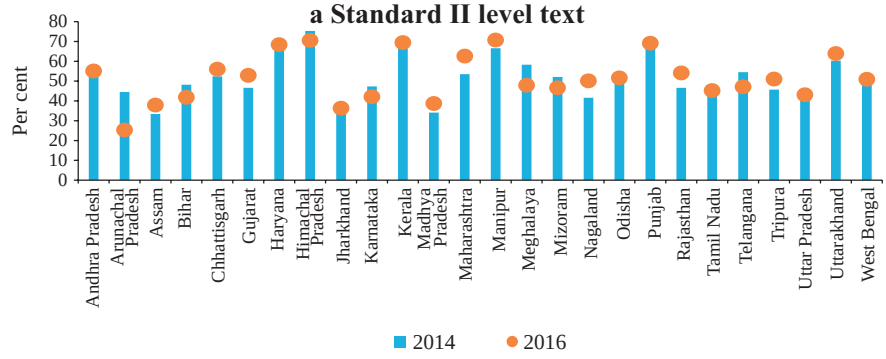


Note: Even though SC states have not been covered in this chart for lack of data since 1990s, but many of them exhibit high enrolment in recent periods.
Source: NITI Aayog and Ministry of Human Resource Development, GoI.

Maternal Mortality Rate

Unlike IMR, maternal mortality rates (MMR) - another indicator to assess SDG 3 - have witnessed overwhelming changes. There has been a

Chart 11: Percentage Children (Standard V) who can read a Standard II level text

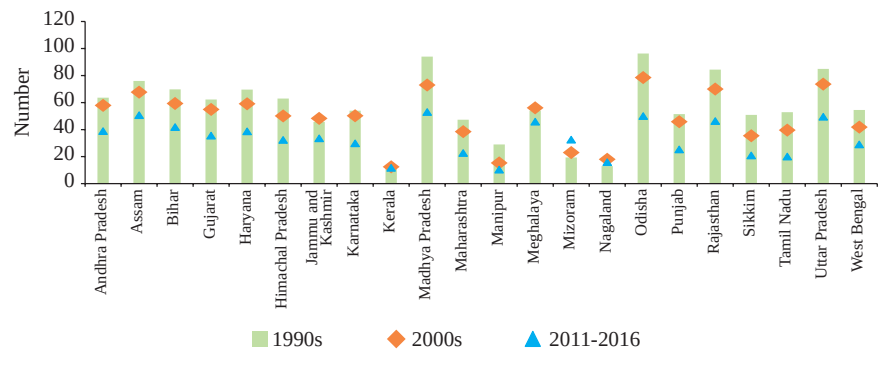


Source: Annual Status of Education Report (ASER) 2016.

general decline in MMR for most states which had high MMR to start with. Bihar, Kerala Madhya Pradesh, Rajasthan, Uttar Pradesh and West Bengal have shown large improvements, with their MMRs reducing by more than half across almost three decades (Chart 13).

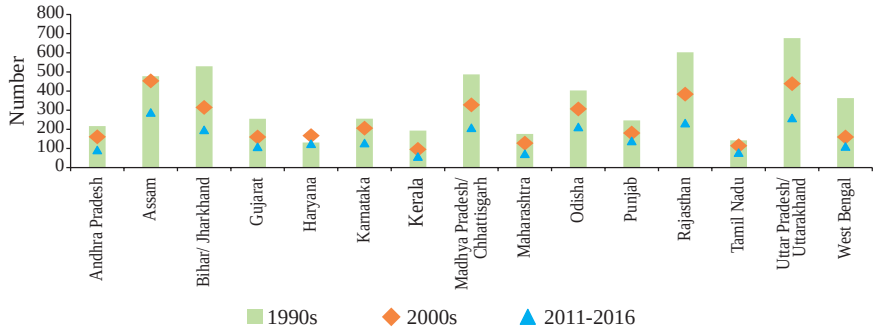
To sum up, notwithstanding the progress in the education and health SDG indicators over the last few decades, India needs to work harder to achieve the SDG targets. Even while outcome levels remain modest, there are substantial variations across states. The overall modest levels of achievement on the SDGs front can be a manifestation of relative variation in social sector expenditure across states that has been explored in a cross-state analysis in the subsequent section.

Chart 12: Infant Mortality Rates (Number of deaths per 1000 live births): Decadal Comparison



Source: Handbook of Statistics on Indian States, RBI.

Chart 13: Maternal Mortality Rates (Maternal deaths per 100,000 live births): Decadal Comparison



Source: Ministry of Health and Family Welfare, GoI and the Office of the Registrar General & Census Commissioner, India.

Section IV

Social Sector Expenditures and SDG Indicators: The Link

From a policy perspective, a healthy and educated citizenry is an asset to democratic institutions.[15] Theoretical and empirical estimates also support the growth enhancing role of human capital formation for India (Annex 4). With the role of human capital formation being firmly established, it may be pertinent to empirically validate whether social sector expenditures contribute towards human capital formation *via* improving SDG outcomes. This has been intensively examined in cross-country empirical frameworks, but the results are varied (Filmer and Pritchett, 1999; Gupta *et al.*, 2002; Gupta and Verhoven, 2001). Given this lack of consensus in the literature on productivity of social sector expenditures, efforts have gone into establishing a long-run relationship between economic growth and social expenditures such as education, health and social security/welfare (Alam *et al.*, 2010).

For the period 1985-2001, panel data analysis for Indian states suggests that public spending on education has been more productive than that on

[15] This includes a central bank. A thinking, voting and productive member of society who understand how the central bank achieves its mandate can contribute to informed decision making (Wolla, 2016). As the former Federal Reserve Chairman Ben Bernanke (2006) puts it, "The Federal Reserve's mission of conducting monetary policy and maintaining a stable financial system depends on the participation and support of an educated public".

health (Kaur and Misra, 2003). More recent studies have incorporated the inherent linkages between the health status of children and their educational achievements in India through a simultaneous equation framework, yielding the finding that poor health status as proxied by high infant mortality is responsible for lower enrolment rates and high dropout rates at the primary level (Bhakta, 2014). Moreover, states appear to be spending their resources more efficiently on education than on health, with governance[16] across states playing an important role in determining efficiency differentials (Mohanty and Bhanumurthy, 2018).

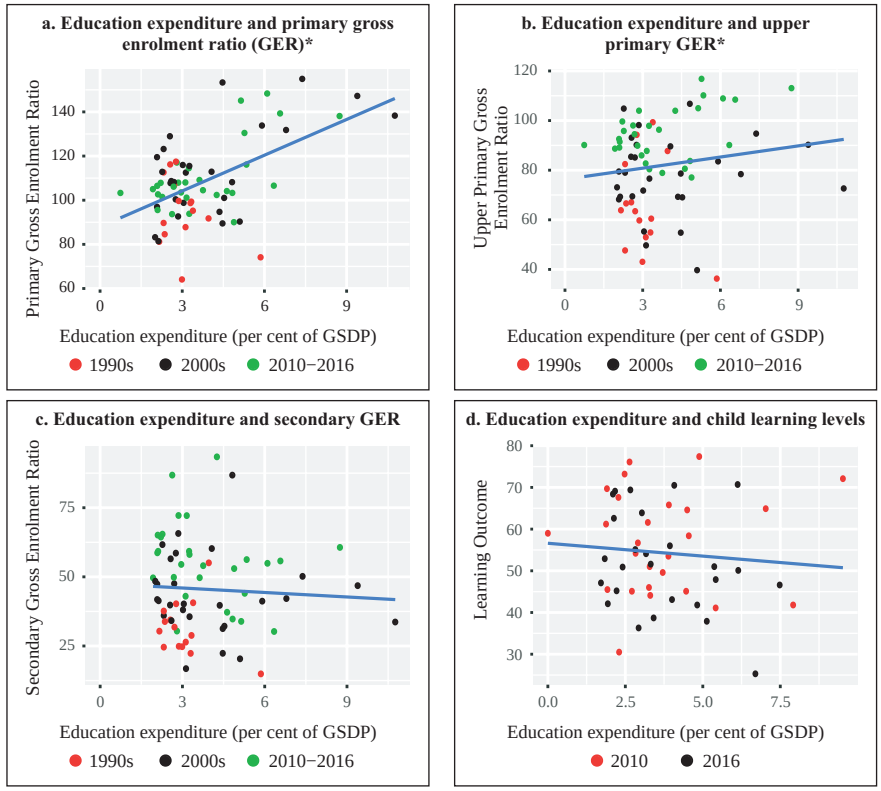
Decadal analysis of social sector expenditures and SDG indicators suggests that states' spending on education seems to have worked towards improving enrolment only at the primary level and somewhat at the upper primary level over the decades (Chart 14). However, the same cannot be said for enrolment at the secondary level and overall learning levels among students (as provided by the proportion of children of Standard V who can read a standard II level text), hinting at role of other factors and also indicating a desirable shift in focus of education expenditures from primary to secondary enrolment and further towards improving quality of education. With regard to health expenditures, they seem to have worked in reducing IMR across decades (Chart 15).

Given the rationalisation of centrally sponsored schemes as well as their improved efficiency post 2000s, an attempt has been made to corroborate the results stated in the previous para by a scheme-wise analysis of currently operational CSS in an input-output indices framework. The analysis is conducted for important CSS that have seen reasonable/robust growth in their expenditures in the current decade, *viz.*, *Sarva Shiksha Abhiyan (SSA), National Rural Health Mission (NRHM), Mid Day Meal Scheme (MDMS), National Rural Drinking Water Programme (NRDWP) and Swachh Bharat Mission (SBM).*

The performance of five CSS have been measured through the construction of input and outcome indices for each scheme for all states

[16] This is based on Public Affairs Index (PAI) as compiled by Public Affairs Centre (PAC), Bengaluru comprising of indicators like law and order, social protection, essential infrastructure, inequality, fiscal management, transparency and accountability, among others.

Chart 14: Education Expenditures (as percentage of GSDP) and Education Outcomes: Decadal Averages



* Estimating the above relationship in a panel framework of the form given below gives a positive and significant β coefficient for chart a and chart b only.

$Y_{it} = \alpha_i + \beta X_{it} + \gamma GSDP_{it} + \mu_{it}$

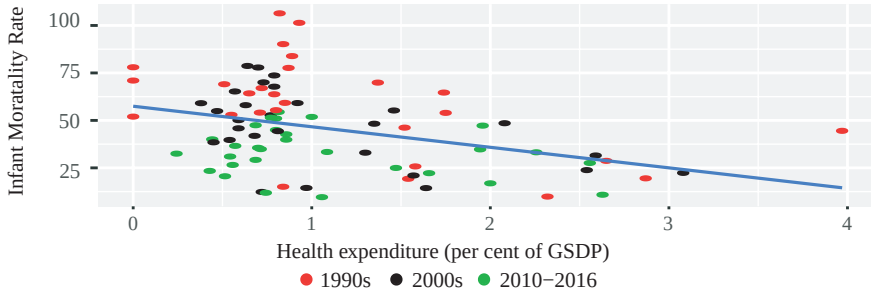
where Y represents education outcomes and X is the education expenditures. Detailed results are given in Annex 5, Table A5.1.

and union territories with certain exemptions.[17] Input indices for different states have been constructed by using the expenditure on each scheme as per equation 1.[18] Given that output indicators are different for different CSS,

[17] The following states and union territories have been excluded for various CSSs due to lack of adequate data: **Sarva Shiksha Abhiyan (SSA)** –Andaman and Nicobar Islands, Chandigarh, NCT Delhi, Dadra and Nagar Haveli, Daman and Diu, Goa, Jammu and Kashmir (J&K), Lakshadweep, Puducherry; **Mid Day Meal Scheme (MDMS)** - Andaman and Nicobar Islands, Chandigarh, NCT Delhi, Dadra and Nagar Haveli, Daman and Diu, Goa, Jammu and Kashmir (J&K), Lakshadweep, Puducherry; **National Rural Drinking Water Programme (NRDWP)**- Goa, Puducherry, Chandigarh, Andaman and Nicobar Islands, Telangana, Chandigarh; **Swachh Bharat Mission (SBM)** - Andaman and Nicobar Islands, Chandigarh, NCT Delhi, Dadra and Nagar Haveli, Daman and Diu, Goa, Lakshadweep, Puducherry.

[18] In the absence of a common threshold for input and output indicators (as used by Bhanumurthy *et al.*, 2017), we have taken the minimum as a threshold.

Chart 15: Health Expenditures (as percentage of GSDP) and IMR : Decadal Averages



* Estimating the above relationship in a panel framework of the form given below gives a negative and significant β coefficient.

$Y_{it} = \alpha_i + \beta X_{it} + \gamma GSDP_{it} + \mu_{it}$

where Y represents health outcomes and X is the corresponding expenditures. Detailed results are given in Annex 5, Table A5.1.

the overall outcome index for each CSS is arrived at by taking the arithmetic mean of the range of output indices computed by using equation 2.

$$Input\ Index = \frac{Actual\ Expenditure - Minimum\ Expenditure}{Maximum\ Expenditure - Minimum\ Expenditure} \quad (1)$$

$$Outcome\ Index = Arithmetic\ Mean\ of\ various\ Output\ Indices$$ [19]

$$Output\ Index = \frac{Actual\ Output - Minimum\ Output}{Maximum\ Output - Minimum\ Output} \quad (2)$$

where, Index takes value between 0 to 1.

The state-wise analysis throws up in general a positive relationship between the input and the outcome indicators for most CSS under consideration (Chart 16).

Two CSSs which have shown strong and significant relationships between input and output indices are National Rural Health Mission

[19] The CSS scheme-wise output index is worked out for the following indicators:

SSA – Number of schools opened, number of school teachers, number of free text books, percentage of children (standard III-V) who can read standard II level text, percentage of schools complying with pupil-teacher ratio and classroom-teacher ratio, percentage of schools with computer and children using them, girls' toilet, playground and drinking water.

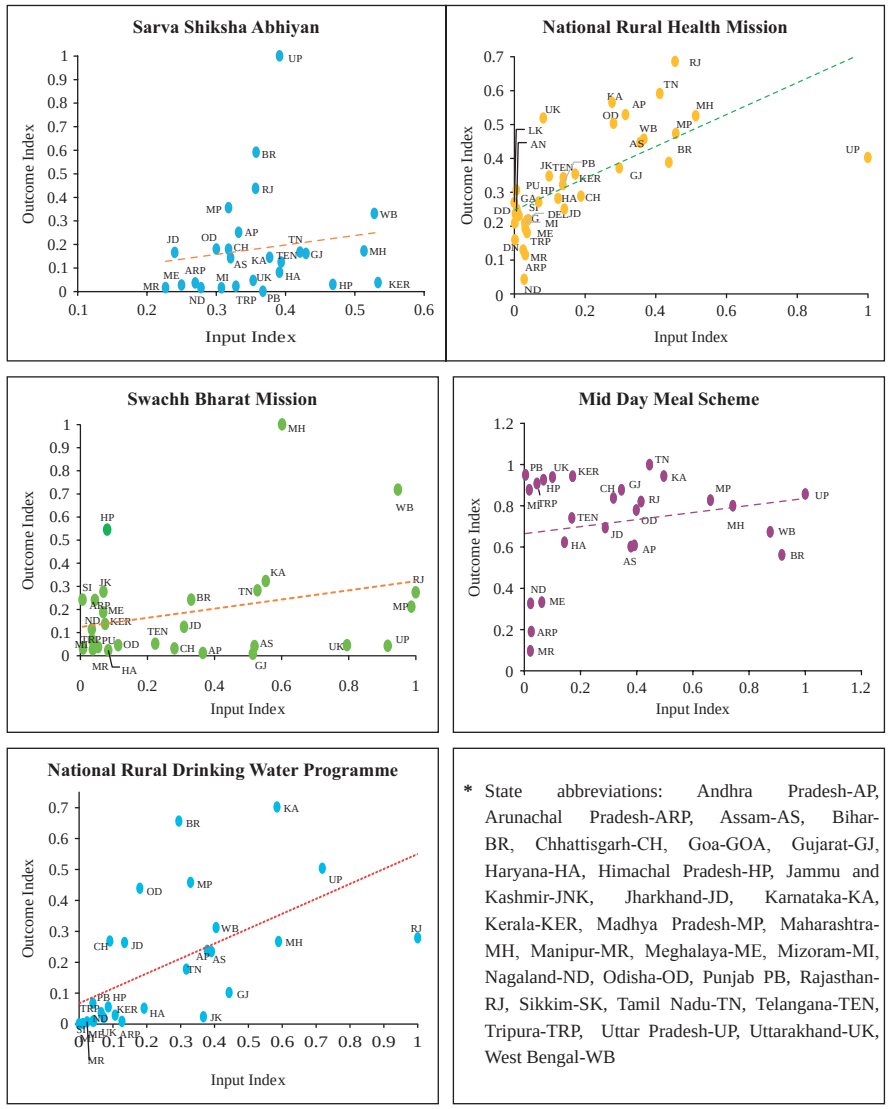
NRHM – Institutional deliveries, IMR, MMR, nursing staff, total hospitals, total specialists, doctors at primary health centres, percentage of children immunised, number of sub-centres.

SBM – Number of sanitary complexes constructed.

MDMS – Mid-day meals served in school on day of visit, kitchen shed for cooking.

NRDWP – Quality affected habitation and population, partially covered habitation and population, fully covered habitation and population.

Chart 16: Performance of Centrally Sponsored Schemes (CSS) across States*



* State abbreviations: Andhra Pradesh-AP, Arunachal Pradesh-ARP, Assam-AS, Bihar-BR, Chhattisgarh-CH, Goa-GOA, Gujarat-GJ, Haryana-HA, Himachal Pradesh-HP, Jammu and Kashmir-JNK, Jharkhand-JD, Karnataka-KA, Kerala-KER, Madhya Pradesh-MP, Maharashtra-MH, Manipur-MR, Meghalaya-ME, Mizoram-MI, Nagaland-ND, Odisha-OD, Punjab PB, Rajasthan-RJ, Sikkim-SK, Tamil Nadu-TN, Telangana-TEN, Tripura-TRP, Uttar Pradesh-UP, Uttarakhand-UK, West Bengal-WB

Note: The correlation coefficients along with their significance levels are given in Annex 5, Table A5.2.
Source: Authors' own estimates.

(NRHM) and National Rural Drinking Water Programme (NRDWP). The NRHM shows favourable effects in Rajasthan, Tamil Nadu, Karnataka, Andhra Pradesh, Uttarakhand and Maharashtra, with improvement in health indicators such as number of institutional deliveries, infant mortality rates,

maternal mortality rates, medical staff and specialists as well as number of hospitals. The NRDWP has also helped in improving availability of potable water. Other schemes, *viz.*, the *Sarva Shiksha Abhiyan (SSA) and Swachh Bharat Mission (SBM)* are also showing a positive correlation, though insignificant. As regards SBM, the low significance of the correlation co-efficient may be attributed to the fact that it was just launched in 2014 and may require some more time to visibly show the outcomes.

Section V

Social Sector Expenditures and Outcomes: Evidence of Convergence across States

As witnessed in section III, there are large divergences across states with respect to their SDG outcomes, necessitating differential focus across states. Considering that the proportion of children in the age group 0-14 years is higher for certain states than their respective population shares, the need to harness the demographic dividend could be more pressing in these states *vis-à-vis* others.

Convergence/catching up across States

An attempt has been made to analyse whether gaps in social sector expenditures and outcome indicators have narrowed over the years, thus helping the process of convergence across states and reducing inequality among them. The idea of '*beta convergence*' - that poor economies grow faster than rich ones - is popularly used to test convergence across nations and sub-national entities.[20] In the available empirical literature, the beta convergence methodology has been applied to study regional divergences in India (Ghosh *et al.*, 1998), spatial convergence of public expenditure (Garg, 2015), and fiscal convergence across states (Raut, 2017).

The hypothesis being tested is that there is convergence in terms of SDG indicators of states for education and health if initially poor performing states (*i.e.*, low value of indicators) grow at a faster rate than high performers. The

[20] The empirical literature on output convergence proposes the concept of beta-convergence. This method is based on econometric modeling which tells that there is evidence for convergence if the growth rate of an indicator depends negatively on its initial level.

econometric estimation for this *beta convergence* involves specification of the following cross state equation:

$$\frac{1}{T} ln \frac{Y_{it}}{Y_{i0}} = \alpha + \beta ln(Y_{i\,0}) + \epsilon_i$$

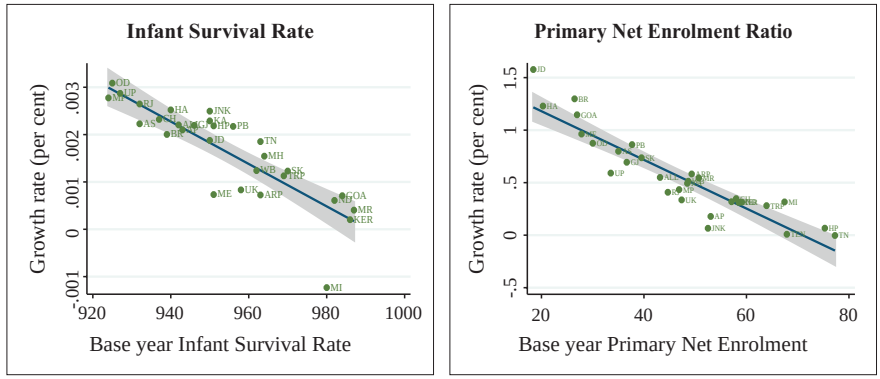
where T is the length of time interval, Y_{it} is value of the indicator of state *i* at time *t*, and Y_{i0} is the the value of the indicator at the initial time period, thus, y axis in effect measures the growth rate of the outcome indicator. Convergence (or divergence) of an indicator depends on the value of β – a negative value refers to convergence while a positive value shows divergence (Raut, 2017). Taking the base year as 2005-06 and calculating average annual growth rates till 2015-16, it is observed that the SDG indicators are converging (Chart 17, Table A6.1 of Annex 6).

For health, the infant survival rate (ISR) - a variant of the infant mortality rate (IMR) - is taken so as to make it a positive indicator of health which satisfies the above specification with negative β signifying convergence. ISR is obtained by the following formula:

$$ISR = \frac{1000 - IMR}{1000}$$

The scatterplot diagram of annual average growth rates of ISR *versus* the initial level of ISR (2005-06) shows negative correlation, implying spatial convergence (Chart 17). The ISR for states which were not doing well in terms of health criteria, is growing faster than for those that were doing well initially. States are achieving higher levels of ISR over time; states with relatively

Chart 17: Convergence of Infant Survival Rate and Primary Net Enrolment Ratio



Note: State abbreviations similar as in Chart 16.

high IMR/low ISR in 2005 such as Odisha, UP have the highest growth rates. Similar analysis for the education outcome indicator, *i.e.,* primary net enrolment ratio also confirms evidence of convergence, which is particularly high for Jharkhand and Bihar.

Thus, using this standard beta convergence methodology, socio-economic indicators are observed to have exhibited convergence between 2005-06 and 2015-16, implying that states which have fallen behind in terms of indicators have grown at a faster rate and caught up with the better performing states. This phenomenon has been observed in both development indicators as well as in public expenditure under various socio-economic heads and is immune to addition of other control variables like per capita income growth and share of education/health expenditure in GSDP (Table A6.2 of Annex 6).

Inequality across States

While the empirical literature has largely focussed on cross-country impacts of social sector spending on income inequality (Anderson *et al.*, 2017; Haile and Niño-Zarazúa, 2017), the effects of social sector spending on inequality across states in terms of social sector outcome has not received adequate attention. This lacuna is particularly acute for India, where interest has been drawn to the estimation of health inequality and its relationship with income inequality (Joe *et al*., 2008) or assessing inequality within a particular state, across districts or between different spending groups/gender (Bhadra, 2015, Chakraborty *et al.,* 2013).

Concentration curve[21] (CC) has emerged as a standard tool to assess inequality. Inequality in health - in terms of health status or health care facilities - is one of the central problems of developing countries.[22] As higher income is associated with better health status, it is likely that worsening of health indicators is largely concentrated among the poorer sections of society. Weak health status leads to reduction in productivity of workers as well as loss of income/wages. Besides, health care facilities provided by the private sector are costly and unaffordable by the poor, necessitating governmental provision.

Health inequality is estimated using the standard concentration curve (CC)

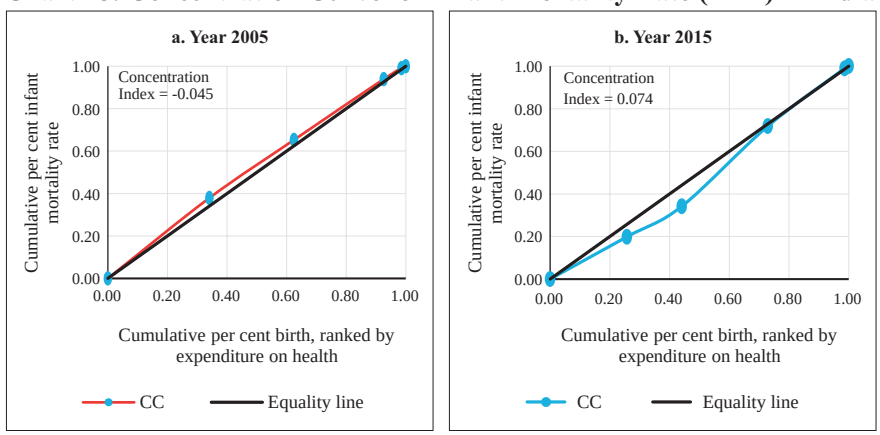
[21] Concentration curve (CC) can be used to identify whether socio-economic inequality in some health sector variable exists and whether it is more pronounced at one point in time than another or in one country than other. In other words, CC displays the share of health accounted for by cumulative proportions of individuals in the population ranked from poorest to richest (Wagstaff *et al.,* 1991).

[22] It may be noted that education inequality has not been estimated due to dated availability of state-wise actual enrolment numbers across different education levels.

approach (O'Donnell *et al.*, 2008). The CC essentially plots the cumulative infant mortality (in per cent) against the cumulative live births (in per cent) ranked by public expenditure on health to GSDP ratio in ascending order, *i.e.*, going from lowest to highest. States are grouped into five categories – low spending; second; middle; fourth; and high spending. If the infant mortality rate is equally distributed across states, the concentration curve will coincide with the equality line. If poor health is concentrated in the low spending group, the health CC would lie above the equality line and distance between CC and equality line determines the degree of inequality, which can also be estimated through a Concentration Index (CI).[23] For comparative purposes, CC and CI are estimated for 2005 and 2015.

The CC suggests that between 2005 and 2015, inequality has changed gears from above to below the line of equality (Chart 18). In 2005, the CC was

Chart 18: Concentration Curve for Infant Mortality Rate (IMR) in India



[23] The concentration index quantifies the degree of socioeconomic-related inequality in a health variable. This index is directly related to CC. Formally, the CI is defined as twice the area between the CC and the line of equality (the 45-degree line):

$$1 - 2\int_0^1 L_h(p)dp$$

The index is bounded by -1 and 1. For a discrete living standard, it can be written as

$$C = \frac{2}{N\mu}\sum_{i=1}^{n} h_i r_i - 1 - \frac{1}{N},$$

where h_i is the health sector variable, μ is its mean, and $r_i = \frac{1}{N}$ is the fractional rank of individual I in the living standards distribution, with i=1 for the poorest and i=N for the richest. For computation, a more convenient formula for the CI defines in terms of the covariance between the health variable and the fractional rank in the living standards distribution $C = \frac{2}{\mu} cov(h, r)$.

Table 3: Mean Infant Mortality Rate, Ranked by Public Spending on Health

Per 1000 births

	2005	2015
1	2	3
Low Spending	56.3	26.7
2nd	48.8	28.2
Middle	48.2	44.7
4th	44.4	29.8
High Spending	31.0	25.0

above the equality line, implying that lower infant mortality rates were largely concentrated in the higher spending states. In 2015, on the contrary, lower spending states appear to be catching up with higher spending states. This is substantiated by the substantial deviation of the concentration curve from the equality line in favour of lower spending states.

The shift in the CC against the higher spending states was not on account of increase in IMR in these states, but due to a sharper reduction of IMR in low spending states during the decade (Table 3). While the middle spending states are still having high IMR notwithstanding some decline, the higher spending states were already at a low base, leading to shallower reduction in IMR.

The findings suggest a change in the nature of inequality in 2015 *vis-à-vis* 2005. While in 2005, the inequality was essentially due to high infant mortality rate (IMR) in low spending states, this has changed in 2015, with inequality being essentially due to reduction in IMR for low spending states. A mapping of the average IMRs across spending quintiles reveals that there have been sharp gains in the first two quintiles (low spenders) and modest gains in the uppermost quintile (highest spenders).

Section VI

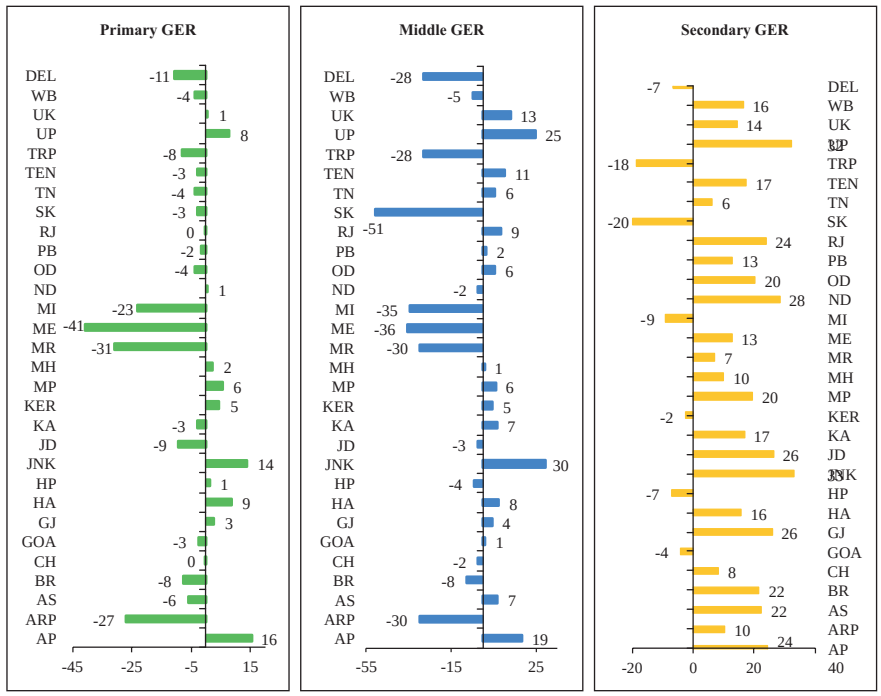
Achieving SDG Targets in 2030: Current Gap and Future Resources

As documented in the previous sections, there has been substantial progress with regard to achieving the social development goals along with evidence of convergence and catching up across states. Nevertheless, the gap to meet the SDG targets remains significant. An assessment of deviations in

major social indicators from the desired SDG levels can provide a gauge of the size of improvement that states will have to undertake with regard to achieving SDG targets in the coming twelve years.

In terms of educational indicators such as enrolment at primary level, several states have already attained the target, *viz.*, Meghalaya, Manipur, Mizoram, Arunachal Pradesh among others. Likewise, states of Sikkim, Meghalaya, Mizoram, Manipur, Arunachal Pradesh and Tripura have achieved the target of middle level gross enrolment. Nevertheless, in terms of secondary enrolment, the gap still remains significant for most of the states except Sikkim, Tripura, Mizoram, Goa, Himachal Pradesh and Kerala (Chart 19).

Chart 19: Education Indicators – Deviations from SDG Target of Full Enrolment: 2015-16
(for Primary, Middle and Secondary Gross Enrolment Ratio)

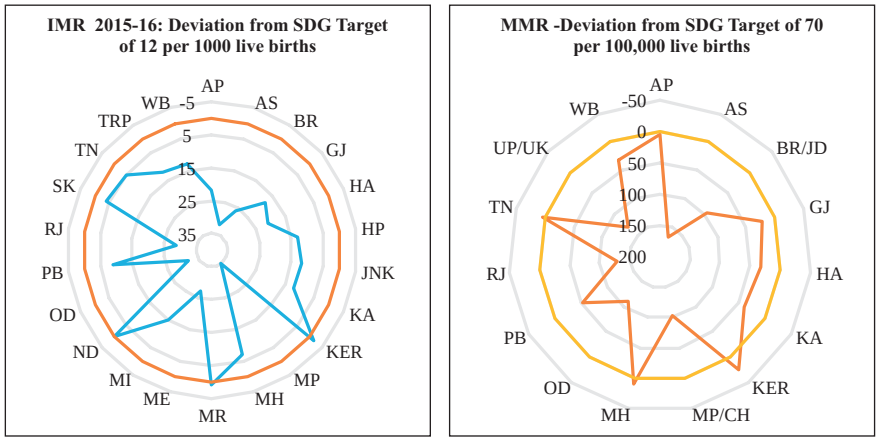


Note: Deviation is worked out as difference from the SDG target (SDG target-x) where x is actual number of Primary, Middle and Secondary GER in each state during 2015-16.
State abbreviations: Andhra Pradesh-AP, Arunachal Pradesh- ARP, Assam- AS, Bihar- BR, Chhattisgarh- CH, Delhi- DEL, Goa-GOA, Gujarat-GJ, Haryana-HA, Himachal Pradesh-HP, Jammu and Kashmir-JNK, Jharkhand-JD, Karnataka-KA, Kerala-KER, Madhya Pradesh-MP, Maharashtra-MH, Manipur-MR, Meghalaya-ME, Mizoram-MI, Nagaland-ND, Odisha-OD, Punjab-PB, Rajasthan-RJ, Sikkim-SK, Tamil Nadu-TN, Telangana-TEN, Tripura-TRP, Uttar Pradesh-UP, Uttarakhand-UK, West Bengal-WB.
Source: NITI Aayog and Authors' own calculations.

In terms of IMR, Manipur, Nagaland and Kerala have already attained the target level of 12 deaths per 1000 live births of infants. In terms of MMR, except Maharashtra, Tamil Nadu and Kerala, most of the states are far away from the SDG target of 70 per 100,000 live births (Chart 20). Thus, many states may have to make considerable efforts to narrow the gap between achievements and SDG targets in health.

Drawing upon this gap analysis, an attempt has been made to estimate the likely resource requirements for attaining the SDG goals on health and education by 2030. Using the ordinary least squares (OLS) regression method, the relationship between real per capita spending by centre and states taken together on health and education and their respective outcome indices for the period 1999 to 2017 are estimated and the desired funding gaps (over and above baseline budget projections) are derived for the period 2018 to 2030. Health and education indices have been sourced from human development indices sub-components for health and education. Nominal expenditures are converted to real by using WPI indices (2011-12 base year). Population projections have been sourced from the medium variant of the United Nations.

Chart 20: Health Indicators – Deviations from SDG Targets



Note: Unlike education indicators, the deviation for health indicators is worked out as difference from the SDG target (x-SDG Target) where x is actual number of IMR and MMR in each state during 2015-16 considering that the lower the value of the health indicator, the better it is for a state. Therefore, in the above Chart, the farther a state from the mid-point, the better is its performance. State abbreviations: Andhra Pradesh-AP, Assam- AS, Bihar- BR, Chhattisgarh- CH, Gujarat-GJ, Haryana-HA, Himachal Pradesh-HP, Jammu and Kashmir-JNK, Jharkhand-JD, Karnataka-KA, Kerala-KER, Madhya Pradesh-MP, Maharashtra-MH, Manipur-MR, Meghalaya-ME, Mizoram-MI, Nagaland-ND, Odisha-OD, Punjab-PB, Rajasthan-RJ, Sikkim-SK, Tamil Nadu-TN, Tripura-TRP, Uttar Pradesh-UP, Uttarakhand-UK, West Bengal-WB
Source: NITI Aayog and Authors' own calculations.

The models have been checked for suitable diagnostic checks, *viz.*, serial correlation and other parameter stability.

Based on our exercise, the incremental general government public expenditure[24] required to achieve the 2030 targets for health and education are ₹12.1 trillion and ₹53.6 trillion, respectively. It may be noted that these estimates are in line with those estimated for India by a UNDP supported study by Bhamra *et al.*, (2015) of ₹19 trillion and ₹46 trillion[25] for health and education, respectively.[26] Considering that secondary enrolment gap at present remains significant as highlighted in Chart 19 earlier, the focus going forward should be to route education expenditure more towards secondary enrolment and improvement of the learning levels.

Given these additional financing requirements coupled with the recently observed fiscal stress of centre and certain state governments, it may be important to insulate such expenditures from getting crowded out by other committed expenditures. Furthermore, this also highlights the need to expand the fiscal space of centre and states substantially either via expenditure reprioritisation or innovative revenue-generating measures.

Section VII

Concluding Observations

Drawing on the analysis of the levels, trends, distribution and productivity of public expenditures in India (including spending under CSS) with respect to health and education, this paper finds that there has been a considerable progress in achieving SDGs, particularly in the current decade; yet we need to gear ourselves to meet the 2030 SDG targets. Empirical analysis in this paper supports the view that investment in human capital formation like education and health can contribute to higher growth. States' social sector expenditures have contributed towards improvement in SDG outcomes over the decades justifying the need for higher social sector expenditures. The focus may have to be on improving learning levels among students, besides enrolment. More

[24] Public expenditure of union and state governments.

[25] Includes all sub-components of SDG 4.

[26] Their projections are based on actual data for the period 2005-06 to 2010-11 and forecasted for the remaining period.

recently, higher spending on certain CSS schemes has favourably impacted the SDG indicators.

A major comforting evidence from this paper is that inter-state variations among states in terms of both social sector expenditures and outcomes are narrowing, bringing about greater convergence. States with low expenditures and SDGs are catching up with the others, which augurs well for eventually boosting the effectiveness of social sector spending. The new equilibrium is closer to the SDG goals, though there is still a distance to cover as shown in the paper in terms of the current gaps between SDG outcome indicators and their respective targets. The additional financing requirement to meet the SDG targets by 2030 is estimated at ₹12.1 trillion and ₹53.6 trillion for health and education, respectively.

Spending on education and health in India during 2016-17 was below the world average. Currently, there is an acute lack of balance in the allocation of public social expenditure between recurring costs and asset creation on one hand, and the disproportionate pre-emption by salary and maintenance expenditure, on the other. In the context of education, for instance, a reorganisation of expenditure towards better learning, vocational training and teachers' training programmes may help in improving efficiency of public expenditure and quality of education. The Right to Education Act (2010) routed through the *Sarva Shikhsha Abhiyan* (SSA) has, in fact, sought to focus on non-salary expenditures and, therefore, should generate better results going forward, not just in terms of enrolment but also in terms of overall learning levels. Similarly, other efforts on achieving SDG targets need to expand on dimensions like efficiency and quality of service delivery. With regard to health expenditures, the *Ayushman Bharat* National Health Protection Scheme announced this year should, if implemented effectively, provide a circuit-breaker by helping more than 500 million people with insurance coverage of ₹5 lakh for each family.

While persevering with fiscal consolidation, channelising spending towards SDGs might be critical. Stabilising and generating higher revenues through the goods and services tax (GST) while reprioritising expenditures towards social spending and improving their efficiency could help attain SDG targets.

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Annex 1: Implementing Strategy of SDGs by Select Countries

	Country	SDGs Implementing Strategy
1.	**Bangladesh**	Country identified nine of eleven goals of SDGs in its 7th Five Year Plan (2016-2020); the remaining two goals are embedded in the SDG targets but have been elevated as priorities.
2.	**Chad**	Established a structure, or coordination body under the auspices of the Prime Minister's Office (PMO), with the involvement of sectoral ministries, including the Ministry of Finance and Foreign Affairs.
3.	**Colombia**	The President declared a law to align their national development plan with the SDGs. A high-level commission (HLC) was constituted, chaired by the national planning department with ministerial/other sectors support to produce an analysis of the existing gaps in SDG implementation.
4.	**Ethiopia**	The Office of the First Lady partnered with government ministries and NGOs to empower girls and women to develop entrepreneurial skills and provide basic training to connect them with the export market.
5.	**Germany**	A process to align its National Sustainability Strategy to the Agenda 2030 goals and targets started and annual progress report takes it into account. SDG is being implemented by the Federal Cabinet, the State Secretaries' Committee, the Sustainable Development Council and the Parliamentary Advisory Council.
6.	**Ghana**	A high level inter-ministerial committee has been established for SDGs implementation. A platform consisting of 18 clusters; one for each of the 17 goals and an additional one for advocacy on the SDGs has been launched to promote collaboration and experience sharing among different sectoral groups to build synergy.
7.	**India**	The responsibility for overseeing SDG implementation has been assigned to the NITI Aayog, which has mapped goals and targets to various nodal ministries as well as flagship programmes with draft indicators developed by the Ministry of Statistics and Programme Implementation. State governments are also engaged in developing roadmaps for achieving the SDGs, with several of them having already published their plans.

	Country	SDGs Implementing Strategy
8.	**Mexico**	A Technical Committee has been set up in the President's Office to follow-up and monitor the MDGs. This Committee monitors the SDGs.
9.	**Sweden**	A commission has been set up to facilitate the integration of the SDGs into a comprehensive national action plan and promote the exchange of information and knowledge between the various stakeholders.
10.	**The United States of America**	An inter-agency process that includes agencies and departments has been put in place for the necessary policies and actions for SDG implementation. It addresses both international and domestic issues and meetings are organised through the White House, and involve the National Security Council and Domestic Policy Council.
11.	**Uganda**	The Office of the First Lady founded a National Strategy for the Advancement of Rural Women in Uganda and plans to expand and scale agriculture programmes in pursuit of a national agriculture plan that emphasizes women's empowerment.
Source: (i) http://www.worldbank.org/ (ii) http://www.thefinancialexpress-bd.com.		

Annex 2: Central Government Allocation for Major CSS over the years

(₹ Billion)

Centrally Sponsored Schemes	2015-16	2016-17	2017-18 (RE)	2018-19 (BE)	Average 2015-19
1	2	3	4	5	6
1. Sarva Shiksha Abhiyan (SSA)	217	217	235	261	232
2. National Rural Health Mission (NRHM)	183	198	255	243	220
3. Integrated Child Development Services (ICDS)	168	159	200	231	189
4. Mid Day Meal Scheme (MDMS)	91	95	100	105	98
5. National Rural Drinking Water Programme (NRDWP)	44	60	71	70	61
6. Swachh Bharat Mission (SBM)	75	126	193	178	143
7. Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS)	373	482	550	550	489
8. National Social Assistance Progam (NSAP)	86	89	87	100	90
9. Umbrella Scheme for Development of Scheduled Castes (USDSC)	42	49	51	52	48
10. Umbrella Scheme for Development of Scheduled Tribes (USDST)	29	33	35	38	34
11. Pradhan Mantri Awas Yojna (PMAY)	116	210	290	275	223
12. Pradhan Mantri Gram Sadak Yojna (PMGSY)	183	179	169	190	180

Source: Union Budget Documents.

Annex 3: Current Centrally Sponsored Schemes

Serial No.	Centrally Sponsored Schemes/ Ministry/ Department
(A)	**Core of the Core Schemes**
01	National Social Assistance Program
02	Mahatma Gandhi National Rural Employment Guarantee Program
03	Umbrella Scheme for Development of Scheduled Castes
04	Umbrella Programme for Development of Scheduled Tribes
05	Umbrella Programme for Development of Minorities
06	Umbrella Programme for Development of Other Vulnerable Groups
(B)	**Core Schemes**
07	Green Revolution
08	White Revolution
09	Blue Revolution
10	Pradhan Mantri Krishi Sinchai Yojna
11	Pradhan Mantri Gram Sadak Yojna
12	Pradhan Mantri Awas Yojna (PMAY)
13	National Rural Drinking Water Mission
14	Swachh Bharat Mission
15	National Health Mission
16	National Education Mission
17	National Programme of Mid-Day Meal in Schools
18	Umbrella ICDS
19	Mission for Protection and Empowerment for Women
20	National Livelihood Mission- Ajeevika
21	Jobs and Skill Development
22	Environment, Forestry and Wildlife
23	Urban Rejuvenation Mission: AMRUT and Smart Cities Mission
24	Modernisation of Police Forces
25	Infrastructure Facilities for Judiciary
26	Border Area Development Programme
27	Shyama Prasad Mukherjee Rurban Mission
28	Rashtriya Swasthya Bima Yojna

Source: Union Budget Document.

Annex 4: Role of Human Capital: Theoretical Underpinnings[a]

Seminal work of Lucas (1988) and Romer (1990) has firmly established the role of human capital accumulation in endogenous growth models. Including human capital in the Solow model (Solow, 1956) has shown that higher human capital accumulation is associated with higher physical capital accumulation (Acemoglu, 2009). There is also an influential strand of literature that illuminates the social or non-market effects of human capital accumulation, establishing a strong positive link between an individual's own education attainment and education of the next generation, and own health and family health status (Haveman and Wolfe, 1994), improving fertility choices, reducing participation in criminal activities and enhancing marriage stability (Becker *et al.,* 1977). Furthermore, a simple real business cycle (RBC) model incorporating human capital provides the wherewithal for generating estimates of the human capital impact on output and consumption.

Empirical estimates of human capital impact on output proliferate in the literature. Employing a panel of 28 countries, it is observed that increasing the number of employees with secondary education by 1 percentage point raises output by 0.04 per cent (Pelinescu, 2015). In the case of information and communication technology (ICT) industries, in a sample of 20 OECD countries for the period 1980-2002, a unit rise in human capital is found to increase output by 0.2 (Murphy and Traistaru-Siedschlag, 2007). The impact of human capital stock on output in India is estimated at 0.02 (Leeuwen, 2007). Given the heterogeneity of human capital measures used, the empirical estimates of human capital impact on output have ranged between 0.02 and 0.2 depending on the definition of human capital that is used.

An attempt is made here to update the estimate of human capital multiplier for India by providing micro-foundations to the concept. A two-sector business cycle model[b] is thus envisaged in which a representative agent

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[a] The theory of human capital formation has been firmly rooted in neoclassical theory. Barro (1997) summarised the relationship between economic growth rate (*Dy)* and the long-run level of per capita product *(y)* as $Dy = f(y, y^*)$ where y is the per capita product, y^* is the long-run level of y which depends on government policies and institutions and on the character of the national population (Barro, 2001).

[b] The small open economy RBC model appears as a reasonable first approximation to thinking about business cycles in India (Ghate *et al.,* 2013). The authors argued that trade liberalisation in India in 1991 brought about major structural change in the properties of the India business cycle which moved very close to the properties of advanced economies in terms of co-movement and volatility.

accumulates physical *(k)* and human capital *(h)* according to the following laws of motion:

$$k_t = (1 - \delta_k)k_{t-1} + i_t^k, \text{ and}$$

$$h_t = m_t(1 - \delta_h + \theta e_{t-1}{}^{\omega})h_{t-1}, \text{ where}$$

i^k is investment in physical capital, δ_k and δ_h are depreciation rates of physical and human capital, respectively, m_t is an exogenous human capital shock, θ is an ability parameter, ω is returns to scale parameter and e_t is the amount of time the household devotes to all human capital enhancing projects (Wei, 2004). The representative household maximises by choosing a lifetime utility function separable in consumption (c) and leisure (1-u-e) which is the amount of time left after work and the time devoted to human capital enhancement. The lifetime utility function is given as:

$$E_0 \sum_{t=0}^{\infty} \beta^t (\ln(c_t) + \varepsilon_t^l \ln(1 - u_t - e_t))$$

The optimisation takes place with respect to a flow budget constraint given below:

$$c_t + i_t^k \leq w_t u_t h_t + r_t^k k_{t-1} + \aleph_t$$

The household earns a wage rate w and rent r^k by renting out its labour time (u) and capital services to the firm. The household owns the firm and gets undistributed profits worth $\aleph_t$. The income proceeds are spent on consumption (c) and investment on physical capital (i^k).

The two major equations emanating from the first order condition of the optimisation exercise are the intertemporal Euler equation and the intratemporal labour supply condition.

$$\beta E_t \left[\frac{(1 + r_{t+1}^k - \delta_k)c_t}{c_{t+1}} \right] = 1$$

$$\varepsilon_t^l \frac{c_t}{(1 - u_t - e_t)h_t} = w_t$$

The Euler's equation depicts the trade-off between lower consumption today in order to achieve higher levels of consumption tomorrow. The labour

supply equation states that effective labour supply varies positively with wages but negatively with consumption.

The firm's optimisation problem is to maximise profits subject to a technology constraint given below:

$$y_t = z_t k_{t-1}^{\alpha} (u_t h_t)^{1-\alpha}, \text{ where}$$

z_t is the exogenous productivity shock that follows an autoregressive stochastic process. Finally, the aggregate resource constraint that closes the economy is given as:

$$y_t = c_t + i_t^k$$

A competitive equilibrium for this economy may be defined as a set of quantities $\{c^*,u^*,e^*,y^*,k^*,h^*\}$ such that (i) given $\{w^*, r^*\}$, the household chooses $\{c^*,u^*,e^*,i^*\}$ to maximise its lifetime utility; (ii) the firm chooses $\{k^*, u^*\}$ to solve the firm's profit maximisation problem; and (iii) all markets clear, subject to a set of sequential budget constraints and the transversality condition.

Model Calibration

The model parameters are calibrated to data or information from past studies. The depreciation parameters for capital are set at 0.025 and 0.0125, as in Anand *et al.* (2010) . The share of capital in output is fixed at 0.25, while the discount factor is 0.99. The returns to scale parameter is set at 0.05 in line with Wei (2004).

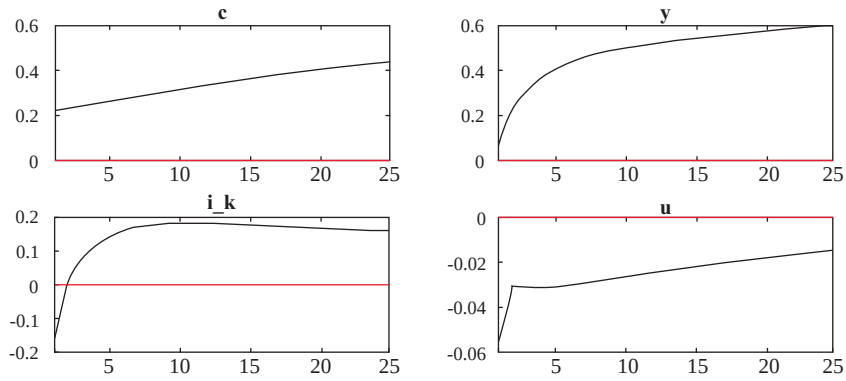
As a first step to solving the non-linear theoretical model, the model is linearised around a non-stochastic steady state. This produces a set of equations involving leads and lags of endogenous variables and exogenous variables such as

$$E_t[Fx_{t+1} + Gx_t + Hx_{t-1} + Lz_{t-1} + Mg_t] = 0$$

Where x={c,u,e,h,k,r,w} is a vector of endogenous variables, g={z,m} is a vector of exogenous variables and F, G, H , L and M are vectors of non-linear parameters. The system of equations has a recursive solution of the form

$$x_t = Px_{t-1} + Qg_t$$

Chart A4.1: Impulse Response of Shock to Human Capital



Note: The above charts show impulse responses of consumption (c), income (y), investment (i_k) and labour time (u) to a one standard deviation (SD) shock to human capital (h).

Impulse Responses

The model is simulated by computing the Taylor approximations of the decision and transition functions generating impulse responses to the two shocks. A one standard deviation shock to human capital in the model leads to higher output through the production function, consumption and gradual rise in investment (Chart A4.1). Output rises by 0.1 unit and consumption by 0.25 unit on impact (impact multiplier). Hours worked decline due to the wealth effect of higher returns on physical capital. The estimate of the short-term impact of human capital[c] on output for India, as estimated above at 0.1, is within the range of estimates in the literature for similar studies.

While empirical estimates of the impact multiplier of human capital on output, consumption and investment turn out to be small, the total effect of human capital (taking into account both direct and indirect impact) could be higher. In human capital driven endogenous growth models, the estimated long run elasticity of output with respect to human capital or skill adjusted labour is higher (Abdih and Joutz, 2008; Lucas, 1988).

[c] Human capital need not be education quality alone. Human capital indicates the wholesome development of an individual encompassing his skills contributed by education, physical and mental health, living environment and so on.

Annex 5: Empirical Results of Section IV

Table A5.1: Regression Results for Social Sector Outcomes and Expenditures (Ref: Charts 14 and 15)

	Dependent Variables	Constant	Education expenditure-GSDP	GSDP growth	R-squared	No. of cases
(1)	Primary GER	87.80***	5.396***	0.0139	0.29	72
		(8.30)	(5.29)	(0.02)		
(2)	Upper Primary	50.20***	1.198	1.927*	0.10	72
		(4.22)	(1.04)	(2.40)		
(3)	Secondary GER	29.65**	-0.832	1.352	0.05	71
		(2.69)	(-0.77)	(1.78)		
(4)	Learning outcome	57.35***	-0.625	-0.0441	0.01	52
		(8.40)	(-0.66)	(-0.13)		
		Constant	**Medical expenditure-GSDP**	**GSDP growth**	**R-squared**	**No. of cases**
(5)	IMR	78.51***	-9.895**	-1.570	0.18	84
		(6.33)	(-3.38)	(-1.79)		

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A5.2: Correlation Coefficient between Input and Output Indices of Select CSS (Ref: Chart 16)

	SSA	NRHM	SBM	MDMS	NRDWP
Correlation Coefficient	**0.15**	**0.82*** **	**0.16**	**0.21**	**0.58*** **

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Annex 6: Empirical Results of Section V

Table A6.1: Convergence Analysis of Social Expenditure and Indicators (without control variables)

		Constant	Slope (beta coefficient)	R-squared	N. of cases
(1)	Real per capita Expenditure on Education	-1.418*	-2.808***	0.48	26
		(-2.39)	(-4.69)		
(2)	Real per capita Expenditure on Health	-4.900***	-2.956***	0.49	26
		(-4.23)	(-4.80)		
(3)	Upper Primary Net Enrolment Ratio	1.644***	-0.023***	0.83	30
		-17.06	(-11.82)		
(4)	Gender Parity Index	0.078***	-0.001***	0.47	22
		-4.47	(-4.22)		
(5)	Infant Survival Rate	0.044***	-0.000***	0.73	29
		-8.92	(-8.59)		

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A6.2: Convergence Analysis (using control variables: growth in per capita income and share of expenditure in GSDP)

		Constant	Slope (beta coefficient)	Growth in per capita income	Share of education/ medical expenditure in GSDP	R-squared	N. of cases
(1)	Upper Primary Net Enrolment Ratio	1.574***	-0.021***	-0.006	0.053	0.87	26
		(8.60)	(-11.54)	(-0.48)	(1.68)		
(2)	Gender Parity Index	0.070***	-0.001***	-0.001	0.001*	0.61	20
		(4.71)	(-4.49)	(-0.92)	(2.19)		
(3)	Infant Survival Rate	0.038***	-0.000***	0.000	-0.000*	0.803	26
		(7.15)	(-6.62)	(0.68)	(-2.60)		

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Reserve Bank of India Occasional Papers
Vol. 39, No. 1&2, 2018

Monetary Policy and Crude Oil: Prices, Production and Consumption by Basil Oberholzer, 304 pp. Edward Elgar Publishing (2017), US$ 140.

Crude oil has played a major role in impacting growth and development outcomes of several countries in the twenty-first century. It, in fact, has emerged as the most important source of energy in the world and also acts as a benchmark for prices of other fuels like coal and natural gas. The movements in crude oil prices often influence inflation outcomes of countries, posing the challenge of "accommodate *versus* resist" for monetary policy.

Against this backdrop, this book delves into the forces driving the crude oil market and examines the nexus between monetary policy and crude oil prices with a focus on the Unites States (US) economy. The book is divided into three parts. Part I presents the facts and theories on monetary policy and crude oil; Part II takes us through some of the major empirical evidences; and, Part III offers a new economic policy proposition.

In the overview chapter, the author discusses the impact of US monetary policy on the crude oil market. To understand the role of monetary policy, one needs to first understand the role of money – whether it is neutral or not. If money is not neutral and it impacts both the supply and demand conditions in an economy, then the analysis of monetary policy's impact on crude oil becomes essential. The author emphasises the dual character of crude oil – apart from having characteristics of a physical commodity or a conventional good, it also has the attributes of a financial asset, which arises due to trading of futures contracts based on crude oil. Monetary policy has the potential to affect both these aspects. Monetary policy can influence crude oil market in various ways. Speculation becomes an important factor influencing the impact of monetary policy on the oil market. An expansionary monetary policy may lead to speculation in the futures market, which in turn could lead to over-investment in the crude oil spot market, thereby disturbing the equilibrium in crude oil spot and futures markets. This may undermine, potentially, economic and financial stability. It may also alter oil supply and consumption patterns having implications for ecological sustainability. Here, the author proposes a rather unconventional policy proposition. Instead of aiming at eliminating any

harmful effects of financial markets on the real economy, he suggests ways to use financial market mechanisms to achieve better outcomes.

The author begins with a detailed theoretical analysis of crude oil market and the role of money in the first part of the book. The crude oil market is analysed with the help of existing literature and some stylised facts such as the total energy intensity of output, which declined from 1980 to 2000 but rose thereafter. The literature on crude oil market is focussed on three principal domains: crude oil as an exhaustible resource; existence and effectiveness of speculation in the oil market; and, the role of the Organisation of the Petroleum Exporting Countries (OPEC).

The author then discusses the role of money in terms of two perspectives of monetary theory: the one which considers money as an exogenous variable (neoclassical economic theory) and the second, which endogenises money, created *ex nihilo* in the process of credit granting. Neoclassical economists assume efficient market hypothesis to hold true and therefore rule out asset price bubbles. In contrast, the framework with endogenous money coupled with uncertainty allows financial markets to evolve independently from the real economy to some extent, such that speculation becomes an effective element of the financial system.

After analysing the role of money and monetary theory, the book discusses the dual nature of the oil market *i.e.*, spot and futures markets. The spot market is influenced by industrial production, consumers' income, geopolitical conflicts and wars, market structures and new oil discoveries. The futures market is more flexible and reacts faster to new information. Demand for futures can increase without any change in fundamentals – the spot market and the rest of the economy – due to lower liquidity preference. The variables that make the difference between the two markets are the interest rate, risk premium, convenience yield and carrying cost of the commodity. Monetary policy exerts quantity effects by influencing economic fundamentals and price effects through the futures market. Speculation is the mechanism through which monetary policy materialises in financial markets as monetary policy sets the interest rate which affects liquidity preference and investment perspectives. The author analyses the impact of monetary policy on both these markets and concludes that monetary policy has an effect on both production and consumption of oil.

The second part of the book presents empirical evidence on the US monetary policy and market structures using different methodologies. The empirical investigation of US monetary policy is based on data for the period 2000-2014, which covers not only the global financial crisis of 2008 but also the transition of US monetary policy from the use of conventional tools to unconventional ones in the wake of the crisis.

The author argues that there is no single market price in the global crude oil pricing system as every deal yields its own price, which means that the assumption of a single price is a simplification of reality. Nonetheless, the market is highly integrated on geographical and temporal dimensions. Furthermore, prices of different types of crude oil around the world are perfectly correlated and so are spot and futures prices of different maturities. Even natural gas and coal seem to be integrated with the global crude oil market, in the medium to long run.

The econometric analysis presented in the book is based on a stock-flow consistent (SFC) model of monetary policy and crude oil market in order to crystallise the main effects and principal variables. The SFC model contains 43 endogenous variables and is estimated using data for the period 1990-2014. The empirical estimates have simultaneity problems that are obvious in the context of fast evolving financial markets and slowly reacting fundamentals. The author argues that speculation is too complex a phenomenon to be represented by a single framework and that it is difficult to represent monetary policy by a variable which is not anticipated by the agents. The author also considers inventories as an approximation for speculative activity. This model lays the basis for econometric analysis. The results indicate that financial markets affect prices permanently and hence the quantity variable is also impacted. The results of the SFC model are empirically tested using a two stage procedure for the period 2000 till 2014. The first stage investigates the transmission of monetary policy from the interest rate to the oil price using SVAR, cointegration and Granger Causality tests. The second stage examines the impact that the oil price itself exerts on oil quantities through Granger Causality tests. The empirical analysis confirms the theoretical intuition that an expansionary monetary policy transmits ambiguously, if significantly, through fundamentals but significantly through financial markets.

The author identifies two problems with respect to impact of monetary policy on crude oil market: first, economic and financial instability; and second, a threat to the environment due to higher oil intensity. The answers to these problems are presented in the third part of the book. An expansionary monetary policy triggers speculation in the crude oil futures market, which raises the oil price. This improves profit prospects for oil producers. As a result, oil producers invest in their oil production capacity, producing more oil for the market. This rise in oil production leads to a decline in oil prices. Overinvestment in oil production capacities keeps oil prices low for a long time leading to higher oil consumption. Speculation in the futures market leads to price volatility, entailing ramifications for financial and economic stability. The author suggests futures market regulation and the use of US strategic petroleum reserves to ensure price stability.

On the ecological front, the author argues that prevailing instruments such as the carbon emission trading system and an energy tax are not sufficient to guarantee stability and sustainability. Therefore, the author proposes a new approach which aims to bring out the best of existing policy propositions while avoiding their drawbacks. The new approach promises to achieve economic and financial stability, as well as ecological sustainability, without creating new macroeconomic problems. It does not try to eliminate financial market disturbances. The author calls this new approach the 'oil price targeting system', where monetary policy and fiscal policy coordinate to make use of the futures market. Under this mechanism, an oil price target is set and achieved through interventions by central banks in the futures market. This is along the lines of using strategic petroleum reserves. Trading in futures contracts, instead of physical oil, allows more flexibility and better fine-tuning between the two policies. To prevent imbalances in the spot market, a tax is imposed on production. Once the targeted oil price is achieved, stability in the oil market is guaranteed and speculation is ruled out.

Such a policy framework can be used to increase oil prices step by step. This may help achieve the twin objectives of reducing oil consumption as well as ensuring economic and financial stability. Uncertainty with respect to oil prices will be eliminated. The insight that the futures and spot markets are integrated, given that spot and futures prices move closely together, allows the scope for using the futures market for economic policy.

The author also suggests that a lot more work is needed in order to better understand the issues and implement policy options suggested in the book. Future research needs to focus on understanding the impact of oil price targeting on overall inflation. There is also a need to understand the impact of change in oil prices, specifically if the change is persistent, on the composition of economic output. Another aspect requiring research is the impact of rising oil prices on income and wealth distribution in the economy.

The book provides some interesting empirical evidence on the oil market and the interconnections between oil market, economic stability and ecological stability. It analyses the role of the US monetary policy in the global crude oil market. As the SFC model is of a macroeconomic nature and describes a particular sector of a capitalist economy, the role of geopolitical strategies like those of the OPEC are not addressed appropriately. The effects of exchange rate movements are also not factored in adequately. These appear to be some of the areas on which the book could have devoted greater attention. Nevertheless, the book provides an interesting and innovative solution to the problem at hand. Implementing it, however, may be a challenging task given the difficult to assess lobbying by producer and consumer groups.

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Reserve Bank of India Occasional Papers
Vol. 39, No. 1&2, 2018

FDI in India: History, Policy and the Asian Perspective by Prof. Manoj Pant and Deepika Srivastava, Orient Blackswan Pvt. Ltd. (2015), ₹695

Foreign Direct Investment (FDI), according to the IMF, is the category of international investment that reflects the objective of obtaining a lasting interest by a resident entity in one economy in an enterprise resident in another economy. The lasting interest implies the existence of a long-term relationship between the direct investor and the enterprise and a significant degree of influence by the investor on the management of the enterprise. FDI is often perceived as a channel of progress and development, as it promises to bring financial resources and technology. The counter view is that FDI is an instrument employed by rich countries to control resources in developing economies. This debate requires rigorous empirical country specific research to be able to assess the role of FDI in a country. *FDI in India: History, Policy and the Asian Perspective* provides a research-based analysis of FDI in India from the perspective of evolution of policy on FDI and its associated economic impact. Prof. Pant and Ms Srivastava address some specific issues such as the spillover effects of FDI on local firms and the substitutability/ complementarity between trade and FDI.

Though several books exist on this topic, the analytical rigour and the issues covered in this book set it apart from the others. Prof. Pant, who is an expert in international trade, has extensive experience in India's trade policies and the book reflects his rich academic background and involvement in the country's trade affairs over a long period. This book attempts to answer frequently asked questions, namely: Will large corporates monopolise and take over profitable sectors? Will the government have effective control over them? To what extent will local businesses be affected? FDI from developed to developing countries grows rapidly with some reverse in the 1980s accompanied by declining importance of developed countries.

The book is divided into nine chapters. Chapter 2 of the book provides an overview of the evolution of FDI policy in select South Asian countries while chapters 3 and 4 document developments in India's foreign investment policy. Chapter 5 makes a comparison between foreign and domestic firms in terms of various parameters. Export orientation, spillovers and trade linkages of FDI in India are discussed in chapters 6 to 8, while chapter 9 concludes the book with some policy recommendations.

Policymakers normally employ macroeconomic and tax policies to encourage FDI. This book provides a historical overview of the evolution of policy frameworks in select South Asian countries such as China, Malaysia, Thailand and Singapore, with an objective to draw relevant lessons for India. Apart from macroeconomic conditions, tax policy has been the key determinant of FDI in these countries. The effective tax rate for FDI firms can vary substantially from nominal tax rates for local firms because of several exemptions provided by a host country to FDI firms. Tax policy assumes significance due to differential tax treatment of residents and non-residents. The book mainly focusses on taxation in India relative to its South Asian neighbours.

The initial conditions in China, in the 1950s, were more or less similar to those in India. During the period 1979–88, FDI flows into China were of low technology and labour-intensive type and originated mostly from Hong Kong. A major factor that encouraged FDI in China was its relatively easier rules and regulations, facilitated by a decentralised system of authority that enabled quick decisions and eliminated bureaucratic delays. The taxation policies of China acted as a catalyst in attracting FDI inflows in the 1980s, wherein tax concessions were linked to the volume of FDI and the timeline for it was committed. Foreign joint ventures (JVs) were given preferential tax treatment, besides the additional tax benefits given to export-oriented JVs and those employing advanced technology.

In Malaysia, which is like India in terms of ethnic heterogeneity and dominance of an agricultural economy, its infrastructure availability, disciplined labour force and a tax haven status were the main factors contributing to FDI. Tax policy was used, post 1985, to help transnational

corporations (TNCs) tide over the effects of recession of the early 1980s. It gave exemptions on separate withholding tax on repatriated dividends. Dividend distribution income arising from sources outside Malaysia by a resident company (other than one in the business of banking, insurance, shipping and air transport) were exempted from tax. Foreign ownership up to 100 per cent was allowed if a company exported 80 per cent of its production or if it employed at least 350 Malaysians and its product did not compete with any locally-produced product.

In Thailand, FDI was sought mainly to generate employment and increase exports. The government undertook a massive restructuring of processes followed for FDI approvals, which facilitated a sharp increase in FDI in the country. The labour intensity of exports increased from 1.4 per cent in 1970 to 31 per cent in 1986. Singapore, a classic 'small' economy with a limited resource base, has naturally emerged as a re-export economy. The policy initiatives undertaken by Singapore to attract FDI included the development of world-class infrastructural facilities, with a focus on developing the financial sector, upgrading the skills of its labour force and a periodic economic review with a view to restructure the economy to respond to the changing external environment. The factors attracting FDI in Singapore were more related to a sound macroeconomic policy framework rather than tax benefits *per se*. The lessons which could be drawn from the experience of these countries is that the changes in laws in line with the interests of TNCs is a key determinant of FDI flows.

The book provides a historical evolution of India's foreign investment policy and its impact on the role of foreign investment in the economy. The policy during the period 1950–80 was largely shaped by the struggle between the state and monopoly foreign interests, where the major TNCs were oil companies. The setting up of Free Trade Zones (FTZs) with a host of tax and other concessions failed to attract FDI. In 1969, the government defined three groups of industries for the purpose of foreign investment – FDI without technical collaboration, FDI with technical collaboration, and FDI with no foreign participation. After the announcement of the Industrial Policy Statement of 1973, the Foreign

Exchange Regulation Act (FERA) came into force in 1974, which specified the detailed list of industries in which foreign firms could participate with or without FDI, with exemptions in tea plantations, and drugs and pharmaceuticals sectors. Thus, 1970–80 was considered a 'FDI restrictive period', as FERA acted as an instrument of control rather than provider of incentives.

The government began liberalising FDI during 1980-91 with the Industrial Policy Statements of 1980 and 1982 followed by the Technology Policy Statement in 1983. This period also witnessed a considerable degree of trade liberalisation in terms of reductions in tariffs and the shifting of many import items from licensing to open general license (OGL) category. During the first half of the 1990s, FDI emerged, for the first time, as a preferred route for mobilising financial resources over loans and other forms of financial channels. Foreign equity up to 51 per cent was permitted under the automatic approval route by the RBI in specified industries producing intermediate and capital goods. FDI was considered as an instrument to bring in foreign technology not available domestically and which subsequently replaced the phrase 'indigenous' by 'sophisticated and high technology'.

A comparison of tax policies of the four countries analysed in the book with that of India's tax policy suggests that these countries insisted on a certain minimum level of FDI for availing tax exemptions. India's policy on FDI, on the other hand, discouraged long term investment till 2000 unless a very large export commitment existed and was relatively backward in renegotiating tax treaties. Though others also imposed restrictions on foreign ownership, the relaxation or tax concessions were not linked only to export performance but also to important domestic policy issues like employment, local content and location. After 1995, India's foreign investment policy was largely influenced by the Uruguay Agreement of 1995 wherein foreign firms could no longer be treated on less favourable terms. Also, the revolution in the communications sector created a whole new set of businesses which were classified as 'industries' in terms of FDI regulations. The series of measures initiated to encourage FDI included: (a) introduction of a dual route – RBI's automatic route and the government's approval route; (b) automatic permission for technology agreements in high priority industries and

removal of restriction in low technology areas as well as liberalisation of technology imports; (c) permission to NRIs and overseas corporate bodies to invest up to 100 per cent in high priority sectors; (d) hike in foreign equity participation limit to 51 per cent for existing companies and liberalisation of using foreign 'brand name'; and (e) signing the Multilateral Investment Guarantee Agency for the protection of foreign investments. These measures resulted in a significant increase in FDI even as portfolio investment declined due to the East Asian crisis after 1997. To further encourage FDI, foreign equity participation up to 100 per cent with a cap of ₹15 billion, was permitted under the automatic route for the infrastructure sector which included power supply, roads, ports and harbours.

Using the balance sheet data of 440 firms in two industry groups, namely, 'chemical' and 'electrical and non-electrical' for two periods, *i.e.* 1985–90 and 2001–10, the book draws a comparison between domestic and foreign firms in terms of seven firm characteristics — export intensity, import intensity, capital intensity, value-added, tax payments, profitability and the effective tax rate defined as the ratio of tax provisions to gross profit. The foreign firms, as expected, were generally more vertically integrated than domestic firms in both the periods, *albeit*, at a low level of statistical significance. The study strongly suggests that for the period 1985–90, while the outward orientation of firms (measured by export intensity) was the same for domestic and foreign firms, the import dependence of domestic firms was much higher. However, during the period 2001–10, foreign firms were more outward-oriented than domestic firms. Contrary to the general perception, domestic firms were found to be more capital-intensive than foreign firms. Therefore, the fear that foreign firms promote capital-intensive techniques and reduce employment opportunities may not be true. There was little difference in the effective tax rates and the profit rates of domestic and foreign firms. In the case of foreign firms, share of their sales revenue going to the exchequer declined significantly in the period 2001–10 from that in 1985–90.

The liberalisation process followed in Less Developed Countries (LDCs) gave emphasis to greater outward-orientation, thereby increasing

export earnings. These countries generally reduced import duties over time. In India, the general rate of import duties fell from about 300 per cent in 1990 to 80 per cent by 1994 and further to around 12 per cent at present. The direction liberalisation took was influenced by the belief that permitting TNCs (or FDI) in certain sectors will greatly help promote exports. As a result, FDI has switched from natural resources-based industries to manufacturing, and more recently to the service sector. The empirical research relating to the export performance of TNCs, which has largely focused on the manufacturing sector, indicates that there is no significant difference in the export propensities of domestic and foreign firms in India in both the periods studied in the book, *i.e.* 1985–90 and 2000–10. The export performance of firms was determined by firm and industry-specific factors, rather than difference in ownership (foreign/ domestic) of a firm, *per se*, and this is found to be true since 1989.

Horizontal technology spillover often occurs through competition from foreign firms, demonstration impact and labour turnover; though it can be delayed or prevented intentionally. Foreign firms generally have less incentive to prevent vertical spillovers. The factors influencing technology spillover from foreign firms include absorptive capacity, competitive environment and openness of the concerned sectors. Technology spillover from foreign subsidiaries was considered a major benefit by LDCs. There are studies which have found that the firms with higher research and development activity often happen to be the major recipients of technology spillover due to foreign presence. At the same time, some studies indicate that technology import alone does not improve firms' efficiency. During 2001–07, the presence of foreign firms helped domestic firms improve their productivity *via* indirect 'learning by doing' rather than attempts to import technology embodied in drawings and designs.

Traditionally, 'trade and FDI' were treated as two separate issues, until the 1980s when FDI, like other forms of international investment, was seen to be determined by differences in the rates of return on capital across countries. Horizontal FDI arises among similar countries in the absence of trade costs where trade and FDI are substitutes. In

the case of dissimilar countries in the presence of trade costs, there exists a complementary relationship. Empirical investigations have found broad support for the complementary relationship as compared to substitution.

The authors conclude the book with some policy recommendations. FDI policy should focus on improving access to world-class technologies with no sectoral caps. The objective of FDI policy should be to improve competition and bring technology spinoffs for the local industry. There should be no distinction between FDI and trade, where international production and trade and investments are increasingly being organised within 'global value chains'. There is a need to remove administrative complexities by achieving synergy among various government machineries. The experience of other Asian economies that have been analysed in the book, particularly that of China, offers an important policy lesson for India, *i.e.* decentralisation of powers may facilitate considerable freedom to make quick decisions and encourage FDI in desired sectors.

The book is useful addition to the literature on the subject and can meet the expectation of both students and researchers giving its delicate balance between clear illustrations and empirical inferences, though it does not deal in distinguishing the various components of FDI. Thus, it would be of considerable benefit to those particularly interested in understanding the nuances of FDI in India.

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Regd. No. “No. R.N. 37535/80”

Published by Jai Chander for the Reserve Bank of India, Shahid Bhagat Singh Road, Fort, Mumbai-400 001 and printed by him at Jayant Printery LLP, 352/54, Girgaum Road, Murlidhar Compound, Near Thakurdwar Post Office, Mumbai - 400 002.