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Does Fiscal Deficit Matter for Economic Growth Performance of Indian States?
An Empirical Analysis

Binod Kumar Behera[*] **Hrushikesh Mallick**[**#]

Abstract

Considering a standard economic growth model, this study tries to empirically evaluate the effects of fiscal deficits on the economic growth of 14 major Indian states from 1980-81 to 2019-20. The panel fixed effect regression establishes that gross fiscal deficit (GFD), tax revenue, and inflation rates have a significant adverse impact on economic growth. In contrast, private investment, gross enrolment ratio (GER) in primary education, and the adoption of Fiscal Responsibility Legislations (FRLs) have favourable effects; non-tax revenues, GER in secondary education, and economic policy reform (EPR) didn't show any significant effect. Where FRLs were enacted, fiscal deficits showed a positive impact on growth in the post-FRL period. Further, we find a threshold effect of fiscal deficit on growth, implying that when GFD lies within a specified threshold, it has a positive impact; beyond this limit, it impedes states' economic growth.

Keywords: Fiscal Rule, Fiscal deficit, Tax revenues, non-tax revenues, Economic growth, Indian state

JEL Codes: H2, H3, H6, H7 & E6

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[*] Binod Kumar Behera is a PhD research scholar at the Centre for Development Studies.
[**] Hrushikesh Mallick is an Associate Professor of Economics at the Centre for Development Studies, Thiruvananthapuram, Kerala.
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1. Introduction

While orthodox economic theory envisages a limited role of the government in economic activities, with the emergence of Keynesian theories, the concepts of compensatory finance[1] and government borrowing have gained the limelight in macroeconomic policy. The role of public spending has taken center stage in the Keynesian economic policy approach to enhance effective demand (Eisner, 1989). Public spending has been playing a significant role in providing adequate economic and social infrastructure and helping to improve human capital and productivity across economies (Aschauer, 1989; Easterly et al., 1993). Governments have also been mobilizing resources through borrowing, to finance excess expenditures over revenues, with the increasing number of functions they take on (Buiter, 1985).

In a federalist financial system like India, where sub-national (state) governments have major responsibilities to undertake various economic activities to provide public goods and services, their fiscal actions can affect macroeconomic performance. India's central and state governments realised revenue surpluses in the first three decades after independence, and budget documents were used to report only the budget or uncovered deficit[2] (Blinder and Solow 1974). Due to large fiscal and external sector imbalances, the idea of fiscal deficit made its first appearance in the economic survey of 1990-91, under the discussion of the IMF structural adjustment program. The unchecked growth of fiscal deficit created major macroeconomic problems at the central and state levels. To finance excess expenditure over the revenues, state governments cannot raise external debt unless they seek prior permission from the Centre. Even if they need to borrow from the domestic market, they need to have prior approval from the Centre, in case they already have outstanding loans from the Centre.

Before implementing Fiscal Responsibility Legislations (FRLs), some states had adopted Structural Adjustment Lending (SAL[3]) induced fiscal reforms to curb fiscal and revenue deficits. This has marginal beneficial impacts in improving the deficit indicators observed in SAL-implementing states (World Bank, 2005; Rao and Chakraborty, 2006). To achieve greater fiscal discipline[4], India passed the "Fiscal Responsibility and Budget Management Act (FRBM Act) in 2003", which prescribed the limits of Gross Fiscal Deficit (GFD) as a percentage of gross domestic product (GDP) to 3% by 2008-09, and sought to abolish the revenue deficit permanently to achieve the required fiscal consolidation[5]. The FRBM Act applied to the Centre. Several states have also implemented their respective FRLs, imposing similar numerical limits on their fiscal and revenue deficits[6]. However, adopting these rules in the Indian fiscal system had its roots in the Maastricht Treaty fiscal rules of European Union (EU) countries. This rule had no theoretical rationale in its adoption to fix the ceilings on various deficit indicators in the Indian fiscal system (Rangarajan and Rao 2007). Fixing fiscal deficit ceilings to almost the same percentage levels for both the centre and states in the Indian context has been contested by many experts, given the differential economic conditions of the members of EU countries and India. The same fiscal deficit limit as a percentage of

GSDP for all the states, which seems to be quite ad-hoc, did not seem to be justified (Chakraborty, 2017).

Further, this rule-based fiscal policy (FRBM at the national and FRL at the state levels) did not specify debt-GDP targets, only a ceiling (Rangarajan and Srivastava 2005). However, the Fourteenth Finance Commission[7] proposed setting fiscal deficit targets for the states through their FRLs, and putting the overall ceilings on debt and deficits for both levels of government. In light of the global financial crisis, these targets were subsequently revised by the Centre in its annual budget announcements, and by the FRBM review Committees, over the years. Revisions are carried out given the current and future outlook of the economy, historical outcomes, international economic developments, and global best practices[8]. However, actual deficits have continued to deviate from the targets.

The FRLs in the states had aimed at imposing fiscal discipline in two ways. Firstly, the deficit was not permitted to exceed more than three per cent of the gross state domestic product (GSDP), and the revenue deficit was required to be eliminated by 2008/09 (later, it was achieved in 2009/10). Secondly, the Twelfth Finance Commission permitted the state governments to raise funds directly from the market, assuming that this would push up the states' interest liability burden and bring in fiscal self-discipline (Economic Survey, 2016-17). The main aim of fiscal consolidation was to trim fiscal deficits to ensure high economic growth at the national and sub-national levels, as the fiscal deficit was believed to harm economic growth (Mishra and Khundrakpam 2009).

Although numerous studies have explored the relationship between fiscal policy and economic growth in India in an aggregative context (macro level), few studies help determine the threshold limit on fiscal deficits, to understand whether the impact of fiscal deficit on economic growth is symmetrical or not. Understanding this would be quite useful, at least for the fiscally weaker states, in reviewing their fiscal policy rule. Given this motivation, the present study intends to examine whether fiscal deficits have a threshold effect[9] on economic growth in 14 major states of India.

2. Theoretical Background

There is no consensus view on the growth effect of fiscal deficit. According to the Ricardian Equivalence Theorem (RET), "the deficit in any current period is equal to the present value of future taxation" (Barro 1974). Any decrease in current government savings due to an increase in deficit causes an equivalent rise in private savings, leaving gross savings and gross investment at the national level unaltered. The discounted value of future taxes is equal to current government expenditure because, ultimately, the government collects revenue by imposing taxes. So, the taxation time does not matter (Seater 1982; Aschauer 1985).

However, the Keynesian school viewed that in underemployment and idle resources, an increase in deficit-financed government expenditure would cause an increase in output through a multiplier process, even if that expenditure is financed through borrowing (Aschauer, 1989). The rise in deficit

level would improve the profitability of private investment and accelerate economic growth (Chakraborty and Chakraborty 2006; Shen et al. 2018). This paradigm argued that "deficits have not crowded-out[10] investment, rather there has been discernible crowding-in effect[11]" (Eisner 1989).

In contrast, the Neoclassical school argued that fiscal deficit hurts growth if private saving does not fully compensate for the decline in government savings. An increase in fiscal deficits leads to a rise in lifetime consumption by postponing taxes from the current to the future. In a closed economic system, if there is full employment, any increase in consumption would cause a decline in savings. However, in an open economy context, an increase in deficit filled through external sources of borrowing may keep the level of investment and real interest rate unaltered. Still, the domestic currency may appreciate along with reduced exports.

3. Empirical literature survey

Similar to the lack of theoretical consensus among different schools of thought, the empirical findings are also relatively unclear about the growth effects of deficits. Given the three schools of thought on the relationship between economic growth and fiscal deficits-good for the economy, harmful or neutral in terms of affecting key macroeconomic variables (especially economic growth), one can also find empirical evidence supporting each of these views.

In a cross-country analysis, Nelson and Singh (1994) did not observe any significant linkage between economic growth and deficit. In particular, they observed that deficit did not significantly impact growth in Lower-Income Countries (LICs). However, an extremely weak linkage exists between these variables while pooling all the countries together. In contrast, the relation turned negative and statistically significant for middle-income countries. It is evident that the budget deficit does not have any growth effect in the short run for Saudi Arabia (Ghali 1996) and in the long run in Malaysia, Sri Lanka and the USA (Tan 2006; Velnampy and Achchuthan, 2013; Arora and Dua, 1993). However, in the Indian context, Chakraborty (2007) ruled out the relationship between economic growth and fiscal deficits in the short run. It is also found that there is no significant relationship between these variables in India from 1991-92 to 2013-14 (Bhoir and Dayre 2015).

It is observed that an increase in the real structural deficit has a positive impact on real income in the United States of America (USA) (Eisner and Pieper 1992). A similar finding is also observed during the recession (Taylor et al., 2012). Odhiambo, Lucas, and Aila (2013) concluded that fiscal deficit promotes economic growth by increasing productivity through health, education, and infrastructure in Kenya. In similar kinds of studies, it is found that fiscal deficits accelerate growth for Gambia (Onwioduokit and Bassey 2013) and Pakistan (Nayab 2015).

There exist significant positive effects of fiscal deficit on the economic growth of Nigeria during the Military regime (1985-1998); however, the same impact turned statistically insignificant during the democratic regime period (1999-2013) (Edame and Okoi, 2015). Another study by Hussain and Haque (2017) found that there is a positive relationship between economic growth and fiscal deficit

in Bangladesh when authors used Bangladesh Bureau of Statistics data; however opposite holds when they used data from a different source for the same period (1993-94 to 2015-16). Martin and Frdmanesh (1990) found that although tax revenue is inversely related to economic growth, tax is associated with higher growth when benefits are taken into account to reduce deficits. Further, there existed a positive relationship between GDP growth and government expenditure. However, it turned out to be harmful when the impact on deficits is factored in, and the expenditure coefficient is relatively lower (in absolute value) than the coefficient of taxes.Further, they found that the effect of all fiscal variables on GDP growth is strongest and qualitatively similar to the aggregate results for middle-income countries. However, opposite and insignificant results are found for low and highly-developed countries compared to the aggregate results.

In a study, Olatunji and Sunday (2012) found a positive effect of tax revenues, oil revenue, and productive expenditures on economic growth; in contrast, unproductive expenditure and the fiscal budget deficit had a detrimental impact on growth. Budget deficits are more related to real output growth than nominal output growth, as inflationary effects of fiscal deficit are not observed. However, the level of investment is negatively affected by the deficit with one and two-period lags. Hence deficit is negatively associated with real output growth (Karas, 1994). It is observed that the deficit hurts the per capita income growth via the volatility in relative price in Argentina (Avila 2011). In the case of Pakistan, a negative association between fiscal deficit and economic growth is alsobserved (Fatima et al. 2012; Ghani et al. 2017).

In the Indian context, Amrutha et al. (2017) observed the negative impact of fiscal deficit on growth in India. The magnitude of the adverse impact of fiscal deficit on growth is lower in the post-economic reform period than in the pre-reform period (Mohanty 2013), and Mohanty (2020) also found the same effect in both the long and short run. However, Sharma and Mittal (2019) witnessed that fiscal deficit hampers the GDP but stimulates investments in India. A negative growth effect of fiscal deficit was witnessed in the case of all the South Asian countries except Nepal. However, it was also confirmed that the fiscal deficit had a causal relation with economic growth in Bangladesh, Pakistan and Nepal, while the economic growth causal relation with the fiscal deficit for Sri Lanka and India (Navaratnam and Mayandy, 2016). Considering 16 Indian states from 2001-2016, Sethi et al. (2020) empirically verify the justification for the FRBM-prescribed fiscal deficit limit of 3%. They also witnessed a little higher threshold limit for middle- and low-income states.

4. A standard theoretical framework

Neoclassical growth theory envisages that fiscal policy determines the level of output rather than the long-run growth rate of an economy (Chamley, 1986). The theory assumes a steady state of growth rate, which is exogenously determined by the population growth rate and technological progress, and fiscal policy only affects the transition path to the steady state of growth. In contrast, the endogenous growth models with the incorporation of fiscal policy designed by Barro (1990), Barro and Sala-i-

Martin (1992), (1995), and Mendoza et al. (1997), envisaged that fiscal policy not only determines the level of output but also the steady-state of growth rate.

In this context, we present a simple theoretical growth framework underlying our empirical strategy adopted in the study to statistically uncover the relationship between budget deficit and economic growth in India. This heavily draws on the growth model of Barro (1990) and Barro and Sala-i-Martin (1992, 1995). Similar to these studies, we have adopted a simple Cobb-Douglas production function incorporating the role of fiscal policy. Thus, the production function can be represented as follows:

$$y = Ak^{1-\propto}g^{\propto} \quad \text{.....(i)}$$

- $\alpha \in [0,1]$
- y is the output per capita,
- A represents the total factor productivity,
- k is the private capital per capita, and
- g is the measure of fiscal policy, i.e. government expenditure on goods and services per head of individuals. The expenditure can consist of both productive and unproductive expenditures.

A government's simple, balanced budget without borrowing constraints can be represented as follows:

$$g = \tau ny + NTR + NDCR \quad \text{……. ……..…..(ii)}$$

- τ is the flat tax rate which is imposed on output,
- n is the total population,
- NTR represents government non-tax revenue, and
- NDCR refers to that non-debt capital receipts other than the government debt.

Theoretically, the non-tax revenue is non-distortionary, so its effect may be positive on the output. In contrast, the taxes are assumed to be distortive and would affect the output level by affecting leisure and labour supply choices and the economy's private saving and investment decisions.

Assuming an iso-elastic utility[1] function, Barro and Sala-i-Martin (1992) demonstrated that the long-run growth rate in this model φ can be expressed as:

[1] Iso-utility function is also called power utility function and a special case of hyperbolic absolute risk aversion where addition of any constant terms in the objective function doesn't change the optimal decision. Barro and Sala-i-Martin (1992) assumed that the consumer doesn't alter his decision in his life time consumption for an increase in his absolute wealth in the initial period.

$$\varphi = \lambda(1-\tau)(1-\propto)A^{1/(1-\propto)}\pi(g/y)^{\propto/(1-\propto)} - \mu \quad \text{.....(iii)}$$

where λ and μ are constants that reflect parameters in the utility function.

To analyse the effects of fiscal deficit on economic growth performance, we relax the assumption of the state of a balanced budget in the budget constraints and incorporate the fiscal deficit into it. Following the work of Kneller et al. (1999) and Bleaney et al. (2000), the budget constraints can be rewritten as:

$$g = d + \tau ny + NTR + NDCR \quad \text{.....(iv)}$$

Where d refers to fiscal deficit.

By following the work of Kneller et al. (1999), Amanja and Morrisey (2005) and Matthew (2009), the growth equation can be written as

$$y_i = \alpha + \sum_{i=1}^{k} \beta_i Z_{it} + \sum_{j=1}^{m} \gamma_j X_{jt} + \varepsilon_{it} \quad \text{.....(v)}$$

- y_i is the growth rate of per capita output
- X is the vector of fiscal variables, and
- Z is the vector of non-fiscal variables, such as private fixed investment and educational achievements to capture human capital,
- ε_{it} denotes the random error term.

In the case of a balanced budget, the X vector of the fiscal variable tends to be zero. With the presence of the fiscal deficit, it approaches negative values and approaches to positive values for the budgetary surpluses.

$$\sum_{j=1}^{m} \gamma_j X_{jt} = 0$$

One element of X must be omitted to avoid the multicollinearity problem in the model estimation. To capture the effects of fiscal deficit on economic growth, this study omits the last term of the right-hand side of equation (ii), i.e. non-debt capital receipts (NDCR), in the final estimation model. Then the final growth equation would take the following form.

$$y_i = \alpha + \sum_{i=1}^{k} \beta_i Z_{it} + \sum_{j=1}^{m-1} \gamma_j X_{jt} + \varepsilon_{it} \quad \text{.....(vi)}$$

The above relates to per capita income as a function of private investment per capita and government expenditure per capita. Government expenditure is decomposed into expenditure financed by tax and non-tax revenues, and another component is financed by borrowing from various sources.

Although borrowing from various sources would have different implications on the output growth of an economy since a supplemental agreement between the government of India and the Reserve bank of India in 1994 has ceased the practice of ad hoc monetisation of government debt since 1997. Therefore the fiscal deficit would predominantly capture all kinds of government market borrowings and other liabilities with a little amount of monetisation happening through ways other than ad-hoc issue of treasury bills to the Reserve Bank of India, and this is captured from the measure of fiscal deficit[12].

5. Data sources and variable descriptions

Table 1 provides descriptive statistics and highlights some other essential characteristics of the variables used in this analysis.

- Per capita income growth rate**:** This is computed based on a simple growth rate formula based on states' per capita state domestic product.
- Gross Fiscal Deficit: The gap between total expenditures minus net recovery of the loan over revenue receipt and non-debt capital receipts. The governments incur deficits to meet the excess expenditure over their revenue.
- Tax Revenue: It is a major part of the revenue receipts collected by taxing the people. It includes both indirect and direct taxes.
- Non-tax revenue: non-tax revenues are those receipts not generated by taxing people. It includes dividends and profits from Public Sector Enterprises such as Railway, government earnings from General Services and community services, etc., and other money such as fees, stamps, fines, penalties etc.
- Inflation rate: This rate is calculated from the GSDP deflator of the states. It is the growth rate of the implicit GSDP price deflator of the states.
- Private Investment: Since the private investment data across the states are unavailable, the credit of the scheduled commercial banks (SCBs) to the private sector based on their utilization is a proxy variable for private investment.
- Enrolment in Primary Education: It is the gross enrolment ratio (GER) of the states in the primary level of education, which includes GER in both the primary (class I-V) and upper primary (class VI-VIII) schools.

- Enrolment in Secondary Education: It refers to the GER of both the secondary and higher secondary levels of education. It is calculated by taking the arithmetic mean of the GER of these secondary and higher secondary schools across the states.

We cover the period from 1980-81 to 2019-20. We use the statistics on the state's per capita income growth rate, their respective deficits, and other fiscal variables such as non-tax revenue, tax revenue, and credit of the scheduled commercial banks from the Economic and Political Weekly Research Foundation (EPWRF). We draw data on gross enrolment rates from various states' departments of education or ministry of education and Economic survey. The variables such as private investment, tax revenue, non-tax revenue, and gross fiscal deficit (GFD) are taken as a percentage of the GSDP of the respective states.

6. Econometric methods

To empirically investigate the relationship between economic growth and fiscal deficit, the study employs two methods to check two distinct aspects of their relations. Firstly, it employs a static panel fixed /random effect model to examine the effect of fiscal deficit on economic growth. Secondly, it also utilises the panel threshold fixed effect model to investigate the non-linear relationship between these two variables. Following the theoretical model of economic growth as illustrated above, the present study specifies a model of regional economic growth to examine the effects of the fiscal deficit of Indian states on their growth performance. The model can be specified as follows:

Specification of a basic model of economic growth

$$\text{Percapita income growth rate}_{it} = \alpha_0 + \alpha_1 \text{gross fiscal deficit}_{it} + \alpha_2 \text{tax revenue}_{it} + \alpha_3 \text{ nontax revenue}_{it} + \alpha_4 \text{private investment}_{it} + \alpha_5 \text{inflation rate }_{it} + \alpha_6 \text{education}_{it} + \alpha_7 Z_{it} + \alpha_8 \mu_i + u_{it} \quad \ldots\ldots (1)$$

Where the above growth equation (1) expresses that the per capita income of states or regions is a function of private investment, enrolment in primary and secondary education (human capital), and the fiscal deficits of states, moreover, z stands for any other time-specific dummy capturing changes or introducing new policies. $u_{it} = \omega_i + \varepsilon_t + \epsilon_{it}$ is an idiosyncratic error term which is a linear combination of states specific error terms (ω_i), time-specific error terms (ε_t) and both time and states specific error terms (ϵ_{it}), and μ_i is the fixed effect intercept term for all the states.

6.1 Static panel random and fixed effect model

To empirically verify the relationship between economic growth and fiscal deficit among the fourteen major selected states (non-special category) of India, the empirical estimation at first is carried out using a panel data regression analysis. A panel data analysis technique provides an environment for the development of the estimation method and the theoretical result (Green, 2003). Panel Fixed effect and random effect (Generalized Least Square) models are the two most popular techniques for panel data analysis. The application of the fixed effect model or random effect model depends on whether the individual state-specific effects are correlated with the regressors in the model and whether the effect is stochastic or not (Green, 2003; Baltagi, 2008).

In this study, we employ either the fixed effect or random effect model depending on the decision emerging from Hausman's specification test (Hausman, 1978). If the value of the Hausman test statistic is significant, then the fixed effect model is the best option for the estimation as compared to the random effect model. Otherwise, the study relies on the random effect model to provide econometrically robust coefficient estimates. The study estimates three alternative variants of the above growth model represented in equation (1) using the panel data estimation technique to assess the effect of fiscal deficit on economic growth in fourteen selected states of India from 1980-81 to 2019-20. Those estimable equations can be specified with panel data specifications as follows:

Model 1: Basic Growth Model (same as in Equation 1)

$$pcgsdpgr_{it} = \alpha_{it} + \beta_1\, gfd_{it} + \beta_2\, tr_{it} + \beta_3\, ntr_{it} + \beta_4\, inf_{it} + \beta_5\, pri\_inv_{it}$$

$$+\beta_6\, edn\_pri_{it} + \beta_1\, edn\_sec_{it} + u_{it} \qquad \ldots\ldots\ldots (1.1)$$

Model 2: Basic model with the introduction of FRLs and EPR policy dummy

$$pcgsdpgr_{it} = \alpha_{it} + \beta_1\, gfd_{it} + \beta_2\, tr_{it} + \beta_3\, ntr_{it} + \beta_4\, inf_{it} + \beta_5\, pri\_inv_{it}$$

$$+\beta_6\, edn\_pri_{it} + \beta_7\, edn\_sec_{it} + \beta_8\, D_1 frl + +\beta_{10}\, D_2 epr + u_{it} \ldots\ldots (1.2)$$

Model 3: Basic model with FRLs and EPR dummies separately interacted with gross fiscal deficits

$$pcgsdpgr_{it} = \alpha_{it} + \beta_1\, gfd_{it} + \beta_2\, tr_{it} + \beta_3\, ntr_{it} + \beta_4\, inf_{it} + \beta_5\, pri\_inv_{it}$$

$$+\beta_6\, edn\_pri_{it} + \beta_7\, edn\_sec_{it} + \beta_8\, D_1 frl + \beta_9\, D_1 frl * gfd_{it} + \beta_{10}\, D_2 epr + \beta_{11}\, D_2 epr * gfd_{it} + u_{it}$$

$$\ldots\ldots (1.3)$$

Where,

- pcgsdpgr= growth rate of per capita gross state domestic product (GSDP)
- gfd = Gross fiscal deficit as a percentage to GSDP
- tr = Tax revenue as a percentage to GSDP
- ntr = Non-tax revenue as a percentage to GSDP
- inf = inflation rate
- pri_inv =Private Investment as a percentage to GSDP
- edn_pri = Gross enrolment rate at the primary school level
- edn_sec = Gross enrolment rate at the secondary school level
- D_1frl= time dummy for fiscal responsibility legislation
- D_2epr = time dummy for EPR
- $D_1 \text{frl} * \text{gfd}_{it}$= interaction of time dummy variable for fiscal responsibility legislation with the gross fiscal deficit
- $D_2 \text{epr} * \text{gfd}_{it}$= interaction of time Dummy variable for EPR with the gross fiscal deficit.

The basic model (first model) treats the per capita income growth rate as a function of gross fiscal deficit (GFD), non-tax revenue, tax revenue along with private investment, inflation rate, and GRE at primary school and secondary school. In the second model, two-time dummy variables are incorporated into the basic panel model to examine the impact of economic reform and FRLs on the economic growth of the states. In the third model, the time dummies and their interactions with the GFD variables are augmented in the basic model to verify whether the FRL and EPR interacted with the fiscal deficit and had any differential effects on the economic growth rate of the states.

6.2 Threshold effect of fiscal deficits of states on their per capita income growth rate

This section aims to investigate if there is any threshold effect of fiscal deficit on the economic growth of states, where the relation between economic growth and fiscal deficit is likely to be different for each threshold value of a series. However, the major issue which needs to be tackled is whether the threshold value has to be determined endogenously or exogenously.

With the traditional approach, the threshold level is usually determined exogenously by choosing some arbitrary value, where it is not possible to derive the confidence interval for a given threshold value. In contrast, an endogenous threshold regression technique is more appropriate over the conventional exogenous threshold regression technique, on the ground that it determines the values and locations of the thresholds endogenously from the data, through some specific non-linear functional form of the model to capture such thresholds in the absence of information about the exogenous changes. It applies asymptotic theory to construct the appropriate confidence intervals. At

the same time, it also uses bootstrap techniques to assess the significance level of the threshold effect to test the null hypothesis of no threshold effect with linear formulation against a threshold effect with a non-linear effect.

Thus, the study chooses to use the panel threshold fixed effect method as developed by Hansen (1999); the detailed description of the analysis of this econometrics methodology has been illustrated in Appendix-A.

7. Descriptive statistics of the variables used in our analysis

The data on most of the fiscal variables are utilised from the Handbook of Statistics on the Indian economy (2021), and the statistics on state gross domestic product and state population have been taken from the Economic and Political Research Foundation. It covers the data for 14 (Non-Special Category[2]) states of India.

Table 1 depicts the behavioural characteristics of variables for all the 14 selected states from 1980-81 to 2019-20. It shows that the average PCI growth rate of states is around 4.87 per cent with 6.64 standard deviations, and its lowest and highest values range from 81.83 per cent to -16.62 per cent, respectively. The average gross fiscal deficit (GFD) to GSDP ratio across 14 states stands at 3.35%, varying within a range of 12.38% to -0.98% with a standard deviation of 1.62. The average tax revenue and non-tax revenue each as a proportion to GSDP constitute 9.60% and 3.72% with a standard deviation of 2.97 and 1.74 respectively, and the tax revenue and non-tax revenue varying within a range from 20.01% to 5.53% and 13.08% to 1.34%, respectively. The mean value of private investment (measured with a proxy variable of credit of scheduled commercial banks to the private sector based on its utilisation to GDP) is 29.85%, with a maximum value of 100.49% and a minimum value of 7.97%. The mean of GER for primary and secondary education are 85.27 and 40.99, respectively, with a standard deviation of 16.49 and 14.67, respectively. These variables vary from 143.15 to 46.55 and 95.05 to 9.14, respectively. The mean of the inflation rate is 6.76%, and it varies from a range of 21.45% to -29.77%, with a standard deviation of 3.89. It shows that private investment has the greatest variation reflected by its highest standard deviation value, and this is followed by gross enrolment ratios and PCI growth rate.

[2] The study covers only the fourteen non-special category states and excludes all the special category states which are located in the northeast of India. These states are smaller in size by their market size in terms of their GSDP and population size. As a result, with the smaller absolute size of their fiscal deficit, they are likely to register a higher deficit to GSDP ratio and bias our empirical result relating to fiscal deficit and growth. Thus, it excludes the special category states on account of their features such as (1) located in hilly and difficult terrains, (2) low population density and a sizable share of tribal population (3) strategic locations bordering the neighbouring countries, (4) economic and infrastructural backwardness and (5) non-viable nature of state finances. In addition, this study excludes newly created non-special category states as consistent time series data is unavailable. Moreover, the 14 non-special category states covered in our study cover almost more than 75% of the total geographical areas of India. The name of all those 14 states are Andhra Pradesh, Bihar, Gujarat, Haryana, Karnataka, Punjab, Kerala, Madhya Pradesh, Maharashtra, Odisha, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal.

For exploring a better understanding on the relationship between the fiscal deficit and economic growth of the states, the trends of those two variables are presented for each state separately in figure 1(Appendix-B).

Table 1:Descriptive Statistics of the Variables

Variable	Mean	Min	Max	Std. Dev.
Per Capita Income growth rate	4.87	-16.62	81.83	6.64
Gross Fiscal Deficit	3.35	-0.98	12.38	1.62
Tax Revenue	9.60	5.53	20.01	2.97
Non-tax Revenue	3.72	1.34	13.08	1.74
Private Investment	29.85	7.97	100.49	16.50
Inflation	6.76	-29.77	21.45	3.89
Gross Enrolment at Primary Education	85.27	46.55	143.15	16.49
Gross Enrolment at Secondary Education	40.99	9.14	95.05	14.67

Note: All device indicators, including private investment, are taken as a percentage of the GSDP of respective states.

As the time for the analysis is thirty years, it is necessary to check the time series characteristics of all the variables. The panel unit-root test shows that per capita income growth rate, GFD, and non-tax revenue are stationary at the level; however, other variables such as tax revenue, inflation rate, and GRE in primary and secondary school levels are stationary at the first difference.

For the sake of the robustness of the results, we have run the pooled mean group model of the same model as specified for the static fixed-effect model by replacing the per capita income growth rate with the level of per capita income as the former is stationary at the level and latter is non-stationary at first-difference. The unit-root results of all the variables are given in Appendix C.

8. Empirical results & discussion

8.1 Results based on static panel random and fixed effect models

Table 2 provides the estimated results of these three models based on all the 14 selected Indian states for the entire sample period from 1980-81 to 2019-20. Relying on the Hausman-test criteria, which was found to consistently reject the null hypothesis of the robustness of estimates from the random effect model, all the models were estimated based on the fixed effect model.

The estimated results shows that a one per cent increase in the fiscal deficit on an average significantly reduces the per capita economic growth rates of the states by -0.76 per cent. This supports the neoclassical view on the relationship between economic growth and fiscal deficit performance, and this result is similar to the findings of the study by Karas (1994), Cebula (1995), Avila (2011), Rana and Wahid (2016), and Iqbal, Din and Ghani(2017).

All the models are estimated with the incorporation of tax rate, i.e. tax revenue to GSDP ratio, to see the growth effect of taxation. The result shows that the tax rate hurts economic growth. This result is as per the prediction of the neoclassical model of economic growth. According to the neoclassical idea, taxation curbs economic growth by distorting the major choice factors of agents, which determine the economic growth rate. This affects labour employment and capital accumulation and hence the growth productivity. This finding is akin to the findings of Skinner (1988), Easterly and Rebelo (1993), Mendoza et al. (1994), and Lee and Gordon (2005) for other countries' contexts. However, the variable non-tax revenue (which is measured as non-tax revenue to GSDP ratio) comes out to have a statistically insignificant relationship with the per capita income growth.

In all three models, the credit extended by scheduled commercial banks to the private sector based on their utilisation rate, which has been used as a proxy for private investment, showed a positive and significant impact on economic growth. This result is consistent in line with the standard theory of investment, which argues that private investment is a basic determinant of economic growth, and this result is supported by numerous other studies such as Blejer and Khan(1984), Barro(1991), Mankiw, Romer and Weil(1992) and Barro, Sala-i_Martin(1992)

Table 2 : Estimation of per capita income growth rate model

Independent Variables	Model 1(FE)	Model 2(FE)	Model 3(FE)
Gross Fiscal Deficit (GFD)	-0.76*** (0.203)	-0.54*** (0.218)	-0.94** (0.457)
Tax Revenue	-0.53*** (0.215)	-0.61*** (0.216)	-0.59***(0.216)
Non-tax Revenue	-0.060 (0.216)	-0.068 (0.266)	-0.115(0.267)
Private Investment	1.85** (0.611)	-1.08 (0.800)	-0.59(0.1.641)
Inflation	-0.38*** (0.079)	-0.41*** (0.212)	-0.40***(0.080)
Enrolment in Primary Education	0.046* (0.028)	0.033** (0.028)	0.027**(0.028)
Enrolment in Secondary Education	-0.038 (0.031)	-0.042 (0.034)	-0.049(0.0335)
D_1 FRL		3.78***(1.308)	1.145 (1.994)
D_2 EPR		1.403 (1.162)	1.10 (2.140)
D_1 FRL*GFD			0.74*(0.412)
D_2 EPR*GFD			0.085 (0.518)
R^2(Within)	0.10	0.12	0.12
R^2(Between)	0.0001	0.01	0.0089
R^2((Over All)	0.05	0.06	0.06
Hausman test (Chi Square)	15.44**	14.67**	14.32**

Note: ***, ** and * denote significance at 1 per cent, 5 per cent and 10 per cent level of significance

The inflation rate is found to be significant and adversely affects economic growth. The presence of a high inflation rate increases the riskiness of long-term investment projects, and it is also considered an indicator of macroeconomic instability. As a result, it creates an adverse environment for investment. Thus, it proves that even in a developing economy context, the inflation rate reduces private investment and productivity, and ultimately it hampers economic growth (Barro, 1991; Levine and Renelt, 1992; Barro, 1995; Ghosh and Phillips, 1998; Fischer, 1993; Ambler and Cardia, 1997).

The enrolment rate and mean year of schooling are the two most commonly used variables used as a proxy for the stock of human capital. The study incorporated the gross enrolment ratio in primary and secondary school education in our model to capture the effect of human capital on economic growth. The estimation of these parameters in all the models shows a significant positive relationship between the gross enrolment ratio at primary school and economic growth (Barro and Lee, 1994). However, contrary to previous studies, our result shows that the gross enrolment ratio at secondary school level education has no significant effect on economic growth. Although this result seems surprising, it is consistent with the finding of Self and Grabowski (2004).

Given the fact that all our model estimations show that the growth effect of the fiscal deficit is negative and statistically significant at 1% level, in order to capture the policy effect on the growth the study further used two separate time dummies for two different periods such as after the economic reform of 1990-91 till 2019-20(EPR) and post FRLs period after the implementation of FRBM since 2004-05 till 2019-20(FRLs). These effects are captured and reported under Model 2 in column 3 in Table 2. The estimated results of the model demonstrate that the FRLs dummy has a statistically significant positive coefficient implying that fiscal prudence has enabled the states to economically perform better. However, at the same time, it also confirms that economic policy reform does not have any effect on the per capita income growth for the major selected states in India. Estimating the subsequent model (Model 3), the study interacts with both the FRLs and EPR period dummy variables with GFD and the results are shown in column 4 of Table 2. The estimated result reveals that although the FRLs dummy continue to significantly explain its positive contribution to states' economic growth performance in all the other two model, but it is statistically insignificant in this model 3. However, its interaction term with GFD is found to be positive and statistically significant and makes reasonable sense about it.

Further, a comparison of parameter estimates between GFD and the interaction of the FRLs dummy with GFD shows that the absolute magnitude of the interactive GFD term (0.74) is relatively lesser than the magnitude of the GFD coefficient (-0.94) alone. It indicates that the negative effect of fiscal deficit is higher than its positive effect prior to the adoption of FRLs in Indian states. Similarly, both the EPR and its interaction variable are found to have positive impacts on economic growth, although they are statistically insignificant.

8.2 Results from threshold effects

Test results on threshold effects

We examine the threshold effect model as proposed by Hansen (1999). This is applied by assuming that there may exist a non-linear relationship between economic growth and fiscal deficit. First of all, we tested for the existence of a single threshold effect and then for the double threshold effect up to triple thresholds in our per capita income growth model. Table 3 provides the test results on the threshold effect of fiscal deficit on per capita economic growth.

Table 3: Test for threshold effect of fiscal deficits on per capita income growth rate

Hypothesis	LR Statistics	P-value	Threshold Value
H_0= No Threshold Effect	710.13	0.0000	2.3297
H_1= Single Threshold Effect			(2.3040-2.3387)
H_0= Single Threshold Effect	-136.05	1.000	
H_1= Double Threshold Effect			

Note: The test result reported in the table is based on following a repeated bootstrap procedure of 1000 times for each threshold test

Table 3 reports the test result for a single and double threshold effect. The result shows that only a single threshold effect is statistically significant at 1%. In contrast, it also finds that the double threshold is insignificant, with a bootstrap p-value of 1.000. One cannot reject the null hypothesis of the existence of a single threshold effect of fiscal deficit in our growth model. Thus, we conclude that a single threshold effect of fiscal deficit exists on economic growth.

Empirical results and discussion on panel threshold fixed effect model

From a comparative perspective, Table 4 produces both estimates from linear and non-linear models. The second column of Table 3 reproduces the estimates based on the static panel fixed effect model with no threshold effect of fiscal deficit, while the third column presents the estimates based on the panel threshold fixed effect model with a single-threshold effect of fiscal deficit on economic growth. The coefficient of the variables such as tax revenue, non-tax revenue, inflation, private investment, and education at the primary and secondary school levels have similar signs as expected, and the signs are almost consistent with our initial estimates reported in Table 2. However, they vary in terms of their magnitude only.

Table 4: Threshold Effect of Fiscal Deficits on Levels of Per Capita Income

Independent Variables	Fixed Effect Model	Threshold Fixed Effect Model
Constant	-0.085 (5.689)	-3.86(2.974)
Gross Fiscal Deficit	-0.76*** (0.203)	-0.92*** (0.105)
Tax Revenue	-0.53*** (0.215)	-0.78 (0.113)
Non-Tax Revenue	-0.060 (0.216)	-0.098 (0.139)
Inflation rate	-0.38***(0.079)	-0.003*** (0.043)
Enrolment in Primary Education	0.046* (0.028)	0.010* (0.014)
Enrolment in Secondary Education	-0.038 (0.031)	-0.030 (0.016)
Private Investment	1.85** (0.611)	1.48*** (0.477)
Threshold1(GFD< 2.3297)		0.905***(0.024)

Note: ***, ** and * denote significance at 1 per cent, 5 per cent and 10 per cent levels of significance

Given that there exists a single threshold effect, the threshold value splits all the observations into two regimes, based on whether GFD is smaller or larger than the threshold value. These regimes are differentiated by different slope coefficients θ_0 and θ_1 .

In the first regime, when the GFD to GSDP ratio lies below 2.3297%, the slope coefficient $\widehat{\theta_0}$ is 0.905, which is positively significant at 1% level. In contrast, this indirectly proves that when the GFD to GSDP ratio exceeds 2.3297, it has a detrimental effect on the economic growth rate of states with a slope coefficient of -0.92 at 1% level of significance. It is also observed that when the fiscal deficit exceeds this threshold value, not only it is the effect becomes negative, but also the magnitude of this effect is greater than the positive effect when the fiscal deficit lies within the threshold value.

From the above analysis of the threshold fixed effect model, it demonstrates that if the fiscal deficit to GSDP ratio lies within a specified limit, then it helps the Indian state economies to accelerate their pace of economic growth rates. However, once it exceeds that specified limit, then it starts to retard its economic growth. This not only provides a caution to the individual state governments in maintaining a higher level of fiscal deficits to GSDP ratio exceeding 2.33%, but also supports the individual governments' efforts towards maintaining the fiscal deficit to GSDP ratio by restricting within the maximum limit of 2.33. In this sense, setting a commonly targeted ceiling of 3% on the fiscal deficit to GDP ratio for each state may represent an overestimation compared to our approximated or estimated target value obtained through an application of the threshold regression estimation approach.

Therefore, it suggests that a uniformly specified fiscal deficit to GDP ratio for all the states through a general rule-based fiscal policy (FRBM or FRLSs) is likely to significantly hamper the economic growth potential of the state economies across India. It confirms for all the states that they should specify their own individual deficit to GSDP targets to accelerate their pace of economic growth.

9. Robustness check

To check the robustness of estimated parameters, the panel ARDL model has been employed by replacing the dependent variables with levels of per capita income instead of per capita income growth rate. The application of the ARDL model would make greater sense when the dependent variable is non-stationary rather than stationary. The long-run coefficient of the ARDL model shows that GFD has a negative impact on the per capita income of the states in the long run. All other variables also come as expected and in line with the standard theory. The empirical estimation results of long-run coefficients are presented in the following Appendix-C.

10. Conclusion and Policy Suggestion

Using a panel fixed effect model for fourteen selected Indian states together for the period 1980-81 to 2019-20, the estimated results reveal that increase in GFD hampers the per capita income growth rate of Indian states. This result supports the neoclassical views about the relationship between economic growth and fiscal deficit.

Further, it also shows that the FRL policy has a positive impact on economic growth, and the EPR does not affect the economic growth of Indian states. When we considered interacting both the FRL and EPR policy dummies with the level of GFD-to-GSDP ratio, it is found that the FRLs policy dummy alone has a significant and positive impact, along with its interaction with GFD on the economic growth rate of 14 major selected states. However, it is found that the negative effect of fiscal deficit on economic growth prior to the adoption of FRLs is higher than its positive effect in the post-FRLs adoption period.

While examining the threshold effect in the panel fixed effect model, the study observed a threshold effect of GFD on economic growth. When GFD lies within the threshold limit, it has a significant and positive impact on economic growth, implying that once it exceeds this minimum limit, the fiscal deficit adversely affects the economic growth of the state economies in India. From both the linear and non-linear analyses, it can be concluded that the fiscal deficit has a positive impact on the economic growth performance of the states in the post-FRLs period. However, a much higher positive impact of fiscal deficit on economic growth can be realised by keeping the fiscal deficit within the specified threshold limit of 2.33%.

This study provides a cautious benchmark limit on the fiscal deficit to GSDP ratio for the states of India. Hence, this requires studying and determining different thresholds limit on the fiscal deficit to GSDP ratio for the different individual states. A commonly arbitrary ceiling can affect economic growth differently, as fiscal capacity can differ depending on economic capability or growth. Nevertheless, arriving at this particular limit is something quite unique to this study, and helpful for designing the future fiscal policy of states in India.

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Appendix-A

To check the presence of threshold effect of fiscal deficit on economic growth, the study employs Hansen(1999) methodology. The non-linear formulation of the threshold fixed effect model can be represented as follows.

$$gy_{it}=\alpha + \beta' X_{it}+\omega' W_{it}+\theta' h_{it}[W_1 - \widetilde{W}_1]+u_{it} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(2)$$

$$h_{it} = \begin{cases} \text{One if } W_1 > \widetilde{W}_1 \\ 0 \text{ if } W_1 \leq \widetilde{W}_1 \end{cases}$$

And $u_{it=}\ \mu_i + \lambda_t\ +\ \varepsilon_{it}$

Where,

X_{it} = the vector of non-fiscal variables such as inflation rate, private investment, and gross enrolment ratio at the secondary and primary level of education.

W_{it}= the vector of fiscal variables such as the gross fiscal deficit, non-tax revenue, tax revenue

W_1= gross fiscal deficit (GFD to GSDP ratio)

Above Eq. (2) is a standard fixed effect panel data model, whereas the states are indexed as I, and the period is denoted by t. The error term u_{it} is the linear combination of three types of error terms, firstly μ_i represents the random error term, which is time-invariant and state-specific effects. Secondly, λ_t denotes the error term, which is state-invariant and captures the time-varying effects. Finally, ε_{it} is an idiosyncratic error term which captures both time and varying state effects. h is an indicator variable, and β, ω and θ are the parameters to be estimated by the data.

The above specification allows measuring the marginal effect of the fiscal deficit on economic growth to vary around its thresholds values, which is represented by $\widehat{W_1}$. It divides the whole period into two regimes based on whether the threshold variable W_1 is smaller or larger than the threshold value $\widehat{W_1}$, which is endogenously determined by the data. The regimes are differentiated based on different regression slope parameters, such as $\theta_1$and θ_2. However, the necessary condition is that the threshold variable should not be time-invariant. The error term should be independent and identically distributed with zero mean and constant variance. The threshold value $\widehat{W_1}$ is estimated by using the least square method developed by Hansen.

Estimations of threshold fixed effect model

At first, we need to compute $S(W_1) = u(\widehat{W_1})'\hat{u}(W_1)$, which is the residual sum of squares(RSS) of the model in equation(2), estimated for the threshold level $\widehat{W_1}$. Then the optimal threshold value is determined in the following way:

$$\widehat{\widetilde{W}}_1 = \underset{\widetilde{W}_1}{\operatorname{argmin}}\ S(\widetilde{W}_1). \qquad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (2.1)$$

$\widetilde{W}_1$ is estimated from Eq. (2) For all possible values of fiscal deficit, which range from minimum % of GSDP to some higher % of GSDP on an annual basis-point interval. Once the optimal threshold level $\widetilde{W}_1$ is obtained, then the slope coefficient associated with $\widetilde{W}_1$ is estimated $\hat{\theta}=\hat{\theta}(\widetilde{W}_1)$ and the residual variance of the estimator is given by $\hat{\sigma} = \frac{1}{n(T-1)} SSE_1(\widetilde{W}_1)$, Where n represents the number of states and t denotes the sample periods.

Testing for a threshold effect

After obtaining the optimal threshold value, it is essential to test for the statistical significance of the threshold effect. Then the null and alternative hypotheses can be written as:

$$\begin{cases} H_0: \theta_0 = \theta_1 \\ H_0: \theta_0 \neq \theta_1 \end{cases}$$

The null hypothesis states that the coefficient of W_1 and $\widehat{W_1}$ are the same. In other words, $\theta_1 = \theta_2$, which means there is no threshold effect of fiscal deficit on economic growth. Whereas the alternative hypothesis assumes both the coefficients are different and there exists a threshold effect of the fiscal deficit while impacting economic growth.

Under the null hypothesis of no threshold, the following model is estimated by assuming $\theta = 0$

$$gy_{it} = \beta' X_{it} + \omega' W_{it} + \theta' h_{it}[W_1 - \widetilde{W}_1] + u_{it} \quad \ldots\ldots\ldots\ldots\ldots (2.2)$$

Here we use the bootstrap method to test if the value of $\widehat{W_1}$ shows a significant difference from zero. Asymptotic confidence intervals are simulated using the bootstrap, and the following likelihood ratio statistic is calculated,

$$LR_0 = \left\{S(\widetilde{W}_1^0) - S(\widehat{\widetilde{W}}_1)\right\}/\hat{\sigma}^2$$

Where $S(\widetilde{W}_1^0)$ denotes the RSS for the linear model without threshold effect and $\hat{\sigma}^2$ represents the estimated error variance of the model with the threshold $\widehat{\widetilde{W}}_1$. Hansen (1999) provides the critical value for this statistic. Likewise, another asymptotic confidence interval for $\widehat{\widetilde{W}}_1$ is also computed, and the following is the likelihood ratio statistic for the whole range of values of $\widetilde{W}_1$ given as follows:

$$LR_1 = \left\{S(\widetilde{W}_1) - S(\widehat{\widetilde{W}}_1)\right\}/\hat{\sigma}^2$$

LR_1 is equal to zero if $\widetilde{W}_1 = \widehat{\widetilde{W}}_1$ and it is a random variable Q with the distribution function as $P(Q \leq \widetilde{W}_1) = (1 - e^{-x/2})^2$. The distribution can be inverted into a given level of significance of 100

α% using the likelihood ratio statistic $c(\alpha) = -2\log(1-\sqrt{1-\alpha})$. The null hypothesis $\theta_0 = \theta_1$ is rejected if $LR_1(\widetilde{W}_1)$ exceeds C (α).

Using the likelihood ratio, we can estimate the asymptotic p-value. Based on Hansen's (1999) results, the distribution function has the inverse. Thus,

$$c(\alpha) = -2\log(1-\sqrt{1-\alpha})$$

From this, critical values are easily calculated. For a given asymptotic level α, the null hypothesis $\gamma = \gamma_0$ is rejected if $LR_1(\gamma)$ it exceeds $c(\alpha)$.

If there is more than one threshold in a model, then the model can be represented as follows:

$$gy_{it} = \alpha + \beta' X_{it} + \omega' W_{it} + \theta' h_{it}[W_1 - \widehat{W_1}] + u_{it} \quad \text{.....(2.3)}$$

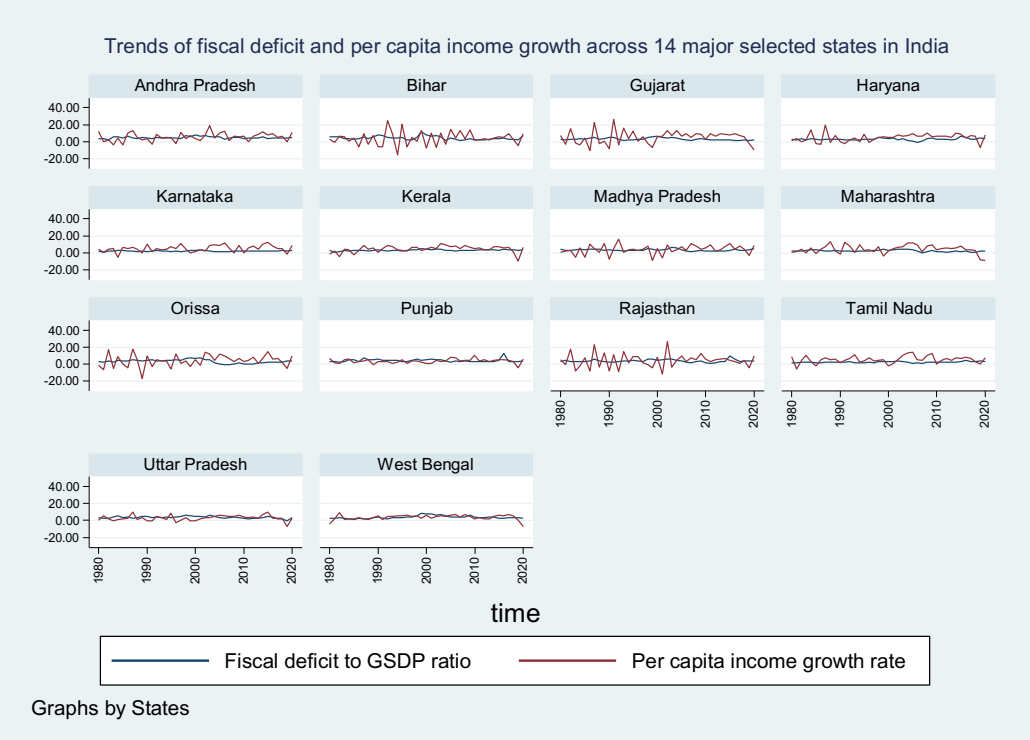
$$h_{it} = \begin{cases} 1 \text{ if } W_1 > \widetilde{W}_1 \\ 0 \text{ if } W_1 \leq \widetilde{W}_1 \end{cases} \text{ For Single Threshold Effect Model}$$

$$h_{it} = \begin{cases} 1 \text{ if } W_1 < \widetilde{W}_1 \\ 0 \text{ if } \widetilde{W}_1 \leq W_1 \leq \widetilde{W}_2 \end{cases} \text{ For the Double Threshold Effect Model}$$

and, so on

Appendix-B

Figure: 1A



Appendix Table-C

Table 1A: Panel unit-root test of the required variables

Variables Name		With individual intercept			With individual intercept & trend		
		LLC	IPS	F-ADF	LLC	IPS	F-ADF
Per Capita Income Growth rate	At Level	-7.07 ***	-10.168 ***	157.27 ***	-7.045**	-10.54 ***	151.18 ***
	At 1st Dif.	NA	NA	NA	NA	NA	NA
Per Capita Income	At Level	18.73	21.44	0.00013	8.076	14.469	0.0308
	At 1st Dif.	2.647 ***	1.014 ***	0.46 ***	-0.59 ***	-4.15 ***	76.38 ***
Gross Fiscal Deficit	At Level	-3.042**	-4.867* *	71.983**	-1.99***	-2.745***	47.53***
	At 1st Dif.	NA	NA	NA	NA	NA	NA
Tax Revenue	At Level	-0.359	-0.405	35.812	-2.581*	-1.587*	39.061*
	At 1st Dif.	-11.35**	-14.31**	228.86*	NA	NA	NA
Non-Tax Revenue	At Level	0.495	-1.358*	31.16	0.976	26.15	54.95*
	At 1st Dif.	-5.628**	NA	208.99**	-2.486**	169.813**	760.12**
Private Investment	At Level	2.82	4.228	8.852	-0.753	2.681	9.759
	At 1st Dif.	-10.63***	-12.84***	204.66* **	-8.795***	-11.239**	165.31***
GRE at Primary	At Level	-2.549*	-1.679*	41.052*	-0.765	-0.799	32.59
	At 1st Dif.	NA	NA	NA	7.87*	-12.935*	189.58*
GRE at Secondary Level	At Level	4.844	7.589	6.069	1.385	1.506	18.977
	At 1st Dif.	-10.17***	-12.96***	203.74***	-8.594*	-11.95*	183*94
Inflation	At Level	-0.672	-1.181	28.32	4.454	-0.142	22.54
	At 1st Dif.	-4.63*	-10.96*	169.07*	-2.453**	-8.497**	122.214**

Table 2A: ARDL-based estimates of per capita income model

Independent Variables	ARDL1 (3,2,2,2,2,2,2,2)	ARDL 2 (1,2,2,2,2,2,2,2,2,2)
Gross Fiscal Deficit	-4.869*** (1.9100)	-2.949*** (0.9430)
Tax Revenue	-2.005* (1.2203)	-9.0736*** (0.7981)
Non-tax Revenue	-8.3574*** (2.1745)	-3.0385*** (0.6960)
Inflation	-0.927*** (0.206)	-2.7924*** (0.8269)
Primary Education	1.689*** (0.2431)	0.5812*** (0.0931)
Secondary Education	1.961*** (0.2432)	0.7010*** (0.0980)
Private Investment	0.4205** (0.2280)	0.4517*** (0.0207)
D1_FRL*GFD		5.705*** (1.1557)
D2_EPR*GFD		0.9446 (0.5999)
ECM	-0.095*** (2.786)	-0.17*** (6.784)

Note: ***, ** and * denote significance at 1 per cent, 5 per cent and 10 per cent levels of significance, respectively; the robust standard error is given in the parenthesis bracket.

Notes

1. Compensatory finance refers to the fiscal policy measure to adjust the excess government spending over the revenue through borrowing to maintain full economic employment without inflation. In the time of the great depression, Keynes prescribed this measure as a way out of the great depression.

2. Budgetary or uncovered deficit is defined as the gap between the total expenditure and total receipts of the government (Blinder and Solow 1974)

3. Structural Adjustment Lending (SAL) is an economic reform programme undertaken by the World Bank to provide loans to a nation's central and state governments to enhance their long-term economic growth through financing projects.

4. Fiscal discipline refers to a state of an ideal balance between revenues and expenditures of the government in an economy

5. Fiscal consolidation is a fiscal policy measure which aims to reduce government imbalances in revenue and receipts and debt accumulation.

6. The sub-national governments in India have embraced the rule-based fiscal policy with the passing of "The fiscal Responsibility and Budget Management (FRBM) act", which puts the precondition to limit the size of total liabilities and debt service liabilities. Among the Indian states, Karnataka first enacted the FRBM act in 2002, accompanied by Kerala, Tamil Nadu in 2003 and Punjab in 2004. In the subsequent years, all the other states have enacted the FRBM act to realize the incentives provided with the recommended of 12th FC. Further schemes like Debt swaps and Debt Consolidation and Relief Facilities by the national government have given incentives to the sub-national governments to maintain such fiscal commitments of FRBM.

7. The Finance Commission is a statutory, constitutional body appointed by the President of India quinquennially for the distribution of the net proceeds of taxes of the Union government between the Union and the states and establishing principles that should govern the grants in aid of the revenues of the states out of the Consolidated Fund of India. Apart from the Finance Commission, resources to the states are transferred through the Planning Commission and various ministries of the Union government. Finance Commission–recommended transfer continues to be the primary channel of resource transfer to the states.

8. FRBM Review Committee, under the chairmanship of N.K Singh, submitted its report in April 2017. It had proposed to replace the FRBM Act (2003) with a Debt Management and Fiscal Responsibility Bill (2017). It has also recently submitted another report in Jan 2020, in which it has set the target for the debt-to-GDP ratio to be at 38.7% for the central government, and 20% for the state governments together by the FY 2022 – 23. The fiscal deficit for each should be restricted to 2.5% of GDP by FY 2022 – 23.

9. Threshold effect refers to a critical value of the interest variables (independent variable), after which the effect on the dependent variable changes significantly (magnitude or sign).

10. Crowded out refers to the reaction of private investment to government investment, where the government investment, financed by borrowing, reduces the loanable funds available for private investment, driving up interest rates and reducing the level of private investment.

11. Crowding-in effect refers to the effects of government investment on private investment through which government spending enhances the productivity of private capital through the accumulation of public capital.

12. Our estimating model is majorly based on equation(vi), and we have taken the dependent variable in terms of the growth rate of per capita incomes which endogenizes the population in the model, but the independent variables are expressed as ratios to GDP instead of standardizing those

with respect to population or labour supplies. This is how our model relates to income growth with fiscal deficits and other basic variables incorporated in other standard growth models.