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Understanding the evolution of fiscal performance of Indian states

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Abstract

This study investigates the fiscal performance of 21 Indian states for the period 1980–81 to 2017–18. To do so, this study first applies a widely used multidimensional composite index. Second, this study implements data envelopment analysis (DEA) to assess the fiscal performance. The findings reveal that among Indian states, Odisha achieves the first rank and is found to be the best fiscal performing state in recent years. On the contrary, our results indicate that Punjab is the least performing state during 2015–16 to 2017–18. From the policy perspective, least performing states should get more attention from the central government and can adopt the policies of other best performing states, which may improve their fiscal performance.

1 | INTRODUCTION

This study aims to examine the fiscal performance of the Indian states by considering several fiscal indicators as there is a growing interest of researchers and policymakers. In recent years, research on states' fiscal performance is gaining more attention than the central government finance due to the fact that maintaining the states' fiscal performance is essential for the overall nation's fiscal performance (Mohanty & Mishra, 2016). The fiscal performance (or fiscal health) of the states is dynamic and changed over the periods in response to change in fiscal rules. Fiscal rules are considered to be the rider of fiscal performance (Kopits & Symansky, 1998). It is believed that a large and persistent fiscal deficit might occur when the subnational government are largely dependent on the central transfers (Rodden, 2002). Another reason for addressing the fiscal performance at subnational is essential from overall India's fiscal policy point of view. A country needs to be strong in its fiscal performance at the subnational level by implementing sound budgeting that consists of fiscal deficit, quality expenditures, revenue efficiency, and debt sustainability (Dabla-Norris et al., 2010). It has been further argued by Rodden (2002) that the long-term budget balance or sound fiscal performance of subnational

governments can be attained when the Centre put the restriction on the borrowing of subnational governments as they have the wide-ranging power taxing and borrowing autonomy. Also, addressing the fiscal performance of an individual state level has become a vital area due to regional disparities in terms of revenue collection, expenditure, debt, and deficit in India. Further, Reddy and Reddy (2019) argued that states vary in terms of revenue collection, expenditures, debt, and deficit level due to their tax-raising capacity, demographic and geographical characteristics. In other words, it is called "horizontal imbalance" (or inter-state disparities). The central government generally solves these issues by providing relatively more transfers to the lower per capita income states. However, transfers do not entirely correct poor states disabilities (Reddy & Reddy, 2019) as richer states spend a more substantial part of their income as compared to poor states. Thus, states compete with each other to get more transfers from the Centre. In terms of per capita revenue and expenditure, it is also noticed that the state's per capita revenue variation is similar to per capita gross state domestic product variations. This arises from a different revenue generation capacity of states (Rao, 2017).

Further, for better visualization, we plot the key fiscal indicators such as fiscal deficit, debt, total expenditure and total revenue, as a percentage of Gross State Domestic Product (hereafter, GSDP) at the decadal level (1980s, 1990s, 2000s, and 2010s). The fiscal indicators are presented in Figures 1–4, respectively. From Figure 1, we see that Gujarat, Haryana, Karnataka, Meghalaya, and Tamil Nadu had relatively low fiscal deficits as a percentage of GSDP (FD/GSDP) during the 1980s (i.e., 1980–81 to 1989–90). During the 2010s (i.e., 2010–11 to 2017–18), the smallest fiscal deficit is recorded for Goa, Gujarat, Karnataka, and Odisha. Figure 2 displayed that Gujarat, Karnataka, Kerala, and Tamil Nadu had relatively low debt during the 1980s, whereas, during the 2010s, Karnataka, Maharashtra, Odisha, and Tamil Nadu have experienced low debt. However, in recent years (2015–2018), an increase in debt level has been noted due to the implementation of Pay Commission[1] recommendations,

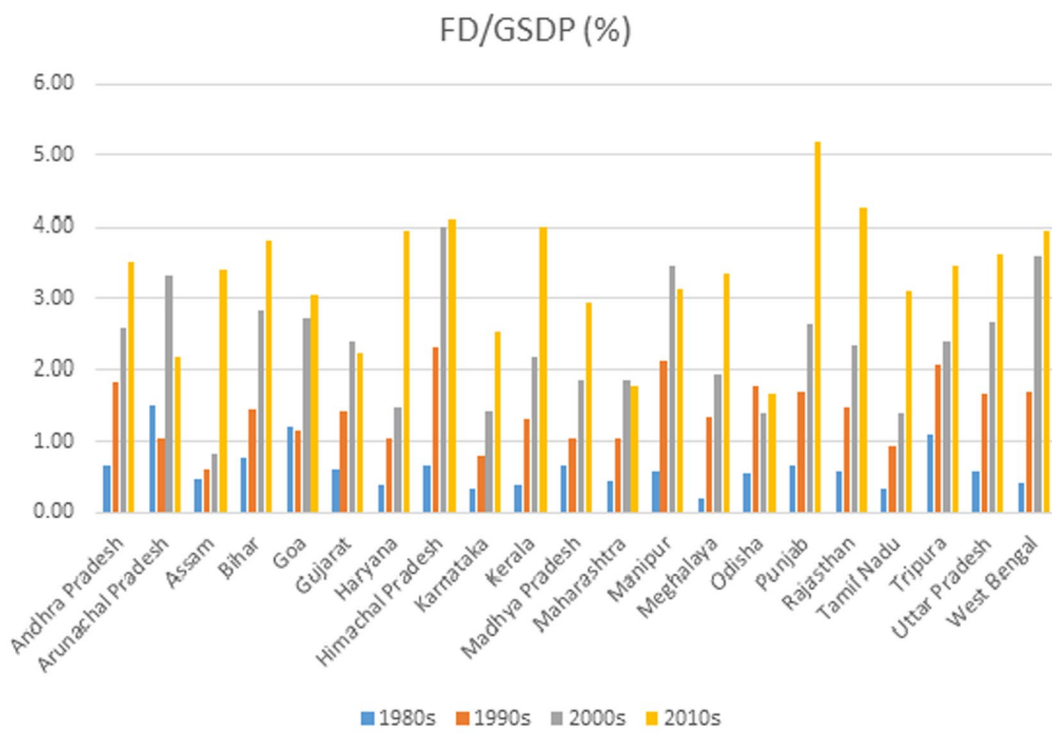

FIGURE 1 Average fiscal deficit (FD) as % to GSDP

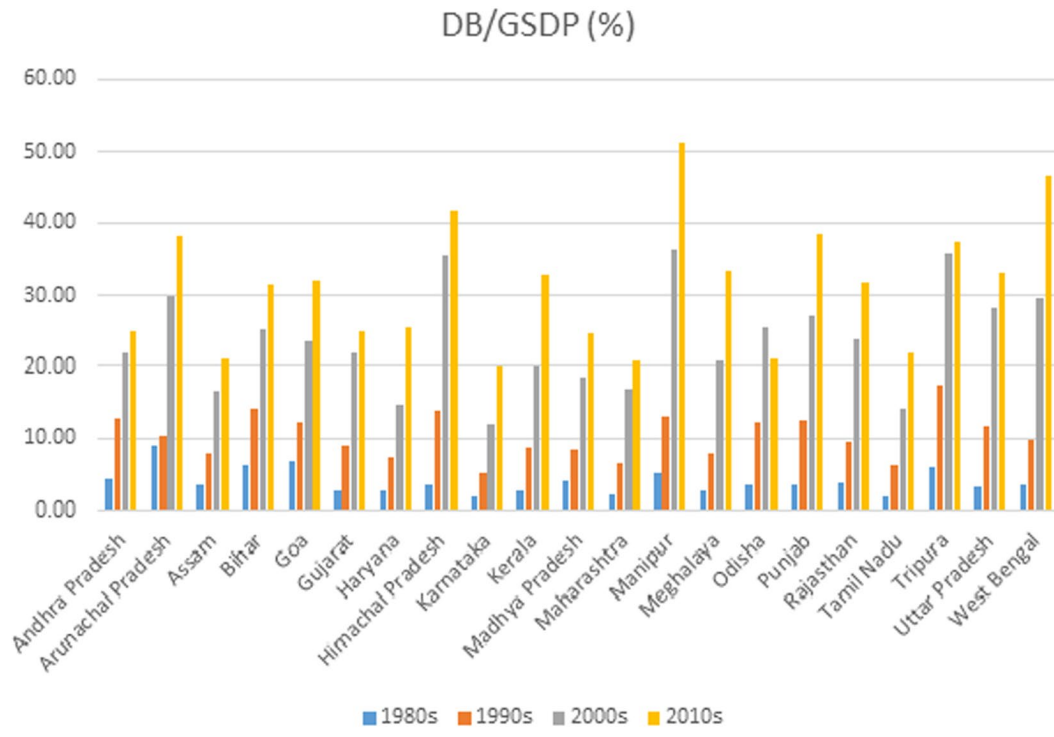

FIGURE 2 Average debt (DB) as % to GSDP

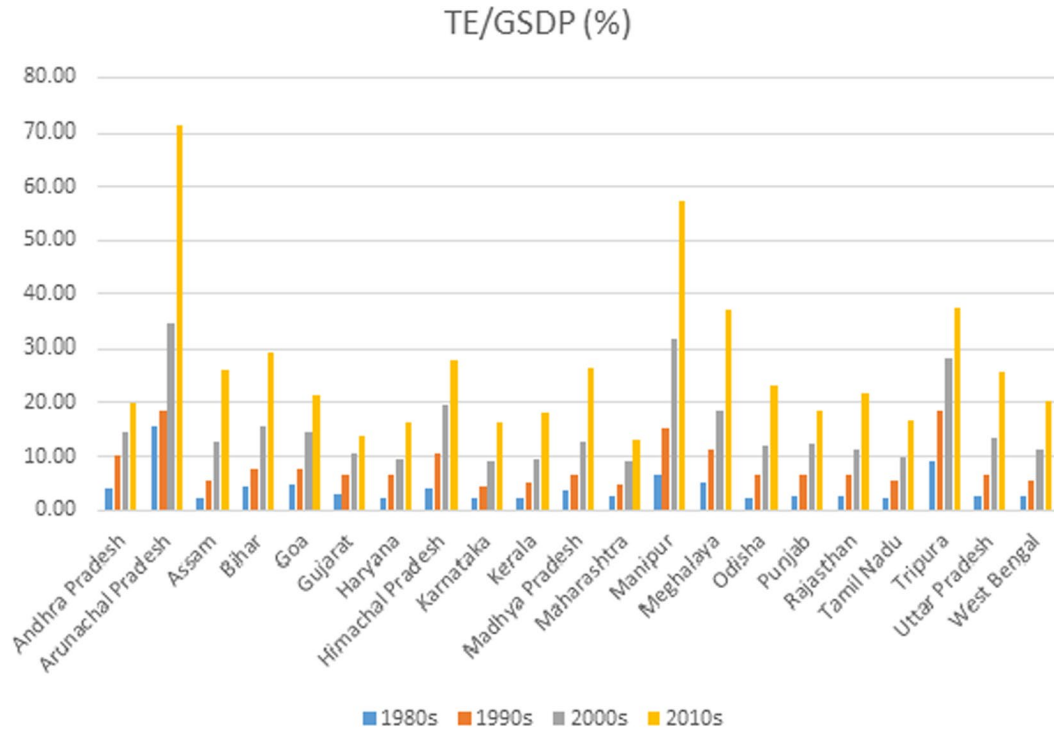

FIGURE 3 Average expenditure (TE) as % to GSDP

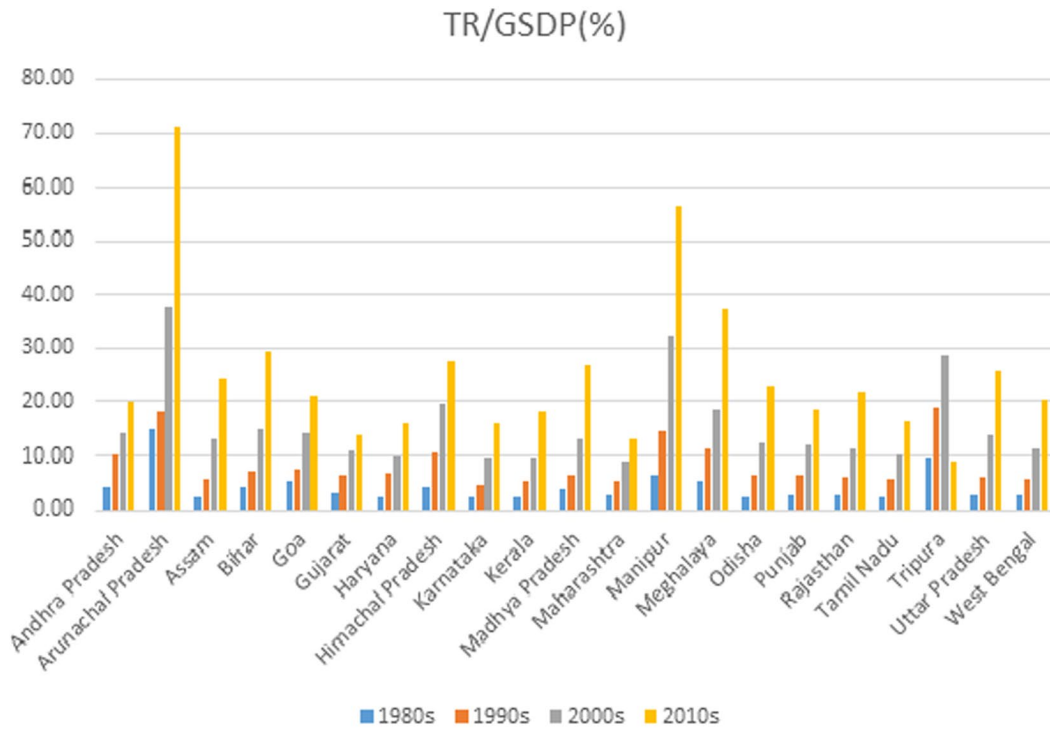

FIGURE 4 Average total revenue (TR) as % to GSDP

slowing growth, and rising payments from the Ujwal Discom Assurance Yojana (UDAY)[2] bonds as states are allowed to increase their debt by 75% under this scheme. In addition, the ongoing coronavirus disease of 2019 (COVID-19) pandemic is going to certainly worsen the fiscal performance of the Indian states in the coming years.

Next, we visualize the total expenditure and revenue as a percentage of GSDP in Figures 3 and 4, respectively. From Figure 3, it has been noticed that Arunachal Pradesh, Bihar, Himachal Pradesh, Madhya Pradesh, Manipur, Odisha, Rajasthan, Tripura and Uttar Pradesh have the relatively higher expenditure ratio. Consequently, we have seen from Figure 4 that special category states have larger revenue as a percentage to GSDP (TR/GSDP) because they receive the more central transfer and grants-in-aid as compared to non-special category states. These transfers are added to the states' revenue as it can be seen that states like Arunachal Pradesh, Himachal Pradesh, Manipur, and Tripura have relatively higher revenue (Figure 4).

The real position of the states can be judged by their own revenue. As per the state finance report published by the Reserve Bank of India, Arunachal Pradesh, Himachal Pradesh, Manipur, and Tripura receive more transfers, but their own revenue is very low. In terms of own revenue, Andhra Pradesh, Gujarat, Goa, Chhattisgarh, Karnataka, Madhya Pradesh, Odisha, Tamil Nadu, and Uttar Pradesh are on the higher side as compared to Arunachal Pradesh, Himachal Pradesh, Manipur, and Tripura. Consequently, expenditure, debt, and fiscal deficit are also increasing over the years at a higher rate (State Finance Report, 2018–19). Overall, it has been noted that wide-ranging of disparities across the states in fiscal indicators which motivate us to study the fiscal performance of each of the states by considering all the fiscal indicator.

With this backdrop, the present study makes five vital contributions to the existing literature (Das & Baig, 2014; Das, 2015; Dholakia, 2005). First, although, Dholakia (2005), Das and Baig (2014),

and Das (2015) have examined the fiscal performance of the states, they have ignored the evolution of fiscal performance from 1980 onwards. It is vital to consider the data period from the 1980s onward as it is considered one of the reference periods for the economic growth of the country (DeLong, 2003; Panagariya, 2004). Moreover, it is argued by the economic historian DeLong (2003) that the economic growth in India began to increase in the early or mid-1980s, long before the economic reform of 1991. It is also said by Rodrik (2002) that a change in official attitudes towards encouraging entrepreneurial activities and integration with the world noted during the 1980s had a bigger impact on the performance of the economy than specific policy reforms. Wallack (2003) further found that the shift in the growth rate of GDP took place between 1980 to 1994. Easterly and Schmidt-Hebbel (1993) also state the urgency of fiscal adjustment during the 1980s. Thus, it is vital to measure the fiscal performance index by taking ten indicators over a longer period from 1980–81 to 2017–18.

Second, Dholakia (2005)'s multidimensional composite index has considered only four major sub-indices namely deficit index (DFI), debt index (DBTI), revenue efficiency index (RVEI), and expenditure quality index (EXQI) and eight minor sub-indices. In addition to Dholakia (2005), in our study, we include one newer sub-index namely Debt Sustainability Index (DSUI). It is crucial to include the DSUI in the composite index because it provides information on whether state governments need to borrow to fulfil their interest payments obligation. In other words, this index provides debt trap information which is a very essential dimension of the states.

Third, this study contributes to existing studies by focusing on the special category (SC)[3] states and non-special category (NSC) states. The reason for measuring the fiscal performance between these two category states is that because there is a huge difference in terms of per capita income, the share of government expenditure, and Central transfers. The SC states get higher central transfers in comparison to NSC states. Moreover, Reddy and Reddy (2019) state that NSC states are relatively lower in expenditure whereas SC states spend more and their revenue creation capacity is low. There are two reasons for their low economic activity include remoteness and attachment to the international border (Akram & Rath, 2020a, 2020b). Thus, splitting the sample into NSC and SC will provide more insights to each category. The findings based on two categories might also help to understand about utilizing their funding in terms of fiscal management.

Fourth, this study contributes to the existing studies by emphasizing the fiscal performance for each state for pre-and post-implementation of the Fiscal Responsibility and Budget Management (FRBM) Act. As per this act, states are adhered to maintain the fiscal deficit by 3% for fiscal stability and more equitable distribution of debt over the years. It is well stated in the literature that fiscal deficit and debt are the key fiscal indicators which help in maintaining fiscal stability by improving the fiscal health of the state. Thus, examination of fiscal performance after implementation of the FRBM Act is essential to judge whether this Act is effective in managing the fiscal discipline of a state or not. Furthermore, to capture the impact of the schemes such as Fiscal Responsibility Legislations (FRL), Debt Swap Scheme, the introduction of Value Added Tax (VAT), global financial crises, etc., we divide the entire period into decades that covers the multiple phases of fiscal stress, fiscal consolidation and post-global fiscal stress for more insights.

Fifth, this study measures the performance of the states by applying data envelopment analysis (DEA), which is innovative because it assigns the different weights to each of the fiscal indicator (deficit index, debt index, revenue efficiency index, and expenditure quality index, and debt sustainability index) unlike fiscal performance index FPI (Cherchye, 2001; Cherchye et al., 2004, 2007, 2007, 2008; Sahoo & Acharya, 2012). In other words, we assess whether inputs (deficit index, debt index, revenue efficiency index, and expenditure quality index) maximize the output (GSDP).

To attain the above objectives, the present study uses two following methods to measure the fiscal performance for the period 1980–81 to 2017–18: (a) Composite index and (b) Data envelopment

analysis. We include a total of ten fiscal indicators in the analysis for 21 Indian states. Our results show the unevenness of fiscal performance across the states. In particular, we notice that Odisha has achieved the first rank and is found to be the best performing state in comparison to other states during 2015–16 to 2017–18. A lot of improvement has been noted in the fiscal indicators of Odisha over the years. On the contrary, our results indicate that Punjab is the least performing state in fiscal position during 2015–16 to 2017–18 and it had occupied the third position during 1980–81 to 1984–85. A deterioration is observed in fiscal indicators of Punjab state over the periods.

The rest of the paper is structured as follows. Section 2 discuss the review of the literature. Section 3 presents the methodology and data sources. Section 4 illustrates the results and discussions. The final section concludes.

2 | REVIEW OF LITERATURE

This section summarizes the relevant literature on fiscal performance at the international and national level. At the global level, there are very few studies that address the fiscal performance indirectly (see, for instance; Von Hagen, 1992; Von Hagen & Harden, 1994; Easterly & Schmidt-Hebbel, 1993; Alesina et al., 1999; Fabrizio & Mody, 2006; Mulas-Granados et al., 2009; Dabla-Norris et al., 2010; among others). The study by Von Hagen (1992) and Von Hagen and Harden, 1996 investigated the fiscal discipline based on the budgetary process analysis in the case of European Union countries. They found that a strong budgetary process enhances fiscal performance. Easterly and Schmidt-Hebbel (1993) examined the fiscal adjustment in developing countries and macroeconomic performance by focusing on fiscal indicators. They found that fiscal policy is closely related to the macroeconomic performance of developing countries. Alesina et al. (1999) measure the quality of the budget for the first time in the case of Latin American and Caribbean countries. Some recent studies also re-examined this issue by taking different countries sample. For instance, Hallerberg and Wolff (2008) for European countries; Perotti and Kontopolous (2002) for OECD countries; Fabrizio and Mody (2006); Mulas-Granados et al. (2009) for Central and Eastern Europe; Filc and Scartascini (2005) for Latin America, and Prakash and Cabezón (2008) for Sub-Saharan heavily indebted countries; Dabla-Norris et al. (2010) for low-income countries. All these studies found that budgetary institutions have a significant impact on fiscal performance.

While observing the research on fiscal performance in the case of India/Indian states, we also noted few studies. For instance, Kurian (1999) and Rao (2000) noted a weak states' finance after 1990–91 because of the low tendency of central transfers and weak expenditure management by state governments. Das (2015) noticed that states like Kerala, Punjab and West Bengal are fiscally unsound during the late 1990s to early 2000s. The reason could be an increase in revenue deficit that has pulled the fiscal deficit as a result an increase in debt stock is noticed. Anand et al. (2002) further argued that weak states' finance deteriorates the overall Indian public finance and affects overall fiscal sustainability. Therefore, a sound fiscal performance would help the states achieving high growth with macroeconomic stability (Akram & Rath, 2020a, 2020b). Further, the 10th Finance Commission (FC) has measured fiscal performance using Tax Effort Index (TEI), and the weight has been considered as the inverse of income, which implies that if two states have the same tax effort, the poor state would get a relatively higher share of transfers from the Centre. However, the 11th and 12th FC have also used the Tax Effort Index with a weight change. The 11th FC designs the "Fiscal Self-Reliance and Improvement Index (FSRII)" to measure the fiscal discipline with an assignment of 7.5% weights. It is estimated by taking the improvement ratio of own revenue receipt to total revenue expenditure of an individual state relative to the average ratio across all the states. The 13th FC is continued with the "Fiscal Discipline Index" but

removed the Tax Effort Index. Bhide and Panda (2002) have used a composite index to assess the performance of India by constructing the quality-budget index for the period 1980–81 to 2002–03. They have concluded that the behavior of the budget changes by years. Dholakia (2005) has criticized the approach followed by the different Finance Commissions, because of the single indicator that measures the criterion of tax devolution based on fiscal discipline. Further, Dholakia (2005) has developed a new composite index that has eight sub-indicators to measure the fiscal performance of states. Dholakia's (2005) study found a significant variation among the states in terms of fiscal performance. Similarly, Das and Baig (2014) have also measured the fiscal performance of states by considering four indicators. A recent study by Mohanty and Mishra (2016) also estimated the fiscal performance of Indian states and found a vast variation across the states in their fiscal performance.

Although these studies (Dholakia & Solanki, 2001; Venkatraman, 2003; and Dholakia, 2005) measure the fiscal performance of Indian states, however, these studies have some limitations with regard to the measurement of fiscal performance index.[4] For instance, Dholakia and Solanki (2001) proposed the composite index was based on six different fiscal indicators whereas Bhide and Panda (2002)'s index had only five fiscal indicators. Moreover, Venkatraman (2003) study only ranks the states based on fiscal achievements. He did not construct the composite index. Dholakia (2005) only considered four major and eight minor sub-indices. In recent years, another vital index that is debt sustainability index is getting more attention because of its usefulness in accounting for the debt dimension of the states (Mohanty & Mishra, 2016). Also, the above majority of studies only considered the few states (NSC) and they have ignored the SC states' fiscal performance where SC states are largely depending upon the central transfers and grants-in-aid. Hence, examining and including the larger set of states will provide more insights for the policymakers. Another limitation of the above studies is the time period they have selected. Thus, the present study fills these research gap by examining the fiscal performance at the state level in India for the period 1980–81 to 2017–18 because the Indian federal system can be seen as a game played between Centre and state governments in politics, economics, and public finance (Reddy & Reddy, 2019). In other words, the Indian federation plays an active role in policy formation through the democratization and decentralization function of governments. This provides the sound economic and social services that have been mounting gradually over the years due to more emphasis on state-level finance (Das, 2015).

3 | METHODOLOGY

3.1 | Fiscal performance index based on the composite index

The fiscal performance index (FPI) is based on the composite index developed by Dholakia and Solanki (2001). The composite index is not new in the economic literature. However, it is very famous because of its unique feature such as it gives a clearer picture of more than one dimension of a given scenario (Bhide & Panda, 2002). One could see the multiple dimension while analyzing government budget that has a varying degree of importance over time. In such cases, the composite index provides comprehensive results. The composite index is widely accepted than single criteria in economic literature to assess the performance of the economy (see, for instance, Bhide & Panda, 2002; Dholakia, 2005; Dholakia & Solanki, 2001; Mohanty & Mishra, 2016).

Following Dholakia (2005), we construct FPI based on the multidimensional composite index considering five major sub-indices namely Deficit Index (DFI), Debt Index (DBTI), Revenue Efficiency Index (RVEI), and Expenditure Quality Index (EXQI). In addition to Dholakia (2005) study, we include one new index namely Debt Sustainability Index (DSUI). DSUI is vital to include in the

composite index because it provides the information of whether state governments need not have to borrow to fulfil their interest payments obligation that protects the states going into the debt trap (Mohanty & Mishra, 2016). These indices are calculated by using the relative distance method. Before constructing the above five major sub-indices, two points must be noted: (a) we normalized the variables before converting indices because the simple average (arithmetic mean) is not possible because considered variables are in the ratio form where different numerators are divided by the different denominators; (b) we take the success scores to normalize the scale by considering maximum and minimum values of selected variables so that all the variables can be converted into indices on 0 and 1 scale. Once all the variables are converted to the sub-major indices with 0 and 1 scale, we take the simple mean of all the five indices to construct the composite index (see, for instance, Bhide & Panda, 2002; Dholakia, 2005; Morris & McAlpin, 1982). Where 0 means utter worst performance and 1 refers to utter best performance. An increase in the value of FPI certainly represents an improvement the fiscal performance. A detailed structure of the indices is provided in Table 1.

3.2 | Relative distance method

To construct the above indices, this study uses the relative distance method. This methodology is developed by the United Nations Development Programme (UNDP) to build the human development index (HDI) to rank the country. The relative distance method is also used by the Reserve Bank of India (2016) to construct the liquidity index. The novelty of this method is that it normalized the series at 0 and 1 scale (Dholakia, 2005; Mohanty & Mishra, 2016). The following formulas can be used to calculate the sub-indices to construct the composite index.

$$RVDI_k = \frac{RVD_{max} - RVD_k}{RVD_{max} - RVD_{min}}; \quad RVD_{max}\left\{RVD_k\right\}\forall_k, \quad RVD_{min}\left\{RVD_k\right\}\forall_k, \tag{1}$$

$$FSDI_k = \frac{FSD_{max} - FSD_k}{FSD_{max} - FSD_{min}}; \quad FSD_{max}\left\{FSD_k\right\}\forall_k, \; FSD_{min}\left\{FSD_k\right\}\forall_k, \tag{2}$$

$$DBI_k = \frac{DB_{max} - DB_k}{DB_{max} - DB_{min}}; \quad DB_{max}\left\{DB_k\right\}\forall_k, \; DB_{min}\left\{DB_k\right\}\forall_k, \tag{3}$$

$$IPI_k = \frac{IP_{max} - IP_k}{IP_{max} - IP_{min}}; \quad IP_{max}\left\{IP_k\right\}\forall_k, \; IP_{min}\left\{IP_k\right\}\forall_k, \tag{4}$$

$$SOTI_k = \frac{SOT_k - SOT_{min}}{SOT_{max} - SOT_{min}}; \quad SOT_{max}\left\{SOT_k\right\}\forall_k, \; SOT_{min}\left\{SOT_k\right\}\forall_k, \tag{5}$$

$$SONTI_k = \frac{SONT_k - SONT_{min}}{SONT_{max} - SONT_{min}}; SONT_{max}\left\{SONT_k\right\}\forall_k, \; SONT_{min}\left\{SONT_k\right\}\forall_k, \tag{6}$$

$$REI_k = \frac{RE_k - RE_{min}}{RE_{max} - RE_{min}}; \quad RE_{max}\left\{RE_k\right\}\forall_k, \; RE_{min}\left\{RE_k\right\}\forall_k, \tag{7}$$

$$CEI_k = \frac{CE_k - CE_{min}}{CE_{max} - CE_{min}}; \quad CE_{max}\left\{CE_k\right\}\forall_k, \; CE_{min}\left\{CE_k\right\}\forall_k, \tag{8}$$

TABLE 1 Structure of fiscal performance index

Composite index	Major and minor indices
FPI	1. DFI: It comprises two following minor indices: a. RVDI: Revenue deficit as a proportion of gross state domestic product (GSDP). Revenue deficit is defined as the difference between revenue expenditures and revenue receipts b. FSDI: Gross fiscal deficit (GFD) as a proportion of gross state domestic product (GSDP) 2. DBTI: It consists of two following minor indices: (i) DBI: The ratio of debt stock to GSDP. This index shows the debt burden of the state (ii) IPI: The ratio of interest payments to revenue receipts. It represents the debt servicing position of the state 3. RVEI: It contains two following minor indices: (i) SOTI: This index is computed by taking the ratio of state own tax revenue to gross state domestic product for a year (ii) SONTI: This index is calculated using the ratio of state own non-tax revenue to gross state domestic product for a year. Both indicators jointly represent the tax collection capacity of the states 4. EXQI: It contains two following minor indices: (i) DREI: This index is constructed by considering the ratio of development revenue expenditure to revenue receipts (ii) DCEI: It is formulated by taking the ratio of development capital expenditures to revenue receipts 5. DSUI: It comprises two following minor indices: (i) DSI: This index is a difference between the growth rate of GSDP and the growth rate of debt stock (ii) RSI: It is the difference between the growth rate of GSDP and the average cost of borrowing. Where the cost of borrowing is equal to "interest payments(t)/average [debt stock (t), debt stock (t-1)]". The cost of borrowing data is not readily available. Thus, to compute the average cost of borrowing, this study follows the following formula: $ACB_t = \frac{IP_t}{Avg.(DBS_t, DBS_{t-1})}$ .Where ACB_tstands for the average cost of borrowing at time t. IPdenotes the interest payments. $DBS$and $DBS_{t-1}$is the debt stock at time t and $t-1$. The higher score of DSUI indicates improvement. In other words, state governments need not have to borrow to fulfil their interest payments obligation that protects the states going into the debt trap

Note: FPI is constructed by taking the simple average of all the five indices.

Abbreviations: DBTI, Debt Index; DCEI, Development Capital Expenditure Index; DFI, Deficit Index; DREI, Development Revenue Expenditure Index; DSI, Debt Spread Index; DSUI, Debt Sustainability Index; EXQI, Expenditure Quality Index; FPI, Fiscal Performance Index; FSDI: Fiscal Deficit Index; GSDP, Gross State Domestic Product; IPI, Interest Payment; RSI, Rate Spread Index; RVDI, Revenue Deficit Index; RVEI, Revenue Efficiency Index; SONTI, State Own Non-Tax Revenue Index; SOTI, State Own Tax-Revenue Index

$$DSI_k = \frac{DS_k - DS_{min}}{DS_{max} - DS_{min}}; \quad DS_{max}\{DS_k\}\forall_k,\ DS_{min}\{DS_k\}\forall_k, \tag{9}$$

$$RSI_k = \frac{RSU_k - RSU_{min}}{RSU_{max} - RSU_{min}}; \quad RS_{max}\{RS_k\}\forall_k,\ RS_{min}\{RS_k\}\forall_k, \tag{10}$$

where k stands for states ($k = 1, \ldots, 21$). The values of the above indices lie between 0 to 1 scale, where 0 depicts the least performance, and 1 implies the best-performing state. This study constructs five

indices such as DFI, DBTI, RVEI, EXQI, and DSUI using Equations (1)–(10). This method assumes equal weight for all the indicators. The composite index is constructed by taking an average of these five indices.

3.3 | Data envelopment analysis (DEA)

The earlier section emphasizes on the construction of the FPI using the simple average of all the five major indices by assuming equal weight to each index (see, for instance, Dholakia & Solanki, 2001). However, not all the fiscal and macro indicators across the states need to be the same. Many existing studies provide evidence in favor of heterogeneity across the Indian states in terms of fiscal and macro variables (see, for instance, Sahoo & Acharya, 2012; Mohanty & Mishra, 2016; Akram & Rath, 2020a, 2020b; among others). In other words, considering all the fiscal indicators at a time may not provide consistent results. Thus, to void such biases, we further, implement an alternative DEA method to capture the fiscal performance of Indian states. This method is widely used in the existing literature to account for the macroeconomic performance at Indian states (Chaudhuri, 2004; Krishna, 2004; Sahoo & Acharya, 2012) and global level (Cherchye, 2001; Cherchye, Lovell, et al., 2007; Cherchye et al., 2004, 2008; Lovell, 1995; Lovell et al., 1995). It is believed that the DEA approach provides more comprehensive results by not considering the equal weight (Cherchye, Lovell, et al., 2007; Cherchye et al., 2004, 2008; Cherchye, Moesen, et al., 2007). The DEA is a non-parametric method and has several advantages, such as it does not need to either specify any production functional form or weights on various inputs and outputs. In this study, we use output-oriented DEA to attain our objective. The reason for selecting the output-oriented DEA is because, we aim to maximize the output with given inputs that are on the same scale (Banker et al., 1984; Murillo-Zamorano, 2004). Hence, in our case, the output-oriented DEA is more suitable than the inputs-oriented DEA. However, in the literature, it is mentioned that value is a bit higher-side in the case of output-oriented DEA than input-oriented DEA but there is not much difference in efficiency scores (Rajasekar & Deo, 2014). To do so, this study uses the DEA approach to find the fiscal performance of the states using four major indicators with gross state domestic product (GSDP). The GSDP series is also normalized on a 0 to 1 scale using an improvement index formula as follows:

$$GSDPI_k = \frac{GSDP_k - GSDP_{min}}{GSDP_{max} - GSDP_{min}};\ GSDP_{max}\left\{GSDP_k\right\}\forall_k, \quad GSDP_{min}\left\{GSDP_k\right\}\forall_k \tag{11}$$

where *GSDPI* indicates the gross state domestic product index. After normalizing the GSDP series, this study uses the DEA approach to find out the efficiency of the states by considering *GSDPI* as output and *DFI*, *DBTI*, *RVEI*, *EXQI*, and *DSUI* as inputs. The Malmquist (output-oriented) between period t and s (the base period) and period t can be written as:

$$m_0^t\left(q_s, x_s, q_t, x_t\right) = \frac{d_0^t(q_t, x_t)}{d_0^t(q_s, x_s)} \tag{12}$$

It may be noted that the notation $(q,\ x)$ in Equation (12) represents the input and output, respectively. Likewise, the notation $d_0^s(q_t, x_t)$ represents the distance from the period t observation to the period s. A value of m_0 greater than one indicates positive from period s to period t, while a value less

than 1 indicates a decline in the fiscal performance of the states. The Malmquist index is typically defined as the geometric mean of these two indices.

$$\left(q_s, x_s, q_t, x_t\right) = \left[\frac{d_0^s(q_t, x_t)}{d_0^s(q_s, x_s)} \times \frac{d_0^t(q_t, x_t)}{d_0^t(q_s, x_s)}\right]^{1/2} \tag{13}$$

3.4 | Data source

The data for gross revenue deficit, gross fiscal deficit, total debt, state own tax revenue, state own non-tax revenue, development revenue expenditure, development capital expenditure, interest payments and gross state domestic product (GSDP) are collected from Economic and Political Weekly Research Foundation India Time Series.[5] The unit of the series is in 100 thousand. This study covers the period from 1980–81 to 2017–18. The entire GSDP series (from 1980–81 to 2017–18) has been taken by considering 2011–12 as the base year. This study confines its analysis to only 21 states of India due to data availability from 1980–81 to 2017–18. A previous study like Dholakia (2005) has collected fiscal indicators from the state's finance reports published by the Reserve Bank of India. Sometimes there is an inconsistency in providing the data for all the indicators in freely available state's finance reports. This could lead to restricting the research for a longer time period and indicators. Thus, we use the Economic and Political Weekly Research Foundation India Time Series database to get authentic and systematic data on states' fiscal indicators. A detailed description of the data is provided in Table 2.

TABLE 2 Data description

Variables	Unit	Source	Sample period: 1980–81 to 2017–18
Gross state domestic product (2011–12)	100 thousand	EPWRFITS	Fiscal performance index (FPI) is calculated based on the following periods: P1: 1980–81 to 1984–85. P2: 1985–86 to 1989–90. P3: 1990–91 to 1994–95. P4: 1995–96 to 1999–00. P5: 2000–01 to 2004–05. P6: 2005–06 to 2009–10. P7: 20010–11 to 2014–15. P8: 2015–16 to 2017–18
Gross revenue deficit	100 thousand	EPWRFITS	
Gross fiscal deficit	100 thousand	EPWRFITS	
Total debt	100 thousand	EPWRFITS	
State own tax revenue	100 thousand	EPWRFITS	
State own non-tax revenue	100 thousand	EPWRFITS	
Development revenue expenditure	100 thousand	EPWRFITS	
Development capital expenditure	100 thousand	EPWRFITS	
List of the Indian states			
Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Goa, Gujarat, Haryana, Himachal Pradesh, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Odisha, Punjab, Rajasthan, Tamil Nadu, Tripura, Uttar Pradesh, and West Bengal. Whereas states like Andhra Pradesh, Bihar, Madhya Pradesh, and Uttar Pradesh are tied with Telangana, Jharkhand, Chhattisgarh, and Uttarakhand			

Abbreviation: EPWRFITS, Economic and Political Weekly Research Foundation India Time Series.

4 | RESULTS AND DISCUSSIONS

This section first discusses the summary statistics of the FPI scores across the states over 1981–81 to 2017–18. The results are reported in Table 3. We note that the highest mean and median value of FPI scores for Tamil Nadu and lowest for Bihar. The reason for Bihar having the lowest FPI scores could be high deficits, debt sustainability issue, less efficient in terms of revenue which hinders the capital expenditure. On the contrary, Tamil Nadu is found to be superior in the majority of fiscal indicators. Further, we also notice high figures of standard deviation for Bihar, Odisha, Rajasthan and West Bengal. This implies that these states fiscal performance are more volatile and changes more frequently over time as compared to other states. From the Jarque-Bera test, we could see that majority of the states do not follow the normal distribution. This implies that the sample is either positively or negatively skewed. Overall, the summary statistics suggest a dynamic change in the performance of the states.

After presenting the preliminary findings, we next present the performance of the states. To do so, we divide our sample into six SC and fifteen NSC states for better understanding. We may not better understand the dynamic rankings of the states by clubbing SC and NSC states together. Therefore, we analyze each category ranking separately. Moreover, we consider the five years average in order to see the dynamic performance of the states. In particular, we divide entire sample period into 1980–81 to 1984–85, 1985–86 to 1989–90, 1990–91 to 1994–95, 1995–96 to 1999–00, 2000–01 to 2004–05, 2005–06 to 2009–10, 2010–11 to 2014–15, and 2015–16 to 2017–18, respectively. The rank of the states based on the FPI scores is reported in Table 4. From the results, we observed an unevenness in fiscal performance of NSC and SC states over the different sub-periods. More specifically, among fifteen NSC states, Odisha (1), Uttar Pradesh (2) Karnataka (3), Tamil Nadu (4) and Gujarat (5)[6] have emerged best five states in their fiscal performance for the period 2015–16 to 2017–18, whereas these states were not better in fiscal performance during 1980–81 to 1984–85 to 2005–06 to 2009–10. Moreover, although, Tamil Nadu obtained the fourth rank during 2015–16 to 2017–18, there has been deterioration in the fiscal performance in comparison to 1980–81 to 1984–85 periods, as the growth of FPI (GFPI) scores found negative. Similarly, in the case of Gujarat, Odisha, Karnataka, and Uttar Pradesh, we noticed positive GFPI suggesting an improvement in fiscal performance. There could be multiple reasons of why these states obtained top five rankings. In particular, Odisha has made an exceptional effort in improving the fiscal discipline. Over the last seven years, Odisha has averaged GSDP growth of over 7%. The government also has met the FRBM Act requirement by controlling the fiscal deficit below 3.5% of GSDP and its debt to GSDP ratio below 25%. Moreover, the interest payment has remained below the stipulated limits (i.e., 15%) to ensure the manageable debt-service cost. To further strengthen the fiscal indicators of Odisha, Finance Department in consultation with the International Monetary Fund's South Asia Regional Training and Technical Assistance Center has developed a medium-term fiscal framework (MTFF) to support the annual budget formulation and medium-term fiscal planning. Also, the creation of fiscal space has enabled the Odisha government to invest more in socioeconomic priorities (health, education, social security, water and sanitation, etc.).[7] In a similar manner, fiscal discipline and socioeconomic indicators have been improving in Uttar Pradesh, Karnataka, Tamil Nadu and Gujarat. Further, Uttar Pradesh obtained the second rank because of the decline in revenue and fiscal deficits, better debt servicing, and high debt sustainability are the main contributors to a high FPI score particularly after 1995–96 to 1999–00. Karnataka has remained in the top ten in all the periods except 1985–86 to 1989–90 and in 2015–16 to 2017–18, achieved the third rank owing to higher revenue efficiency resulted from an increased state own revenue capacity. Tamil Nadu has obtained the fourth rank due to high-quality expenditures and improvement in debt servicing towards the development sector.[8] Gujarat again has remained under the top ten categories from 1980–81 to 1984–85 to 2010–11 to 2014–15. However, during 2015–16 to 2017–18,

TABLE 3 Summary statistics

States	Mean	Median	Max	Min	*SD*	Skewness	Kurtosis	JB	Prob
Andhra Pradesh	0.485	0.504	0.550	0.337	0.060	−0.949	2.780	5.785	0.055
Arunachal Pradesh	0.489	0.505	0.634	0.319	0.071	−0.530	3.159	1.817	0.403
Assam	0.493	0.498	0.627	0.319	0.077	−0.283	2.139	1.680	0.432
Bihar	0.429	0.463	0.558	0.283	0.088	−0.296	1.535	3.955	0.138
Goa	0.521	0.528	0.642	0.366	0.079	−0.337	2.244	1.626	0.444
Gujarat	0.516	0.523	0.628	0.388	0.064	−0.397	2.367	1.632	0.442
Haryana	0.533	0.515	0.693	0.410	0.074	0.479	2.178	2.523	0.283
Himachal Pradesh	0.479	0.492	0.590	0.287	0.079	−1.013	3.373	6.720	0.035
Karnataka	0.551	0.569	0.681	0.371	0.076	−0.725	2.897	3.347	0.188
Kerala	0.504	0.496	0.659	0.380	0.078	0.387	2.267	1.800	0.407
Madhya Pradesh	0.453	0.455	0.594	0.308	0.072	−0.262	2.263	1.295	0.523
Maharashtra	0.494	0.500	0.641	0.326	0.073	−0.382	2.837	0.967	0.617
Manipur	0.528	0.548	0.661	0.291	0.079	−1.096	4.318	10.352	0.006
Meghalaya	0.502	0.510	0.608	0.369	0.062	−0.397	2.208	1.992	0.369
Odisha	0.503	0.521	0.678	0.243	0.121	−0.429	2.352	1.829	0.401
Punjab	0.534	0.534	0.688	0.372	0.075	−0.054	2.479	0.448	0.799
Rajasthan	0.511	0.522	0.651	0.294	0.082	−0.586	3.237	2.260	0.323
Tamil Nadu	0.623	0.617	0.765	0.492	0.069	−0.007	2.145	1.157	0.561
Tripura	0.490	0.493	0.637	0.374	0.064	0.029	2.253	0.890	0.641
Uttar Pradesh	0.503	0.554	0.679	0.315	0.102	−0.455	1.866	3.347	0.188
West Bengal	0.468	0.488	0.672	0.248	0.099	−0.307	2.400	1.166	0.558

Note: This table reports the descriptive statistics. Results indicate the heterogeneity in the fiscal performance across the states.

Abbreviation: JB, Jarque–Bera.

TABLE 4 Fiscal performance of SC and NSC states based on FPI

	P1	R1	P2	R2	P3	R3	P4	R4	P5	R5	P6	R6	P7	R7	P8	R8	GFPI	ΔR
NSC states																		
Andhra Pradesh	0.53	12	0.52	13	0.48	11	0.43	11	0.40	8	0.51	7	0.53	9	0.48	13	−9.4	−1
Bihar	0.52	14	0.47	14	0.40	15	0.33	15	0.31	14	0.42	14	0.49	12	0.53	7	1.9	7
Goa	0.59	5	0.56	4	0.53	5	0.47	10	0.43	5	0.51	10	0.54	8	0.57	6	−3.4	−1
Gujarat	0.56	8	0.53	12	0.53	6	0.50	3	0.40	6	0.51	8	0.54	7	0.57	5	1.8	3
Haryana	0.54	11	0.54	10	0.49	10	0.47	8	0.48	2	0.64	2	0.57	6	0.52	9	−3.7	2
Karnataka	0.58	6	0.53	11	0.54	3	0.52	2	0.44	4	0.62	3	0.61	4	0.60	3	3.4	3
Kerala	0.62	2	0.59	3	0.53	4	0.48	5	0.40	7	0.45	13	0.45	14	0.49	11	−20.8	−9
Madhya Pradesh	0.51	15	0.47	15	0.45	13	0.38	13	0.34	12	0.47	12	0.53	10	0.49	10	−3.9	5
Maharashtra	0.53	13	0.56	5	0.53	7	0.48	6	0.36	10	0.52	6	0.49	13	0.47	14	−11.3	−1
Odisha	0.56	9	0.55	8	0.47	12	0.40	12	0.30	15	0.51	9	0.65	2	0.66	1	17.9	8
Punjab	0.61	3	0.60	1	0.56	2	0.48	7	0.47	3	0.58	4	0.51	11	0.43	15	−29.5	−12
Rajasthan	0.57	7	0.54	9	0.52	9	0.48	4	0.38	9	0.50	11	0.61	3	0.49	12	−14.0	−5
Tamil Nadu	0.63	1	0.59	2	0.60	1	0.57	1	0.57	1	0.72	1	0.70	1	0.58	4	−7.9	−3
Uttar Pradesh	0.59	4	0.56	7	0.45	14	0.37	14	0.36	11	0.55	5	0.58	5	0.62	2	5.1	2
West Bengal	0.55	10	0.56	6	0.52	8	0.47	9	0.32	13	0.42	15	0.39	15	0.53	8	−3.6	2
SC states																		
Arunachal Pradesh	0.53	4	0.47	5	0.50	3	0.43	5	0.40	4	0.51	4	0.52	5	0.59	2	11.3	2
Assam	0.54	2	0.46	6	0.47	5	0.40	6	0.41	2	0.53	2	0.56	3	0.60	1	11.1	1
Himachal Pradesh	0.52	6	0.54	3	0.48	4	0.46	3	0.32	6	0.52	3	0.50	6	0.50	6	−3.8	0
Manipur	0.55	1	0.57	1	0.52	1	0.51	1	0.37	5	0.56	1	0.59	1	0.55	3	0.0	−2
Meghalaya	0.53	3	0.55	2	0.50	2	0.46	2	0.40	3	0.50	6	0.54	4	0.55	4	3.8	−1
Tripura	0.52	5	0.53	4	0.42	6	0.44	4	0.42	1	0.50	5	0.57	2	0.51	5	−1.9	0

Note: P1 = 1980–81 to 1984–85. P2 = 1985–86 to 1989–90. P3 = 1990–91 to 1994–95. P4 = 1995–96 to 1999–00. P5 = 2000–01 to 2004–05. P6 = 2005–06 to 2009–10. P7 = 2010–11 to 2014–15. P8 = 2015–16 to 2017–18. R1 to R8 are the rankings of states' fiscal performance for sub-periods P1 to P8, respectively. $\Delta R = R1 - R8$, where +ve rank shows the improvement and −ve rank show the deterioration in the fiscal performance of the state. 0 indicates no change in fiscal performance. GFPI is the growth of fiscal performance based on P1 and P8.

Gujarat fiscal performance has improved as result Gujarat has achieved the fifth rank. The reason could be a decline in deficits; as a result, an improvement has been noted in the revenue and fiscal deficit positions, debt management and debt sustainability.

Moreover, from our results, we also note that Punjab holds rank 15 for the period 2015–16 to 2017–18 while it was holding the third rank during 1980–81 to 1984–85, the first rank during 1985–86 to 1989–90, third rank in 1990–91 to 1994–95, seventh rank in 1995–96 to 1999–00, third rank in 2000–01 to 2004–05, four rank in 2005–06 to 2009–10 and eleventh rank in 2010–11 to 2014–15 and then it starts worsening more. Further, Punjab's GFPI is −29.5 and its rank has dropped by 12 suggesting the poorest fiscal performance. This clearly suggests that Punjab is unable to create fiscal space. Punjab has remained a revenue deficit state and its fiscal situation continued under fiscal stress due to higher committed expenditure from 2011–12 to 2017–18. Punjab's economic growth is also less than the average growth. It has been also noticed that Punjab's debt burden has led to weak performance in the management of its state public finances.[9]

While looking at the ranks of six SC states, Assam and Arunachal Pradesh are found to be the best performing states as it secures the first and second rank in the period 2015–16 to 2017–18. Moreover, it has been observed that the GFPI of Assam and Arunachal Pradesh is 11.1 and 11.3, respectively. The reason behind achieving the best performance due to an increase in both revenue receipts and revenue expenditures.[10] At the same time, they have achieved revenue surplus and fiscal deficit targets set by FRBM Act. On the contrary, Himachal Pradesh is found to be the worst-performing state as it holds the sixth rank during 2015–16 to 2017–18. The main reason for Himachal Pradesh's worst performance could be due to a decline in the revenue surplus despite of increase in central transfers in recent years. Therefore, Himachal Pradesh could not improve its rank like other SC states. The performance of Himachal Pradesh is also disproportionate in infrastructure and social parameters.

Next, we analyze the fiscal performance of the states before and after the implementation of the FRBM Act and other fiscal reforms as the rationale is mentioned in the introduction section. To do so, we first report the FPI scores before and after the implementation of the FRBM Act in Table 5. The results indicate that except for Kerala, Punjab and West Bengal, other states have achieved the fiscal deficits targets during the post-FRBAM Act. Moreover, it is found that Odisha is one of the successful states particularly after the implementation of the FRBM Act. The plausible reason could be due to successfully managing their fiscal deficit as per the FRBM Act. Further, the main reason for the unsuccessfulness of FRBM Act in Kerala, Punjab and West Bengal could be many inherent problems such as financial difficulty due to higher expenditure on non-development that could not lower the fiscal deficit thereby borrowing has kept on increasing over the years. Overall, this act has proved a milestone for the majority of states in reducing the fiscal deficits and creating fiscal space by lowering borrowing. This Act has brought a significant reform in both expenditure and revenue as a result it has provided a first-class fiscal system to the country by equitable and fair distribution of revenue.

However, FRBM Act is not the sole impetus behind this impressive fiscal performance during the post-implementation of the FRBM Act. Many other schemes such as Fiscal Responsibility Legislations (FRL), Debt Swap Scheme, the introduction of Value Added Tax (VAT), etc. Most of these fiscal schemes have been brought into the picture after economic reform 1990–91. We discuss the decadal FPI scores in Table 6 as it covers the three phases of fiscal stress, fiscal consolidation and post-global fiscal stress. The results show a dynamic change in the FPI scores in response to the fiscal reforms and fiscal stress as an acceleration of GSDP growth, increased tax devolution, the decline in interest payments, and quality of expenditure have contributed significantly to fiscal consolidation. Moreover, the state's budgeting process also has helped in controlling India's overall fiscal deficit.

In the next stage, we rank the states based on the productivity and efficiency scores[11] by applying the DEA. In particular, we assess whether inputs are maximizing the output. To do so, we consider

TABLE 5 Fiscal performance of states during pre and post-FRBM Act

	Pre-FRBM	Post-FRBM	Δ (%)	R
NSC states				
Andhra Pradesh (Apr.05)	0.47	0.51	4	9
Bihar (Apr.06)	0.40	0.49	9	2
Goa (May.06)	0.52	0.59	7	5
Gujarat (Mar.05)	0.51	0.53	2	11
Haryana (Jul.05)	0.51	0.58	7	5
Karnataka (Sep.02)	0.53	0.58	5	8
Kerala (Aug.03)	0.54	0.46	−8	15
Madhya Pradesh (May.05)	0.43	0.50	7	4
Maharashtra (Apr.05)	0.49	0.50	1	12
Odisha (Jan.05)	0.46	0.57	11	1
Punjab (Oct.03)	0.55	0.51	−4	14
Rajasthan (May.05)	0.50	0.53	3	10
Tamil Nadu (May.03)	0.59	0.66	7	3
Uttar Pradesh (Feb.04)	0.48	0.54	6	7
West Bengal (Jul.10)	0.47	0.44	−3	13
SC states				
Arunachal Pradesh (Mar.06)	0.47	0.53	6	3
Assam (Sep.05)	0.46	0.56	10	1
Himachal Pradesh (Apr.05)	0.47	0.51	4	5
Manipur (Aug.05)	0.50	0.57	7	2
Meghalaya (Mar.06)	0.49	0.53	4	5
Tripura (Jun.05)	0.47	0.53	6	3

Note: FRBM Act implemented across Indian at different-different periods. The date of implementation of the FRBM Act is provided in the parenthesis across the states. $\Delta(\%) = (\text{Post\_FRBM} - \text{Pre\_FRBM}) \times 100$, where +ve score shows the improvement and −ve score show the deterioration in fiscal performance. R indicates the raking based on the $\Delta(\%)$.

Abbreviations: NSC, non-special category; SC, special category.

GSDP as output and deficit index (DFI), debt index (DBTI), revenue efficiency index (REVI), expenditure quality index (EXQI) and debt sustainability index (DSUI) as the inputs. The output along with inputs are on the same scale. More specifically, higher scores of the inputs and output indicate an improvement. The productivity score is more comprehensive as it is the multiplication of efficiency and technical efficiency scores (Cherchye et al., 2008). The productivity scores reported in Table 7 show that Goa, Haryana, Kerala, Madhya Pradesh, Odisha, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh, and West Bengal are the top ten best states in NSC states during 2015–2018. Moreover, when comparing the ranks of 2015–16 to 2017–18 with 1980–81 to 1984–85, it is noted that only eight states (Goa, Haryana, Kerala, Madhya Pradesh, Odisha, Tamil Nadu, Uttar Pradesh, and West Bengal) improve their productivity scores out of top ten states. In the case of SC states, results show that Assam, and Arunachal Pradesh, Manipur, Meghalaya, and Tripura are the top five states during 2015–2018. While comparing the ranks for the periods 2015–16 to 2017–18 with 1980–81 to 1984–85, the results exhibit that Arunachal Pradesh and Assam are the top two states.

TABLE 6 Fiscal performance based on the FPI at decadal level

	P1	R1	P2	R2	P3	R3	P4	R4
NSC states								
Andhra Pradesh	0.527	16	0.453	15	0.453	11	0.515	15
Bihar	0.495	20	0.365	21	0.364	21	0.507	16
Goa	0.574	4	0.501	8	0.466	7	0.550	10
Gujarat	0.550	11	0.513	5	0.455	10	0.556	8
Haryana	0.542	13	0.483	12	0.564	2	0.547	12
Karnataka	0.556	8	0.526	2	0.529	3	0.605	3
Kerala	0.607	2	0.506	6	0.429	16	0.466	20
Madhya Pradesh	0.488	21	0.417	19	0.403	19	0.517	14
Maharashtra	0.546	12	0.503	7	0.443	14	0.481	18
Odisha	0.553	9	0.431	18	0.403	18	0.652	2
Punjab	0.604	3	0.518	3	0.524	4	0.480	19
Rajasthan	0.553	10	0.499	9	0.440	15	0.562	7
Tamil Nadu	0.613	1	0.585	1	0.645	1	0.656	1
Uttar Pradesh	0.572	5	0.408	20	0.457	9	0.595	4
West Bengal	0.557	7	0.497	10	0.368	20	0.444	21
SC states								
Arunachal Pradesh	0.502	18	0.467	14	0.451	12	0.548	11
Assam	0.501	19	0.437	16	0.473	5	0.576	6
Himachal Pradesh	0.531	15	0.472	13	0.418	17	0.501	17
Manipur	0.558	6	0.517	4	0.467	6	0.580	5
Meghalaya	0.541	14	0.484	11	0.450	13	0.542	13
Tripura	0.525	17	0.434	17	0.462	8	0.550	9

Note: P1 = 1980–81 to 1989–90. P2 = 1990–91 to 1999–00. P3 = 2000–01 to 2009–10. P4 = 2010–11 to 2017–18. R1 to R3 indicates the rankings of states' fiscal performance from the periods P1 to P3, respectively. The lowest rank shows the best performance of the states.

Finally, we compare the rank of the states based on both FPI and productivity and efficiency scores. We find Goa, Gujarat, Haryana, Odisha, Tamil Nadu, Uttar Pradesh and West Bengal are competent in both fiscal performance and fiscal productivity/efficiency scores during 1980–81 to 1984–85. Moreover, during 2015–16 to 2017–18, we find Goa, Haryana, Madhya Pradesh, Odisha, Tamil Nadu, Uttar Pradesh, and West Bengal are the well-performing with NSC states in both the measures and fall in the top ten rank because they are better in terms of expenditure quality, revenue efficiency and have adhered the FRBM Act to maintain the fiscal deficit by 3% level. In the case of SC states, we have noted Arunachal Pradesh, Assam, Manipur and Meghalaya and Tripura are the best performing during 2015–16 to 2017–18. Again, these states are relatively better in expenditure quality, revenue efficiency, and management of debt and deficit. We have also seen that there is a dynamic change in the raking of these states over the periods (from 1980–81 to 1984–85 to 2015–16 to 2017–18).

Overall, an improvement/deterioration in the performance of the states is subject to change with time due to amendments/implementation in the various schemes or fiscal rules as our findings indicate. Moreover, our findings are important in guiding the policymakers about the fiscal performance of the states. In particular, new/existing policies can be implemented/relooked for the states which are

TABLE 7 Performance based on productivity scores

	P1	R1	P2	R2	P3	R3	P4	R4	P5	R5	P6	R6	P7	R7	P8	R8	GPI	ΔR
NSC states																		
Andhra Pradesh	2.06	14	5.20	7	2.12	6	1.84	10	2.56	2	1.15	4	1.18	14	1.06	11	−48.5	3
Bihar	2.83	13	9.70	1	2.79	3	4.09	3	1.69	6	0.99	7	1.40	12	0.94	14	−66.7	−1
Goa	3.89	4	2.94	11	1.84	10	2.58	4	3.28	1	1.04	6	1.66	7	2.72	2	−30.1	2
Gujarat	3.28	9	2.73	13	1.62	12	2.22	8	1.71	4	1.17	3	1.65	8	0.94	15	−71.3	−6
Haryana	4.00	3	3.05	10	1.75	11	1.59	14	1.52	7	0.99	8	2.79	3	3.65	1	−8.7	2
Karnataka	3.80	5	8.53	2	2.90	2	2.49	5	1.71	5	0.87	12	1.61	9	0.99	12	−73.9	−7
Kerala	3.28	10	3.77	9	2.06	8	54.20	1	1.89	3	0.76	15	1.45	11	1.93	3	−41.2	7
Madhya Pradesh	2.95	12	6.10	3	2.45	5	2.18	9	1.39	9	0.86	13	2.26	4	1.28	10	−56.6	2
Maharashtra	3.76	6	2.75	12	1.33	15	7.17	2	1.01	14	0.92	9	1.82	5	0.98	13	−73.9	−7
Odisha	3.48	7	5.29	5	1.34	14	2.36	6	1.36	10	1.14	5	3.70	2	1.51	4	−56.6	3
Punjab	4.43	2	5.27	6	1.89	9	1.66	11	0.67	15	0.88	11	5.55	1	1.39	5	−68.6	−3
Rajasthan	3.36	8	6.07	4	3.69	1	1.64	12	1.28	12	0.92	10	1.15	15	1.28	9	−61.9	−1
Tamil Nadu	1.31	15	4.41	8	2.55	4	1.61	13	1.35	11	1.34	1	1.76	6	1.29	8	−1.5	7
Uttar Pradesh	4.71	1	0.96	14	2.10	7	1.27	15	1.40	8	1.26	2	1.57	10	1.33	6	−71.8	−5
West Bengal	3.23	11	0.83	15	1.55	13	2.29	7	1.09	13	0.79	14	1.30	13	1.31	7	−59.4	4
SC states																		
Arunachal Pradesh	2.45	5	0.49	5	1.07	5	1.54	3	2.03	1	0.89	5	1.79	3	1.25	3	−48.9	2
Assam	2.34	6	0.67	4	0.98	6	1.06	6	1.82	2	1.21	2	1.19	5	1.23	4	−47.4	2
Himachal Pradesh	3.13	4	5.60	3	2.23	3	1.28	5	1.44	5	1.22	1	1.14	6	0.65	6	−79.2	−2
Manipur	4.04	3	8.24	1	3.35	2	3.76	1	1.46	4	0.94	4	71.39	1	0.83	5	−79.5	−2
Meghalaya	5.99	2	5.76	2	2.22	4	2.62	2	1.63	3	0.86	6	1.26	4	1.42	1	−76.3	1
Tripura	6.73	1	0.21	6	7.17	1	1.32	4	1.38	6	1.13	3	2.34	2	1.37	2	−79.6	−1

Note: The lower rank shows the best performance states. Note: P1 = 1980–81 to 1984–85. P2 = 1985–86 to 1989–90. P3 = 1990–91 to 1994–95. P4 = 1995–96 to 1999–00. P5 = 2000–01 to 2004–05. P6 = 2005–06 to 2009–10. P7 = 20010–11 to 2014–15. P8 = 2015–16 to 2017–18. R1 to R8 are the rankings of states' fiscal performance for sub-periods P1 to P8. The lowest rank shows the best performance of the states. $\Delta R = R1 - R8$, where +ve rank shows the improvement and −ve rank show the deterioration in the fiscal performance of the state. 0 indicates no change in fiscal performance. GPI is the growth of productivity index based on P1 and P8.

not performing well. This can be done by reviewing the policies of those states which are performing well. Further, the evaluation of the fiscal performance over time (as this study provides the findings over the years) can be judged by the existing policies related to managing fiscal indicators.

5 | CONCLUSIONS

This paper examined the fiscal performance of Indian states by implementing the widely used multidimensional composite index and data envelopment analysis (DEA) across the 21 Indian states for the period 1980–81 to 2017–18. To construct composite index and productivity/efficiency scores, ten different indices are used. To obtain a comprehensive picture of the state's finance, it is imperative to consider multi-indicators over a single indicator-based analysis.

Our results based on the composite index showed a significant inter-state variation in terms of fiscal performance. In particular, we found Gujarat, Odisha, Karnataka, Tamil Nadu, and Uttar Pradesh are the top five states within NSC states during 2015–16 to 2017–18. Similarly, Assam and Arunachal are the top two best states among SC states during the same period. The reason for the improvement in the recent year can be attributed to an improvement in expenditure quality and improvement in revenue efficiency. Moreover, it is found that these states can maintain their debt and fiscal deficit below 25% and 3.5%, respectively as a result of an improvement in the fiscal performance of Assam, Arunachal, Gujarat, Karnataka, Tamil Nadu, Odisha and Uttar Pradesh noted. Further, to judge the existing policies related to fiscal indicators such as FRBM Act, Debt Swap Scheme, Global Financial crises, etc., we analyze the FPI scores during pre-and post-FRBM Act and at the decadal level too. During post-FRBM Act, we noted an improvement in the FPI scores in all the states except Kerala and Punjab, West Bengal which suggests that FRBM Act is extensively helpful in marinating fiscal deficit at an ideal level (i.e., 3%). The results derived from the DEA indicated that Goa, Gujarat, Haryana, Kerala, Madhya Pradesh, Odisha, Rajasthan, Tamil Nadu, and Uttar Pradesh are the best states. In the case of SC states, we have noted Arunachal Pradesh, Assam, Manipur and Meghalaya and Tripura are the best performing during 2015–16 to 2017–18. Again, these states are relatively better in expenditure quality, revenue efficiency, and management of debt and deficit. Overall, a vast variation is noticed across the states in terms of fiscal performance over the last four decades.

Our findings suggest a new set of policies at the state level particularly those who are the bottom in fiscal performance in recent years. This can be done by implementing fiscal reforms in the least performing states following the recommendation of the Fifteen Finance Commission's guidelines. Further, the evaluation of the fiscal performance can judge the existing policies related to managing fiscal indicators and help the policymakers. Moreover, greater attention needs to be paid to the quality of expenditure and revenue efficiency by increasing state own tax and non-tax revenues, and high quality of expenditures by raising both development revenue and capital expenditures. Further, the state's budgeting process can also help in controlling the fiscal deficit/debt. States commitment towards fiscal responsibility legislation (FRL) or FRBM Act could be another way of managing fiscal deficit and debt more effectively which will help in improving the fiscal performance. However, it is noted that fiscal challenges are mounting in recent years because of the implementation of Pay Commission recommendations, slowing growth, and rising payments from the Ujwal Discom Assurance Yojana (UDAY) as states are allowed to increase their debt by 75% to fix the precarious financial position of power distribution companies (Discoms). This further may worsen the fiscal performance of the states. Moreover, macroeconomic conditions will not be as favorable to states because of the ongoing COVID-19 pandemic, which has already created havoc to the Indian economy. Thus, going forward for greater market-based discipline on state government finances will also be a major imperative for

fiscal performance. The fifteen-finance commission has also taken the lead not only in incentivizing fiscal prudence by states but also by acting as a model through its own fiscal management. That implies that states with better fiscal performance can be self-sustained in the long run.

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CONFLICT OF INTEREST

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

DATA AVAILABILITY STATEMENT

Data available on request from the authors.

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ENDNOTES

[1] Pay Commission is set up by Government of India in 1947, and gives its recommendations regarding changes in salary structure of its employees.

[2] Government of India launched UDAY scheme in November 2015. This scheme designed to fix the precarious financial position of power distribution companies (Discoms) of states. Discoms buys the electricity from the generation companies and sells it to consumers.

[3] Arunachal Pradesh, Assam, Jammu & Kashmir, Himachal Pradesh, Manipur, Meghalaya, Mizoram, Sikkim, Tripura are lie in SC and Uttarakhand and rest lie in NSC.

[4] See contribution part in the introduction section for more details.

[5] http://epwrfits.in/.

[6] Rank of the states are given in the parenthesis.

[7] Detailed can be found in the fiscal strategy report of government of Odisha: https://finance.odisha.gov.in/sites/default/files/2021-02/19-Fiscal%20Strategy%20Report.pdf.

[8] We do not provide the results of sub-indices as per the reviewer's suggestion and to conserve the space. However, these can be obtained upon request.

[9] See for more details: https://niti.gov.in/sites/default/files/2019-08/Final%20Report%20of%20the%20Research%20Study%20on%20Fiscal%20Scenarios%20in%20Punjab_IEG_Delhi.pdf.

[10] Finance Report of Assam State Government (2019). https://cag.gov.in/uploads/download_audit_report/2020/Report_No_2_of_2020_State_Finance_Government_of_Chhattisgarh.pdf.

[11] We do not provide the rank of the states based on the efficiency scores because ranks of states based on efficiency are mostly similar to the rank based on productivity scores.

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