

Fiscal Capacity, Fiscal Stress and Social Sector Spending in Indian States: Evidence from a State-Level Panel Dataset, 2005–2025

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Abstract

The social sector expenditure is important in promoting human development, welfare and inclusive growth especially in a federal system like India where the delivery of social services is largely the responsibility of the states. We analyse the effect of social sector expenditure on per capita GSDP, Own Tax Revenue, Fiscal Deficit, Debt and Intergovernmental Grants using 315 observations from 15 large states between 2005 and 2025. The results indicate that Intergovernmental Grants and Fiscal Deficit have significant and positive impact on Social Sector Spending at 1 percent and 5 percent level of significance and the value of correlation coefficients are 0.494 and 0.591 respectively. However, variables of economic capacity such as GSDP, Own Tax Revenue and Debt show relatively modest relationships. Multiple regression shows a R^2 of 0.626, which means that the selected variables explain 62.6 percent of the variation in spending. The F-statistic (103.378) indicates that the model is overall significant. The results point to the role of fiscal transfers and state fiscal conditions as determinants of social expenditure preferences.

Keywords

Fiscal Deficit, Fiscal Federalism, Intergovernmental Grants, Public Expenditure, State Finances

1. Introduction

Public spending in the social sector is an important aspect of inclusive development as it impacts on the well-being of the generations living today and the potential productivity of the generations of the future. Spending on education, health care, social protection, nutrition and

other welfare-oriented services contributes to a better formation of human capital, access to vital public services and has the potential to offset inequities across socio-economic and regional lines. The allocation and effectiveness of public resources is especially important in developing countries with large disparities in income, human capital and access to public services. From a public finance perspective, therefore, social-sector expenditure is not merely a redistributive instrument but also an investment in the long-run productive capacity of the economy (Arrow, 1963; Musgrave, 1959; World Bank, 2018).

The importance of public expenditure becomes particularly pronounced in a federal system such as India, where expenditure responsibilities and revenue-raising powers are distributed across different levels of government. Indian fiscal federalism is characterised by a substantial vertical fiscal imbalance: the Union government possesses relatively greater access to broad-based and buoyant tax sources, whereas state governments bear significant expenditure responsibilities associated with the provision of education, health, social welfare and other public services (Rao & Singh, 2005; Reddy et al., 2026). Consequently, state governments remain central to the delivery of social-sector services, making the fiscal position and expenditure priorities of individual states important determinants of variations in social-sector spending across the country. Recent evidence similarly demonstrates that a substantial share of public expenditure on education is undertaken by state governments, underscoring their central role in financing social development (Motkuri & Revathi, 2023).

However, the relationship between fiscal capacity and social-sector expenditure is theoretically and empirically complex. A higher level of per capita income or Gross State Domestic Product (GSDP) may expand the resource base available to a state and thereby increase its capacity to finance social services. However, economic growth is not necessarily accompanied by higher spending on the social sector. State budgets face competing demands from infrastructure, economic development, debt servicing, administration and other areas of public spending. Similarly, a broader own-revenue base can strengthen fiscal autonomy and budgetary flexibility, though the additional fiscal space may need to be distributed amongst competing spending priorities. Evidence on tax capacity in Indian states shows considerable inter-state disparities in revenue mobilisation and tax effort, suggesting that disparities in fiscal capacity can influence states' ability to independently pay their expenditure duties (Garg et al., 2017).

Another important element of this budgetary relationship is made up of intergovernmental transfers. Transfers from the Union to the states in the Indian federation serve, inter alia, to redress imbalances in revenue-raising capabilities and expenditure demands among the states. The equalisation role of fiscal transfers is particularly relevant for social-sector expenditure, as countries with lower fiscal capacity may not be able to provide comparable levels of important public services otherwise. Empirical literature on Indian states with state level panel data suggest that fiscal transfers may have substantial crowding-in effects on public expenditure. The effect size differs across the different cluster of states (Shanmugam & Shanmugam, 2022). Similarly, research on intergovernmental transfers suggests that the composition and conditionality of transfers can influence the fiscal behaviour and expenditure decisions of state governments (Lalvani, 2010; Raja & Rao, 2013).

The relevance of intergovernmental transfers is particularly evident in the financing of health and education. Evidence from Indian states suggests that central grants do not necessarily translate proportionately into additional state-level spending, with the response varying

according to the fiscal and socioeconomic characteristics of states (Bowser et al., 2019). However, more recent evidence points to larger untied transfers post-Fourteenth Finance Commission leading to an increase in states' non-National Health Mission health expenditure, which suggests that some expansion of fiscal space for social-sector priorities may be a consequence of having greater fiscal flexibility (Sharma et al., 2025). These apparently contradictory findings suggest that the effect of transfers may depend not only on the size of the transferred resources but also on their design, conditionality and the fiscal characteristics of the recipient states.

Deficits and debt add a new dimension to the interaction of fiscal health and social-sector spending. When governments are unable to raise sufficient revenues to meet expenditure commitments borrowing can allow them more fiscal space in the short term. This could enable states to preserve funding for core public goods in periods of revenue panic. However, prolonged fiscal deficits could also lead to ballooning public debt and ever larger debt service payments which may constrain fiscal options in the future. Recent evidence from Indian states suggests that borrowing arrangements and fiscal transfers may influence fiscal behaviour and revenue mobilisation differently, highlighting the importance of differentiating between short-term fiscal freedom and long-term fiscal sustainability (Bora & Barua, 2025). Revenue trends, fiscal capacity, deficits and outstanding liabilities are also important aspects of state public finances, as mentioned by the Reserve Bank of India (RBI)⁷. The RBI also stresses that fiscal discipline should not be maintained at the expense of expenditure on development.

Recent empirical work continues to make the case that social-sector spending is not fully explained by standard income-based measures. Studies of fiscal decentralisation in India demonstrate that the institutional design of fiscal decentralisation affects the provision of health and education services, while the effectiveness of decentralisation is conditioned by institutional and socioeconomic factors (Singh et al., 2024). More recent research on fiscal asymmetry finds that differences in states' revenue-mobilisation capacity account for a substantial part of the variation in social-sector allocations, while fiscal transfers remain important in addressing inter-state disparities (Harikrishnan & Hiremath, 2026). These findings suggest that social-sector spending is better understood as the outcome of an interaction between economic capacity, own-source revenues, intergovernmental transfers and fiscal constraints rather than as a simple function of state income.

Despite this growing literature, an important empirical gap remains. Existing studies have frequently examined individual components of social expenditure, such as health or education, or have focused on particular fiscal mechanisms such as decentralisation, equalisation transfers or tax effort. Comparatively less attention has been given to examining the combined association of economic capacity, own-tax revenue, fiscal deficit, public debt and intergovernmental grants with aggregate social-sector spending across a consistent panel of major Indian states over an extended period. This gap needs to be addressed because the relative importance of fiscal resources and fiscal constraints may change over time, because of institutional reforms, changes in intergovernmental transfers, and changes in spending obligations.

Against this backdrop, the present study investigates the association between selected fiscal and economic indicators and Social Sector Spending (SSE) across 15 major Indian states over

the period 2005–2025. Specifically, the study examines the role of per capita GSDP, own-tax revenue, fiscal deficit, public debt and intergovernmental grants in explaining variations in state-level social-sector expenditure. By considering these fiscal and economic determinants jointly within a balanced state-level panel framework, the study seeks to contribute to the literature on Indian fiscal federalism by providing evidence on whether social-sector spending is primarily associated with underlying economic capacity, states' own fiscal resources, intergovernmental transfers or fiscal constraints. The findings are expected to provide policy-relevant insights into the design of fiscal transfers, the management of state finances and the protection of social-sector priorities within a fiscally sustainable framework.

2. Review of Literature

2.1 Importance of Social-Sector Expenditure

Social-sector expenditure constitutes a critical component of public expenditure because government spending on education, health, social protection, nutrition, sanitation and related services contributes to human-capital formation, social welfare and more inclusive development. From the perspective of public finance, government intervention in these sectors is justified not only by the presence of market failures and under-provision of merit goods but also by the need to improve equity in the distribution of economic opportunities and public services (Musgrave & Musgrave, 1989; Stiglitz & Rosengard, 2015). Sen's (1999) capability-oriented approach further emphasises that development should be assessed in terms of people's substantive opportunities and capabilities, thereby providing a broader rationale for public investment in education, health and other social services. Consistent with this perspective, empirical research has associated social expenditure with human-capital development and long-term economic performance, particularly in developing economies (Baldacci et al., 2008). The significance of social-sector expenditure is particularly pronounced in India because the provision of social services operates within a multi-level federal fiscal structure characterised by considerable variation in the revenue-raising capacity and expenditure requirements of states. The post-reform literature indicates that research on social-sector expenditure in India has evolved from descriptive assessments of expenditure trends towards questions concerning fiscal decentralisation, intergovernmental transfers, regional disparities, governance and the effectiveness of public expenditure. A recent bibliometric assessment of the post-reform literature identifies public finance, fiscal federalism, inclusive growth, regional disparities, human capital and intergovernmental fiscal relations as major thematic clusters in research on social-sector expenditure in India (Alam & Fatima, 2026b).

2.2 Fiscal Federalism and the Allocation of Social Expenditure

The theoretical foundation for examining state-level social-sector expenditure is closely associated with fiscal federalism. The traditional fiscal federalism framework concerns the appropriate assignment of expenditure functions and revenue instruments across different levels of government and the potential welfare gains arising from decentralised provision of public services (Oates, 1972, 1999). The decentralisation of expenditure responsibilities in a system of government, but with inefficient revenue raising powers for the different subnational units, gives rise both to vertical and to horizontal fiscal asymmetries. Therefore, intergovernmental transfers have an important role of equalisation and allocation to enable subnational governments to provide public services regardless of variations in fiscal

capacities.(Oates, 1999; Musgrave & Musgrave, 1989).India provides a particularly important context in which to study these issues.

The political economy of Indian federalism reflects an institutional structure in which states undertake substantial expenditure responsibilities while their fiscal capacities vary considerably across jurisdictions (Rao & Singh, 2005). Consequently, the level of social-sector spending cannot be interpreted solely in terms of the expenditure preferences of individual state governments. It must also be understood in relation to the distribution of fiscal resources, the design of intergovernmental transfers, borrowing constraints and the institutional arrangements governing Centre–State fiscal relations.

The second-generation fiscal federalism literature further extends this perspective by emphasising institutional incentives, governance arrangements and political-economy considerations alongside the traditional assignment of functions and resources (Oates, 2005). Thus, differences in state-level social expenditure may arise not only from differences in income or revenue capacity but also from the manner in which fiscal institutions influence expenditure decisions.

2.3 Social-Sector Expenditure in the Indian Post-Reform Context

The post-1991 period witnessed substantial changes in India's fiscal and development policy framework. The literature reviewed by Alam and Fatima (2026b) shows that research on social-sector expenditure initially focused on the implications of economic reforms, fiscal consolidation and structural adjustment for public spending on education, health and related social services. Subsequent research increasingly examined the expansion of welfare programmes and the role of social expenditure in inclusive development. Major interventions such as the Sarva Shiksha Abhiyan, the National Rural Health Mission and the Mahatma Gandhi National Rural Employment Guarantee Act contributed to the expansion and diversification of social-sector commitments during the 2000s.

The empirical literature also points to persistent disparities across Indian states. Rao (2017) highlights the role of fiscal decentralisation and Finance Commission transfers in shaping expenditure patterns across states, while Deb (2025) documents substantial differences in state-level social expenditure across areas such as education, health, nutrition, sanitation, housing and social security. Deb's analysis reinforces the argument that the quantity and composition of social expenditure remain important dimensions of state-level development policy.

More broadly, the post-reform literature has increasingly moved beyond aggregate expenditure levels towards questions of expenditure quality, governance and institutional effectiveness. The bibliometric evidence suggests that the research agenda has gradually expanded from expenditure trends and fiscal constraints towards fiscal sustainability, governance quality, inequality, decentralisation and development effectiveness (Alam & Fatima, 2026b).

2.4 Decentralisation, Fiscal Asymmetry and Social Spending

An important strand of the literature examines whether fiscal decentralisation improves the capacity of states to provide social services. Aiyar and Kapur (2019) argue that the Indian fiscal architecture has retained a significant centralising tendency despite the movement towards greater fiscal decentralisation. They find that the link between fiscal decentralisation and social policy cannot be understood simply in terms of the size of the pot of financial transfers; administrative instruments, political incentives and the nature of the institutional framework of Centre-State relations also shape social policy outcomes.

New evidence shows fiscal asymmetry is much more important. Harikrishnan and Hiremath (2026) show that differential capacity to generate revenue across Indian states accounts for a

large share of variation in social sector spending. Union transfers may help in filling these economic gaps, but their data suggests that state level expenditure on health and education may be constrained by matching contribution requirements.

Similarly, Singh et al. (2024) examined the impacts of fiscal decentralisation on health and education in a sample of 18 non-special-category Indian states over the period 2002–2020 and found the impacts to be favourable. They also stress the importance of institutional quality, the capacity of local governments and accountability mechanisms to achieve good service delivery through decentralisation.

Together these findings suggest that not all forms of social spending are benefiting from fiscal decentralisation. The effect depends on fiscal capacity of states, structure of intergovernmental organisations, and the capacity of subnational governments to turn available fiscal resources into public services.

2.5 Revenue Capacity and Own Tax Revenue

Fiscal decentralisation is defined by the mobilisation of income at the state level. A stronger own-revenue base would give governments more flexibility in determining their spending priorities and reduce their dependence on intergovernmental transfers. In the Indian context, however, substantial variation exists in states' capacity to mobilise own revenues.

Garg et al. (2017), using stochastic frontier analysis for 14 major Indian states over 1991–92 to 2010–11, find substantial and increasing variation in tax effort across states. Their findings indicate that per capita GSDP is positively associated with tax capacity, while intergovernmental transfers, conditional on tax capacity, are negatively associated with tax effort. This suggests that the fiscal capacity of states and their incentives to mobilise own resources are interconnected.

The relationship between own tax revenue and social-sector expenditure, therefore, is theoretically ambiguous. Higher own revenue may increase fiscal space and permit greater social spending; alternatively, states with stronger revenue capacity may allocate additional resources to other competing priorities such as infrastructure, capital expenditure or debt management. Consequently, the independent relationship between own tax revenue and social-sector expenditure warrants empirical examination rather than being assumed a priori.

2.6 Income and Economic Capacity

Per capita income is another potentially important determinant of state-level social expenditure. Higher income and economic activity may enlarge the tax base and increase the fiscal resources available to governments. The relationship between economic capacity and public expenditure is consistent with the broader literature on government expenditure and development, while empirical evidence for Indian states indicates a positive association between per capita GSDP and tax capacity (Garg et al., 2017).

Nevertheless, higher economic capacity does not necessarily imply proportionately higher social-sector expenditure. States differ in their spending priorities and institutional constraints and political incentives. Alam and Fatima (2026a) report some state-level results that are of particular relevance here. They find that, for 15 large Indian states over the period 2005-2025, per capita GSDP and own tax revenue have a modest independent effect on social-sector expenditure when other fiscal measures are controlled for. This result poses an important empirical question, namely whether social-sector spending is a function of the ex ante economic capacity of governments or the fiscal institutional channels through which resources are obtained and dispersed.

2.7 Fiscal Deficit, Debt and Fiscal Constraints

Fiscal deficit and government debt also influence social sector spending. The fiscal deficit can be used as a source of short term funding to the governments and can be used to support social programs when current revenues are short of current expenses. However, continuing deficits could threaten fiscal sustainability over the longer term and constrain future spending through higher interest and debt servicing requirements.

The debt/spending link is not a simple one in theory. While an increase in debt may initially provide a source of fiscal space for public investment, a mounting debt burden may ultimately erode the discretionary space for development and social spending. Composition and durability of fiscal adjustment are also emphasised by the fiscal adjustment literature as important for expenditure outcomes (Alesina & Perotti, 1996).

The State-finance reports of Reserve Bank of India (RBI) have time and again emphasised fiscal deficit, outstanding liabilities, income mobilisation, transfers and composition of expenditure as the main determinants of state fiscal performance. For example, the 2023 report looks at revenue trends and fiscal strength of Indian states and has a dedicated section on social sector spending, transfers and state deficits. The next 2024 report will put more emphasis on fiscal restraint, debt consolidation, quality of spending and medium-term fiscal frameworks as part of healthy state finances. Fiscal deficit and debt must not be seen only as indicators of fiscal fragility. The impact on social sector spending could hinge on whether borrowing is used to sustain or increase social spending, or whether the servicing of debt obligations crowds out discretionary spending.

2.8 Intergovernmental Grants and Social-Sector Spending

The normal way to correct fiscal imbalances between countries is via intergovernmental transfers. From the perspective of fiscal federalism, transfers can be justified as spending equalisation, as they compensate for differences in fiscal capacity and expenditure needs (Oates, 1999; Oates, 2005). Its importance is particularly evident in India as differences in revenue raising capacity are coupled with wide ranging differences in expenditure needs across states.

Aiyar and Kapur (2019) go further in arguing that the effect of fiscal decentralisation on social policy is mediated by the institutional architecture through which financial support is provided to states. Most directly, Shanmugam and Shanmugam (2022) build a panel data set for Indian states and find a positive and robust crowding-in effect of fiscal transfers on states' expenditure; they also find evidence consistent with the flypaper effect.

However, the effect of transfers need not always be uniformly positive. Bowser et al. (2019), examining central grants for primary healthcare, highlight the additionality problem, whereby central grants do not necessarily translate one-for-one into increased state-level spending. Similarly, Harikrishnan and Hiremath (2026) show that the conditions attached to transfers, including matching requirements, may influence the ability of states to expand social expenditure.

The literature therefore suggests two competing possibilities. Transfers may crowd in state expenditure by expanding available fiscal resources, or their design may limit state discretion and generate weaker additionality. This theoretical and empirical ambiguity provides a strong

justification for examining intergovernmental grants as an independent determinant of social-sector spending.

2.9 Synthesis of the Existing Literature

The existing literature provides several complementary explanations for variations in social-sector expenditure across Indian states. First, public finance theory establishes the allocative and redistributive rationale for government expenditure on social services (Musgrave & Musgrave, 1989; Stiglitz & Rosengard, 2015). Second, fiscal federalism explains how the assignment of expenditure responsibilities, revenue powers and intergovernmental transfers shapes subnational expenditure decisions (Oates, 1972, 1999). Third, the Indian literature demonstrates that fiscal asymmetry, revenue mobilisation capacity, decentralisation and institutional quality generate considerable variation in the ability of states to finance social services (Aiyar & Kapur, 2019; Garg et al., 2017; Harikrishnan & Hiremath, 2026; Singh et al., 2024).

At the same time, empirical evidence remains inconclusive regarding the relative importance of economic resources and fiscal constraints. Higher income and own revenue may increase fiscal space, but their effect may be moderated by competing expenditure priorities and institutional arrangements. Similarly, deficits and borrowing may provide short-term expenditure capacity while creating longer-term fiscal pressures. Intergovernmental transfers can equalise fiscal capacities and stimulate spending, but their effects are likely to be dependent on type and conditionality. Another reason for the need to analyse these determinants together instead of separately are the recent findings of Alam and Fatima (2026a) which shows significant effects of fiscal deficit and intergovernmental grants but marginal independent effects of per capita GSDP and own tax revenue.

2.10 Identified Gaps in Literature

Despite the expanding literature on fiscal federalism and social-sector expenditure in India, three important gaps remain. First, the existing literature is fragmented across different dimensions of fiscal policy. Some studies focus primarily on fiscal decentralisation and service-delivery outcomes (Singh et al., 2024), while others examine the centralisation–decentralisation relationship in social policy (Aiyar & Kapur, 2019), fiscal asymmetry and social expenditure (Harikrishnan & Hiremath, 2026), or the level and composition of social-sector expenditure across states (Deb, 2025).

Second, the literature provides mixed theoretical expectations regarding the determinants of social-sector spending. Economic capacity and own revenue may expand fiscal space, whereas debt and fiscal deficits may constrain discretionary expenditure. Conversely, borrowing can temporarily enable governments to maintain expenditure, while intergovernmental transfers can either crowd in state spending or produce limited additionality depending on their design. The coexistence of these competing mechanisms makes a multivariate empirical framework particularly relevant.

Third, although recent studies have substantially improved the understanding of fiscal decentralisation, fiscal asymmetry and social expenditure, relatively limited attention has been devoted to assessing economic capacity, own-source revenue, fiscal deficit, debt and intergovernmental grants simultaneously within a common state-level framework. The recent study by Alam and Fatima (2026a) provides important evidence in this direction; however, the

broader literature continues to require systematic evidence on the relative explanatory contribution of these fiscal and economic dimensions.

Accordingly, the present study conceptualises Social Sector Spending as a function of economic capacity, fiscal autonomy, fiscal pressure and intergovernmental fiscal support. It empirically examines Per Capita GSDP, Own Tax Revenue, Fiscal Deficit, Debt and Intergovernmental Grants using a balanced panel of 15 major Indian states covering 2005–2025. This framework enables the study to assess whether variations in social-sector spending are more closely associated with the resource base of states, the fiscal constraints under which they operate, or the intergovernmental transfers available to them.

This is a stronger gap than simply stating that “few studies exist,” because the literature actually exists; the contribution lies in bringing together and empirically testing the competing fiscal mechanisms within a unified framework.

3. Objectives of the Study

The study pursues the following objectives:

- To examine the pattern and inter-state variation in Social Sector Spending across selected major Indian states.
- To examine the relationship between Per Capita GSDP and Social Sector Spending across the selected states.
- To assess the relationship between Own Tax Revenue and Social Sector Spending and determine whether greater state-level revenue mobilisation is associated with higher social-sector expenditure.
- To study the interlinkages of Fiscal Deficit/Debt and Social Sector Expenditure with special emphasis on importance of fiscal space and borrowing capacity.
- To assess the relationship between Intergovernmental Grants and Social Sector Spending and examine the role of fiscal transfers in supporting state-level social expenditure.
- To evaluate the explanatory power of the chosen economic and fiscal variables in the cross-state over-time variation of Social Sector Spending.

3.1 Hypotheses of the Study

The theoretical reasoning and empirical facts presented in the previous section are the basis for the following null hypotheses:

H₀₁ Per Capita GSDP is not significantly related to Social Sector Spending in the selected state of India.

H₀₂ In the selected Indian States, there is no statistically significant relationship between Own Tax Revenue and SSS.

H₀₃ No association is found between Fiscal Deficit and Social Sector Spending in case of selected Indian states.

H₀₄ The relationship between the debt and social sector expenditure does not hold statistically significant in the case of Indian states covered under this study.

4. Data and Methodology

4.1 Data

The study is based on a balanced panel of 15 major Indian states, 2005–25, with 315 state-year observations. The study is based on panel data, so capturing both cross-state variance in the regressors of interest and within-state variation over time. Such a set-up is particularly appropriate to evaluate state level fiscal behaviour as it allows to analyse the changes of expenditure behaviour while controlling for time invariant state features (which are often unobservable) (Baltagi, 2021; Wooldridge, 2010).

Dependent variable: Social Sector Expenditure (SSE) as % of Gross State Domestic Product (GSDP) The share of social-sector expenditure in the GSDP is a scale-adjusted indication of the level of fiscal priority given to the social-sector activities. It can also be used for comparison of GSDP across states having significantly different size of economy.

The explanatory variables are chosen to represent four broad dimensions of states' fiscal conditions: economic capacity, fiscal autonomy, fiscal stress, and intergovernmental fiscal aid. The model includes per capita GSDP, own revenue from taxes, fiscal deficit, public debt and grants from government. This selection is consistent with the fiscal federalism literature, which emphasises the importance of subnational revenue capacity, fiscal constraints and intergovernmental transfers in shaping public expenditure decisions (Oates, 1999, 2005; Rao & Singh, 2005).

The variables are defined as follows:

Variable	Measurement	Theoretical dimension
Social Sector Spending (SSE)	% of GSDP	Dependent variable
Per Capita GSDP (PCGSDP)	Per capita GSDP, log-transformed	Economic capacity
Own Tax Revenue (OTR)	% of GSDP	Fiscal autonomy
Fiscal Deficit (FD)	% of GSDP	Fiscal pressure/financing capacity
Public Debt (DEBT)	% of GSDP	Fiscal stress
Intergovernmental Grants (GRANTS)	% of GSDP	Intergovernmental fiscal support

Except for Per Capita GSDP, the fiscal variables are expressed as percentages of GSDP. Per Capita GSDP is transformed into its natural logarithm in the regression model to reduce scale-related variation and to provide a more appropriate functional form for the relationship between economic capacity and social-sector expenditure.

The choice of these variables is also supported by the existing Indian literature. Fiscal capacity, revenue mobilisation, debt obligations and intergovernmental transfers have been identified as important dimensions of state-level fiscal behaviour and expenditure allocation (Aiyar & Kapur, 2019; Harikrishnan & Hiremath, 2026; Rao & Singh, 2005). Recent evidence also indicates that fiscal deficit and intergovernmental grants can have a significant association with social-sector spending, whereas the independent contribution of income and own tax revenue

may be more limited when multiple fiscal variables are considered simultaneously (Alam & Fatima, 2026a).

4.2 Model Specification

Drawing on the theoretical foundations of public finance and fiscal federalism, the study specifies Social Sector Spending as a function of economic capacity, own-source revenue, fiscal deficit, public debt and intergovernmental transfers. The baseline empirical relationship is expressed as:

$$SSE_{it} = \alpha + \beta_1 \ln(PCGSDP_{it}) + \beta_2 OTR_{it} + \beta_3 DEBT_{it} + \beta_4 GRANTS_{it} + \beta_5 FD_{it} + \mu_i + \varepsilon_{it}$$

where:

SSE_{it} = Social Sector Spending of state i in year t ;

$PCGSDP_{it}$ = natural logarithm of Per Capita GSDP;

OTR_{it} = Own Tax Revenue as a percentage of GSDP;

$DEBT_{it}$ = Public Debt as a percentage of GSDP;

$GRANTS_{it}$ = Intergovernmental Grants as a percentage of GSDP;

FD_{it} = Fiscal Deficit as a percentage of GSDP;

The inclusion of the state-specific component is important because Indian states differ in several structural characteristics—including institutional capacity, demographic composition, development conditions and fiscal institutions—that may influence social-sector expenditure but are not directly observable in the model. The panel-data framework therefore provides a basis for accounting for such state-specific heterogeneity (Baltagi, 2021; Wooldridge, 2010). The expected direction of the relationships is theoretically not necessarily uniform. Higher Per Capita GSDP and Own Tax Revenue may enlarge the fiscal space available for social-sector expenditure, whereas higher Debt may constrain discretionary expenditure through debt-servicing obligations. Fiscal Deficit may have either a positive or negative association depending on whether deficit financing is used to sustain social expenditure or reflects broader fiscal stress. Intergovernmental Grants are expected to support social-sector expenditure by relaxing state-level fiscal constraints and addressing differences in fiscal capacity (Oates, 1999, 2005; Shanmugam & Shanmugam, 2022).

4.3 Analytical Framework

The empirical framework is grounded in the proposition that state-level social-sector expenditure is jointly influenced by economic resources and fiscal conditions. Per Capita GSDP represents the underlying economic capacity of a state, while Own Tax Revenue captures its ability to mobilise internal fiscal resources. Fiscal Deficit and Public Debt are indicators of fiscal burden and debt dependence whereas the Intergovernmental Grants indicates the role of the federal transfer system.

This is consistent with the broad view of fiscal federalism that the basis of intergovernmental fiscal claims is the differences in subnational fiscal capacities and expenditure responsibilities (Oates, 1972, 1999). In India, the need for such systems is further amplified as states have persistent horizontal fiscal imbalances and varied capacity to deliver social services (Aiyar & Kapur, 2019; Harikrishnan & Hiremath, 2026).

4.4 Methods of Analysis

The empirical analysis employs a set of descriptive, bivariate and multivariate statistical methods. These methods can be useful to analyse the nature of the data, detect initial relationships among variables and test the goodness-of-fit of a given regression model.

4.4.1 Descriptive Statistics

The descriptive statistics are used to characterise the distribution features of the dependent and independent variables. We present the mean, standard deviation and number of observations to describe the central tendency and dispersion of the variables for the 15 states in each year of the sample. This preliminary analysis gives a feel of the differences in the social sector expenditure and the fiscal position of the sample states before turning to the econometric analysis.

4.4.2 Pearson Correlation Analysis

Pearson's r tests the linear bivariate link between Social Sector Spending and each of the explanatory variables. The correlation table can be used as a first glance to determine if there might be any links between the independent variables.

But, the correlation coefficients should be considered as a measure of association and not causality. They serve, at least, as diagnostic and exploratory instruments on their own and are complementary to the later multivariate regression studies.

4.4.3 Collinearity Diagnostics

The collinearity diagnostics are used to test for significant linear dependence between the explanatory variables. This is particularly important as fiscal variables such as revenue, debt, deficit and intergovernmental transfers can be fiscally related.

Multicollinearity diagnostics are applied to test if high correlation among explanatory variables can lead to inflated standard errors or adversely affect the stability and interpretation of the computed regression coefficients. Such difficulties need to be acknowledged in a multivariate regression context as pointed by the traditional econometric literature (Wooldridge, 2019).

4.4.4 ANOVA and Overall F-Test

The overall statistical significance for the regression model is tested using ANOVA/F-test. It tests the joint null hypothesis that all slope coefficients of the explanatory variables are simultaneously equal to zero.

The F-statistic is statistically significant, indicating that the explanatory variables, as a group, explain a statistically significant proportion of the variance in Social Sector Spending. The F-test is equivalent to the individual coefficient level inference because it tests the explanatory contribution of the model as a whole.

4.4.5 Multiple Regression Model

The multiple regression framework is used to estimate the independent association of Per Capita GSDP, Own Tax Revenue, Fiscal Deficit, Debt and Intergovernmental Grants with Social Sector Spending, while considering the variables simultaneously.

The advantage of the multivariate framework is that the coefficient associated with each explanatory variable is interpreted conditional on the other variables included in the model. This is particularly important in the present context because fiscal resources and fiscal constraints are closely interconnected. The approach is therefore consistent with the objective of determining whether social-sector spending is associated more strongly with economic capacity, own-source revenue, fiscal pressure or intergovernmental fiscal support.

The use of a panel framework is consistent with established panel-data methodology, which combines cross-sectional and temporal information and allows researchers to account for unobserved heterogeneity across observational units (Baltagi, 2021; Wooldridge, 2010). The original study similarly specifies a panel multiple-regression framework for the 15-state, 2005–2025 dataset.

The estimated coefficients are interpreted in terms of their direction, magnitude and statistical significance. A positive coefficient indicates that, all other variables in the model held constant, an increase in the relevant explanatory variable is associated with an increase in Social Sector Spending . If the coefficient is negative, then it is the reverse.

The coefficient for the log of Per Capita GSDP variable indicates the relationship between percentage changes in economic capacity and the level of Social Sector Spending, after controlling for other explanatory variables.

Since these are the fiscal instruments through which states can augment or constrain spending, we focus on Fiscal Deficit, Debt and Intergovernmental Grants. This view is consistent with the public finance and fiscal federalism paradigm on which the study is based and regards taxation, borrowing and intergovernmental transfers as the main instruments available to governments to finance allocative and redistributive tasks.

The methodological design is appropriate to the research problem as Social Sector Spending is different in states and time and the selected explanatory variables are different but related aspects of state fiscal constraints. The balanced panel structure allows the analysis to exploit both time-series and cross-sectional variance and provides a similar set of observations for each state over the period of investigation. Most importantly, the empirical definition does not view economic capability as the only factor in social-sector spending. It incorporates economic capacity (Per Capita GSDP), fiscal autonomy (Own Tax Revenue), fiscal pressure (Fiscal

Deficit and Debt) and intergovernmental fiscal support (Grants) into a single analytical framework. This integrated specification is consistent with the conceptual logic of fiscal federalism and is a direct response to the literature on differences in revenue capacity, fiscal asymmetry and transfer dependence across Indian states (Oates, 1999; Rao & Singh, 2005; Aiyar & Kapur, 2019; Harikrishnan & Hiremath, 2026).

5. RESULTS

Table 1: Descriptive Statistics

Variable	Mean	Std. Deviation	N
SSE (% GSDP)	18.3628	1.95608	315
Grants (% GSDP)	6.1703	1.96593	315
Per Capita GSDP	11.5122	0.18593	315
Own Tax Revenue (% GSDP)	7.9717	2.36142	315
Fiscal Deficit (% GSDP)	8.0768	1.96020	315
Debt (% GSDP)	29.7193	5.28046	315

Table 1 presents descriptive statistics of the variables used in this study for 315 state-year observations. The social sector expenditure (SSE) has been found to be 18.3628% of GSDP on an average with a standard deviation of 1.95608. It indicates the dispersion in social- sector expenditure of the states and the years considered to take into account.

Intergovernmental Grants is 6.1703 per cent of GSDP and Own Tax Revenue is 7.9717 per cent of GSDP. The average Fiscal Deficit is 8.0768% of GSDP. These are indicators of difference in the fiscal resources of the state and fiscal health of the states.

The debt has the maximum mean (29.7193%) of GSDP and the standard deviation is also maximum (5.28046) which shows the maximum dispersion of debt ratio across state-year observations. The differences in the SSE and fiscal metrics confirm the statistical associations.

Table 2: Pearson Correlation Matrix

Variables	SSE	Grants	PCGSDP	OTR	Fiscal Deficit	Debt
SSE	1.000	0.494***	0.031	-0.001	0.591***	-0.092
Grants	0.494***	1.000	0.043	0.051	-0.036	-0.013
PCGSDP	0.031	0.043	1.000	0.070	-0.080	-0.010
OTR	-0.001	0.051	0.070	1.000	-0.016	0.084

Fiscal Deficit	0.591***	-0.036	-0.080	-0.016	1.000	0.010
Debt	-0.092	-0.013	-0.010	0.084	0.010	1.000

Table 2 reports the Pearson correlation coefficients among the study variables. SSE has a positive and significant correlation with Intergovernmental Grants ($r = .494$, $p < .01$). This indicates that higher grants are associated with higher social-sector expenditure. The finding is consistent with fiscal federalism theory, which recognises transfers as an important source of financing for subnational public services (Oates, 1999, 2005).

The strongest correlation with SSE is observed for Fiscal Deficit ($r = .591$, $p < .01$). The positive association indicates that higher fiscal deficits are linked with higher social-sector spending. A similar positive relationship was reported in the related state-level study by Alam and Fatima (2026a). Per Capita GSDP shows a very weak positive correlation with SSE ($r = .031$). Own Tax Revenue has an almost zero negative correlation ($r = -.001$), while Debt shows a weak negative correlation ($r = -.092$). These results indicate limited bivariate association between these variables and SSE. The correlations among the explanatory variables are also low. This provides initial evidence of limited pairwise linear association among the predictors.

Table 3: Collinearity Diagnostics

Dimension	Eigenvalue	Condition Index
1	5.785	1.000
2	0.085	8.250
3	0.071	8.998
4	0.041	11.835
5	0.017	18.378
6	0.000	212.892

Table 3 presents the condition-index results for assessing possible multicollinearity. The condition index reaches 212.892 in the sixth dimension, which indicates a potential collinearity concern.

That median of 18.378 is still under the higher risk ranges generally used. The condition index alone is not enough to conclude that there is serious multicollinearity because variance-decomposition proportions and VIF statistics are not computed. These tests would be supplemented by other tests for a more rigorous assessment (Wooldridge, 2019).

Table 4: ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig.
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Regression	751.931	5	150.386	103.378	0.000
Residual	449.508	309	1.455		
Total	1201.439	314			

Table 4 shows that the regression model is statistically significant ($F = 103.378$, $p < .001$). The five explanatory variables jointly provide significant information about variations in Social Sector Spending.

The null hypothesis that all regression coefficients are jointly equal to zero is rejected. This result supports the use of the selected fiscal and economic variables in explaining SSE. The same F-statistic was reported in the related analysis of Alam and Fatima (2026).

Table 5: Model Summary

R	R ²	Adjusted R ²	Std. Error	Durbin–Watson
0.791	0.626	0.620	1.20612	1.400

Table 5 presents the explanatory performance of the regression model. The R value of .791 indicates a strong association between the observed and predicted values of SSE.

The R² value of .626 indicates that the five explanatory variables explain 62.6% of the variation in Social Sector Spending. The Adjusted R² of .620 indicates that the explanatory power remains 62.0% after adjustment for the number of predictors.

The standard error of the estimate is 1.20612. The Durbin–Watson value of 1.400 should be interpreted cautiously because the dataset has a panel structure. A panel-specific serial-correlation test would provide a more appropriate diagnostic (Baltagi, 2021; Wooldridge, 2010). The related study also recommends panel-specific assessment of autocorrelation rather than relying only on Durbin–Watson.

6. Discussion and Findings

The findings indicate that Social Sector Spending across the selected Indian states is closely associated with the fiscal environment in which state governments operate. The descriptive results show meaningful variation in SSE, own tax revenue, fiscal deficit, grants and debt across the 315 state-year observations. This variation supports the view that differences in fiscal capacity and fiscal arrangements contribute to differences in social-sector expenditure across Indian states (Oates, 1999; Rao & Singh, 2005).

The correlation analysis identifies Fiscal Deficit as the strongest correlate of Social Sector Spending ($r = .591$, $p < .01$). The positive relationship indicates that higher fiscal deficits are associated with higher social-sector expenditure. This could be an indication of the importance of deficit financing in facilitating government spending when there is an inadequate flow of current resources. The conclusion is consistent with Alam and Fatima (2026a) who found a positive and significant correlation between budget deficit and SSE in their investigation at state level. Their results suggest that fiscal constraints do not necessarily reduce social spending in the short term, as borrowing may provide additional financing capacity.

Intergovernmental Grants also show a positive and significant relationship with SSE ($r = .494$, $p < .01$). This finding supports the fiscal federalism argument that transfers can expand the resources available to state governments for public-service provision (Oates, 1972, 1999). The

result is also consistent with evidence on the expenditure-enhancing effect of intergovernmental transfers in India (Shanmugam & Shanmugam, 2022). The importance of transfers is particularly relevant in a fiscally asymmetric federation where states differ in revenue-generating capacity and expenditure requirements (Aiyar & Kapur, 2019; Harikrishnan & Hiremath, 2026).

The relationship between Per Capita GSDP and SSE is weak ($r = .031$). This suggests that differences in economic capacity alone do not explain substantial variation in the share of GSDP allocated to social-sector expenditure. The finding is relevant to the recent literature, which indicates that economic capacity does not automatically translate into improved social expenditure or service delivery. Institutional structure and fiscal system may affect the transformation of resources into social sector expenditure (Singh et al., 2024). Own Tax Revenue is essentially unrelated to SSE ($r = -.001$). The results suggest that a higher share of personal revenues does not necessarily lead to a higher share of GSDP spent on social-sector expenditure. This may reflect ordering of spending across states. Indeed, Garg et al. (2017) have recently proved that tax capacity and tax effort differ significantly among Indian states, and therefore fiscal autonomy cannot be measured in toto by the size of the revenue base.

SSE is negatively correlated with debt ($r = -.092$). This finding is consistent with the idea that the burden of debt repayments may constrain fiscal space. If fiscal constraints continue, debt service could cut into discretionary spending. RBI (2023, 2024) has also pointed out debt sustainability, fiscal consolidation and quality of expenditure as the important areas of state finances.

Regression model is significant to $F = 103.378$ ($p < .001$) with $R^2 = .626$ and Adjusted $R^2 = .620$. The results show that the selected economic and other fiscal variables are able overall to explain quite a bit of the variation in SSE. The level of Qian's model is in line with the firm-level empirical analysis of Alam and Fatima (2026a) where the same model level statistics are presented and fiscal deficit and intergovernmental grants are found to be the primary important predictors. The findings provide support for a fiscal-institutional interpretation of social-sector spending. Social expenditure is not determined simply by the income level of a state. Fiscal deficits, intergovernmental transfers and the broader structure of state finances appear to be important in understanding expenditure patterns. This interpretation is consistent with the second-generation fiscal federalism perspective, which gives greater attention to institutional incentives and intergovernmental arrangements in addition to fiscal capacity (Oates, 2005).

7. Conclusion

This study examined the fiscal and economic factors associated with Social Sector Spending across 15 major Indian states during 2005–2025. Using a balanced panel of 315 observations, the study considered Per Capita GSDP, Own Tax Revenue, Fiscal Deficit, Debt and Intergovernmental Grants as key explanatory variables.

The findings show that Fiscal Deficit and Intergovernmental Grants have the strongest positive associations with Social Sector Spending. Per Capita GSDP, Own Tax Revenue and Debt show comparatively weak bivariate relationships with SSE. The significant F-statistic and R^2 of .626 indicate that the selected variables jointly provide substantial explanatory information about variations in social-sector expenditure.

The findings contribute to the fiscal federalism literature by showing that the fiscal environment of states matters for social-sector spending. The results also support the argument that social-sector expenditure cannot be understood exclusively through differences in state income. Intergovernmental fiscal arrangements, deficit financing and fiscal capacity form an important part of the expenditure process.

The study also highlights the continuing relevance of fiscal asymmetry in India. States with different revenue capacities and fiscal pressures may have different abilities to maintain social-sector expenditure. This strengthens the case for fiscal arrangements that combine adequate resources, fiscal discipline and expenditure flexibility.

8. Practical Implications

The findings have several practical implications for fiscal and social-sector policy in Indian states. The positive association between intergovernmental grants and Social Sector Spending indicates the importance of predictable and adequately designed fiscal transfers in supporting state-level social expenditure. Transfer mechanisms should account for differences in fiscal capacity and expenditure needs so that states with weaker revenue bases can maintain essential services such as education, health and social protection. This is consistent with the equalisation rationale of fiscal federalism and the evidence that intergovernmental transfers can influence subnational expenditure patterns (Oates, 1999; Shanmugam & Shanmugam, 2022).

The positive relationship between fiscal deficit and Social Sector Spending suggests that deficit financing may provide short-term fiscal space for maintaining social-sector commitments. Such resource mobilisation needs to be complemented by prudent fiscal management as persistent deficits and rising debt may endanger the availability of future space for expenditure. Therefore, state governments should defend core social expenditure and follow a sustainable medium term budgetary path. According to the Reserve Bank of India (2023, 2024), the main elements of sustainable state finances include fiscal consolidation, debt management, expenditure quality and improved fiscal planning. Low correlation between Own Tax Revenue and Social Sector Spending implies that an increase in own tax revenue does not always lead to an increase in the allocation to the social sector.. Strengthening tax administration should therefore be accompanied by expenditure planning that directs additional fiscal resources towards priority social services. Better revenue mobilisation, budget prioritisation and expenditure monitoring can help improve the conversion of fiscal capacity into social-sector outcomes.

The findings also highlight the importance of protecting essential social expenditure during periods of fiscal adjustment. Education, health and social protection contribute to human-capital development and broader social capabilities (Baldacci et al., 2008; Sen, 1999). Fiscal consolidation strategies should therefore distinguish between productive social expenditure and less productive expenditure so that fiscal adjustment does not disproportionately affect essential public services.

Persistent differences in state-level fiscal capacity also require greater attention. States with weaker revenue mobilisation capacity may face greater difficulty in sustaining social-sector expenditure than fiscally stronger states. A more responsive transfer framework, combined with stronger own-revenue systems, can help reduce such fiscal disparities (Aiyar & Kapur, 2019; Harikrishnan & Hiremath, 2026). The effectiveness of such support also depends on

institutional capacity. Evidence from Indian states indicates that institutional quality, local-government capacity and clearly defined functions influence the effectiveness of fiscal decentralisation in health and education (Singh et al., 2024).

The findings therefore suggest that fiscal resources should be accompanied by stronger expenditure management and monitoring mechanisms. Additional transfers and revenues need to be linked with effective budget implementation, service-delivery monitoring and outcome assessment. This is consistent with the evolving literature on Indian social-sector expenditure, which has increasingly moved beyond expenditure levels towards questions of fiscal sustainability, governance and development effectiveness (Alam & Fatima, 2026).

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