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What determines the provision of free elementary education across Indian states?

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Abstract

An analysis of relevant data for 27 Indian states from 2005-06 to 2016-17 indicates that there were considerable variations in the provision of free elementary education (FEE) across states. While there was a slight decline in the access dimension of FEE, especially after the implementation of the Right to Education (RTE) Act in 2010, there were improvements in physical infrastructure, quality, and student support dimensions. The fixed-effect panel regression estimates overwhelmingly suggest that the FEE provision increases with per capita real NSDP, and decreases with child population growth and private school enrollment. Further, there is some evidence of FEE provision decreasing with an increase in rural population share and of it increasing with increases in child population share and the number of secondary schools.

***Keywords*:** Free elementary education (FEE), Right to education (RTE) Act, India, access to education, per capita real NDSP, educational opportunity, education infrastructure

***JEL Codes*:** I24; I25; I28

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1. Introduction

Growing evidence shows that the contribution of elementary education toward economic growth is relatively higher than that of secondary or tertiary education in developing countries (Petrakis and Stamatakis, 2002; Psacharopoulos, 1994; Rosenzweig, 1995).[1] Therefore, achieving the goal of universal elementary education (UEE) has taken the center stage in the pursuit of overall growth and development in those countries. In order to reach this goal, most developing countries have embarked on delivering free elementary education (FEE). Note that free education refers to the removal of all types of barriers that prevent children from pursuing and completing a particular level of education with reasonable quality. Provision of FEE in developing countries is warranted by the fact that the direct costs of schooling and low quality education are significant barriers to enrollment and school completion rate (Dreze and Kingdon, 2001), especially for children belonging to poorer and weaker sections of the society (Deininger, 2003; Glewwe, 2002).

Like other developing countries, India has made a renewed attempt to deliver FEE since the early 2000s. The country abolished fee from all government primary and upper primary schools in 2005 and has been distributing free textbooks and uniforms to the students. Furthermore, efforts have been made to improve the quality of education by reducing class size (Bernal et al., 2016; Krueger, 1999; Lee and Barro, 2001; Pedder, 2006) or pupil-teacher ratio (Duflo et al., 2015) and raising the quality of teachers (Azam and Kingdon, 2015; Hanushek and Rivkin, 2010). Consequently, there has been a rapid expansion of government (public) schools at the elementary

[1] The Universal Declaration of Human Rights in 1948 used the term 'elementary education' to refer to the pre-secondary stage of education. In India, elementary education is the combination of primary (classes I – IV/V) and upper primary (classes V/VI – VII/VIII) schools.

level in recent years. Between 2005-06 and 2015-16, the government added about 150 thousand elementary schools thereby raising the total number from about 0.93 million to about 1.08 million. The average number of teachers per school has increased from 3.7 to 4.3 during the same period.

Notwithstanding the importance of and persistent efforts to deliver FEE, the key questions are: has India been able to deliver FEE? And, what determines the public provision of FEE? The current study attempts to address these questions by constructing a composite index to measure the provision of FEE in different states of India and by estimating panel data regression models to explore its determinants. Previous studies estimate household direct costs of schooling in India (Bhattacharya, 2012) to get an idea of the extent of free education available to the students. However, their empirical strategies do not capture the quality of education that, as we mention above, has been a defining characteristic of FEE. In this study, by construction, we control for both household direct costs of schooling and education quality in a composite measure of the FEE provision by combining a large number of indicators under four dimensional categories.[2]

The results based on secondary data for 27 states from 2005-06 to 2016-17 indicate that there were considerable variations in the provision of FEE across states. While there was a slight decline in the access dimension of FEE, particularly after the implementation of the Right to Education (RTE) Act in 2010, there were improvements in physical infrastructure, quality, and student support dimensions of FEE. However, the growth of FEE was not uniform across the states. Consequently, their relative positions in the provision of FEE changed over time. The fixed-effect panel estimates of the regression model lead us to conclude that the provision of FEE increases with per capita real NSDP, and decreases with child population growth and private school enrollment. There is some evidence of FEE provision decreasing with an increase in rural population share and of it increasing with increases in child population share and the number of secondary schools. There is little

[2] Households' indirect costs of schooling are the opportunity costs of going to schools. In general, poor households have higher opportunity costs (Kane, 2004).

evidence of the government elementary education expenditure share and the RTE Act implementation having any significant impact on the provision of FEE.

To the best of our knowledge, this is the first study to quantify the provision of FEE in a comprehensive manner by combining four different dimensions consistent with the concept of FEE articulated by the government of India. Further, ours is perhaps the first study to draw intuitions from a market demand-supply model framework to investigate the factors that determine the provision of FEE using a panel regression model. These findings not only provide with important insights into the across-state variations in the provision of FEE but they are also informative to the policymakers. While, in general, government's developmental efforts including population control could be catalytic in achieving UEE, specific policies that influence the growth of private and secondary level schools are likely to have implications for the provision of FEE.

The rest of the paper is organized as follows. Section 2 presents an overview of India's policies and programs to deliver FEE with a focus on financing these programs. The methods, model, and data used in the current study are discussed in Section 3. Section 4 presents the empirical results and their discussions. The final section includes our concluding remarks and policy implications.

2. Evolution of FEE in India

2.1 Policies and programs

Since the promulgation of India's Constitution in 1950, a multitude of national and state education policies and programs have reiterated the governments' commitment to deliver UEE.[3] However, the

[3] Some of the most notable education policies and programs in independent India until the turn of the 21st century are the National Policy on Education (NPE) 1968 and 1986 [revised as a Program of Action (POA) in 1992], the Operation Blackboard (OB) 1987, the District Primary Education Program (DPEP) 1994, the Mid-Day Meal (MDM) Scheme 1995, and the Education Guarantee Scheme (EGS) 1997. The new NPE was formulated in 2016 and enacted in 2020 more than three decades later since the last NPE of 1986 with the aim to complete the unfinished task of previous policies and to improve the quality of education at all levels.

policies launched and implemented since the Second Five Year Plan (1956-1961) until the 1990s had a clear bias toward higher education. A lack of clarity in policy mechanisms, particularly with respect to elementary education, during this period led to very limited success in providing UEE. In 2001, the central government launched the *Sarva Siksha Abhiyan* (SSA) that laid down various norms and standards for government schools to improve the quality of education and to achieve the goal of UEE.

At the time of introduction of SSA, 35.5 percent of India's total population or 360 million people were illiterate. The adult illiteracy rate was even higher at 39 percent (illiterates of age 15 and above as a percentage of total adult population) while female illiteracy rate was 52.2 percent. This large number of illiterates indicates lackadaisical effort to fulfill the constitutional dream of UEE. India was already five decades behind her constitutional outlook. This status provided the context for the 86th Amendment Act (2002) of the Indian Constitution that enshrined the 'Right to Education' as a fundamental right for all children aged between 6–14 years. In 2009, the 'Right to Education Bill' was notified as children's Right to Free and Compulsory Education (RTE) Act. With the RTE Act coming into force on April 1, 2010, India joined the group of over 130 countries that have promised to deliver free education.[4]

The RTE Act redefines the norms and standards of the SSA to deliver FEE in the country. It lays out specific norms regarding availability and quality of physical infrastructure, teacher, distance to schools from habitations, availability of free textbook, uniform, and so on and so forth. Thus, the Act has important implications for the overall implementation strategies of the SSA in subsequent periods. The combined RTE-SSA program articulates the SSA implementation strategies consistent with the mandates of this new Act.

[4] The RTE Act has not been implemented in Jammu & Kashmir that was enjoying the status of 'special state' until recently. However, in March 2010, the state government under its Jammu & Kashmir School Education Act 2002 incorporated several provisions of the RTE Act to bring it at par with the central RTE Act 2009.

2.2 Financing FEE

While the strategy for the delivery of FEE in India has been impressive, there has also been considerable growth of budgetary allocation for elementary education as a share of GDP as well as total expenditure on education. The budgetary expenditure for elementary education increased from 1.61 percent (with 1.23 percent state share and 0.38 percent central share) of country's GDP in 2005-06 to about 1.81 percent (with 1.37 percent state share and 0.44 percent central share) in 2016-17.[5] The central government expenditure for elementary education increased about 11 folds from Rs. 35.8 billion in 2001-02 to Rs. 386.1 billion in 2014-15. However, this allocation decreased to Rs. 344.2 billion in 2016-17. Further, the central government approved Rs 2.3 trillion for the implementation of combined RTE-SSA program during the period from 2010-11 to 2014-15.

In India, the governments incur education expenditures under three different sub-heads: revenue account, capital account, and loans and advances. The revenue account share of total expenditure on elementary education remained more or less constant (around 50 percent) during 2005-06 to 2016-17. However, there were substantial variations across states. In 2016-17, the revenue account share was the highest in Uttarakhand (78.6 percent) followed by Jharkhand (64.9 percent) and Gujarat (59.9 per cent). This share was considerably low in smaller states like Goa (23.9 percent).

Within the revenue account, the share of plan expenditure (mostly non-recurrent in nature) increased from 34.1 percent in 2005-06 to 35.7 percent in 2016-17. The central government finances about 75 percent of total plan expenditure whereas the state governments fund the remaining plan expenditure and almost all (99 percent) non-plan expenditure - mostly recurrent in nature (Tilak, 2009).[6] Sub-head wise expenditure data also indicate that most expenditure required for implementing RTE-SSA norms falls under the plan expenditure. Since the central government had

[5] Figures for the year 2016-17 are based on budget estimates.
[6] In the Union Budget 2017, Indian government has removed the distinction between plan and non-plan expenditure and switched to capital and revenue spending classification.

already increased budgetary allocation for expenditure under both plan and non-plan heads prior to the RTE Act, there has been an increased burden of expenditure on state governments (Tilak, 2009). As a result, the low-income states that are unable to meet the additional cost are continuously experiencing a low per student expenditure compared to the national average.

3. Methods, model, and data

As discussed above, FEE by definition is not a unidimensional concept. Therefore, we need to develop a measure that combines all different dimensions and various elements within each dimension. To that end, we construct a composite index of FEE following a method as described below. Further, in order to examine the determinants of FEE provision, we specify a regression model based on a theoretical framework and use appropriate regression estimation method. Finally, we obtain the appropriate secondary data to calculate the proposed composite index scores and to estimate the regression model. This section is subdivided into three subsections that respectively describe the method for construction of the composite index, specify the regression model and describe the method to estimate it, and discuss the data and data sources.

3.1 Method for constructing a FEE Index

To obtain a quantitative measure of the provision of FEE, we construct the free elementary education index (*FEEI*) using a methodology akin to that for the computation of social security livelihood index (SLSI) proposed by Swaminathan (1991). Our composite index combines eighteen indicators, as listed in Table 1, that reflect various quantity and quality aspects of FEE as conceptualized in the government policy. In order to capture four different dimensions of FEE, namely access to education, physical infrastructure in school, quality of education, and individual

supports to students, we first construct four sub-indices. Let $FEEI_{ij}$ be the sub-index for the i^{th} dimension of *FEEI* in state *j* and X_{ij} be the value of the indicator representing the i^{th} dimension of FEEI in the j^{th} state. We use the following formula to calculate the sub-index.

$$FEEI_{ij} = \frac{1}{K}\sum_{k=1}^{K} x_{ij}^{k} \quad (1)$$

Where $x_{ij}^{k} = \frac{X_{ij}^{k} - \min(X_{ij}^{k})}{\max(X_{ij}^{k}) - \min(X_{ij}^{k})}$ is the normalized value of an indicator variable X_{ij}^{k} and max(X_{ij}^{k}) and min(X_{ij}^{k}) are respectively the across-state maximum and minimum values of the indicator for each year. *k* (*k* = 1, 2, …*K*), *i* (*i* = 1, 2, …, *I*), and *j* (*j* = 1, 2, …, *J*) index indicator variable, FEE dimension, and state respectively. In order to minimize over-crowding of notations, we do not use a time index. After calculating different $FEEI_{ij}$s representing different dimensions of FEE, we calculate the overall $FEEI_j$ as the weighted average of sub-indices as follows:

$$FEEI_j = \sum_{i=1} w_{ij} FEEI_{ij} \quad (2)$$

where, w_{ij} is the weight assigned to the i^{th} dimension of *FEEI* in the j^{th} state and $\sum_{i=1}^{I} w_{ij} = 1$. These weights are normalized factor-loadings of the first common factor obtained from a principal component analysis (PCA) of the sub-indices.[7] *FEEI* takes a value between 0 and 1 that represent the minimum and maximum provision respectively. Note that the four sub-indices representing the four dimensions of FEE as discussed above are: Access to Education Index (AEI), Physical Infrastructure Index (PII), Quality of Education Index (QEI), and Individual Support Index (ISI).

3.2 **Regression model and method**

We now specify our regression model to examine the factors that determine FEE provision. Considering that there are time-invariant state-specific factors with potential differential impacts and

[7] This is a common approach used by several studies. For example, see Ruel and Menon (2002), Mckenzie (2005).

that there are time variant factors with potential impacts on FEE across states, we use a fixed-effects panel data model of the following form:

$$FEEI_{jt} = \alpha + \sum_{i=1}^{M} \beta_i z_{ijt} + \theta_j + \mu_t + \varepsilon_{jt} \quad (3)$$

where t indexes time or year (where t = 2005-06, 2006-07, …, 2016-17); j indexes state (j = 1, 2, …, 27); i indexes the independent variable (i = 1, 2, …, M); α is the intercept; β_i's are the coefficients associated with the independent variables z_{ijt}'s; θ_j is the state fixed effect; μ_t is the time fixed effect; and ε_{jt} is the error term.

We use a reduced-form market demand and supply model framework to identify the potential factors (independent variables) that affect FEE provision. We consider three categories of factors with potential impacts on either the demand side or the supply side or on both. Since we exploit state-level variations for our empirical analysis, these are state-level variables. We discuss the variables under each of the three categories.

3.2.1 Economic variables

We consider two variables that reflect the overall economic prosperity and structure of a state: per capita income (measured by per capita real Net State Domestic Product – NSDP) and rural population share. Previous studies highlight the role of income or economic growth in determining educational expenditure (Bils and Klenow, 2000; Strawczynski and Zeira, 2003). We would expect that higher income leads to higher FEE. This is a supply side effect of income on FEE. On the demand side, the effect is ambiguous. While higher income may lead to higher demand for FEE, it may lead to lower demand after income reaches a specific threshold. In other words, FEE may be a normal good up to a specific income level beyond which it would be an inferior good. Overall, although a positive relationship between income and FEEI is a more likely outcome, there is a possibility that it is negative.

We consider rural population share as indicative of the economic structure and the level of economic development of a state. There is limited access to government schools in rural areas where a large section of the population is still not covered by schooling facilities. The existing schools in rural areas are often deficient in physical infrastructure such as school building, number of classrooms, library etc. and quality measures such as the number of teachers, number of professionally trained teachers etc. Thus, states having larger rural population are likely to have lower supply of FEE. However, what happens on the demand side is not clear. Since the average income in rural areas is lower than that in urban areas, demand for FEE may go both ways depending on whether it is treated as a normal or an inferior good. Thus, the nature of association between rural population share and FEE is not clear a priori.

3.2.2 Demographic variables

We consider five demographic variables: population growth, child population growth, share of child population, infant mortality rate, and child sex ratio. These are primarily demand side factors. Intuitively, if population grows at a faster rate the number of school-going children is expected to grow and the demand for education in general is likely to go up. It may be further argued that high population growth does not automatically translate into high growth of children in the elementary school age group, specifically when there is high incidence of infant mortality that also varies across states. Furthermore, a state may experience relatively high population growth due to migration of adults from other states (or countries). Therefore, child population growth is a better measure of growth in demand for education in general and of FEE in particular. Age distribution of the population is also an important factor that affects demand for education. A large proportion of children generate higher demand for school education than do a large proportion of adults.

Therefore, we consider the share of children (age 6 – 13) in total population as a potential determinant of FEE.

We consider infant mortality rate as a potential determinant of FEE. For a given population (and given population growth rate), a larger infant mortality rate implies a smaller growth of the child population in the elementary education age group. This is likely to affect the demand side of elementary education in general and FEE in particular. Thus, we would expect a negative relationship between infant mortality rate and FEE.

Further, there is much evidence of gender bias in education expenditure by the households. Azam and Kingdon (2013), Lancaster et al. (2008) and Saha (2013) report gender bias in intra-household allocation of resources to education: parents generally send their male children to fee charging private schools and the female children to fee free government schools. Thus high child sex ratio (female child per male child) may positively affect FEE by raising the number of enrollment per government schools.

3.2.3 Education variables

We use three education variables: share of private school enrollment, the number of secondary schools per thousand population, and education expenditure.

Intuitively, private or private-aided schools are substitutes for government schools. There are two competing mechanisms through which private school enrollment can affect FEE. *First*, a high enrollment share of private and private-aided schools reduces enrollment per government school and thereby improves quality indicators like pupil teacher ratio (PTR) and student classroom ratio (SCR) assuming that the number of government schools do not change.[8] Thus, it will have a positive

[8] Private-aided schools in India are a specific form of public-private partnership (PPP) in school education where governments pay an annualized/lump-sum amount to the private providers who build infrastructure and run the institution and the later recover other costs through user charges.

impact on FEE. *Second*, an increase in private school enrollment may reduce the number of government schools per thousand of children population, which in turn would negatively affect access to free education. The net effect of these two opposite forces is difficult to know a priori.

Greater opportunity for secondary level education may influence demand for and provision of elementary education thereby influencing FEE. At a basic level, we may think of secondary education as a complement to elementary education. Thus, greater access to secondary education is likely to increase demand for elementary education. Further, more secondary education may increase the awareness and quality of elementary education.

Government spending on elementary education is a policy variable. Since education is a state subject in India, there are substantial variations across the states. In general, a larger share of state domestic income spent on elementary education is expected to have a positive impact on educational outcomes including FEE.

Although we have discussed these potential factors all at once, our approach to the regression analysis would be to start with a parsimonious baseline specification that includes a subset of the above variables and to examine the relevance of others by expanding the specification with the consideration of potential issues regarding estimation.

3.3 Data

We obtain the relevant data for our analysis from various departments of the Government of India. Our sample includes data for 27 Indian states covering the time-period from 2005-06 to 2016-17.[9] The data on education variables are drawn from the State Report Cards (SRC) of the District Information System for Education (DISE), published by the National University of Educational

[9] The state of Telangana has been excluded from the analysis as it was carved out of Andhra Pradesh in 2014. Thus, for the years 2014-15, 2015-16, and 2016-17 we consider undivided Andhra Pradesh.

Planning and Administration (NUEPA) and the Annual Status of Education Report (ASER). Other major data sources include the Analysis of Budgeted Expenditure on Education, Reserve Bank of India (RBI) website, and the Central Statistical Office (CSO), Ministry of Statistics and Programme Implementation. We use standard interpolation or extrapolation techniques to fill in for the missing observations. Note that, for the purpose of comparison in our discussion of data and FEEI, we divide the states into low and high-income states based on whether average per capita real NSDP over the sample period is respectively lower or higher than the all-India average. Appendix Table A.1 lists the states along with average per capita real NSDP and their respective classifications.

[Insert Table 1]

Table 1 presents the summary of the 18 indicator variables used for the construction of FEEI. As we observe, in most cases, there are glaring disparities across states as reflected in the extreme (minimum and maximum) values of the indicators. An inspection of state-level data indicates that access to education is higher in low-income states where there are more government schools per sq. km and per thousand of child population. However, the number of government schools per thousand of child population has experienced a falling trend in almost all states. This may have been driven by two factors: increase in population relative to the number of schools, and closure and/or merger of existing schools due to falling demand for enrollment in government schools. In contrast, the high-income states are far ahead of the low-income states in physical infrastructure of schools and quality of education as reflected in the relevant variables. However, some of the indicators of education quality, such as percentage of professionally-trained regular teachers and percentage of schools inspected, declined in value over time. In indicators of individual supports to students, we do not observe any significant differences between states at different income levels.

[Insert Table 2]

Table 2 presents the summary statistics of the regression variables that include the dependent variable: FEEI, and the potential explanatory variables. There are significant variations in these variables across states. Among the economic variables, per capita real NSDP (in 2004-05 constant prices) widely varies between ₹7,588 and ₹154,025 with a mean of ₹ 39,414. Based on the average per capita real NSDP over the sample period, we divide the states into high-income and low-income categories. We use the average real NSDP across states and over the sample period as the threshold for such classification. A list of the sample states along with their average real NSDPs and their classification is presented in the Appendix table. Although about 71 per cent of the people in India live in rural areas, this ratio varies from about 37 percent in Goa (2016-17) to 90 per cent in Himachal Pradesh (2005-06). The share of child population in the age group of 6 to 13 years varies from about 9 per cent in Goa (2005-06) to about 24 per cent in Bihar (2011-12). The child population in the age group of 6-13 years has been growing at a modest rate with several states experiencing negative growth. While small but rich states like Goa experienced rapid population growth (3.7 per cent in 2009-10), the population in large developed states like Tamil Nadu grew at a much lower rate (0.53 per cent in 2016-17). There are wide variations in infant mortality rate that ranges from 8 per thousand live births in Goa (2016-17) to 76 in Madhya Pradesh (2005-06) reflecting wide disparity in healthcare and health outcomes. The average child sex ratio varied between 78 girls per 100 boys in Punjab to a ratio of 1 in Goa. This represents a wide disparity and it has been growing in many states over the years.

Although the private school enrollment has been rising in all states, there has been wide disparity. The share of enrollment in private elementary schools ranges from 0.14 per cent in Bihar (2009-10) to 81.6 per cent in Goa (2016-17). Further, while Mizoram has 73 secondary schools per 100,000 population in 2016-17, Bihar had only 3 in 2005-06 and it increased only to 8 in 2016-17. Finally, while Arunachal Pradesh spent about 5.7 per cent of NSDP on elementary education in

2009-10, Nagaland spent as little as 0.39 per cent a year earlier. There have been considerable variations in the government expenses on elementary education over the sample period.

4. Results and discussions

In this section, we present and discuss the results from our empirical analysis. First, we present the values of sub-indices that reflect various dimensions of FEE in different states highlighting their differences. We then report the FEEI values for the sample period and discuss their patterns and trends. Second, we present and discuss the results from the regression analyses.

4.1 Measuring FEE across states

4.1.1 FEE dimension indices

As we have discussed above, the concept of FEE is not simply confined to free school enrollment, textbooks, and uniforms but extended to wide ranging aspects that reflect four dimensions of FEE. While it is important to examine the overall evolution of FEE, it would be useful to take a look at the dimensional sub-indices across the Indian states as well as over time.

[Insert Table 3]

Table 3 presents the FEE dimension index values for 2005-06, 2010-11, and 2016-17. We make the following general observations about AEI. First, low-income states had higher access to FEE during the sample period. Second, access to FEE declined over time. In particular, the post-RTE Act period witnessed a steady decline in the value of AEI. In contrast to AEI, PII increased over time and the high-income states experienced a higher growth than did the low-income states. Further, during the pre-RTE Act period, PII grew faster than during the post-RTE Act period. QEI exhibited similar trends and patterns of growth during the sample period. Individual supports to

students grew in most states but they grew faster during the pre-RTE period than during the post-RTE period.

[Insert Figure 1]

In order to highlight the differences in various FEE dimensions across states, we now plot a radar diagram of the average value (average over the sample period) of each FEE dimension in Figure 1 (a) – (d). As Figure 1(a) shows, AEI is higher in most of the low-income states relative to the national average (shown by the red line), with a few exceptions, such as Himachal Pradesh, Mizoram, and Uttarakhand. Kerala holds the lowest position with an index value of 0.054. The reason is obvious as Kerala has fewer government schools per sq. km and per thousand child population (6-13 years). In contrast, some of the low-income states like Assam, Bihar, Chhattisgarh, and West Bengal have relatively higher scores.

In contrast, high-income states have higher scores in PII and QEI as reflected Figure 1 (b) and (c) respectively. That is, low-income states are lagging behind the high-income states in terms of school infrastructure and quality of education. In both PII and QEI, Tamil Nadu and Kerala, respectively, hold the first two positions. PII values for all north-eastern (NE) states are lower than the national average, except for Tripura which has slightly higher PII value than the national average. Meghalaya has the least infrastructure facilities in schools followed by Jammu & Kashmir and Arunachal Pradesh. Variation of infrastructure facilities across states is the highest among all dimensions, with a standard deviation of 0.145. At least nine states (mostly low-income) are lagging behind the national average in terms of both PII and QEI. This indicates that the poor states have expanded government schools at the cost of quality – a phenomenon observed by Avenstrup et al. (2004) in developing country case.

Finally, low-income states are doing better in providing individual supports to students, as shown by Figure 1(d). This may be because these states have higher share of enrollment in

government schools (around 75 percent) where students receive textbooks, uniforms, and midday meal free of cost. The share of enrollment in government schools in high-income states is around 50 percent.

4.1. 2 Composite FEEI

Table 4 presents the FEEI scores across Indian states from 2005-06 to 2016-17. We make the following general observations. *First*, there were substantial differences in the provision of FEE across states in the beginning of the sample period and those differences did not disappear nor did they exhibit any specific trend. *Second*, most high-income states had high FEEI scores indicating relatively higher provision of FEE. A casual inspection of the sub-indices reveals that relatively better physical infrastructure and higher quality of education in those states are primarily responsible for their high performance scores as compared to low-income states.

[Insert Table 4]

Third, the provision of FEE increased across the states during the sample period as indicated by rising FEEI scores. There were variations across states. Interestingly, low-income states like Meghalaya, Arunachal Pradesh, Jharkhand, Jammu & Kashmir, Odisha, West Bengal, Chhattisgarh, Rajasthan, and Madhya Pradesh experienced growth higher than all India average. In contrast, the growth rate was dismal in Bihar, Uttar Pradesh, Assam, Tripura, and Manipur. Further, the FEE provision grew rapidly in high-income states like Punjab, Himachal Pradesh, and Goa as well. Due to these differential growths across states, their relative positions changed over the sample period. In particular, low-income states like Chhattisgarh, Jharkhand, and Rajasthan made considerable strides. In contrast, the relative position of states like Assam and Manipur slid down. *Fourth*, while the growth of FEE provision has been smooth in about two-thirds of the states, it has been volatile in low-income states like Andhra Pradesh, Assam, Manipur, and Uttar Pradesh; and high-income states like Haryana, Kerala, Maharashtra, and Tamil Nadu.

Finally, the growth of FEE provision accelerated after the implementation of the RTE Act. As Col. (13) & (14) show, there are wide variations across states. During the pre-RTE period, seven states experienced decline in the provision of FEE. However, during the post-RTE period, except for Tripura, all other states in our sample experienced growth. During this period, a number of low-income states like Odisha, West Bengal, Chhattisgarh, Bihar, Jharkhand, Jammu & Kashmir, Arunachal Pradesh, and Madhya Pradesh experienced growth faster than the all India average. High-income states like Mizoram, Himachal Pradesh, Haryana, Punjab, and Goa also joined this group of states with fast growing provision of FEE. In contrast, low-income states with faster growth of FEE provision during the pre-RTE period such as Meghalaya, Rajasthan, Nagaland, Tripura, and high-income states like Kerala, Karnataka, Gujarat, and Maharashtra experienced substantially lower growth in FEE provision during the post-RTE period.

Overall, we observe substantial variations in the provision of FEE across states and over time. It seems that there were considerable improvements in physical infrastructure and some of the quality aspects of elementary education, which in turn led to an overall improvement in FEE provision. However, to understand the underlying driving forces, we need a much deeper analysis based on theoretical intuitions.

4.2 Regression results

Given our discussion on the regression model specification and that we have limited number of observations (27 states × 12 years = 324), we start with a parsimonious baseline model and then add additional variables in order to examine the robustness of our results. Accordingly, we first pick seemingly the most important variables from each of the three categories discussed above: per capita NSDP, population share of children (of age 6 -13 years), and the share of private school enrollment. Further, we include the state and time fixed effects. The results are reported in Col (1) of Table 5. As

the results indicate, per capita NSDP and child population share have statistically significant positive impacts and private school enrollment has significant negative impact on the provision of FEE. These results seem to suggest that FEE is a normal good and the demand for which increases with the share of children population. Together with our observation in the last section, this result seems to further suggest that as income increases, the demand for quality aspects of FEE increases. Elementary education provided by private schools is a substitute of FEE. A one per cent increase in per capita NSDP increases the FEEI by approximately 0.00083, a one percentage point increase in child population share increases it by 0.002, and a one percentage point increase in private enrollment share decreases the index value by 0.0006. While the qualitative results are intuitive and important, the quantity estimates are not very useful. For example, what does a difference of 0.00083 in FEEI value tell us? How different are the situation in these two cases? The joint test result for redundancy of state and time fixed effects, reported at the bottom of the table, indicates that the fixed effects are important sources of variations in FEEI and, therefore, the model specification is appropriate.

[Insert Table 5]

To see if the implementation of the RTE Act in 2010 has any significant impact on FEE provision, we now include a dummy variable that takes the value of 1 for the years 2010 onward (post-RTE period) and 0 for previous years. Since this dummy capture some of the same effects captured by the time fixed effects, we cannot include both without facing the collinearity problem. Therefore, we modify the baseline specification by replacing time fixed effects by the RTE dummy variable. Col. (2) presents the coefficient estimates. The signs and significance of the estimated coefficients for per capita real NSDP remain the same as before although they are quantitatively different. While the implementation of RTE Act seems to have a positive impact on FEE provision,

it is not statistically significant. Further, the sign of the estimated coefficient of child population share is reversed. However, it is not statistically significant.

We now add one additional variable under each category: rural population share under economic variables category, child population growth under demographic category, and number of secondary school per thousand people (in log) under education variables. The coefficient estimates are presented in Col. (3) of the table. Note that the effects of per capita NSDP, child population share, and private school enrollment share are qualitatively similar although there are quantitative differences. Both rural population share and child population growth have significant negative impacts and the number of secondary schools has significant positive impact on FEE provision. The negative association of rural population share and FEEI may have been driven by the fact that schools in rural areas are deficient in physical infrastructure and several quality measures such as PTR, SCR, and professionally trained teacher. An increase in child population may put pressure on existing resources generating negative impact on several quantitative indicators of FEE. The significant positive impact of secondary school points to a complementary relationship between secondary schools and FEE.

We now use total population growth instead of child population growth rate. The results are presented in Col. (4) of Table 5. The estimated coefficient for total population growth is positive but statistically insignificant. A high population growth does not necessarily translate into a high demand for FEE. The results for other variables are qualitatively similar to those from the previous specifications except that child population share is no longer a significant determinant of FEE. In the next specification, we include infant mortality rate which does not have any significant impact. Note that we exclude rural population share, child and total population growth rates from this specification due to potential collinearity with infant mortality rate.

Next, we add government expenses on elementary education (as a percentage of NSDP) to Model 3. The results indicate that government expenditure has a negative (counterintuitive) but statistically insignificant effect on FEE. The effects of other variables are qualitatively similar with the exception that rural population share is no longer a significant determinant of FEE. Finally, in Model 7 & 8, we have included all variables together, some of which may be strongly correlated. The only difference between these two models is that Model 7 includes time fixed effects while Model 8 includes RTE dummy. Both models provide evidence of significant positive impact of per capita real NSDP and negative impacts of rural population share, child population growth, and private enrollment share on FEE provision.

Overall, the significant positive impact of per capita real NSDP and the significant negative impacts of child population growth and private school enrollment share on FEE provision are robust to alternative specifications of the regression model. In addition, there is some evidence of significant negative impact of rural population share and positive impacts of child population share and number of secondary education. There is little evidence that government expenditures on elementary education (as a share of NSDP) have any systematic impact on the provision of FEE.

5. Conclusions and policy implications

Using secondary data for 27 states from 2005-06 to 2016-17, this paper quantifies and examines the provision of FEE across different states in India and investigates its determinants. The results indicate that there were considerable variations in the provision of FEE across states. While there was a slight decline in the access dimension of FEE, particularly after the implementation of the RTE Act in 2010, there were improvements in physical infrastructure, quality, and student support dimensions of FEE. However, the growth of FEE was not uniform across the states. Consequently, their relative positions in the provision of FEE changed over time. The fixed-effect panel estimates

of the regression model lead us to conclude that provision of FEE increases with per capita real NSDP, and decreases with child population growth and private school enrollment. There is some evidence of FEE provision decreasing with an increase in rural population share and of it increasing with increases in child population share and the number of secondary schools. We find little evidence of government expenditures on elementary education (as a share of NSDP) having any systematic impact on the provision of FEE. Nor did we find any evidence of RTE implementation having an impact on it.

These findings not only provide important insights into the across-state variations in the provision of FEE but they are also informative to the policymakers. While, in general, government's developmental efforts including population control could be catalytic in achieving UEE, specific policies that influence the growth of private and secondary level schools are likely to have implications for the provision of FEE.

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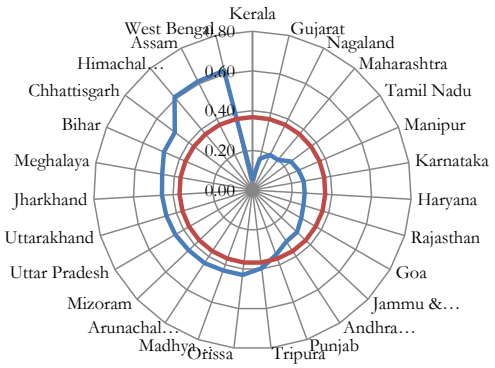
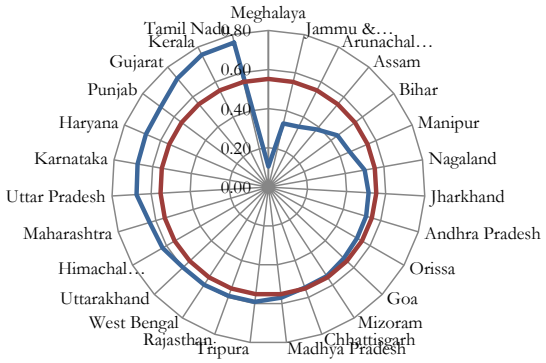
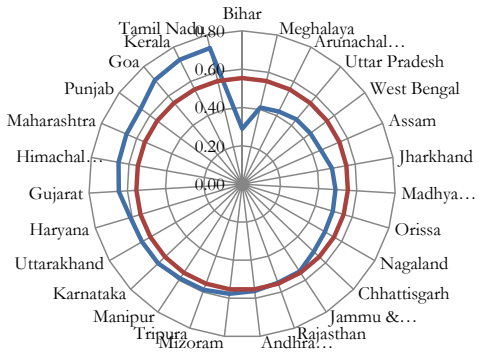
Figure 1. Radar diagrams of FEE sub-indices



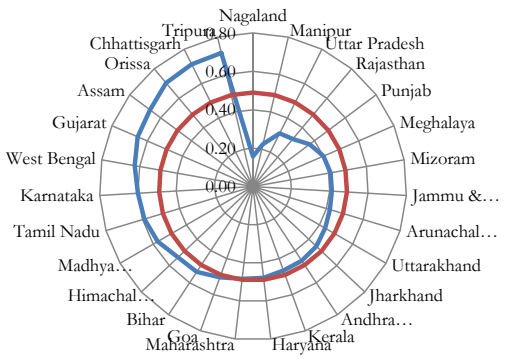
(a) Access to Education Index (AEI)



(b) Physical Infrastructure Index (PII)



(c) Quality of Education Index (QEI)



(d) Individual Support Index (ISI)

Table 1 Summary of the indicators of free elementary education; 27 states; 2005-06 – 2016-17

	Variables	Mean	Std. Dev.	Min	Max
		(1)	(2)	(3)	(4)
Access to education	Average no. of schools per sq km	0.31	0.19	0.03	0.94
	Average no. of schools per thousand child population (6-13 years)	7.59	3.94	0.84	21.09
Physical infrastructure in school	Percentage of school with girls toilet*	66.46	29.46	7.70	100
	Percentage of school with drinking water	88.79	11.47	43.85	100
	Average no. of classroom per school	4.15	1.45	1.90	11
	Percentage of schools having school building	69.76	14.18	8.54	96.06
	Percentage of schools having kitchen shed**	53.07	28.81	1.62	100
	Percentage of schools having book bank/library	55.78	28.70	4.98	99.31
Quality of education	Average no. of teacher per school	4.94	2.25	2.00	15.10
	Percentage of female teachers in schools*	46.71	13.56	24.78	80.47
	Percentage of professionally-trained regular teacher ***	78.07	24.02	11.90	100
	Average Pupil-Teacher Ratio (PTR)	23.81	11.50	5.85	64.01
	Average Student-Classroom Ratio (SCR)	26.49	13.72	10.49	96.44
	Percentage of schools inspected****	54.47	15.48	1.20	94.84
	Average instructional days per schools	216.46	15	173.73	247
Individual support to students	Percentage of student received free textbook***	64.14	16.53	0	100
	Percentage of student received free uniform***	24.17	24.47	0	84.98
	Percentage of schools providing mid-day meal (MDM)*****	85.05	15.70	37.27	99.60

Note: * includes all categories of schools, ** includes government and private-aided schools, *** data reported for previous academic year, **** data not available for the year 2016-17; ***** Data taken from ASER, Std. Dev.: standard deviation, Min: all time-state minimum, Max: all time-state maximum

Source: Authors' calculation based on secondary data

Table 2 Summary statistics of the regression variables for 27 states from 2005-06 to 2016-17

Variables	Mean	Std. Dev.	Max	Min
	(1)	(2)	(3)	(4)
Free elementary education index	0.49	0.07	0.71	0.26
Per capita NSDP in 2004-05 prices (INR)	39,414	21,085	15,4025	7,588
Share of rural population (people living in rural areas as a percentage of total population)	70.98	12.48	89.70	37.20
Infant mortality rate (no. of deaths per 1,000 live births of children under one year of age)	38.43	16.09	76.00	8.00
Growth of child population of age 6 – 13 years (%)	0.01	0.07	0.41	-0.23
Growth of total population (%)	1.30	0.44	3.70	0.53
Share of child population (children of age 6-13 years as a percentage of total population)	16.07	2.73	24.12	9.30
Child sex ratio (no. of girl child per boy child)	0.93	0.05	1.00	0.78
Share of enrollment in private schools (students enrolled in private schools as a percentage of total population)	36.56	19.42	81.64	0.14
No of secondary schools per thousand population	0.25	0.13	0.73	0.03
Expenditure on elementary education (percentage share of NSDP)	1.98	0.95	5.66	0.39

Note: Std. Dev.: standard deviation; Max: Maximum value; Min: Minimum value;
Source: Authors' calculation based on secondary data

Table 3 Sub-indices of free elementary education (FEE)

Sl. No.	States/Indices	AEI			PII			QEI			ISI		
		2005-06	2010-11	2016-17	2005-06	2010-11	2016-17	2005-06	2010-11	2016-17*	2005-06	2010-11	2016-17
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
1	Andhra Pradesh	0.36	0.29	0.30	0.48	0.51	0.63	0.61	0.57	0.59	0.36	0.40	0.46
2	Arunachal Pradesh	0.35	0.50	0.41	0.27	0.29	0.49	0.38	0.41	0.48	0.48	0.15	0.53
3	Assam	0.59	0.50	0.61	0.35	0.37	0.45	0.46	0.49	0.43	0.58	0.53	0.76
4	Bihar	0.52	0.46	0.48	0.35	0.42	0.58	0.33	0.27	0.26	0.44	0.53	0.87
5	Chhattisgarh	0.60	0.43	0.46	0.39	0.48	0.76	0.48	0.53	0.52	0.40	0.68	0.92
6	Goa	0.39	0.25	0.22	0.40	0.54	0.75	0.72	0.72	0.76	0.16	0.62	0.57
7	Gujarat	0.22	0.14	0.16	0.55	0.69	0.89	0.64	0.68	0.62	0.65	0.72	0.60
8	Haryana	0.30	0.24	0.25	0.54	0.62	0.75	0.59	0.55	0.71	0.49	0.35	0.35
9	Himachal Pradesh	0.70	0.53	0.63	0.43	0.58	0.80	0.67	0.65	0.70	0.31	0.40	0.68
10	Jammu & Kashmir	0.25	0.31	0.33	0.24	0.26	0.55	0.56	0.57	0.48	0.35	0.37	0.63
11	Jharkhand	0.51	0.43	0.43	0.30	0.50	0.73	0.48	0.49	0.53	0.40	0.46	0.74
12	Karnataka	0.32	0.23	0.25	0.52	0.73	0.79	0.63	0.64	0.64	0.78	0.81	0.55
13	Kerala	0.08	0.05	0.06	0.67	0.76	0.80	0.69	0.77	0.76	0.29	0.53	0.53
14	Madhya Pradesh	0.49	0.39	0.43	0.40	0.53	0.67	0.47	0.46	0.52	0.48	0.62	0.63
15	Maharashtra	0.22	0.19	0.20	0.55	0.59	0.74	0.63	0.69	0.60	0.41	0.57	0.43
16	Manipur	0.31	0.19	0.31	0.41	0.44	0.48	0.64	0.59	0.57	0.23	0.32	0.24
17	Meghalaya	0.33	0.59	0.59	0.00	0.08	0.20	0.47	0.42	0.42	0.14	0.46	0.46
18	Mizoram	0.39	0.43	0.44	0.37	0.48	0.74	0.60	0.54	0.63	0.06	0.42	0.50
19	Nagaland	0.17	0.17	0.21	0.38	0.53	0.61	0.55	0.49	0.52	0.08	0.27	0.26
20	Orissa	0.42	0.40	0.45	0.39	0.48	0.73	0.52	0.45	0.55	0.62	0.55	0.85
21	Punjab	0.40	0.32	0.34	0.55	0.63	0.80	0.59	0.68	0.77	0.33	0.17	0.41
22	Rajasthan	0.32	0.24	0.23	0.43	0.58	0.67	0.40	0.57	0.54	0.51	0.25	0.33
23	Tamil Nadu	0.30	0.21	0.25	0.70	0.78	0.81	0.76	0.73	0.72	0.56	0.76	0.49
24	Tripura	0.39	0.39	0.21	0.49	0.63	0.72	0.61	0.60	0.52	0.44	0.68	0.90
25	Uttar Pradesh	0.50	0.42	0.45	0.62	0.62	0.73	0.37	0.45	0.49	0.30	0.28	0.17
26	Uttarakhand	0.49	0.42	0.44	0.55	0.55	0.68	0.57	0.63	0.66	0.30	0.41	0.46
27	West Bengal	0.57	0.63	0.69	0.57	0.55	0.76	0.41	0.45	0.49	0.54	0.41	0.83
28	**All India average**	**0.39**	**0.35**	**0.36**	**0.44**	**0.53**	**0.68**	**0.55**	**0.56**	**0.57**	**0.40**	**0.47**	**0.56**

Note: * Data on share of schools inspected in 2016-17 is not available; thus QEI in 2016-17 is based on 6 indicators

Source: Authors' calculation based on secondary data

Table 4 Free Elementary Education Index (FEEI) across states

Sl. No.	States	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	Average Annual Growth Rate		
														Full sample	Pre-RTE	Post-RTE
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
1	Andhra Pradesh	0.48	0.48	0.47	0.45	0.45	0.46	0.47	0.43	0.46	0.47	0.50	0.51	0.64	-0.82	1.87
2	Arunachal Pradesh	0.34	0.37	0.36	0.36	0.39	0.39	0.40	0.42	0.43	0.47	0.46	0.46	2.87	2.89	2.85
3	Assam	0.47	0.50	0.47	0.50	0.48	0.46	0.46	0.48	0.51	0.52	0.51	0.51	0.84	-0.28	1.77
4	Bihar	0.40	0.38	0.36	0.37	0.39	0.38	0.41	0.43	0.43	0.45	0.43	0.46	1.39	-0.93	3.33
5	Chhattisgarh	0.48	0.46	0.47	0.47	0.50	0.49	0.51	0.55	0.58	0.58	0.62	0.60	2.13	0.48	3.51
6	Goa	0.50	0.46	0.47	0.48	0.51	0.52	0.54	0.53	0.52	0.53	0.56	0.59	1.60	0.90	2.17
7	Gujarat	0.49	0.50	0.47	0.49	0.52	0.52	0.53	0.54	0.57	0.56	0.56	0.57	1.44	1.28	1.57
8	Haryana	0.49	0.53	0.53	0.52	0.52	0.47	0.52	0.52	0.52	0.53	0.55	0.56	1.35	-0.67	3.03
9	Himachal Pradesh	0.59	0.58	0.53	0.55	0.58	0.58	0.63	0.69	0.70	0.69	0.69	0.71	1.82	-0.22	3.51
10	Jammu & Kashmir	0.36	0.39	0.37	0.39	0.37	0.39	0.39	0.42	0.42	0.42	0.45	0.47	2.56	1.78	3.21
11	Jharkhand	0.43	0.44	0.43	0.43	0.46	0.47	0.47	0.50	0.52	0.52	0.54	0.57	2.64	1.84	3.30
12	Karnataka	0.51	0.48	0.45	0.48	0.46	0.55	0.57	0.52	0.57	0.56	0.56	0.57	1.31	1.99	0.75
13	Kerala	0.48	0.50	0.53	0.52	0.54	0.54	0.50	0.52	0.53	0.53	0.53	0.55	1.31	2.43	0.38
14	Madhya Pradesh	0.46	0.45	0.49	0.49	0.49	0.47	0.51	0.50	0.54	0.53	0.54	0.54	1.57	0.53	2.43
15	Maharashtra	0.47	0.48	0.48	0.49	0.51	0.50	0.51	0.51	0.54	0.53	0.53	0.51	0.78	1.27	0.38
16	Manipur	0.45	0.44	0.40	0.40	0.42	0.41	0.46	0.42	0.44	0.43	0.43	0.45	0.18	-1.74	1.77
17	Meghalaya	0.27	0.26	0.26	0.27	0.27	0.37	0.37	0.36	0.38	0.39	0.38	0.41	4.36	7.44	1.80
18	Mizoram	0.44	0.48	0.45	0.47	0.46	0.48	0.50	0.55	0.58	0.60	0.61	0.60	2.96	1.90	3.85
19	Nagaland	0.36	0.36	0.34	0.39	0.40	0.40	0.36	0.39	0.43	0.42	0.42	0.44	2.07	2.34	1.84
20	Orissa	0.46	0.45	0.45	0.45	0.45	0.45	0.49	0.51	0.54	0.54	0.57	0.59	2.34	-0.43	4.65
21	Punjab	0.51	0.53	0.50	0.52	0.55	0.53	0.55	0.58	0.60	0.61	0.60	0.63	2.01	0.88	2.95
22	Rajasthan	0.39	0.43	0.46	0.48	0.48	0.46	0.46	0.49	0.50	0.49	0.48	0.48	1.99	3.48	0.75
23	Tamil Nadu	0.59	0.59	0.56	0.58	0.60	0.59	0.58	0.57	0.58	0.60	0.60	0.60	0.19	0.05	0.30
24	Tripura	0.50	0.50	0.48	0.48	0.51	0.55	0.55	0.56	0.60	0.61	0.62	0.51	0.42	2.02	-0.91
25	Uttar Pradesh	0.48	0.49	0.48	0.48	0.51	0.49	0.50	0.53	0.55	0.54	0.52	0.54	1.14	0.47	1.69
26	Uttarakhand	0.53	0.53	0.51	0.52	0.53	0.53	0.55	0.56	0.57	0.58	0.58	0.59	1.00	0.02	1.81
27	West Bengal	0.52	0.50	0.49	0.50	0.54	0.53	0.54	0.53	0.58	0.60	0.64	0.65	2.14	0.47	3.52
	All India average	**0.46**	**0.47**	**0.45**	**0.46**	**0.48**	**0.48**	**0.49**	**0.50**	**0.53**	**0.53**	**0.54**	**0.54**	1.50	0.90	2.00

Source: Authors' calculation based on secondary data

Table 5 Fixed-effects panel regression results. Dependent variable: FEEI; Samples: 27 states; 2005-06 to 2016-17

Independent variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Per capita real NSDP (in log)	0.083*	0.280***	0.091**	0.094**	0.096**	0.087**	0.085**	0.172***
	(0.04)	(0.066)	(0.039)	(0.041)	((0.040)	(0.039)	(0.042)	(0.938)
Rural population share (%)			-0.001*	-0.001**		-0.0008	-0.001**	-0.003***
			(0.0005)	(0.0005)		(0.0005)	(0.0005)	(0.0006)
Child population share (%)	0.002**	-0.001	0.003**	0.001	0.002*	0.003***	0.003**	-0.0006
	(0.0009)	(0.002)	(0.001)	(0.0009)	(0.0009)	(0.001)	(0.001)	(0.002)
Child population growth (%)			-0.051***			-0.049***	-0.048***	-0.044**
			(0.016)			(0.016)	(0.017)	(0.020)
Total population growth (%)				0.009			0.007	0.006
				(0.010)			(0.013)	(0.010)
Infant mortality rate (%)					-0.0002		-0.0004	-0.001***
					(0.0002)		(0.0003)	(0.0004)
Child sex ratio							0.036	-0.257**
							(0.211)	(0.129)
Private school enrollment share (%)	-0.0006***	-0.0005***	-0.0006***	-0.0006***	-0.0006***	-0.0006***	-0.0006***	-0.0009***
	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0003)
Number of secondary school per 1000 population (in log)			0.030*	0.032*	0.028	0.030*	0.027	0.054**
			(0.018)	(0.019)	(0.019)	(0.018)	(0.020)	(0.021)
Govt. elementary education exp. as a percentage of NSDP (%)						-0.002	-0.003	-0.006
						(0.003)	(0.003)	(0.004)
RTE dummy		0.017						0.009
		(0.012)						(0.009)
State fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time fixed effects	Yes	No	Yes	Yes	Yes	Yes	Yes	No
Adjusted R-squared	0.895	0.871	0.896	0.895	0.895	0.896	0.895	0.883
F-Stat for redundant fixed effects	45.91	39.67	46.12	43.83	45.48	45.97	39.55	38.86
(Degrees of freedom)	(37, 283)	(26, 293)	(37, 280)	(37, 280)	(37, 280)	(37, 279)	(37, 276)	(26. 286)
(p-value)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
No. of observations	324	324	324	324	324	324	324	324

Notes: Each model includes a constant term that has not been reported. ***statistically significant at the 1% level; **statistically significant at the 5% level; and *statistically significant at the 10% level. Robust standard errors are in parentheses.

Appendix Table

Table A.1 Average real NSDP over 2005-06 – 2016-17 by states and their classification

Sl. No.	State	Real NSDP (2004-05 constant INR)	Income group
1	Andhra Pradesh	38462.7	Low-income
2	Arunachal Pradesh	35015.0	Low-income
3	Assam	21481.9	Low-income
4	Bihar	11917.3	Low-income
5	Chhattisgarh	26469.0	Low-income
6	Goa	108042.5	High-income
7	Gujarat	57088.4	High-income
8	Haryana	60355.4	High-income
9	Himachal Pradesh	49317.7	High-income
10	Jammu and Kashmir	27506.9	Low-income
11	Jharkhand	23995.7	Low-income
12	Karnataka	41966.4	High-income
13	Kerala	51450.9	High-income
14	Madhya Pradesh	22855.4	Low-income
15	Maharashtra	60080.6	High-income
16	Manipur	22112.8	Low-income
17	Meghalaya	30292.9	Low-income
18	Mizoram	41055.8	High-income
19	Nagaland	44712.2	High-income
20	Odisha	24737.9	Low-income
21	Punjab	45616.7	High-income
22	Rajasthan	27942.7	Low-income
23	Tamil Nadu	53794.3	High-income
24	Tripura	39389.4	Low-income
25	Uttar Pradesh	17493.2	Low-income
26	Uttarakhand	49287.8	High-income
27	West Bengal	31747.8	Low-income

Note: The states are classified into high-income and low-income group using the average real NSDP of ₹ 39,414 across states and over the sample period 2005-06 – 2016-17.