SOME ASPECTS OF ELEMENTARY EDUCATION IN RURAL INDIA: AN EMPIRICAL ANALYSIS

THESIS SUBMITTED FOR THE DEGREE OF

DOCTOR OF PHILOSOPHY (ARTS)

OF

JADAVPUR UNIVERSITY

2023

BY

PUJA BISWAS

DEPARTMENT OF ECONOMICS

JADAVPUR UNIVERSITY, KOLKATA-700032

WEST BENGAL, INDIA

Certified that the Thesis entitled

'SOME ASPECTS OF ELEMENTARY EDUCATION IN RURAL INDIA: AN EMPIRICAL ANALYSIS' submitted by me for the award of the Degree of Doctor of Philosophy in Arts at Jadavpur University is based upon my work carried out under the Supervision of Professor Amit Kundu, Department of Economics, Jadavpur University, and that neither this thesis nor any part of it has been submitted before for any degree or diploma anywhere/elsewhere.

Countersigned by the

Supervisor: **Candidate:**

Dated: **Dated:**

Acknowledgement

I would like to express my sincere gratitude to all those who have contributed to the successful completion of this thesis. First, I would like to express my heartfelt appreciation toward Prof. Amit Kundu, Department of Economics, Jadavpur University for his valuable guidance, unwavering support and insightful feedback throughout my research work. I remain heavily indebted to him for his constant encouragement and belief in my abilities which serve as a driving force towards my work.

I would like to express my gratitude toward Prof. Sushil Kumar Haldar, a member of my Research Advisory Committee and Former Head of the Department of Economics, at Jadavpur University for devoting his valuable time and guidance to facilitate my work and I am thankful to Prof. Saikat Sinha Roy, another member of my Research Advisory Committee and Head of the Department of Economics, at Jadavpur University for providing his valuable feedback on my research work. I would also like to thank the Department of Economics, Jadavpur University for allowing me to carry out my Ph.D. Programme.

Last, but not least, my special thanks are extended to my mother, brother, other family members, friends, colleagues and Dr Arnab Ghosh (Principal, Prasanta Chandra Mahalanobis Mahavidyalaya) without their inspiration and moral support, this thesis could not have been completed.

PUJA BISWAS

DEPARTMENT OF ECONOMICS

JADAVPUR UNIVERSITY,

KOLKATA-700032

Executive Summary of the Thesis:

This thesis emphasizes rural regions due to their demographic significance and distinct socio-economic context characterized by a predominant informal workforce. The primary objective of this study is to illuminate the landscape of primary school education attainment and achievement within the context of rural India. Primary education in India is the foundation of a child's educational journey and typically covers students aged 6 to 10 years. It constitutes the initial stage of formal education and is crucial for laying the groundwork for further learning. While there have been positive strides in primary school enrolment and access, challenges and continuing to focus on improving the overall learning experience for students are essential for the growth and development of India's education system. The first three chapters contain an introduction, a survey of the literature and the objectives of the thesis respectively.

The Fourth chapter of the thesis 'Determinants of Overall Enrolment Ratio and Girls' Enrolment Ratio in Primary Education in Rural India: A Region-based Analysis' investigates the factors that can influence overall enrolment and girls' enrolment in primary education in rural India. Based on the 2011 Census, 352 rural people-dominated districts of 16 major states of India are identified. Due to socio-cultural differences among rural Indian people, which can influence enrolment decisions in primary schools, the states are divided into four regions based on their geographical locations. Initially, after constructing the School Grant Coverage Index through Principal Component Analysis and with the help of the General Entropy measure of Inequality, it is observed that the coverage of grants in public primary schools has enhanced and inequality in terms of receiving government grants has decreased over time in rural India. Results based on the static panel regression model depict that mid-day meals and teaching-learning material grants influence overall enrolment only in the Northern and Eastern regions of rural India. Similarly, mid-day meals, school development grants, and fathers' education influence girls' enrolment in Eastern, Western and Northern regions but fail to influence the Southern regions of rural India. The availability of female teachers positively influences girls' enrolment in primary school attainment in Eastern, Western and Southern regions of India. It has also been observed that parents show a higher inclination towards enrolling their daughters in public primary schools and sons in private primary schools located in rural India.

Next, the Fifth chapter of the thesis 'Gender Parity Index in Primary School in Rural India: An Analysis' tries to identify the possible factors that can influence the Gender Parity Index (GPI) during the time of enrolment in primary education in rural India. This study based on DISE statistics has found that school development grant influences GPI in Eastern, Western and Southern zones and teaching learning material grant influence GPI value in Eastern and Western zone and also encourages overall enrolment of children in the Northern zone in rural schools. It is also found that increased female teacher positively influences GPI value in primary school enrolment in the Eastern and Southern zone of India. The reduced pupil-teacher ratio has a positive impact on girls' enrolment in primary schools mainly in the Eastern, Western and Southern zones of India. The availability of mid-day meals in school has positively influenced GPI value in primary school enrolment in the Eastern, Western and Southern zone of India and also have a positive impact in increasing overall enrolment in rural primary schools in the Northern zone of India. Female literacy and overall literacy have a positive influence on GPI in the Eastern zone of India. The provision of specialised toilets for girl children has also motivated parents to enrol their girl child in primary school mainly in the Eastern, Western and Southern zones of India.

Then, in the Sixth chapter of the thesis 'Gender Discrimination in Enrolment in Private Primary Schools in Rural India: A Fairlie's Decomposition Analysis' using the 75^{th} round NSS unit level data on Social Consumption on Education tries to identify the various household and school-related factors which influence the household choice of schooling for their children at the time of enrolment in primary school in rural India. The contribution of each factor explaining the gender gap in school enrolment is quantified with the help of Fairlie's decomposition technique. Social attributes like caste, religion and school-related factors like English medium school, the distance between the household and primary school and household size widen the gender gap and economic attributes like the occupation of the head of the household, the income of the household and ownership of computers can reduce the gender gap in enrolment in private primary schools in rural India.

Next, the Seventh chapter 'Gender Discrimination in Education Expenditure in Public Primary Schools in Rural India among Religious Groups: An Oaxaca-Blinder Decomposition Analysis' will try to capture the disparity in expenditure on primary education based on gender among the religious groups (Hindu, Muslim & Christian) in rural India. The gender gap in education expenditure for a certain demographic group is calculated using the Oaxaca-Blinder decomposition

approach. Further, the study tries to identify the various household-related factors that might influence the decision to spend on a child's education using the 75th-level National Sample Survey Office (NSSO) unit-level dataset of July 2017 to June 2018(one academic year) to obtain data on education expenditure and other household factors which play a manifesting role in the gender gap in expenditure on education. This study suggests that the total differential (log mean boys education expenditure-log mean girls education expenditure) is positive among all religious groups signifying the gender bias in education expenditure. It is found that the magnitude of the 'Unexplained Effect' component is higher compared to the 'Explained Effect' component signifying that the treatment of characteristics by students differs by their sex at primary education attainment. Household size and if household members are employed on a casual basis, then their expenditure on education falls on the other hand, a household with computer availability and household members engaged in regular wage/salary earning plays a positive role in expenditure on primary education in rural India.

Later, in the Eighth chapter 'Learning Outcomes in Primary Education in Rural India: An Inter-state Comparison' the focus of the study shifted from educational attainment to academic achievement gained after completion of a class from primary school. An investigation is done on learning outcomes among children of different states of India at the primary level. Here 24 major states of India are considered. The exercise is done based on different ASER reports from 2010 onwards whose information is rural-specific. The learning outcome index of the students of each state is here calculated both at standard III and standard V levels. It is observed that in most states, the learning achievement of children at the primary level is deteriorating but not rapidly. This analysis also portrays that higher literacy among parents; and availability of some school-related factors like Mid-day Meals, proper drinking water, sanitation and playground facilities can play a positive role in improving the learning achievement of rural Indian children at the primary level.

The last chapter 'Nexus between Children's Malnutrition and their Academic Achievement at the Primary Level in Rural India' tries to identify the influence of children's health, measured by stunting, wasting and underweight and other socioeconomic factors such as household characteristics, parental education, and school-level infrastructure on the academic achievement of rural Indian children after completion of primary education using National Achievement Survey(NAS), National Family Health Survey(NFHS) and DISE Statistics. A significant negative relationship between undernutrition and the academic achievement of children who have passed

standard IV from rural primary schools in India is established. It is observed that parental support, students' understanding of the teaching taught in the class and the presence of qualified teaching staff in schools with adequate instructional materials and more proportion of female teachers in school will lead to better academic achievement of the children in primary education in rural India. Maternal education also plays a positive role in achieving quality education for children. It is also noted that mid-day programs, the pupil-teacher ratio at primary schools and immunization of children under five years fail to influence the learning outcome of children at the primary level in the rural Indian context.

Contents:

CHAPTER 1: INTRODUCTION

Introduction:

Education is a major development-enhancing tool that can positively change human life by improving an individual's information, expertise and insight (Mankiw *et al*, 1992; Sen, 1999; Self & Grabowski, 2004). Primary education forms the foundation for a child's future academic and intellectual growth. It provides essential knowledge and skills necessary for higher levels of education. Without a strong foundation in primary education, children may struggle to grasp more complex concepts in later years. Primary education focuses on teaching children fundamental literacy and numeracy skills, such as reading, writing, and basic mathematics. These skills are essential for effective communication, critical thinking, problem-solving, and decision-making, which are vital for personal and professional development. Achieving better quality basic education would strengthen the pillar of higher education and further enable skill development and better job market options and outcomes. In India, the school management system comprises government schools, private-aided schools (quasi-government schools) and private-unaided schools (also referred to as private schools). Government schools are entirely owned, funded, and managed by Central, State, or Local governments. Private-aided schools, adhere to government rules and regulations while being owned and managed by private institutions. These schools receive partial or full funding from the government. On the other hand, private-unaided schools are privately owned and managed by organizations in the private sector. In addition to the three main types of institutions, some 'unrecognized' primary schools do not comply with basic government regulations. Here government schools and private-aided schools are considered as part of the broader category known as public schools. Each type of school plays a crucial role in the Indian education system, catering to the diverse needs, and preferences of students and parents across the country. The availability of these three types of schools offers choices to parents and contributes to the overall growth and development of education in India. The District Primary Education Program (DPEP) was an important initiative launched by the Government of India in 1994 to address the challenges faced in primary education and to enhance access, equity and

overall learning outcomes in elementary schools. Over time, the program evolved into the Sarva Shiksha Abhiyan (SSA) which had a broader scope and aimed to provide universal elementary education across all districts in India. SSA was further integrated into the Samagra Shiksha Abhiyan in 2018, which seeks to provide quality education from preschool to higher secondary levels, emphasizing the holistic development of students. The Sarva-Shiksha-Abhiyan (SSA) is a flagship program launched to provide universal primary education which has its base in DPEP. The introduction of the Right of Children to Free and Compulsory Education Act (RTE) in 2010 strengthened the implementation of the Sarva Shiksha Abhiyan (SSA) by enshrining the right to primary education as a fundamental entitlement for all Indian citizens. The RTE Act[1] mandated that every child between the ages of 6 to 14 years has the right to receive free and compulsory education, making it a legal obligation for the government to provide elementary education to all children. This synergy between the SSA and the RTE Act further reinforced the government's commitment to achieving universal access to quality education for all children, regardless of their social or economic backgrounds. The combination of these initiatives has played a pivotal role in advancing educational opportunities, promoting enrolment, and enhancing the overall educational landscape in the country. Under the Sarva Shiksha Abhiyaan or Samagra Shiksha Abhiyan, the government grants to public schools in rural India aimed to enhance educational infrastructure, ensure the availability of necessary facilities, improve teacher training and promote quality education. Infrastructure Development, Teaching and Learning Materials, Teacher Training, School management committees etc. are the various components under which the SSA grants are distributed in rural primary schools.

According to data from DISE 2008 and U-DISE 2018, there has been a significant surge in the presence and enrolment of private schools in India. Over the period from 2007-08 to 2016-17, the share of private schools increased from 19.49% to 25.24%, and these schools' enrolment rose from 19.30% to 45%[2]. This trend is evident across all states in India, as observed in the ASER 2020 Report. In urban regions, a higher proportion of children attend private-unaided schools compared

[1] By integrating with the RTE Act, the SSA gained significant legal backing, ensuring that primary education became a constitutional right and a crucial child entitlement in India.

[2] Remarkably, the growth in enrolment at the elementary level in private schools has been even more pronounced since 2013-14

to those living in rural areas. Conversely, in rural areas, a higher proportion of children opt for public schools compared to children residing in urban areas. In public schools, the enrolment of girls surpasses that of boys. However, a contrasting trend is observed in private primary schools, where a higher number of boys are enrolled compared to girls.[3] Notably, this gender gap in enrolment is more pronounced in rural areas compared to urban areas. (ASER Report, 2020). The global concern over parental choice between public and private schools reflects the unwavering commitment of parents to provide the optimal educational environment for their children. This ongoing debate highlights the significance of selecting the right educational setting that aligns with each child's unique needs and aspirations. In developing nations, extensive research indicates a prevailing trend where parents show a preference for enrolling their children in private schools. This choice is influenced by a range of factors, including perceptions surrounding the language of instruction, perceived higher quality of education, improved infrastructure, and other advantages perceived in private educational institutions. (Kingdon, 1996; Tooley & Dixon, 2003). Gender discrimination in private primary school enrolment is a concerning issue that persists in various parts of the world, including India. While progress has been made in improving access to education for both boys and girls, disparities still exist, particularly in private school enrolment. In some regions, girls face barriers and biases that limit their access to private schools. Deep-rooted cultural norms,societal expectations, and economic factors often restrict girls' enrolment in private schools. Discriminatory practices can include prioritizing boys over girls, favouring male children for educational opportunities, and allocating limited resources primarily to boys. Gender stereotypes and biases can influence private school enrolment decisions. Traditional beliefs may perpetuate the notion that education is more important for boys, while girls are expected to prioritize domestic roles. These stereotypes can lead to parents favouring boys' education over girls' education, resulting in gender-based disparities in private school enrolment. Economic considerations also play a role in gender discrimination in private school enrolment. Families facing financial constraints may prioritize investing in their sons' education, believing it will bring higher returns in the future. This preference for sons' education can result in limited resources being allocated to girls' education, including enrolment in private schools. Gender discrimination in private school enrolment has long-term consequences for girls and society as a whole. Girlswho are denied quality education face reduced opportunities for personal growth, limited employment prospects, and

[3] As found from DISE (2015-16) Handbook and ASER 2020 Report.

decreased economic independence. This perpetuates a cycle of gender inequality and hinders societal progress. Intra-household resource allocation discrimination based on gender can intersect with religious identities and practices, leading to additional complexities in certain contexts. It is important to note that practices and beliefs vary among different religious groups and communities, and not all religious groups engage in discriminatory resource allocation based on gender within households. However, there are instances where gender discrimination occurs within specific religious contexts. Traditional and cultural norms within some religious communities may reinforce gender-based discrimination within households. These norms often assign specific roles, responsibilities, and expectations to individuals based on their gender, which can result in unequal access to resources. Muslim families score lower on the dimension of women's autonomy. This restricted autonomy prevails in terms of taking household-related decisions like the choice of schooling for their children, expenditure on education and health, etc. (Morgan *et al*,2002). Research indicates that there is a notable disparity in women's autonomy among Muslim families, particularly when it comes to making household-related decisions. Women in these families tend to have limited autonomy in matters such as choosing their children's schooling, allocating funds for education and healthcare and others. This restricted autonomy highlights the need for further understanding and addressing the underlying factors that contribute to such disparities. Promoting women's empowerment and agency within these communities can play a crucial role in fostering inclusive decision-making processes and improving overall access to education and healthcare for their children. (Zimmerman, 2012; Saha, 2013). Jeejeebhoy and Sather (2001) shed light on the issue of female-constrained autonomy and limited access to information among various religious groups in India. The research highlights the challenges faced by women in terms of decision-making power and their ability to access important information among various religious groups in India. This constraint on female autonomy is observed across different religious communities in the country. Such limitations can have significant implications for women's participation in various aspects of life, including education, healthcare, and overall empowerment. Recognizing and addressing these issues is crucial for promoting gender equality and ensuring that all women have the opportunity to make informed decisions and actively participate in shaping their lives and the lives of their families.

Gender discrimination can affect access to education within households. In some cases, girls may face barriers in accessing formal education due to cultural beliefs or societal expectations tied to

religious practices. This can limit their educational opportunities, perpetuate gender disparities, and hinder their social and economic mobility. Gender discrimination can also manifest in the unequal distribution of decision-making power within households. Traditional gender norms and practices may assign greater decision-making authority to men, particularly in matters related to finances, education, healthcare, and family planning. This can limit women's agency and autonomy within the household. The Governments of India have initiated several policies aimed at narrowing the gender gap in educational achievement. These initiatives include the Ladli Scheme (Delhi Government), Balika Samraddhi Yojana (Gujrat), Kanyashree Prakalpa (West Bengal) and various others. Additionally, specific assistance programs have been introduced to support girls living below the poverty line, such as Bhagya Laxmi Scheme (Karnataka), Kanya Jagriti Jyoti Scheme (Punjab), and Bangaru Thali (Andhra Pradesh) among others. These policies seek to provide equal educational opportunities and financial aid to girls, encouraging their access to education and empowerment. But despite these policies gender discrimination is still a perennial problem in the Indian economy and this discrimination is more prominent in rural India than in urban areas. Religious interpretations or cultural practices within some communities may reinforce gender-based discrimination. However, it is important to highlight that religious texts and teachings themselves do not necessarily promote discrimination. Interpretations and cultural practices can vary widely, and many religious groups have movements advocating for gender equality within their faith traditions. Gender parity in primary school enrolment is one of the crucial targets within both the Millennium Development Goals (MDGs) and the Education for All (EFA) goals. These global initiatives aimed to promote equal access to education for boys and girls, breaking down gender-based barriers and fostering gender equality in primary education by specific target years. Education empowers women by enhancing their earning capacity and increasing their influence within families and society. A significant correlation exists between illiteracy and child marriage. In regions with lower levels of development, child marriage tends to be more prevalent. As development and education levels improve the incidence of child marriage tends to decrease. Investing in female education yields the most substantial returns in developing countries when considering all its benefits. Educated women contribute significantly to a more productive labour force, delayed marriages, reduced fertility rates, and enhanced child health and nutrition. Therefore, ensuring the enrolment of girls in primary education becomes indispensable for fostering development and progress. (Summers, 1992; Sagade, 2005).

While education attainment provides a snapshot of an individual's educational credentials or qualifications,education achievement delves deeper into the actual learning outcomes and the quality of education received. It highlights the extent to which students have acquired the necessary knowledge and skills relevant to their education level. Children must acquire quality education to increase their knowledge and develop their skills which will lead to thecreation of human capital in the economy in the long run. (Grant & Catherine, 2017). The focus should extend beyond just increasing enrolment rates, and towards providing individuals with access to better quality education that can equip them with the skills and knowledge needed to succeed in a rapidly evolving global economy. Galor and Zeira (1993) highlighted the importance of the value of human capital in fostering sustainable economic growth. According to them, human capital development is a major contributor to economic growth and is driven by an array of factors, including the amount invested in education, the educational quality, and the pace of technological advancement. A strong foundation in primary education is crucial for children, as it sets the stage for their future academic and professional success. A well-educated population is a cornerstone of a nation's progress and economic growth. By investing in primary education, India can build a skilled workforce, drive innovation, attract investments, and enhance productivity. Quality primary education equips individuals with the knowledge and skills required for various sectors, contributing to the country's overall development. The most reliable indicator of learning is the learning outcome, as it accurately reflects what learners have assimilated upon completing a class. To break the cycle of poverty in an economy, fostering a skilled labour force is crucial, and this can be achieved by empowering children to enhance their knowledge from the elementary level onward. By focusing on improving learning outcomes, we can equip children with the necessary skills and knowledge to become a competent and skilled workforce in the future. Investing in education at the elementary level is a key step towards breaking the chains of poverty and fostering sustainable economic growth through a well-prepared and skilled labour pool.

The probability for children to attend primary school rises as the mortality rate for children under five has decreased dramatically in the developing world. The health of a child significantly influences their academic achievement, serving as a crucial indicator of their educational progress. (Matingwina, 2018). Malnutrition significantly impacts the body's immune system, making it less capable of defending against diseases and infections. Additionally, it disrupts the vital process of nutrient absorption, leading to hindered physical and mental growth in children. This stunted

growth can have detrimental consequences on a child's overall development and learning capabilities as they progress in life. (Chattopadhyay & Saumitra, 2016). Malnutrition in rural children poses a serious threat to their immune systems, potentially jeopardizing their lives. Apart from impeding their physical growth and overall development, this nutritional deficiency can have lasting consequences on their future well-being. The issue extends beyond the immediate health challenges, as it can lead to long-term health complications, impacting their overall health trajectory as they grow older. Thus, addressing the problem of malnutrition is not only crucial for ensuring a healthy childhood but also for safeguarding the long-term health and well-being of these children as they transition into adulthood. Rural children in India are more vulnerable to malnutrition because they are receiving inadequate access to nutritious food and biased distribution practices during intra-household food distribution patterns. (Singh & Srivastava, 2017; Gupta, Dadhich, & Gupta, 2020). Integrated Child Development Services (ICDS) is a flagship program implemented by the Ministry of Women and Child Development in India which aims to provide essential services to children under six years of age and pregnant and lactating women. The services include supplementary nutrition, immunization, health check-ups, referral services, and preschool education. National Nutrition Mission (Poshan Abhiyaan) focuses on improving the nutritional status of children from conception to two years of age and pregnant women and lactating mothers. The program uses a targeted approach with the convergence of various departments, including health, education, women and child development, and rural development launched in 2017, Pradhan Mantri Matru Vandana Yojana (PMMVY) scheme, introduced in 2017, aims to provide conditional cash transfers to pregnant and lactating women to improve their health and nutrition. Under this program, eligible beneficiaries receive financial assistance for wage loss during pregnancy and lactation, and to ensure adequate nutrition before and after childbirth, Mid-Day Meal Scheme (MDM) scheme is a school feeding program aimed at improving the nutritional status of children and increasing school enrolment and attendance. It provides cooked meals to children in primary and upper primary schools across the country. The meals are expected to meet specified nutritional standards. National Food Security Act (NFSA) enacted in 2013, seeks to provide subsidized food grains to approximately two-thirds of the population in India. Under this act, pregnant women and lactating mothers are entitled to nutritious meals, including maternity benefits and free meals during pregnancy and six months after childbirth. Janani Suraksha Yojana (JSY) is a safe motherhood intervention program that provides cash incentives to pregnant women

for delivering in health institutions. This scheme aims to reduce maternal and neonatal mortality and encourages women to seek prenatal and post-natal care. These are some of the major government policies and programs aimed at addressing child malnutrition in India. It's worth noting that combating child malnutrition is a complex challenge, and these initiatives are part of a broader effort to improve the overall health and well-being of children in the country. The mortality and morbidity rates among children under the age of five are pressing issues in emerging nations, as they are closely tied to the overall quality of life. (Johnson, 2000). Based on a report by the United Nations International Children's Emergency Fund (UNICEF, 2008), undernutrition emerges as a primary contributor to child mortality worldwide, accounting for at least 50% of all child deaths. Malnutrition continues to be a significant factor contributing to child mortality and hindering proper development in India, as well as in many other predominantly developing nations. The findings of the third National Health and Family Survey conducted during 2005-06 in India revealed that nearly half of all children in the country experience undernourishment, emphasizing the pressing necessity for immediate and effective interventions to tackle this pervasive problem. Addressing malnutrition is essential to ensure the well-being and prospects of the younger generation. Effective and comprehensive strategies aimed at improving nutrition and healthcare are vital to reduce child mortality rates and empower children to reach their full potential.

CHAPTER 2: SURVEY OF LITERATURE

Survey of Literature:

India is a socio-economic diverse nation with regional inequality in attaining education, health care, and other dimensions of social development (Maiti & Marjit, 2015; Basu, 2015). There are huge regional disparities among the Indian states in the standard of living of its citizens (Iyengar & Sudarshan, 1982; Ohlan, 2013), Cultural practices and the socioeconomic status of the society are important determinants of primary school enrolment in India. (Huisman, Rani, & Smits, 2010). India's rural landscape is marked by striking disparities, with a majority of its population not evenly economically poor and vulnerable. (Cheema, 2011). Diverse customs and cultural flourish are unique to each of its locality. (Maharana, 2010). Various paper explores the complex interplay between socio-economic disparities, cultural factors and educational access and several challenges and opportunities in the context of rural India. (Dhar, 2014; Khera and Nayak, 2015). Given the regional variations in social and cultural factors across India, these local sociocultural dynamics assume a crucial role when it comes to the critical decision of enrolling children, particularly girls into primary educational institutions (Jencks, 1972; Shavit & Blossfeld, 1993; Mingat, 2007. Following the introduction of the Sarva Shiksha Abhiyan in 2001, there has been a substantial increase in the Indian government's budget for basic education, rising from Rs 3577 crores to Rs 39622 crores between 2001 and 2013. (Paisa Report, 2012). This increase in funding was aimed at supporting the educational needs of the country. To further enhance access to basic education, the government has implemented various grants for public primary schools, designed to alleviate both direct and indirect education costs. This strategic approach intends to encourage the enrolment of children, particularly girls, from economically disadvantaged backgrounds. However, despite these efforts, a notable gap remains in the comprehensive evaluation of the effectiveness of this program. However, no proper investigation has been done to investigate the impact of these initiatives on educational outcomes and enrolment patterns. This lack of assessment leaves several critical questions unanswered. One such question pertains to the prevalence of a preference among parents, residing in rural regions, for private schools when

enrolling their children in primary education. The extent to which parents opt for the private institution and the factors guiding this decision requires proper examination. Additionally, it is critical to ascertain whether gender-based biases exist among rural parents when considering the enrolment of their children, especially daughters, in primary schools. In light of these gaps, there is a pressing need for rigorous research that delves into the outcomes and implications of the Sarva Shiksha Abhiyan and related grants. Proper investigation is essential to determine the program's efficacy in achieving its intended objectives, particularly in rural areas. Addressing the inclination toward private schools during primary school enrolment and identifying potential gender biases within rural communities are crucial steps in ensuring equitable and effective access to education for all children in India.

The impact of direct education expenses on school enrolment disproportionately affects girls' attendance compared to boys. (Vaid, 2004). The distribution of grants to schools in developing nations is seen to exert a stronger and more beneficial impact on improving educational accessibility for individuals from economically disadvantaged backgrounds. (Sari, 2019). Murlidharan *et al* (2013), research indicates a noteworthy advancement in input-based indicators of school quality over time. For instance, the pupil-teacher ratios have declined by close to 20 % (from 47.4 to 39.8), the proportion of schools equipped with electricity and toilet availability doubled (from 40 % to 84 % for toilet availability and from 20 % to 45 % for electricity availability), the prevalence of mid-day meal availability in primary schools has nearly quadrupled (rising from 21 % to 79 %), and the overall measure of school infrastructure has demonstrated an improvement of 0.9 standard deviations compared to the school infrastructure index of 2003. Abundant evidence exists demonstrating the presence of gender bias or a preference towards males in terms of parental investment in their children's education. (Davies & Zhang, 1995; Dreze & Kingdon, 2001; Pal, 2004; Kingdon, 2005; Hazan, & Zoabi, 2015). Hiring female teachers stands as a pivotal policy capable of narrowing gender disparities, particularly in developing countries. (Burusic, Babarovic & Serie, 2012). The Indian government has augmented its expenditure towards enhancing school infrastructure, primarily focusing on public primary schools. However, an essential inquiry pertains to the potential impact of diverse factors related to schools or households in rural areas, in motivating parents to enrol their daughters in primary education and attaining the intended Gender Parity Index (GPI) target.

Most of the prevailing literature tends to agree that private schools, particularly private-unaided fee-charging schools exhibit greater efficiency compared to public schools. (Kingdon, 1996; Dreze & Kremer, 2006; Kingdon, 2007; Muralidharan & Kremer, 2008; Muralidharan & Sundararaman, 2013; Kingdon, 2017). Few pieces of literature shed light on gender-based discrimination in the choice of schooling in the rural Indian context. (Muralidharan, 2013; Maitra *et al*, 2014). The presence of a gender bias favouring sons is evident in the distribution of resources within Indian households. (Tilak, 2002; Pal, 2004). Kingdon (2005), highlighted two primary patterns through which gender-based discrimination against girls in educational expenses occurs: (i) complete absence of educational spending for daughters while allocating funds for sons, and (ii) allocating educational funds for both genders, but with lower financial allocation for girls compared to boys. Preferential feeding is observed to be directed more towards sons than daughters, with this bias being notably more pronounced in rural areas as compared to urban areas. (Congdon & Lindskog, 2023). Parents exhibit a preference for enrolling their sons in private schools for a better-quality education while they opt for public primary schools for their daughters. In the age bracket of 6 to 8 years, 47.9 % of boys are admitted to private schools as opposed to 39 % of girls, as reported in ASER 2019. This gender-based discrimination may restrict girls from achieving quality education, limiting growth and economic independence. Such discrimination compounded by religious contexts obstructs women's autonomy. Among Muslim households, there is a notably lower score in terms of women's autonomy, particularly in areas such as making household-related choices including decisions about their children's schooling, expenses related to education and healthcare, and similar matters. (Morgan *et al*, 2000; Sathar & Kazi, 2000; Jejeebhoy, 2002). Jeejeebhoy and Sather (2001) highlighted the presence of limited female autonomy and restricted access to information across diverse religious communities in India. Government statistics also depict a higher enrolment of boys in private-unaided schools compared to girls, with this disparity being more pronounced in rural regions (as per data from the National Sample Survey Office, 75th Round). This study aims to validate the hypothesis that gender-based disparities in primary education expenditure within different religious groups persist in rural India. Disparities in primary education based on gender persist, although, over time, this form of gender discrimination in education spending has been reduced. (Kingdon, 2007). Yet, it remains an enduring issue within patriarchal Indian society. This chapter intends to investigate the extent of the gender gap in primary education expenditure across different religious groups in rural India, employing the

Oaxaca-Blinder decomposition model. Presently, there is a lack of research that specifically delves into gender-based differential treatment in terms of primary education expenses within the context of rural India. This chapter aims to bridge this gap in the existing literature.

Following the enactment of the Right to Education Act (RTE) in August 2001, there has been a substantial augmentation in the Central government's investment in primary education. The most notable estimate, as per a report from the CABE Committee, indicates an annual allocation of Rs 70,000 crores or a cumulative sum of 4.36 lakh crore over six years for the effective implementation of the RTE Act. Allocations dedicated to targeted initiatives aimed at enhancing the quality of learning constitute less than 1% of the total budget allocated for the Sarva Shiksha Abhiyan, as highlighted in the PAISA Report of 2012. India has made significant strides towards achieving universal primary education, but a comprehensive assessment of children's learning outcomes at the elementary level has been lacking. (ASER 2019).

Child nutritional balance significantly influences factors like resilience, physical maturation cognitive advancement and educational success. (Nyaradi *et al*, 2013). In India, the issue of child malnutrition stands as a critical challenge (Srivastava, 2012). Metrics such as stunting (low height-for-age), wasting (inadequate weight-for-height) and underweight (low weight-for-age) are widely used measures of malnutrition. (WHO, 2016). Stunting, wasting and being underweight affect several areas of the child's overall development. (Bhattacharya, 2000). Undernourishment is an important indicator of child health which may affect the quality of education of a child at the primary level. (Zaini *et al*, 2005). There is a close association between malnutrition and various areas of a child's academic achievement among the school-age population in less developed countries. (Fanjiang & Kleinman, 2007; Prangthip, Soe & Signar, 2019). The relationship between the nutritional status and academic performance of any school-age child has little been investigated. Galal & Hulett, (2003) gave importance to investigating whether there exists any relationship between children's nutritional status and their educational achievement. They had shown that undernourished children have lower attendance, slower attention span in class and lower performance in academic achievement than their well-nourished counterparts.

CHAPTER 3: RESEARCH OBJECTIVES

Research Objectives of the Thesis:

The primary emphasis of this thesis centers on rural regions, driven by an acknowledgement of their demographic significance and the distinct socio-economic context they encompass, further accentuated by the sizable population inhabiting these localities. Given that a significant portion of the rural population is involved in informal employment, poverty emerges as a prevalent issue within this context. This informal sector plays a pivotal role in the rural economy, encompassing agriculture, small-scale business and various unstructured occupations. By concentrating on rural regions, this study tries to gain insights into the specific challenges and opportunities faced by the predominantly informal workforce and contribute to a more nuanced understanding of the issues at hand. This study seeks to dissect the intricate interplay between informal employment, education and various grants provided by the government. This approach allows to capture the unique dynamics at play and offer insights that could potentially inform policies aimed at improving education accessibility and achievement, particularly at the primary level in rural India. The main focus of this study is to shed light on the picture of primary school education attainment and education achievement within the rural Indian context. In essence, this research endeavours to contribute a comprehensive understanding of the education landscape in rural India, addressing the specific needs of its predominantly informal working population. The thesis aims to address the following research question expressed in summarized form.

1. The government of India has implemented several measures aimed at reducing the direct and indirect costs of education. These policies include providing grants to public primary schools, such as increasing the availability of provision of Mid-day meals in school, teaching-learning material grants to enhance the teaching skills of the teachers, funds for the provision of girls' toilet facilities and enhancement of funds for school development to improve enrolment rates and achieve basic education goals. However, a significant challenge persists within Indian society. Despite the government's provision of various

grants, the benefits of the grants might not be equally distributed to all public primary schools in rural India due to institutional limitations. To comprehensively address this issue the study focuses on the potential inequalities in the allocation and utilization of different government grants among government primary schools in rural India. The basic objective is to investigate whether these grants have been equitably distributed over time and whether they have effectively reached a substantial proportion of rural public schools. To achieve this, the "School Grant Coverage Index" is constructed to serve as a metric to quantify the extent to which these grants have been successfully deployed across various schools. This research intends to shed light on the disparities that might exist in the distribution of government grants among rural public primary schools. Furthermore, it will investigate whether the availability of these grants has improved over the years and whether they have reached the intended beneficiaries proportionately.

2. In light of the availability of diverse grants for public primary schools, it is crucial to determine whether rural parents exhibit any preference for enrolling their children in primary schools. This study tries to investigate whether any fascination exists during the enrolment process and whether parents' choices are influenced by gender-based considerations when selecting a schooling option for their children.
3. This study aims to assess the effectiveness of various grant-related and household-specific factors in influencing the Gross Enrolment Ratio (GER), specifically the GER for girls in India. Additionally, this thesis will also examine whether any regional disparities contribute to the variation of it or not.
4. A comparative analysis is done to evaluate the influence of various exogenous factors on the enrolment of girl children in districts predominantly inhabited by rural communities. This will focus on the four distinct regions and explore how these factors impact enrolment patterns among girl children. The research question 1 to 4 is addressed in chapter 4.
5. Then the study will try to investigate the possible factors mainly school-related and socio-economic factors which are contributing positively towards achieving the Gender Parity Index (GPI) values at a target level in rural areas of India. This research question is addressed in Chapter 5.
6. This study also tries to identify the household and school-related factors that play a role in influencing parents' decisions to enrol their children in private primary schools within rural

India and also quantitatively assess the impact of each of these factors in elucidating gender-based disparities observed during the enrolment process in private primary schools within rural India. Fairlie's Decomposition technique will be used to dissect and analyse the individual contributions of these factors in explaining instances of gender discrimination during the enrolment phase in private primary school. This research question is addressed in Chapter 6.

7. This study aims to investigate the magnitude of unequal treatment based on gender that exists in the context of primary education expenditure within various religious groups in rural India. By analysing this phenomenon, this study intends to contribute to a deeper understanding of the factors perpetuating gender-based inequalities in education spending within the religious groups and among the religious groups in the rural Indian context using the Oaxaca-Blinder decomposition model. This research question is addressed in Chapter 7.
8. Learning outcomes serve as a crucial indicator of actual learning achievement, showcasing the knowledge students have acquired upon completing a class. Addressing this aspect is essential in breaking the cycle of poverty within the economy, as it is through the cultivation of skilled labour that economic progress is fostered, ensuring that children can enhance their knowledge from the primary level which plays a pivotal role in achieving this objective. This study seeks to explore the potential factors that can influence the learning outcomes of children at the primary level in rural India. By delving into these factors, this study aims to gain insights into the dynamics that impact the educational journey of rural children and contribute to the formulation of targeted interventions aimed at improving learning outcomes at the primary level in rural India. This research question is addressed in Chapter 8.
9. Lastly, the empirical study concentrates on examining the correlation between child health and educational achievements within rural districts of India. This research significantly enhances the current body of literature, offering a valuable contribution and understanding to the current study. This research question is addressed in Chapter 9.

CHAPTER -4:

DETERMINANTS OF OVERALL ENROLMENT RATIO AND GIRLS' ENROLMENT RATIO IN PRIMARY EDUCATION IN RURAL INDIA: A REGION-BASED ANALYSIS

Determinants of Overall Enrolment Ratio and Girls' Enrolment Ratio in Primary Education in Rural India: A Region-based Analysis

4.1 Introduction:

Education is a major development-enhancing tool that can give positive changes to human life by improving the information, expertise, and insight of an individual (Mankiw, Romer & Weil, 1992; Sen, 1999; Self & Grobowski, 2004). It is the base of human capital formation and without fruitful investment in human resources, a country can't achieve sustainable development. Children are the ultimate wealth of the nation. Bringing up all children under the umbrella of education irrespective of gender is one of the major objectives of the Millennium Development Goal. The government of India (GOI) has taken various measures to bring all children under the umbrella of education at least for the primary level. In 1993-94 with the aim of universal primary education, Govt. of India initiated the District Primary Education Program (DPEP) which is the base of the launch of Sarva Shiksha Abhiyan (SSA) in 2000.

Though overall enrolment has increased over time, inequalities and the gender gap in attaining primary education are still perennial problems in the Indian economy. Different state Governments of India have initiated various policies to reduce the gender gap in educational attainment like Ladli Scheme (Delhi Government), Balika Samraddhi Yojana (Gujrat), Kanyashree Prakalpa (West Bengal) and many others. Some Policies are also launched to give assistance focusing on girls living below the poverty line such as Bhagyalaxmi Scheme (Karnataka), Kanya Jagriti Jyoti Scheme (Punjab), Bangaru Thali (Andhra Pradesh) etc. According to UNESCO, to achieve gender parity during the time of enrolment in primary school, the value of the Gender Parity Index (GPI) should be between 0.97 and 1.03. Biswas and Kundu (2022) have shown that the value of GPI in enrolment in primary education in rural India is not uniform and many rural districts of India fail to achieve the recommended target of UNESCO. In this background, it is required to identify the factors the government should give importance to enhance the enrolment of girl children in rural India in a satisfactory position. To do that overall Gross Enrolment Ratio (GER) and GER of girls in primary education should be given importance simultaneously. It has to be remembered that both GER and GER of girls are macro-specific variables and district-level data is the lowest

possible unit (based on the availability of necessary data) to address the above research problem. India is a land of sharp contrast, particularly in rural areas where most of the people are not evenly economically poor and vulnerable but they have different customs and cultures (Cheema, 2011). As the social and cultural factors in different parts of India are different from each other, the local socio-cultural practice may play an important role during the time of deciding on a child's enrolment especially girls' enrolment in primary educational institutions (Jencks, 1972; Shavit & Blossfeld, 1993; Mingat, 2007)**.** Attainment in primary education yields enhanced productivity, economic growth, social development, and poverty reduction but in developing countries, political factors, state capacity, poor administration, poor delivery system, poor governance, poor community information, and corruption/leakages are likely to hinder the education system (Kingdon & Azam, 2014). Individual, household characteristics and parental education are important determinants of school enrolment, particularly for girls. It is observed that the probability of a child's enrolment is enhanced with parental education but mothers' education is relatively more important in encouraging the enrolment of girls in public primary schools. (Dostie & Jayaraman, 2006). It has also been identified that there is a huge gender gap in non-public school enrolment in India and the gender gap is more prominent than the national average among kids living in Northern and North-Western states. (Maitra, Pal & Sharma, 2016). An intriguing study by Dreze & Gazder (1996) from an informal field investigation on the efficiency of public schools to private schools in rural U.P, it had shown that private schools had a high attendance rate, low dropout, and a significant dominance of male students. There is currently an overall agreement in the writing that private schools are more effective than state schools for more noteworthy grades and higher earnings. (Bedi & Garg, 2000; Muralidharan & Kremer , 2006). Dreze and Kingdon (1999) considered five states in rural North India and based on household-level data showed that the participation of girl children in school is very much dependent on parental education and motivation, social background, dependency ratio, village development, teacher regularity, and a midday meal.

After the launch of Sarva Shiksha Abhiyan in 2001, Govt. India's budget for basic education has increased from Rs. 3577 crores to Rs. 39622 crores from 2001 to 2013. (Paisa Report, 2012) The government of India has initiated different types of grants for public primary schools to reduce the direct and indirect cost of education so that even poor Indian parents feel encouraged to enrol their children, especially daughters in primary education. However, no proper investigation has been

done to investigate the efficacy of this program. It is still not addressed whether there exists any inclination of the parents for private schools during the time of their children's enrolment in primary school in rural India and whether gender biases are observed among rural parents. All those problems will be addressed in this paper over 10 years considering 352 rural people-dominated districts selected from the 16 major states of India after segregating those states into four regions based on the geographical locations.

The paper is divided into six sections. In Section 4.2 the research objective of the paper is discussed, in Section 4.3 rural people-dominated districts in 16 major states of India are identified, in Section 4.4, Data and methods required to address the above-mentioned research problems will be narrated, in Section 4.5 results of the Panel data regression will be analyzed and Section-4.6 covers the conclusion and policy prescription part of this study.

4.2 Research Objectives:

In this paper, four research objectives will be addressed based on the research gap mentioned above. These are as follows:

a) The Government of India has taken various steps to reduce the direct and indirect cost of education by providing various grants to public primary schools such as increasing the availability of provision of Mid-day meals in school, teaching-learning material grants to enhance the teaching skills of the teachers, funds for the provision of girls' toilet facility and enhancement of funds for school development to influence on enrolment rate to attain basic education**.** But the main problem in Indian society is that even if various grants are provided by the government due to institutional constraints these grants may not percolate down to all public primary schools in rural India uniformly. Still now, in the Indian context, whether there exists any inequality in achieving various grants allotted to government primary schools focussing on the rural-dominated districts is not clear. We will try to address this issue and also investigate whether the availability of different government grants for public primary schools has increased over time and percolated down to most of the public primary schools in rural India proportionately or not. The research problem will be addressed after constructing the School Grant Coverage Index.

b) Despite the availability of various grants to public primary schools, it is required to identify whether there exists any fascination of the rural parents to send their child to private

primary schools during the time of enrolment or not and whether gender-based preference prevails among parents when deciding on the choice of schooling for their children?

c) This paper tries to identify the efficacy of various grant-related and household-specific factors that can influence the overall GER and GER of girl children in India and whether there exists any regional variation of it or not[4].

d) Lastly, a comparative analysis will be done about the impact of different exogenous factors on the enrolment of girl children in rural people-dominated districts between the four different regions considered in this study.

4.3 Identification of rural people-dominated districts in 16 major states of India:

India is a socio-economic diverse nation with regional inequality in attaining education, health care, and other dimensions of social development (Maiti & Marjit, 2015; Basu, 2015). There are huge regional disparities among the Indian states in the standard of living of its citizens (Iyengar & Sudarshan, 1982; Ohlan, 2013), Cultural practices and the socio-economic status of the society are important determinants of primary school enrolment in India. (Huisman, Rani, & Smits, 2010). Due to this plurality and socio-economic diversification, to investigate the above-mentioned problem, initially, rural people-dominated districts are identified in 16 major states of India and then the identified districts under different states are divided into four regions based on the geographical position of India where socio-cultural differences are also observed between different regions over decades but generally identical in a particular region. As per the census 2011, it is found that among the major Indian states, the percentage of people living in rural areas is highest in Bihar at 88.7 % and lowest in Tamil Nadu at 51.55%. So, during the time of identification of rural people-dominated districts, those districts (based on the Census Report 2011) are considered where more than 50 % of people of the total population live in rural areas. Again, based on the Census Report (2011), a district is classified as an urban district if above 75 % of its male main working population of the district is engaged in non-agricultural pursuits and below 25 % of its male main working population is engaged in agricultural and allied activities. So, it can be said that in rural people-dominated districts, a major percentage of the population is engaged in

[4]There are different socio-economic household-related factors which can influence the parents during the time of taking enrolment decision of their girl children in primary education. But as this analysis is based on macro-level data extracted from DISE statistics, data availability of other variables at least at the state level for the rural people from other sources is absent.

agriculture and allied activities for their livelihood. Considering this criterion in our study, we have identified 120 districts as urban people-dominated districts and 352 districts as rural people-dominated districts out of 472 districts from 16 major states in this study. For example, let us consider West Bengal which comprises 19 districts out of which 14 districts have been identified as rural people-dominated districts where more than 50% of the population is living in rural areas and more than 75% and above of the main working population are engaged in agricultural and allied work. The rest of the 4 districts (Burdwan, Howrah, North 24 Pgs., and Kolkata) do not follow the criterion. Hence those districts are not considered in our study. This condition also holds for identifying rural people-dominated districts or rural districts for the rest of the 15 states considered in our study. Now**,** Table 4.1 shows the number of identified rural people-dominated districts of India in its different regions of India.

Table 4.1: Region-wise and State-wise distribution of Rural Districts of India:

Region-1(**East**)		Region-2(**West**)		Region-3(**North**)75 District		Region -4(**South)**54 District	
States	Number of Rural districts in different states of the Eastern Region	States	Number of Rural districts in different states of the Western Region	States	Number of Rural districts in different states of the Northern Region	States	Number of Rural districts in different states under the Southern Region
Bihar	35	Rajasthan	29	Uttar Pradesh	51	Andhra Pradesh	12
Jharkhand	18	Madhya Pradesh	27	Haryana	12	Karnataka	23
Chhattisgarh	15	Gujrat	17	Punjab	12	Tamil Nadu	13
Orissa	27	Maharashtra	41			Kerala (94)	6
West Bengal	14						
Total number of identified districts	109	Total number of identified districts	114	Total number of identified districts	75	Total number of identified districts	54

Source: Calculated by the author based on the Census data 2011

Here the states under special assistance are not considered to minimize heterogeneity among the states.

Initially, it is required to investigate whether the various grants provided by the Central government of India for the development of the education system at the elementary level percolate properly and uniformly in the rural primary schools in India. To do that, the School Grant Coverage Index is formed and calculated for each identified district separately.

4.4 Data and Methods:

Data Source:

The entire investigation is based on DISE statistics extracted from its report published in different years. DISE Statistics provides district-wise information on both public primary schools and private (both aided and unaided) primary schools including Madrassa. Most of the schools are also co-educational schools. We have taken data from five time points and those are 2007-08, 2009-10, 2011-12, 2013-14, and 2015-16 respectively. All the data taken from DISE Statistics are presented in percentage forms. The two-year gap is taken to get an appropriate effect of the accessible information chiefly identified with the infrastructural improvement of elementary schools which is reliant essentially on the public authority's help. Government aids need some ideal process to reach the public school mainly in rural areas as the different reports, government authorization, and so forth are needed to pass these aids. Also, for the financial components to get a legitimate pattern we have taken a gap of two years between periods.

Methodology:

Initially, the School Grant Coverage Index (SGCI) is framed and calculated to summarise the various supply-related grants provided to public schools under one head or index. This SGCI is important to make a region-wise comparison of the percolation of different grants in an index form. It is required to investigate whether there exists uniform percolation of the grants in primary schools in rural India or not. To investigate that, it is required to take the help of the inequality measurement technique. Here, the General Entropy Measure of Inequality is considered. After that, it is required to investigate whether proper percolation of government grants for school development among public primary schools encourages the parents to admit their children, more

specifically their girl children to primary school. It is also required to investigate if there is an inclination of rural parents to admit their children to private primary schools. To do that, initially, it is required to investigate whether there is an expansion of private primary schools in rural districts of India and it is done with the help of the Mean Exponential Growth Rate (%) of expansion of private school enrolment to public school enrolment over the years in each region separately between our concern periods. Finally, the static panel fixed effect regression model is applied to identify how various grant-related and household-specific factors can influence the overall GER and GER of girl children in India and whether there exists any regional variation of it or not. In this investigation district is considered as unit.

Calculation of School Grant Coverage Index:

The amount sanctioned in terms of rupees under different heads in any particular district in any particular year is not available In the DISE statistics, the percentage of primary schools receiving that grant in that particular period is only given. So, to calculate the index, we have considered the percentage of schools of a particular district in a particular financial year that has received different funds available in public schools sanctioned by the Central Government such as funds for the provision of mid-day meals, school development grant, teaching-learning material grant and funds for the provision of girls' toilet. The maintenance grant is provided to the school for infrastructural enhancement and part of the maintenance grant is allocated for providing toilet facilities as we are including the availability of girl's toilets as our exogenous variable during the time of calculating the index. So, the maintenance grant is excluded here. So, during the time of calculation of the School Grant Coverage Index in any particular region, those values are considered. The importance of each of the four variables considered here is not equal. Therefore, the weighted index is calculated for better implications. Principal Component Analysis (PCA) can be used for assigning the weights while computing the School Grant Coverage Index**.** The goal of PCA is to summarize the interrelationship among the set of variables in terms of a smaller set of orthogonal principal components which are linear combinations of the original variables. But before initiating the calculation of the Index, the normalized value of each variable is not required because all the considered variables are measured on the same scale. Analogous to Pearson's, the squared factor loading is the percentage of variance in that variable explained by the factor. The sum of the squared loading of all variables (features) for each PC in our analysis is equal to 1.

Our study is solely based on DISE statistics data and due to the unavailability of data on all the exogenous factors considered in all the 352 rural people-dominated districts, we have considered the period from 2007-08 to 2015-16 in our study separately. Hence,

$SGCI_{it}$ is calculated after applying Principal Component Analysis (PCA) on (mdm_{it}, gt_{it}, $sd_{it,}$ and tlmit) separately in all four zones. Here,

$SGCI_{it}$= Estimated value of School Grant Coverage Index of the i^{th} district in the t^{th} year.

mdm_{it} =Percentage of public schools of the i^{th} district in the t^{th} year who are receiving the benefits of mid-day meal.

sd_{it} = Percentage of public schools of the i^{th} district in the t^{th} year who have received the benefit of school development grant

tlm_{it}= Percentage of public schools of the i^{th} district in the t^{th} year who have received teaching-learning material grant

gt_{it} = Percentage of public schools of the i^{th} district in the t^{th} year where separate girl's toilet facility is available.

Here we have eight sets of variables because all four regions are considered separately for both the periods, 2007-08 and 2015-16. Before exercising PCA, the communality of each variable in each region is checked for both periods and it is identified that the value is more than 0.5 in each situation which establishes that all variables have sufficient explanations and PCA can be applied without dropping any concerned variable. Kaise Meyer-Olkin (KMO) statistic has also been checked to measure the strength of the relationship among the variables and in all situations, its value lies between .05 and 1 which also establishes the fact that PCA is suitable here for calculation of the School Grant Coverage Index of each district separately in both the concerning periods.

Initially, we have identified the Eigenvalue in each situation which is more than 1. The first principal component will always have the greatest variation of the data set and the second component will be orthogonal to the first component and will have the greater variance in the subspace orthogonal to the first component. In our model in all eight data sets, both in the first principal component and the second principal component the identified Eigenvalue is more than 1. The two components on average explain nearly 75% of the variance of the variables included in the analysis.

Here Lij implies factor loading value obtained from the rotational component matrix (used varimax criterion as it maximizes the sum of variances of required loading of the factor matrix). So, the Weight of each variable is calculated as

$$Wi=\sum \left| Lij \right| Ej$$

Where, Wi= Weight of the i^{th} variables

Ej= Eigenvalue of the j^{th} variable

The calculated weight of the variables in all four regions in both periods is presented in Table 4.2.

Table 4.2: Weights calculated through PCA for each variable in all four regions in 2007-08 and 2015-16

Region	2007-08				2015-16			
	sd grant	tlm grant	mdm	girls' toilet	sd grant	tlm grant	mdm	girls' toilet
East Region	2.1424	2.1129	1.3904	0.861	1.1881	1.0068	1.3448	1.4043
West Region	1.9361	2.0581	1.624	1.8477	1.4063	1.4272	1.1324	0.6646
North Region	1.0359	1.5422	1.7144	1.426	1.3279	1.3106	0.9148	0.8979
South Region	1.8944	1.8333	1.2273	1.3799	1.4297	1.4704	0.989	1.0454

Source: Calculated by the authors.

Now we move to the calculation of the School Grant Coverage Index (SGCI) of each district separately and it is calculated as:$SGCI_i = \frac{\sum_i^4 W_i X_i}{\sum_i^4 W_i}$

Here X_i indicates the value of the variable of the i^{th} district and W_i indicates the weight of the variable in that particular region.

The School Grant Coverage Index is calculated for each district separately for 2007-08 and 2015-16. The numeric value of SGCI lies between (0-100)[5] where the higher value of SGCI is always desirable as a higher value of SGCI implies higher coverage of grants for that district. Thus, if the value of SGCI of a particular district in a particular year is 100 it implies that all the schools in that district are receiving all the four grants considered for our study in that particular year.

To calculate the School Grant Coverage Index of a particular region, the mean value of the School Grant Coverage Index of all the rural people-dominated districts identified under that region is considered. The values are mentioned in Table 4.3.

Table 4.3: Value of the School Grant Coverage Index in Four Regions in 2007-08 and 2015-16

Region	Mean Value of School Grant Coverage Index (%) (2007-08)	Rank	Mean Value of School Grant Coverage Index (%) (2015-16)	Rank	Exponential Growth Rate (%) of the School Grant Coverage Index. (2007-08 to 2015-16)	Rank
Eastern Region	51.84908	4	94.46402	2	5.9988	1
Western Region	63.7788	3	91.31436	3	3.5888	2
Northern Region	68.55397	1	95.12131	1	3.2753	3
Southern Region	64.55716	2	85.24483	4	2.7797	4

Source: Calculated by authors

[5]As the availability of the grants is given in percentage form in DISE Statistics.

From the above Table-4.3, it is observed that the availability of coverage of grants to public primary schools in rural-dominated districts had increased over time in all four regions of India. The mean value of the SGCI in each region shows a sharp rise over the years. This is mainly because initially, few schools are getting the benefits. For example, in the Eastern region, out of 109 districts, the availability of mid-day meals was 27.277% and the availability of girl's toilets was 17.496% in 2007-08 but this figure has sharply increased over the years with the availability of mid-day meal becomes 98.048% of schools and availability of girl's toilet becomes 93.581% of schools in 2015-16. The growth rate column shows that the enhancement of the coverage of school grants is highest in the Eastern region and lowest in the Southern region. The calculated value of district-specific SGCI in all four regions of India is given in the summary statistics table given in the Appendix section (Table A1).

The General Entropy Measure of Inequality of SGCI in each region:

The Generalized Entropy (GE) measures constitute the only family of indicators (up to a transformation) that display additive decomposability as well as anonymity, the scale of variance, the principle of transfers, and the population principle. Other commonly used methods of inequality like the Atkinson method or the Ginni coefficient fail to satisfy all the main properties of inequality measures (Shorrocks, 1980; Cowell, 1998). The GE inequality analysis helps us to compare the changes in the distribution of grants region-wise over the periods.

The mean log deviation (MLD or GE (0)), Theil Index (GE (1)), and coefficient of variation (COV) belong to the entropy (GE class measure of inequality). The generalized form of the entropy class measure of inequality is shown by the following equation:

$$E(\alpha) = \frac{1}{n(\alpha 2 - \alpha)} \sum \left(\frac{x_i}{\bar{x}}\right)^n - 1 \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (1)$$

Putting the value of α=0,1,2 in (1) we derive GE (0) or Mean Log Deviation, GE (1) or Theil Index and GE (2) or Coefficient of Variation entropy class of inequality

$$E(\alpha)|_{\alpha=0} = \frac{\Sigma \ln\left(\frac{\bar{x}}{x_i}\right)}{n} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (2)$$

$$E(\alpha)|_{\alpha=1} = \frac{\sum\left(\frac{x_i}{\bar{x}} \ln \frac{x_i}{\bar{x}}\right)}{n} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (3)$$

$$GE(\alpha)|_{\alpha=2} = \frac{1}{2} COV^{2} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (4)$$

GE (0) gives more relative importance to the lower tail of the distribution,

GE (2) gives relatively greater importance to the upper tail of the distribution and

GE (1) gives equal weights to both the tails.

We have considered the Mean log deviation (GE (0)), Theil Index (GE (1)), and the Coefficient of variation Index (GE (2) simultaneously in our study to check the presence of inequality in the distribution of grants to all public school over time.

Inequality in SGCI is captured by General Entropy measures of inequality considering all the rural-dominated districts of India. If the value of the GE indicator of a particular region is zero, then one can claim the case of complete equality which implies that the government grant percolates down equally or uniformly to all primary schools in that region. A larger value of the GE index in any region indicates higher inequality in SGCI among the primary schools in the districts in that region**.** Several programs have been launched by the government for primary education but the sustainability of these schemes is a problem as sometimes these projects remain entangled in bureaucratic and political battles. Here the General Entropy results are shown in Table 4.4.

Table 4.4: Inequality trend in School Grant Coverage Index in the four regions of India

Region	GE	2007-08	2015-16
Eastern Region	GE(0)	0.055	0.002
	GE(1)	0.044	0.002
	GE(2)	0.0399	0.001
Western Region	GE(0)	0.006	0.006
	GE(1)	0.006	0.006
	GE(2)	0.006	0.005

Northern Region	GE(0)	0.009	0.007
	GE(1)	0.008	0.006
	GE(2)	0.008	0.005
Southern Region	GE(0)	0.022	0.018
	GE(1)	0.02	0.017
	GE(2)	0.021	0.016

Source: Author's estimation

It is observed from Table 4.4 that Inequality in the availability of grants in public primary schools in all four regions of India has decreased over time as captured by G.E.

It is also observed that the slope of GE curve measures of inequality in percolation of the grant is steeper in Eastern and Southern regions as compared to Western and Northern regions which implies that inequality in the distribution of grants decreases more sharply in Eastern region and Northern region compared to Western and Southern region in India.

Expansion of privatization of primary education in rural India

As the extension number of exiting private schools in any district in any particular period is not available, we are using the ratio of private school enrolment to public school enrolment as a proxy to investigate whether there is an expansion of private primary schools in rural India. Initially, the exponential growth rate of the ratio of private school enrolment and public school enrolment of each district is calculated separately between the periods 2007-08 to 2015-16 and then to identify the expansion in a region, the mean value of the growth rate of all the districts in that particular region is calculated for both the periods. This is done in all four regions separately.

Table 4.5: Mean of Exponential Growth Rate (%) of Expansion of Private School Enrolment to Public School Enrolment over the years in each region:

Region	Mean of Exponential Growth Rate (%) in each Region between (2007-08 to 2015-16)
Eastern Region	0.124
Western Region	0.007
Northern Region	0.085
Southern Region	0.033

Source: Authors' estimation

Since the mean value of the exponential growth rate of the ratio of private to public enrolment in primary education between the concerning periods is positive in all four regions of India one can conclude that there is a gradual expansion of private school enrolment among the rural children relative to public school enrolment in India. This also indicates that over time, there is a gradual expansion of private schools at the primary level in rural India.

From this positive trend of privatization of education, one can conclude that despite the availability of various grants in most of the public schools in rural India, there is a gradual enhancement of private to public school enrolment which indicates the fascination of the rural parents to send their children to private schools in primary level. It can also reflect that there is a gradual expansion of private schools in rural districts of India.

Factors influencing GER and GER_F in rural people-dominated districts of India.

It is now required to investigate whether rural parents have any gender preference during the time of enrolment of their children in primary schools or not. Besides that, it is required to focus on the

possible factors that might affect the overall GER and GER of girls in attaining primary education in rural India[6].

Theoretical justifications for considering the necessary explanatory variables required for this investigation and possible directions in which the variables can influence GER and GER_F are narrated below.

The enrolment of children in primary school is very much dependent on their family background (Coleman, 1966). Literate mother plays a role model for their children. Parental education attainment plays a significant role in his/her child's educational attainment. A Child's first education begins at home so an educated family knows the importance of education and they spread positive externality in the society and also to their child's educational achievement.

.1. Female Literacy (flit): Female Literacy is taken as a proxy variable for a mother's education. Better education among mothers may help to improve child health, nutrition, and education, and reduce gender discrimination.

.2. Male Literacy (mlit): Male Literacy is taken as a proxy variable for a father's education. The Report of the Office for National Statistics claims that a child is at least seven and half times more likely to have a low educational outcome if their father has a low educational level (ONS Report, 2013).

Data on Female and Male literacy is presented in percentage form and calculated for each year of each district using the exponential growth rate formula taking the 2001 value as the initial value and the value of 2011 as the final value because here Census data (Census 2001 & Census 2011) is used.

School Grant-Related Factors: All data on school grant-related factors taken in our survey is presented in Percentage form. Here the components required to form the School Grant Coverage Index are taken separately because it may be observed that the overall GER and GER

[6]There are lots of household-related factors due to which a girl child cannot get a chance in getting admission in primary school in rural India. But here the factors which can possibly influence the overall GER and GER of girls are considered region-wise. So, to tackle that research problem, it is required to consider all macro variables which are available district-wise in the identified rural districts of India of 16 major states.

of girls are not influenced by the same component in each region rather, they may vary region-wise.

.3. School Development Grant (sd): School development grant is expressed as the percentage of schools in the i^{th} district that got this grant in the t^{th} year. School Development grant is used for the operation and administration or purchase of equipment like geometry boxes, blackboards, dusters, chalks, newspapers, library books, maps, etc. It is also utilized for the cleanliness of school premises and the purchase of dustbins, as well as the procurement of books self. This grant actually can enhance the infrastructure of the school including the enhancement of drinking water facilities. Thus, this grant may attract rural parents to send their children to school because better school infrastructure may encourage the parents to admit their children to schools.

.4. Teaching Learning Material Grant (tlm): Teaching Learning Material grant is expressed as a percentage of the schools who got this grant in the i^{th} district in the t^{th} year. 'tlm' grant is used for extra instructional aids for teaching. As per the guidelines of the Ministry of Education, all regular teachers are entitled to this grant which is Rs.500 per year as support for qualitative improvement in Education. Teachers with appropriate resources can teach better by making education more interesting to students. This can also motivate the parents to send their children to school as it can reduce the direct cost of education.

.5. Girls Toilet (gt): This indicates the percentage of primary schools having the provision of girls' toilets in the i^{th} district in the t^{th} year. The provision of girls' toilets is an important (Muralidharan & Sheth, 2013) determinant for school enrolment mainly in rural areas. The absence of girls' toilets in school implies a lack of privacy and dignity for a girl child. Guardians desire to send their girl child to a school that has separate toilets for girls.

.6. Provision of Mid-day meal availability at school (mdm): This indicates the percentage of primary schools with the availability of mid-day meal provision in the i^{th} district in the t^{th} year. Poor rural people are so poor that they are unable to provide two times meals to their children, thus this scheme can act as a catalyst to drive children of all strata of society to attend school. (Dreze & Goyal, 2003; Khera, 2007).

Another important factor that may influence GER, particularly the GER of girls is the presence of female teachers in the school.

7. Female Teacher (ftech): This is calculated by the total percentage of female teachers in primary school over the total number of teachers (male & female) in the i^{th} district of the t^{th} year. It is found that hiring female teachers may reduce gender gaps in education (Muralidharan & Sheth, 2013). It is found that a girl child finds it more comfortable to study from a teacher of the same gender. Female teacher is more efficient in teaching girls and also are capable of teaching boys (Muralidharan, 2013). It is expected that the gender of the teacher may play an important role in facilitating students' sense of relatedness to the teachers in primary school, particularly in rural areas which may encourage even the conservative parent to send their girl child to school.

Next, it will also be investigated whether the rural parents experienced any gender discrimination during the time of enrolment in primary school. So, we consider the following factors:

8. Expansion of Privatization of Education (Pvt/Pub): From Table 4.5, the gradual expansion of private schools in rural districts of India is identified. In a patriarchal society, individuals have the thought that girl children are intended for family tasks and get hitched and shipped off others' houses. On the other hand, boys are considered the legitimate beneficiaries of the family. Because of this thought, boys in some cases get preferential feeding in comparison to girls (Maitra, Pal & Sharma, 2016). So, it is required to be investigated whether the expansion of private schools at the primary level creates a positive impact on enrolment particularly for their daughter's enrolment in primary schools.[7]

The summary statistics of all the explanatory variables are given region-wise in (Appendix A, Table A1). The value of standard deviation among the values of GER_F of the 4 regions is highest for the Western region and lowest in the Southern region, Similarly, the value of standard deviation among the values of privatization of education of the 4 regions is highest for the Southern region and lowest in the Eastern region in all the time point in our consideration as shown in the summary statistics

[7]This variable should depend on the availability of private primary schools in that district. But as the data is not available in DISE statistics or can be extracted district-wise numbers over the concerned time period from any other source; we rule out the possibility of endogeneity in this model.

Before initiating the investigation, the considered variables used for this investigation and the expected sign of those variables with the dependent variables are summarized in Table 4.6.

Table 4.6: The explanatory variables which are considered in this investigation:

Variable	Variable expressed as	Description	Expected Sign
Female Literacy	flit	Female Literacy is expressed as a percentage of literate females over the total population of the i^{th} district in the t^{th} year	Positive
Male Literacy	milt	Male Literacy is expressed as a percentage of literate males over the total population of the i^{th} district in the t^{th} year.	Positive
School Development Grant	sd	School development grant is expressed as a percentage of schools in the i^{th} district that got this grant in the t^{th} year.	Positive
Teaching Learning Material Grant	tlm	The teaching Learning Material grant is expressed as the percentage of the schools that got this grant in the i^{th} district in the t^{th} year.	Positive
Girls Toilet	gt	percentage of primary schools having the provision of girl's toilet of the i^{th} district in the t^{th} year.	Positive
Provision of Mid-day meal availability at school	mdm	percentage of primary schools with the availability of mid-day meal provision of the i^{th} district in the t^{th} year.	Positive
Female Teacher	ftech	percentage of female teachers over the total number of teachers (male & female) in the primary school of the i^{th} district in the t^{th} year.	Positive
Expansion of Privatization of Education	Pvt/Pub	This is calculated by taking the ratio of Private enrolment to public enrolment in the primary school of the i^{th} district in the t^{th} year.	Positive

It is required to apply panel data to address the above-mentioned research problem. Initially, we considered the impact of exogenous factors on the Gross Enrolment Ratio [(Overall, excluding 0–6-year girls].

To do that we consider the following regression equation:

$$GER_{it} = \alpha_0 + \beta_1 ftech_{it} + \beta_2 gt_{it} + \beta_3 sd_{i(t-1)} + \beta_4 tlm_{i(t-1)} + \beta_5 mdm_{it} + \beta_6 pvt/pub_{it} + \beta_7 flit_{it} + \beta_8 mlit_{it} + \in_{it} \ldots\ldots\ldots\ldots (1)$$

Where i = (1 to 109) for the Eastern region, i = (1 to 114) for the Western region, i = (1 to 75) for the Northern region and i = (1 to 54) for the Southern region, (t = 1 to 5) t= 2007-08, 2009-10, 2011-12, 2013-14 and 2015-16 for each region.

Here $\varepsilon_{it} = a_i + \mu_{it}$

The above model will be estimated for all four regions of India separately to identify whether there exists any region-specific factor that can influence GER and GER_F. Here, GER_{it} represents the Gross Enrolment Ratio in primary education of i^{th} district in the t^{th} year. The error term of a panel regression model has two components: (i) time-invariant factor a_i and (ii) idiosyncratic error term v_{it}. The time-invariant factor a_i is an unobserved heterogeneous factor of the i^{th} district of a particular region that accommodates the local administrative and socio-cultural factors that are correlated with the explanatory variables in that region and can influence GER and GER_F.

We are considering the same explanatory variables mentioned in Eq. (1) to investigate whether the different grants, parental education, presence of female teachers in school, and expansion of private primary schools influence GER of girls (GER_F) in elementary education (excluding 0–6-year girls) in rural India? The panel regression is expressed as:

$$GER_{Fit} = \mu_0 + \theta_1 ftech_{it} + \theta_2 gt_{it} + \theta_3 sd_{i(t-1)} + \theta_4 tlm_{i(t-1)} + \theta_5 mdm_{it} + \theta_6 pvt/pub_{it} + \theta_7 flit_{it} + \theta_8 mlit_{it} + \in_{it} \ldots\ldots\ldots\ldots (2)$$

Where i = (1 to 109) for the Eastern region, i = (1 to 114) for the Western region, i = (1 to 75) for the Northern region and i = (1 to 54) for the Southern region, (t = 1 to 5) i.e. t = 2007-08, 2009-10, 2011-12, 2013-14 and 2015-16 for each region.

Here again $\varepsilon_{it} = a_i + \mu_{it}$

GER_{Fit} represents the Gross Enrolment Ratio of girl children in primary education of i^{th} district in the t^{th} year. Here also the unobserved heterogeneous factor of a particular district in any region (a_i) accommodates different local administrative, social and cultural factors of a particular district in a particular region which can be correlated with the explanatory variables in that district and can influence overall GER and GER_F both. In both the models, 'sd' and 'tlm' are considered in one

period lag because the reflection of utilization of those two grants in any primary school is observed in the next period which may influence the local parents to decide on their children's enrolment.

Before application of the Static Panel data, it is required to check whether the variables considered are stationary or not. We have considered the Harris-Tzavalis unit root test of all the variables. Initially, it is required to test the stationarity of the two explained variables. Here N (total number of the cross-sectional unit of the panel) is very large in all regions in comparison to T which is only 5 in each region. Generally, this type of short strongly balanced panel does not require stationary testing before running a panel regression analysis. (Woolridge, 2002). But still, the tests have been done. Here it is observed that among all explanatory variables, the null hypothesis is rejected which proves that considered panels are stationary[8].

A set of explanatory variables in both the models mainly related to government grants are very much dependent on local administrative efficiency which is an unobserved time in-variant factor for our study. Here the rural people-dominated districts of each major state, identified for this study are not chosen randomly but are selected from the Census data. The fixed-effects estimation method redresses the potential estimation bias arising from time-invariant omitted factors which may not only influence the overall enrolment rate and girl's enrolment rate but also public-school enrolment and privatization of education in attaining elementary education. So, taking access to five-year district-level panel data, the district fixed effects model is considered because it is appropriate for our study. In this model, the cross-sectional heterogeneity is correlated with other explanatory variables taken into consideration. So statistically fixed effect model is appropriate for our study (Greene, 2009). Even the Hausman Specification Test[9] also suggests a fixed-effect model for our study. Hausman's Test is based on certain extreme assumptions.[10] Here we have

[8]Variables considered in the model are stationary implying that the mean and variance do not vary with time and the data retains mean reverting so the data set is predictable. So, there is no need for an error correction mechanism. Here the value of $\hat{\rho}$ in the Northern region = 0316 (3.25) for GER and = 0.219 (8.4957) for GER_F. The values of Z are given in the parenthesis and all the estimated values are statistically significant. Similarly in the Western region, the estimated value of $\hat{\rho}$ = 0.0295 (7.3073) for GER and = 0.2422 (5.6472) for GER_F which again shows that the estimated values are statistically significant. In the Eastern region the estimated value of $\hat{\rho}$ = 0.357 (3.0577) for GER and = 0.2602 (5.136) for GER_F and in both situations the estimated values are statistically significant. The same situation happens in Southern regions. The explanatory variables in all the four-panel regression are also stationary in nature.

[9] Results of the Hausman Specification Test are presented in the Regression table.

[10]Random Effect estimation procedure can be applied if and only if cross-sectional units are random in nature and individual error components are uncorrelated with the explanatory variables.

divided India into four geographical regions and from each region, the rural people-dominated districts are identified. So, the identified districts are not random. Besides that, from Table 4.4 it is identified that the inequality in School Grant Coverage Index has decreased over time among the rural districts in each region of India but that does not move towards complete equality. So there exist some district-specific unobserved factors which may influence the value of SGCI, in different districts. During the time of formation of SGCI, the components considered and other exogenous components of the model are correlated with the error term and the panel data set consists time-invariant factor. Hence Fixed Effect model is only applicable to this study.

Now as the fixed effect model cancelled out time-invariant predictors, if we incorporate dummy variables that are time-invariant in my regression model using fixed effect panel data then the dummies will be differenced away during estimation. (Kohler & Kreuter, 2009) . So fixed-effect model cannot be used to investigate time-invariant causes of the dependent variable. Thus, using the Fixed Effect model an investigator cannot check the impact of a zonal dummy in this model. This is another reason behind addressing our research objective after dividing India into four regions based on geographical positions.

4.5 Results and Discussions:

The absence of a multi-collinearity problem (VIF <10) among the explanatory variables in the above econometric models is identified. The results of static panel regression (Fixed Effect) are presented in Table 4.7A and Table 4.7B respectively. In all situations, the Hausman test and F statistic establishes the importance of the fixed effect model in all eight separate regression equations.

Table 4.7A: Determinants of GER

Explanatory Variables	**Dependent Variable**: Overall GER (value of SE is given in the parenthesis)			
	East	**West**	**North**	**South**
Female Teacher	-.206 (.3007)	1.244 (.979)	-.196 (.246)	-.483 (.589)
Girls' toilet	-.023 (.054)	-.108 (.417)	.055 (.061)	-.044 (.075)
School Development Grant	-.270 (.313)	-.0671 (.237)	.029 (.062)	-.099 (.122)
Teaching Learning Material Grant	.154** (.086)	-.0037 (.0203)	.0306* (.023)	.086** (.028)

Mid-Day Meal	.1207*** (.047)	-.0001 (.0333)	.193*** (.029)	.008 (.042)
PVT/Pub	.272* (.213)	.447*** (.102)	.117*** (.051)	.151*** (.066)
Female Literacy	-.2004 (.737)	1.940 (.606)	-.155 (.662)	-1.207 (1.302)
Male Literacy	-.1494 (1.197)	2.07** (1.066)	.449 (1.176)	5.413*** (2.284)
Constant	258.282*** (57.896)	108.762** (57.610)	143.319*** (58.307)	-142.236* (112.676)
F Value (9,427)	21.59, Prob>F= 0.000	17.18, Prob> F=0.000	9.13 Prob> F=0.000	12.45 Prob> F= 0.0148
R^2 Overall	0.199	0.120	0.201	0.161
χ^2 (8)	70.44	35.91	21.09	12.79
Prob >χ^2	0.000<5%	0.000<5%	0.007<5%	0.049<5%
Hausman Test Result	Fixed Effect Model	Fixed Effect Model	Fixed Effect Model	Fixed Effect Model
No of Observation	545	570	375	270
Stationary/Unit Root	Stationary (Reject Null Hypothesis)	Stationary (Reject Null Hypothesis)	Stationary (Reject Null Hypothesis)	Stationary (Reject Null Hypothesis)

***= Prob at 1% **=Prob at 5% *=Prob at 10%

Considering the same set of explanatory variables, it is required to investigate the influence of those variables on girls' enrolment in primary education which is presented in Table 4.7B.

Table-4.7B: Determinants of GER of girls only.

Explanatory Variables	**Dependent Variable**: GER of Girls (value of SE is given in the parenthesis)			
	East	**West**	**North**	**South**
Female Teacher	.038*** (.017)	.068*** (.019)	-.008 (.018)	.464*** (.023)
Girls' toilet	-.007 (.032)	.009 (.021)	-.004 (.004)	.002 (.003)
School Development Grant	.028*** (.006)	.003*** (.001)	.004* (.004)	.002 (.005)
Teaching Learning Material Grant	.005 (.005)	.0004 (.001)	-.002 (.002)	-.002 (.001)

Mid-Day Meal	.009*** (.003)	.009*** (.002)	.005*** (.002)	-.002 (.002)
PVT/Pub	-.018* (.012)	-.017*** (.005)	-.017*** (.004)	-.012*** (.002)
Female Literacy	-.199 (.424)	-.082 (.303)	-.075 (.048)	.016 (.051)
Male Literacy	.496*** (.069)	.184*** (.053)	.185** (.085)	-.007 (.089)
Constant	18.222*** (3.331)	36.263*** (2.883)	39.402*** (4.239)	52.185*** (4.405)
F Value (9,427)	50.68 Prob> F= 0.0000	11.84 Prob> F=0.000	15.93 Prob> F=0.000	16.23 Prob> F=0.0000
R^2 Overall	0.2033	0.0165	0.2051	0.0034
χ^2 (8)	87.88	51.53	17.35	18.63
Prob >χ^2	0.0000<5%	0.0000<5%	0.04<5%	0.0169<5%
Hausman Test Result	Fixed Effect Model	Fixed Effect Model	Fixed Effect Model	Fixed Effect Model
No of Observation	545	570	375	270
Stationary/Unit Root	Stationary (Reject Null Hypothesis)	Stationary (Reject Null Hypothesis)	Stationary (Reject Null Hypothesis)	Stationary (Reject Null Hypothesis)

*****=** Prob at 1% ******=Prob at 5% *=Prob at 10%

It is found that the factors that can reduce the direct and indirect cost of elementary education like mid-day meals and teaching-learning material grants influence overall enrolment in rural districts of Northern and Eastern regions but have created no impact on Southern and Western regions of India. On the other hand, a father's education has positively influenced overall GER in the Western and Southern regions of India. Similarly, factors like mid-day meals, school development grants, and fathers' education influence female enrolment in Eastern, Western and Northern regions but fail to influence female enrolment in the Southern region of India. Interestingly female literacy fails to create any impact on GER and GER_F in any region. In the Southern zone, the grants provided by the government which directly or indirectly reduce the cost of education fail to have an impact on GER and GER of girls. Considering the existence of a patriarchal society, the availability of female teachers has a great influence on parents in making enrolment decisions for girls' children, especially in rural areas. No literature has found where the influence of female

teachers was addressed on enrolment mainly enrolment of girls in rural India. It is found that the availability of female teachers positively influences girls' enrolment in primary school attainment in the Eastern, Western and Southern regions of India. It is also observed that girl children are facing discrimination from their parents during the time of admission in primary schools in every region of rural India. The ratio of private to public enrolment considered as a proxy for privatization of education has positively influenced overall GER but creates a negative impact on GER of the girl child in all four considered regions of rural India. This part depicts the gender biases in our rural households during the time of choosing a school for their children. This shows that girl children are generally preferred to be admitted to public primary schools in rural India in all four regions.

4.6 Conclusion and Policy Prescriptions:

The government of India has sanctioned different grants for public primary schools to reduce the direct and indirect costs of education at the primary level. It is very important for the rural areas where most of the people are economically poor and depend on agriculture and allied activities for their livelihood. It is observed that over the years, the coverage of grants among primary schools in rural people-dominated districts has enhanced and percolated down to most of the schools. However, the inequality in the distribution of grants among the public primary schools decreases more rapidly in Eastern and Northern regions compared to Western and Southern regions of India. So, to enhance GER among girls at the elementary level, we can state that more coverage of School development grants is required in the public schools in the rural districts of Western and Southern regions of India. Parents in rural India now prefer to enrol their children in private schools because it is observed that the ratio of overall private to public school enrolment has increased in all the regions of rural India. This also indicates more private primary schools have been founded in rural India. It is observed that fathers' education influences enrolment decisions but mothers' education failed to influence enrolment decisions even for the girl child in rural India. This result contradicts the findings mentioned in the existing literature. These results portray the patriarchal structure of the society in rural India where the major decision of the family is taken by the male member of the family. The importance of midday meals to encourage parents to admit their daughters to primary education cannot be ignored because this scheme can reduce the indirect cost of education for Indian parents in rural areas. Our study has also portrayed that enhancement of private

education has shown a positive impact on overall enrolment but hurts the enrolment of girl children in rural public schools. This is intriguing and highlights the fascination of the parents during the time of admission of their children where they prefer to send their girl child to public school and on the other hand their boys are admitted to private school to receive a better education. The availability of female teachers positively influences girls' enrolment in primary school attainment in Eastern, Western and Southern regions of India but fails to influence girls' enrolment in the Northern region of India. So, it is required to appoint more female teachers in the public schools of the Northern regions. Hence, more recruitment of female teachers in primary schools is required to enhance GPI at a targeted level in elementary education in rural India.

Limitations of the Study:

Our paper is solely based on DISE statistics data which are district-specific macro-level data. Other household-related factors can influence the enrolment of girl children in primary education like per capita income, the incidence of poverty among the rural households, motivation and vision of the rural parents on their children's education, empowerment of mothers, etc. which cannot be addressed here. These issues can be addressed only based on primary data.

This chapter focuses on the Gross Enrolment Ratio, Gross Enrollment Ratio of girls and availability and distribution of government grants in primary schools in rural India in the next chapter, we will shift our focus to gender parity in attaining primary education in rural India.

4.7 Appendix

Table-A1: Table of Summary Statistics

Variables	Zone	2007-08				2015-16			
		Mean	S. D	Minimum	Maximum	Mean	S. D	Minimum	Maximum
Normalized Grant Index	East	51.849	14.707	3.674 (Darjeeling)	80.137 (Bankura)	94.464	5.230	69.443 (Sheikhpura)	99.825 (Korba)
	West	63.778	6.919	44.022 (Janagadh)	81.564 (Ahmadnagar)	91.314	9.371	38.196 (Tikamgarh)	99.092 (Jalna)
	North	68.553	8.855	39.942 (Jalaun)	87.279 (Kaushambi)	95.121	9.893	40.518 (Baghpat)	100 (Hoshiarpur)
	South	64.557	13.331	39.303 (Bidar)	91.305 (Wayanad)	85.244	15.548	58.574 (Krishna)	99.950 (Krishnagiri)

Gross Enrolment Ratio	East	125.95	27.46	38 (Baudh)	175 (Giridih)	105.14	16.85	32.81 (Surguja)	149.94 (Mayurbhanj)
	West	122.00	27.571	19.2 (Burhanpur)	175 (The Dangs)	99.048	10.146	48.7 (Janagadh)	122.67 (Dhaulpur)
	North	105.05	26.14	35.1 (Rupnagar)	184 (Baghpat)	103.34	13.85	49.51 (Firozpur)	133.37 (Pratapgarh)
	South	98.54	27.87	43.1 (Chamarajanagara)	175 (Perambalur)	101.01	28.75	40 (Belgaum)	276.72 (Perambalur)
Gross Enrolment Ratio (Female)	East	47.21	2.69	38.1 (Supaul)	50.5 (Maldah)	49.41	0.84	45.9 (Dantewada)	51.6 (Hazaribagh)
	West	48.43	2.16	41.4 (Patan)	52.3 (Sehore)	48.98	1.92	44 (Sirohi)	54.8 (Shajapur)
	North	48.79	1.6	45.4 (Fategarh Sahib)	53.2 (Deoria)	49.39	1.44	45.9 (Shrawasti)	53.4 (Mahendragarh)
	South	49.18	0.78	47.3 (Dharmapuri)	51.5 (Gadag)	48.91	1.33	44.9 (Bellary)	51.7 (Kolar)
Female Literacy	East	50.77	12.32	28.42 (Dantewada)	77.92 (PurbaMednipur)	66.10	9.35	39.77 (Dantewada	87.09 (PurbaMednipur)
	West	56.71	10.79	31.44 (Jhabua)	81.07 (Amravati)	66.78	10.83	39.58 (Jhabua)	87.68 (Amravati)
	North	54.90	9.98	30.15 (Shrawasti)	79.08 (Hoshiarpur)	69.61	6.54	52.39 (Shrawasti)	83.63 (Hoshiarpur)
	South	64.57	12.08	44.87 (Anantapur)	95.38 (Pathanamthitta)	73.43	10.45	46.74 (Anantapur)	97.69 (Pathanamthitta)
Male Literacy	East	72.55	10.50	47.86	91.33	80.30	7.50	58.82	94.29

				(Dantewada)	(PurbaMednipur)			(Dantewada)	(Jagat Singhpur)
	West	80.89	7.30	52.6 (Jhabua)	92.19 (Wardha)	85.63	6.89	58.28 (Jhabua)	97.47 (Kheda)
	North	77.26	7.87	56.88 (Bahraich)	92.53 (Rewari)	85.47	6.26	68.15 (Shrawasti)	96.04 (Mahendragarh)
	South	80.70	7.56	65.17 (Chamarajanagara)	97.23 (Kottayam)	85.3	6.75	65.17 (Vizianagram)	98.09 (Pathanamthitta)
Privatization of Education	East	1.75	2.98	0(Siwan)	6.26 (Jashpur)	4.60	6.26	0(Siwan)	31.1475 (Gumla)
	West	21.07	21.34	1.38 (The Dangs)	143.13 (Latur)	23.95	24.37	1.05 (Guna)	130.2 (Latur)
	North	19.30	16.83	0 (Kapurthala)	73.70 (Saharanpur)	44.95	40.25	40.25 (Fatehgarh Sahib)	197.5 (Mathura)
	South	54.63	49.94	8.54 (Chamarajanagara)	270.5 (Kottayam)	72.74	53.12	14.81 (Kolar)	279.2 (Kottayam)
Girls Toilet	East	17.49	11.17	1.7 (Giridih)	47.3 (Latehar)	93.58	10.45	51.1 (Supaul)	100 (Bankura)
	West	49.49	23.11	8.3 (Dindori)	93.8 (Hanumangarh)	98.47	3.21	83.1 (Barwani)	100 (Bhilwara)
	North	81.69	14.29	40.6 (Azamgarh)	99.9 (Etawah)	99.75	.42	98.3 (Rampur)	100 (Baghpat)
	South	40.59	17.69	13.9 (Gulbarga)	80.1 (Idukki)	99.66	.98	93.6 (Kolar)	100 (Chitradurga)
School Development Grant	East	70.83	18.16	1 (Darjiling)	98.8 (Madhepura)	95.42	4.78	72.1	100 (Munger)

								(DakshinDinajpur)	
	West	83.73	10.75	21.9 (Jhabua)	98.9 (Sindhudurg)	90.64	10.01	0 (Shajapur)	99 (Valsad)
	North	74.73	14.21	24 (Sirsa)	98.1 (Karnal)	96.67	11.46	0 (Baghpat)	100 (Fatehgarh Sahib)
	South	82.29	10.93	44.5 (Anantapur)	97.9 (Wayanad)	91.56	10.94	60.4 (Krishna)	100 (Cuddalore)
Teaching Learning Material Grant	East	68.71	19.45	0.4 (Darjiling)	98.8 (Bhirbhum)	89.76	19.61	0 (Sheikhpura)	100 (Korba)
	West	79.23	12.35	44 (Amreli)	97.8 (Sindhudurg)	83.20	24.99	0 (Tikamgarh)	100 (The Dangs)
	North	73.24	18.3	4.7 (Baghpat)	97.3 (Jind)	87.34	27.10	0 (Baghpat)	100 (Kapurthala)
	South	77.12	16.98	0.2 (Kurnool)	96.5 (Wayanad)	60.00	45.88	0 (Dharmapuri)	100 (Hassan)
Female Teacher	East	32.98	8.73	13.6 (Giridih)	60.6 (Jagatsinghapur)	39.87	9.74	14.6 (Deoghar)	67.2 (Jagatsinghapur)
	West	33.21	10.38	14 (Jalor)	69.6 (Amreli)	35.99	10.38	15.8 (Jalor)	64.5 (Valsad)
	North	42.32	10.91	15.1 (Baghpat)	66.7 (Kapurthala)	45.96	10.15	21.1 (Baghpat)	73.5 (Kapurthala)
	South	55.58	15.63	33.4 (Srikakulam)	91.7 (Thiruvarur)	61.91	15.43	39 (Srikakulam)	99.8 (Thiruvarur)
Availability of Mid-day meal	East	27.27	22.61	2.1 (Chatra)	87.9 (PurbaMedinipur)	98.04	2.785	82.5 (Krishanganj)	100 (Naupada)

	West	36.65	24.69	0 (Jodhpur)	91.7 (Neemuch)	98.16	2.147	85.5 (Surendranagar)	100 (Navsari)
	North	46.67	34.21	0 (Yamunanagar)	95.2 (Jaunpur)	99.45	1.13	92.7 (Mau)	100 (Budaun)
	South	45.35	32.62	0 (Kottayam)	91.8 (Krishnagiri)	98.38	7.266	46.1 (Bagalkot)	100 (Ramanathapuram)

Source: Calculated by the author based on the data given in DISE Statistics in different years

CHAPTER -5:

GENDER PARITY INDEX IN PRIMARY SCHOOLS IN RURAL INDIA:

AN ANALYSIS

Gender Parity Index in Primary Schools in Rural India: An Analysis

5.1 Introduction:

India has increased its spending[11] on primary education to achieve universal primary education for its children and eliminate gender disparity in achieving education from the elementary level. A high Gross Enrolment Ratio (GER) in primary education indicates that a large proportion of the primary school-age population is enrolled in school. A high Gender Parity Index (GPI) in primary education indicates that there is gender parity in enrollment, meaning that both girls and boys are equally likely to be enrolled in primary school. In some cases, high GER and a low GPI in primary education may coexist, indicating that while a large proportion of the primary school-age population is enrolled in school, there is still a significant gender gap in enrollment. In such cases, policies and interventions aimed at promoting gender equality in primary education may be needed to ensure that girls are not left behind. Conversely, a high GPI and a low GER could indicate that while there is good gender parity in enrollment, a low overall enrollment rate suggests a lack of access to education for both genders. In the previous chapter, we focus on GER in primary school and in this chapter, we will shift our focus to gender parity in attaining primary education in rural India. Education is the base of human capital formation and an important factor in ensuring gender equality and empowerment. It provides positive changes in human life by enhancing the knowledge, skill, and intelligence of a person and enables them to lead a successful life. Gender inequality may be defined as discrimination against women based on their sex. India's economy is characterised by gender-based discrimination. The major cause of gender inequality in Indian society lies in the system of patriarchy. Rural girls are mainly confined within the four walls of their houses. Societal norms put a heavy burden on girls resulting in their dependence on their male counterparts. In rural areas, people have the notion that girls are meant for household chores and get married and sent to others' houses. On the other hand, boys are considered the legal heirs of the family. Due to this notion, boys sometimes get preferential feeding in achieving education compared to girls.

[11] From 2001-2013 GOI's expenditure on elementary education had increased over 11-fold i.e., from Rs 3577 crore to Rs 39622 crore (PAISA Report, 2012).

Various complimentary programme has been initiated that specifically target girls to eliminate gender imbalance in enrolment in school. Since independence, one of the main objectives of social welfare policies in India is to provide basic education to all strata of society. The Sarva-Shiksha-Abhiyan (SSA) is a flagship program launched to provide universal primary education. With the launch of the Right to Free and Compulsory Education Act (RTE)[12] in 2010, the SSA has gained the legal force for its implementation, by making primary education a fundamental child right for Indian citizens. The Mid-day meal scheme works as a catalyst for driving rural poor children to school, but still, India cannot achieve the Education for All goals. Indian society still faces the problem of child labour and adolescent marriage.

According to the United Nations Annual Report (2016), providing education to women is the most effective way to improve the status and condition of women and also the economic prosperity of the family. Progress towards gender parity in primary school enrolment is one of the Millennium Development Goals as well as one of the Education for All (EFA) goals. An educated person is an asset to any country. Education helps to reshape the future of the nation and to achieve the Millennium Development Goals (MDGs). Still, in the twentieth century, millions of girls were deprived of their right to basic education. Here we mention different public policies adopted by different State Governments to encourage girls' education and reduce school dropout and gender-based discrimination: These are as follows:

- Balika Samraddhi Yojana: It was launched by the Gujrat government to encourage girls' education by providing monthly scholarships to girls 'children up to 18 years of age.
- Delhi Ladli scheme: It was launched by the Delhi government to give financial assistance in various stages of education to girls to promote girls' education and reduce school dropout. This policy also controls female foeticide as it provides financial support in giving birth to girls to end discrimination against girls. To get the benefit of this scheme, the family need to stay above 3 years in Delhi with an income ceiling of 1 lakh.
- Beti Hai Anmol Yojana: It was launched by the Haryana government to encourage girls' education by providing financial assistance through a scholarship range of Rs 300 to Rs 1200. It is provided to girls from class I to class XII.

[12]The Constitution (Eighty-sixth Amendment) Act, 2002 inserted Article 21-A in the Constitution of India to provide free and compulsory education of all children in the age group of six to fourteen years as a Fundamental Right.

- Kanyashree Prakalpa: It was launched by the West Bengal government, to encourage girls' education and to reduce child marriage. Its basic objective is to improve the status and well-being of girls by providing annual financial assistance and one-time grant payments after they reach 18 years.
- Sabooj Sathi scheme: This scheme is coined by the West Bengal Chief Minister to empower girls and reduce the school dropout rate among girls. This scheme is also called the "Bicycle Distribution Scheme" which can reduce the transportation cost of girls to attend school.

Some public policies are also taken mainly focusing on the girls living below the poverty level. These are:

- Bangaru Thali: This scheme was launched on 1st May, 2013 by the government of Andhra Pradesh to eliminate discrimination between genders and support female children in terms of socially and economically. The benefit of the scheme was provided to below-poverty-line girls to support education till graduation.
- Bhagya Laxmi Scheme: This scheme is launched to assist girl children living below the poverty line in Karnataka. Its main objective is to encourage their education and reduce dropout. It also provides them with special health insurance maximum of 25,000 per year.
- Kanya Jagriti Jyoti Scheme: This scheme was launched to encourage education to the girl child in Punjab living below the poverty line.

Various government policies have been implemented to increase overall school access but fail to eliminate gender imbalance from society in achieving formal education. The basic objective of all the above-mentioned schemes is to spread girl's education mainly in rural areas. Still, according to the Census Report 2011, in rural areas, the literacy rate among women is 58.75% whereas that of the male is 78.57%. If we look at the overall literacy rate, it is observed based on Census data, 2011 that 65.46% of women are literate whereas the rate of males is 74.04%. Education among women boosts their earning capacity and improves their bargaining power in family and the society. Education can narrow the long-standing gender gap in the field of education achievement. Illiteracy and child marriage are correlated. Among total cases of child marriage, nearly 40% of child marriage takes place in India (UNICEF,2009), although only 514 cases of such marriage were registered in India during 2004-08(National Crime Record Bureau,2008). The incidence of

child marriage varies inversely with the level of development (Sagade, 2005). Poverty, lack of awareness, illiteracy of parents, unemployment, social customs etc. are the main causes of child marriage. Lawrence Summers (1992) emphasized that investing in female education provides the highest return in developing countries once all its benefits are concerned. A World Bank study (1999) of 100 countries found that, when women gain four years of education on average, fertility per woman is dropped by about one birth. More educated women lead to a greater productive labour force, later marriage, lower fertility, and improved child health and nutrition. Hence, if gender-based discrimination can be reduced in education then the status, condition and dignity of girls can be improved. So, enrolment of girls in primary education is necessary for development.

India's position in terms of Gender equality*:*

India's value in GDI was 0.819 in 2015 which implies medium human development. Based on GDI, countries are divided into five groups by absolute deviation from gender parity in HDI values. Here India falls in group 5 comprised of low equality in HDI achievements between men and women (absolute deviation gender parity of more than 10%). Thus, India's society is characterised by gender-based discrimination. Besides that, in terms of the Gender Inequality Index, India ranks 125 out of 159 with a value of 0.530 in 2015. World Economic Forum's (WEF) Global Gender Index measurement captures gender equity among countries based on four major areas such as education, politics, economy and health. India's rank is 108 in 2017 among 144 countries. India's rank has fallen by 21 places compared to last year's rank of 87. This implies gender inequality in Indian society is predominant and also increased compared to previous years.

Importance of the Gender Parity Index during the Time of Enrolment in Primary Education:

The Gender Parity Index is a socio-economic index designed to measure the relative access to education of boys and girls. It emphasises on egalitarian treatment based on gender, here in terms of enrolment in elementary education.

GPI = Girl's enrolment in primary grades in the year (t)/Boys enrolment in primary grades in the year (t)

GPI<1 implies a disparity in favour of Boys i.e., proportionately fewer girls are enrolled in primary education compared to boys which means girls have comparatively fewer learning opportunities than boys.

GPI>1 implies disparity in favour of girls i.e., proportionately more girls are enrolled in primary education compared to boys

GPI=1 implies there exists gender parity between boys and girls

UNESCO has defined a GPI value between 0.97 and 1.03 as an achievement of gender parity.

Gender difference is the most basic gender-rated disparity measure in primary education. Gender difference refers to the difference in net male child school attendance and net female child attendance at primary school. However, this measure does not take into consideration of the overall level of school attendance. In such cases, countries with higher attendance rates are much closer to gender parity than the country with lower attendance rates. So, GPI provides a better picture of gender equality in society compared to gender difference measures.

5.2 Survey of Literature:

It is found that the direct costs of education adversely affect the probability of children going to school more than girls relative to boys (Chandrasekhar & Mukherjee, 2006). Hiring female teachers is one of the key policies that can bridge gender gaps mainly in developing countries (UNESCO (2010)), Herz and Sperling (2004). It is noted that the transfer of the grant to a school in five developing countries has positively influenced access to education more to poor people (UNESCO (2001)). Murlidharan *et.al*, (2013) have found that input-based measures on school quality have shown a significant improvement over the years. For instance, pupil-teacher ratios have fallen by nearly 20 % (from 47.4 to 39.8) the fraction of school with electricity and toilets have doubled (from 40 % to 84 % for toilets and 20 % to 45 % for electricity), the fraction of school with functioning midday meal programme has nearly quadrupled (from 21 % to 79 %) and the overall index of school infrastructure has improved by 0.9 standard deviations(relative to the school infrastructure index in 2003). There is ample evidence of gender bias or male preference in the case of parental investment in their children's education (Tansel, 1997; Kingdon, 1998; Glick & Sahn, 2000; Dreze & Kingdon, 2001; Pal, 2004; Kingdon, 2005). Pal (2004) in his paper found that mothers' literacy plays a significant role in enrolling their girl child on formal education. The government of India have increased their spending for the improvement of school infrastructure mainly of the public primary schools. But the question is whether these school-related factors play

any significant role in encouraging rural parents to enrol their girl child in primary education. This will be investigated here.

5.3 Research objective:

The basic objective of this chapter is to investigate the possible factors mainly school-related which are playing a positive role in placing the value of GPI at a targeted level in major parts of rural India.

5.4 Data and Methods:

Data Source:

India is predominantly a rural-based economy and most of the people live in rural areas. In rural India, we observe a predominance of lower-income families. Lower-income parents face financial hardship in addition to the opportunity cost of girls not fulfilling other time-intensive household care responsibilities (Rao *et. al*, 2003). So, when we give focus on enrolment in primary education particularly among girl children, we have to concentrate our study in rural areas. From the census 2011, we have identified districts with a higher rural population (more than 50%). In our study, we have identified 352 such rural-based districts based on Census data, 2011. India is a socio-economic diverse country. Social and cultural factors are different in different regions of India. The Ministry of Culture of GOI has divided India into overlapping cultural zones to promote and preserve the cultural heritage of various regions of India. Similarly, we have also divided the rural predominant district into zones to strengthen the ancient roots of Indian composite national culture. This local socio-cultural practice also plays an important role during the time of deciding on a girl's education. If we look at the GPI scores of Kerala and Haryana, we will find that the GPI scores of Kerala are much higher compared to Haryana. One of the main notions of this is the cultural difference between the two states. To tackle this, we have divided India into four zones such as North, East, West and South. Culture plays an essential role in how children make sense of the world. Cultural heritage, cultural tradition, and cultural practice are time-invariant but can influence parental decisions on their child's schooling (Cole, Hakkarainen, Bredikyte, 2010). So based on geographical position, under each selected zone, we have identified the states. We assume that cultural and other factors are almost identical zone-wise[13]. We have considered the 16 major

[13]Tradition and culture of rural people in a particular zone is assumed almost identical.

states in our study based on data available in DISE Statistics. Table 5.1 gives the states of India which are considered in any particular zone. Besides that, the total number of rural population-dominated districts in each state under a particular zone is also mentioned.

Table 5.1: Zone-wise division of the county

Zone-1(East) 109 District		Zone-2(West) 114 District		Zone-3(North)75 District		Zone -4(South)54 District	
States	Number of Rural dominated districts	States	Number of Rural dominated districts	States	Number of Rural dominated districts	States	Number of Rural dominated districts
Bihar	35	Gujrat	17	Haryana	12	A.P	12
Chhattisgarh	15	M.P	27	U.P	51	Kerala	6
West Bengal	14	Maharashtra	41	Punjab	12	T.N	13
Jharkhand	18	Rajasthan	29			Karnataka	23
Orissa	27						

Source: Calculated by the author based on the Census data 2011

So, the total number of rural districts considered in our study

Districts of Zone 1+Districts of Zone 2 +Districts of Zone 3+Districts of Zone 4 =109+114+75+54=352 Districts[14]

[14]To keep maximum homogeneity among the states, we here ignore the states under special assistance.

The entire investigation is based on DISE statistics. This statistic considers both public primary schools and private (both aided and unaided) schools including Madrasasa. Most of the schools are also co-educational schools.

For Panel Regression Analysis, data have been taken with a two-year gap. We have considered data from 5-time points and those are 2007-08, 2009-10, 2011-12, 2013-14 and 2015-16 respectively. The two-year gap is taken to get a proper impact of the available data mainly related to the infrastructural development of the primary school which is dependent mainly on government aid. These aids need some time to reach the rural school as various documents, government permission etc. are required to pass these grants. Similarly for the socio-economic factors to get a proper trend we have taken a gap of two years. All the data taken from DISE Statistics are presented in percent forms.

The Model:

In rural India, the majority of the girls are either engaged in agricultural activity or household chores, especially being in charge of sibling care. Even due to fear of discrimination in the school, girls of the parents are sometimes losing interest to send their girl's child into school. Apart from that in rural India, poverty, disinterest in schooling, and lack of safety in schools are the leading reasons, why girls mainly from the marginalised class are out of school. Here, we have to consider possible school-related factors and socio-economic factors which might influence the Gender Parity Index in elementary education in rural districts of India.

Among the school-related factors we have chosen six factors and those are the percentage of female teachers (ft), the percentage of schools having girl's toilets (gt), the percentage of schools that received school development grants (sdg) in the previous year, percentage of schools received teaching learning material grant (tlm) in the previous year, Pupil-teacher Ratio (ptr) and percentage of schools having Mid-day meal (mdm). In a recent World Bank Report (January 2018) on Afghanistan, it is observed that girl student's enrolment is increasing with the enhancement of new facilities in schools like the construction of new buildings, and toilet facilities, which provides a safer and better learning environment. We actually borrow that concept and want to investigate whether the enhancement of infrastructure in primary school mainly through government funding play any positive role in enhancing GPI in primary education in rural India.

The model considered for this investigation is presented as:

$GPI_{itZ} = f\{ft_{itz}, gt_{itz}, sdg_{i(t-1)z,}\ tlm_{i(t-1)z,}mdm_{itz}, ptr_{itz,}fl_{itz}, ol_{itz,}\ a_{iz}\}$

Where i = (1 to 16), (t = 1 to 5) and z = 1...4

t= 2007-08, 2009-10, 2011-12, 2013-14 and 2015-16.

Cross section unit= 16

Here GPI_{itz} represents the ratio of girls' enrolment to boys' enrolment in primary education or the Gender Parity Index (GPI) of i^{th} district in the t^{th} year in the z^{th} zone. Here a_{iz} is the time-invariant factor of the z^{th} zone. This unobserved heterogeneous factor of z^{th} zone accommodates the social and cultural factors of that zone which can influence GPI in that zone[15]. This factor is time invariant in a particular zone but is different in different zones of India.

The theoretical justification behind choosing those explanatory variables in our investigation is given below:

(a) Female teacher (ft_{itz}): This is calculated by the total percent of female teachers in primary school over the total percent of teachers (male & female) in the primary school of the i^{th} district in the t^{th} year in the z^{th} zone. Female teachers are more effective in teaching girls than male teachers but no worse at teaching boys. It is found that hiring female teachers on the current margin may reduce gender gaps and thus increase the participation of girls in formal education (Murlidharan & Sheth, 2013). However no proper investigation has been done to justify this statement. Here we include full-time, part-time as well as contractual female teachers simultaneously. It is expected that the gender of the teacher may play an important role in facilitating students' sense of relatedness to the teacher in primary school. In rural areas, various conservative families prefer a female teacher for their daughters. Even the presence of male teachers does not necessarily provide a barrier to a girl child's enrolment but parents often prefer female teachers over male teachers. Girls also find it comfortable to discuss their problems with female teachers compared to male teachers. Female teacher act as an advocate for girls, symbolise female empowerment, facilitate the needs and

[15]Admitting daughters in to school in rural India is very much dependent on the socio-cultural factor of the native village of that girl. This factors also influence the decision of the parents during the time of admission of their daughter at primary school.

perspectives of girls, and promote girls' friendly learning. Thus, the gender of the teacher may affect the GPI.

(b) Girl's toilet (gt_{itz}): This indicates the percentage of primary schools having the provision of girls' toilets in the i^{th} district in the t^{th} year in the z^{th} zone. It is an important parameter in determining education achievement by girls in rural areas as girls are more affected than boys due to the lack of proper sanitation facilities. The absence of a toilet in school implies a lack of privacy and dignity of the r girl child[16]. Parents sometimes also do not want to send their girl to school which does not have separate toilet for girls. It is expected that provision of girls' toilets may increase girls' enrolment in school which is an important determinant of GPI.

(c) School development grant ($sdg_{i(t-1)z}$): The school development grant is expressed as the percent of schools in the i^{th} district who got this grant in the $(t-1)^{th}$ year in the z^{th} zone. Repair/replacement or purchase of equipment like geometry boxes, blackboards, dusters, chalks, newspapers, library books, maps etc., cleanliness of school premises and purchase of dustbins, also procurement of book self are mainly the heads of expenditure for utilization of this grant. This enhances the infrastructure of the school including enhancement of drinking water facilities[17]. School development grants provide teaching materials and stationeries to students which can reduce the direct cost of education for rural parents. Thus, this grant may attract rural parents to send their girls to school because that will minimize the direct cost of education for their girl child. Here previous year is considered based on the logic that complete information about this grant to the parents may help them to decide whether they would enrol their girl child into school or not in the present time period.

(d) Teaching learning material grant ($tlm_{i(t-1)z}$): Teaching Learning Material grant is expressed as a percentage of the school who got this grant in the i^{th}district in the $(t-1)^{th}$ year in the z^{th} zone. As per the guidelines, of the Ministry of Education, all teachers who are regular employees are entitled to this grant. After the implementation of Sarva Shiksha Abhiyan, the TLM Grant of Rs 500/- per year is being given to all the teachers working at the Elementary Level as support for qualitative

[16]All India Education Survey in 2002-09 had shown that three out of ten primary schools in rural area were without usable toilet facilities.

[17]All India Education Survey (AIES) done by NCERT, for 2002-09 had shown that one fifth of the total primary schools in rural areas did not have drinking water facilities.

improvement in Education. Teachers with appropriate resources can teach better by making education more interesting to students. This will also motivate the parents to send their children to school.

(e) Mid-day meal (mdm_{itz}): This variable indicates the percent of schools that have the provision of free meals in the primary school of the i^{th} district in the t^{th} year in the z^{th} zone. This program target to provide a mid-day meal to every child attaining primary education in public school with a minimum content of 300 calories and 8- 12 gram of protein each day of school for a minimum of 200 days. (Kingdon, 2007). Thus, this scheme is important for improving the nutritional status and also simultaneously improving enrolment, attendance and retention of primary school children. Healthy children are more active in class which leads to improved learning outcomes among the children. This program also enhances social and gender equity as children from all communities and castes eat their food together which reflects better social integration among children. Poor rural people are so poor that they are unable to provide two times meals to their children so the mid-day meal will work as a catalyst to drive especially girls' children to school.

(f) Pupil-teacher Ratio (ptr_{itz}): Pupil-teacher ratio is the average number of the pupil (students) who attend school by the number of teachers in the institution in the i^{th} district in the t^{th} time period of the z^{th} zone[18]. It indicates the intensity of attention a student may receive during school hours keeping in mind that not all classrooms are the same. It is expected that a teacher with fewer students in a class will be able to give more attention to individual students. This may provide security to the girl child in school apart from possible improvement of their learning ability.

Besides that, there are some socio-economic factors that may influence the parents during the time of deciding on enrolment of their girl child in primary education. Due to the lack of data availability, we have considered only female literacy and(or) overall literacy as parameters that might affect the gender parity index.

(g) Female Literacy (fl_{itz}): This variable is expressed as the percent of literate females in the i^{th} district in the t^{th} year of the z^{th} zone. As per the census 2011, the female population in India constitute 48.5 % (48.1% in urban and 48.6% in rural) of the total population. The overall literacy

[18]According to the report of the Right to Education Forum (2015), more than 4.1 lack teaching posts are lying vacant in Bihar, Utter Pradesh, Jharkhand

rate is 74.04% but the female literacy rate is only 65.46% compared to the male literacy rate of 84.12%. More educated mothers will understand the importance of education and will have less or no gender-based priority among their children. So female literacy (which is used as a proxy for mother's literacy) is expected to be an important factor for the gender parity index.

(h) Overall Literacy (ol_{itz}): This variable is expressed as the percent of the literate person in the i^{th} district in the t^{th} year of the z^{th} zone. Overall literacy means combined literacy rates of males and females. This is used as a proxy for the literacy of the parents.

The summary statistics of all the explanatory variables are given zone-wise in the Appendix. Before going to the result of the regression, we have to check for the possibility of serial correlation between all the independent variables. Female literacy is a subset of overall literacy and also through VIF estimates; we found a high correlation between these two variables.

School development grants and teaching learning material grants are two different grants used for two different purposes. One is used for school development purposes and the other one is used to improve the qualitative development of the teacher. School development grants and teaching learning materials are not correlated in any of the zones.

School development grant is used for school development purpose and maintenance grant is used for maintenance purposes. Parts of maintenance grant is sometimes used for the maintenance of girls' toilet but school development grant is not used for the provision of girls' toilet in primary school.

School development grant and the provision of girls' toilet facility in school is not correlated as found in our study.[19]

The static panel regression model of equation (1) can be expressed in the following way to rule out the problem of multicollinearity:

$$GPI_{itZ} = f\{ft_{itz}, gt_{itz}, sdg_{i(t-1)z,}\ tlm_{i(t-1)z,}mdm_{itz}, ptr_{itz,}fl_{itz}, a_{iz}\} \quad \ldots\ldots\ldots\ldots\ldots\ldots \text{(1a)}$$

$$GPI_{itZ} = f\{ft_{itz}, gt_{itz}, sdg_{i(t-1)z,}\ tlm_{i(t-1)z,}mdm_{itz}, ptr_{itz,}, ol_{itz,}\ a_{iz}\} \quad \ldots\ldots\ldots\ldots\ldots\ldots \text{(1b)}$$

Where i = (1 to 16), (t = 1 to 5) and z = 1....4. Cross section unit= 16

[19]These multicorrelation check is done by VIF estimates.

5.5 Results and Discussions:

To do the investigation, we have to depend on the panel data regression model. This model is a Balanced Panel Regression Model. Here Hausman test has accepted the fixed effect regression result for the entire four zones.

Now Fixed effect regression mentioned in Eq.(1a) and Eq. (1b) is done separately for each zone. Initially, we consider the Eastern zone of India.

Table 5.2: Results of Panel Data Regression for Eastern Zone

East (The covered states are Bihar, Chhattisgarh, West Bengal, Jharkhand and Orissa)		
Dependent variable GPI		
Name of the Variable	Values of the Co-efficient and Standard Errors	
	Equation 1	Equation 2
Girls' toilet(gt)	0.0001531(0.0000737) **	0.0001546(0.0000715) **
Mid-day meal(mdm)	0.0001229 (0.000079) *	0.0000354(0.0000804)
Female literacy(fl)	0.0010206 (0.000278) ***	
School Development Grant(sdg)	0.0004746(0.0001467) ***	0.0004668(0.0001426) ***
Teaching Learning Material Grant(tlm)	0.0004069(0.0001207) ***	0.0003773(0.0001174) ***
People teacher Ratio(ptr)	-0.0019243(0.0002636) ***	-0.001881(0.0002565) ***
Female teacher(ft)	0.0014176(0.0004332) ***	0.0014683(0.0004195) ***
Overall literacy(ol)		0.0022044(0.0003542) ***
Constant	0.7052248(0.0241234) ***	0.6340596(0.0273738) ***
F Value	39.35***	45.10***

R^2 (Overall)	0.0346	0.0536
Hausman Test value	$\chi^2(7)$ =108.98***	$\chi^2(7)$ =52.40***

***=>significant at 1%, **=>significant at 5%, *=> significant at 10% level

5.4.1 Discussion:

All the school-related variables like the percent of female teachers in school, availability of girls' toilets, percent of schools that received school development grants and teaching learning material grants in the previous year and availability of mid-day meals have positively influenced GPI in primary education in the states of the Eastern zone of India. Besides that, the pupil-teacher ratio has negatively influenced GPI in the Eastern zone of India. This implies that the gender gap during the time of enrolment in primary education in the Eastern zone can be reduced further if we improve the school infrastructure facility, more recruitment of teachers mainly female teachers and overall literacy of the parents.

Table 5.3: Results of Panel Data Regression for Western Zone

West (the covered states are Gujarat, Madhya Pradesh, Maharashtra and Rajasthan)		
Dependent variable GPI		
Name of the Variable	Values of the Co-efficient and Standard Errors	
	Equation 1	Equation 2
Girls' toilet(gt)	0.0002479(0.0000609) ***	0.0002862(0.0000605) ***
Mid-day meal(mdm)	0.0001971(0.0000497) ***	0.0001672(0.0000492) ***
Female literacy(fl)	0.0000326(0.000305)	
School Development Grant (sdg)	0.0003185(0.0001378) ***	0.0003224(0.0001372) ***
Teaching Learning Material Grant (tlm)	0.0001724(0.0000873) **	0.0001817(0.0000871) **
People teacher Ratio (ptr)	-0.0023288(0.0002279) ***	-0.002333(0.0002265) ***
Female teacher (ft)	0.000078(0.000484)	0.0001551(0.0004846)

Overall literacy (ol)		0.0005452(0.0003992)
Constant	0.8326883(0.0240388) ***	0.8053771(0.02947) ***
F Value	32.65***	33.05***
R^2 (Overall)	0.1221	0.1332
Hausman Test value	$\chi^2(7)$ =49.18***	$\chi^2(7)$ =48.13***

***=>significant at 1%, **=>significant at 5%, *=> significant at 10% level

5.4.2. Discussion:

It is observed from the above table that better provision of girls' toilets, a larger percent of schools covered school development grants and teaching learning material grants in the previous year, and the availability of mid-day meals in rural public schools have positively influenced GPI in the rural primary schools of Western India. It is also observed that the pupil-teacher ratio has negatively influenced GPI during the time of enrolment in primary education in the rural areas of the Western zone of India.

Table 5.4: Results of Panel Data Regression for Southern Zone

South (The covered states are Andhra Pradesh, Kerala, Tamil Nadu and Karnataka)		
Dependent variable GPI		
Name of the Variable	Values of the Co-efficient and Standard Errors	
	Equation 1	Equation 2
Girls' toilet(gt)	0.0001094(0.0000764) *	-0.0000791(0.0000823)
Mid-day meal(mdm)	0.0001209(0.0000404) ***	0.0001216(0.0000405) **
Female literacy(fl)	.0001235(0.0003275)	
School Development Grant (sdg)	.00022(0.0001086) **	0.0002245(0.0001086) **
Teaching Learning Material Grant(tlm)	.0000403(0.0000353)	0.0000415(0.0000354)
People teacher Ratio(ptr)	-.0012497(0.0005241) ***	-0.001253(0.0005248) ***
Female teacher(ft)	.0009883(0.0005409) **	0.00091(0.0005402) *

Overall literacy(ol)		-0.0001158(0.0004832)
Constant	1.018459(0.0389356) ***	1.027458(0.0444659) ***
F Value	6.21***	6.19***
R^2 (Overall)	0.0023	0.0065
Hausman Test value	$\chi^2(7)$ =15.78***	$\chi^2(7)$ =21.40***

***=>significant at 1%, **=>significant at 5%, *=> significant at 10% level

5.4.3. Discussions:

It is observed that better provision of girl's toilets in school, a higher percent of the presence of female teachers, a higher percent of schools that received school development grants in the previous year, and availability of mid-day meals in school have positively influenced GPI in elementary education in rural primary schools of Southern India. It is also observed that the pupil-teacher ratio has negatively influenced GPI in the Southern zone of India. Next, we shall consider the rural primary schools in the Northern zone.

Table 5.5: Results of Panel Data Regression for Northern Zone with GPI as Dependent Variable

North Zone (Haryana, U.P, Punjab)		
Dependent variable GPI		
Name of the Variable	Values of the Co-efficient and Standard Errors	
	Equation 1	Equation 2
Girls' toilet(gt)	0.000183(0.0001302)	0.0002076(0.0001301)
Mid-day meal(mdm)	0.0001646(0.000605)	0.0001681(0.000612)
Female literacy(fl)	-0.0008412(0.00002974) **	
School Development Grant(sdg)	0.0001609(0.0001465)	0.0001634(0.000147)
Teaching Learning Material Grant(tlm)	0.0000873(0.0001129)	0.0000809(0.0001132)
Pupil teacher Ratio(ptr)	0.0005123(0.0003649)	0.0005697(0.0003666)
Female teacher(ft)	0.0003285(0.0005097)	0.0002953(0.000511)

Overall literacy(ol)		-0.0001681(0.0000612) *
Constant	0.9381854(0.0364911) ***	0.9527079(0.0403767) ***
F value	10.82***	10.45***
R^2 (Overall)	0.1012	0.0715
Hausman Test	49.53***	56.13***

***=>significant at 1%, **=>significant at 5%, *=> significant at 10% level

5.4.4. Discussions:

All the school-related variables chosen for our study failed to influence the Gender Parity Index during the time of enrolment in rural primary schools of the Northern Zone. In our first model, female literacy creates a negative impact on GPI in the rural states of the Northern zone of India. In our second model, the overall literacy of the parents also plays a negative role in improving GPI in primary education in Northern India. We will now try to investigate the causes behind this result.

UNESCO has defined a GPI value between 0.97 and 1.03 as the achievement of gender parity during the time of enrolment. Rural primary schools in all the zones of India except the Northern zone have almost achieved the target. But the picture is quite different in the rural primary schools of the Northern zone. It is found that the value of GPI in many rural districts mainly of Haryana and U.P is very low (low as 0.7). This implies that gender discrimination is predominant in these states during the time of enrolment in primary education. This is consistent with the finding of Husain's observation (2011) which shows that Northern Indian women face greater discrimination than women in other zones of India concerning completion of school education. Gender disparity is also not uniform across regions[20].

Our results have shown that female literacy hurts the participation of girls in the Northern zone. This might be because women have less or no power in decision-making in these regions and they are mostly confined in household chores. Female literacy is a subset of overall literacy and due to the negative effect of female literacy on the GPI of Northern areas; overall literacy might also have a negative impact. GPI is low in these regions which portrays that girls are neglected in the

[20]The value of standard deviation among the values of GPI of the 5 zone is highest for the Northern zone and lowest in the Southern zone in all the time point in our consideration as shown in the summary statistics (appendix).

Northern zone of India during the time of enrolment in primary school. The fluctuation in the value of GPI (as measured by standard deviation) is also high in the Northern zone compared to other zones in all the five-timepoints in our study. This might be a reason why the exogenous school-related factors taken in our study fail to influence GPI in Northern Zone.

The 2008 EFA Global Monitoring Report (GMR) uses the Net Enrolment rate (NER) as the critical indicator in "a systematic assessment of progress toward EFA since Dakar" (UNESCO 2007). This study is done based on secondary data and due to the unavailability of data on Net Enrolment Ratio, we will take Gross Enrolment Ratio (GER), and check the effect of the independent factors taken in our study on GER through panel data regression model for Northern zone. If we look at GER, we find an interesting result in the Northern Zone.

Table 5.6: Results of Panel Data Regression for Northern Zone with GER as Dependent Variable

North (Haryana, U.P, Punjab)		
Dependent variable GER (in place of GPI)		
Name of the Variable	Values of the Co-efficient and Standard Errors	
	Equation 1	Equation 2
Girls' toilet(gt)	0.0688789(0.0630567)	.064338(.0628313)
Mid-day meal(mdm)	.2057637(0.0293109) ***	0.2061564(.0295277) ***
Female literacy(fl)	-.3215401(0.1439688) *	
School Development Grant(sdg)	.0199943(.0709253)	.0205052(.0709848)
Teaching Learning Material Grant(tlm)	.0751619(.0546389) *	.076351(.054665) *
People teacher Ratio(ptr)	-.7113988(.1766797) ***	-.719094(.1770309) ***
Female teacher(ft)	-.1062256(.246776)	-.1153704(.2467462)
Overall literacy(ol)		.03744045(.1772969)
Constant	79.36057(17.66742) ***	86.95306(19.49644) ***
F Value	9.86***	9.77***

R^2 (Overall)	0.2441	0.2428
Hausman Test value	$\chi^2(7)$ =17.69***	$\chi^2(7)$ = 17.37***

***=>significant at 1%, **=>significant at 5%, *=> significant at 10% level

5.4.5. Discussions:

Overall enrolment is increasing with time which may result in boys being much more enrolled than girls in rural primary schools. Availability of mid-day meals and teaching learning material grants received in the previous year have positively affected the GER and the pupil-teacher ratio has negatively influenced GER in the Northern zone. As boys are more enrolled which also increases the GER, this might be why female literacy hurts GPI in rural primary schools in the Northern zone of India.

5.6 Conclusion and Policy Prescriptions:

It is observed that in the rural districts of the selected major states of India, under the Southern, Western and Eastern zones, GPI lies within 0.97 to 1.03. This indicates the achievement of Gender parity as mentioned by UNESCO during the time of school enrolment in primary school in rural India, but the situation is not encouraging in the rural districts of the Northern zone though the overall enrolment in primary education in that zone is satisfactory. Thus, girls are not deprived during the time of enrolment in primary education in most of the zones except the Northern zones of India. There are a large number of socio-economic factors which influence a parent during the time of deciding enrolment of their girl child in primary education. Here we mainly consider the factors related to school infrastructure. In countries with gender enrolment gaps, there should be a preference towards hiring more female teachers as there is a correlation between the number of female teachers and girls' enrolment (UNICEF 2000, Watkins 2000). This is consistent with our findings. In the Eastern and Southern zones of India, we have found that a higher percent of female teachers out of total teachers has a strong positive impact on girls' enrolment rates in rural-dominated districts in primary education. Female teachers act as role models for girl children and girls are more comfortable with teachers of the same gender. Parents in mainly rural-dominated districts think that the presence of female teachers may ensure the protection of girls from unwanted attention from boys or male teachers and even from sexual exploitation and abuse. According to the guidelines of SSA norms, the female-teacher ratio must be 50% in primary school but most of the primary schools failed to maintain this guideline (Evaluation report on SSA, May

2012). The government needs to take steps to increase the recruitment of female teachers as these may bridge the gender gap in formal school participation mainly in the rural-dominated district. A low pupil-teacher ratio enables more attention from the teacher to individual students. It is also found in our study that the pupil-teacher ratio hurts girls' enrolment in primary schools in mainly rural-dominated districts of India. In the Eastern, Western and Southern zones, we have found a negative impact of the Pupil-teacher ratio on GPI. In the Northern zone, we have found a negative relation between PTR and Gross Enrolment Ratio. More recruitment of teachers' mainly female teachers can improve GPI in primary education during the time of enrolment in rural primary schools of India. Mid-day meal scheme was launched to maintain the nutritional status of students as healthy students are more attentive in school. This scheme encourages parents to send their children to school. We have found that this scheme has a positive impact on girls' enrolment in primary school in most parts of India. In the Eastern, Western and Southern zones, we have found a strong positive impact of the Mid-day meal scheme on GPI and in the Northern zone we have found a positive relation between the Mid-day meal scheme and the Gross Enrolment Ratio. It is found that school development grant and teaching learning material grant sanctioned by the government plays a positive role in increasing girls' enrolment in primary school. In the Eastern, Western and Southern zone, school development grant has a positive impact on GPI and in the Eastern and Western zone teaching learning material grant has a positive impact on GPI. Besides that, 'teaching learning material grant' has a positive impact on the gross enrolment ratio in rural public schools in the Northern zone. These grants also influence parents to send their children to primary school. Separate toilet facilities designed for girls' children are important for the proper sanitation of girl children. Parents also prefer to send their daughters to school with separate sanitation facilities for them. It is also seen that provision of girls 'toilets in rural public schools positively influences the GPI values in rural districts of the Southern, Eastern and Western zone of India. Female literacy which is considered a proxy variable of mothers' education in our study has a positive impact on girls' participation in primary education. In the Eastern zone, female literacy has positively influenced GPI. But in the Northern zone where women face the maximum discrimination in comparison to other areas and do not have any power in decision making has resulted in the negative influence of female literacy on GPI. Educated women cannot be easily dominated and will not let their daughter get discriminated against as she knows the importance of education. Dreze and Kingdon (2001) have shown that maternal education has a large positive

effect on a daughter's chances of completing primary education and a boy's schooling is found to be more responsive to a father's education. So, for a better and more progressive nation government need to take steps to educate the parents mainly the mothers of the child so that the nation will be free from patriarchal dominance and which will open the mind and changes the notion of the parents on their girls which will ensure proper development of the nation in a meaningful way.

This chapter tries to investigate the possible factors mainly school-related and socio-economic factors which are playing a positive role to place the value of GPI at a targeted level in major parts of rural India. The next chapter will try to identify the household and school-related factors that influence a parent when deciding to enrol their child in a private primary school in rural India and also quantify the contribution of each factor in explaining gender discrimination during the time of enrolment in private primary schools in rural India using Fairlie's Decomposition technique.

CHAPTER 6

GENDER DISCRIMINATION IN ENROLMENT IN PRIVATE PRIMARY SCHOOLS IN RURAL INDIA: A FAIRLIE'S DECOMPOSITION ANALYSIS

Gender Discrimination in Enrolment in Private Primary Schools in Rural India: A Fairlie's Decomposition Analysis

6.1 Introduction:

In the previous chapter it is observed that over the years, the coverage of government grants among the primary schools in rural people-dominated districts has increased, inequality in the distribution of grants has reduced and the grants have percolated down to most of the schools in rural India. Despite of this it also found that there exists a fascination of the rural parents to send their children to private primary schools during the time of their enrolment. Education always plays an important role in designing the socio-economic development of an economy. Parents always want to ensure the best possible educational environment for their children. Primary education is the base of higher education and achieving better quality basic education would strengthen the pillar of higher education and further enables skill development and better job market options and outcome. Based on the school management system, three different types of primary schools are available in India: (i) Government schools (referred to as public schools), (ii) Private-aided schools (quasi-government in nature) and (iii) Private-unaided schools (also referred to as private schools). The government schools are owned, funded and managed by Central, State or Local governments. The private-aided school are quasi-government in nature as these schools follows the rules and regulation laid down by the government and are owned and managed by private institution but are partially or fully funded by the government. The private-unaided schools on the other hand are owned and managed by private organizations but receive no grants or aid from the government. These are self-financed and generate revenue through student fees; donations etc. but may sometimes receive government subsidies in the form of tax concession or reduced tariffs. Besides these three broad types of institutions, a few 'unrecognized' primary schools do not follow basic government regulations. This study classified primary schools as public schools and private-unaided schools. Prior studies suggest that with time, parents are fascinated to enrol their children in private primary schools even in rural areas of India. (Maitra, Pal & Sharma, 2011; Muralidharan, 2013; Biswas & Kundu, 2022). Several kinds of literature have also shown that parent prefers to send their son to private school but their daughter to public school. (Kingdon, 2007; Muralidharan, 2013). Indeed, the gender gap during the time of enrolment in primary education has decreased over time (Kingdon, 2007). But still, it is a perennial problem for a developing country like India.

The Present situation in India:

Parental choice of sending their children to public or private school is a growing concern worldwide. In developing countries, prior research portrays that parents prefer to enrol their children in private schools due to various perceptions like the medium of instruction, a better quality of education, infrastructural development etc. (Kingdon, 1996; Alderman, Orazem, & Paterno, 2001; Tooley & Dixon, 2003). In India particularly after the post-1990s, there has been a massive expansion of private schools even in rural areas (Biswas & Kundu, 2022). The share of private schools has increased from 19.49% to 25.24% and enrolment in private schools has raised from 19.30% to 45% during 2007-08 to 2016-17 (U-DISE, 2008,2018). Enrolment in private schools at the elementary level has increased at a higher pace since 2013-14 and the rate of total private school enrolment and Percentage share of private schools among all schools have been consistently increasing since 2013-14. This is witnessed in all the states of India (ASER Report, 2020). From the sector-wise comparison drawn from Table A1[21], it is seen that in urban areas children studying in private unaided schools are higher in comparison to children living in rural areas. On the other hand, in rural areas, children studying in public schools are higher in comparison to children living in urban areas. Table A2[22], portrays a gap in private primary school enrolment based on gender in India. It is found that enrolment of girl child is higher in public schools compared to a boy. On the other hand, enrolment of the son is higher than daughter in private primary school. This gap in enrolment is even wider in rural areas compared to urban areas. Rural private school enrolment has increased from 4 % in 1993 to 26.6 % in 2017-18. Though enrolment in private-unaided primary schools has increased from 9.2% in 1993 to 34.8% in 2017 enrolment in private-aided schools was reduced from 22% in 1993 to 11.5% in 2017(U-DISE,2018). The expansion of the private-unaided schools is mainly demand-driven and if the private organization finds it profitable then only, they will invest in this sector. Thus, with time the expansion of private-unaided school indicates that household has a fascination with private primary schools over public schools.80% of primary schools in India are located in rural areas and

[21] Provided in the appendix

[22] Provided in the appendix

71% of enrolment in the country is concentrated in rural locations. (Central Square Foundation Report, 2021)

6.2 Survey of Literature:

Most of the existing literature on a consensus supports that private schools or private-unaided fee-charging schools are more efficient than public schools. (Bedi & Garg, 2000; Kingdon, 2007; Goyal & Pandey, 2009; Wadhwa, 2009; Tooley, 2010). On the other hand, few works of literature portray the picture of discrimination in the choice of school based on gender. (Muralidharan, 2013) (Maitra, Pal & Sharma,2016). It is widely discussed in various pieces of literature regarding the existence of gender bias towards one in the intra-household allocation of resources in Indian society. (Dreze & Kingdon, 2001; Tilak, 2002; Pal, 2004; Muralidharan & Kremer ,2006; Muralidharan, 2013). Kingdon (2005) pointed out two main ways by which gender discrimination against girls in education expenditure is happening :(i) through zero spending on education for daughters and positive spending on sons and (ii) positive education expenditure for both genders but lower expenditure on girls compared to their boy's counterpart. Sons received preferential feeding in comparison to daughters and this bias is even more prominent in rural areas compared to urban areas. (Muralidharan & Sheth, 2013)The parent prefers to enrol his son on private schools even at the primary level to get a better education and their daughter in public primary schools. (Muralidharan, 2013; Kingdon & Pal, 2014). Among the age group of 6 to 8 years, 47.9% of boys were admitted to private schools against 39% of girls (Report, ASER (2019). Literature identifying the household and school-related factors responsible for this gender gap in enrolment is not properly available in the Indian rural context. This present study aims to identify the major household and school-related factors that influence parents 'decisions on the choice of schooling during the time of enrolment of their children in primary school in rural India**.** The contribution of each factor responsible for the gender gap at the time of enrolment in private primary schools will also be calculated and a few policies are suggested that can check this gender discrimination during the time of enrolment in private primary schools.

6.3 Research Objectives:

Factors responsible for the gender disparity that shapes parental aspiration and choice of schooling in the Indian rural context remain poorly explored and not properly analyzed in the empirical literature. This chapter will try to bridge this gap in the literature by identifying those factors responsible for the discriminatory treatment by parents based on gender and also quantifying the contribution of those factors in explaining gender discrimination during the time of enrolment in private primary schools in rural Indian scenarios. We have considered only rural India for our study as a large section of the Indian population resides in rural areas and the majority of the people in rural areas are engaged in informal employment.

- Initially, this study will try to identify the household and school-related factors that influence a parent when deciding to enrol their child in a private primary school in rural India.
- Next, it is required to quantify the contribution of each factor in explaining gender discrimination during the time of enrolment in private primary schools in rural India. Fairlie Decomposition technique will be used to understand the relative contribution of different covariates to the gender gap during the time of enrolment in private primary school

6.4 Data and Methods:

Data Source:

We have used the NSSO 75th round dataset of Household Social Consumption on Education to address the above-mentioned research problems. NSSO 75th Round unit level dataset covers a total of 14,285 FSU (8097 villages in rural areas and 6188 Urban Frame Survey Blocks in urban areas) consisting of 1,13,757 households (64519 rural households and 49238 urban households) and enumerating 5,13,366 persons (3,05,904 rural person and 2,07,462 urban person).In this survey, the total number of people surveyed was 267887 males (1,59,411 males in rural areas & 1,08,476 males in urban areas) and 245479 females (1,46493 females in rural areas & 98986 females in urban areas). From this dataset, we have considered a sample comprising children between the age group of 6-10 years.[23] From that sorted sample, children enrolled in rural primary schools are

[23] Mainly between this age group (6-10years) children's studies in primary school in rural India.

extracted for this study. Here total sample comprises 36,821 children out of which 20,331 children are boys (nearly 55%) and 16490 children are girls (nearly 45%)[24]. This survey covered both quantitative (expenditure incurred on the education of the household members by its household itself and other household or by any institution/organization other than the government) and qualitative aspects (educational level attained, type and nature of the institution, current attendance or enrolment rate etc.) related to the educational attainment of the household members. As private-aided schools are mostly or fully funded by the government or charities, we have considered private-aided schools as public schools for this study.[25]

This study will also try to identify the factors that can explain the gender discrimination done by parents during the time of enrolment of their children in private primary school.

Methodology:

First, the household and school-related factors will be identified which play important roles when parents decide whether to enrol their children in a private primary school in rural India. To do that logit model will be applied. Next, it is required to quantify the contribution of each factor identified in explaining the gender discrimination which is observed during the time of enrolment in private primary schools in rural India. Identification of the factors becomes very important because the Government of India has implemented various new policies that provide various financial support, concessions etc. to bridge the gender gap in education. The Blinder-Oaxaca decomposition technique is the most widely used method to identify and quantify the contributions of differences in measurable characteristics to group differences in the outcome variable. However, this technique provides misleading inconsistent estimates when the dependent variable of interest is binary in nature and the group differences cannot be explained by an influential explanatory variable. The solution to this problem is a simulation algorithm to address non-linear decomposition first developed by economist Robert W. Fairlie in 1999 (Fairlie, 2006). The

[24] From the sorted sample we have dropped the transgender sample for our study as there are only 4 transgender children (less than 1%) in our sample.

[25] So broadly our sorted sample comprises of two types of school public schools and private schools.

decomposition method developed by Fairlie is considered here because in this study the dependent variable 'enrolment in private primary schools in rural India' is binary in nature.

Factors Influencing Enrolment Decisions in Private Primary Schools in Rural India:

Initially, it is required to identify the factors that influence a parent during the time of deciding the type of school for their child during the time of enrolment in primary school. To do that Logit regression technique will be applied where the outcome variable is binary in nature. It takes the value '1' if the child is enrolled on a private primary school and '0' if the child is enrolled on a public primary school. The possible influencing factors will be narrated below:

1. Log income ($lninc_{ij}$): Here monthly consumer expenditure (Rs) is considered a proxy for the household's total monthly income. In a patriarchal society, the income of a household possibly plays an important role during the time of deciding on the type of primary school at the time of their children's enrolment. The income of the household is an important determinant of the prevalence of gender disparity in rural India. (Alcott & Rose, 2017).
2. Gender ($Gender_{ij}$): Through this variable, it is required to investigate whether there exists any gender preference among parents during the type of enrolment in private primary school. This dummy variable is assigned a value '1' if the i^{th} child surveyed from the j^{th} household is a girl child and '0' otherwise.
3. Ownership of Computer (Com_{ij}): There is a positive association between household computer ownership and the educational outcome of children. (Schmitt & Wadsworth, 2006; Djinovic & Giannakopoulos, 2022). Various literature supports that the educational level of parents has a positive association with the academic achievement of the children. (Parsasirat, *et. al*., 2013; Li & Qiu, 2018). Thus, indirectly there is a positive association between household ownership of computers and the educational level of the parents. (Cheah & Mei, 2013) Using binary logit regression analysis proved that better education among the household members and better income level of the household are the two main determinants of the ownership of a computer. So here, owning a computer is considered a proxy for the parental education level.[26] Ownership of a computer can also be used as a

[26] Data is extracted on the basis of age group between 6 to 10 years. So, we failed to incorporate parental education in this study.

proxy for the economic solvency of the household to which he/she belongs. The value of it is assigned '1' if the i^{th} child surveyed from the j^{th} household has ownership of a computer and '0' otherwise

4. Occupation ($Occu_{ij}$): The occupation of the household plays a major role in making decisions regarding their children enrolling in private school. The occupations of the sample rural households were divided in two categories: (i) regular salaried workers in the agricultural and non-agricultural sectors and (ii) casual workers in the agricultural and non-agricultural sectors. 'Occupation' is also treated as a dummy variable and will take the value 1 in the main earning member of the sample rural household is a casual worker and 0 for the regular salaried worker.
5. Social/Caste Groups ($Caste_{ij}$): The Caste/Social group of the household is an important decision-making factor in this analysis. Inthe NSSO data set, the caste of an individual is classified as Scheduled Castes (SC) or Scheduled Tribes (ST),) or Other Backward Castes (OBC) or General Castes. For this study we have classified them into two groups: (i) households belonging to SC and ST castes are clubbed under one group called 'backward caste' (BC) and households belonging to other backward castes and general castes are clubbed under another group called 'forward caste' (FC). Here the value of 'Caste' will be considered '1'if the sample household belongs to the backward class and '0' if the household belongs to the forward class.
6. Household Size ($hhsize_{ij}$): Distribution among the household members in terms of age is not given. So, it is not possible to calculate the household size on the adult equivalence scale. So total household members of a particular rural household represents the household size. According to Murlidharan (2013), if household size rises, parents prefer to send their girl child to public school, and their son to private primary school. (Kingdon, 2007; Muralidharan, 2013). So, this variable is considered here to check this proposition.
7. Religion ($Religion_{ij}$): The majority of Indian household belongs to the Hindu community (79.8%) followed by the Muslim Community (14.23%), Christian Community (2.30%) & other communities (3.67%). In our study, we have classified religion into two groups: (i) households belonging to the Hindu religion i.e., the dominant religious practice of the majority of the population and (ii) households belonging to other religious groups excluding the Hindu community for the fairlie decomposition Analysis. Here the value of

'Religion' will be considered as '1' if the sample household belongs to the Hindu community and '0' if the household belongs to the Muslim or Christian community. We have incorporated the three main religious practices followed by Indian households which are Hindu, Muslim and Christian[27]. Households belonging to minority groups prefer to send their children to school where their children get access to their religious practices and strengthen their religious base along with education (Zada, 2006). Among Muslim children aged 7-19 years, the proportion of Muslim children mainly boys studying in madrasas is higher in rural areas (NCAER, 2018-19). But on average only 2.3 % of Muslims in the primary school age group are enrolled in madrassas (NCERT, 2018-19). However, most of the Christian people in rural India belong to the lower strata of society. (NCPCR Report, 2016) Christian missionary schools are mainly funded by Christian missionaries and the medium of instruction is mainly English in these schools. In missionary schools, there are also special reservations for children belonging to the Christian community so rural households belonging to the Christian community mainly enrolled their children in aided Christian schools (NSS Report, 2017-2018). It is expected that the religion of the household may play an important role in the choice of schooling for their children.

The school-specific factors influencing the choice of schooling are narrated below:

1. Distance of nearby primary school ($dist_{ij}$): Distance was assigned a value of '1' if the distance to the nearest primary school is less than three km and '0' if the distance to the nearest primary school is more than or equal to three km. Distance to school may play a major role in the choice of schooling in rural India as many places of rural India still lack transport connectivity and road availability to school. Considering societal problems, this distance to school from a house may strongly influence parents when choosing a school for their child.
2. Medium of Instruction in School ($Medium_{ij}$): The Medium of instruction in school can play a major role in deciding on the choice of schooling for the child (Kumar & Choudhury, 2021). The medium of instruction was assigned a value of '1' if the medium

[27] According to (Report, Census, 2011) data, household belonging to Hindu, Muslim and Christian community constitutes 96.33 % of Indian total household.

of instruction in the school in which the child enrolled is English and '0' if the medium of instruction in school is Hindi or another local regional language.

Logistic Regression to examine Parental choice of Schooling:

The following Logit regression equation is considered to address the first research problem.

$$Y_{ij} = \alpha + \beta_0 gender_{ij} + \beta_1 lninc_{ij} + \beta_2 dist_{ij} + \beta_3 com_{ij} + \beta_4 occu_{ij} + \beta_5 med_{ij} + \beta_6 hhsize_{ij} + \beta_7 caste_{ij} + \beta_8 religion^{28}_{ij} + \in_{ij} \text{ …….. (Eq. 1)}$$

Here, Yij =1 if the i^{th} child from the j^{th} household is enrolled on a private primary school

=0 if the i^{th} child from the j^{th} household is enrolled on a public primary school

All the independent covariates were tested for possible multicollinearity through the VIF test before putting them in the regression model[29]. The results of the Logit model mentioned in Eq.1 are presented in Table 6.1.

Table 6.1: Logit Regressions for Probability of Child enrolled in Private School

Explanatory Variables	Coefficient (Standard Error)	Marginal Effect
Gender (gender)	-0.1716*** (0.0317)	-0.0187***
Log of Income (lninc)	0.7212*** (0.0386)	0.0789***
Ownership of Computer (com)	0.5359*** (0.0635)	0.0701***
Distance(dist)	0.5485*** (0.1328)	0.0491***

[28] For the logistic regression we have divided religion into three groups Hindu, Muslim and Christian. The 'Other' religion group is not considered for our study, so Interactive Dummy cannot be considered in this study.

[29] We find the absence of collinearity among the explanatory variables.

Occupation (occu)	-0.6834*** (0.0434)	-0.0672***
Medium(medium)	2.235*** (0.0364)	0.3669***
Caste(caste)	-0.1195*** (.0388)	-0.0134**
Household Size (hhsize)	-0.0182** (0.0064)	-0.0020**
Hindu	1.2418*** (0.0741)	0.1118***
Muslim	0.8126*** (0.0823)	0.1099***
Christian	-0.4367*** (0.0864)	-0.0416***
Constant	-10.028*** (0.3767)	
No of Observation	36825	
Pseudo R^2	0.1995***	

Note: ***p<0.01, **p<0.05 & *p<0.10

A discussion of the results is mentioned in Table 6.1.

Logistic regression is applied to identify the possible factors which influence the parent's aspiration during the time of enrolment of their children in private primary schools in rural India. Table 6.1 indicates that comparatively economically affluent rural households prefer to send their

child to private schools. The increased economic well-being of a family tends to increase their livelihood and choose a private primary school for their children's education. The ownership of a computer in a household not only acts as a proxy of household wealth but also a certain education level of the household thus inducing parents to enrol their children on private school. The medium of instruction in school is an important determinant for the household to enrol their child in private school and the result depicts the same picture. Parents prefer to send their children to private schools because the medium of instruction in private schools is English. This finding is similar to many other scholars who also claim that the use of English as the medium of instruction is the main reason for a rural household to enrol its child in private schools. (Muralidharan & Kremer, 2006) (Tooley & Dixon, 2003) (Endow, 2018)). Households belonging to a backward caste, [30]prefer to enrol their children in rural public primary schools. It is found that household belonging to the Christian community has a negative association with enrolling their children on private school. From the NSSO 75th Round unit level data set it is found that among the total 2977(8%) households belonging to the Christian community, most of the children are enrolled in the private-aided school, followed by public school and private school. Here, as private-aided schools are considered public schools, we observe a negative value of the coefficient. According to the NCPCR Report, (2016) among the total minority group, the Christian community comprises 11.54% of the total minority population but there is 71.96% of Christian missionary schools among the total minority schools. On the other hand, as per our result, households belonging to Hindu and Muslim communities have a fascination towards enrolment in private schools over public schools. Households with regular salaries engaged in agricultural and non-agricultural activities prefer to send their child to private schools but household members engaged in casual labour in agricultural and non-agricultural activities have to send their children to public schools primarily due to financial constraints. Our result also portrays that 'English' as the medium of instruction in primary school is the largest possible decision-making factor influencing parents to enrol their children in private primary school as reflected in the marginal coefficient. The sons receive preferential feeding compared to girls during the time of enrolment. According to Dixon & Humble, (2017) probably as parents, preference for girls is a safe environment and they likely want to admit their daughter to public primary school. But this is not the only cause behind gender discrimination

[30] Backward caste means household belonging to Scheduled Caste and Scheduled tribe.

during the time of admission in private primary schools in rural India which is patriarchal in nature. The other reasons will be discussed next.

The household belonging to the 'Hindu' or 'Muslim 'religion is the second and third most important factor influencing parents towards private school enrolment for their children. Similarly, the income of the household and ownership of the computer which denotes the economic solvency of the household is the fourth important factor guiding parents to enrol their children on private schools.

According to NSSO, 75thRound unit level data apart from these factors considered in our logit model, there are some other factors mentioned in Table 6.2 that are responsible for the fascination of parents towards private school enrolment. We failed to incorporate these factors in our logit model (in Eq.1) as these reasons are for attending private school reported in the dataset by surveying only those children who are already enrolled in private primary school.[31]

Table 6.2: Perception of the parents for enrolment in private primary school.

Reasons For Attending Private Institution	Percentage
Located Nearby	12.65
Tried in government institution but could not get admission	1.25
Social reasons (like children of colleagues/neighbour/relatives, etc. also attend this school	10.25
Private coaching not required	3.90
Due to the availability of specific facilities	18.57
Less burden of homework	0.31
The Quality of education in nearby government schools is not satisfactory	50.53
Other causes	2.54

[31] As in the logit model we need a sample of children studying in private schools as well as a public school, but here the reasons are provided for those children who are already enrolled in private schools so these factors cannot be incorporated into our logit model.

Total	100

Source-Author's Calculation from National Sample Survey (NSS) Report, 75th Round, 2017-18

There is no overlapping case among the reasons. The main cited reasons behind the fascination of parents in enrolment of their children in private primary schools in rural India are 'quality of education in nearby government school is not satisfactory' and 'availability of specific facilities in private primary schools' which indicates better infrastructure of the schools. Biswas & Kundu, (2022) through framing School Grant Coverage Index (supply-related grants provided to the public schools by the government under one head or index) had shown that all types of government grants have percolated down to most of the public primary schools in all parts of rural India. Still, that fails to gain confidence among rural parents and an inclination is observed among themselves to private primary schools during the time of their children's admission. As the responses mentioned in Table 6.2 come from households who have already enrolled their children in private primary schools, those cannot be incorporated into the logit model mentioned in Eq.1.

According to the Annual Status of Education Report (ASER(Rural) Report, 2014) among the age group of 6-14 years nearly 29 % of enrolments are now in private schools. Rural primary private school enrolment shows a discriminatory trend. Girls' enrolment is higher than boys' enrolment in public school but this pattern gets reversed in private un-aided school enrolment (NSS, 75th Round). Research suggests that gender discrimination in private school enrolment is increasing over time in rural areas in elementary education attainment. (Mehrotra & Panchamukhi, 2006; Harma & Rose, 2012; Woodhead, Frost, & James, 2013). Now, Fairlie decomposition analysis will be used to quantify the contribution of the explanatory factors to gender discrimination in rural India during the time of admitting children to private primary schools.

6.5 Fairlie's Decomposition Analysis

Fairlie's Decomposition Analysis to quantify the contribution of the explanatory factors influencing the decision of gender discrimination among rural parents during the time enrolling their children on private primary school:

According to the Standard Blinder-Oaxaca decomposition, the gender gap in the average value of the dependent variable, Y, (here enrolment in a private school) can be expressed as:

$\bar{Y}^{M} - \bar{Y}^{F} = [(\bar{X}^{M} - \bar{X}^{F})\hat{\beta}^{M}] + [\bar{X}^{F}(\hat{\beta}^{M} - \hat{\beta}^{F})]$ …… Eq.2

Where $\bar{X}^{j}$ is a row vector of the average value of the independent covariates and $\hat{\beta}^{J}$ is a vector of coefficient estimates for gender j (j = M, F).

Following Fairlie (1999) the decomposition for a non-linear equation, $Y = (X\hat{\beta})$ can be written as

$$\bar{Y}^{M} - \bar{Y}^{F} = \left(\sum_{i=1}^{N^M} \frac{F(X_i^M \hat{\beta}^M)}{N^M} - \sum_{i=1}^{N^F} \frac{F(X_i^F \hat{\beta}^M)}{N^F}\right) + \left(\sum_{i=1}^{N^F} \frac{F(X_i^F \hat{\beta}^M)}{N^F} - \sum_{i=1}^{N^F} \frac{F(X_i^F \hat{\beta}^F)}{N^F}\right) \text{…….Eq. 3}$$

Here 'F' stands for girls and 'M' stands for boys and 'N' stands for sample size. In this case, the coefficient estimates $\hat{\beta}^{M}$ for boys are used as weights for the first term in the decomposition and the girls' distribution of the independent covariates $\bar{X}^{F}$ are used as weights for the second term. The alternative expression for the decomposition is used because:

$\bar{Y}$ does not necessarily equal F $(X\hat{\beta})$. An equally valid expression for the decomposition is:

$$\bar{Y}^{M} - \bar{Y}^{F} = \left(\sum_{i=1}^{N^M} \frac{F(X_i^M \hat{\beta}^F)}{N^M} - \sum_{i=1}^{N^F} \frac{F(X_i^F \hat{\beta}^F)}{N^F}\right) + \left(\sum_{i=1}^{N^M} \frac{F(X_i^M \hat{\beta}^M)}{N^M} - \sum_{i=1}^{N^M} \frac{F(X_i^M \hat{\beta}^F)}{N^M}\right) \text{…….Eq. 4}$$

In this case, the girl's coefficient estimates $\hat{\beta}^{F}$ are used as weights for the first term in the decomposition and the boys' distribution of the independent covariates $\bar{X}^{M}$ are used as weights for the second term.

We define $\bar{Y}$j as the average probability of the binary outcome of interest for gender j and F as the cumulative distribution function from the logistic distribution.

The first term of Eq.3 and Eq. 4 provides an estimate of the contribution of gender differences in the entire set of independent covariates to the gender gap in the dependent variable (due to group differences in the distribution of X). Estimation of the total contribution is relatively simple and we only need to calculate two sets of predicted probability by gender gap and take the difference bet ween the average values of the two. The second term represents the part due to the differences in the group processes determining the level of Y. It also captures the portion of the gender gap due to group differences in immeasurable or unobserved endowments.

Identifying the contribution of group differences in specific covariates to the gender gap is not as straightforward (Fairlie, 2005). For simplicity, we first assume that there exists a natural one-to-one matching of boys' and girls' observations. Using coefficient estimates from a logit

regression for a pooled sample β^{*}, the independent contribution of Xi to the gender gap can be expressed as:

$$\frac{1}{N^{M}}\sum_{i=1}^{N^{M}}(\hat{\alpha}^{*} + x_{1i}^{F}\hat{\beta}_{1}^{*} + x_{2i}^{F}\hat{\beta}_{2}^{*}) - F(\hat{\alpha}^{*} + x_{1i}^{M}\hat{\beta}_{1}^{*} + x_{2i}^{F}\hat{\beta}_{2}^{*}) \quad \text{..... Eq.5}$$

Similarly, the contribution of X_2 can be explained as:

$$\frac{1}{N^{M}}\sum_{i=1}^{N^{M}}(\hat{\alpha}^{*} + x_{1i}^{M}\hat{\beta}_{1}^{*} + x_{2i}^{F}\hat{\beta}_{2}^{*}) - F(\hat{\alpha}^{*} + x_{1i}^{M}\hat{\beta}_{1}^{*} + x_{2i}^{M}\hat{\beta}_{2}^{*}) \quad \text{..... Eq.6}$$

The contribution of each variable to the gap is thus equal to the change in the average predicted probability from replacing the girl's distribution with the boy's distribution of that variable while holding the distributions of other variables constant.

6.6 Results and Discussions:

The result of the decomposition analysis is given in Table 6.3.

Table 6.3: Fairlie's Decomposition of the gender discrimination in Probability of Child Enroled in Private Primary School

Explanatory Variables	Coefficient (Standard Error)
Income	-0.0059*** (0.0003)
Computer	-0.0004*** (0.00003)
Distance	0.00008*** (0.00002)
Occupation	-0.0006*** (0.0001)
English Medium	0.0016***

	(0.0004)
Household Size	0.0003** (0.0001)
Caste	0.0002*** (0.00005)
Religion	0.0098*** (0.0004)
No of observations	36821 (Male-20331, Female-16490)
Prob (Enrolment of Boys)	0.1811
Prob (Enrolment of Girls)	0.1572
Gender Gap	0.0239***

Note: ***p<0.01, **p<0.05 & *p<0.10

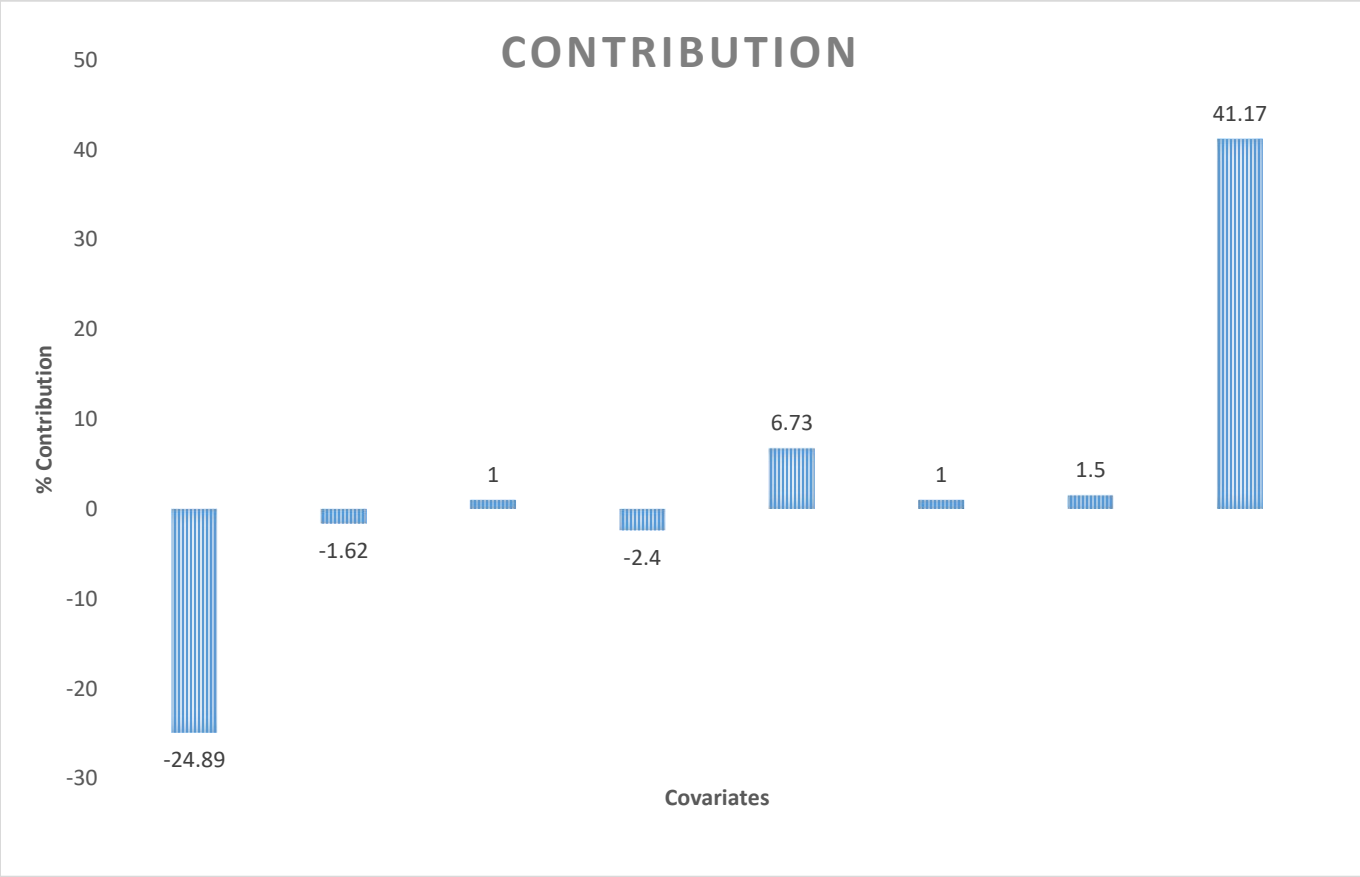
The probability of enrolling a son to a private primary school is 0.1811 and that for the daughter is 0. 1571. Thus there is a difference in the probability of enrolling children on private primary schools based on gender this result portrays the presence of son pro-bias in enrolling on private schools in Indian rural society. As household becomes economically affluent, the gender gap in enrolment decreases. Similarly, when any one member of the household has ownership of a computer it will also reduce the gap in enrolment based on gender[32].

Occupation of the household also reduces gender discrimination in enrolment to private schools as households engaged with regular/salary earnings in the agricultural and non-agricultural sectors

[32] Our sample only consists of children between 6-10 years enrolled in primary school so we cannot capture the education achievement of the parents or guardians of the children

are normally considered more educated compared to households engaged in casual labour. Discrimination based on gender is usually less in educated households compared to uneducated households which support the finding of Murlidharan, (2015). Religious practices in the household are an important covariate in widening gender discrimination in enrolment in private schools. Similarly, in a rural patriarchal society in India as, household size increases, there is a cut-down in education expenses for girl children whereas that is not the case for boys. Thus, as household size increases the gender gap in enrolment in primary schools also expands. Distance to the primary school from the household also widens the gender gap in enrolment as still in the 21st century girls are mainly enroled on nearby schools due to safety and other social issues but these social issues are less important when taking decisions on boys' enrolment. The medium of instruction in school is an important parameter when enrolling on a private school as it is normally believed that a child with better English vocabulary has a better future. In most of the rural private schools, the medium of instruction is English compared to rural public schools and considering a better future for the son parents enrol their boy child on private school and girl child on public schools. The medium of instruction widens the gap in enrolment to private schools based on gender. Social attributes like caste, religion and school-related factors like English medium school, the distance between the household and primary school and household size widen the gender gap and economic attributes like better income, occupation of the head of the household and ownership of computers can reduce the gender gap in enrolment in private primary schools in rural India.

Figure 6.1: Contribution of each covariate to the gender gap in the probability of a child enrolled in private school



Contributions by each component to total differential= $\left(\frac{\text{Numerical Value of the Component}}{\text{Total Difference}} * 100\right)$

Table 6.3 quantifies the contribution of each covariate to the gender gap in the probability of child enrolment in private schools. While the positive contribution of a covariate indicates that the particular covariate contributes to widening gender discrimination during the time of enrolment in private schools, the negative contribution of a covariate indicates diminishing the gap. The religious practice of the household exhibits the highest contribution (41.17%) explaining the gender gap in enrolment in private schools in rural India. Household income level contributes to 24.89 % in explaining the gender gap in enrolment in private primary schools in rural India. Medium of instruction in the primary school explains nearly 7% of the gap and occupation of the household explains 2.4 % of the gap in enrolment. Household size also exhibits a minor contribution of nearly 2% in explaining the gap in enrolment. The distance between the household and primary school also explains only 1% of the gender gap in enrolment, similarly the social

groups to which the household belongs also explain 1% of the gender gap in the outcome variable. Household with computer exhibits nearly 2% in explaining the gap in enrolment. Increasing the income of the household, a household with computer ownership and occupation of the household reduces the gap on the other hand religious practices by the household, household size, the social group to which the household belongs, the medium of instruction in school and the distance to the primary school widens the gender gap in enrolment to private primary school.

6.7 Conclusions and Policy Implications:

Parents even in rural areas prefer to send their children to private schools because the medium of instruction in most of the private schools is 'English'. Besides that, a good percentage of rural parents believe that the quality of education in the nearby public school is not satisfactory. This chapter delineates the fascination of parents to prefer private primary school over the public school at the time of enrolment of their children. The decomposition results highlight the presence of gender discrimination in the probability of enroling children on private primary schools and this result portrays the presence of son pro-bias in enrolling on private schools in Indian rural society. Social attributes like caste and religion widen the gender gap but economical attributes like income, occupation, and ownership of computers can reduce the gender gap in enrolment in private primary schools in rural India. On the other hand, school-related factors like the medium of instruction in primary school or the distance between the household and primary school widen the gender gap in enrolment in the outcome variable. The religious practice of the household exhibits the highest contribution in explaining gender discrimination during the time of enrolment in private primary schools in rural India. Better income of the household, computer ownership, and salaried occupation of the household reduce gender discrimination during the time of enrolment of their children in private primary school. On the other hand, religious practices by the household, household size, social group to which the household belongs, medium of instruction in school and the distance to the primary school widens the gender gap in enrolment in private primary school. Hence, the government should initiate English as the medium of instruction in public primary schools. This can reduce gender discrimination during the time of enrolment. The government can also introduce a national family planning policy like a maximum two children policy which can induce households to increase the per-child household expenditure on their child's education which might lead to a reduction in the gender gap in primary school enrolment in rural India. The

income of the households could be enhanced through different income support and income-generating programme which can also reduce gender discrimination. Setting up new primary schools in the different gram panchayat is necessary to reduce the distance from the household to the nearest school and the gender gap in enrolment in primary school. The patriarchal mindset which plays a decisive role in the enrolment of girls in private primary schools' vis-a-vis male children can be reshaped if those initiatives can be taken by the government.

Research Limitations:

This chapter is based on NSSO Unit Level data (75th Round) on Social Consumption of Education. Here our research objective is to identify the possible household-related factors and school-related factors which can influence the possibility of private primary school enrolment in rural India. Some factors are identified. But the lack of availability of data like parental education level, perception of parents etc. which can also influence the enrolment cannot be considered in this investigation though it has strong theoretical justifications.

6.8 Appendix:

Table A1: Percentage of Primary School Age Group (6-10yrs old) studying in schools in India:

Type of Institution	Rural	Urban	Total (Rural & Urban)
Government School	76.19	34.41	62.07
Private-Aided School	5.57	17.83	9.71
Private-Unaided School	18.12	47.41	28.01
Not Known	0.13	0.35	0.20

Source-Author's Calculation from National Sample Survey (NSS) Raw Data, 75th Round, 2017-18

Table A2: Percentage of students in primary school by type of institution in which they are currently attending

Type of Institution	Rural			Urban			Total (Rural & Urban)		
	Male	Female	Person	Male	Female	Person	Male	Female	Person
Government School	72	75.7	73.7	30.4	31.5	30.9	61.5	64.9	63

Private-Aided School	5.6	5	5.3	18	18.6	18.2	8.7	8.3	8.6
Private-Unaided School	22.3	19.2	20.9	51.2	49.7	50.5	29.6	26.6	28.3

Source-Author's Calculation from National Sample Survey (NSS) Report, 75thRound, 2017-18

CHAPTER 7

GENDER DISCRIMINATION IN EDUCATION EXPENDITURE IN PUBLIC PRIMARY SCHOOLS IN RURAL INDIA AMONG RELIGIOUS GROUPS: AN OAXACA-BLINDER DECOMPOSITION ANALYSIS

Gender Discrimination in Education Expenditure in Public Primary Schools in Rural India among Religious Groups: An Oaxaca-Blinder Decomposition Analysis.

7.1 Introduction

The within-household gender bias toward male household members is even more predominant in rural areas compared to its urban counterparts (Muralidharan & Sheth, 2016). Parents prefer to enrol their male children on fee-charging private schools to receive a better education, on the other hand, enrol their female children on fee-free public primary schools. (Muralidharan, 2013; Kingdon & Datta, 2019). The government has initiated various policies to bridge the gender gap in educational attainment like Ladli Scheme (Delhi Government), Balika Samraddhi Yojana (Gujrat), Kanyashree Prakalpa (West Bengal) and many others. Some policies are also launched to give assistance focusing on girls living below the poverty line like Bhagyalaxmi Scheme (Karnataka), Kanya Jagriti Jyoti Scheme (Punjab), Bangaru Thali (Andhra Pradesh) etc. But despite all these schemes, there is a gap in primary education attainment in rural India based on gender. (DISE, 2014). In the previous chapter, it is noticed that the religious practice of the household exhibits the highest contribution (41.17%) explaining the gender gap in enrolment in private schools in rural India. So, this chapter tries to capture the disparity in expenditure on primary education based on gender among the major religious groups (Hindu, Muslim & Christian) and within these religious groups in rural India. The gender gap in education expenditure for a certain demographic group is calculated using the Oaxaca-Blinder decomposition approach. Further, we tried to identify the various household-related factors that might influence the decision to spend on a child's education. Several works of literature portray the picture of within-household preferential feeding towards the male household members in the intra-household allocation of resources in Indian patriarchal society. (Subramanian & Deaton, 1991; Kingdon, 1998; Dreze & Kingdon, 1999; Tilak, 2002; Pal, 2004; Kambhampati, 2008; Lancaster *et al*, 2008; Zimmerman, 2012; Azam & Kingdon, 2013). The within-household gender bias toward male household members is even more predominant in rural areas than in urban areas (Muralidharan & Sheth, 2016).

7.2 Literature Review and Research Hypothesis-

India is the second largest populous country in the world comprising 1.4 billion population with inhabitants of various religions who live peacefully and practice their religion freely. The dominant religion strata of India's population are Hindu (81%) followed by Muslim (12.9%), Christian (2.4%), Sikh (1.9%), Buddhist (0.7%) and other religions. (Report, Census, 2011) Thus, the massive population is diverse as well as devout. Indian society is still the victim of dowry and child marriage and the figure is more depressing in rural areas (DLHS 4). Investing on girls' education is considered an additional monetary burden over dowry for poor families. Boys are thought to provide age-old support and provide bread-butter to the family and the benefits of the girl's education are reaped by her in-laws and not by the investing parents. Muslim families score lower on the dimension of woman autonomy (Morgan *et at.*, 2002). This restricted autonomy prevails in terms of taking household-related decisions like the choice of schooling for their children, expenditure on education and health etc. Jeejeebhoy and Sather (2001) pointed out the scenario of female-constrained autonomy and access to information across different religious groups in India. Existing literature has portrayed the picture of differentiated treatment based on gender bias in primary education expenditure in the Indian context (Zimmerman, 2012; Saha, 2013). Government Data also portrays that more boys are enrolled in private-unaided schools compared to girls and this gap is even more in rural areas (NSSO, 75^{th} Round Data). This study tries to verify the hypothesis that there exists unequal treatment with respect to gender in primary education expenditure in rural India within the various religious groups. Prior studies suggest that parents prefer to enrol their male child in private un-aided schools and enrol their female child in public schools. And this scenario is even denser in rural society (Murlidharan,2013; Kingdon & Pal, 2014; Kingdon & Datta, 2019; Biswas & Kundu, 2022). Thus, there is a difference in primary education expenditure based on gender, though with time this gender discrimination in education expenditure has reduced but it is still a perennial problem in patriarchal Indian society. (Kingdon, 2007). This chapter aims to study the magnitude of the gender gap in primary education expenditure in rural India among the various religious groups using the Oaxaca-Blinder decomposition model. Still, now there is a lack of proper work focusing on differentiated treatment based on gender among and within the major religious groups in primary school education expenditure focusing on rural India. This chapter will try to bridge this gap in the existing literature.

7.3 Data Source

India is a socio-economic diverse country with a majority of people (68.84%) living in rural areas. (Report, Census, 2011) and the pace of urbanization is still slow (Bhagat,2011). Rural workers mainly engaged in informal service without proper job security. The gender gap in educational achievement is higher in rural India in comparison to its urban counterparts (Kingdon, 2007). The main motive of our study is to capture the disparity in expenditure on primary education based on gender among the religious groups (Hindu, Muslim & Christian) in rural India. Data used in your study is based on the 75th-level National Sample Survey Office (NSSO) unit-level dataset of July 2017 to June 2018(one academic year). The survey covers 29 major Indian states and six Union territories. From the total dataset of 5,13,366 samples, we have taken only the rural sample of 3,05,904(59.59%) as your focus is on rural India. For this study, the sample is limited to children within the age group 6-10 years[33] (i.e., 39,014 samples) in rural India. Individuals within the age group of 6-10 years residing in rural India but not enrolled in primary school or studying above the primary level were also excluded from our sample study[34]. Our eligible sample consists of 5655 boys and 4723 girls (n=10,378) as the main focus of our study is limited to primary school level children of rural India.

7.4 Oaxaca-Blinder (1973) Decomposition Analysis-

The main objective of this chapter is to capture the disparity in expenditure on primary education based on gender across the religious groups (Hindu, Muslim & and Christian) in rural India. This objective cannot be estimated with the technique of interactive dummy as this differential could only be estimated through the statistical significance of specific coefficients of the interactive. The Blinder (1973) and Oaxaca (1973), decomposition analysis enables us to segregate the contribution of the explained factors (the difference between the average characteristics of the boys and girls) and the unexplained factors (differential treatment based on gender) in explaining the education expenditure gap in attaining basic primary education in rural India.

---

[33] Mainly between the age group of 6-10years children's studies in primary school.

[34] From our sample study we have dropped the transgender sample as they are less than 0.5 Percentage of our sample.

Two separate equations for the i^{th} boy and i^{th} girl belonging to z^{th} religious groups are given by

$Y_{Mz} = \alpha + x\beta_{Mz} + \varepsilon$……. (For Boys) (Equation 1)

$Y_{Fz} = \alpha + x\beta_{Fz} + \varepsilon$……. (For Girls) (Equation 2)

M and F are indexes of Boy and Girl respectively.

The regression equation in equation (1) and equation (2) is estimated separately for boys and girls for each z^{th} religious group.

Here Y, the dependent variable is the expenditure incurred by the household on primary education expenditure items. X is the vector of independent variables like Log Income, Household Size, and household Occupation and a dummy d1, with a value of 1 if the child is enrolled to public school and 0, otherwise and another dummy d2, with a value of 1 if a member of the household has ownership of computer and 0, otherwise. These household characteristics might influence the household's expenditure decision on their children's primary school attainment β's are the vectors of the coefficient. $\varepsilon(scalar)$is a random error term capturing unmeasured and immeasurable effects on the dependent variable i.e.log expenditure on education. The response vector is measured on an ordinal scale. x (matrix) contains the household-related variables that might influence the expenditure decisions of households on primary education. Thus, the explanatory variables considered in our model are: log (income), $[\log(\text{income})]^2$, household size, enrolment in public school, ownership of a computer, and occupation of the household.

We have Log Expenditure on Education as our outcome variable and we have considered three religious' groups (Hindu, Muslim, Christian). The parameter of Equation 1 and Equation 2 are estimated separately for boys and girls on the considered household characteristics.

The early model prior to 1973 considered the difference between intercepts of two regressions for measuring the discrimination between the groups but Oaxaca (1973) and Blinder (1973) consider the slope coefficient also as it also contains information regarding the discrimination. In this model, we have considered the expected differences method by Oaxaca and Blinder where the concept of the composite mean is used.

In general Oaxaca-Blinder approach can be used to study group differences in any continuous outcome variable.

Let $N = N^M + N^F$……. (Equation 3)

Here, N denotes the total number of observations and N^M denotes the number of male (boys) observations and N^F denotes the total number of female(girls) observations.

As the difference between the genders is statistically significant the decomposition is performed. The difference between the overall mean for boys and girls among the different religious groups can be decomposed in the following ways:

$$\overline{\ln Y^M} - \overline{\ln Y^F} = \Sigma_{z=H,M,C}\alpha_Z^M \overline{\ln Y_Z^M} - \Sigma_{z=H,M,C}\alpha_Z^F \overline{\ln Y_Z^F}$$

$$= \Sigma_{z=H,M,C}\alpha_Z^M \overline{X_Z^{M\prime}}\hat{\beta}_z^M - \Sigma_{z=H,M,C}\alpha_Z^F \overline{X_Z^{F\prime}}\hat{\beta}_z^F$$

$$= \Sigma_{z=H,M,C}\alpha_Z^M (\overline{X_Z^M} - \overline{X_Z^F})'\hat{\beta}_z^M + \Sigma_{z=H,M,C}\overline{X_Z^F}'(\alpha_Z^M\hat{\beta}_z^M - \alpha_Z^F\hat{\beta}_z^F) \ldots \text{(Eq 4)}$$

= Explained Effect + Unexplained Effect

Equation (4) explains the components of the decomposition results for the major religious groups in India. Here $\alpha_Z^M and \alpha_Z^F$ denotes the fraction of boys and girls' observations belonging to the z^{th} religious groups.

For identifying the religious groups with highest gender discrimination, we have done a similar decomposition separately for each z^{th} religious group in the following ways:

$$\overline{\ln Y_z^M} - \overline{\ln Y_z^F} = \overline{X_Z^{M\prime}}\hat{\beta}_z^M - \overline{X_Z^{F\prime}}\hat{\beta}_z^F$$

$$= (\overline{X_Z^M} - \overline{X_Z^F})'\hat{\beta}_z^F + \overline{X_Z^{F\prime}}(\hat{\beta}_z^M - \hat{\beta}_z^F) + (\overline{X_Z^M} - \overline{X_Z^F})'(\hat{\beta}_z^M - \hat{\beta}_z^F) \text{ (Eq 5)}$$

=Endowment Effect (E) + Coefficient Effect(C) + Interaction Effect (I)

Equation (5) tries to identify the religious group where the magnitude of gender discrimination is highest comparing the components of all religious groups.

The endowment effect (E) is the expenditure gap due to the average characteristic gap between the genders. If the discriminated group (girls) have the same endowment as the favoured groups (boys) then this term will be zero. This is the explained part. Coefficient Effect(C) quantifies the change in discriminating groups i.e., unequal treatment of characteristics based on gender. It

is the unexplained part. The interaction effect (I) measures the simultaneous effect of endowment and coefficient effect between the discriminating group and the favoured group.

Factors Influencing Expenditure Decisions in Primary Schools in Rural India:

Outcome Variable-

Log Expenditure on Education-It provides the details of expenditure (Rs.) on basic education during the current academic year by the religious group 'z'. This expenditure on education includes expenditure on course fees (including tuition fees, examination fees, development fees and other compulsory payments), books, stationary and uniform fees, transport fees, private coaching fees and other educational expenditures.

Household factors which play a manifesting role in the gender gap in expenditure on education:

- Log Income- Log of the household's usual monthly expenditure (in Rs) is taken as a proxy of household income.
- Household Size-Distribution among the household members in terms of age is not given. So, it is not possible to calculate the household size on the adult equivalence scale. So total household members of a particular rural household represent the household size. As household size raises household spending per child expenditure on education falls as the household has to bear the education expense from the limited income of the household.
- Types of School- In this study, the primary schools are classified as public schools[35] and private-unaided schools. Public schools are mainly owned, funded and managed by Central, State or Local governments or NGOs or foreign funds so education is free in public schools. On the other hand, private-unaided schools are owned and managed by private organizations but receive no grants or aid from the government. Enrolment in public school plays a major role while taking decisions regarding their children's education expenditure in the household as education is free in public school. The value of it is assigned '1' if

[35]We consider the government school and private-aided school under the umbrella of public schools.

the i^{th} child surveyed from the z^{th} religion the household belongs to is enrolled in public schools and '0' otherwise.

- Ownership of computer- Owning a computer is considered as a proxy for the parental education level and economic solvency of the household.[36] The value of it is assigned '1' if the i^{th} child surveyed from the z^{th} religion the household belongs to has ownership of a computer and '0' otherwise
- Occupation- The occupation of the household plays a major role while making decisions regarding their children's education expenditure by the household. The occupation of the household is clubbed into four categories, they are self-employed (agriculture & non-agriculture sector), regular wage/salary earners (agriculture & non-agriculture sector), casual labour (agriculture & non-agriculture sector) and other workers.

Though parental education is an important variable affecting the choice of schooling and education expenditure decision of the household as we have only included individuals within the age group of 6-10 years residing in rural India and enrolled in primary education for our sample study so, we cannot incorporate individuals above primary education or parents with only primary education but above the age group of 6-12 years. The occupation of the household members is considered a proxy of parental education in our study [37](Kingdon, 1999).[38]

[36] Data is extracted on the basis of age group between 6 to 10 years. So, we failed to incorporate parental education in this study.

[37] Better education results in better occupation. There is a positive relation between education achievement and occupation.

[38] There are many other factors that influence rural households to spend on a child's education like the perception of parents etc. but due to the unavailability of data, we cannot incorporate it in our study.

7.5 Results & Discussion-

Before Regression, we will test whether the independent variable of interest is correlated with the remaining independent variable included in the multiple regression analysis.

Test of Multicollinearity among the exogenous variables is done by VIF estimates. Tolerance is estimated[39] as $1-R^2$. If the value of VIF >10 then it indicates multicollinearity among the dependent variables. We only observe collinearity between the occupation of the household so we had to drop those household who are engaged as self-employed (agricultural and non-agricultural sector) for our study.

Table 7.1: Regression Result for Different Religious Groups

Explanatory Variable	Hindu		Muslim		Christian	
	Boys	Girls	Boys	Girls	Boys	Girls
Household Size	-0.07*** (0.006)	-0.099*** (0.008)	-0.08*** (0.018)	-0.10*** (0.021)	-0.04*** (0.027)	-0.13*** (0.027)
log(income)	0.810 (0.539)	-1.826** (0.6341)	3.403** (1.442)	-1.450 (1.837)	-2.696** (1.300)	-4.67*** (1.530)
$[\log(income)]^2$	-0.078** (0.03)	0.133*** (0.035)	-0.21*** (0.080)	0.109 (0.1015)	0.163* (0.0730)	0.269*** (0.085)
Access to Computer	0.264*** (0.067)	0.198* (0.076)	0.73*** (0.183)	0.396* (0.237)	0.021 (0.156)	0.132 (.172)
Enrolled in Public School	-1.73*** (0.034)	-1.655*** (0.033)	-1.20*** (0.086)	-1.39*** (0.094)	-1.44*** (0.089)	-1.24*** (0.099)
Regular/Salary Workers	0.237*** (0.049)	0.163*** (0.053)	0.149 (0.117)	-0.281** (0.145)	0.076 (0.120)	0.099 (0.127)
Casual Workers	-0.104** (0.033)	-0.162*** (0.037)	0.057 (0.082)	-0.0907 (0.095)	-0.35*** (0.143)	-0.45*** (0.145)
Other Workers	0.144 (0.089)	0.059 (0.093)	0.183 (0.153)	-0.135 (0.180)	0.306 (.330)	0.964*** (0.385)

[39]Where R^2 is calculated by regressing the independent variable of interest onto the remaining independent variable included in the Multiple Regression Analysis.

R-squared	0.4818***	0.4206***	0.3126***	0.3577***	0.4293***	0.4248***
_cons	10.194*** (2.396)	14.861*** (2.843)	22.15*** (6.455)	13.345* (8.342)	19.93*** (5.813)	29.469*** (6.838)
No of Observation	4199	3549	719	557	468	396

Note: ***p<0.01, **p<0.05 & *p<0.10

In table 7.1, the regression result for boy and girl children belonging to Hindu, Muslim & Christian communities are presented separately. The coefficient of household size is statistically significant and is negative for both genders implying that with an increase in the member of the household, there is a cut-down in education expenditure of the children in that household. The coefficient of log income and $(\log \text{income})^2$ is statistically significant for Hindu(girl) and Christian and Muslim(boy) communities. We find that the coefficient of log income is positive for son and negative for daughter belonging to the Hindu community and Muslim communities portraying the picture of gender-based discrimination on primary education expenditure in rural India. This implies that with an increase in income the expenditure on education increases for boys but falls for girl child denoting the intra-household disparity in education expenditure based on gender for the Hindu and Muslim communities. As per NCPCR Report, most of the household that corresponds to the Christian community belongs to the lower strata of society. Among the total minority group, the Christian community comprises 11.54% of the total minority population but there is 71.96% of Christian missionary schools among total minority schools (NCPCR Report, 2016). It is found that among the total 2977(8%) household belonging to the Christian community, most of the children are enrolled in private-aided schools[40]followed by public schools followed by private schools (NSSO,75th Round data). Here our results show a negative relationship between household income and household belonging to Christian community expenditure on primary education[41]. It is noticed that household with regular or salary earners spends more on education expenditure for

[40]So, household belonging to the Christian community mainly enrolled their children in aided Christian schools (NSS, 75th Round).

[41] With time Christian missionary schools are raising which attracts households mainly belonging to the Christian community to admit to these aided schools which are mainly funded by Christian missionaries (NCPCR Report, 2016). There are also special reservations for children belonging to the Christian community in these schools

household belonging to the Hindu community but incurs negative expenditure on girl child belonging to the Muslim community denoting the picture of gender discrimination. Household belonging to Hindu and Christian community involved in casual labour tends to spend less on primary education expenditure of their children. The coefficient of the dummy variable (d1=1, if child is enrolled in public schools) is negatively significant denoting that if education is free then education expenditure on primary education falls in rural India. Another dummy variable (d2=1, if any member of the household owns a computer) is positive for children belonging to Hindu and Muslim communities. It implies that if a household member owns a computer, then it induces the parents to spend more on their child's primary school education expenditure even in rural areas.

Table 7.2: The Decomposition Result:

<table>
<tr><td colspan="9">Table 7.2(a) -The Decomposition Result based on the Religious Groups</td></tr>
<tr><td colspan="9">Total Difference ($\overline{ln\,Y^M}$-$\overline{ln\,Y^F}$)= 0.1089773</td></tr>
<tr><td colspan="3">Explained Effect
$(\Sigma_{z=H,M,C}\,\alpha_Z^M(\overline{X_Z^M}-\overline{X_Z^F})'\hat{\beta}_z^M)$=0.0298</td><td colspan="6">Unexplained Effect=
$(\Sigma_{z=H,M,C}\,\overline{X_Z^F}'(\alpha_Z^M\hat{\beta}_z^M-\alpha_Z^F\hat{\beta}_z^F)$=0.0791</td></tr>
<tr><td colspan="2">Hindu</td><td>Muslim</td><td>Christian</td><td colspan="2">Hindu</td><td>Muslim</td><td colspan="2">Christian</td></tr>
<tr><td colspan="2">0.0464</td><td>0.043</td><td>0.036</td><td colspan="2">0.082</td><td>0.057</td><td colspan="2">0.057</td></tr>
<tr><td colspan="2">42.58%</td><td>40.26%</td><td>33.40%</td><td colspan="2">75.52%</td><td>53.13%</td><td colspan="2">52.8%</td></tr>
<tr><td colspan="9">Table 7.2(b)- The Decomposition Result within the Religious Groups</td></tr>
<tr><td colspan="3">Hindu
Total Difference= 0.129</td><td colspan="3">Muslim
Total Difference= 0.101</td><td colspan="3">Christian
Total Difference= 0.094</td></tr>
<tr><td>Endowment Effect</td><td>Coefficient Effect</td><td>Interaction Effect</td><td>Endowment Effect</td><td>Coefficient Effect</td><td>Interaction Effect</td><td>Endowment Effect</td><td>Coefficient Effect</td><td>Interaction Effect</td></tr>
<tr><td>0.0512</td><td>0.082</td><td>0.004</td><td>0.058</td><td>0.067</td><td>0.014</td><td>0.077</td><td>0.047</td><td>0.030</td></tr>
<tr><td>39.82%</td><td>63.93%</td><td>3.75%</td><td>58%</td><td>66.58%</td><td>14.74%</td><td>81%</td><td>50.11%</td><td>32.13%</td></tr>
</table>

In Table 7.2(a), the components of the differential based on religion group are noted. Oaxaca-Blinder's Decomposition shows that the difference in primary education expenditure between the 'gender' is statistically significant denoting the presence of gender bias within households when deciding on expenditure on primary education in rural India. The magnitude of the "Unexplained Effect" component is higher in comparison to the "Explained Effect" component. The "Unexplained Part" captures all potential effects of differences in unobserved variables. The contribution of "Unexplained Part" is highest for households belonging to the Hindu community (75.52%) followed by the Muslim community (53.13%) and the Christian community (52.8%). It implies that discrimination based on gender is more severe in the Hindu community in comparison to Muslim and Christian communities. The contribution of the "Unexplained part" is lowest for households belonging to the Christian group denoting that the gender bias in primary education expenditure is least for them in comparison to other religious groups.

In Table 7.2(b), the components of the decomposition for each religious group are presented. The total differential between the boy and girl child expenditure on primary education is positive for all religious groups. This difference is highest for the Hindu community followed by the Muslim and Christian communities. The contribution of the coefficient effect is higher than the endowment effect for the Hindu and Muslim groups. The coefficient effect is positive for all religious groups implying the pro-male bias in education expenditure and this component denotes different treatment based on gender. The contribution of the coefficient effect is highest for Hindus followed by Muslim and Christian communities. It portrays a higher degree of gender bias in this community concerning primary school education expenditure in rural India

7.6 Conclusion and Policy Prescriptions:

In this chapter, the gender gap among the religious groups is examined using the NSSO 75th round unit-level dataset. We found that the mean log expenditure difference between boys and girls is positive denoting the presence of discrimination in primary school education expenditure between the genders. Differences in potential discrimination explained by the "unexplained part" are higher compared to the "explained part" for all the three dominant religious groups of India. The gender gap in education expenditure as highlighted by the

unexplained effect is highest among the household belonging to the Hindu community followed by the household belonging to the Muslim community and least in households belonging to the Christian community. The education expenditure of Christian community children is mainly financed by Christian missionaries who receive foreign funding (mostly from developed countries) so gender-based discrimination is the least among the Christian communities' children receiving basic education in rural India.

This chapter tries to capture the disparity in expenditure on primary education based on gender across the religious groups (Hindu, Muslim & Christian) in rural India. The Blinder (1973) and Oaxaca (1973), decomposition analysis is used that enable us to segregate the contribution of the explained factors (the difference between the average characteristics of the boys and girls) and the unexplained factors (differential treatment based on gender) in explaining the education expenditure gap in attaining basic primary education in rural India. In the next chapter, we will shift our focus from education attainment to education achievement attained in primary rural schools.

CHAPTER 8

LEARNING OUTCOMES IN PRIMARY EDUCATION IN RURAL INDIA: AN INTER-STATE COMPARISON

Learning Outcomes in Primary Education in Rural India: An Inter-state Comparison.

8.1 Introduction:

In the previous four chapters, we have focused on overall enrolment, girls' enrolment, availability of supply-side government grants to public primary schools, percolation and inequality in the distribution of these government grants, the fascination of private schools and factors influencing parents in the enrolment decision, discrimination in private school enrolment and gender discrimination in education expenditure among and within the religious groups. In this chapter, we will shift our focus from education attainment to education achievement attained after the successful completion of primary schools in rural India. Education is a process of imparting knowledge and developing powers of reasoning and judgement of an individual. It is one of the pillars of the Human Development Index (HDI). Without successful investment in human capital, a nation cannot achieve sustainable economic development. It was identified that if the marginal year of schooling rises, the enterprise income also rises by 5.5 % point (Sluis *et al*, 2004). Education not only provides knowledge and skills among children, youth and adults to be active citizens and to fulfil themselves as individuals but also literacy in particular contributes directly to poverty reduction. It has been estimated that global poverty can be decreased by 12 % point if all children in less developed countries can get access to elementary education (Education for All Global Monitoring Report, 2009). The vicious circle of poverty in a less developed country can be broken through investment in human capital formation which will result in the overall development of the economy and that can be done by improving the quality of basic education. Better learning outcomes at the primary level can help future citizens to be capable of working as skilled workers in their adulthood and earn a higher amount. This can play an important role in removing the incidence of poverty in the developing country's economy.

Since independence, the Government of India has taken several initiatives to improve the literacy rate in India. Here we can mention, Sarva Shiksha Abhiyaan (SSA) which aims to provide universal elementary education to children between the age group of 6-14 years. SSA has its root back to 1993-94 when the District Primary Education Programme (DPEP) was launched. Actually, it is a primary vehicle for implementing the Right to Free and Compulsory Education Act (RTE). Right to Education Act enacted by "Parliament of India "extended to the

whole of India except Jammu and Kashmir aims to provide free and compulsory education to all children of the age of 6-14 years. This Act is also known as "Fundamental Child Right" enshrined in Article 21A of the Constitution (Ministry of Law and Justice, 2009).

8.2 Survey of Literature:

Investment in education gives the maximum return than investing in any other resources. For example, every $1 spent on an individual's education yields $10.15 in economic growth over the person's working age (EFA Global Monitoring Report, 2009). Ambrish Dongre, *et. al. (*2016) mentioned that the launch of the Sarva Shiksha Abhiyaan (SSA) in 2001 has resulted in a significant increase in Govt. of India's (GOI) funding for elementary education. At the central and at the state level, allocation on elementary education increased more than two-fold from Rs 68853 crores in 2007-08 to Rs 147059 crores in 2012-13. Budgets for specific initiatives aimed at improving learning quality account for less than 1 % of Sarva Shiksha Abhiyaan's budget [PAISA Report, 2012]. With the passage of time, school enrolment is approaching 100%. According to the Planning Commission report (2011), in most of the Indian states, there is a gradual enhancement of both the Gross Enrolment Rate (GER) and Net Enrolment Rate (NER) at the primary level. India is close to "schooling for all". However, no proper enquiry has been done to identify the learning outcome of the children at the primary level. Here it will be investigated after considering 24 major states of India[42].

8.3 Research objective:

This chapter will try to investigate the scenario of learning outcomes among children at the primary level in different states of India after the implementation of SSA. Learning outcome is the best indicator of learning because it shows what learners have actually learnt after completion of the class. Actually, if we want to remove the vicious circle of poverty from an economy, we should generate more skilled labour and that can be materialized if children can enhance their knowledge from the primary level. Besides that, we will also try to investigate the possible factors that can influence learning outcome of the children at the primary level in rural India.

[42]Sikkim is not considered due to unavailability of necessary data.

8.4 Data and Methods:

Data Source:

Annual Status of Education Report (ASER) is an annual household survey to assess children's schooling status and basic learning levels in terms of reading and mathematical ability. ASER survey has provided a mirror image of the rural public education system. It collects data from a representative sample of children from every state and almost every rural district in India. On average ASER survey reached over 560 districts each year, surveying an average of 650,000 children in more than 16,000 villages and 30 randomly selected villages in each district in the country[43]**.** This is about twice the size of the rural sample of the NSS survey. Data on reading and basic mathematical ability was collected every year for all states in India, using household survey methodology. In the ASER Report, education achievement in different states has been portrayed using two scales i.e., reading ability and mathematical ability.

Reading ability has been tracked using two-parameters and they are:

- Percentage of children in standard III who can read a standard II level text
- Percentage of children in standard V who can read standard II level text.

The mathematical ability of the students at the primary level is represented in ASER data in the following way:

- Percentage of children who can do at least subtraction at standard III level.
- Percentage of children who can do at least division at standard V level.

The present study is solely based on the ASER report but we have considered the time period from 2010, the time period from which the Right to Education Act was implemented.

Methodology

Initially, we have arranged the state-level data on reading ability and mathematical ability obtained by ASER household survey over the years (from 2010 to 2016). Then to get a proper

[43] In each district, 30 villages are sampled from the Report, Census, (2011) village list using the Probability Proportional to Size (PPS) sampling technique. The sample design employs a rotation panel of villages. Each year, 10 villages from three years ago are dropped and 10 new villages are added.

indicator of the learning outcomes of the children at the primary level in different states and in different years, the Learning Outcome Index at standard III and standard V level will be calculated. This Index is a composite index obtained after taking the geometric mean of reading ability and mathematical ability of the children (in Percentage terms) in rural public schools in each state. Relative picture of the learning outcomes of the children in primary education among 24 major states of India[44]is shown by the Rank Analysis method. We have also calculated the Average Growth Rate (in %) at the standard III level and standard V level among the different states of India. Later on, we want to investigate possible household-related and school-related factors that may influence the learning outcomes of children in rural India on the basis of Panel data regression analysis.

Learning Outcome Index (LOI):

It is already mentioned that this index is an indicator of the learning ability among children enrolled in rural public schools at standard III and standard V levels. LOI_{1i}=Learning Outcome Index for standard III level children of the i^{th} state is calculated by using the following method:

$LOI_i = \sqrt{A_i B_i}$ Where, A_i indicates Percentage of children of the i^{th} state who can read at least standard II level text in standard III and B_i indicates Percentage of children of the i^{th} state who can do at least subtraction in standard III.[45]. A higher value of LOI_1 means better learning outcomes among children at the standard III level

Table 8.1: The values of LOI_1 (in Percentage) of different states in different years

States	LOI_1 2010	LOI_1 2012	LOI_1 2014	LOI_1 2016
Andhra Pradesh	27.22	36	25.86	27.22
Arunachal Pradesh	22.7	31.7	19.9	12.25
Assam	20.96	12.53	12.92	15.92

[44]Here out of 24 considered states, Manipur, Meghalaya, Mizoram, Nagaland, Arunachal Pradesh, Himachal Pradesh and Tripura are under special assistance of the Central Government. However special assistance from the Central government may not reflect better learning achievement of the children at the primary level.

[45]Here a gap of two years is considered. The basic logic behind taking this time gap is to get a better picture of the change of learning ability among the children at the primary level in a particular state over time.

Bihar	31.49	18.8	16.76	16.67
Chhattisgarh	16.97	13.78	12.16	17.94
Gujarat	17.21	15.3	14.77	19.88
Haryana	31.22	17.15	22.82	26.37
Himachal Pradesh	36.93	35.99	42.07	46.67
Jharkhand	18.84	13.89	10.26	11.97
Karnataka	20.51	23.75	18.95	22.01
Kerala	49.84	40.66	36.3	36.94
Madhya Pradesh	18.78	6.9	6.67	9.26
Maharashtra	35.23	28.02	24.34	30.45
Manipur	17.33	28.46	30	34.13
Meghalaya	16.82	25.73	23.15	19.11
Mizoram	51.2	38.65	39.35	20.15
Nagaland	22.35	28.65	20	23.55
Orissa	26.7	24.3	26.17	30.64
Punjab	36.08	36.88	27.81	33.33
Rajasthan	15.48	20.98	9.65	12.89
Tamil Nadu	11.19	11.06	18.51	22.11
Tripura	34.95	21.85	30.7	30.15
Uttar Pradesh	11.77	6.6	6.3	7.54
West Bengal	33.31	25.6	32.95	34.95
All India	23.61	18.18	17.2	19.74

Source: Calculated by the authors on the basis of the data given in the ASER Report in different years

The above table shows that at all India levels LOI_1 (overall India) marked a fall from 23.61% in 2010 to 18.18% in 2012 and further to 17.2% in 2014, though it increased very slightly in 2016 by 2.54% as obtained by our calculation based on ASER household survey over the years[46]. All the states except Andhra Pradesh, Arunachal Pradesh Karnataka, Manipur, Meghalaya,

[46]Right to education act is not very successful to improve learning achievement of the India children at elementary level.

Nagaland and Rajasthan marked a fall in their LOI_1 while moving from 2010 to 2012. Similarly, while moving from 2012 to 2014 all states except Haryana, Himachal Pradesh, Manipur, Orissa, Tamil Nadu, Tripura and West Bengal marked a fall in the learning ability of the children in elementary education at standard III level. On the other hand, while moving from 2014 to 2016 all states except Meghalaya, Arunachal Pradesh and Mizoram marked a rise in the value of learning outcome index[47]. Next, we shall look at the learning outcome of the rural children at the standard V level[48] on the basis of LOI_2.

$LOI_{2i} = (A_iB_i)^{½}$ where Ai indicates the Percentage of children in standard V who can read a standard II level text and B_i indicates the Percentage of children in standard V who can do at least division.

Table 8.2: The values of LOI_2 (in Percentage) of 24 major states of India in different years

States	LOI_2 2010	LOI_2 2012	LOI_2 2014	LOI_2 2016
Andhra Pradesh	48.66	51.72	46.41	43.25
Arunachal Pradesh	34.1	47.6	39.5	14.2
Assam	31.03	17.21	16.59	17.14
Bihar	54.34	35.96	37.42	33.14
Chhattisgarh	48.02	24.01	25.77	30.8
Gujarat	29.2	23.96	24.9	27.54
Haryana	55.36	33.24	40.74	40.54
Himachal Pradesh	68.4	53.83	52.06	55.63
Jharkhand	44.05	25.56	22.63	25.06
Karnataka	28.32	28.66	27.62	26.85
Kerala	56.47	47.71	39.61	41.42

[47]The diagrammatic representation of this table through clustered column chart is shown in the appendix

[48]In India, at standard V, the student has completed 4 years of education at elementary level. Though LOI_2 one can get a better picture of learning achievement scenario of children at different states after completion of four initial years of schooling. Higher value of LOI_2 of a state indicates better learning achievement of the children at that state after completion of primary education.

Madhya Pradesh	45.8	15.64	16.58	21.88
Maharashtra	53.22	33.42	29.3	34.88
Manipur	34.31	35.25	43.1	55.09
Meghalaya	51.26	31.79	16.5	21.7
Mizoram	62.5	48.4	42.1	33.15
Nagaland	33.85	34.8	22.85	25.4
Orissa	37.74	28.16	31.26	34.08
Punjab	69.74	58.12	47.53	52.24
Rajasthan	33.37	18.16	20.32	25.75
Tamil Nadu	20.87	17.03	35.74	32.51
Tripura	37.95	28.5	33	33.15
Uttar Pradesh	25.95	15.26	18	15.9
West Bengal	45.44	37.39	40.27	37.82
All India	41.457	29.09	29.55	29.62

Source: Calculated by the author on the basis of the data given in the ASER Report in different years.

If we look at the all-India picture, it is observed that the value of LOI_2 among children has marked a fall from 41.457% in 2010 to 29.09% in 2012[49]. It increased very slightly in 2014 by 0.46% only i.e., from 29.09% to 29.55% and later in 2016 it remained more or less stagnant as obtained by our calculation based on the ASER household survey over the years. All the states except Andhra Pradesh and Arunachal Pradesh marked a fall in their learning outcome index while moving from 2010 to 2012. Similarly, while moving from 2012 to 2014 all states except Bihar, Chhattisgarh, Haryana, Manipur, Orissa, Rajasthan, Tamil Nadu, Uttar Pradesh, Tripura and West Bengal marked a fall in LOI_2. On the other hand, while moving from 2014 to 2016 states except Andhra Pradesh, Arunachal Pradesh, Bihar, Mizoram, Tamil Nadu, Uttar Pradesh and West Bengal has marked a rise in the value of the LOI_2.[50]

[49]Learning achievement among Indian children after completion of four years of schooling is deteriorating.
[50]The diagrammatic representation of this table through clustered column chart is shown in the appendix.

To draw a comparative analysis of learning outcomes among children in different states of India over time, we have considered the Rank Analysis Method. For the Rank Analysis, we have arranged the data of the Learning Outcome Index of standard III and standard V children over the years and then drawn an interstate comparison taking the highest level as rank 1 and so on.

Table 8.3: Ranking of different states in terms of LOI_1in different years (for std III level children)

States	LOI_1 2010	LOI_1 2012	LOI_1 2014	LOI_1 2016
Andhra Pradesh	10	4	9	9
Arunachal Pradesh	12	6	14	21
Assam	14	21	19	19
Bihar	8	16	17	18
Chhattisgarh	20	20	20	17
Gujarat	19	18	18	15
Haryana	9	17	12	10
Himachal Pradesh	3	5	1	1
Jharkhand	16	19	21	22
Karnataka	15	13	15	13
Kerala	2	1	3	2
Madhya Pradesh	17	23	23	23
Maharashtra	5	9	10	7
Manipur	18	8	6	4
Meghalaya	21	10	11	16
Mizoram	1	2	2	14
Nagaland	13	7	13	11
Orissa	11	12	8	6
Punjab	4	3	7	5
Rajasthan	22	15	22	20

Tamil Nadu	24	22	16	12
Tripura	6	14	5	8
Uttar Pradesh	23	24	24	24
West Bengal	7	11	4	3

Source: Calculated by the author on the basis of the data given in the ASER Report in different years.

From the above table, it is observed that:

- Mizoram attained the highest rank in LOI_1 in 2010 and in 2012 and 2014 its position falls to the second highest position but its position falls badly in 2016 and its rank in LOI_1 falls to 14.
- Himachal Pradesh marked a rise in rank and attained the highest position in 2014 and maintained this position later on. Andhra Pradesh and Arunachal Pradesh both the states marked a remarkable rise in their rank from 2010 to 2012 but it is a temporary improvement. Manipur marked an improvement in its position over the years. Meghalaya marked an improvement in its rank from 2010 to 2012 by 11 points and then its rank deteriorated slightly by 1 point and later on its position again deteriorated by 5 points. West Bengal marked a remarkable rise in its rank from 2012 to 2014 by 7 points later on in 2016 also its position as shown by rank in LOI_1 again improved by 1 point.
- Assam marked remarkable fall in its rank in LOI_1 by 7 points in 2012 later on its rank has improved by 2 points and maintain its position till 2016. Bihar rank in LOI_1 also falls by 8 points from 2010 to 2012. Haryana also marked a fall in its rank by 8 points from 2010 to 2012 but later on it marked a rise in rank by 4 points and again a rise in rank by 2 points.

Next, the ranking of different states based LOI_2 in different years will be considered

Table 8.4: Ranking of different states in terms of LOI_2 in different years (for standard V level children)

States	LOI_2 2010	LOI_2 2012	LOI_2 2014	LOI_2 2016
Andhra Pradesh	9	3	3	4

Arunachal Pradesh	17	6	9	23
Assam	20	21	22	21
Bihar	6	8	10	11
Chhattisgarh	10	18	16	13
Gujarat	21	19	17	14
Haryana	5	12	6	6
Himachal Pradesh	2	2	1	1
Jharkhand	13	17	19	17
Karnataka	22	14	15	15
Kerala	4	5	8	5
Madhya Pradesh	11	23	23	19
Maharashtra	7	11	14	8
Manipur	16	9	4	2
Meghalaya	8	13	24	20
Mizoram	3	4	5	10
Nagaland	18	9	18	18
Orissa	15	16	13	9
Punjab	1	1	2	3
Rajasthan	19	20	20	16
Tamil Nadu	24	21	11	12
Tripura	14	14	12	10
Uttar Pradesh	23	24	21	22
West Bengal	12	7	7	7

Source: Calculated by the authors on the basis of ASER Report in different years

From the above table, we can observe the following facts:

- Punjab attains the highest rank in LOI_2 in 2010 and 2012 and later on Himachal Pradesh occupied this position in 2014 and 2016
- Chhattisgarh marked a remarkable fall in rank from 2010 to 2012 by 8 points but then in 2014 its rank has improved by 2 points and later on by 3 points in 2016. Madhya Pradesh had shown a remarkable fall in its rank of the LOI_2 from 2010

to 2012 by 12 points. Meghalaya had shown a remarkable fall in its rank from 2010 to 2014.

- Andhra Pradesh marked a remarkable rise in its rank from 2010 to 2012 by 6 points and maintains this improved position till 2014 later on in 2016 its rank fall slightly by 1 point. Arunachal Pradesh had marked an improvement in its rank from 2010 to 2012 but it is a temporary improvement. Nagaland had also marked a temporary improvement in rank from 2010to 2012. Karnataka had shown a remarkable rise in its rank of LOI_2 from 2010 to 2012 Similarly Manipur had shown a remarkable rise in its rank of LOI_2 from 2010 to 2012 by 7 points and then again, its rank rise by 5 points and again rise by 2 points. Tamil Nadu had also shown a remarkable rise in its rank of the learning outcome index from 2012 to 2014 similarly West Bengal had also marked a remarkable improvement in its rank from 2010 to 2012 and maintains this improved position in the latter year.

So, from Table-8.3 and Table-8.4, it is observed that there is a fluctuation of rank of the states, both of LOI_1 and LOI_2 in different years. Now we have to investigate whether there is any average enhancement of LOI_1 and LOI_2 of different states over the years. This will indicate whether the learning outcomes of the children in different states at the primary level are improving or not over the years. The Average Annual Growth rate of LOI_1 and LOI_2 reflect how LOI_1 and LOI_2 have changed over time within the considered time period. It may take a positive or negative value. It is very much useful because it reflects the trend of the variable.

Table 8.5: Change of Average Growth rate while moving from std III level children to std V level Children

States	Average Growth Rate of LOI_1 between 2010 to 2016 (AGR_1)	Average Growth Rate of LOI_2 between 2010 to 2016 (AGR_2)
Andhra Pradesh	3.116	-3.595
Arunachal Pradesh	-12.006	-13.825
Assam	-4.629	-14.941

Bihar	-17.228	-13.733
Chhattisgarh	5.659	-7.717
Gujarat	6.678	-1.14
Haryana	1.183	-5.961
Himachal Pradesh	8.427	-5.910
Jharkhand	-11.913	-14.233
Karnataka	3.911	-1.738
Kerala	-10.301	-9.306
Madhya Pradesh	-9.253	-9.291
Maharashtra	-2.832	-10.162
Manipur	27.8	17.609
Meghalaya	8.498	-18.187
Mizoram	-23.830	-18.944
Nagaland	5.248	-6.791
Orissa	5.262	-1.785
Punjab	-0.842	-8.324
Rajasthan	5.033	-2.322
Tamil Nadu	28.548	27.474
Tripura	0.41	-2.885
Uttar Pradesh	-9.596	-11.635
West Bengal	3.877	-5.365
All India	-4.540	-9.337

Source: Calculated by the author on the basis of the data given in the ASER Report in different years

- It is found that all India average growth rate in terms of Learning outcomes for both standard III (-4.540) and standard V (-9.337) have marked a fall over time.
- For standard III children, it is observed that Arunachal Pradesh, Assam, Bihar, Jharkhand, Kerala M.P, Mizoram, U.P marked a fall in their average growth rate overtime. Similarly, for standard V children in rural India it has been observed that a significant number of states marked a fall in their Average Growth Rate.

- The highest fall in the average growth rate is shown in Meghalaya i.e., fall of (-23.830) for standard III children and (-18.944) for standard V children, similarly the highest growth in the average growth rate is shown in Tamil Nadu i.e. (28.548) for standard III children and (27.474) for standard V children.

Thus, it can be concluded that despite the fall in the Average Growth Rate of learning ability there are few states that marked a rise in it over the years.

Possible factors (both household and school-related) that may influence the learning outcome of the rural children of India in primary education:

Coleman (1966) claimed that the learning outcomes of the children are very much dependent on family background. Kundu and Dutt (2015) also observed that 'motivation' of the parents plays a significant role on learning outcome of their children. 'Motivation' is very much dependent on the education level of the parents and economics condition of the households in which the children belong. It is observed that despite 96% enrolment at primary education, India's education system fails to capitalize on providing quality education to their children even at primary level. According to Filmier and Pritchett (1998), household wealth and parent's education have a positive correlation with children's educational outcome. As we are analysing on the basis of ASER data, we have to consider the state specific family and school related factors which are available in ASER report only. Caste and gender factors are not reflected in ASER data. So, these two factors are here not considered. Hence, the possible factors which can influence the Learning Outcome Index are as follows:

1. Mother's education :(ME)-

Literate women play a major role in socio-economic development. With the passage of time, the literacy rate amongst women in India has gone up from 0.69% in 1901 to 24.82% in 1981(Report, Census (1981). But still in the Twentieth century, nearly three-fourths of women in rural areas are illiterate (ASER, 2014). There is a possible positive correlation between parental education, especially mothers' education and offspring education. (Chevalier. Arnaud, 2004). If the mother is able to read, then the child born to that mother is 50 % more likely to survive to the age of five as educated mothers are more likely to immunize their children

compared to illiterate mothers (UN Millennium Project, 2006). This is important because there is a high positive relationship between child's health and learning ability.

Mother education is divided into four sections:

- Percentage of mothers of the i^{th} state who are illiterate (MEI_i).
- Percentage of mothers of the i^{th} state that has attained school education till standard V (MEV_i).
- Percentage of mothers of the i^{th} state that has attained school education till standard X (MEX_i).
- Percentage of mothers of the i^{th} state who have achieved education qualification above Standard X ($MEX_{+}i$).

Here data is collected in particular time period.

2. Fathers' education :(FE)-

Studies have also found that a strong link between the education as well as earnings of the father and his offspring. For example, the intergenerational correlation in earnings between father and son varies between 0.40 & 0.50 in the U.S and 0.60 in U.K (Chevalier Arnaud et.al. 2005).

Father's education is also divided here into four classes:

- Percentage of fathers of the i^{th} state who are illiterate (FEI_i).
- Percentage of fathers of the i^{th} state who have attained school education till standard V (FEV_i).
- Percentage of fathers of the i^{th} state who have attained school education till standard X (FEX_i).
- Percentage of fathers of the i^{th} state who have achieved education qualification above standard X (FEX_{+i}).

Besides parental education, there are few other household specific factors which may influence the learning outcome of the children. These are as follows:

3. Percentage of households of the i^{th} state who have pucca house (PH_i)-

Pucca household may be an important parameter determining education quality in rural areas. It elevates financial status of the family. Actually, a house is a "turning point" in the lives of the poor, which leads towards a better life and so 'Housing for All' scheme is launched in June 2016. It actually gives security to a child particularly for the girl child. It is expected that a child in pucca house can devote more concentration in his/her study.

4. Percentage of households of the i^{th} state who have electric connection (EC_i)-

Without electric connection, children face obstacles in completing their homework and preparing their lessons. Studying in kerosene lamp or candle light also cause stress to the child's vision. In India, students whose households are electrified are more likely to complete grade-appropriate tests successfully as compared to their counterparts whose households are not electrified (Kanagawa and Nakata, 2008). Thus, proper electric connection provides a better ambiance for children in pursuing their education.

5. Percentage of households of the i^{th} state who have proper sanitation (PS_i)-

Without proper sanitation, human waste goes into the water of the ponds, lakes or rivers. This water is further used for washing clothes, and dishes or even used for drinking purposes in rural Ares. Thus, many people are prone to many waterborne diseases like diarrhoea, dysentery, cholera etc. Globally nearly five thousand children die every day because of the lack of sanitation facility (Unitarian Universalist Association, 2001). Swachh Bharat Abhiyan (Clean India Movement) is a campaign by the Government of India to reduce or eliminate open defecation through the construction of individual, cluster and community toilets but still India failed to achieve 100 % availability of proper sanitation facilities. Actually, to maintain hygiene, toilet facility at home is essential which can reduce the possibility of illness among the children.

As information about income level of the sample household is not available, here we consider pucca household, electric connection and proper sanitation as a proxy variable of household asset as well as financial condition. Children from financially disadvantaged families appear to be less well prepared for the transition to school due to the impact of financial stress on family relationships, which affects children's social/emotional readiness (Smart *et al*., 2008).

Next, we consider possible school related factors which may influence the learning outcome of the rural children of India in primary education:

6. Pupil-Teacher Ratio (PTR_{it}) -

Pupil-teacher ratio is the number of students who attend a school divided by the number of teachers in the institution. It is an indicator of the amount of individual attention any single

child is likely to receive keeping in mind that not all class sizes are going to be same. The idea that teachers who have fewer students in their classrooms will be able to spend more attention to individual students which may improve his chances for academic success. Thus, it is a tool to measure teacher workload as well as allocation of resources. RTE mandates an optimal pupil-teacher ratio of 30:1 for primary school and 35:1 for pre-primary school for all Indian schools.

7. Percentage of schools of the i^{th} state who have playground facility (P_{it}) -

Schools which have playground will enable the children to be physically and mentally active which will affect the intellectual and social wellbeing of the children. It is important for the children for fun and relaxation as well as for good health. For many children, school playtime is the most active part of their day. Improvement in the physical and mental health of children has occurred as a result of play facilities in the school premises may affect the quality of education achievement.

8. Percentage of schools of the i^{th} state who have availability to proper drinking water ($DW_{it,}$)-

Availability of proper drinking water in school will help to increase students overall water consumption, maintain hydration, reduce the possibility to get affected in various water borne diseases. Proper hydration can also improve academic and physical performance of the students.

9. Percentage of schools of the i^{th} state in the t^{th} period who have proper toilet facilities available and useable (TS_{it})-

Lack of sanitation facility may increase the possibility to get infected by water borne diseases like diarrhoea, dysentery, cholera etc. Availability of proper sanitation in educational institution can create improved learning environment, also facilitating increased attendance and retention of students mainly girl's student.

10. Percentage of schools of the i^{th} state in the t^{th} period where Mid-day meal is served on the day of visit (MTM_{it})-

This scheme aims to provide nutritious meals to children in order to promote regular school attendance, improve nutrition and enhance overall educational outcomes. Malnourished

children often face physical and cognitive development challenges that can hinder their educational progress. Providing nutritious meals can help to combat malnutrition and support better learning outcomes from public primary schools.

Model 1:

The static panel regression model can be explained in the following way:

$$LOI_{1it} = f\{MEI_{it}, MEV_{it}, MEX_{it}, MEX_{+it}, FEI_{it}, FEV_{it}, FEX_{it}, FEX_{+it}\ PH_{it}, EC_{it}, PS_{it}, PTR_{it}, P_{it}, DW_{it}, TS_{it}, MTM_{it}\}$$ ..... Eq. (1)

$$LOI_{2it} = f\{MEI_{it}, MEV_{it}, MEX_{it}, MEX_{+it}, FEI_{it}, FEV_{it}, FEX_{it}, FEX_{+it}\ PH_{it}, EC_{it}, PS_{it}, PTR_{it}, P_{it}, DW_{it}, TS_{it}, MTM_{it}\}$$ ..... Eq. (2)

Where i = (1 to 24) and (t = 1 to 4). Here t=2010, 2012, 2014, 2016 and 24 states of India is considered as cross-sectional unit. Here we have considered a gap of two years as children need two years to get promoted from standard III levels to standard V level as there is no retention policy.

LOI_{it}represents the Learning Outcome Index of the ith state in the tth year at two different levels in both equations[51]. Table-A1 (Appendix) will concentrate on the summary statistics of the variables considered in our study. Before going for regression analysis, it is required to check whether there exists any problem of multi-collinearity among the explanatory variables mentioned in Eq. (1) and Eq. (2). It is observed that 'EC and 'PS' [52]& 'DW' and 'MDM'[53] are highly collinear.

So, equation (1) can be expressed in the following ways to ruled out the problem of multi-collinearity:

[51]There are few families' related factors and school related factors which may be changed significantly after a gap of two years. Besides that, we may get a proper trend of the learning outcome index of 24 selected states if a gap of at least two years is considered.

[52]Value of the correlation co-efficient is 0.69.

[53]Value of the correlation co-efficient is 0.7548.

$$LOI_{1it} = f\{MEI_{it}, MEV_{it}, MEX_{it,} MEX_{+it,} FEI_{it}, FEV_{it,} FEX_{it}, FEX_{+it} PH_{it,} EC_{it,} PTR_{it,} P_{it,} TS_{it,} DW_{it}\}$$

$$LOI_{1it} = f\{MEI_{it}, MEV_{it}, MEX_{it,} MEX_{+it,} FEI_{it}, FEV_{it,} FEX_{it}, FEX_{+it} PH_{it,} EC_{it,} PTR_{it,} P_{it,} TS_{it,} MTM_{it}\}$$

$$LOI_{1it} = f\{MEI_{it}, MEV_{it}, MEX_{it,} MEX_{+it,} FEI_{it}, FEV_{it,} FEX_{it}, FEX_{+it} PH_{it,} PS_{it,} PTR_{it,} P_{it,} TS_{it,} MTM_{it}\}$$

$$LOI_{1it} = f\{MEI_{it}, MEV_{it}, MEX_{it,} MEX_{+it,} FEI_{it}, FEV_{it,} FEX_{it}, FEX_{+it} PH_{it,} PS_{it,} PTR_{it,} P_{it,} TS_{it,} DW_{it}\}$$

Similarly, Eq (2) representing the variables which might affect LOI_{2it} can also be expressed in this way.

8.5: Results and Discussions

Before moving towards panel regression, it is necessary to check whether fixed effect or Random effect technique is necessary in the regression. The Hausman test suggests rejecting the null hypothesis. Hence fixed effect panel regression is appropriate.

Table 8.6-: Regression results (LOI_1)

Dependent Variable	LOI_1 (Excluding electric connection and drinking water)	LOI_1 (Excluding electric connection and Mid-day meal availability on day of visit)	LOI_1 (Excluding household sanitation and availability of drinking water in school)	LOI_1 (Excluding household sanitation and Mid-day meal availability on day of visit)
Name of the Independent variable:	Value of Coefficient	Value of Coefficient	Value of the Coefficient	Value of Coefficient
No schooling (Mother)(MEI)	-2.217449* (0.6147986)	-2.190251* (0.6162269)	-2.057299* (0.5991574)	-2.041881* (0.5987349)
Standard I-V (Mother)(MEV)	-1.272604** (.6263927)	-1.251943* (0.6328464)	-1.165876* (0.613621)	-1.176305* (0.618469)
Standard V-X(mother)(MEX)	-2.245936* (0.6892552)	-2.17547* (0.673576)	-2.00049* (0.7348698)	-1.94784* (0.7202709)

Above Standard X (Mother) ($MEX_{+)}$	0.1514887** (0.0874134)	0.1156639* (0.089552)	0.1562912* (0.0869988)	0.1554143* (0.0888805)
No Schooling (Father)(FEI)	7.799128 (10.99383)	7.694323 (10.9978)	9.326585 (11.08655)	9.471761 (11.22587)
Standard I-V (Father)(FEV)	6.168898 (11.15464)	6.096178 (11.1468)	7.761001 (11.25848)	7.927864 (11.38614)
Standard V-X(father)(FEX)	8.44787 (10.99077)	8.32146 (11.00353)	9.878858 (11.06527)	9.99473 (11.1996)
Above Standard X (Father) (FEX_{+})	6.363298 (11.06542)	6.232522 (11.07864)	7.913081 (11.16351)	8.056242 (11.30761)
Pucca Household (PH)	-0.385466* (0.1353877)	-0.371079 (0.1321503)	-0.357179* (0.1378951)	-0.34702* (0.1352846)
Household Sanitation (PS)/Electric Connection (EC)	-0.0164532 (0.1002912)	-0.0202467 (0.098163)	-0.0131698 (0.1235555)	-0.0957797 (0.1288569)
Pupil-teacher ratio (PTR)	0.0484265 (0.0891258)	0.0448304 (0.084831)	0.0540296 (0.0887622)	0.0445774 (0.084522)
Playground Facility(P)	0.02388779* (0.0962931)	0.0237781* (0.0958585)	0.0226244* (0.0930407)	0.0234866* (0.0900434)
Toilet available and useable (TS)	-0.104484 (0.0764595)	-0.039372 (0.1471428)	-0.0787138 (0.0791915)	0.0004404 (0.1547687)
Mid-day meal served in school on day of visit (MDM)/availability of drinking water in school (DW)	0.0166075 (0.0954837)	-0.1005626 (0.0782615)	0.0326762 (0.095844)	-0.0834525 (0.0781487)
R^2 (within)	0.4805	0.4808	0.480	0.4810

*=> significant at 1% level, **=> significant at 5% level and ***=> significant at 10% level

Discussion: On the basis of the results shown in Table-8.6 we can mention the following observations:

High Percentage of illiteracy among mothers creates a negative impact on learning achievement of the children at standard III level. Learning achievement of the children at standard III level will be much better if mother have at least cross standard X level. Mothers with education qualification till standard X fails to create any impact on std III level children. Schools with playground enabled the children to be physically and mentally active that results in the intellectual and social wellbeing of the children. Improvement in the physical and mental health of children as a result of play facilities in the school premises has positive impact on the quality of education achievement at standard III level.Availability of pucca household which is an indicator of rural economic condition fails to create any impact on standard III level children. It has been found that better drinking water facility, sanitation facility at school, and even availability of mid-day meal and better pupil-teacher ratio cannot create any positive outcome on the learning achievement of the children at standard III level.

Table 8.7: Regression results (LOI_2)

Dependent Variable	LOI_2 (Excluding electric connection and drinking water)	LOI_2 (Excluding electric connection and Mid-day meal availability on day of visit)	LOI_2 (Excluding household sanitation and availability of drinking water in school)	LOI_2 (Excluding household sanitation and Mid-day meal availability on day of visit)
Name of the Independent variable:	Value of Coefficient	Value of Coefficient	Value of the Coefficient	Value of Coefficient
No schooling (Mother) (MEI)	-1.902861* (0.888957)	-1.90961* (0.9165121)	-2.101004* (0.8775242)	-2.010852* (0.896374)
Standard I-V (Mother) (MEV)	1.062289 (0.9056588)	0.6281015 (0.9412301)	0.9066571 (0.8987076)	0.5259236 (0.9259183)

Standard V-X(mother)(MEX)	-3.153653 (0.9965475)	-2.762899 (1.001807)	-3.123501 (1.076288)	-2.625144 (1.078327)
Above Standard X (Mother)(MEX_+)	0.0130776* (0.1263852)	0.0528098 (0.1331936)	0.0248741* (0.1274181)	0.0442485* (0.1330642)
No Schooling (Father) (FEI)	-26.69636** (15.89524)	-20.13659 (16.35699)	-24.77906 (16.23733)	-17.34738 (16.8064)
Standard I-V (Father) (FEV)	-30.93406 (16.12774)	-24.29682 (16.57859)	-29.02496** (16.48915)	-21.49329 (17.04634)
Standard V-X(father) (FEX)	-25.20741 (15.89081)	-19.13476 (16.36551)	-23.46944 (16.20616)	-16.56101 (16.76707)
Above Standard X (Father)(FEX_+)	-21.25525 (15.99874)	-20.68589 (16.47722)	-25.80187 (16.35005)	-18.28209 (16.92877)
Pucca Household (PH)	-0.471094* (0.195748)	-0.39258** (0.1965466)	-0.4152367* (0.2019608)	-0.3325*** (0.205363)
Household Sanitation (PS)/Electric Connection (s)	0.14276 (0.1450042)	0.1163107 (0.1484564)	-0.0657032 (0.180959)	-0.1153127 (0.1929133)
Pupil-teacher ratio (PTR)	0.09236 (0.1288609)	-0.036258 (0.126261)	0.0909022 (0.1300009)	-0.0363567 (0.126539)
Playground Facility(P)	0.3264113* (0.1392237)	0.5539213* (0.1825701)	0.3707046* (0.1362672)	0.5018124* (0.1848052)
Toilet available and useable (TS)	0.0322524* (0.1105477)	0.395682* (0.116398)	0.261334* (0.1159837)	0.3824887* (0.1303251)
Mid-day meal served in school on day of visit (MDM)/availability of drinking water in school (DW)	0.3989553* (0.1380535)	0.4768589* (0.218845)	0.39243* (0.1403734)	0.3313121* (0.1169974)
R^2 (within)	0.5933	0.5699	0.5874	0.5680

*=> significant at 1% level, **=> significant at 5% level and ***=> significant at 10% level

Discussion: On the basis of the results shown in Table-8.7 we can mention the following observations:

High Percentage of illiteracy among mothers and fathers creates a negative impact on learning achievement of the children at standard V level. Learning achievement of the children at standard V level will be much better if mother have at least cross standard X level. Mothers with education qualification till standard X fails to create any impact on standard V level children. Schools with playground facilities have positive impact on the quality of education achievement at standard V level. Availability of proper drinking water, sanitation facility and Mid-day Meal in school leads in overall wellbeing of the children which results to better academic achievement for standard V children.

Availability of pucca household which is an indicator of rural economic condition fails to create any impact on standard III level children. It has also been found that better pupil-teacher ratio at school and household electric connection and sanitation i.e., assets of the household economic condition cannot create any positive outcome on the learning achievement of the children even at the primary level.

8.6 Conclusion and Policy Prescriptions:

Here from the ASER data, it is found that parental education has a positive impact on a child's education. Hence to improve the learning outcome of the children at the primary level, expansion of education among the parents is important. The availability of playground facility in the school, availability of mid-day meals, drinking water and proper sanitation at school creates a positive impact on standard V level children to improve their quality of education.

According to the last NSSO Employment-Unemployment Report 2011-12, more than 80% worker of India are informal in nature. Their wage /salary income is not very high and a major part of their income is spent for consumption purposes. Very few amounts of money are left to bear the direct cost of education for their children. A poor family inherits less, has to work as unskilled and leaves fewer bequests for the next generation thus they are trapped in the vicious circle (Galor Zeira. 1993). The government of India has taken many initiatives to reduce the direct cost of education through different types of subsidised programmes both at the s level and secondary level. India follows the strategy of decentralisation of educational management

through the central state and panchayat raj. The central government has taken many policies like National Programme for the education of girls at the Elementary level (NPEGEL) to encourage female literacy and reducing the Gender Parity Index. Similarly, various programs are also undertaken by the State government like Kanyashree, Sikhashree programme implemented in West Bengal to increase female literacy. If a girl receives education, then in her next generation, after her motherhood she wants to tend to send her child in school to become educated because educated parents are usually more involved to their child's education. Actually, every child's first education begins at home then after attaining a certain age they are admitted to school and their school-based education starts. It is found that some of the intergenerational effects of education may be transmitted through parents. More educated parents provide an environment that improves their children's opportunities and decision process. A mother knows best, and the amount of education she attains can predict her children's success in reading and mathematical skills. So, the government apart from giving importance to child education should also put more stress on adult education mainly education among mothers. That can be done through Local panchayat or NGOS. The government needs to take strong steps in this matter so that girls get proper education and thus the next generation receive proper schooling and can work as skilled workers in their adult age through improving their learning ability. According to RTE guidelines, a school must have a playground, proper drinking water, sanitation, Mid-day meal facility but unfortunately, some places are still lacking this amenity. But these items in school can make a child more attractive and (s)he can devote more quality time to school education. It is required to find out whether the benefit of this policy can be reached to every corner of society. The demographic dividend of India's population can be achieved if and only if the learning outcomes of the children improve so that in their adulthood they can work as skilled workers.

In this chapter, an analysis is done on learning outcomes achieved in rural primary schools and the various household and school-related factors that influence the academic achievement attained in primary school over the last ten years. The next chapter will focus on the impact of children's health, measured by stunting, wasting and underweight and other socioeconomic factors and school-level infrastructure on the academic achievement attained by rural Indian children after completion of primary education.

8.7 Appendix:

Table-A1: Descriptive statistics of both the explained and explanatory variables:

Statistic/ Year	2010	2012	2014	2016
Learning Outcome Index for standard III student (LOI_1)				
Mean	26.045	23.467	22.015	23.420
Cv	0.4099	0.4198	0.4448	0.4121
Median	22.525	24.025	21.41	22.06
Min	11.19	6.6	6.3	7.54
Max	51.2	40.66	42.07	46.67
Min State	Tamil Nadu	Uttar Pradesh	Uttar Pradesh	Uttar Pradesh
Max State	Mizoram	Kerala	Himachal Pradesh	Himachal Pradesh
Learning Outcome Index for standard V student (LOI_2)				
Mean	43.747	32.974	32.075	32.463
Cv	0.3005	0.3786	0.3316	0.3454
Median	44.745	32.515	32.13	32.825
Min	20.87	15.26	16.5	14.2
Max	69.74	58.12	52.06	55.63
Min State	Tamil Nadu	Uttar Pradesh	Meghalaya	Arunachal Pradesh
Max State	Punjab	Punjab	Himachal Pradesh	Himachal Pradesh
Percentage of households which have a pucca house (PH)				
Mean	28.754	32.895	39.170	40.895
Cv	0.6781	0.7047	0.6682	0.6280
Median	21.4	26.05	34.55	35.3
Min	2.4	2	5.9	5.4
Max	61.5	78.3	90.4	84.6
Min State	Tripura	Tripura	Mizoram	Mizoram

Max State	Tamil Nadu	Kerala	Kerala	Tamil Nadu
Percentage of households which have electric connection (EC)				
Mean	79.462	82.462	87.4	88.95
Cv	0.2339	0.1876	0.1510	0.1221
Median	85.65	86.2	91.9	93.35
Min	38.2	39.8	49.8	56.9
Max	99.1	98.4	99.2	99.3
Min State	Bihar	Bihar	Bihar	Uttar Pradesh
Max State	Himachal Pradesh	Punjab	Punjab	Punjab
Percentage of households which have proper sanitation (PS)				
Mean	52.712	54.175	59.762	67.320
Cv	0.4461	0.4815	0.4515	0.3287
Median	51.7	53.65	57.65	65.2
Min	15	10.6	9.7	21.7
Max	96	97	97.8	97.8
Min State	Jharkhand	Jharkhand	Jharkhand	Jharkhand
Max State	Kerala	Kerala	Kerala	Kerala
Percentage of schools complying with Pupil-teacher ratio (PTR_{it})				
Mean	50.12	53.308	58.654	60.579
Cv	0.494	0.4605	0.382	0.3537
Median	50.65	52.45	60.35	60.05
Min	8.8	8.5	12.7	11.7
Max	91.9	93	96.6	97.1
Min State	Bihar	Bihar	Bihar	Bihar
Max State	Nagaland	Nagaland	Kerala	Nagaland
Percentage of schools with playground facility (P_{it})				
Mean	61.625	59.954	63.88	64.383
Cv	0.2351	0.2672	0.236	0.237
Median	61.35	58.75	65.2	66.8

Min	37.9	31.4	32.4	29.2
Max	89.5	92	88.3	89.9
Min State	Jharkhand	Odisha	Odisha	Odisha
Max State	Tripura	Tripura	Maharashtra	Maharashtra
Percentage of schools with availability to proper drinking water ($DW_{it,}$)				
Mean	65.041	66.229	68.829	67.7458
Cv	0.3109	0.3340	0.3079	0.3056
Median	72.05	73.8	77.3	75.55
Min	5.1	7.1	15.7	15.3
Max	85.7	85.1	90.4	89.5
Min State	Manipur	Manipur	Manipur	Manipur
Max State	Kerala	Kerala	Bihar	Bihar
Percentage of schools with proper toilet facilities available and useable (TS_i)				
Mean	46.162	55.108	64.283	68.05
Cv	0.2781	0.2315	0.2352	0.2049
Median	46	52.5	63.75	69.3
Min	24.5	31.7	33.7	40
Max	67.9	75.7	84.8	85.5
Min State	Meghalaya	Meghalaya	Mizoram	Mizoram
Max State	Haryana	Kerala	Kerala	Haryana
Percentage of schools where Mid-day meal is served on the day of visit (MTMit)				
Mean	80.987	81.595	78.745	82.283
Cv	0.2516	0.259	0.270	0.2440
Median	93.15	91.75	87.2	91.75
Min	31.9	30.5	24.1	24.6
Max	100	99.8	99.8	99.5
Min State	Nagaland	Meghalaya	Nagaland	Nagaland
Max State	Kerala	Tamil Nadu	Tamil Nadu	Andhra Pradesh
Mother Schooling Over Time (ME)				
Percentage of mother's who are illiterate (MEI)				

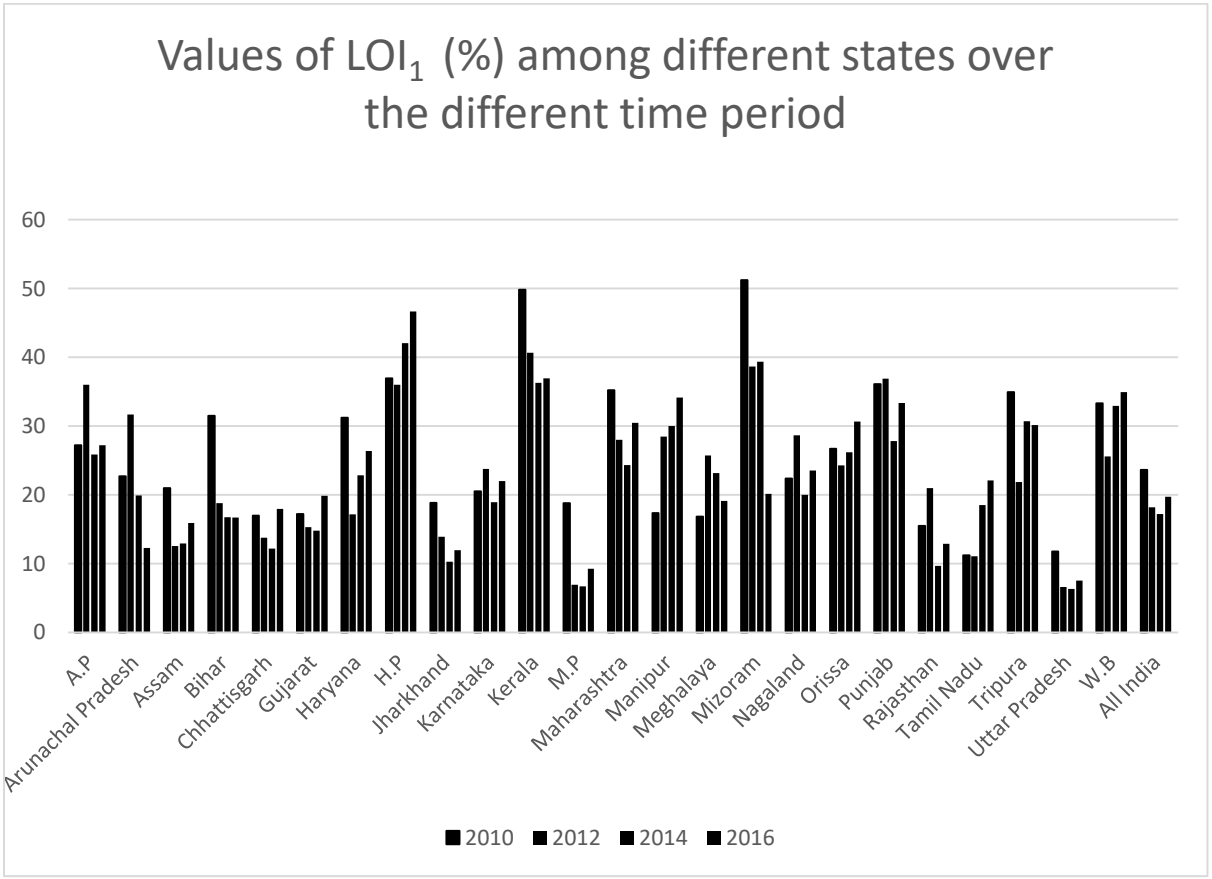
Mean	39.308	39.3125	37.616	35.329
Cv	0.4335	0.4447	0.4941	0.4847
Median	40.9	39.45	36.65	34.65
Min	1.0	1.4	0.9	1.3
Max	68.9	71.2	69.7	68
Min State	Kerala	Kerala	Kerala	Kerala
Max State	Rajasthan	Rajasthan	Rajasthan	Rajasthan
Percentage of mother's who have attained school education till Standard V(MEV)				
Mean	19.379	17.679	16.895	16.120
Cv	0.2245	0.3194	0.3309	0.3161
Median	19.5	17.2	16.35	15.05
Min	5.3	5	3.4	3.7
Max	26.7	30.1	27.6	28.7
Min State	Kerala	Kerala	Kerala	Kerala
Max State	Meghalaya	Mizoram	Mizoram	Mizoram
Percentage of mother's who have attained school education till standard X (MEX)				
Mean	33.25	34.245	35.291	36.991
Cv	0.3720	0.3425	0.3336	0.3055
Median	32.6	35.55	37.15	38.85
Min	12.9	13.2	14.5	15.3
Max	61.2	57.5	53.8	54.7
Min State	Rajasthan	Rajasthan	Rajasthan	Rajasthan
Max State	Kerala	Kerala	Mizoram	Kerala
Percentage of mother's whose education qualification is above Standard X (MEX_{+})				
Mean	8.075	8.775	10.204	11.5875
Cv	0.8210	0.8088	0.8499	0.7483
Median	6	6.6	7.35	8.1
Min	3	2.5	3	3.4
Max	32.5	36.1	42.7	40.3
Min State	Chhattisgarh	Rajasthan	Jharkhand	Rajasthan

Max State	Kerala	Kerala	Kerala	Kerala
Father Schooling Over Time (FE)				
Percentage of father's who are illiterate (FEI)				
Mean	24.491	23.662	23.083	22.325
Cv	0.4519	0.4231	0.4995	0.4546
Median	26.05	25.1	22.8	24.5
Min	0.4	1.3	1.1	1.6
Max	42	41	51	41.2
Min State	Kerala	Kerala	Kerala	Kerala
Max State	Meghalaya	Meghalaya	Arunachal Pradesh	Meghalaya
Percentage of father's who have attained school education till Standard V (FEV)				
Mean	16.666	16.666	15.483	14.866
Cv	0.2731	0.3178	0.3367	0.3029
Median	16.9	16.4	14.7	14.05
Min	5.6	7.7	6.9	6.9
Max	24.5	27.6	28.2	24.2
Min State	Manipur	Manipur	Kerala	Kerala
Max State	West Bengal	Tripura	West Bengal	Mizoram
Percentage of father's who have attained school education till standard X (FEX)				
Mean	41.675	42.295	42.725	43.433
Cv	0.2126	0.1850	0.1896	0.1557
Median	39.65	39.85	40.55	41.05
Min	29.1	28.2	26.6	31.7
Max	68	63.9	62.1	62.7
Min State	Meghalaya	Meghalaya	Arunachal Pradesh	Meghalaya
Max State	Kerala	Kerala	Kerala	Kerala
Percentage of father's who have achieved education qualification above Standard X (FE X_{+})				
Mean	17.191	17.379	18.729	19.395
Cv	0.3628	0.3377	0.3830	0.3808

Median	15.15	15.85	16.9	17.05
Min	9.1	9.3	9	8.0
Max	35.8	30.3	34.6	38.5
Min State	Jharkhand	Meghalaya	Arunachal Pradesh	Meghalaya
Max State	Manipur	Himachal Pradesh	Himachal Pradesh	Himachal Pradesh

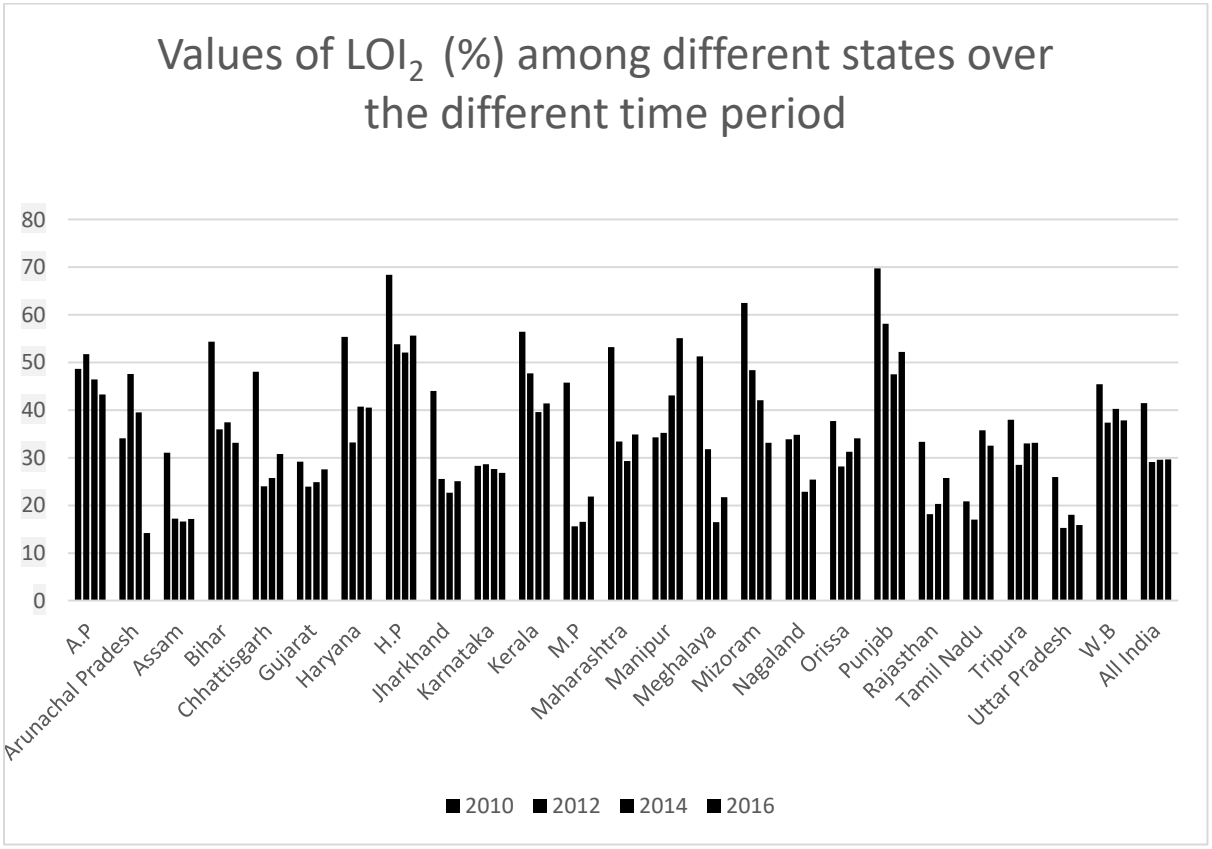
Source: Calculated by the author on the basis of the data given in ASER Report in different year.

Figure A1: Values of LOI_1 (%) among different states over the different time period



Source: Calculated by the author on the basis of the data given in ASER Report in different year.

Figure A2: Values of LOI_2 (%) among different states over the different time period



Source: Calculated by the author on the basis of the data given in ASER Report in different year.

CHAPTER 9: NEXUS BETWEEN CHILDREN'S MALNUTRITION AND THEIR ACADEMIC ACHIEVEMENT AT THE PRIMARY LEVEL IN RURAL INDIA

Nexus between Children's Malnutrition and their Academic Achievement at the Primary Level in Rural India.

9.1 Introduction:

In the previous chapter, an investigation is done on learning outcomes achieved in rural primary schools and the influence of various household and school-related factors on the academic achievement attained over the last ten years. This chapter attempts to identify the influence of children's health, measured by stunting, wasting and underweight and other socioeconomic factors such as household characteristics, parental education, and school-level infrastructure on the academic achievement of rural Indian children after completion of primary education. Learning outcome is the best indicator of learning because it shows what learners have actually learnt after completion of the class. Children must acquire quality education to increase their knowledge and develop their skills which will lead to the creation of human capital in the economy in the long run. (Grant, Catherine, 2017). Schooling is a tool for developing children's potential and preparing them for responsible citizenship in a globalized society. (Joyner & Lawson, 1986). The growth of human capital is not ensured by enrolment alone. The term "human capital" alludes to the knowledge, abilities, and skills that persons own and can use to advance their career and personal development as well as the development of the nation as a whole. Children must acquire quality education to increase their knowledge and develop their skills which will lead to the creation of human capital in the economy in the long run. (Grant, Catherine, 2017). The focus should extend beyond just increasing enrolment rates, and towards providing individuals with access to high-quality education that can equip them with the skills and knowledge required to succeed in a rapidly evolving global economy. Galor and Zeira (1993) highlighted the importance of the value of human capital in fostering sustainable economic growth. According to them, the development of human capital is a major contributor to economic growth and is driven by an array of factors, including the amount invested in education, the educational quality, and the pace of technological advancement. A strong foundation in primary education is crucial for children, as it sets the stage for their future academic and professional success. Even with high enrolment rates, if education quality is compromised, children may lack the necessary skills and knowledge required to thrive in the labour market. As a result, it is imperative to prioritize both improving education quality and increasing investment in education.

This approach will support the development of human capital and promote long-term economic growth, thereby benefiting individuals and society as a whole. Educational achievement plays a crucial role in the economic, political and social development of the economy. Primary education is the base for the development of the consciousness and personality of the child. Quality education at the primary level could affect the quality of life of children in the long run. The Sarva Shiksha Abhiyan (SSA) launched in 2001 is a flagship program initiated by the Indian government to encourage learning outcomes in primary schools in rural India. Under the SSA, the government provides financial support to state governments to strengthen infrastructure, appoint more teachers, and provide free textbooks and uniforms to students. The program also includes initiatives such as the setting up of residential schools for girls, mid-day meal schemes, and special training programs for teachers. The government has also introduced the National Programme for Education for Girls at Elementary Level (NPGEL) to reduce gender disparities in education. The program aims to improve access to education for girls in rural areas and included initiatives such as the setting up of residential schools, gender-sensitization training for teachers, and free textbooks and uniforms. Various schemes had increased education attainment over the years but only getting into school is not enough, government need to shift the perspective from educational attainment to educational achievement for the overall development of the child. Now Gross Enrolment Ratio (GER) of children in primary education covering rural India over the recent time in most of the districts is above 0.8 (Biswas & Kundu, 2022) but the learning outcome of rural children even after completion of primary school is not so impressive (Biswas & Kundu, 2018). At present investment in human capital should not be confined to enrolment alone but one should give more stress on the learning outcome of the child in the primary level as enrolment is not sufficient for generating human capital or skilled labour in the adulthood of a child.(Galor and Zeira,1993). Thus, attaining quality education at the primary level is crucial for the long-term development and prosperity of any country.

Mortality and morbidity among children under the age of five are significant concerns in emerging nations, as they are strongly linked to the overall standard of living. (Shariff, Bond & Johnson, 2000). According to a United Nations International Children's Emergency Fund (UNICEF) report, undernutrition is a leading cause of child mortality globally, responsible for at least 50 % of all child deaths (UNICEF, 2008). In 2016, the joint child malnutrition estimates provided by UNICEF, WHO and the World Bank (WB) reported that a staggering 155 million

children under the age of five were affected by stunted growth, while 52 million children suffered from wasting. This highlights the pressing issue of child malnutrition on a global scale. (UNICEF-WHO-WB, 2017). Malnutrition remains a significant contributor to child mortality and developmental obstacles in India, as it does in many other mainly developing countries. The findings of the third National Health and Family Survey from 2005-06 in India indicated that almost half of all children in the country suffer from undernourishment, underscoring the urgent need for effective interventions to address this widespread issue. (NFHS-3, 2005-06). The probability for children to attend primary school rises as the mortality rate for children under five has decreased dramatically in the developing world. A child's health is a key indicator of the child's academic achievement. De and Chattopadhyay (2019) have shown that rural children in India are more vulnerable to malnutrition because they receive food having low nutritional values and with this, they also face discriminatory distribution of food within the household. Malnutrition weakens the body's ability to defend against diseases and infections and hinders the essential nutrient absorption process. This results in stunted growth, both physically and mentally, which can have adverse effects on a child's development and learning abilities in the future (Lloyd-Still, Hurwitz, Wolff & Shwachman, 1974; Chatterjee & Saumitra, 2016). This further reduces the body's immunological capacity, creating a potentially life-threatening situation. The problem of malnutrition among rural children not only obstructs the normal growth and development of children but also has a long-term impact on his/her future health. In September 2000 the United Nations Declaration was signed among 189 member countries in addressing eight goals, most of which directly address the issue of maternal health, child nutritional status and primary education. India is also a signatory to the Millennium Development Goal (MDG) and has laid policies which gyrate around achieving the objectives laid down by the United Nations (UN) Mandate.

Traditionally stunting, wasting and being underweight have been used as anthropometric indicators of undernutrition among children. This chapter will try to investigate whether undernourishment (measured by stunted, wasted or underweight) among children may affect their quality of education at the primary level. Our study also attempts to identify the influence of other socioeconomic factors such as household characteristics, parental education and school-level infrastructure on academic achievement through an empirical cross-sectional analysis covering

352 rural-dominated districts of India and also presents policy recommendations based on the findings.

The rest of the chapter is organized as follows: Section 9.2 is on Literature review and research hypothesis, Section 9.3 presents the Data and methods used in our study, Section 9.4 explains the model used and Section 9.5 explains the study's result and empirical findings obtained and finally, Section 9.6 presents the conclusions and policy recommendations based on our findings.

9.2 Literature Review and Research Hypothesis:

According to reports, the biggest challenges faced by education planners in developing economies is the high percentage of school dropout even at the elementary level and the subpar academic performance of those who finish primary schooling. (Verspoor, 1990). Child nutritional balance plays a pivotal role in endurance, physical growth, cognitive development and learning achievement. (Nyarad *et al*, 2013). Malnutrition among children constitutes one of India's most serious concerns. (Srivastava, 2012). Low height-for-age (stunting)[54], inadequate weight for height (wasting) and low weight compared to age (underweight) are the most commonly used measures of malnutrition (WHO, 2016). As per the World Health Organization (WHO), Stunting[55] is defined as the percentage of children aged 0-59 months whose height for age is less than minus two standard deviations (-2 SD) from the median of the WHO child growth standard. Similarly wasting is defined as the percentage of children aged 0-59 months whose weight for height is less than minus two standard deviations (-2 SD) from the median of the WHO child growth standard. Lastly, underweight[56] is defined as the percentage of children aged 0-59 months whose weight for age is less than minus two standard deviations (-2 SD) from the median of the WHO child growth standard. Thus stunting, wasting and being underweight affect several areas

[54]The consequences of child stunting are both immediate and long term and include increased morbidity and mortality, poor child development and learning capacity, increased risk of infections and non-communicable diseases, increased susceptibility to accumulate fat mostly in the central region of the body, lower fat oxidation, lower energy expenditure, insulin resistance and a higher risk of developing diabetes, hypertension, lowered working capacity and unfavorable maternal reproductive outcomes in adulthood. Furthermore, stunted children who experienced rapid weight gain after 2 years have an increased risk of becoming overweight or obese later in life.

[55]Stunting is usually associated with poverty, poor maternal health and nutrition, frequent illness and/or inappropriate feeding and care in early life. Stunting prevents children from reaching their physical and cognitive potential.

[56]An underweight child may be stunted, wasted or both

of the child's overall development. (Bhattacharya, 2000). Undernourishment is an important indicator of child health which may affect the quality of education of a child at the primary level. (Zaini *et al.*, 2005). There is a close association between malnutrition and various areas of a child's academic achievement among the school-age population in less developed countries. (Fanjiang & Kleinman, 2007; Prangthip, Soe & Signar, 2019). The relationship between the nutritional status and academic performance of any school-age child has little been investigated. Galal & Hulett, (2003) gave importance to investigating whether there exists any relationship between children's nutritional status and their educational achievement. They had shown that undernourished children have lower attendance, slower attention span in class and lower performance in academic achievement than their well-nourished counterparts. Traditionally 'stunting', 'wasting' and 'underweight' are three important indicators that have been used as anthropometric indicators of the undernutrition of any child (Bhattacharya, 2000). Various studies have explored the association between nutrition, health and academic achievement of the school-age population (Shariff, Bond & Johnson, 2000; Glewwe, Jacoby & King, 2001; Alderman *et al.*, 2016) but none of these studies was done covering the Indian economy. The dearth of empirical studies on the association between child health and education achievement covering Indian rural districts makes this study an important contribution to the existing literature.

9.3 Data and Methods:

Data Source:

National Achievement Survey (NAS) is a sample-based survey covering 1.24 lakh schools across 733 districts by GOI for collecting information about the learning achievement of Standard III, V, VIII and X level students with a cycle period of three years. NAS, 2021 was conducted on 12th November 2021 on government, government-aided and unaided private schools including central government schools. We have chosen Standard V level students for our study as this grade is the crucial level of education as it is the first year after completion of primary school education in India. Analyzing the education achieved at this level will help us to understand the amount of knowledge the student gathered from primary education. In general students of standard 5 are mainly nine or ten years of age considering no detention policy as per the existing education

system in India.[57] Now for considering the data on child health status, we have considered the National Family Health Survey (NFHS-4) data which was conducted by the Ministry of Health and Family Welfare covering approximately 610,000 households across 640 districts to collect data on important health and family welfare issues needed for policy and programme purpose. NFHS-4 fieldwork was conducted from 20th January 2015 to 4th December 2016 and it portrays the malnutrition indicator of under 5 years children who are stunted, wasted, and underweight and also the health indicator like whether fully immunized from major diseases or not, etc. So, to get the relationship between academic achievement and the nutrition status of the child we have considered learning outcomes attained in 2021(NAS Survey conducted on 21st Nov 2021) with child nutrition condition and vaccination condition of under 5 children from NFHS-4 data (conducted from 20th January 2015 to 4th December 2016). Data on women with ten or more years of schooling and household with electricity connections are collected from the NFHS-5 dataset. Data on the availability of female teachers, pupil-teacher ratio and availability of Mid-day meals in school are collected from DISE Statistics (2015-16).[58] As under V levels, children's nutrition status data are mentioned in the NFHS report so we have considered NFHS data for 2015-16 and academic achievement data of educational achievement of 2019-20 as five years is required for the under-five children to reach class 5 level standard considered in our study (no detention policy).

Traditionally stunting, wasting and being underweight have been used as anthropometric indicators of undernutrition among children. If more percentage of stunting or wasting or underweight is observed in any certain geographical area, then the problem of undernutrition among children in that economy is alarming. Stunting[59], wasting[60] and underweight children of an economy are macro-specific variables. Here the lowest possible macro-specific unit is

[57] Section 16 of the RTE Act states that "no child can be detained or held back in a class until the completion of his or her elementary education up to class grade 8"

[58] DISE Report Card of 2015-16 is the latest available Report Card on district-wise students' data.

[59]Stunting reflects chronic or recurrent undernutrition during the most critical periods of growth and development in early life. It reflects a failure to receive adequate nutrition over a long period

[60]Wasting reflects acute undernutrition. It represents the failure to receive adequate food intake or a recent episode of illness causing loss of weight and the onset of malnutrition.

'district' which is here considered a unit for our investigation. Our study is based on district-level data where the district is considered as a unit. Actually, in India, there is no unit-level secondary data of NSSO using which one can investigate the relationship between the learning outcome of a child and its health condition. Based on this constraint of unavailability of data, the above-mentioned relationship is addressed by considering the district as a unit.

Identification of Rural Districts:

We have identified those districts as rural people-dominated districts which have above 50 % of people of the total population living in rural areas. (Report, Census, 2011) According to the Census Report (2011), a district is regarded to be an urban district if at least 75% of the districts male main working population is employed in non-farming occupations and less than 25% of the male main working population is employed in agricultural and related activities. Out of 472 districts from sixteen major states, we found 120 districts as being dominated by urban people and 352 districts as being dominated by rural people based on this classification. For example, let us consider Andhra Pradesh which comprises thirteen districts out of which twelve districts have been identified as the rural people-dominated districts where above 50 % of the population is living in rural areas and above 75 % of the main working population are engaged in agricultural and allied work and only one district (Vishakhapatnam) is identified as an urban district. This same criterion holds for considering the rural people-dominated districts or rural districts for the rest of the sixteen major states considered in this study.

Methodology:

The intensity of malnutrition among the children in a particular district in a particular time period is indicated by the percentage of children who are stunted or wasted or underweight in that particular district in that time period. In the Indian context, the NFHS survey provides valuable insights related to health-related matters. We first considered the percentage of pregnant women whose BMI is below normal, the percentage of pregnant women aged 15-49 who are anaemic and the percentage of pregnant mothers who had at least 4 antenatal care visits as possible instruments for child nutritional status. In the first stage, we checked whether the instruments selected are strong and valid instruments correlated with the endogenous term but uncorrelated with the error term or not. Then we replaced our predicted values of the endogenous variables to investigate the impact of socioeconomic factors such as household characteristics, parental

education, and school-level infrastructure on academic achievement through an empirical cross-sectional analysis.

Outcome Variable:

Quality of education is very important for economic development. The quality of education of a child at the primary level indicates his/her acquired basic knowledge of reading ability and basic mathematical skills. Here the quality of education is represented based on the Learning Outcome Index.

Learning Outcome Index (gloi**)-**The educational achievement of children in a particular district in this study is assessed by taking the geometric mean of the literature score and mathematics scores of standard V-level children of the particular district. For Example, the Learning Outcome Index of Bankura district of West Bengal is calculated by taking the geometric mean of reading ability[61] and mathematical ability[62] of standard V-level children. This variable is presented in percentage form in our model.

Possible factors which may influence Academic Achievement in Primary Schools in Rural India:

Theoretical explanations for taking into account the necessary explanatory variables required for our study and possible ways in which they might affect learning outcomes attained at the primary level in rural India are narrated below. All the variables considered in our model are presented in percentage form in our model.[63]

[61] The reading ability of a particular district is calculated by considering the percentage of sample children of that district who can read the text with comprehension and sequence of events.

[62] The mathematical Ability of a particular district is calculated by considering the percentage of children of that district who can estimate the sum, difference, product and quotient of numbers and verifies the same using different strategies like using standard algorithms or breaking a number and then using the operation

[63] Gender discrimination within the household of the particular district cannot be considered here due to the unavailability of data on all the identified 352 rural districts of India in a particular time period.

Child nutritional imbalance is measured by stunting, wasting and being underweight. The district-wise data considered for this investigation are extracted from NFHS-4 (2015-16) for under-five-level children. As the academic achievements of the standard V-level children are obtained from the National Achievement Survey of 2019-20 and at least 5 5-year gap is required for the sample children of NFHS-4(2015-16) to reach the standard V level under the no retention policy. Undernutrition in children can have long-lasting effects, even after five years. If a child experiences undernutrition during their early years, it can lead to stunted growth, cognitive impairments, a weakened immune system, and increased vulnerability to diseases. These effects can persist into later childhood and even adulthood if proper intervention and nutritional support are not provided. Undernutrition in children can have long-lasting effects, even after five years. (Martins *et al.,* 2011). Stunting is a measure of chronic undernutrition and is typically determined by comparing a child's height for age to a reference population. Inadequate nutrition, prolonged malnutrition, poor feeding practices and inadequate diet diversity which hinder proper growth and development are the main causes of stunting measures of undernutrition. Wasting refers to acute undernutrition and is measured by low weight-for-height or low mid-upper arm circumference (MUAC). The main causes of wasting include inadequate calorie intake, or lack of access to a diverse and nutrient-rich diet, acute illness and infections, and poor infant and child feeding practices. Underweight refers to a general term encompassing both stunting and wasting indicating insufficient overall nutritional intake. Stunting, wasting, and being underweight are distinct terms used to describe different conditions related to malnutrition so the undernourishment of a child measured by stunting (st) or wasting (wt) or undernutrition (unw) is considered as an explanatory variable but not in a single equation but separately and they have different impacts and causes. In our model, these three variables here are treated as possible endogenous variables as malnutrition of a child happens due to several reasons in rural India.

Household-Related Factors:

- Parental Support in Educational Achievement(ps**)**: Numerous studies demonstrate that parental support plays a pivotal role in children's academic achievement, even after other factors that affect learning outcomes have been taken out of consideration, including the quality of schools at the primary age ((Desforges & Abouchaar, 2003; Mahuro & Hungi,

2016). The motivation of parents is also an important tool in achieving quality education for their children. (Kundu & Dutt, 2014**).**

- Women with ten or more years of schooling (yrmore): Literate mothers serve as positive role models for their children by inspiring them to value education and strive for academic success. There is a positive correlation between the academic achievements of a child and the educational attainment of their mother, especially if the mother has completed ten or more years of schooling. (Pianta & Harbers, 1996; Coffey *et al.*, 2016).
- Household with electricity Connection(elec): A study conducted in Kenya found that students who had access to electricity at home were more likely to have higher test scores and better academic performance than those who did not have access to electricity (Simiyu *et al.*, 2017). Another study conducted in rural India found that providing electricity to households in the community led to improvements in children's educational outcomes, including increased school attendance and higher test scores (Nair & Mishra, 2023). A similar study conducted in Ghana found that students who had access to electricity at home were more likely to complete their homework assignments and had higher grades than those who did not have access to electricity (Owusu-Manu *et al*., 2019). Lack of access to electricity is a major barrier to education in many developing countries, and providing electricity to households and schools can lead to improvements in educational outcomes. (Kanagawa & Nakata, 2008).
- Fully Immunized (fi**)**: There have been some studies that have explored the relationship between under five fully immunized children and their academic achievement. According to the World Health Organization (WHO) guidelines, children who are fully immunized with all basic vaccinations have a healthier life compared to their counterparts.

Per capita district domestic product which can be used as a proxy of the district-level per-capita income of the household of that particular district cannot be considered here due to the unavailability of data on all the identified 352 rural districts of India in a particular time period.

School-Related Factors:

- Student Understanding (un)**:** Student understanding is essential for academic achievement in primary school. It helps students engage in active learning, build a

foundation for future learning, develop critical thinking skills, boost self-esteem, and stay motivated to learn.

- Adequate instructional material and supplies for teachers (tlm**)**: Teachers with appropriate resources can educate more effectively making learning more exciting for students. The availability of adequate instructional material supplied for teachers may also motivate parents to send their children to school as it can reduce the direct cost of education.
- Adequate qualified staff of Schools (tstaff**):** Adequate and qualified teaching staff is crucial for academic achievement in primary school. It enables effective instruction, personalized attention, a positive learning environment, teacher professional development, and positive role models for students. School and education systems should prioritize the recruitment and retention of qualified teachers to ensure that all students have access to high-quality education.
- Pupil-Teacher Ratio (ptr**)**: Pupil-teacher ratio is an important factor that can impact the quality of education in schools. A lower ratio can provide individualized attention, improve classroom management, reduce teacher workload, and enhance student performance.
- Availability of Midday Meals in School (mdm): The government of India launched the Midday meal scheme in August 1995 for the students of government primary schools to provide them with nutritional support, and to improve school enrolment and retention of children in school. This scheme has the potential to catalyse children from all socioeconomic backgrounds to attend school, as it addresses the issue of hunger and incentivizes parents to send their children to school (Dreze & Goyal, 2003; Khera, 2007).
- Availability of Female Teachers (ft): Research has shown that girls tend to feel more comfortable learning from teachers of the same gender. (Muralidharan & Sheth, 2013). The gender of a primary school teacher can significantly impact students' sense of connection with their educators, particularly in rural areas. This can be particularly beneficial for girls, as having a female teacher may encourage even conservative parents to prioritize their daughter's education and send them to school. (Muralidharan, 2013).

Mother is the only source of nutrition for fetal growth including the brain development of the child. Thus, the potential determinant of a child's overall development depends on the mother's nutritional status before and during the pregnancy. There is a strong association between maternal

nutritional status during pregnancy and the offspring's cognitive function during childhood (Veena *et al*., 2016). Various studies examine the association between maternal anthropometry with child cognitive function. (Tavris & Read, 1982; Neggers *et al*., 2003; Basatemur, 2012; Hinkle *et al*. 2012; Craig *et al.*, 2013; Huang *et al*. 2014)

To eradicate the endogeneity problem, we consider maternal health during pregnancy as a strong and valid instrument with good statistical properties for child nutritional status denoted by the stunting, wasting and underweight measures of malnutrition.

- Pregnant Women whose BMI is below normal (bmis): The nutritional condition of a mother's unborn child is directly correlated with her nourishment during pregnancy. The risk of infant malnutrition increases if the mother is underweight because she may lack the nutrients needed to support the growth and development of her baby. Low body mass index (BMI) among mothers in Bangladesh was identified as a significant risk factor contributing to low birth weight and stunting in infants (Research article published in the Journal of Health, Population and Nutrition, 2011). Another literature review published in the International Journal of Environmental Research and Public Health in 2020 emphasized that improving a mother's nutrition during pregnancy could potentially mitigate the adverse effects of infant malnutrition. The review chapter examined the existing evidence connecting maternal undernutrition, as indicated by a low BMI, with unfavourable pregnancy outcomes and child health issues, including child malnutrition. These studies offer compelling evidence for the connection between low BMI in expectant women and child malnutrition, emphasizing the necessity of maternal undernutrition treatments to support healthy pregnancy outcomes and ideal child growth and development. The source of this data is NFHS-4.
- Pregnant women aged 15-49 who are anaemic (anem): Child malnourishment and anaemic pregnant women are strongly correlated. The health and growth of the unborn child can be impaired by the anaemia of the expectant mother. Poor placental growth brought on by anaemia during pregnancy may result in decreased fetal blood flow and nutrition distribution. In this case, it might also lead to inadequate embryonic growth and development. Preterm delivery, low birth weight, and perinatal death are all risk factors for infant malnutrition and can all be increased by anaemia during pregnancy. Low birth

weight or prematurely born babies are more likely to experience malnutrition because they may have trouble feeding, have weakened immune systems, and are more prone to illnesses. A comprehensive review and meta-analysis of data from 29 studies, published in The American Journal of Perinatology in 2018, showed that anaemia during pregnancy was linked to a 29% higher risk of low birth weight and a 56% higher risk of preterm delivery. Another study published in the journal BMC Pregnancy and Childbirth in 2019 found that anaemia during pregnancy was significantly associated with stunting, wasting, and being underweight in children under the age of 5 years in Ethiopia. The study concluded that addressing anaemia during pregnancy is crucial for reducing the burden of child malnutrition. Various other studies also addressed this same issue. (Kiple& Kiple, 1977; Pandit, Galande & Iris, 2021). The source of this data is also NFHS-4.

- Pregnant mothers who had at least 4 antenatal care visits (anc3): As prescribed by the World Health Organization (WHO) a pregnant woman should have at least four antenatal care visits during her pregnancy under normal circumstances (Focused Antenatal Care Model (FANC,2002)). However, the new model of WHO (2016) has suggested that pregnant women must visit a minimum of eight antenatal care (ANC) units during their pregnancy. A study conducted during 2015-16 which analyses the impact of antenatal care and low birth weight in rural Nepal found that mothers who didn't visit ANC or visited less than four times during pregnancy are more likely to have low birth weight (LBW) baby compared to their counterparts (Zhou *et al*., 2019). Another study conducted in sub-Saharan African countries also portrays a statistically significant relationship between ANC and LBW (Weyori *et al.*, (2022). Various other works of literature also reflect this statistically significant association between ANC and child health. Thus, ANC visit during pregnancy is an important determinant for a healthy mother and her offspring.

9.4 Two-Stage Least Squares(2SLS) Regression Model:

Nutritional deficiency of the baby as measured by stunting, wasting or being underweight is treated as an endogenous explanatory variable that may affect the academic achievement of the child (which is here considered as an outcome variable) but is correlated with the disturbance term. The disturbance term in this model accommodates some factors like food security, hygiene in school and at home, poverty, environmental factors etc. which may affect the child's learning outcome but cannot be considered as explanatory variables due to lack of data availability. We consider the mother's health condition during pregnancy (Z) as an instrument which can influence 'st' and 'wt' but is uncorrelated with the error term, u of our structural model. Our instruments are correlated with our endogenous variable stunting, wasting and underweight indicator of malnutrition (shown in table) as found from the first stage reduced form equation. The estimated values of the endogenous variables from the first estimation are used to estimate our main structural equation in the second stage of regression using two SLS estimation techniques. Usually, the main sources of endogeneity problems arise when the factors related to exogenous variables that predict the outcome variables are omitted from the regression model or when the independent variables are measured with error. (Woolridge, 2002)

We assume that $st, wt\ and\ unw$, are endogenous variables of Equation 1, Equation 2 and Equation 3 respectively.

Here 'i' implies the sample district and 'j' implies the factor. The structural equations considered to address the research problems are as follows:

For Model 1:

$$\mathrm{gloi}_{ij} = \alpha_0 + \alpha_1 \mathrm{st}_{ij} + \alpha_2 \mathrm{ps}_{ij} + \alpha_3 \mathrm{un}_{ij} + \alpha_4 \mathrm{tlm}_{ij} + \alpha_5 \mathrm{tstaff}_{ij} + \alpha_6 \mathrm{ptr}_{ij} + \alpha_7 \mathrm{yrmore}_{ij} + \alpha_8 \mathrm{elec}_{ij} + \alpha_9 \mathrm{mdm}_{ij} + \alpha_{10} \mathrm{fi}_{ij} + \alpha_{11} \mathrm{ft}_{ij} + \mu 1_{ij} \ldots\ldots \mathrm{Eq.\,1}$$

$$\mathrm{st}_{ij} = \delta_0 + \delta_1 \mathrm{bmis}_{ij} + \delta_2 \mathrm{anem}_{ij} + \delta_3 \mathrm{anc3}_{ij} + \nu 1_{ij} \ldots\ldots \mathrm{Eq.\,1A}$$

For Model 2:

$$\mathrm{gloi}_{ij} = \beta_0 + \beta_1 \mathrm{wt}_{ij} + \beta_2 \mathrm{ps}_{ij} + \beta_3 \mathrm{un}_{ij} + \beta_4 \mathrm{tlm}_{ij} + \beta_5 \mathrm{tstaff}_{ij} + \beta_6 \mathrm{ptr}_{ij} + \beta_7 \mathrm{yrmore}_{ij} + \beta_8 \mathrm{elec}_{ij} + \beta_9 \mathrm{mdm}_{ij} + \beta_{10} \mathrm{fi}_{ij} + \beta_{11} \mathrm{ft}_{ij} + \mu 2_{ij} \ldots\ldots \mathrm{Eq.\,2}$$

$$wt_{ij} = \lambda_0 + \lambda_1 bmis_{ij} + \lambda_2 anem_{ij} + \lambda_3 anc3_{ij} + \nu 2_{ij} \ldots\ldots \text{Eq. 2A}$$

For Model 3:

$$gloi_{ij} = \gamma_0 + \gamma_1 unw_{ij} + \gamma_2 ps_{ij} + \gamma_3 un_{ij} + \gamma_4 tlm_{ij} + \gamma_5 tstaff_{ij} + \gamma_6 ptr_{ij} + \gamma_7 yrmore_{ij} + \gamma_8 elec_{ij} + \gamma_9 mdm_{ij} + \gamma_{10} fi_{ij} + \gamma_{11} ft_{ij} + \mu 3_{ij} \ldots\ldots \text{Eq. 3}$$

$$unw_{ij} = \pi_0 + \pi_1 bmis_{ij} + \pi_2 anem_{ij} + \pi_3 anc3_{ij} + \nu 3_{ij} \ldots\ldots \text{Eq. 3A}$$

Summary statistics of both the explanatory variable and explained variables are presented in Appendix Table 2. In econometrics, an instrumental variable is a variable that is used as a substitute for an endogenous variable, which is a variable that is potentially affected by unobserved factors or measurement error. The instrumental variable is chosen based on its ability to satisfy two conditions: first, it must be correlated with the endogenous variable and second, it must be uncorrelated with the error term in the regression model. (Greene, 2000). Here in our model, the endogenous variable i.e., the stunting, wasting and being undernutrition measure of malnutrition among standard five-level children is correlated with the error term, leading to biased estimates of the coefficients in the regression model. The use of instrumental variables is particularly important in these situations where the endogenous variable is correlated with the error term, which can lead to biased estimates of the coefficients in the regression model.

From Eq. 1(A), we can obtain the predicted value $\widehat{st}$. Similarly, from Eq. 2(A) and Eq. 3(A), we can obtain the predicted values of $\widehat{wt}$ and $\widehat{unw}$ respectively

Finally, in the second stage, the structural equation is estimated by replacingt with $\widehat{st}$, wt with $\widehat{wt}$ and unw with $\widehat{unw}$.

9.5 Results & Discussions:

The results portray that the instruments considered in our model are correlated with endogenous variables and are uncorrelated with the error term.

Table 9.1: Results of the 2SLS Model-

Explanatory Variable	Learning Outcome Index		
Model Number	Model 1	Model 2	Model 3
Stunting (st)	-.299* (.183)		
Wasting (wt)		-.328*** (.117)	
Underweight (unw)			-.234*** (.085)
Parental Educational Support (ps)	.249*** (.048)	.213*** (.049)	.227*** (.048)
Student Understanding (un)	.423*** (.107)	.480*** (.109)	.450*** (.106)
Adequate instructional material and supplies for teachers (tlm)	.079*** (.033)	.093*** (.032)	.086*** (.031)
Adequate qualified staff of Schools (tstaff)	.107*** (.048)	.103*** (.045)	.077** (.043)
Pupil-Teacher Ratio (ptr)	.0963 (.064)	-.033 (.04)	.031 (.037)

Women with ten or more years of schooling (yrmore)	.131** (.060)	.105*** (.042)	.127*** (.046)
Household with electricity Connection	-.008 (.111)	.144* (.088)	.069 (.086)
Mid-day meal availability in school	.007 (.053)	.013 (.054)	.002 (.053)
Fully Immunized	-.009 (.028)	.000 (.027)	-.002 (.027)
Availability of Female teacher	.128*** (.037)	.122*** (.034)	.132*** (.035)
Constant	-2.635 (20.47)	23.83* (15.14)	-10.22 (15.80)
Durbin Score	3.04*	5.12***	2.65*
Wu-Hausman[64]	3.1*	4.99***	2.56*
First Stage Result	F statistic > any critical values, strong instrument	F statistic > any critical values, strong instrument	F statistic > any critical values, strong instrument
Sargan Score[65]	4.5 (p>10%)	3.66 (p>10%)	4.57 (p>10%)
R^2	0.66	0.68	0.56

Note: ***p<0.01, **p<0.05 & *p<0.10

[64] We reject the null hypothesis because the p-value is less than 0.05.

[65] We accept the null hypothesis because the p-value is greater than 0.05.

Discussion: Here, child health parameter stunting, wasting and being underweight are treated as endogenous variables for our model. The Durbin-Wu-Hausman (DWH) test of endogeneity result portrays that the endogenous regressors considered in our simultaneous equation model are truly endogenous. The First stage estimation result states that the instruments considered in our model are strong instruments. The Sargan-Hansen (SH) test states that the over-identifying restrictions are valid and thus the instruments are valid instruments i.e., uncorrelated with the error term and that the excluded instruments are correctly excluded from the estimated equation. Thus, based on the results of the DWH and SH tests, we can conclude that the instruments used in our model are necessary and valid for the application of two-stage least square estimates. Furthermore, these tests also suggest that our endogenous variables and instruments are correctly specified in the model to obtain reliable estimates in our analysis.It is found that there is a strong negative association between child under-nutrition as measured by stunting, wasting and being underweight with their academic performance when the district is considered as a unit. It is found that parental support in educational attainment plays a positive role in educational achievement. Similarly, if the school have efficient teaching staff and the teacher possesses adequate institutional material then this will lead to improved academic achievement of the children. It is observed that if the student understands the teaching taught in the class, then it leads to better academic scores for the students. Female teacher plays role model for girl child and the more percentage of the presence of female teacher in primary school leads to better quality education at the primary level in rural India. Maternal education plays a positive role in achieving quality education for the children. Our findings portray that the mid-day program and pupil-teacher ratio at school are not effective in improving academic achievement among children covering rural India. Immunization of children under five years fails to influence the learning outcome of primary school children in rural areas of India.

9.6 Conclusion and Policy Prescriptions:

Malnutrition can cause permanent/widespread damage to a child's health, development and well-being. It can also affect brain development, which may impact his/her learning outcome. Malnutrition measured by stunting, wasting and being underweight is the crucial factor for poor learning outcomes among class V-level children in rural India. By reducing the incidence of malnutrition among children, one can improve the quality of education of children in primary

school. The government needs to provide a support program which can reduce malnutrition among children and improve the learning outcome level for Class V level children. The motivation of parents in education achievement and a better understanding of the children received in primary school results in better learning outcomes for class V level children. Qualified teaching staff with adequate instructional material will help to improve children's academic achievement in rural India. The government of India has initiated various schemes for the better attainment of education in primary school in rural India but now the policymaker needs to shift their focus from attainment to the achievement received at primary school. Proper utilization of teaching-learning material grants and the quality of the teacher needs to be investigated at regular intervals for better education achievement in primary schools in rural India. Government can spread camping on the importance of parental education mainly mothers' education as educated mothers understand the importance of education and encourage and assist their children in achieving better quality education even at the primary level. Government can recruit more female teachers in primary schools as it might encourage children mainly girl's child in their primary school education achievement-day meal scheme launched with the moto of providing free, nutritious meals to children in schools to improve their health, well-being, and academic achievement increases the enrolment rates in primary school but it failed to influence the academic achievement of the children at class V level in primary school in rural India. Children in rural areas of India, where access to healthcare resources is often limited and illiteracy rates are high, are particularly vulnerable to developmental issues. This is due to the challenges they face in accessing necessary medical and educational resources, which can exacerbate existing health and developmental problems, underscoring the need for targeted interventions in these regions to improve outcomes for these children.

Research Limitations: The chapter is based on Secondary Data Sources[66]. Here our research objective is to identify the impact of socioeconomic factors such as household characteristics, parental education, school-level infrastructure and children's health (measured by height, weight and age) on primary school academic achievement in rural India. Some factors are identified. But the lack of availability of data like household monthly spending on education, caste and religion

[66] National Achievement Survey (NAS), National Family Health Survey (NFHS-3 & NFHS-4) & DISE Statistics.

of household, perception of parents etc. which can also influence academic achievement cannot be considered in this investigation though it has strong theoretical justifications.

9.7 Appendix:

Table Appendix 1: First-Stage Results:

Explanatory Variable	Stunting	Wasting	Underweight
Preg Mother BMI	0.0438(0.007) ***	0.045 (0.007) ***	0.071 (0.008) ***
Preg Anemic Mother	0.01 (0.002) *	0.160 (0.025) ***	0.178 (0.027) ***
Preg Mother with 3 or more ANC	0.038 (0.020) *	0.012 (0.020) **	0.116(0.021) **
R-Squared	0.665***	0.3498	0.6562***

Note: ***p<0.01, **p<0.05 & *p<0.10

Table Appendix 2: Summary Statistics:

Variable	Mean (%)	Std. Dev. (%)	Min (%)	District (Min)	Max ((%))	District (Max)
Learning Outcome Index	50.195	7.130	32.756	Jangir-Champa (Chhattisgarh)	74.458	Dhaulpur (Rajasthan)
Stunting	39.345	9.441	13.3	Pathanamthitta (Kerala)	65.1	Bahraich (U.P)
Wasting	22.588	6.648	8.4	Farrakhabad (U.P)	45.8	Gadchiroli (Maharashtra)
Underweight	37.741	9.551	11.3	Kottayam (Kerala)	66.9	Paschim Singhburg (Jharkhand)

Parental Educational Support	82.804	7.742	57	Jaisalmer (Rajasthan)	99	Hoshiarpur (Punjab)
Student Understanding	96.415	3.183	48	Kawardha (Chhattisgarh)	100	Sangrur (Punjab), Mahesana(Gujrat)
Adequate instructional material and supplies for teachers	37.815	12.585	9	Maldah (West Bengal)	81	Mansa (Punjab)
Adequate qualified staff of Schools	76.528	11.938	44.75	Anantapur, Chittor (A.P)	99.4	Dharmapuri (T.N)
Pupil-Teacher Ratio	27.07	12.00	9	Darjiling (W, B)	69	Maharajganj(U.P)
Women with ten or more years of schooling	36.152	12.705	13.6	Pakur (Jharkhand)	96.6	Jagat-Singhpur (Orissa)
Household with electricity Connection	96.481	4.516	68.4	Sitapur (U.P)	100	
Mid-day meal availability in school	97.845	6.319	0	Baghpat (U.P)	100	
Fully Immunized	76.003	12.927	38.7	West Champaran (Bihar)	100	Hugli (W.B)
Availability of Female teacher	43.295	14.05	14.6	Deoghar (Jharkhand)	99.8	Thiruvarur (T.N)

Source: Calculated by the Author

CHAPTER 10: CONCLUSION

Conclusion:

This thesis emphasizes rural areas due to their demographic significance and distinct socio-economic context, heightened by their substantial population. It dissects the interplay between informal employment and government grants offering insights into education policy improvements in rural India. In essence, this research comprehensively addresses primary education attainment and achievement for the rural areas mainly the informal working population, contributing to a nuanced understanding of the primary school education landscape in the rural Indian context. In rural India, female teachers have a significant impact and motivate parents to enrol their daughters in primary schools. The availability of female teachers in school not only encourages the enrolment of girl children but also plays a crucial role in maintaining gender parity in primary school enrolment. Furthermore, the positive influence of female teachers extends beyond just enrolment but also leads to improved academic achievements for all children in primary education, regardless of gender, in rural areas. The results portray that fathers' education level significantly impacts enrolment decisions for their children. On the contrary, surprisingly mothers' educations fail to influence the enrolment decision for their children in primary school enrolment in rural India. Despite this, a distinct and positive correlation exists between a mother's education and the education achievement of children in rural primary schools. In other words, while mothers' education may not directly affect enrolment decisions but it does play a crucial role in ensuring that their children receive good quality education at the basic level. Pupil-teacher ratio failed to influence both academic attainment as well as academic achievement in rural primary schools. The mid-day meal program has a positive impact on academic attainment but it failed to influence the academic achievement received in primary school in rural India.

This study reveals that while the enhancement of private education has contributed positively to overall enrolment but it had an adverse effect on the enrolment of girl children in rural public schools. This intriguing finding sheds light on the captivating dynamics surrounding parental decisions during the admission of their children. It appears that parents exhibit a preference for sending their girl children to public schools, while simultaneously enrolling their boys in private schools, likely driven by the desire to provide a better-quality education for their sons.

The observations from the rural districts of the selected major states of India, within the Southern, Western and Eastern zones, reveal that the Gender Parity Index (GPI) falls within a promising range of 0.97 to 1.03 during primary school enrolment. This indicates a notable achievement of gender parity in rural India according to UNESCO's standards. However, the situation in the rural districts of the Northern zone portrays a less encouraging picture, despite the overall satisfactory enrolment rate in primary education within that zone. Increasing the recruitment of teachers, particularly female teachers, holds the potential to improve the Gender Parity Index (GPI) in primary education during enrolment in rural Indian schools. Furthermore, the implementation of the Mid-day meal scheme, aimed at maintaining the nutritional status of students, has proven effective in enhancing students' attentiveness in school. This scheme serves as an incentive for parents to send their children, especially girls, to primary schools, resulting in a positive impact on girls' enrolment rates across various regions in India.

The coverage of government supply-side grants as measured by the School Grant Coverage Index among the primary schools in rural people-dominated districts has increased, inequality in the distribution of grants has reduced and also the grants have percolated down to most of the schools in rural India. But despite this, it's also found that there exists a fascination of rural parents to send their children to private primary schools during the time of their enrolment. Taking into consideration of patriarchal society maintaining gender parity in primary school enrolment is important and it is positively influenced by these various supply-side related grants like the availability of school development grants, availability of teaching-learning material grants, availability of mid-day meals in primary school and availability of girls' toilets grants. These grants have motivated parents to send their children to primary school in rural India.

Social attributes like caste and religion tend to exacerbate the gender gap in enrolment rates in private primary schools in rural India. In contrast, economic attributes such as income, occupation, and ownership of computers can help to narrow the gender gap in enrolment in private primary schools. However, school-related factors, such as the medium of instruction in primary school or the distance between the household and primary school have been found to widen the gender gap in enrolment in the same context. Various factors contribute differently to the gender gap in enrolment in private primary schools in rural India. The most significant factor is the religious practices of the household, accounting for 41.17 % of the explanation. Household

income level also plays a substantial role, contributing 24.89 % to the gender gap. The medium of instruction in primary school explains approximately 7 % of the gap, while the occupation of the household contributes 2.4 %. Household size and ownership of computers have relatively minor contributions of nearly 2% each in explaining the gap in enrolment. Understanding these various influences can help devise targeted strategies to address the gender gap in enrolment in private primary schools in rural India.

It is found that the mean log expenditure difference between boys and girls is positive denoting the presence of discrimination in primary school education expenditure between the genders. The analysis revealed a concerning finding that there exists a positive mean log expenditure difference between boys and girls in primary school education, indicating the presence of discrimination based on gender in expenditure patterns. Moreover, when examining potential discrimination, it is observed that the "unexplained part" contributes more significantly to the differences in expenditure than the "explained part" for all three major religious groups in India. This suggests that a considerable portion of the gender-based expenditure disparity remains unaccounted for and may be attributed to factors related to discrimination. Among households in rural India, the gender gap in education expenditure, as indicated by the unexplained effect, exhibits varying degrees across different religious communities. The highest gender gap in education expenditure is observed among households belonging to the Hindu community, followed by households belonging to the Muslim community. On the other hand, the gender gap is relatively less pronounced in households belonging to the Christian community. This suggests that the factors contributing to the unequal education expenditure between genders differ among these religious groups, with the Hindu community experiencing the most significant disparity. The education expenditure of children from the Christian community in rural India is primarily supported by Christian missionaries, who receive foreign funding, often from developed countries. As a result of this financial backing and support, gender-based discrimination in accessing basic education is comparatively lower among children belonging to the Christian community. The involvement of these missionaries and the external funding they receive play a crucial role in promoting more equitable access to education for both boys and girls within the Christian community, contributing to a reduced gender gap in education expenditure in this particular context. The result portrays that parental education significantly influences a child's educational achievement. Next, to enhance learning outcomes at the basic level, promoting the expansion of education

among parents becomes crucial. By increasing parental education levels, it can positively impact children's academic performance and overall education attainment. Several school-related factors also play a vital role in improving the quality of education for children at the primary level. The presence of playground facilities, provision of mid-day meals, access to clean drinking water and proper sanitation facilities at schools have positively contributed to the educational experience and academic performance of students. Ensuring the availability of these essential resources and amenities can create a conducive learning environment, leading to improved educational outcomes for primary school children in rural India. The findings of the last chapter reveal a robust negative association between child under-nutrition, as indicated by stunting, wasting and being underweight, and their academic performance. The detrimental impact of undernutrition on a child's learning outcomes underscores the importance of addressing nutritional issues as a critical component of efforts to improve educational performance and overall well-being among children. Parental support plays a vital and positive role in a child's educational achievement attained at primary school. When parents actively engage and provide support in their child's learning journey, it significantly contributes to improved academic achievement. Likewise, the quality of the school environment and teaching staff also substantially impacts children's academic performance. Primary schools with efficient, teaching staff, coupled with adequate institutional materials and resources, create a conducive learning atmosphere that fosters better educational outcomes for students. Therefore, investing in teacher training and providing schools with necessary educational materials are essential steps towards enhancing the academic achievements of children in primary school. It is observed that students who comprehend the teachings delivered in the classroom tend to achieve better academic scores. When students grasp the concepts effectively, it positively impacts their overall academic performance. Furthermore, female teachers serve as powerful role models for girl children. The increased presence of female teachers in primary schools in rural India has been associated with improved quality of education at the primary level. Female teachers serve as inspirations for young girls promoting their engagement and participation in the learning process. Encouraging more female representation among teachers can play a crucial role in fostering better quality education and empowering girls in their educational pursuits. The results highlight the positive impact of maternal education on achieving quality education for children. Maternal education is a crucial factor that significantly influences a child's educational outcomes and overall academic

success. The findings also portray that the mid-day meal program and the pupil-teacher ratio at school, do not effectively improve academic achievement among children in rural India. Additionally, the research reveals that immunization of children under five years does not influence the learning outcomes of primary school children in rural areas of India. While immunization is essential for overall health and well-being, it does not seem to directly impact children's academic performance in the context of the study. Understanding these factors can help policymakers and educators to focus their efforts on effective strategies that genuinely enhance educational quality outcomes for children in rural Indian context.

CHAPTER 11: POLICY PRESCRIPTIONS

Policy Prescriptions:

India has adopted a decentralized approach to educational management through central, state and panchayat raj systems.

1. The establishment of new primary schools in different gram panchayats is essential to reduce the distance between households and the nearest schools. This strategic move can help to bridge the gender gap in primary school enrolment and promote better access to education for all children.
2. In rural Indian primary schools, female teachers often play role model for young girls that goes beyond academics. Their nurturing and caring qualities can be reminiscent of a mother figure, leading to a positive impact on student's academic achievement and attainment. Through their presence, they break gender stereotypes and inspire female students to dream big and pursue education passionately. This empowerment can lead to increased academic engagement and improved academic performance among girls, setting them on a path to a brighter future. In summary, the motherly qualities exhibited by female teachers in rural Indian primary schools have a profound positive impact on academic achievement and attainment. Thus, the presence of female teachers not only fosters girls' enrolment and participation in primary education but also contributes to overall academic excellence and quality of education for all students. The government can recruit more female teachers in primary schools as it might encourage children mainly girls in their primary school education achievement as well to enhance the GER of girls at a targeted level in primary education in rural India.
3. Children in rural areas of India, where access to healthcare resources is often limited and illiteracy rates are high, are particularly vulnerable to developmental issues. This is due to the challenges they face in accessing necessary medical and educational resources, which can exacerbate existing health and developmental problems, underscoring the need for targeted interventions in these regions to improve outcomes for these children. Addressing malnutrition at the primary level in India is crucial to ensure that children have the physical

and cognitive capabilities necessary to excel academically. This requires comprehensive efforts from the government, schools, parents, and the community to provide adequate nutrition, healthcare, and support systems to enhance these vulnerable children's overall well-being and academic achievement.

4. Proposing ‘English’ as the medium of instruction in public primary schools could be an effective measure to address gender discrimination and increase public school enrolment in rural India.
5. By implementing a national family planning policy, such as a maximum two-child policy, the government can encourage households to allocate higher per-child expenditure on their children’s education.
6. By implementing various income support and income-generating programs, the government can effectively enhance household incomes. This measure has the potential to reduce gender discrimination and promote greater gender equality in primary school enrolment in rural India.
7. The government can play a significant role in reshaping the patriarchal mindset that can reduce gender discrimination in private primary school enrolment in rural India. Implementing specific initiatives and policies implemented by the central government and various state governments can bring about positive change and encourage equal opportunities for girls in education.
8. Toto foster a more progressive and inclusive society, it is crucial for the government to prioritize educating parents, particularly mothers. By empowering mothers with education, the nation can break free from patriarchal dominance, leading to a transformative shift in parental attitudes toward their daughters. This change in mindset will play a pivotal role in ensuring the comprehensive development of the nation, promoting gender equality and unleashing the full potential of all citizens. Education for mothers will not only equip them with knowledge and skills but also empower them to challenge traditional gender norms and expectations. As mothers become more educated, they will be better equipped to make informed decisions about their children’s education, health and overall well-being. This, in turn, will lead to more opportunities for girls to access quality education and fulfil their potential, fostering a generation of empowered and confident women. Furthermore, an educated mother can serve as a role model for her children, inspiring them to pursue

education and break free from limited societal stereotypes. As such positive influences permeate through families and communities, the nation will witness a positive ripple effect, propelling it toward meaningful development and progress.

9. In addition to education, the government needs to create an enabling environment that supports and encourages gender equality initiatives. This includes implementing policies and programs that promote equal opportunities for women in all spheres of life, including education, healthcare, and the workforce.
10. By prioritizing the education of mothers and championing gender equality, the government can build a more inclusive and progressive society. This transformative approach will not only benefit the current generation but will also leave a lasting legacy for future generations, ensuring the nation's sustainable and holistic development in the coming years. Education plays a vital role in narrowing the persistent gender gap in educational achievements. By providing women with access to education, they gain economic independence and greater decision-making abilities, leading to positive transformations in their lives and society as a whole.
11. While the government of India has taken commendable steps by introducing various schemes to improve primary education in rural areas, it is now crucial for policymakers to shift their focus from mere attainment to measuring the actual achievement obtained in primary schools. By emphasizing the quality of education and learning outcomes, the government can further enhance the effectiveness of these initiatives and ensure that students receive a well-rounded education.
12. It is important for our policymakers to maintain the GPI value between 0.97 and 1.03 as the achievement of gender parity during the time of enrolment.
13. Regularly investigating the proper utilization of the various grants provided by the government and assessing the quality of teachers are essential steps to enhance education achievement in rural Indian primary schools.
14. By ensuring effective resource allocation and maintaining teacher standards, the government can foster improved learning outcomes and overall educational quality for students in rural India.
15. The government can initiate awareness campaigns focusing on the significance of parental education. Educated parents comprehend the value of education and actively support and

guide their children, leading to better quality education even at the primary level. By promoting such campaigns, the government can foster a positive impact on children's learning outcomes and overall educational development.

16. The government should prioritize increasing the recruitment of female teachers, especially in rural-dominated districts, as a crucial step to bridge the gender gap in formal school participation. By ensuring more female representation among educators, young girls in rural areas can find role models, fostering greater enthusiasm for education and promoting gender equality in school enrolment. When a girl receives an education, it positively impacts future generations. As a mother, she is more likely to prioritize sending her child to school and encouraging their education because educated parents tend to be more involved in their child's learning journey.
17. The intergenerational impact of education underscores the importance of continued efforts to promote education, especially among girls, to create a more educated and empowered society. Studies show that intergenerational effects of education are influenced by parents, particularly more educated ones who create a conducive environment that enhances their children's opportunities and decision-making process. Therefore, the government should not only prioritize child education but also emphasize adult education, especially among mothers.
18. Promoting adult education can be achieved through partnerships with local panchayats or NGOs. By taking assertive measures in this regard, the government can ensure that girls receive proper education, leading to a positive impact on the next generation's schooling and their potential as skilled workers in adulthood, as their learning abilities are enhanced through quality education.
19. As per the Right to Education (RTE) guidelines, schools are mandated to have essential facilities like a playground, proper drinking water, sanitation, and the provision of mid-day meals. Unfortunately, some places still lack these amenities, which can hinder a child's overall learning experience. Access to these resources can make a school environment more attractive for children, leading them to invest more quality time in their education.
20. The government can monitor the functioning of ICDS and Anganwadi centers to ensure the supply of nutritious foods to expected mothers. This strategic effort aims to enhance

the nutritional well-being of both mothers and children, ultimately leading to improved child nutrition levels.

21. It is crucial to ensure that the benefits of various government policies reach every corner of society. The demographic dividend of India's population can only be achieved if there is a significant improvement in the learning outcomes of children of the economy. By equipping schools with the necessary facilities and focusing on enhancing learning outcomes, children will be better prepared to become skilled workers in their adulthood, contributing to the nation's progress and development.

CHAPTER 12: REFERENCES

References:

Ahmed, T., Mahfuz, M., Ireen, S., Ahmed, A. M., Rahman, S., Islam, M. M., Alam, N., Hossain, M. I., Rahman, S. M., Ali, M. M., Choudhury, F. P., & Cravioto, A. (2012). Nutrition of children and women in Bangladesh: trends and directions for the future. *Journal of Health, Population and Nutrition*, *30*(1), 1–11.

Alcott, B., & Rose, P. (2017). Learning in India's Primary Schools: How do disparities widen across the grades?'. *International Journal of Educational Development*, 56 (2), 42-51.

Alderman, H., Orazem, P., & Paterno, E. (2001). School Quality, School Cost, and the Public/Private School Choices of Low-Income Households in Pakistan. *The Journal of Human Resources*, 36 (2), 304-326.

Annual Report of the International Food Policy Research Institute (1999) http://www.ifpri.org/sites/default/files/publications/ar1999.pdf

Azam, M., and Kingdon, G. G. (2013). Are girls the fairer sex in India? Revisiting intra-household allocation of education expenditure. *World Development*,42, 143-164.

Basatemur, E. (2012). Hypocalcaemic Seizures Secondary to Vitamin D Deficiency. *Aims of the British Paediatric Surveillance Unit*, 37.

Basu, S. (2015). India's future shaped by the past: The politics of foreign investment. *Global Asia*, 10(2), 80-86.

Bedi, A. S., & Garg, A. (2000). The Effectiveness of private versus public schools: the case of Indonesia. *Journal of Development Economics*, 61(2), 463-494.

Bhagat, R. B., (2011). 'Emerging Pattern of Urbanization in India'. *Economic and Political Weekly*, XLVI.

Bhattacharya, A., (2000). Assessment of Growth and Nutritional Status in Indian Population. *Journal of Anthropological Survey of India*. 49, 69-103.

Biswas, P., and Kundu,A., (2019). Gender Parity Index in Primary Education in Rural India: An Analysis. *Turkish Economic Review*, 6 (2), 104-125.

Biswas, P., Kundu, A. (2019). Learning Outcomes in Elementary Education in Rural India: An Inter-state Comparison. *Journal of Rural Development*, 38(1), 30-54.

Biswas, P., Kundu, A. (2022). Determinants of Enrolment of Girl Children in Primary Education in Rural India: A Region-based Analysis. *Indian Journal of Human Development*, 16(2),1-21.

Blinder, A. S., (1973). Wage discrimination: Reduced form and structural estimates. *Journal of Human Resources*. 8(4), 436–455.

Burusic, J., Babarovic, T., & Serie, M. (2012). Differences in elementary school achievement between girls and boys: Does the teacher's gender play a role? *European Journal of Psychology of Education, 27*(4), 523–538.

Census Data,2011. Office of the Registrar General & Census Commissioner, India. Ministry of Home Affairs, Government of India.

Central Square Foundation (2021). Every Child Deserves Quality Education. New Delhi, India.

Chandrasekhar, S., & Abhiroop Mukhopadhyay. (2006). Primary Education as a Fundamental Right: Cost Implications. *Economic and Political Weekly, 41*(35), 3797–3804.

Chatterjee, N., Saumitra, M. (2016). Developmental Outcome in Children with Malnutrition. *Journal of Nepal Paediatric Society*, 36(2), 170-177.

Cheah, Y., & Mei, N., (2013). Socio-Demographic Determinants of Computer Ownership: An Empirical View in the City of Gui Lin, China. *Institutions of Economics*, 5 (1), 55-70.

Cheema, I.K., (Jan-June, 2011). Socio-Cultural Stratification of India. *Policy Perspective*, 8(1),49-63.

Chevalier, A., (May 2004): "Parental Education and Child's Education: A Natural Experiment" *IZA Discussion Paper* 1153.

Chevalier, A., *et.al*. (January 2005): "The Impact of Parental Income and Education on the Schooling of the Children", *The Institute for Fiscal Studies*, WP05/05

Coffey, J. K., (2020). The cascades of infant happiness: Infant positive affect predict childhood IQ and adult educational attainment. *Emotion, 20*(7), 1255-1265.

Cole, M., Hakkarainen, P., & Bredikyte, M., (2010). Culture and Early Childhood Learning. *Encyclopedia on Early Childhood Development.*

Coleman, C. C. (1966, June). Friendship quality as a predictor of young children's early school adjustment. *Society for Research in Child Development*, 67(3), 1103-1118.

Coleman, J. S., *et.al* (1966). Benefits of Socio-Economic Diversity in Public School. *Equality of Educational Opportunity Study* (EEOS), [ICPSR 6389], National Centre for Educational Statistics, USA.

Congdon Fors, H., Lindskog, A. (2023). Son preference and education Inequalities in India: the role of gender-biased fertility strategies and preferential treatment of boys. *Journal of Population Economics* 36, 1431–1460.

Cowell, F.A., (1998). Inheritance and the Distribution of Wealth. Discussion Paper No: DARP/34.

Craig, W. Y., Palomaki, G. E., Neveux, L. M., & Haddow, J. E. (2013). Maternal body mass index during pregnancy and offspring neurocognitive development. *Obstetric medicine*, *6*(1), 20-25.

Datta, S., and Kingdon, G. G., (2001). Gender Bias in Intra-Household Allocation of Education in India: Has it Fallen Over Time? IZA Discussion Paper No. 12671,

Dreze, J. and G. G. Kingdon (2001). 'School participation in rural India'. *Review of DevelopmentEconomics*,5(1),1-24.

Davies, J. B., & Zhang, J. (1995). Gender Bias, Investments in Children, and Bequests. *International Economic Review*, *36*(3), 795–818.

De, P., Chattopadhyay, N. (2019). Effects of malnutrition on child development: Evidence from a backward district of India. *Clinical Epidemiology and Global Health*, 7(3), 439-445.

Desforges, C., Abouchaar, A., (2003). The impact of parental involvement, parental support and family education on pupil achievement and adjustment. *A Literature Review*, Vol. 433. London: DfES.

Divya Vaid. (2004). Gendered Inequality in Educational Transitions. *Economic and Political Weekly*, *39*(35), 3927–3938.

Dixon, P., & Humble, S., (2017). How School Choice is framed by parental programme family characteristic? A Study of Western Area. Sierra Leone. *Journal of School Choice*. 11 (1), 95-115.

Djinovic, V., & Giannakopoulos, N., (2022). Home computer ownership and educational outcomes of adolescents in Greece. Essen: GLO Discussion Paper, No. 1143, Global Labor Organization.

Dongre, A. and Kapur, A., (Sept. 2016): "Trends in Public Expenditure on Elementary Education" *Economic and Political Weekly*, 51(39), 23-25

Dostie, B., & Jayaraman, R., (2006). Determinants of school Enrollment in Indian Villages, *Economic Development and Cultural Change*, 54(2), 405-421.

Drèze, J. and Kingdon, G.G., (2001). School Participation in Rural India. *Review of Development Economics*, 5(1), 1-24

Dreze, J., & Gazder , H., (1996). 'Uttar Pradesh: The burden of Inertia ' in Jean Dreze and Amartya Sen (eds).Indian Development: Selected Regional Perspective, The United Nations University, Helsinki, Finland.

Dreze, J., & Goyal, A. (2003, November 1). The future of mid-day meals. *Economic and Political Weekly*, 4673-4683.

Dreze. J, & Kingdon, G. G., (1999).School Participation in Rural India. *London School of Economics*.

EFA Global Monitoring Report, (2009). Overcoming inequality: why governance matters. *UNESCO Publishing. Oxford University Press.*

Endow, T., (2018). Inferior Outcomes: Learning in Low-cost English-medium Private Schools—A Survey in Delhi and National Capital Region. *Indian Journal of Human Development*, 12 (1), 1-19.

Fairlie, W., (2006). An extension of the Blinder-Oaxaca Decomposition Technique to Logit and Probit Models. *Journal of Economic and Social Measurement*, 30 (4), 305-316.

Fanjiang, G., Kleinman, R. E., (2007). Nutrition and performance in children. *Current Opinion in Clinical Nutrition & Metabolic Care*, *10*(3), 342-347.

Filmer. D., and Pritchett. L., (Sept. 1998): "The Effects of Household Wealth on Educational Attainment: Demographic and Health Survey Evidence" *World Bank Development Research Group, Poverty and Human Resource*,

Galal, O., Hulett, J., (2003). The Relationship between Nutrition and Children's Educational Performance: A Focus on the United Arab Emirates, *Nutrition Bulletin*, 28(1), 11-20.

Galor. O., Zeira, J., (1993). Income Distribution and Macro Economics. *The Review of Economic Studies*. 60(1), 35-63.

Glewwe, P., Jacoby, H. G., King, E. M., (2001). Early childhood nutrition and academic achievement: a longitudinal analysis. *Journal of Public Economics, 81*(3), 345-368.

Glick, P. and Sahn, D.E (2000) Schooling of Girls and Boys in a West African Country: The Effects of Parental Education, Income, and Household Structure. *Economics of Education Review*, 19, 63-87

Goyal, S., Pandey, P., (2009). How do government and private schools differ? Findings from two large Indian states', Discussion paper, Report No. 30, *South Asia Human Development Sector*. Washington. DC: The World Bank.

Grant, C., (2017). The contribution of education to economic growth. *Institute of Development Studies*. K4D_HDR_The Contribution of Education to Economic Growth Final.pdf (ids.ac.uk).

Greene, H., (2008). Econometric analysis (6th ed.). Upper Saddle River, N.J.: Prentice Hall.

Harma, J., & Rose, P., (2012). Is low-fee private schooling affordable for the poor? Evidence from Rural India. In R. Robert, & K. Mundy, Ha¨rma¨, J., Rose, P., (2012). 'Is low-fee private schooling affordable for public Partnership in Education: New Actors and Models of Governance in Globalizing World (pp. 243-258). Cheltenham*: Edward Elgar Publishing*.

Hazan, M., & Zoabi, H. (2015). SONS OR DAUGHTERS? SEX PREFERENCES AND THE REVERSAL OF THE GENDER EDUCATIONAL GAP. *Journal of Demographic Economics*, *81*(2), 179–201.

Herz, B., Gene, B.S., (2004). What Works in Girls' Education. *Council on Foreign Relations*.

Hinkle, S. N., Schieve, L. A., Stein, A. D., Swan, D. W., Ramakrishnan, U., & Sharma, A. J., (2012). Associations between maternal prepregnancy body mass index and child neurodevelopment at 2 years of age. *International journal of obesity*, *36*(10), 1312-1319.

Huang, L., Yu, X., Keim, S., Li, L., Zhang, L., & Zhang, J. (2014). Maternal prepregnancy obesity and child neurodevelopment in the Collaborative Perinatal Project. *International Journal of Epidemiology*, *43*(3), 783-792.

Husain, Z., (2011). Gender disparities in completing school education in India: explaining geographical variations. *Journal of Population Research.* 28(4), 325-352

IIPS (International Institute for Population Science). 2005. National Family Health Survey. (NFHS-3). India. Mumbai: IIPS.

IIPS (International Institute for Population Science). 2005. National Family Health Survey. (NFHS-4). India. Mumbai: IIPS.

Iyengar, N., & Sudarshan, P., (1982, December 18). A method of classifying Regions from Multivariate Data. *Economics and Political Weekly*, 17(51), 2047-2052.

Jejeebhoy, S. J. (2002). Convergence and Divergence in Spouses' Perspectives on Women's Autonomy in Rural India. *Studies in Family Planning, 33*(4), 299–308.

Jejeebhoy, S. J., & Sathar, Z. A., (2001). 'Women's autonomy in India and Pakistan: The influence of religion and region'. *Population and Development Review*, 24(4). 687-712.

Jencks, C., (1972). Inequality: A Reassessment of the effect of family and schooling in America. New York: Basic Books. *Journal of Development Studies*, 48(1), 151–163.

Joyner, C. C., Lawson, S. A., (1986). The United States and UNESCO: Rethinking the Decision to Withdraw. *International Journal*, *41*(1), 37–71.

Kambhampati, U.S., (2008).' Does household expenditure on education in India depend upon the returns to education?' *Henley Business School University*.

Kanagawa, M., &Nakata. T., (2008): "Assessment of access to electricity and their socio-economic impacts in rural areas of developing countries"; *Energy Policy* 36(6), 2018-2029

Khera, R., (2007, November 18). Mid-day meals in Primary schools: Achievements and challenges. *Economic and Political Weekly*, 4742-4750.

Kingdon, G. G. and Pal, S., (2014): 'Can Private School Growth Foster 'Education for All': Tracing the Aggregate Effects at the District-Level'. *SSRN*.

Kingdon, G. G., & Azam, M. (2014). Assessing Teacher Quality in India.Working Paper,International Growth Centre, 1-33.

Kingdon, G. G., (2007). The progress of school education in India. *Oxford Review of Economic Policy*, 23(2), 168-195.

Kingdon, G.G., (1996). The Quality and Efficiency of Public and Private Schools: A Case Study of Urban India. *Oxford Bulletin of Economics and Statistics*, 58 (1), 57-82.

Kingdon, G.G., (1998). Does the Labour Market Explain Lower Female Schooling in India*? The Journal of Development Studies.*35(1), 39-65.

Kingdon, G.G., (2005). Where Has All the Bias Gone? Detecting Gender Bias in the Intrahousehold Allocation of Educational Expenditure. *Economic Development and Cultural Change*, 409-451.

Kingdon, G.G., Pal, S., (2014). Can Private School Growth Foster universal literacy? Panel evidence from Indian districts. Bonn: IZA Discussion Papers No-5274, *Institute of Labour Economics*.

Kiple, K. F., Kiple, V. H. (1977). Slave Child Mortality: Some Nutritional Answers to a Perennial Puzzle. *Journal of Social History*, *10*(3), 284–309.

Kohler, U., & Kreuter, F., (2009). Data Analysis Using Stata (2nd ed. ed.). Stata Press,.

Kumar, D., & Choudhury, P., (2021). Determinants of Private School Choice in India: All about the Family Backgrounds. *Journal of School Science*, 15 (4), 576-602.

Kundu, A., and Dutt, G., (2015). Quality of Education among Primary School Children Receiving Mid-Day Meal: Evidence from Quasi-Experiment. *The Empirical Economics Letters*, 13(11),1225-1230

Lancaster, G., Maitra, P., & Ranjan, R., (2008). Household expenditure patterns and gender bias: Evidence from selected Indian States. *Oxford Development Studies*, 36(2), 133-157.

Lawrence, H. Summers (1992). Investing in All the People. *The Pakistan Development Review*,31(4) ,367-404

Li, Z., & Qiu, Z. (2018). How Does Family Background Affect Children's Educational Achievement? Evidence from Contemporary China. *The Journal of Chinese Sociology*, 5 (13), 1-21.

Lloyd-Still JD, Hurwitz I, Wolff PH, Shwachman H. (1974). Intellectual development after severe malnutrition in infancy. *Paediatrics*, 54(3), 306-11.

Londero, A.P., Rossetti, E., Pittini, C., Cagnacci, A., Driul, L., (2019). Maternal age and the risk of adverse pregnancy outcomes: a retrospective cohort study. *BMC Pregnancy Childbirth*. 19(1).

Maharana, D. K. (2010). IN DEFENCE OF THE INDIAN PERSPECTIVE OF MULTICULTURALISM. *The Indian Journal of Political Science, 71*(1), 69–83.

Mahuro, G. M., Hungi, N., (2016). Parental participation improves student academic achievement: A case of Iganga and Mayuge districts in Uganda. *Cogent Education*, *3*(1), 1264170.

Maiti, D., & Marjit, S., (2015). Regional openness economic growth and disparity during 1980-2009: Empirical evidences from major Indian states. *South Asia Economic Journal*, 16(1), 145-166.

Maitra, P., Pal, S., Sharma, A., (2011). Reforms, growth and persistence of gender gap: recent evidence from Private School Enrolment in India. Bonn: Germany. Bonn: IZA Discussion Paper 6135, *Institute of Labor Economics*.

Maitra, P., Pal, S. , & Sharma, A.,(2016). Absence of Altruism? Female Disadvantage in Private School Enrolment in India. *World Development*.

Mankiw, N. G., Romer, D., & Weil, D., (1992). A contribution to the empirics of economic growth. The *Quarterly Journal of Economics*, 407-437.

Martins VJ, Toledo Florêncio TM, Grillo LP, do Carmo P Franco M, Martins PA, Clemente AP, Santos CD, de Fatima A Vieira M, Sawaya AL. (2011). Long-lasting effects of undernutrition. *Int J Environ Res Public Health*, 8(6),1817-46.

Mehrotra, S.; Panchamukhi, P.R. (2006). Private Provision of Elementary Education in India: Findings of a survey in Eight States. Comp. *J. Int. Educ*, 36 (4), 421-442.

Mingat, A., (2007). Social Disparities in Education in Sub-Saharan African Countries. In International Studies in Educational Inequality, Theory and Policy (In Teese, R., Lamb, S. and Duru-Bellat, M. (eds.) ed.). Springer.

Ministry of Law and Justice, (2009, August 27) Legislative Department. The Right of Children to free and Compulsory Education Act, 2009 no-35: New Delhi.

Morgan, S., & Stash, S., & Smith, H., & Mason, K., (2002). Muslim and non-Muslim differences in female autonomy and fertility: evidence from four Asian countries. *Population and development review*, *28*(3), 515-537.

Muralidharan, K. &. Sheth, K. (2016). Bridging Education Gender Gaps in Developing Countries: The Role of Female Teachers. *Journal of Human Resources*, 51(2), 269-297.

Muralidharan, K. (2013). Priorities for Primary Education policy in India's 12th five-year plan. *National Council for Applied Economic Research*, 9(1), 1-61.

Muralidharan, K. and V. Sundararaman (2013) "The Aggregate Effect of School Choice: Evidence from a Two-stage Experiment in India", NBER Working Paper No. 19441.

Muralidharan, K., Jishnu, D., Alka, H., Michael, K., and Aakash, M., (2013). The Fiscal Costs of Weak Governance: Evidence from Teacher Absence in India. *UC San Diego.*

Muralidharan. K.; Kremer. M., (2006). Public and private schools in rural India. Mimeo Harvard University, 1-21.

Nair, J. K., Mishra, P., (2023). Household basic amenities and female educational outcome: An exploration of complementarities in rural India. *Journal of Cleaner Production*, 137439.

National Achievement Survey. (NAS, 2021). Department of School Education and Literacy, Government of India.

NCAER. (2018-19). Annual Report, National Council of Applied Economic Research Report. https://www.ncaer.org/uploads/annualreport/pdf/annual_report_21_NCAER%20AR%202018-19.pdf

NCERT. (2018-19). Annual Report, National Council of Educational Research and Training. Retrieved from https://www.education.gov.in/en/annual-report-national-council-educational-research-and-training

NCPCR Report (2016). National Commission for Protection of Child Rights: Understanding Child

Neggers, Y. H., Goldenberg, R. L., Ramey, S. L., & Cliver, S. P., (2003). Maternal prepregnancy body mass index and psychomotor development in children. *Acta obstetricia et Gynecologica Scandinavica*, *82*(3), 235-240.

NSS Report. (2017-2018). 75th Round, Household Social Consumption on Education. Ministry of Statistics & Programme Implementation, Government of India.

Nyaradi, A., Li, J., Hickling, S., Foster, J., & Oddy, W. H., (2013). The role of nutrition in children's neurocognitive development, from pregnancy through childhood. *Frontiers in human neuroscience*, 7 (97).

Oaxaca R., (1973). 'Male–female wage differentials in urban labor markets. *International Economic Review*. 14(3), 693–709.

Odhiambo, J.F., Pankey, C.L., Ghnenis, A.B., Ford, S.P., (2020). A Review of Maternal Nutrition during Pregnancy and Impact on the Offspring through Development: Evidence from Animal Models of Over- and Undernutrition. *International Journal of Environmental Research and Public Health*,17(18):6926. doi: 10.3390/ijerph17186926. PMID: 32971930; PMCID: PMC7559343.

Ohlan, R., (2013, December). Pattern of Regional disparities in Socio-economic development in India: District Level Analysis. *Social Indicators Research*, 114(3). doi:10.1007/s11205-012-0176-8

ONS Report (2013). U.K: Office for National Statistics.

Owusu-Manu, D. G., Jehuri, A. B., Edwards, D. J., Boateng, F., & Asumadu, G., (2019). The impact of infrastructure development on economic growth in sub-Saharan Africa with a special focus on Ghana. *Journal of Financial Management of Property and Construction*, 24(3), 253-273.

Paisa Report (2012). Do school get their money? Accountability Initiative.

Pal, S., (2004). How much of the gender difference in child enrolment can be explained? Evidence from rural India. *Bulletin of Economic Research*, 56(2), 133-158.

Pandit, P., Galande, S., & Iris, F., (2021). Maternal malnutrition and anaemia in India: dysregulations leading to the 'thin-fat' phenotype in newborns. *Journal of nutritional science*, *10*(9).

Parsasirat, et. al., (2013). The Most Effective kinds of Parents on Children's Academic Achievement. Asian Social Science, 9 (13), 229-242.

Pianta, R. C., Harbers, K. L. (1996). Observing mother and child behaviour in a problem-solving situation at school entry: Relations with academic achievement. *Journal of school psychology*, *34*(3), 307-322.

Prangthip, P., Soe, Y. M., Signar, J. F., (2019). Literature review: Nutritional factors influencing academic achievement in school-age children. *International Journal of adolescent medicine and Health*, *33*(2), 20180142.

Rao. V., (2003). Symbolic Public Goods and The Coordination of Collective Action: A Comparison of Community Development in Indonesia and India, mimeo, *Development Research Group*, World Bank.

Report, ASER (2014). Annual Status of Education Report (Rural). New Delhi: Pratham.

Report, ASER (2019). Annual Status of Education Report. New Delhi: Pratham.

Report, ASER (2020). Annual Status of Education Report. New Delhi: Pratham.

Report, Census (2011). India: Office of the Registrar General & Census Commissioner, Ministry of Home Affairs, Govt. of India.

Saha, A., (2013). An assessment of gender discrimination in household expenditure on education in India. *Oxford Development Studies*,41(2), 220–238.

Sari, V. A. (2019). Educational Assistance and Education Quality in Indonesia: The Role of Decentralization. *Population and Development Review, 45*, 123–154.

Sathar, Z. A., & Kazi, S. (2000). Women's Autonomy in the Context of Rural Pakistan. *The Pakistan Development Review*, *39*(2), 89–110.

Schmitt, J.; Wadsworth, J., (2006). Is there an impact of household computer ownership on children's educational attainment in Britain?'. *Economics of Education Review*, 25 (6), 659-673.

Segade, J., (2005). Child Marriage in India. New Delhi. *Oxford University Press*.

Self, S., & Grabowski, R. (2004). Does education at all levels cause growth? India: A case study. *Economics of Education Review*, 23(1), 47-55.

Sen, A. (1999). Development as Freedom. *Oxford University Press*.

Shariff, Z.M., Bond, J.T., & Johnson, N., (2000). Nutrition and educational achievement of urban primary school children in Malaysia. *Asia Pacific Journal of Clinical Nutrition*, 9 (4*)*, 264-73.

Shavit, Y., & Blossfeld, H.-P. (1993). Persistent Inequality: Changing Educational Attainment in thirteen countries. Boulder: West View Press.

Shorrocks, A. F. (1980). The Class of Additively Decomposable Inequality Measures. *Econometrica*, *48*(3), 613– 625.

Simiyu, S., Swilling, M., Cairncross, S., & Rheingans, R. (2017). Determinants of quality of shared sanitation facilities in informal settlements: a case study of Kisumu, Kenya. *BMC Public Health*, *17*(1), 1-13.

Sluis, D.V. J., Praag, V. M., and Viverberg, W., (2005). The World Bank Economic Review Entrepreneurship Selection and Performance: A Meta-Analysis of the Impact of Education in Developing Economies. *Oxford University Press*.

Smart, D. A., Samson, J. B., Edwards, B., and Hayes, A., (2008): Home-to-school TransitionsforFinanciallyDisadvantagedChildren*"*.http://www.thesmithfamily.com.au/webdata/resources/files/HometoSchool_FullReport_WEB.pdf.

Srivastava, A., Mahmood, S. E., Srivastava, P. M., Shrotriya, V. P., & Kumar, B., (2012). Nutritional status of school-age children- A scenario of urban slums in India. *Archives of public health*, *70*(1), 1-8.

Subramanian, S., & Deaton, A., (1991). Gender effects in Indian consumption patterns. *Woodrow Wilson School-Development Studies*. Princeton.

Tansel. A., (1997). Schooling Attainment, Parental Education and Gender in coted' Ivoire and Ghana. *Economic Development and Cultural Change*, 45(4), 825-856.

Tavris, D. R., Read, J. A., (1982). Effect of maternal weight gain on fetal, infant, and childhood death and on cognitive development. *Obstetrics & Gynecology*, *60*(6), 689-694.

Tilak, J.B., (2002). Education poverty in India. *Review of Development and Change*, 7 (1), 1-44.

Tooley, J., Dixon, P., (2003). Private schools for the poor: A case study from India. Discussion paper, CfBT Research and Development.

Tooley, J.P. *et al.* (2010). The relative quality and cost-effectiveness of private and public schools for low-income families: A case study in a developing country. *School Effectiveness and School Improvement*, 21 (2), 117-144.

U.N Millennium Project. (2006). Investment in Development: A Practical Plan to Achieve the Millennium Development Goal. http://www.unmillenniumproject.org/who/index.htm

U-DISE (2014). Unified-District Information System for Education Report, MHRD. http://schoolreportcards.in/DISE.InResponsive/DistrictReportCards/DistrictReportCards.aspx

U-DISE (2015-16). Unified-District Information System for Education Report, MHRD. http://schoolreportcards.in/DISE.InResponsive/DistrictReportCards/DistrictReportCards.aspx

U-DISE. (2008,2018). Unified-District Information System for Education Report, MHRD. http://schoolreportcards.in/DISE.InResponsive/DistrictReportCards/DistrictReportCards . aspx

UN Millennium Project. (2006). Investment in Development: A Practical Plan to Achieve the Millennium Development Goal.

UNESCO (2001). Can School grants lead to school improvement? An overview of experiences of five countries. Working Paper,2001.

UNICEF (2000). The State of the world's children. New York: UNICEF.

UNICEF-WHO-WB (2019). Joint Child Malnutrition Estimates Expanded Database- children 0-4 age group who are stunted (% of children). https://data.unicef.org/topic/nutrition/malnutrition/.

United District Information System for Education (2007-08,2009-10,2011-12,2013-14,2015-16) National University for Education Planning and Administration. New Delhi.

United Nations Children's Fund (UNICEF) Report. (June 2008).

United Nations International Children's Education Fund.2009. District level study on child marriage in India.

Veena, S. R., Gale, C. R., Krishnaveni, G. V., Kehoe, S. H., Srinivasan, K., & Fall, C. H., (2016). Association between maternal nutritional status in pregnancy and offspring cognitive function during childhood and adolescence; a systematic review. *BMC Pregnancy and Childbirth*, *16*(1), 1-24.

Verspoor, A., (1990). Educational development: Priorities for the nineties. *Finance and Development*, *27*(1), 20-23.

Wadhwa, W., (2009). Are private schools really performing better than government schools? New Delhi: Annual Status of Education Report (Rural).

Weyori, A. E., Seidu, A.A., Aboagye, R. G., Arthur-homes, F., Okyere, J., & Ahinkorah, B. O., (2022). Antenatal care attendance and low birth weight of institutional births in sub-Saharan Africa. *BMC Pregnancy and Childbirth*, *22*(1), 1-8.

Woodhead, M., Frost, M., James, Z., (2013). Does growth in private schooling contribute to education for all? Evidence from a longitudinal, two-cohort study in Andhra Pradesh, India. *Int. J. Educ. Dev*, 33, 65-73.

Woolridge, J., (2002). Econometric Analysis of Cross-section and Panel Data. The MIT Press, Cambridge, Massachusetts London, England.

World Bank (1999). Measuring the Economic Gain of Investing in Girls: The Girls Effect Dividend.

World Bank (Jan2018). Afghanistan: Girls 'Enrolment in school increases with new facilities

World Health Organization (WHO,2016). Global Nutrition Policy Review 2016-17.file:///C:/Users/Atun%20Biswas/Downloads/9789241514873-eng.pdf

Xiong, X., Buekens, P., Alexander, S., Demianczuk, N., Wollast, E., (2000). Anaemia during pregnancy and birth outcome: a meta-analysis. *American Journal Perinatology*, 17(3),137-146.

Zada, D.C., (2006). Preserving religious identity through education: Economic analysis and evidence from the U.S.A. *Journal of Urban Economics*, 60 (2), 372-398.

Zaini, M.Z., Lim, C.T., Low, W.Y., Harun, F., (2005). Effects of nutritional status on academic performance of Malaysian primary school children, *Asia Pac J Public Health*. 17(2), 81-87.

Zhou, H., Wang, A., Huang, X., Guo, S., Yang, Y., Martin, K., Wang, Y., (2019). Quality antenatal care protects against low birth weight in 42 poor countries of Western China. *PloS one*., 14(1), e0210393.

Zimmermann, L., (2012). Reconsidering gender bias in intrahousehold allocation in India. *The Journal of Development Studies*, 48(1), 151-163.

List of Publications

Sl No	Type of Publication	ISSN/ISBN	Name of the Publisher	Title of the Paper	Year of the Publication (Volume, No, Page No)
1	Paper in Journal (Indian Journal of Human Development)	0973-7030	SAGE	Determinants of Enrolment of Girl Children in Primary Education in Rural India: A Region-based Analysis	Year-2022 Vol-16 No-2 Page No-317-337
2	Paper in Journal (Journal of Rural Development)	0970-3357	JRD	Learning Outcomes in Elementary Education in Rural India: An Inter-state Comparison	Year-2019 Vol-38 No-1 Page No-30-54
3	Paper in Journal (Turkish Economic Review)	2149-0414	TER	Gender Parity Index in Primary Education in Rural India: An Analysis	Year-2019 Vol-6 No-2 Page No-104-125
4	Chapter in a Book (Gender Inequality and its Implications on Education and Health: A Global Perspective)	978-1-83753-180-6(Online) 978-1-83753-181-3(Print)	Emerald Publishing Limited	Gender Discrimination in Education Expenditure in Public Primary Schools in Rural India among Religious Groups: An Oaxaca-Blinder Decomposition Analysis.	Year-2023 Chapter-4 Page No-43-54

Article

Determinants of Enrolment of Girl Children in Primary Education in Rural India: A Region-based Analysis

Indian Journal of Human Development
1–21

DOI: 10.1177/0973703022120474
journals.sagepub.com/home/jhd

Puja Biswas[1] **and Amit Kundu**[2]

Abstract

This paper investigates the factors which can influence overall enrolment and girls' enrolment in primary education in rural India. Based on the 2011 Census, 352 rural people-dominated districts of 16 major states of India are identified. Due to sociocultural differences among rural Indian people, the states are divided into four regions based on their geographical locations. Initially, after constructing School Grant Coverage Index through principal component analysis and with the help of the General Entropy Measure of Inequality, it is observed that the coverage of grants in public primary schools has enhanced and inequality in terms of receiving government grants has decreased over time in rural India. Results based on the static panel regression model depict that midday meal and teaching–learning material grants influence overall enrolment only in the Northern and Eastern regions of rural India. Similarly, midday meals, school development grants and father's education influence girl's enrolment in Eastern, Western and Northern regions but failed to influence in Southern regions of India. The availability of female teachers positively influences girls' enrolment in primary school attainment in Eastern, Western and Southern regions of India. We have also found that parents are more interested to admit their girl child to public primary schools in rural areas.

Keywords

Primary education, gross enrolment ratio of girls, school grant coverage index, principal component analysis, static panel data

Introduction

Education is a major development-enhancing tool that can give positive changes to human life by improving the information, expertise and insight of an individual (Mankiw et al., 1992, Self & Grabowski, 2004; Sen, 1999). It is the base of human capital formation and without fruitful investment

[1] Jadavpur University, Economics of Prasanta Chandra Mahalanobis Mahavidyalaya, Kolkata, West Bengal, India
[2] Department of Economics, Jadavpur University, Kolkata, West Bengal, India

Corresponding author:
Amit Kundu, Department of Economics, Jadavpur University, 38 Chanchal Sarani, Santoshpur, Kolkata 700075, West Bengal, India.
E-mail: akundu29@gmail.com

Journal of Rural Development, Vol. 38, No. (1), pp. 30-54
NIRDPR, Hyderabad.

LEARNING OUTCOMES IN ELEMENTARY EDUCATION IN RURAL INDIA: AN INTER-STATE COMPARISON

Amit Kundu and*
*Puja Biswas***

ABSTRACT

An investigation is done on learning outcomes among children in different States of India at elementary level. Here, 24 major States of India are considered. The exercise is done on the basis of different Annual Status of Education Report (ASER) from 2010, whose information is rural-specific. Learning outcome index of the students of each State are calculated both at standard III and standard V level. It is observed that in most of the States, the learning achievement of the children at elementary level is deteriorating, but not rapidly. It has also come out that higher literacy among parents, availability of some school related factors like Mid-day Meal, proper drinking water,sanitation and playground facility can play a positive role to improve the learning achievement of the rural Indian children at elementary level.

Keywords: Elementary Education, Inter-State Comparison, Panel Data Regression Model.

Introduction

Education is a process of imparting knowledge and developing powers of reasoning and judgement of an individual.It is one of the pillars of Human Development Index (HDI). Without successful investment in human capital, a nation cannot achieve sustainable economic development.It was identified that if marginal year of schooling rises, the enterprise income also raises by 5.5 per cent point (Sluis D.V Justin et al, 2004).Education not only provides knowledge and skills to children, youth and adults to be active citizens and to fulfil themselves as individuals, but literacy in particular, contributes directly to poverty reduction. It has been estimated that global poverty can be decreased by 12 per cent point if all children in less developed countries can get access to elementary education (Education for All Global Monitoring Report, 2009). The

*Professor, Department of Economics, Jadavpur University, Kolkata-700032, West Bengal, India. E-Mail: akundu29@gmail.com, akundu1970@gmail.com.

**Ph.D. Scholar, Department of Economics, Jadavpur University, Kolkata-700032. E-mail: biswaspuja 20@gmail.com.

Turkish Economic Review

www.kspjournals.org

Volume 6 **June 2019** **Issue 2**

Gender parity index in primary school in rural India: An analysis

By Amit KUNDU [a]
& Puja BISWAS [b†]

Abstract. Patriarchal forces have imposed many subjective norms on girls in achieving education mainly in rural India. Initially on the basis of 2011 Census report of India, the rural population dominated districts of 16 major states of India are identified. Next we have tried to identify the possible factors which can influence Gender Parity Index (GPI) during the time of enrolment in primary education in rural India. Due to disparity in socio-cultural factors across india, which can possibly influence girl's enrolment in primary school, we have divided India into four zones. This paper on the basis of DISE statistics have found that school development grant influences GPI in Eastern, Western and Southern zones and teaching learning material grant influence GPI value in Eastern and Western zone and also encourages overall enrolment of children in Northern zone in rural schools. It is also found that increased female teacher positively influences GPI value in primary school enrolment in Eastern and Southern zone of India. Reduced pupil-teacher ratio has positive impact on girls enrolment in primary school mainly in Eastern, Western and Southern zone of India. Availibility of mid day meal in school has positively influenced GPI value in primary school enrolment in Eastern, Western and Southern zone of India and also have positive impact in increasing overall enrolment in rural primary schools in Northern zone of India. Female literacy and overall literacy have positive influence GPI in Eastern zone of India. Provision for specialised toilet for girl child has also motivated parents to enrol their girl child to primary school mainly in Eastern, Western and Southern zone of India.

Keywords. Patriarchal society, Gender discrimination, Gender parity index, DISE statistics, Panel data regression model, Gross enrolment ratio.
JEL. C33, I24, I38, J12, J16, R12.

1. Introduction

India have increased her spending[1]on primary education to achieve universal primary educationfor its children and eliminate gender disparity in achieving education from elementary level. Education is the base of human capital formation and an important factor to ensure gender equality and empowerment. It provides positive changes in human life by enhancing the knowledge, skill, intelligence of a person and enables to lead a successful life. Gender inequality may be defined as discrimination against women based on their sex. India's economy is

[a] Department of Economics, Jadavpur University, Kolkata, 700032, West Bengal, India.
☎. +91 983 050 5312 ✉. akundu1970@gmail.com
[b†] Department of Economics, Jadavpur University, Kolkata, 700032, West Bengal, India.
☎. +91 983 050 5312 ✉. biswaspuja20@gmail.com

Chapter 4

Gender Discrimination in Education Expenditure in Public Primary Schools in Rural India Among Religious Groups: An Oaxaca–Blinder Decomposition Analysis

Puja Biswas and Amit Kundu

Abstract

This chapter tries to capture the disparity in expenditure on primary education based on gender among the religious groups (Hindu, Muslim, and Christian) in rural India. The gender gap in education expenditure for a certain demographic group is calculated using the Oaxaca–Blinder decomposition approach. Further, we tried to identify the various household-related factors which might influence the decision of spending on a child's education. We used the 75th-level National Sample Survey Office (NSSO) unit-level dataset of July 2017 to June 2018 (one academic year) to obtain data on education expenditure and other household factors which play a manifesting role in the gender gap in expenditure on education. Our finding suggests that the total differential (log mean boys education expenditure-log mean girls education expenditure) is positive among all religious groups signifying the gender bias in education expenditure. We also found that the magnitude of the "Unexplained Effect" component is higher compared to the "Explained Effect" component signifying that the treatment of characteristics by students differs by their sex at elementary education. Household size and if household members are employed on a casual basis, then their expenditure on education falls on the other hand income of the household, a household with computer availability and household member engaged in regular wage/salary earning plays a positive role in expenditure on primary education in rural India.

Keywords: Gender bias; religious groups; education expenditure; Oaxaca–Blinder decomposition; NSSO dataset; rural India

Gender Inequality and its Implications on Education and Health, 43–54

doi:10.1108/978-1-83753-180-620231005