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DOES HUMAN CAPITAL MATTER FOR THE ECONOMIC GROWTH OF INDIAN STATES? A DYNAMIC PANEL DATA ANALYSIS

Surendra Kumar Naik^{*} and Indrajit Bairagya^{**}

Abstract

Although there are several studies examining the role of human capital in economic growth, studies at the sub-national level examining this relationship are found scanty, especially from the Indian context. Filling this research gap, the present study analyses the relationship using various measures of human capital for 15 major states in India from 1994 to 2018. Based on the static and dynamic panel data analysis using the Generalised Method of Moments, the critical role of Average Years of Schooling, Gross Enrolment Ratios, and financing for different educational levels in augmenting the economic growth of the Indian states is established through this study. Besides examining the relationship between economic growth and current human capital in both static and dynamic panel models, we have examined the relationship between economic growth and past human capital factors with their five-year lag values. Results reveal that the enrolment ratio of higher education influences economic growth more than other levels of education in both models. Moreover, although current public spending at the higher educational level does not statistically and significantly affect economic growth, past public spending at the higher educational level has a significant impact on economic growth, perhaps because it takes a few years for individuals after completion of education to join the labour market, which makes a significant contribution to economic growth. Therefore, public spending policies should be thoughtfully devised to meet the twin objectives of egalitarian distribution of education and augmentation of economic growth.

Keywords: Human Capital, Economic Growth, Average Years of Schooling, Gross Enrolment Ratios, Per capita Education Expenditure

Introduction

One of the key elements of human capital, education, is acknowledged as having a significant role in determining economic growth in both developed and developing countries. Human capital matters for economic growth as much as other factors like government consumption, foreign trade, institutional indulgence, and geography (Barro, 1991; Acemoglu *et al*, 2001; Moral-Benito, 2012). Further, human capital is observed to be an important prerequisite for economic development for any nation (Barro, 1991; Hanushek & Woessmann, 2012). Even though the relationship between human capital and economic growth has been explored by a large number of cross-national studies, the issue remains underexplored at the sub-national level in India. Considering this, the present study specifically examines at the Indian context and explores how human capital increased economic growth at the sub-national level between 1994 and 2018.

The study delves into the relationship between human capital and economic growth at the subnational levels for numerous reasons. India is an extensive and populous nation consisting of 28 states

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and 8 Union Territories (UTs), which are highly heterogeneous in population and economic indicators. For instance, Uttar Pradesh (UP), one of the major states in India, accounts for more than half of Japan's population, and this number is substantially higher than that of some of the developed nations of the Western world (Arora & Jalilian, 2020). In terms of economic development levels, some states/UTs are very close to developed nations' traits, while some still show lower levels of development (Arora, 2009). Given the diversity of Indian society across states with varied cultures, societal setups, politics and environments, many factors are pivotal for determining the country's economic growth apart from education variables. From a supply-side perspective, public education is delivered and impacted by various factors, including geographical locations, state development, economic growth, and the fiscal capacity of the central and state governments (Varughese & Bairagya, 2021). Social expenditures, particularly those related to education, development of skills, and attainment rates, are crucial for promoting economic growth (Aggarwal et al, 2019; Grant, 2017; & Mathai et al, 2020). Subnational growth dynamics are incredibly insightful when analysed about the educational patterns of the nation, and the post-reform period witnessed steadfast economic growth, especially for states like Haryana, Kerala, Gujarat, etc., measured by per capita Net State Domestic Product (NSDP). Meanwhile, states like Odisha, Madhya Pradesh (MP), Rajasthan, Bihar, and certain north eastern states grew at a slower pace compared to others. The tenaciously poor growth performance can be ascribed to persisting socio-economic discrepancies among those states (De & Endow, 2008). Notwithstanding, despite the government's tireless efforts towards regional balanced development after the enactment of five-year plans certain states have experienced lower growth than the faster growth states even after six decades (Dholakia, 1985; Prasad et al, 2011; Mishra et al 2016). Notably, underperforming states continued to be classified as low-income over time. From 1991 to 2018, states with stronger growth acceleration were Tamil Nadu (TN), Andhra Pradesh (AP), and Assam. As per Dreze & Sen (2013), traditionally under-developed states maintained their poor growth status owing to poor progress on socio-economic indicators. On the other hand, states performing better in economic growth simultaneously progressed in terms of their socio-economic indicators or qualitative factors. The higher growth performance of the states could be owing to their potential in tapping the demographic endowments, implying the provision of employment to the working age population (Kumar, 2010).

While continuing the discussions on state-wise growth dynamics, it's pertinent to ponder over the status of education and public spending on education to establish a connection between those variables. In India, central and state governments allocate funds for the promotion and development of education. Until recently, state governments shouldered the responsibility of funding primary and secondary education while the central government prioritised higher and technical education. However, in the recent past, public expenditure on elementary education by the central government has increased. For instance, the central government spent merely about 14 per cent on elementary education in 1990-91, whereas it stepped up the spending since 2003-04 to around 50 per cent, primarily at the cost of spending on secondary level education. Although the central government spends a large portion of its budget on higher education, this share has been declining, particularly since 2001. However, there appears to be little impact on the amount spent on technical education. As a result, it is now clear that elementary education gets relatively more priority in the central government policies and programmes related to educational finances compared to higher education (Tilak, 2006a). Therefore, at the centre, the share of education expenditure in total expenditure was found to hover between 20 per centand25 per cent. After education was added to the concurrent list in 1976, funding became a shared duty between the central government and the state governments. State governments have continued their responsibility of maintaining the existing infrastructure of educational institutions across various levels of education. State governments also give thrust to elementary education in terms of their budget allocation. Approximately half of their budget goes to elementary education, one-third to secondary, and the remaining to higher education. In recent years, states spent less on technical education, and it is mostly funded through private investments (De & Endow, 2008).

A plethora of educational policies and programmes were initially introduced by the Centrally Sponsored Scheme (CSS) in the 80sand the 90s. Later, new policy interventions took centre stage rather than continuing with existing schemes. The policy interventions suffered many loopholes as it were effectively carried out in selected areas. Largely, the dynamics of public education spending at the state level followed the development status of the states, especially educational outcomes. For analysing the educational status of the states, the study selected Average Years of Schooling (AYS), Gross Enrolment Ratio (GER) across different educational levels, and per capita public expenditure on education at various levels for the major states in India. Kerala with a higher Human Development Index (HDI) has better educational outcomes measured by AYS followed by Karnataka. They are both high-income states as well, implying that educational betterment may be a pre-requisite for higher growth and development status, although it may not be a sufficient condition as debated in the extant studies. Factors such as parental perception and their educational levels, family background and cost and benefit from achieving higher levels of education are pivotal for the overall educational outcomes of the states.

Education, being an efficient tool for enhancing people's standards of living, as well as their socio-economic stability and sense of security enhancing the fundamental knowledge and technical abilities, it augments production, employment etc. thus contributing to economic growth. For a developing and diverse country like India, it aids in surpassing the ethnic and cultural impediments accelerating individual growth, social aptitude, and economic development (Patel, 1983). Further, according to the endogenous growth theory (Lucas, 1988; Romer, 1990), regions with higher stocks of human capital outperform others in terms of economic growth. This suggests that human capital plays a significant role in regional economic performance. Nevertheless, the growth trajectory is determined by the effective use of human capital, not the stock of human capital (Schwab, 2013). On the contrary, studies also argue that variations in economic growth can also result from variations in the stock of human capital (Easterly & Levine, 1997). In short, additional years of schooling give impetus for innovations and inventions, which in turn induces productivity, thus accelerating economic growth (Romer, 1990; Benhabib & Spiegel, 1994; Bodman & Le, 2013). From the Indian context, human capital, according to Bhattacharjee (2003), improves the quality of the labour force and contributes to the nation's economic development. Moreover, Self and Grabowski (2004) discovered a strong causal link in India between economic growth and primary education. As per Haldar and Mallik (2010),

investment in human capital matters more than physical capital for taking economic growth to the next trajectory for a developing country like India.

Central and state policymakers in India have been influenced by the Kerala model, which emphasises public investment in social sectors and reap benefits from human development without realising higher economic growth (Dholakia, 2003). In addition, southern states often prioritise spending on higher education (Chandrasekhar et al, 2016). The value placed on education, the number of schools, the infrastructure facilities, people's borrowing for education, and access to credit all play a role (Varughese & Bairagya, 2021). Although overall and major head of education spending in Haryana and Punjab increased in absolute terms from 1990 and 2013, these expenditures decreased as a percentage of state income, state budget, and state education budget (Tomar, 2017). It might be due to the preference among rich families in north India to steer their children towards entrepreneurship rather than higher education (Varughese & Bairagya, 2021). Therefore, it is evident that there are significant differences in the human capital stock among the Indian states, with highly successive states like Kerala coexisting with low-human capital states like Bihar and UP. Bihar, UP, West Bengal (WB), MP, and Rajasthan are the most backward among the Indian states. In these five states, two-thirds of the children do not attend school (Dougherty & Herd, 2008). To the best of our knowledge, no other studies have used both inputs (public expenditure) and outputs (AYS and GER) variables simultaneously to check the robustness in the relationship between human capital and economic growth at disaggregate levels. Therefore, the present study adds to the existing literature by analysing the importance of education using various measures and its association with the economic growth of the Indian states using Static and Dynamic panel data analysis. The study considers education variables like GER at elementary, secondary, and higher education levels, AYS as well as per capita public spending across those levels. The analysis considers a time frame spanning between 1994 and 2018 of major 15 Indian states, dividing the states into high, medium, and low developed states.

Following the Human Development Index (HDI) ranking in 2019, states are divided into Highly Developed (HD), Medium Developed (MD), and Low Developed (LD) states. It aids a better understanding of the economic situation and human capital stock, public financing of education as per the development status of the states - high, medium, and low developed. As per the division, HD encompasses Haryana, Kerala, Punjab, and Tamil Nadu (TN) whereas MD states are Andhra Pradesh (AP), Maharashtra, Karnataka, and Gujarat. Finally, LD states are Assam, MP, WB, Odisha, Bihar, Rajasthan, and UP. States partition in 2000, Bihar, MP, and UP are adjusted with the mother states. These states accounted for a population and income of states more than 90 per cent and 82 per cent of the annual average, respectively (Mallick, 2013). Hence, it's a maiden attempt to draw the educational status along with growth and development at a sub-national level.

Extant studies widely accepted that the development of human and physical capital has a significant role in the economy, both theoretically and empirically. Compared with primary and secondary education and higher education had a positive and significant impact on economic growth (Wei, 2008; Zhang & Zhung, 2011). Additionally, higher productivity of workers is observed for higher education levels compared with those with only elementary schooling (Fleisher *et al*, 2010). Education has varying effects on growth depending on the nation's level of development; tertiary education is

more beneficial to highly developed nations than primary and secondary education is to developing nations with low incomes (Petrakis & Stamatakis, 2002). Moreover, the AYS of the employees have a positive impact on the level of their productivity (Barro & Lee, 2013).

Subsequently, Pradhan (2009) examined the connection between public education spending and economic growth in India using an error correction model covering the years 1951 to 2001. In the Indian economy, education and economic growth have a unidirectional causal relationship, according to the study. Economic growth and spending on education are causally related but not the other way around. Chandra (2010) investigated the two-way relationship between investments in education and economic growth in India from 1951 to 2009 using both linear and non-linear Granger causality methods. The study established that India's GDP and its spending on education are causally related in both directions. Tamang (2011) used the Error Correction Modelling method to evaluate the relationship between growth and education spending for the years 1980 to 2008 and noticed that there is a long-term association. Besides, Roy *et al* (2000) used panel data for the main 15 Indian states from 1992-93 to 1997-98 to investigate the factors influencing public education spending on primary, secondary, and post-secondary education. Richer states invest more in education than underdeveloped or poor state governments, according to the study. States with higher per capita incomes spent more on education, according to Chakrabarti and Joglekar's (2006) analysis of government funding of education in 15 Indian states from 1980-81 to 1999-00.¹

Based on the study it used various educational indicator measures to allow for crosscomparison and robustness testing because there is no agreement on what exactly constitutes human capital in education (Siddiqui & Rehma, 2016). Therefore, the present study examined the relationship between human capital and economic growth empirical at the sub-national level using various measures of human capital between 1994 and 2018. The human capital proxies' variables are selected based on the earlier study, such as AYS, GER, and public education expenditure at different levels. The study primarily used secondary data provided by National Sample Survey (NSS), Unified District Information System for Education Plus (UDISE+) published by Department of School Education & Literacy, Government of India (GoI), All India Survey on Higher Education (AISHE) published by Department of Higher Education, GoI, and Analysis of Budgeted Expenditure on Education (ABE) Published by Ministry of Education, GoI. From the analysis, the study found that human capital matters as much as physical capital for augmenting economic growth across Indian states.

The structure of the paper is as follows: Section 2 briefly describes the framework of theoretical and empirical specifications of the study. Section 3 includes descriptive analysis. Section 4 unveils an empirical analysis with subsequent results and discussions. Section 5 concludes the study with important policy recommendations.

¹ For Indian states, Chhibber and Nooruddin (2004) found a similar association between per capita state income and spending for development.

Theoretical Framework and Empirical Specifications

The theoretical background of the study is anchored on the augmented Solow model supported by Tiwari and Mutascu (2011) and Dulleck & Foster (2008). The neoclassical growth model, which identifies technology, labour, physical, and human capital as functions of per capita Gross Domestic Product (GDP), serves as its foundation (Solow, 1956). Mathematically, it looks like this:

$$y_{it} = f(h_{it}, k_{it}, y_{it-1}, z_{it})$$
(1)

Where y_{it} denotes real per capita Net State Domestic Product (NSDP), h_{it} implies human capital, k_{it} shows physical capital, y_{it-1} indicates lagged real per capita NSDP, and Z_{it} represents the vector of endogenous and predetermined variables.²

For analysing the endogenous growth model explicitly, the study uses the dynamic specification of equation one following the study of (Belke & Wernet, 2015). Further, the study also estimates the causal relationship between economic growth and the variables related to human capital.

$$y_{it} = \phi y_{it-1} + \alpha h_{it} + \beta k_{it} + \varphi z_{it} + \mu_i + \varepsilon_{it}$$
⁽²⁾

Where subscript 'i' indicates the states and 't' postulates time, the y_{it} indicates NSDP per capita is at real constant prices of 2011-12. The dependent variable is the real NSDP per capita in the natural log form. h_{it} represents human capital wherein, as per the current context, it includes education variables such as AYS, and GER across three levels of education and per capita public spending, adjusted for inflation on education for all the aforesaid levels. k_{it} represents State Gross Fixed Capital Formation (SGFCF) proxies the physical capital base of the states while the study includes other variables like Labour Force Participation Rate (LFPR); y_{it-1} denotes lagged real NSDP per capita; z_{it} represents the vector of endogenous and predetermined variables. The parameters are denoted by ϕ , α , β , and ϕ . The μ_i captures the state-specific characteristics, and state-specific effects are time-invariant. The error term is denoted by ε_{it} . The μ_i and ε_{it} assume that they are independent of each 'i' overall 't'.

The study uses static and dynamic panel data analysis for the empirical investigation to show the robustness of the results. Since the static analysis is based on fixed effects, it may reflect the variation within states and discard the cross-sectional variation. The study uses dynamic analysis based on the Generalised Method of Movement (GMM) to deal with the endogeneity between education and growth variables. It is ideal for such data with short periods and long panels (Arellano & Bond, 1991). Although Diff GMM can be used, it suffers from a weak instrument problem. Besides, Diff GMM may eliminate the state-wise information while removing the state-specific effects (Blundell & Bond, 1998). Therefore, the System GMM is deployed as it scores over other estimators. It combines the moment conditions in first differences with levels as instruments lagged, a further set of additional moment conditions derived from the levels in the equation (Rellano & Bover, 1995; Blundell & Bond, 1998).

² Endogenous and predetermined variables are assumed to be associated only with past or both the present and past errors, respectively.

Descriptive Analysis

This section deals with the descriptive analyses and the trends of variables under study. Regarding economic development of India, its HDI enhanced from 0.427 in 1990 to 0.640 in 2018, implying the progress is not considerable compared to its peers. However, when it comes to education spending, India has a higher position (Goswami & Bezbaruah, 2011). India's education spending in 2015 was only 2.6 per cent of GDP,³ well below the global average of 4.81 per cent (Bhowmick & Yaday, 2019). India alone is home to 40.4 million illiterates, or approximately 75 per cent of the world's young illiterates (32.2 per cent) are between the ages of 15 and 24 years old (UNESCO, 2010). Harnessing India's demographic dividend strongly relies on the nation's educational system. After all, the foundation of India's human capital is constituted by young people who attend schools and colleges between the ages of 6 and 23, or about one-fourth of the country's population. India should focus on providing its youth with a high-quality education that will develop their skill sets as the need for expertise shifts and dependency on innovation rises. Public education continues to be the most cost-effective choice for the vast majority of Indian states even though private education is usually chosen in urban areas. In India 1.522 million schools are either run or aided by government institutions, accounting for about 80 per cent (Bhowmick & Yadav, 2019). In 2017, the public education systems in India served 113 million students or 65 per cent of the country's total school-age population across Indian states.⁴

The economically backward states like Bihar, UP, MP, Assam, Odisha, and Rajasthan have consistently been identified as low developed states coupled with lower per capita public spending on education. The historical backwardness is evident from these indicators influencing their respective educational outcomes (Dreze, 1999). On the contrary, states like Kerala achieved notable advancements in human development and educational attainment by efficiently distributing government spending on the social sector through appropriate state government intervention (Veron, 2001). Punjab followed Kerala in educational outcomes despite lower spending on the social sector. Maharashtra performs well in educational attainment or human development; the state spends higher per capita expenditure on education. Through calibrated policy interventions, Kerala and TN have reduced the dropout rates to zero, whereas the highest rate of 47.78 per cent was noticed in Assam (Goswami & Bezbaruah, 2011). There was a spending increase per person in all states until the 1990s, albeit to various degrees, followed by a fall in subsequent years.

³ "Chapter 1 - An Overview of India's Economic Performance in 2017- 18," Economic Survey 2017-18, Ministry of Finance, Government of India.

⁴ Devanik Saha, "In 5 years, private schools gain 17 million students, government schools lose 13 million," Hindustan Times, April 17, 2017.





Source: AYS; National Sample Survey (NSS) from various education rounds, and NSDP per capita from National Account Statistics (NAS).

Note: NSDP per capita growth rate authors' computation from secondary data.

Here the states are categorised as per the HDI ranking in 2019 for deriving insightful inferences. Figure 1 portrays the relationship between economic growth and educational outcomes measured by AYS for all three categories of states. Hypothetically, we may anticipate that states with better development status have high income and better educational outcome, however, there are exceptions. Although WB and Assam belong to the LD category, their educational performance turned out to be better. Similarly, Maharashtra and Karnataka are MD states with higher economic growth for the latter, they perform well in education as well. Kerala and Haryana fare better among HD states. There is a stark contrast between economic growth and development status of the states. Most MD states have higher economic growth, implying their lack of focus on HDI indicators and emphasised thrust on economic growth. Moreover, development status and educational outcomes go hand in hand. For instance, despite having MD and LD status such as Gujarat in the west, AP, Karnataka in the south, Assam in the north-east, Odisha, WB, and Bihar in the east, and UP in the central, they have exceptionally high NDSP per capita growth rates. Gujarat placed highest in terms of the per capita growth rate of NDSP in the west and was followed by AP in the southern region. On the contrary, states like Punjab in the north, although under HD states, does not register higher per capita growth rates of NDSP, whereas, Gujarat, an MD state in the west, ranked highest for per capita growth rates of NDSP. The discrepancies in resource abundance, like infrastructure, teachers' availability, etc., may vary extensively across states, which may be the major cause for the variation in educational outcomes measured by AYS. States like Bihar, UP, WB, Assam, and Odisha require more elementary school teachers (Govinda & Biswal, 2006) as their Pupil-Teacher Ratio (PTR) is considerably poor.



Figure 2: Education Performances of Indian States Measured by AYS and Gross Enrolment Ratios

Source: AYS; NSS from various education rounds, GER; Economic Political Weekly Research Foundation, District Information System of Education (DISE), and All India Survey on Higher Education (AISHE).

Note: GER is for three different levels of education: elementary, secondary, and higher. The GER of secondary education is the authors' computation.

The above Figure 2 attempts to draw the dynamics of educational outcomes with enrolment rates. GER at the elementary level is the highest, followed by secondary and higher education across all states. Kerala has better elementary, secondary, and higher education enrolments among HD states. It may be because Kerala historically focuses on human development indicators like health and education (Probe, 1999, p.13). The government policies priorities on people-centric such as reducing intercommunity and interregional gaps in school access, providing mid-day meals in school, promoting female education, free basic primary and compulsory education, and private school teacher salaries, travel concession, etc., gave impetus to educational achievements in the state (Government of India, 2008, p.255). Subsequently, in Kerala, there is little room for further improvement in the educational index as it has already attained about 100 per cent literacy.

Despite Punjab having better AYS, except at the elementary level, its enrolment ratios are not that satisfactory at the other two levels. Notably, TN, an HD state, has the highest enrolment rates at the higher education level, which may be because of the presence and increased enrolments in private institutions. Gujarat is an exception among MD states' leagues, with comparatively lower enrolment rates and educational outcomes. Across LD states, UP and Odisha have higher enrolments in higher education due to the more extensive availability of private institutions.



Figure 3: Per capita public education expenditure and educational outcome (AYS) across Indian states

Source: AYS; NSS from various education rounds, and Analysis of Budgeted Expenditure (ABE) on education (various years).

Note: The authors compute the total per capita public expenditure on education from secondary data sources.

From the policy-making perspective, the relationship between education financing and educational outcomes is insightful. The above Figure 3 draws attention to the dynamics of education spending and its respective outcome. Per capita education expenditure gives a better picture of the public spending on education as a share of total government expenditure or share of GDP, which reveals only the government's spending efforts on education with given resources. It does not capture the actual public flow of resources used to improve education in the country. In various countries, it has been noticed that the demand for school-going-age population numbers does not consider these variables. The resources required across states may differ due to the variation in demographic structure and demand for education by school-age children. Hence, in the present study, public education expenditure in total per capita and across various education levels has been used as input indicators for human capital measures. Since we do not have deflators for the state-level Gross State Domestic Product (GSDP). The study converted per capita public education spending into real constant prices in the 2011-12 base year and controlled the difference in price levels across states, adjusting for inflation using price deflators.

From the above Figure, the educational performance is broadly reflected by the financing efforts of the government. Among HD states, Kerala spends considerably higher on education and it is evident from the educational outcome as well. Maharashtra and AP from the MD states league are proactive in government spending for education while Gujarat lags. Among LD states, Assam and Odisha are front runners in spending for education compared to others. The poor public financing by LD states may be because of the general resource crunch as well as high level of corruption at the administrative units. Among this league, Bihar and MP are cited as comparatively corrupt states. Despite Kerala being an HD state, it is also included at the top across all other states (Chattergi *et al*, 2014).



Figure 4: Per capita public education expenditure and respective educational outcome (AYS) across Indian states

Source: AYS; NSSO from various education rounds, and ABE on education (various years)

Note: Per capita public expenditure across different levels of education is the authors' own computation from secondary data sources.

Figure 4 postulates the relationship between per capita public expenditure on education across three levels of education –elementary, secondary, and higher education with AYS. Among HD states Kerala's level-wise spending stands higher while among MD states Maharashtra and Karnataka spend considerably higher. AP's percapita spending is comparatively better except at the elementary level. Among the LD states, WB, Rajasthan, and Odisha have better percapita spending at the secondary level. Among the league Assam's spending on higher education is considerably higher. Education spending and educational achievements go hand in hand as per the above figure, implying those states that spend on education have achieved better educational outcomes as measured by AYS. In India, certain backward states have a high priority on education financing, with more students in schools reducing their percapita spending (Mehrotra, 2004, p. 987). Public spending on education largely depends upon correct accountability, the release of funds at the right time, and the efficient management system of the governments.

As per the extant studies, for capturing the human capital stock, the study uses various indicators of education for cross-comparison and robustness assessment (Siddiqui and Rehma, 2016). Specifically, this study uses AYS with three different levels of gross enrolment ratio (elementary (6 to 14 years), secondary (14 to 18 years), and higher education (18 to 23 years age group) as a measure of the stock of human capital. Van Leeuwen and Foldvari (2008) pointed out that a potential drawback of using these indicators is none of these educational indicators account for variations in educational quality rather they measure quantity. It would have been preferable to utilise measurements of the individual's cognitive ability rather than measures of educational attainment or government spending on education (Hanushek, 2013; Hanushek & Kimko, 2000). However, the absence of information on cognitive abilities and skills at the state level prevents their inclusion in the current study.

In short, it is observed that HD states spend more on elementary education than others. Following the introduction of new education programmes like Sarva Shiksha Abhiyan (SSA) (2001) and the Right to Education (RTE) Act (2009) for the universalisation of elementary education, per capita spending on elementary education increased significantly. Spending on secondary education surged for all states. Interestingly, LD states are spending more on higher education compared to others, despite their budgetary constraints.

Results and Discussions

The static panel data analysis includes the results of the fixed effect model after presenting the Hausman test result. The GMM-based dynamic panel data estimation results are also included to deal with the potential endogeneity between the variables related to economic growth and education. However, there is an argument that present economic growth may not be affected by current educational expenditure (or enrolment) as much as it is affected by past educational expenditure (or enrolment) because of the simple logic that those who received education a few years ago and joined the labour market are directly contributing to the economy. According to Sylwester (2002), countries that have spent more on education in the past will have lower inequality in the future and in order to control for overall education spending as a percentage of GDP, which is lagged by 10years. In addition, a 10-year lag has been considered for primary enrolment and total education expenditure. The rationale behind considering a 10-year lag is that the majority of the students, who enrol in primary education at the age of five or six, typically join the labour market at the age of 15or 16. This is because the level of educational attainment does not result immediately in reducing inequality (Gruber & Kosack, 2014). Furthermore, another study suggested that there is a lagged causal relationship between education spending and economic growth, meaning that investments in education are anticipated to have an impact on a country's economic growth in the future or after some time (Chandra, 2010). Thus, in addition to examining the relationship between economic growth and current human capital variables in both static and dynamic panel models, we have also examined the relationship between economic growth and past human capital variables with its five-year lag value following the above studies. It not only illustrates the relationship between past human capital stock and economic growth and helps to assess its robustness, but it also eliminates the possibility of bi-directional causality because, while current human capital formation may result from current economic growth, past human capital formation is unquestionably not caused by it. The given Table show how the study looks at the relationship between different measures of human capital and economic growth.

From Table 1, human capital measured by AYS influences economic growth in a positive and significant manner in model 1, whereas in model 3 and model 5 the AYS without lags turns negative. The possible reason could be an unreliable and biased Ordinary Least Squares (OLS) estimator results from the correlation between the fixed effect and the explanatory variables. The fact that the dependent variable is lag-related and that the explanatory variables may be endogenous leads to the second issue (Zhang, 2011). In models 2, 4, and 6, the human capital measured by the lagged AYS found that economic growth influences positively and statistically as well as significantly at the one percent level. The findings show that past human capital, as compared to the present stock of human

capital, had a significant impact on economic growth. The study also confirms that human capital matters as much as the physical capital in India. Similarly, LFPR influences economic growth of the states.

	Eived Effects		Differe	nce GMM	System GMM	
Variables	Fixeu	Effects	One	e Step	One Step	
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
			0.795***	0.478***	0.814***	0.742***
IIIPCNSDP _{t-1}			(0.0248)	(0.0440)	(0.0231)	(0.0470)
INCOLOR	0.285***	0.234***	0.0442***	0.0781***	0.0288	-0.0075
IIISGFCF	(0.0305)	(0.0279)	(0.0131)	(0.0131)	(0.0185)	(0.0451)
Ini EDD	0.0033***	0.0034***	0.0013***	0.0025***	0.0010***	0.0016***
IIILFPR	(0.0005)	(0.0004)	(0.0003)	(0.0005)	(0.0003)	(0.0005)
InAVC	1.505***		-0.0620		-0.0385	
INAYS	(0.120)		(0.0460)		(0.0441)	
InAYS t-5		1.473***		0.882***		0.505***
		(0.111)		(0.134)		(0.118)
Constant	4.122***	4.576***			1.420***	
Constant	(0.184)	(0.1500)			(0.152)	
Hausman Test	-5.85	-38.94				
m1			0.00	0.00	0.00	0.00
m2			0.15	0.10	0.18	0.12
No. of Instruments			24	24	26	26
Hansen Test			0.78	0.78	0.82	0.82
Observations	371	298	341	281	358	298
R-squared (overall)	0.59	0.57				
No. of States	15	15	15	15	15	15

 Table 1: Estimated coefficients of static and dynamic panel data analysis showing the relationship

 between economic growth and Average Years of Schooling

Source: Authors' estimation

Note: ***, ** and * shows significance levels at 1%, 5% and 10% respectively. Standard errors are in parentheses.

Similarly, Table 2 presents the estimated coefficients of relationship between human capital, as determined by enrolment rates at three distinct educational levels, and economic growth.

Human capital is measured by with and without lags of GER across education, and higher education that affects the Indian states' economic growth in a positive and significant manner both under the fixed effects Diff-GMM and Sys-GMM estimation. GER at the elementary level is statistically significant in models 2 and 3, whereas in models 1 and 5 it was found positive but statistically insignificant. Increased funding for teacher training, opening of new schools, infrastructure facilities, and free textbooks for specific groups are the objectives of this programme (Dougherty & Herd, 2008). However, Pratham, a non-governmental organisation, has brought attention to a deeper issue regarding the quality of education than just completion rates. According to the most recent survey, standard five students constitute about 42.8 per cent of students who can read a brief passage from a Class II text book. Besides, only 25.6 per cent of students are proficient in the division. Comparably, of the standard VIII students, nearly 69.6 per cent read a brief passage from the standard two text books and 44.7 percent can perform division (ASER, 2022).

	Fixed Effects		Differe	nce GMM	System GMM		
Variables	Fixed	Effects	One step		One step		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	
InPCNSDP _{t-1}			0.583***	0.732***	0.562***	0.971***	
			(0.0272)	(0.153)	(0.108)	(0.287)	
InSGFCF	0.133***	0.183***	0.0827***	0.0838**	0.105	0.162*	
	(0.0260)	(0.0294)	(0.0164)	(0.0362)	(0.0640)	(0.0856)	
Inlfpr	0.0015***	0.0026***	0.00078*	0.00089	0.00074	0.00013	
	(0.0004)	(0.0004)	(0.00041)	(0.00081)	(0.0012)	(0.0013)	
Ingerelm	0.123		0.438*		0.00503		
	(0.111)		(0.250)		(0.348)		
Ingersec	0.455***		-0.296		-1.135*		
	(0.113)		(0.232)		(0.600)		
Ingerhe	0.656***		0.277*		0.661***		
	(0.0475)		(0.139)		(0.216)		
Ingerelm t-5		0.238**		-1.111**		-1.857**	
		(0.107)		(0.430)		(0.723)	
Ingersec 1-5		-0.00632		-1.152***		-1.009*	
		(0.110)		(0.340)		(0.478)	
Ingerhe t-5		0.541***		0.774***		0.582**	
		(0.0479)		(0.196)		(0.269)	
Constant	4.975***	5.855***			6.170**	9.564***	
	(0.485)	(0.434)			(2.480)	(2.109)	
Hausman Test	0.00	-38.94					
m1			0.00	0.00	0.02	0.00	
			0.44	0.36	0.37	0.49	
m2			24	24	26	26	
Hansen Test			0.68	0.76	0.82	0.78	
Observations	371	298	341	281	358	298	
R-squared	0.75	0.66					
No. of States	15	15	15	15	15	15	

 Table 2: Estimated Coefficients of Static and Dynamic Panel Data Analysis Showing the Relationship

 Between Economic Growth and Gross Enrolment Ratios Across Three Levels of Education

Source: Authors' estimation

Note: ***, ** and * shows significance levels at 1%, 5% and 10% respectively. Standard errors are in parentheses.

Furthermore, despite being statistically significant, secondary education was found to have a negative sign in all models, except model 1. The possible reason could be the number of students enrolled in secondary schools has increased due to SSA targets by 2010. These young people are most possibly employed; 54.7 per cent of them are employed and unlikely to return to school to pursue higher education (ASER, 2023). The high dropout rate among those students has resulted in lower graduation rates.

Notably, the physical capital is positive and turns statistically significant for all the models except model 5, implying physical capital is as important as human capital in augmenting state economies. Similarly, LFPR turns significant under models 1, 2 and 3; however, models 4, 5 and 6 display positive signs but are not significant, probably because of the asymmetric demographic dividend. There is evidence of an untapped demographic dividend, as a mere 53 per cent of the population participates in the labour force from the age cohort of 15-59 years (NSS, 2018). This underscores that half of the working-age population are jobless in India.

Variables Inved Energy One step One step Model 1 Model 2 Model 3 Model 4 Model 5 Model 1 InPCNSDP _{t-1} 0.198*** 0.787*** 0.197*** 0.865* InSGFCF 0.148*** 0.323*** 0.0234 0.0914*** 0.0683 0.0461 InLFPR 0.00181*** 0.00267*** 0.00079 -0.00049* 0.00053 -0.000 InPCTEE 0.889** 0.902*** 0.00049* 0.00079 (0.00079) (0.00079) (0.00079) (0.00079) (0.00079) (0.00079) (0.00079) (0.00079) (0.00079) (0.00079) (0.00079) (0.00079) (0.00079) (0.00079) (0.00079) (0.00079) (0.00079) (0.00079) (0.000079) (0.00079) (0.000079) (0.000079) (0.000179) (0.000179) (0.000179) (0.000179) (0.000179) (0.000179) (0.000179) (0.000179) (0.000179) (0.00170) (0.0256) (0.0173) (0.0256) (0.0173) (0.0256) (0.0173) (0.0256)		Eived Effecte	Differen	ce GMM	System GMM		
$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	riables	Fixed Effects	One	step	One step		
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$		Model 1 Model	el 2 Model 3	Model 4	Model 5	Model 6	
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	OP _{t-1}		0.198***	0.787***	0.197***	0.865***	
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$			(0.0412)	(0.0186)	(0.0461)	(0.0191)	
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	- 0.1	0.148*** 0.323***	* 0.0234	0.0914***	0.0683	0.0463**	
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	(0	(0.0234) (0.0331)	(0.0190)	(0.0141)	(0.0742)	(0.0156)	
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	0.0	0.00181*** 0.00267*	*** 0.00079	-0.00049*	0.00053	-0.00047	
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	(0	(0.0004) (0.0005)	(0.00063)	(0.00024)	(0.00079)	(0.00036)	
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	0.8	0.889***	0.902***		0.862***		
InPCTEE t-5 0.339*** 0.0809*** 0.0614 Constant 0.926*** 3.969*** (0.0173) 0.0614 Constant 0.926*** 3.969*** 0.363 0.865* Mausman Test -1.37 0.00 0.13 0.00 0.17 Mausman Test -1.37 0.00 0.13 0.00 0.17 0.00 m1 0.33 0.27 0.38 0.28 0.28 0.28 0.28 0.28	(0	(0.0359)	(0.0619)		(0.0815)		
(0.0526) (0.0173) (0.025 Constant 0.926*** 3.969*** 0.363 0.865* (0.189) (0.258) 0.00 0.107 0.00 Hausman Test -1.37 0.00 0.13 0.00 0.17 0.00 m1 0.13 0.00 0.17 0.00 0.28 0.28 0.28 0.28	t-5	0.339***	*	0.0809***		0.0614**	
Constant 0.926*** (0.189) 3.969*** (0.258) 0.363 (0.297) 0.865* (0.107 Hausman Test -1.37 0.00 m1 0.13 0.00 0.17 0.00 m2 0.33 0.27 0.38 0.28 No. of Instruments 24 24 26 26		(0.0526)		(0.0173)		(0.0250)	
(0.189) (0.258) (0.297) (0.107) Hausman Test -1.37 0.00 m1 0.13 0.00 0.17 0.00 m2 0.33 0.27 0.38 0.28 Na of Instruments 24 24 26 26	nt 0.9	0.926*** 3.969***	*		0.363	0.865***	
Hausman Test -1.37 0.00	(0	(0.189) (0.258)			(0.297)	(0.107)	
m1 0.13 0.00 0.17 0.00 m2 0.33 0.27 0.38 0.28 No. of Instruments 24 24 26 26	in Test -1.	-1.37 0.00					
m2 0.33 0.27 0.38 0.28			0.13	0.00	0.17	0.00	
No of Instruments 24 24 26 26			0.33	0.27	0.38	0.28	
	nstruments		24	24	26	26	
Hansen Test 0.79 0.79 0.86 0.83	Test		0.79	0.79	0.86	0.83	
Observations 371 298 341 281 358 298	ations 37	371 298	341	281	358	298	
R-squared 0.76 0.61	ed 0.7	0.76 0.61					
No. of States 15 15 15 15 15	itates 15	15 15	15	15	15	15	

 Table 3: Estimated Coefficients of Static and Dynamic Panel Data Analysis Showing the Relationship

 Between Economic Growth and Per Capita Public Education Expenditure

Source: Authors' estimation

Note: ***, ** and * shows significance level at 1%, 5% and 10% respectively. Standard errors are in parentheses.

The third measure of human capital, Per Capita Total Education Expenditure (PCTEE) consistently influences the economic growth of the states throughout the estimation. The performance of human over physical capital is once again reiterated in this estimation. Considering education expenditure as a whole may not be as insightful as level-wise expenditure. Therefore, the study examines this relationship with education spending across three different levels of education. The results are shown in Table 4.

Public spending on education turns positive and significant for all levels of education under fixed effect estimates except higher education. In the System GMM estimation, the lagged elementary education expenditure turns negative and insignificant, but in the Diff GMM, it turns negative and significant. However, secondary is consistently influencing the economic growth of the states. Notably, economic growth is not substantially impacted by public spending on higher education under the fixed effects model. Again, the role of physical capital was identified as positive and statistically significant in all the models; however, in model 5, it is positive but statistically insignificant. LFPR is insignificant in dynamic estimation even though positive in sign in models 1 and 5, whereas in models 4 and 6 it turns negative in sign. Public spending on education is cited insufficient by many studies and there has been a surge in household education expenditure, particularly in the higher education level (Ghosh, 2014). Participation in private institutions has also increased despite prohibitively higher tuition fees. This may discourage the poor and marginalised from accessing higher education, hampering its influence on economic growth (Patel, 2009).

Table 4:	Estimated	coefficie	ents of	static an	d dynamic	panel data	analysis	showin	g the rel	ationship
between	economic	growth	and pe	er capita	education	expenditur	e across	three	different	levels of
educatio	n									

	Bandom Effects		Differe	ence GMM	System GMM		
Variables		n enects	On	e step	One	e step	
	Model 1	Model2	Model 3	Model4	Model 5	Model 6	
InPCNSDP _{t-1}			0.211***	0.787***	0.209***	0.917***	
			(0.0709)	(0.0372)	(0.0695)	(0.0233)	
InSGECE	0.178***	0.253***	0.0520**	0.100***	0.0479	0.0439***	
	(0.0244)	(0.0305)	(0.0228)	(0.0194)	(0.0752)	(0.0128)	
InI FPR	0.0026***	0.0028***	0.00070	-0.00095**	0.000761	-0.000537	
	(0.0004)	(0.0005)	(0.0008)	(0.0004)	(0.0009)	(0.0004)	
InPCPEELM	0.466***		0.611***		0.615***		
	(0.0354)		(0.0991)		(0.101)		
InPCPESEC	0.313***		0.213**		0.214**		
	(0.0311)		(0.0818)		(0.0727)		
InPCPEHE	-0.0908***		0.0323		0.0326		
	(0.0266)		(0.0299)		(0.0280)		
InPCPEELM t-5		0.187***		-0.0955*		-0.0425	
		(0.0407)		(0.0461)		(0.0292)	
InPCPESEC t-5		0.241***		0.170***		0.0315	
		(0.0379)		(0.0439)		(0.0480)	
InPCPEHE t-5		-0.177***		0.0180**		0.0279***	
		(0.0479)		(0.00815)		(0.00739)	
Constant	2.075***	5.325***			0.402	0.652***	
constant	(0.296)	(0.309)			(0.562)	(0.181)	
Hausman Test	0.29	0.19					
m1			0.22	0.00	0.27	0.00	
m2			0.18	0.84	0.33	0.75	
No. of Instruments			24	24	26	26	
Hansen Test			0.76	0.71	0.80	0.74	
Observations	371	298	341	281	358	298	
R-squared	0.72	0.61					
No. of States	15	15	15	15	15	15	

Source Authors' estimation

In the post estimation tests, the instruments are found valid in GMM estimation. The Hansen J tests checked the over-identification restrictions and did not reject the m1 and m2 tests. Although there is evidence of the first difference in the first-order serial correlation, it is eliminated in the second order.

Conclusion and Policy Implications

Filling the research gap investigating the empirical relationship at the sub-national level between human capital and economic growth, the study precisely examined the link using various measures of human capital between1994 and 2018 based on NSS, UDISE plus, AISHE, and ABE on education data. The study carried out a descriptive and empirical analysis of the association between the economic growth of the Indian states and select education variables like AYS and GER across three different levels of education and per capita spending across levels. They are compared with the development status of the states as per the 2019 HDI ranking. Given the dearth of sub-national level analysis on similar lines, the

Note: ***, ** and * shows significance level at 1%, 5% and 10% respectively. Standard errors are in parentheses, PCPEELM; Per Capita Public Education Expenditure on Elementary Education, PCPESEC; Per Capita Public Education Expenditure on Secondary Education; PCPEHE; Per Capita Public Education Expenditure on Higher Education.

efforts of this paper would certainly augment the literature on human capital and economic growth from the Indian context.

Despite a comprehensive policy focus on central aid for secondary school development and quality enhancement, the central government has made relatively little contribution to its expansion over the past seven decades. India's Five-Year Plan prioritised increasing access and affordability of education for all societal segments.⁵ The country placed a larger emphasis on the expansion of economic growth during the initial years of Independence, although it has not been distributed fairly among different regions (Hanagodimath, 2019). In most Indian states, there exists a wide disparity between economic growth and development. Development status and educational outcomes go hand in hand with economic growth.

The study categorised the states as per the development status. Among HD states, Kerala has the best educational outcome compared to others. There exist solid variations in terms of outcomes and per capita public education expenditure. However, HD and MD states are relatively performing better in AYS, GER, and public spending than traditionally backward or poor states, though there are exceptions. Although Maharashtra and Karnataka fall into the category of MD states, their educational performances are exceptionally better. Similar is the pattern for public spending on education. Enrolment rates across various levels of education are exceptionally well in TN may be because of the larger availability and enrolments in private institutions. LD states are laggards in terms of educational outcomes as well as spending, except Assam. It may be because north-eastern states are better placed in terms of educational indicators.

The static and dynamic panel data estimation pinpointed the ardent role of education augmenting the country's economic growth. The lagged AYS influences economic growth and outweighs the physical capital needed to support economic growth in both static and GMM estimations. Enrolment ratios of higher education are a vital factor in elementary and secondary levels for enhancing the growth of the Indian states. Similarly, per capita spending for education through the budgetary provisions of the government is pivotal for taking the growth to the next level for a developing nation like India. Here comes the policy debate on setting apart 6% of GDP for education financing. From the Kothari Commission to the recent National Education Policy (NEP) 2020, there has been an emphasis on targeting education financing at this level. However, India has never achieved the target and is still lagging in public spending for education compared to educationally well-performing nations like the USA (6.4%), Norway (6.5%), the United Kingdom (6.3%), and New Zealand (6.9%).

Nevertheless, this study specifically addressed an important research gap in the literature by empirically examining how level-wise public spending on education affects economic growth. An insightful conclusion drawn from the empirical analysis is how public spending at elementary and secondary levels influences growth more than higher levels of education. The inadequate spending at higher levels of education and the dominant role of the private sector at this level may be the plausible reason behind it. In addition to that, the private good nature of higher education, wherein the private benefit is more than the social benefit, would have been reflected in the analysis. Therefore, education

⁵ Growth of Higher Education in India, International Research Journal of Social Sciences, 2(8), 58-60 (2013), by Gaikwad B R and Solunke R S

financing policies should be carefully devised to give further thrust to secondary education while keeping the focus on elementary-level education. Even though the results indicate that the current public spending at the higher educational level does not statistically and significantly affect economic growth, past public spending at the higher educational level has a significant impact on economic growth. This is perhaps because it takes a few years for individuals after completion of education to join the labour market, which makes a significant contribution to economic growth. Therefore, public spending policies should be carefully devised to meet the twin objectives of egalitarian distribution of education and augmentation of economic growth.

Considering the effects of education on the economic growth of states, there is a pressing need for state and central governments to engage in education financing. Budgetary allocations must be done carefully, wherein the resources should be pumped into growth accentuating levels, keeping the focus intact on other levels of education. GER at secondary and higher education levels should be given utmost importance and focus on the elementary level. The uneven distribution of educational outcomes will have an adverse impact on employment opportunities and overall economic growth. With this analysis, one could argue that India's demographic dividend has dismal prospects. Educationally backward states must be given special attention to efficient resource allocation. A balanced development of HDI may aid in fulfilling the objective of excellent educational attainment. The United Nations (2009) estimated in their World Population Prospects Report that India will add 300 million people between the ages of 15 and 64 between 2010 and 2040, a country with a favourable demographic dividend. To tap the demographic potential, an educated and quality workforce is desirable. Therefore, it flags the undue necessity of channelised investment in education to translate it into higher economic growth.

Appendix

Based on the Human Development Index (HDI) (2019) ranking, states are categorised

Category	States
Highly Developed	Kerala, Punjab, TN, Haryana,
Medium Developed	Maharashtra, Karnataka, Gujarat, AP
Low Developed	WB, Rajasthan, Assam, Odisha, MP, UP, Bihar

Table 1A: Definition and Source of the Variable

Variable N	leasures Source	
PCNSDP	Per capita net state domestic product measures at a constant	National Account Statistics (NAS)
	price	Annual Survey of Industries (ASI),
		Ministry of Statistics and Programme
SGFCF	SGFCF has expressed in rupees in crore.	Implementation (MoSPI),
		Government of India (GoI)
		National Sample Survey Office
		(NSSO) (at various education
AYS	The highest level of education is attained at each age group of	rounds)
	the population and the official duration of each educational	Economic and Political Weekly
	level. Barro and Lee (1993, 2010)	Research Foundation (EPWRF)
GERELM		Economic and Political Weekly
		Research Foundation (EPWRF)
GERSEC		Economic and Political Weekly
	$GER_{t}^{t} = \frac{E_{h}^{t}}{2} \times 100$	Research Foundation (EPWRF), DISE
GERHE	$h = P_{h,a}^t$	and All India Survey on Higher
		Education (AISHE)
		Analysis of Budgeted Expenditure on
		education (various years)
PC TEE		National Sample Survey Office
PC ELM		(NSSO) (various employment and
PC SEC	Per capita public expenditure in different levels of education in	unemployment round)
PC HE	rupees	
LFPR	$\frac{No. of \ employed + unemployed \ persons}{Total \ Population} \times 100$	

Source: Authors' computation

References

- Acemoglu, D, Johnson, S and Robinson, J A (2001). The Colonial Origins of Comparative Development: An Empirical Investigation. *American Economic Review*, 91(5): 1369-1401.
- Aggarwal, S C, Satija, D and Khan, S (2019). *Inclusive Growth in India-Learning from Best Practices of Selected Countries*. Working paper No. 375.
- Arellano, M and Bond, S (1991). Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations. *The Review of Economic Studies*, 58(2): 277-297.
- Arellano, M and Bover, O (1995). Another Look at the Instrumental Variable Estimation of Error-Components Models. *Journal of Econometrics*, 68(1): 29-51.
- Arora, R U (2009). Globalisation and Stages of Development: An Exploratory Analysis. In *Review of Urban & Regional Development Studies: Journal of the Applied Regional Science Conference*, 21 (2-3): 124-42. Melbourne, Australia: Blackwell Publishing Asia.
- Arora, R and Jalilian, H (2020). *Financial Development, Human Capital and Economic Growth: The Indian Case*.
- ASER (2022). Annual Status of Education Report (Rural) 2018. New Delhi: Pratham.
 - (2023). Annual Status of Education Report (Rural) 2018. New Delhi: Pratham.
- Barro, R J (1991). Economic Growth in a Cross-Section of Countries. *The Quarterly Journal of Economics*, 106 (2), 407-43.
- Barro, R J and Lee, J W (2013). A New Data Set of Educational Attainment in the World, 1950– 2010. *Journal of Development Economics*, 104: 184-98.
- Batten, J A and Vo, X V (2009). An Analysis of the Relationship between Foreign Direct Investment and Economic Growth. *Applied Economics*, 41(13): 1621-41.
- Becker, G (1964). S Human Capital: A Theoretical and Empirical Analysis, with Special Reference to Education.
- Belke, A and Wernet, A (2015). Poverty Reduction through Growth and Redistribution Policies—A Panel Analysis for 59 Developing Countries. *Review of Development Economics*, 19(1): 143-62.
- Benhabib, J and Spiegel, M M (1994). The Role of Human Capital in Economic Development is Evidenced by Aggregate Cross-Country Data. *Journal of Monetary Economics*, 34 (2): 143-73.
- Bhowmick, S and Yadav, V (2019). Human Capital Formation through Public Education: How Fares India?
- Blundell, R and Bond, S (1998). Initial Conditions and Moment Restrictions in Dynamic Panel Data Models. *Journal of Econometrics*, 87(1): 115-43.
- Bodman, P and Le, T (2013). Assessing the Roles that Absorptive Capacity and Economic Distance Play in the Foreign Direct Investment-Productivity Growth Nexus. *Applied Economics*, 45(8): 1027-39.
- Chakrabarti, A and Joglekar, R (2006). Determinants of Expenditure on Education: An Empirical Analysis Using State-Level Data. *Economic and Political Weekly*, 1465-1472.
- Chandra, A (2010). *Does Government Expenditure on Education Promote Economic Growth? An Econometric Analysis.* University Library of Munich, Germany.

- Chandrasekhar, S, Geetha Rani, P and Sahoo, S (2016). Household Expenditure on Higher Education in India: What Do We Know & What Do Recent Data Have to Say. *Working Papers*, *38*.
- Chatterji, M, Mohan, S and Dastidar, S G (2014). Determinants of Public Education Expenditure: Evidence from Indian States.
- Chhibber, P and Nooruddin, I (2004). Do Party Systems Count? The Number of Parties and Government Performance in the Indian States. *Comparative Political Studies*, 37(2): 152-87.
- De, A and Endow, T (2008). Public Expenditure on Education in India: Recent Trends and Outcomes.
- Dholakia, R H (1985). *Regional Disparity in Economic Growth in India*. Bombay: Himalaya Publishing House.
- Dholakia, R H (2003). Regional Disparity in Economic and Human Development in India. *Economic and Political Weekly*, 4166-72.
- Dougherty, S and Herd, R (2008). Improving Human Capital Formation in India.
- Dreze, J (1999). A Surprising Exception. Himachal's Success in Promoting Female Education. *Manushi*, (112): 12-17.
- Dreze, J and Sen, A (2013). An Uncertain Glory: India and Its Contradictions. New Delhi: Allen Lane.
- Dulleck, U and Foster, N (2008). Imported Equipment, Human Capital and Economic Growth in Developing Countries. *Economic Analysis and Policy*, 38(2): 233-50.
- Easterly, W and Levine, R (1997). Africa's Growth Tragedy: Policies and Ethnic Divisions. *The Quarterly Journal of Economics*, 1203-50.
- Fernandez, E and Mauro, P (2000). The Role of Human Capital in Economic Growth: The Case of Spain. IMF Working Paper No. 00/8, Available at SSRN: <u>https://ssrn.com/abstract=879322</u>
- Gaikwad, B R and Solunke, R S (2013). Growth of Higher Education in India. *International Research Journal of Social Sciences*, 2(8): 58-60.
- Ghosh, J (2014). Hollow Promises. Frontline, 31 (15): 13-15.
- Goswami, B and Bezbaruah, M P (2011). Social Sector Expenditures and Their Impact on Human Development: The Indian Experience. *Indian Journal of Human Development*, 5(2): 365-85.
- Government of India (2008). Kerala Development Report. Planning Commission, Government of India, New Delhi.
- Grant, C (2017). The Contribution of Education to Economic Growth. *K4D Helpdesk Report. Brighton, UK: Institute of Development Studies, 25.*
- Gruber, L and Kosack, S (2014). The Tertiary Tilt: Education and Inequality in the Developing World. World Development, 54: 253-72.
- Haldar, D, Kumar, S and Mallik, G (2010). Does Human Capital Cause Economic Growth? A Case Study of India. *International Journal of Economic Sciences and Applied Research*, 3(1): 7-25.
- Hanagodimath, S V (2019). Regional Disparity in Per Capita Income in India: A Study on Inter-state and Intra-state Analysis.
- Hanushek, E A (2013). Economic Growth in Developing Countries: The Role of Human Capital. *Economics of Education Review*, 37: 204-212.
- Hanushek, E A and Kimko, D D (2000). Schooling, Labour-force Quality, and the Growth of Nations. *American Economic Review*, 90(5): 1184-1208.

- Hanushek, E A and Woessmann, L (2008). The Role of Cognitive Skills in Economic Development. *Journal of Economic Literature*, 46(3): 607-68.
- Hanushek, E A and Woessmann, L (2012). Schooling, Educational Achievement, and the Latin American Growth Puzzle. *Journal of Development Economics*, 99(2): 497-512.
- IGIDR (2002). India Development Report, 2002. USA: Oxford University Press.
- India, G O (Various Years). *Analysis of Budgeted Expenditure on Education.* New Delhi: Ministery of Education Human Resource Development, Government of India.
- Iqbal, N and Daly, V (2014). Rent-seeking Opportunities and Economic Growth in Transitional Economies. *Economic Modelling*, 37: 16-22.
- Jayasekhar, S, Prasad, S and Roy, V N (2011). Convergence Hypothesis: Some Dynamics and Explanations of Agricultural Growth across Indian States.
- Kumar, U (2010). India's Demographic Transition: Boon or Bane? *A State-Level Perspective*, September 2.
- Lucas Jr, R E (1988). On the Mechanics of Economic Development. *Journal of Monetary Economics*, 22(1): 3-42.
- Mallick, J (2013). Public Expenditure, Private Investment and Income: Evidence in Indian States. *The Journal of Developing Areas*, 181-205.
- Mankiw, N G, Romer, D and Weil, D N (1992). A Contribution to the Empirics of Economic Growth. *The Quarterly Journal of Economics*, 107(2): 407-437.
- Mathai, M K, Duenwald, M C, Guscina, M A, Al-Farah, R, Bukhari, M H, Chaudry, M A, ... and Zaher, M M (2020). Social Spending for Inclusive Growth in the Middle East and Central Asia. International Monetary Fund.
- Mehrotra, S (2004). Reforming Public Spending on Education and Mobilising Resources: Lessons from International Experience. *Economic and Political Weekly*, 987-997.
- Mishra, P K, Mishra, S K and Sahoo, F K (2016). Empirical Evidence on Regional Disparities Across Indian States. *Orissa Economic Journal*, 48(1): 107-122.
- Moral-Benito, E (2012). Determinants of Economic Growth: a Bayesian Panel Data Approach. *Review of Economics and Statistics*, 94(2): 566-79.
- Nauriyal, D K and Sahoo, B K (2010). Economic Growth across Indian States: Role of Education, Infrastructure, and Health. *Inter-Regional Disparities in India. New Delhi, India: Deep & Deep Publications*, 61-88.
- Niti Aayog (2019). School Education Quality Index. New Delhi: Government of India.
- NSS (2018). NSS Report. Periodic Labour Force Survey. New Delhi: Central Statistical Organisation.
- Patel, S P (1983). Equality of Educational Opportunity in India: A Myth or Reality? National.
- Patel, V (2009). Private Higher Education in India Changing Scenario. *International Journal of Education Economics and Development*, 1(1): 36-46.
- Petrakis, P E and Stamatakis, D (2002). Growth and Educational Levels: A Comparative Analysis. *Economics of Education Review*, 21(5): 513-21.
- Pradhan, R P (2009). Education and Economic Growth in India: Using Error Correction Modelling. *International Research Journal of Finance and Economics*, 25 (1): 139-47.

Probe (1999). Public Report on Basic Education in India. New Delhi: Oxford University Press.

- Romer, P M (1990). Endogenous Technological Change. *Journal of Political Economy*, 98(5, Part 2), S71-S102.
- Roy, A, Kamaiah, B and Rao, G (2000). *Educational Expenditure Needs of Large Indian States: A Normative View* (No. 55). Institute for Social and Economic Change, Bangalore.
- Schultz, T W (1961). Investment in Human Capital. The American Economic Review, 51(1): 1-17.
- Schwab, K (2013). The Human Capital Report 2013. In Geneva: World Economic Forum (Vol. 5013).
- Self, S and Grabowski, R (2004). Does Education at all Levels Cause Growth? India, A Case Study. *Economics of Education Review*, 23(1): 47-55.
- Siddiqui, A and Rehman, A U (2016). The Human Capital and Economic Growth Nexus: in East and South Asia. *Applied Economics*, 49(28): 2697-2710.
- Solow, R M (1956). A Contribution to the Theory of Economic Growth. *The Quarterly Journal of Economics*, 70(1): 65-94.
- Sylwester, K (2002). Can Education Expenditures Reduce Income Inequality? *Economics of Education review*, 21(1): 43-52.
- Tilak, J B (2006a). Cess-driven Allocations for Education. Economic and Political Weekly, 1331-1333.
- Tiwari, A K and Mutascu, M (2011). Economic Growth and FDI in Asia: A Panel-data Approach. *Economic Analysis and Policy*, 41(2): 173-87.
- Tomar, R (2017). Education Expenditure in Punjab and Haryana: An Empirical Analysis. *Arthshastra Indian Journal of Economics & Research*, 6(4): 32-40.
- UNESCO. (2010). Reaching the Marginalized. EFA Global Monitoring Report 2010.
- United Nations Department of Economic and Social Affairs, Population Division (2022). World Population Prospects 2022: Summary of Results. UN DESA/POP/2022/TR/NO. 3.
- United Nations (2009). *World Population Prospects: The 2008 Revision*. New York: Department of Economic and Social Affairs, Population Division.
- Van Leeuwen, B and Foldvari, P (2008). Human Capital and Economic Growth in Asia 1890–2000: A Time-series Analysis. *Asian Economic Journal*, 22 (3): 225-40.
- Varughese, A R and Bairagya, I (2021). Interstate Variation in Household Spending on Education in India: Does it Influence Educational Status? *Structural Change and Economic Dynamics*, 59: 405-15.
- Véron, R (2001). The "New" Kerala Model: Lessons for Sustainable Development. *World Development*, 29(4): 601-17.
- Wei, C H I (2008). The Role of Human Capital in China's Economic Development: Review and New Evidence. *China Economic Review*, 19(3): 421-36.
- Zhang, C and Zhuang, L (2011). The Composition of Human Capital and Economic Growth: Evidence from China using Dynamic Panel Data Analysis. *China Economic Review*, 22(1): 165-71.

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