

**Gender Differential in Parental Investment in Education:  
A Study of the Factors Determining Children's  
Educational Investment in India**

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**Master of Philosophy**

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DECLARATION

I, Saumya Kumar, hereby declare that the dissertation entitled "*Gender Differential in Parental Investment in Education: A Study of the Factors Determining Children's Educational Investment in India*", submitted by me for the award of Master of Philosophy in Jawaharlal Nehru University is my bona-fied work. The dissertation has not been submitted so far in a part or in full, for any other degree or diploma of this university or any other university.

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CERTIFICATE

It is hereby recommended that this dissertation may be placed before the examiners for the evaluation.

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*Dedicated to My Parents*

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*For any errors or inadequacies that may remain in this work, of course, the responsibility is entirely my own.*

*Saumya Kumar*

## *Abstract*

Our study “Gender Differential in Parental Investment in Education: A Study of the Factors Determining Children’s Educational Investment in India” attempts to gain an understanding of gender disparity in child educational outcomes. We investigate gender differences in enrolment outcomes and parental expenditure on education of children aged from 6-18 years at an all-India level using the India Human Development Survey (IHDS) 2011-2012 dataset.

Literature suggests that compared to girls, boys typically attend school for longer periods of time because of the following reasons: (a) boys have higher expected returns to education vis-à-vis girls or (b) the cost of education for boys is lesser or (c) it is possible that parents prefer to educate sons over daughters. Since women typically face more discrimination in the labour market in terms of lower earnings or employment opportunities, parents’ incentive to invest in their education may decline.

In this context, our research attempts to delve deeper into questions such as how do socio-economic factors and school characteristics affect the enrolment outcomes and parental expenditure on education of children? Is there a gender bias in these outcomes and if so, how do maternal and paternal education play a role in influencing these outcomes? Which of the two play a larger role in affecting educational expenditure outcomes of children? In order to achieve the desired objectives of the study, we use a logit model to detect gender bias in enrolment. Moreover, we use an OLS model and Oaxaca-Blinder decomposition analysis to detect the existence and extent of gender bias in parental investment by utilizing all- India individual-level data.

Our study finds that while both maternal and paternal education reduce the gender gap in enrolment, maternal education turns out to be more significant for increasing the enrolment of girls as compared to the enrolment of boys. Maternal education also plays a more vital role in reducing gender bias in enrolment as compared to paternal education. Another finding reveals that increasing levels of mother’s education leads to a higher increase in spending on education for boys and girls both compared to a corresponding increase in the levels of father’s education. Moreover, increasing maternal education across all consumption quintiles significantly and positively impacts child educational expenditures; while paternal education only has a significant and positive impact on child educational expenditures in the highest consumption category.

This has meaningful implications for policy purposes. While we recognise that supply side factors such as school characteristics are influential in reducing gender bias in education, our findings suggest that demand side factors also play an important role. Our findings reveal that maternal education is significant in improving educational outcomes of girls, perhaps more so than paternal education. Thus, education policies can incorporate measures which pertain to educating women, making them more well informed and thereby improving their decision making abilities in the household.

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# Chapter 1

## Introduction

## 1.1. Introduction

It is well documented that human capital is instrumental in enhancing economic growth and solving critical issues related to development such as elimination of poverty, inequality and deprivation. Various studies have observed that investment in human capital is associated with better standards of living and higher levels of welfare (Sahn and Alderman, 1988; Strauss and Thomas, 1995; Sen 1999). Moreover, “education is a major development-enhancing tool and is seen as essential to people’s chances in life” Huisman, Rani and Smits (2010). Strauss and Thomas (1995) also affirm that “both market and non-market productivity is enhanced by the accumulation of human capital, particularly education and health. These investments have been shown to affect labor market outcomes, fertility, child health and child educational attainment.” Besides, educated individuals are more likely to be healthy and less likely to be poor (UNESCO,2008; World Bank, 2006). Additionally, “individuals are empowered by education, which improves their ability to communicate, argue, and make informed decisions” (Sen,1999). In this context, steps have been taken to universalize primary education and increase government and private investment in education at the global level.

India has achieved significant progress in growth and development indicators since its independence. For instance, growth in gross domestic product (GDP) has increased from 2.3% in 1951-1952 to 8.2% in 2016-2017.<sup>1</sup> Furthermore, gross capital formation (as a percentage of GDP) has increased from 15.69 % in 1960 to 32.07% in 2018.<sup>2</sup> Besides, health and education indicators reveal that progress has been made on these fronts as well. For instance, as presented by the World Bank data, the infant mortality rate has decreased to 28.3 per 1000 live births in 2019 from 161 in 1960. In addition, the death rate has decreased from 22.18 per 1000 people in 1960 to 7.26 in 2019 and fertility rate (births per woman) has decreased from 5.9 in 1960 to 2.2 in 2019. Moreover, life expectancy at birth has increased from 41.42 years in 1960 to 69.65 years in 2019.

Taking account of the state of education of India, we observe that literacy rates (percentage of people ages 15 and above) have increased from 40.74% in 1981 to 74.37% in 2018. Furthermore, gross enrolment rates for primary schooling have increased from 78.51% in 1971 to 99.90% in 2020 while they have increased from 23.84% in 1971 to 75.48% in 2020 for

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<sup>1</sup> Source: Central Statistical Office (CSO), Ministry of Statistics and Programme Implementation, Government of India.

<sup>2</sup> World Bank.

secondary schooling. Thus, India has made considerable progress in enrolling children in schools in the recent decades. Moreover, Asia accounted for the majority of the global fall in drop out of children after 2000, and while India accounted for the most of the decline, the educational achievements of India have been mixed. Data reveals that while literacy, enrolment rates, and school infrastructure have all improved, learning achievement has remained poor. For instance, according to the ASER 2016, only 25% of pupils in the third grade could read text at the second-grade level. At the same time, math skills have decreased over time and in comparison, to 36% in 2012, only 28% of third-graders in 2016 could solve subtraction sums. Moreover, according to Saha (2013), “even today, after more than 60 years of independence and when India’s economy is growing rapidly, the attainment of education for women has remained an area of great concern.” For example, according to the World Bank data, male literacy increased from 54.84% in 1981 to 82.36% in 2018 while female literacy increased from a mere 25.68% in 1981 to 65.79% in 2018. Although, we have witnessed a substantial increase in the literacy rate of women, despite various policy measures, it has still not been able to catch up with male literacy rates or with the female literacy rates of other developing countries.

Considering the advantages of investing in education, it's critical to understand the determinants that influence family decisions about children's education. It is widely acknowledged that in many emerging economies, the household and family are significant economic decision makers and intermediates, with some of these functions being taken over by the market or the state as development proceeds. In this context, decision making about the human capital of children and adults is one of the most essential considerations for households.

It is well known that India is “a classical patriarchal system”<sup>3</sup> where gender roles are clearly defined with boys being future breadwinners who will look after their parents in old age and girls leaving their natal home and becoming a part of their husband’s family. “This might mean daughters are not sent to school, since investments in daughters’ education accrue to their future husbands’ family, whereas boys are, since investments in their education stay in the family. These gender specific roles may be responsible for continuing wide gaps in education across gender in patriarchal areas” Huisman, Rani and Smits (2010). Moreover, Alderman and King (1998) find that “the perception that the benefits of education are lower for women can dampen demand for their education.” Glick and Sahn (2000) offer a similar explanation for gender

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<sup>3</sup> Kandiyoti, (1988); Agarwal, (1988)

differences in education. In comparison to girls, boys typically attend school for longer periods of time because of the following reasons: (a) boys have higher expected returns to education vis-à-vis girls or (b) the cost of education for boys is lesser or (c) it is possible that parents prefer to educate sons over daughters. Since women typically face more discrimination in the labour market in terms of lower earnings or employment opportunities, parents' incentive to invest in their education may decline. Thus, we find that gender bias is markedly visible in the matter of education, with households in rural and urban India prefer to invest more in the education of their sons than their daughters (both in monetary terms and in the time allocated to each child).<sup>4</sup>

Existing literature confirms this bias for male children in terms of educational outcomes. (Kingdon 2005; Azam and Kingdon, 2013; Zimmerman, 2012; Kaul 2018). This could be attributed to the conceptual understanding of theories of parental investment in education and the concept of patrilocality which suggests that parents are likely to invest more in boys' education as compared to girls' education since they see them as support for old age. To acquire a better understanding of gender disparity in India, our research attempts to study the relevant factors and examine if and how educational investment made by parents varies between boys and girls. In this context, this research attempts to study the existence of gender bias in enrolment and educational expenditure of children aged from 6-18 years through the IHDS-2 dataset. Moreover, we attempt to analyse the influence of parental education on this bias.

## **1.2. Objectives**

To evaluate the extent to which relevant factors influence educational outcomes in India, we combine them into a comprehensive theoretical framework and produce hypotheses about the their influence. This research consists of two sets of objectives. First, we analyse the various determinants of child enrolment in schools in India. The detailed objectives are as follows:

1. How do the age of the child, caste, religion, household economic position, school characteristics and region of residence affect the enrolment outcomes of children? Do

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<sup>4</sup> This investment can be in the form monetary resources or in terms of the amount of time spent interacting with each child.

these factors have a differential impact on the enrolment of boys and girls in public and private schools?

2. How does the gender of the child influence his or her enrolment outcomes? More specifically, we attempt to study whether there exists a gender bias in the enrolment of children in the age group of 6-18 years. How do maternal and paternal educational attainment levels affect enrolment outcomes of children? Which of the two play a larger role in affecting enrolment outcomes of children?
3. How does a household's economic position influence the gender bias in enrolment of children in educational institutions?

Second, we analyse the various determinants of educational expenditures of children in schools in India. The detailed objectives are as follows:

4. To examine the determinants of parental decision to spend or not on the education of their children. More specifically, we determine if there is an *existence* of gender bias in household expenditure allocation on education.
5. Conditional on the decision to spend, we analyse the determinants of the child educational expenditures. How do the age of the child, parents' educational attainment levels, caste, religion, household economic position, school characteristics and region of residence affect a child's educational expenditures?
6. How do the above factors have a differential impact on the educational expenditures of boys and girls? How do maternal and paternal educational attainment levels affect child expenditure outcomes of boys and girls differently? Which of the two play a larger role in affecting educational expenditure outcomes of children?

### **1.3 Hypotheses**

The following hypotheses would be tested in the study:

1. There exists a gender bias in enrolment and child educational expenditures.
2. Enrolment outcomes and child educational expenditures of girls are worse for socially and marginally deprived communities viz. Muslims, SCs and STs.
3. An increase in maternal and paternal education improves enrolment outcomes and child educational expenditures.



4. An increase in maternal education has a greater effect on enrolment outcomes and child educational expenditures of girls.

## **1.4. Data Set and Sample**

### **1.4.1. Database**

The study will use the Indian Human Development Survey (IHDS)-2011 dataset for the analysis. We have considered child as the unit of observation for all the objectives. The IHDS dataset is a nationally representative, two-wave panel dataset, the first round of which was conducted in 2004-05. The data collection has been across all the states and union territories of India except Andaman and Nicobar and Lakshadweep islands (Desai & Vanneman, 2012; Desai, Vanneman, & National Council of Applied Economic Research, 2005). This project is a collaboration between the University of Maryland and the National Council of Applied Economic Research (NCAER), New Delhi. The IHDS dataset covers various socio-economic aspects and provides information on a wide array of variables such as health, education, economic status, marriage, fertility, gender relations and employment. Taking about the questionnaire on education we find that we have education details for all the children between 0-18 years of age. Moreover, special surveys were done for the age group of 8-11 years which provide detailed information on the learning outcomes of the children. The head of the household is the respondent of the household survey while the wife of the head of the household or any other ever-married woman who is in the age group of 15-49 years. The data collection for the second wave of the IHDS (IHDS-II) began in 2011 and was completed within a year. Approximately 83percentage points of the households which were interviewed in IHDS-I were re-interviewed for IHDS-II. The total sample size for the second round is that of 42,152 households and includes a replacement sample of 2,134 households that were not re-interviewed (Desai & Vanneman, 2015).

### **1.4.2. Sample**

The sample for our study is restricted to the children who are aged between 6-18 years. We restrict the age group for the children in our analysis to 6-18 years because children in India start with formal schooling i.e., first standard when they are around 5-6 years old. By 18 years of age the children generally complete the senior secondary school and thereafter pursue higher

education. Now, although the original sample consists of 2,15,754 individuals, we restrict our sample to N= 49,147 as we are interested on children's educational outcomes in the form enrolment rates and parental expenditure on education for the age group of 6-18 years. The next section outlines the variables that will be used in order to fulfil the all the research objectives in our research. First, we discuss the dependent variables followed by the independent variables.

### **1.5 Dependent Variables**

*Child's enrolment in the school:* The first dependent variable which has been used for our analysis in Chapter 3 is the child's enrolment in school.<sup>5</sup> School enrolment has been measured as a binary dummy variable where 0 stands for a child not being enrolled while 1 stands for the child being enrolled in school.

*Type of School (Public/Private):* The next set of dependent variables in Chapter 3 is the type of school in which a child is enrolled which could be public or private school. It is a binary variable where 0 denotes a child being enrolled in a private school while 1 represents child getting enrolled in a public school.

*Parental Expenditure on Child's Education:* In chapter 4, educational expenditure incurred on a child is the dependent variable. This variable has been constructed by summing the annual amount that is spent on school fees; books, uniforms, transportation, and other materials; and private tuition. Moreover, the expenditure on child education has been further categorized into two different types of dependent variables. The first one is 'conditional' expenditure on child education while the second one is 'unconditional' expenditure. The conditional expenditure includes only those entries for which there has been some positive expenditure on the child's education. On the contrary, unconditional expenditure includes both the positive and zero parental expenditure on the child's education.

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<sup>5</sup> School refers to government schools, private schools, convents, madrasa and open schools.

## 1.6 Independent Variables

*Gender of the child:* It is well documented that “gender bias towards male members in the allocation of households’ resources is strongly embedded in Indian culture” (Saha,2013). Moreover, Alderman and King (1998) find that “the perception that the benefits of education are lower for women can dampen demand for their education.” Thus, we expect enrolment rates for girls to be lower vis-à-vis boys and parental expenditure on education of girls to be lower compared to boys. A detailed explanation of the mechanisms underlying this have been presented in the literature review.

*Age of the child:* The age of the child is expected to have an impact on the enrolment rates and on the parental expenditure on the education of children. We expect that the enrolment rates for a younger child will be higher than the ones who are older. Moreover, this also means that the parental expenditure on education of the children is expected to be lower during the early stages of education but this expenditure is expected rise with the increase in the age of the child.

*Mother’s Education:* According to Ersado (2005) and Huisman and Smits (2009), various studies have shown that children with better educated parents have a higher probability of going to school and dropping out less. Further, Huisman, Rani and Smits (2010) argue that “for educational enrolment of girls, education of the mother might be especially important. Mothers who have succeeded in completing a certain level of education have experienced its value and know that it is within the reach of girls to complete that level.” Therefore, we expect that with an increase in the levels of mother’s education, both the enrolment rates and parental expenditure on education of a girl child will rise. Mothers’ education in the IHDS-2 dataset has been recoded as a categorical variable with five categories based on their highest level of schooling achieved (illiterate=0, primary=1, secondary=2, bachelors=3 and above bachelors=4). “The years of schooling is an indicator of the cumulative investment in an individual’s education” (Glick and Sahn, 2000). We use the variable ‘Highest Female Adult Education’ as a proxy for the child’s mother’s educational attainment level.

*Father’s Education:* Similarly, we use the variable ‘Highest Male Adult Education’ as a proxy for the child’s father’s educational attainment level. We expect that the father’s education affects child enrolment and parental educational expenditure positively. This is useful for

drawing comparisons between the impact of paternal and maternal education on child educational outcomes.

*Grandfather's Education:* The data that has been collected on father's education is reported by the head of the household in IHDS-II and may be also self-reported in some cases. In order to capture the multigenerational effect, we include grandfather's education as one of the explanatory variables. With an increase in levels of the grandfather education we expect that there will be an increase in the parental expenditure on education and also in the enrolment of children.

*Number of Male and Female Siblings:* With an increase in the number of siblings, it is expected that the parental expenditure on the education of children will decrease. This argument is put forward by the Resource-dilution hypothesis.<sup>6</sup> Buchmann and Hannum (2001), Knodel, Havvon and Siittrai (1990) and Blake (1989) have found the hypothesis to be true for western societies and many developing countries. In the case of developing countries, studies find the likelihood of older siblings having educational outcomes is high compared to younger siblings, since the older children are expected to do household work or contribute to family expenses by acquiring some extra income. Furthermore, "this has been found to be especially the case for older girls in the household, who often receive the least education in developing countries" (Ota and Moffatt, 2007). Studies such as Saha (2013) highlight that as the size of the household increases, gender bias in educational expenditure also increases. For instance, "households with more members tend to discriminate against girls more, and inequality among these girl students is highest in families with 10 or more members. By contrast, households with five or fewer members are observed to show less favouritism to male students. The severity of discrimination increases with an increase in household size. We find that females in households with more members are subjected to a higher degree of discrimination in rural as well as urban areas" (Saha, 2013).

*Main Source of Income of Household:* We have categorized the type of income source into five categories viz. Agriculture and allied activities, non-agriculture informal income source, salaried income, unorganized business and other income source. Huisman, Rani and Smits

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<sup>6</sup> According to Downey (2001), the resource dilution model posits that parental resources are finite and that as the number of children in the family increases, the resources accrued by any one child necessarily decline. Siblings are competitors for parents' time, energy, and financial resources and so the fewer the better.

(2010) propose that they expect “parents who are in salaried employment to be more aware of the importance of education and hence to invest more in their children’s education. Moreover, parents are less likely to invest in their children’s education when direct occupational transmission or transference of capital is a viable option to obtain a good position in society for their children. Hence farmers and business owners may feel less need to invest in their children’s education than people in dependent employment. Also, for small farmers the opportunity costs of sending their children to school may be high, since they are more likely to expect their children to help out tending the land and rearing livestock, especially during peak working times.” Depending on the type of income source, both the child enrolment and parental expenditure on the education of the child are expected to vary.

*Religion and Caste:* According to Boorah and Iyer (2005), “Vidya (education), Veda (religion) and Varna (caste) are inter-linked in India.” The caste system being at the core of Indian socio-cultural and economic aspects of society, becomes a key factor in analysing educational outcomes of children since it is still instrumental in determining individuals’ hierarchy in Indian society. Huisman, Rani and Smits (2010) suggest that “children from a scheduled caste or tribe have a lower chance of being in school. If they do go, they are often treated differently. Teachers from higher castes tend to have low expectations for these children, and the attitude of teachers and other pupils towards the children from low-caste families often forces them to drop out. Children from lower castes were found to perform worse in tests when their caste was announced publicly than when that was not the case.” Furthermore, Boorah and Iyer (2005) explain the role played by religion in influencing educational outcomes by what they call the and ‘attribute effect’ and ‘community effect’. According to Boorah and Iyer (2005), ‘attribute effect’ captures that different communities have varied endowments of ‘enrolment-friendly’ characteristics while ‘community effect’ represents that “different communities, by virtue of differences in their norms, translate a given attribute endowment into different enrolment rates” (Boorah and Iyer, 2005). For instance, religion, may influence family size and hence impact children’s educational investment. Using the IHDS-2, we construct the religion variables viz. Hindus, Muslims, Christian and Other religious groups whereas caste variables have been categorized as Forward/Brahmin castes, ‘OBC’ or Other Backward Castes, ‘SC’ or Scheduled Castes and ‘ST’ or Scheduled Tribes. Thus, since each social group has different economic, social and cultural capital, both religion and caste are expected to affect parental expenditure on education and enrolment outcomes of children. In particular, we expect that the households

belonging to socially disadvantaged groups and minority communities such as SCs, STs and Muslims may have worse educational outcomes.

*Number of Assets:* The number of assets capture the economic position of the household and have been used as a proxy for household income. The IHDS-2 records assets such as ownership of a house, car, television and other durable consumer goods to measure the number of household assets. Huisman, Rani and Smits (2010) argue that “both in developed and developing countries, children from families with more socio-economic resources are more often enrolled in school. For wealthier families, the direct costs associated with education, such as fees, books and uniforms are less likely to be an obstacle. Opportunity costs of children not being able to help at home, at the family farm or by earning additional income through child labour, are also less important to them.” Thus, we expect that households with more number of assets will have a higher probability of getting their child enrolled and also higher levels of parental expenditure on education of the children.<sup>7</sup>

*Media exposure:* This variable captures how often males and females in the household read a newspaper which represents their exposure to media and accessibility of information. We expect that higher levels of exposure to media will have a positive impact on both the enrolment rates and the parental expenditure on education.

*School Distance:* School distance is also expected to have an influence on the explained variables. We expect that with an increase in the distance from the school there will be a decline in the enrolment rates, especially for girls. According to Alderman and King (1998), while “it is unlikely that direct fees would greatly differ by gender in a manner that would be sufficient to explain differences in enrolment rates, but other costs, such as the cost of reaching a school often a significant proportion of the total cost of schooling may differ by gender. Moreover, schools may be effectively ‘closed’ or inaccessible to girls. Furthermore, there is evidence that distance to schools is a more important factor for girls than boys, perhaps because parents fear exposing their daughters to moral or physical peril.” On the contrary with an increase in the

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<sup>7</sup> Similarly, Glick and Sahn (2000) argue that “family income will favourably influence the demand for children's education for developing nations. Poor families are unable to afford the direct or indirect costs of education, and their capacity to borrow to cover these costs may be limited. Children from wealthy homes are predicted to enrol and stay in school longer since they are more likely to be able to pay for schooling out of current income or savings (and have easier access to loans). If education is a normal consumption good, income will likewise have a favourable impact on schooling.” (Glick and Sahn, 2000).

school distance, the parental expenditure on education is expected to increase as there would be higher costs of commutation.

*Government Scholarship (Yes/No):* Huisman, Rani and Smits (2010) find that in numerous nations, scholarships for girls have been proven to enhance their school involvement and that greater government expenditure on education impacts educational outcomes positively. Thus, we expect that the presence of government scholarship will have a positive impact on the enrolment rates of children. On the contrary, the parental expenditure on education is expected to fall if the child receives any government scholarship.

*Type of School:* Here the type of school has been divided into three categories viz. public school, private school and Others. Since private schools have higher fee, we expect the enrolment rates to be lower in the case of private schools. The parental expenditure on education is expected to be higher in the case of private school vis-a-vis public school.

*Region of Residence (Urban/Rural):* Taking the role played by region of residence, such as urban areas into account, Huisman, Rani and Smits (2010) suggest that “modernization is generally associated with urbanization, lower distance to schools, better road and communication infrastructure, and more impact of globalization. In urban areas, state influence is generally stronger and there is more pressure on parents to send their children to school.” Thus, we expect child enrolment and educational expenditure incurred on a child to be higher for urban areas.<sup>8</sup>

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<sup>8</sup> For instance, according to Sidkar and Mukherjee (2012), “the 64th round of the National Sample Survey (NSSO) reveals that 12.8 percent of rural children and 7.3 percent of urban children are never enrolled in school, while 5.3 percent of rural children and 3.9 percent of urban children drop out at this age. The data also shows that about 90 percent of secondary school-aged students have enrolled in school, yet 50 percent of them are unable to complete their studies. In the secondary school age, there are 42.8 percent of dropouts in the rural sector and 33.3 percent in the urban sector.”

## 1.7. Sample Description

In this section we present descriptive statistics at the child, parent and household levels.

Table 1.1: Descriptive statistics by child gender

	<b>Full Sample</b>	<b>Girls</b>	<b>Boys</b>
<i>Children Characteristics</i>	Mean (Standard Deviation)	Mean (Standard Deviation)	Mean (Standard Deviation)
<b>Enrolment (6-18years)</b>	0.90 (0.29)  (N=49,147)	0.88 (0.31)  (N=23,709)	0.91 (0.28)  (N=25,438)
<b>Child Expenditure of those enrolled (6-18years)</b>	4615.82 (8841.67)  (N=41,966)	4162.32 (8602.47)  (N=20,008)	5029.05 (9034.51)  (N= 21,958)
<b>Whether Student received free books from government in the last year (6-18 years)</b>	0.23 (0.42)  (N=42,956)	0.54 (0.49)  (N=20,754)	0.47 (0.499)  (N= 22,790)
<b>Whether student received school fees from government in the last year (6-18 years)</b>	0.346 (0.476)  (N=43,539)	0.37 (0.48)  (N= 20,751)	0.32 (0.46)  (N= 22,788)
<b>Whether student received free uniform from government in the last year (6-18 years)</b>	0.30 (0.45)  (N=43,542)	(0.34) (0.47)  (N= 20,754)	(0.25) (0.44)  (N= 22,788)
<b>Whether student received any scholarship from government in the last year (6-18 years)</b>	0.23 (0.42)  (N=42,956)	0.25 (0.44)  (N= 20,458)	0.20 (0.40)  (N= 22,498)
<b>Amount of scholarship received in the last year (6-18 years) (including 0 also)</b>	141.60 (517.52)  (N=42,956)	161.67 (551.34)  (N=20,458)	123.35 (483.99)  (N= 22,498)
<b>Whether attended government school</b>	0.64 (0.48)  (N= 43,768)	0.67 (0.47)  (N= 20,859)	0.61 (0.49)  (N= 22,909)
<b>Whether attended private school</b>	0.33 (0.47)  (N= 43,768)	0.29 (0.46)  (N= 20,859)	0.37 (0.48)  (N= 22,909)



<b>Whether attended English medium school</b>	0.18 (0.38)  (N= 41,948)	0.17 (0.37)  (N= 19,915)	0.19 (0.39)  (N= 22,033)
<b>School Distance</b>	2.67 (4.93)  (N= 43,655)	2.51 (4.61)  (N= 20,808)	2.81 (5.20)  (N= 22,847)
<b>No of children in household (Aged 0- 18)</b>	2.41 (1.66)  (N=51,288)	2.45 (1.68)  (N=24,851)	2.28 (1.62)  (N=26,377)
<b>Household size</b>	6.30 (2.71)  (N= 51,288)	6.44 (2.70)  (N= 24,851)	6.16 (2.71)  (N= 26,377)
<b>Household Assets</b>	14.79 (6.39)  (N=51,204)	14.69 (6.38)  (N=24,837)	14.89 (6.39)  (N=26,637)
<b>Household income</b>	125617.4 (236348.4)  (N= 51,228)	122392.2 (219608.5)  (N=24851)	128656.1 (251067.2)  (N=26377)
<b>Household income per capita</b>	20985.99 (39197.75)  (N= 51228)	20043.28 (35697.5)  (N=24851)	21874.17 (42212.34)  (N=26377)
<b>Household Consumption</b>	124731.3 (115945.5)  (N= 51,208)	123986.8 (114226)  (N=24,838)	125432.5 (117539.9)  (N= 26,370)
<b>Household Expenditure per capita</b>	21206.22 ( 20569.11)  (N= 51,208)	20627.6 (20201.24 )  (N=24,838)	21751.23 (20895.43)  (N=26,370)
<b>Whether Poor household</b>	Yes= 23.94% No= 76.06%	Yes= 25.41% No= 74.59%	Yes= 22.55% No= 77.45%
<b>Parents' Characteristics</b>			

<b>Mother's Education</b>			
<b>Illiterate</b>	43.22%	43.53%	42.92%
<b>Primary (1st to 4th)</b>	6.89%	6.74%	7.04%
<b>Upper Primary (5<sup>th</sup> to 8th)</b>	23.32%	23.39%	23.26%
<b>Secondary (9 to 12)</b>	19.69%	19.47%	19.9%
<b>Bachelors</b>	3.85%	3.84%	3.85%
<b>Above Bachelors</b>	1.80%	1.82%	1.78%
<b>Father's Education</b>			
<b>Illiterate</b>	22.09%	21.76%	22.40%
<b>Primary (1st to 4th)</b>	8.19%	8.02%	8.36%
<b>Upper Primary (5<sup>th</sup> to 8th)</b>	25.74%	26.07%	25.42%
<b>Secondary</b>	31.90%	31.92%	22.39%
<b>Bachelors</b>	7.34%	6.79%	6.89%
<b>Above Bachelors</b>	3.54%	3.57%	3.51%
<b>Grandfather Education</b>	2.22 (3.65)	2.22 (3.65)	2.22 (3.64)
<i>Households Characteristics</i>			
<b>Highest Education obtained by adult Household Member</b>	7.47 (4.97)	7.48 (4.97)	7.45 (4.98)
<b>Caste</b>			
<b>Brahmin &amp; Forward/General</b>	27.98%	27.88%	28.07%
<b>OBC</b>	42.37%	42.73%	42.03%
<b>SC</b>	22.31%	22.50%	22.13%
<b>ST</b>	8.85%	8.93%	8.77%
<b>Others</b>	1.04%	1.00%	1.07%
<b>Religion</b>			
<b>Hindu</b>	78.55%	78.31%	78.78%
<b>Muslim</b>	15.85%	16.24%	15.48%
<b>Sikh, Jain, Christian, Others</b>	5.60%	5.46%	5.74%
<b>Urban Residence</b>	31.13%	30.86%	31.39%

Source: IHDS-2 Dataset.

### 1.7.1. Children Characteristics

The first panel in Table 1.1 shows the gender wise descriptive statistics for all the children who have been considered in the sample. We find that approximately 90 percent of the children in the age group of 6 -18 years are enrolled. This proportion of enrolment is slightly higher for boys and we observe that their enrolment rate is almost 91 percentage points. This rate is lower for girls by 3 percentage points showing that there is a gender gap in the enrolment rates of boys and girls. Looking at the parental expenditure on children education, we find that the mean parental expenditure is approximately ₹4,615. Taking into account the gender of the child, we find that there exists a notable gender gap in educational expenditure. The results show that the mean expenditure on a girl is approximately ₹867 lower when compared to a boy. Considering government's support in educating children, we find that approximately 54 percent of girl students receive free books from the government. This percentage is lower for boys where 47 percent of them receive free books. Next, observing the values of government assistance (in the form of free uniform, providing school fees or scholarship), we find that the proportion of girls who receive this support is higher when compared to the boys. For instance; approximately 38 percent of girls received school fees from the government vis-à-vis 32 percent of boys. Furthermore, school characteristics play an important role in our analysis and we observe that the proportion of girls attending government school is higher by 6 percentage points when compared to boys. On the contrary this proportion which was higher for girls in the case of public schools changes for private schools. Sample statistics show that parents prefer to send boys to private schools which is reflected in lower enrolment of girls in private schools. Descriptive data on children's characteristics shows that there is a trend of preference of the son in the sample. We also find that girls have more siblings than boys, although this difference is very small. We find that girls live in larger households where average household size is approximately 7 individuals compared to boys where the average household size is 6 individuals. Furthermore, observing the household income and household per capita income statistics, we find that girls reside in poorer households vis-à-vis the boys. This also gets reflected through the last row in panel 1 where we find that almost 26 percent of girls reside in poorer households.

### **1.7.2. Parents' Characteristics**

Panel 2 of Table 1.1 shows the descriptive statistics of parents. We find that almost 44 percent of the mothers are illiterate in our sample. Almost 7 percent of the mothers have attained primary education. The highest proportion of mothers lie in the upper primary category (5<sup>th</sup> to 8<sup>th</sup> standard) and almost 20 percent of the mothers have attained secondary education. The proportion of mothers who have attained bachelors' or above bachelors' education is negligible and only 5 percent of mothers in the sample have higher education. We can see that almost 22 percent of fathers are illiterate which is approximately half of the number of mothers who are uneducated. More than 50 percent of fathers have had an upper primary or secondary level of education. The proportion of father who have attained secondary education is the highest amongst all the education brackets showing that fathers have higher levels of education. The proportion of fathers who have attained a bachelors or above bachelors' education is approximately 11 percent which is more than double when compared to mothers having the same level of education.

### **1.7.3. Household Characteristics**

The third panel in Table 1.1 shows the descriptive statistics related to households' characteristics. We observe that girls have a higher probability of living in households with adults who are more educated when compared to households in which boys reside. Moreover, we find that almost 79 percent of the sample consists of those households who are Hindus. The proportion of Muslims is approximately 16 percent while households belonging to 'other religious' groups are approximately 6 percent. Across caste categories, most of the households (43 percent) are from the OBC (Other Backward Caste) category followed by Brahmin and Forward Caste category (28 percent) and then the SC (Scheduled Caste) category (22 percent). Finally, we observe that almost 31 percent of the sample resides in urban areas.

## **1.8 Organisation of the Study**

The study is organized as follows. Chapter 1 discusses the relevance, scope, methodology and objectives. The second chapter deals with theoretical models and major conclusions of past studies. It discusses the database used, choice of variables used and sample statistics. The third chapter discusses the various determinants and existence of gender bias in enrolment outcomes of children and the role played by parental education in influencing these outcomes. The fourth chapter discusses the various determinants of child expenditure and how parental education affects gender bias in child educational expenditure. The fifth chapter is a conclusion of the study and discusses relevant results, limitations and scope for further research.

## Chapter 2

# Conceptual Framework and Literature Review

## **2.1. Conceptual Framework**

“When modelling the economics of education, one needs to consider the fact that investments in education are generally not made by the primary beneficiaries but by their care givers. Thus, there are issues not only of the efficiency of the investment, but also of the intrahousehold allocation of the expected benefit” (Alderman and King, 1998). Moreover, various studies have found parental education to be one of the most significant determinants in schooling of children. The following theories attempt to determine the factors that influence parental investment in the education of children. This section explores the theoretical frameworks through which associations between the following are made:

### **2.1.1. Parental investment in children’s education**

#### **2.1.1.1. Theories of parental investment: What are the determinants of parental investment in education?**

According to the Human Capital Theory by Becker and Tomes (1976), parents decide the amount of investment to make towards a child’s human capital depending on the expected payoff from the investment. Based on previous studies in Becker and Lewis (1973) and Becker (1974b), Becker and Tomes (1976) build a model wherein at first, they construct a household utility function which depends on the number of children, “quality” of each child, and all other commodities that are consumed. Here, the “quality” of each child has been assumed to be the same for convenience.<sup>9</sup> This implies that the parental contributions to each child is equal. By relaxing the assumption of same quality and endowment of each child. In addition, Becker and Tomes (1976) extend the model wherein the impact of withdrawing the assumption has been explored and “differences in ability, public support, luck and other factors” are introduced in the model. They conclude by observing that when differences in endowments of children are accounted for, parents can either “compensate those with poorer endowments by spending more on them or reinforce those with better endowments” (Becker and Tomes, 1976). Furthermore, they note that greater human capital is invested in “better endowed” children while more non-human capital in the “less endowed” children. “That is, they reinforce with

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<sup>9</sup> According to Becker and Tomes (1976), “this characteristic is partly influenced by the household through its spending on children, and partly outside of it due to inherited aptitude, state investments in children, luck and other factors. Because each child’s endowment is believed to be equal, parental contributions must be equal if overall quality is to be equal.” (Becker and Tomes, 1976).

human capital and compensate with nonhuman capital” (Becker and Tomes, 1976). Moreover, according to Solon (2014) who builds on the traditional Becker and Tomes (1976) model, parents have greater willingness to invest in the children’s human capital when the expected returns are higher.

Subsequently, Kingdon and Theopold (2008) argue that the amount of education acquired by a child is determined by comparing the costs and benefits associated with each extra year of education. Their study highlights the contributions of both demand and supply side measures in determining educational decisions of individuals. They argue that “there is much analysis of the role of supply-side measures in reducing the costs of school participation; for example, reduction of school fees, direct cash subsidies, school-construction programs to reduce travel costs and the provision of non-monetary benefits in schools, such as school meals.”<sup>10</sup> Thereafter, they insist that the expected returns from schooling play a significant role in determining the demand for education. Thus, the demand for education of a child depends on the *expected* economic benefits and the costs associated with the education. Kingdon and Theopold (2008) suggest that if the expected economic benefits are low for certain groups of individuals (such as women and historically marginalized groups), this may translate into disparities in educational outcomes among them. Further, they examine the role played by income or economic status of a household in determining the demand for education as well. For instance, “liquidity constraints may change this positive relationship into a negative one since for credit-constrained poor households the negative income effect may dominate the positive substitution effect (of higher returns to education) on demand for schooling.”<sup>11</sup>

According to Blake (1981), the Resource Dilution Model assumes that parental resources (time, energy, money etc.) are finite and of three types.<sup>12</sup> Blake (1981) argues that “the more children, the more these resources are divided even taking account of economies of scale and, hence, the lower the quality of the output.” The model defines the “sibship size” or the number of siblings

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<sup>10</sup> According to Kingdon and Theopold (2008), “the effectiveness of supply-side initiatives in enhancing schooling quality in order to increase educational gains has also been investigated.”

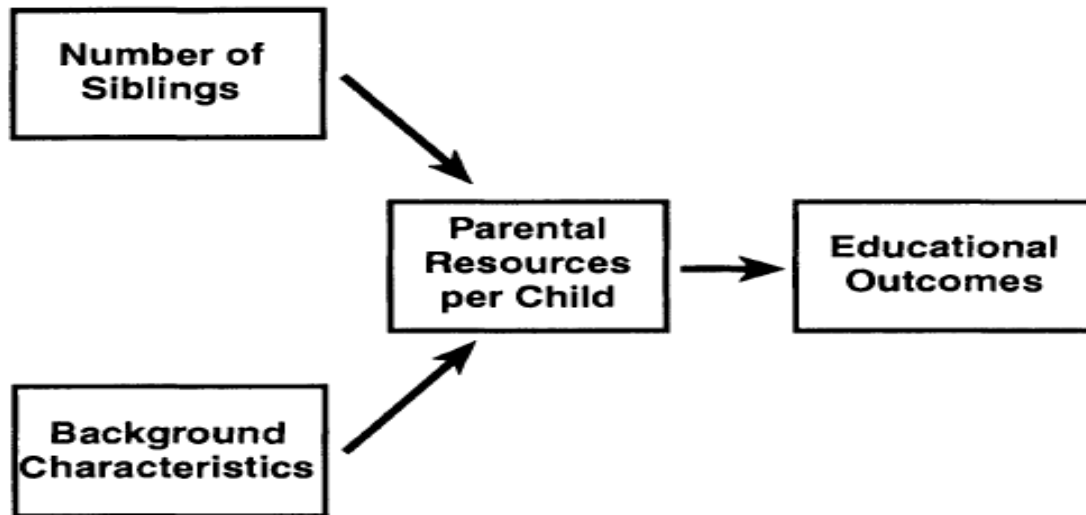
<sup>11</sup> According to Kingdon and Theopold (2008), “this could be because increased educational returns make present schooling more valued in the labour market, causing a poor family to pull their children out of school and put them to work. If this is the case, an increase in educational returns could have unforeseen negative consequences for impoverished children's education.”

<sup>12</sup> According to Blake (1981), the three types of finite parental resources are: (1) "types of homes, necessities of life, cultural objects (like books, pictures, music and so on)," (2) "personal attention, intervention, and teaching," and (3) "specific chances to engage the outside world or, as kids say, 'to get to do things'.



as the “respondent’s total number of brothers and sisters, including half-, step-, and adoptive siblings.”

Figure 2.1: Illustration of Resource Dilution Model



Source: Downey (1995)

As depicted in Figure 2.1, in addition to the “sibship size”, background socioeconomic characteristics such as parent’s education, parent’s occupation, household income, race, urban/suburban/rural, sex of the child and region also play a role in determining parental resources per child. Downey (1995) tests the Resource Dilution Hypothesis by using data from the National Education Longitudinal Study of 1988 (NELS:88).<sup>13</sup> He concludes that “parental resources are finite and that additional children dilute the total quantity of resources any one child receives, which in turn decreases their educational output.”

#### **2.1.1.2. Theories of Parental Investment: How does parental investment in education vary with the gender of the child?**

Alderman and King (1998) build on the existing Human Capital Theory by Becker and Tomes (1976) and discuss theoretical rationales for the gender differences in school enrolment. The theoretical underpinnings of the model are such that investment in education is made by care givers and not the primary beneficiaries themselves. “Thus, there are issues not only of the

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<sup>13</sup> The NELS is a nationally representative, longitudinal dataset wherein students from the United States of America were surveyed regarding their school, work, home experiences, educational resources, the role of parents in education amongst others.

efficiency of the investment, but also of the intrahousehold allocation of the expected benefits. Preferences, then, matter for two distinct reasons. First, learning may contribute directly towards the welfare of the child and of parents, over and above its productive return as an investment. That is, learning may be a consumption good. Second, the decision maker(s)' preference for equity amongst children influences how investments in education are allocated to children with different expected rates of return" (Alderman and King, 1998). They develop an intergenerational (two-period) investment model of education in which parents work in the first period and retire in the next. As per them, there may be gender-based differences in educational investments by parents due to two reasons. First, there can be gender specific rates of return for education because of differences in costs associated with education for each gender and therefore different rates of investment.<sup>14</sup> Second, parental empathy may be gender specific and parents can have different preferences for allocation of resources among sons and daughters. For instance, mothers may be more empathetic with their off springs or particularly with their daughters. However, they may also be more biased towards the child that they expect to live with in old age.<sup>15</sup>

According to Alderman and Gertler (1997) as cited in Alderman and King (1998), "under the same conditions that would lead to higher investments in sons, the demand for daughters' human capital will be more income and price elastic than the demand for sons'." As per Alderman and King (1998), "parents invest in their children's human capital to the point where the marginal cost in terms of consumption today equals the marginal benefit tomorrow." Furthermore, "since the market returns to boys' education is greater than the return to girls' human capital, families invest more in boys' human capital than girls' human capital" (Alderman and King, 1998). However, Jensen (2012) through a study of randomly selected rural Indian villages tests the human capital theory and finds that in conditions of favourable economic opportunities for girls, parents alter their behaviour and girls are rewarded with a higher investment in human capital. Thus, "parents are willing to invest in girls' human capital in anticipation of labor market returns far in the future" (Jensen, 2012).

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<sup>14</sup>According to Alderman and King (1998), "both genders perform equally well in school, depending on the balance of inputs. When direct costs such as fees or uniform expenses are gender-specific, when access differs by gender, or when the opportunity cost of a child's time vary by gender, cost streams may differ. Such cost disparities will result in relatively simple variances in investment rates."

<sup>15</sup> According to Alderman and King (1998), "while many of the suggested causes for gender imbalance in schooling are feasible whether or not parental preferences differ for sons and daughters, gender gap may be widened or minimised if preferences differ under particular models of how families resolve differences in preferences."

Glick and Sahn (2000) offer a similar explanation for gender differences in education. Boys often receive more years of schooling compared to girls because of the following reasons: (a) boys have higher expected returns to education vis-à-vis girls or (b) costs of educating boys is lower or (c) because parents may simply prefer educating sons compared to girls. Since women are typically more discriminated in the labour market in terms of lower earnings or employment opportunities, parents' incentive to invest in their education may decline.<sup>16</sup> Moreover, despite opportunities where educated girls may earn as much as boys, "income remittances to parents from married adult daughters, who join their spouses' families, may be lower than from adult sons" (Glick and Sahn, 2000). Furthermore, school and teacher attitudes or lower attendance due to household chores and obligations may cause the quality of schooling that girls receive to be inferior and thus may contribute to lower expected returns. The last reason can be due to socio-economic and cultural roles of women. Since girls and women are expected to do more household chores than boys due to sexual division of labour, the demand for their education may be lower.

Moreover, kinship norms and socio-cultural factors play a vital role in influencing educational expenditures of sons and daughters in the Indian context. For instance, "one channel through which the male bias may intensify is parents choosing to invest disproportionately in the child who is designated to look after them in their old age" (Kaul, 2018). According to Ebstein (2013), the presence of patrilocality "implies that parents with a son will have two caregivers in their elder years, whereas those with daughters will have zero, resulting in a significant difference in the expected value of sons relative to daughters."<sup>17</sup> Thus, the Theory of Patrilocality (Ebstein, 2013) argues that in countries where patrilocality is a norm, parents choose to invest excessively in the child who is delegated to take care of them in their old age. In India, parents typically choose to live with their eldest son (Das Gupta, 1987) while daughters are not required to provide financial support to their natal homes which may explain their choice to make greater investments in the education and health of their son compared to their daughters. (Kaul, 2018). Moreover, "the prevalence of dowry in India makes daughters an additional liability and sons, an additional asset" (Das Gupta et al, 2003). This

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<sup>16</sup> According to Glick and Sahn (2000), "while there may be significant non-market returns to female schooling, parents may be unaware of or value these non-monetary benefits less than monetary ones."

<sup>17</sup> According to Ebstein (2013), "parents may abort girls because of patrilocality, which is a cultural norm in which sons care for their elderly parents and daughters leave the family after marriage to care for their in-laws."

disincentivises parents from investing in their daughters' education while reinforces the incentive to invest in their sons to make them desirable candidates in the marriage market.

### **2.1.2. Parental education and investment in children's education**

It is well documented that both market and non-market productivity is elevated by the accumulation of human capital which affects health and education levels of children along with labour market outcomes.<sup>18</sup> In this light, this section attempts to explore the conceptual underpinnings which determine how parental education affects investment in education of children.

As per Eccles and Davis-Kean (2005), "parents' education should influence parents' skills, values and knowledge of the educational system; which, in turn, should influence their educational practices at home and the skills children have to model, as well as the parents' ability to intervene in the educational system on their children's behalf." Moreover, more educated parents have greater aspirations for their children and they expose them to various academic opportunities as well. Furthermore, Strauss and Thomas (1995) develop an empirical model of household decisions and argue that parents with higher levels of education make greater investments in the education of children by (a) extending to them better quality and higher levels of goods and services that enhance learning and (b) by spending more time with their children. Firstly, while parents with higher levels of education may spend more time working and thus, forego time spent with children, they may make up for it by earning higher wages and investing in the education of their children. Secondly, higher levels of parental education may enhance the efficiency of their interaction time with children. They assert that "if the returns to education are higher for the children of more educated parents or if parental education positively influences parental preferences for children's education, then more educated parents may make greater investments in both goods and time, even in poor households" (Strauss and Thomas, 1995).

A study conducted by Glick and Sahn (2000) in West Africa has theoretical underpinnings which have been vital for our research. They develop a collective model of parental decision

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<sup>18</sup> For instance, according to Thomas and Struss (1995), "the majority of research find robust links between parental education and baby or child mortality, as well as child educational attainment. Parental education has also been linked to improved anthropometrics in children."

making about educational investments on boys and girls which incorporates different preferences of mothers and fathers (or husband and wife) in a household with different utility functions. How resources are determined depends on “each partner’s bargaining power which is a function of income under his or her direct control.” This represents their ‘fallback position.’<sup>19</sup> According to the model, factors that increase the mother’s bargaining power would increase the resources to goods she prefers. With more education, women have higher bargaining power and fallback position (if they work) in the household. “Thus, if women value the schooling of their children more than men do, maternal schooling will have a stronger impact than paternal schooling on children’s education” (Glick and Sahn, 2000). They add that educated mothers have a strong preference for educated daughters. Being educated increases the mothers’ bargaining power in the household which increases the resource allocation towards daughters’ education. Similarly, a study conducted by Thomas (1992) in US, Ghana and Brazil finds that mothers are more inclined towards allotting resources to their daughters while fathers have a stronger preference for boys. “Then increases in mother’s schooling would have a larger beneficial effect on daughters’ education than on sons’, and father’s schooling would favor sons’ education. The former is particularly plausible because the mother’s bargaining power and her preferences for daughters’ schooling are both likely to rise with her own education” (Glick and Sahn, 2000). While this holds true for a collective model, Glick and Sahn (2000) argue that the above results also hold for a household model with unified household preferences. Glick and Sahn (2000) find that higher maternal education has a stronger effect on educational investment of daughters compared to sons. Similarly, while higher paternal education also promotes investments in daughters’ education compared to sons, this increase is lesser. Thus, they conclude that “the relative benefit to girls, defined as the difference in the improvements in girls’ and boys’ schooling, is greater from mother’s education than from father’s education” (Glick and Sahn, 2000).<sup>20</sup>

A theory conceptualized by Kabeer(2000b) i.e., the Theory of Empowerment (2000b) presents how educated mothers may contribute to more equitable distribution of resources among

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<sup>19</sup> According to Glick and Sahn,2000, “factors that threaten the relationship determine the fallback position or bargaining strength. That is, if a partner has a stronger fallback position, she or he can more credibly threaten to dissolve the partnership if allocations do not meet her or his preferences.”

<sup>20</sup> However, Alderman and King (1998) argue that as per the Theories of Parental investment, even if mothers are more educated, most of the household resources may end up being spent on sons rather than daughters. “Thus, although mothers’ education and employment would increase the budget shares of education at the household level, it doesn’t predict an equitable investment in daughters’ education.”

daughters and sons. According to the theory, empowerment refers to the ability to make and facilitate one's choices and it comprises of access to resources, agency and achievements. It regards women's education along with employment and political participation as a resource which contributes to their empowerment. Education of women also contributes to a change in the power dynamics within a household and gives them greater access in decision making. Amongst other positive effects, educated women are more likely to take care of their children better, less likely to suffer from domestic violence and more able in dealing with government officials and various service providers (Kabeer, 2005).<sup>21</sup> Based on the Theory of Empowerment (2000b), "women who have some education and are economically active are more likely than others to give equal value to sons and daughters and to exercise equal effort on their behalf." Thus, we may infer that more educated mothers would invest in an egalitarian manner in the education of sons and daughters.

A second channel worth investigating is presented through Exposure-based Theories. These theories suggest that with increasing exposure to egalitarian beliefs and situations, individuals develop gender egalitarian beliefs. Moreover, "higher levels of education may expose mothers to different ideas and worldviews, and this exposure may change mothers' beliefs in gender norms, especially regarding marriage and the distribution of power in households" (Bourne and Walker, 1991). Das Gupta et al (2003) propose that "as cultural and gender norms, and traditional family structures influence the value attached to sons and daughters, changes in mothers' beliefs in stereotypical gender norms may be more beneficial for girls' outcomes, especially in India where son preference is more prevalent". Zhang, Kao and Hannum (2007) conducted research in rural China and found that "mothers with gender egalitarian attitudes were more likely to have similar educational aspirations for both girls and boys, as compared to mothers with more traditional gender attitudes who had higher educational aspirations for their boys". Based on the above theories, we propose that more educated mothers' may prefer an egalitarian allocation of resources amongst their sons and daughters in the form of investment on education.

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<sup>21</sup> However, according to Kabeer (2005), "there is additional research that implies that the changes related with education are likely to be conditioned by the context in which it is offered and the social interactions that it embodies and encourages. Not only is women's access to education hampered by numerous limits on their mobility and their limited position in the larger economy in countries marked by strong forms of gender inequality, but its consequences may also be limited. Where women's function in society is defined only in terms of reproduction, education is viewed as a means of preparing young women to be better spouses and mothers, or enhancing their chances of finding a good husband."

## 2.2. Literature Review

### 2.2.1. Studies on Gender Bias in Parental Investment in Children’s Education

While there have been numerous studies that have investigated gender bias in parental investment in children’s education, our focus will be on the studies conducted in India. It is well documented that in rural India, resources on education are not split equally between boys and girls in the household. We may then ask ourselves, “whether this reluctance is significantly large so as to result in a substantial gap in the resources available for schooling of the male and female children” (Chaudhuri and Roy, 2006). This question has important implications for policy purposes since if found to be true, “then schemes as the mid-day meal programme, etc, assume special significance” (Subramaniam, 1995).

Table 2.1: Studies on gender bias in parental investment in children’s education

Author(s)	Year	Period of Study	Country & State	Data Set	Methodology	Findings
Deaton “Looking for Boy-Girl Discrimination in Household Expenditure Data”	1989	1985	Thailand and Cote d'Ivoire	Living Standards Survey of Cote d'Ivoire (1985)  Socioeconomic Survey (1980-81) of Thailand	Engel Curve Approach (extension of the Engel Curve approach proposed by Working (1943)) used using Ordinary Least Squares Technique	No gender discrimination found in consumption of goods in Cote d'Ivoire.  Some evidence of gender discrimination detected in Thailand.

<p>Subramanian &amp; Deaton</p> <p>“Gender Effects in Indian Consumption Patterns”</p>	<p>1991</p>	<p>1983</p>	<p>India, Maharashtra</p>	<p>38th round of the National Sample Survey</p>	<p>Engel Curves (extension of the Engel Curve approach proposed by Working (1943) are estimated using Ordinary Least Squares Technique with the dependent variable as the share of budget devoted to education of children; Rothbarth’s (1943) procedure for measuring the cost of children</p>	<p>In urban areas, higher expenditures on education and health were incurred on boys compared to girls</p> <p>Discrimination against girls is limited to the youngest age groups</p>
<p>Lancaster, Maitra and Ray</p> <p>“Endogenous power, household expenditure patterns and new tests of gender bias: evidence from India”</p>	<p>2003</p>	<p>1993-94</p>	<p>India, Kerala, Bihar and UP</p>	<p>50th round of the National Sample Survey</p>	<p>OLS estimation of budget shares in the household using household level data</p>	<p>There exists a notable gender bias in educational attainment of children with the bias being in favour of boys who belong to the age group 10-16 years but not in the 6-9 age group. This is suggestive of the prominent gender biasness against girls where parents don’t have an incentive to spend as much as on the education girls vis-à-vis boys.</p> <p>The exception is the state of Kerala where gender bias is found in the favour of girls. The reason for the same is the presence of matriarchal society and</p>



						inheritance flowing from mothers to their daughters.  There is no evidence of gender bias in urban households in educational expenditure.	
Kingdon  “Where Has All the Bias Gone? Detecting Gender Bias in the Intrahousehold Allocation of Educational Expenditure”	2005	1994	India, major Indian states	16	The 1994 National Council of Applied Economic Research (NCAER) rural household survey	Engel Curves Estimation using OLS Methodology and Hurdle Model estimation using individual-level data <sup>22</sup>	States with most skewed sex ratios have a higher enrolment rates for boys vis-à-vis girls. Parental expenditure on the education girls is significantly lower than boys in the states which have worse educational outcomes for girls. This reflects that lower levels of educational inputs is a dominant mechanism resulting in the inferior quality of educational outcomes for girls in comparison to boys. Considering the rural households they find that gender bias in educational resource allocation is majorly in the form of non-enrolment of girls, implying zero educational expenditure.
Chaudhuri and Roy	2006	1997-98	India, rural Uttar Pradesh and Bihar		1997-98 Uttar Pradesh-Bihar, Survey of Living Conditions (LSMS)	Household level Engel curve and individual level Engel	Results show that there are significant gaps in expenditure incurred on girls

<sup>22</sup> The Hurdle Model has been given by Craig (1971). According to John (1986), “the idea underlying the hurdle formulations is that a binomial probability model governs the binary outcome of whether a count variate has a zero or a positive realization. If the realization is positive, the ‘hurdle’ is crossed, and the conditional distribution of the positives is governed by a truncated-at-zero count data model”.

“Do Parents Spread Educational Expenditure Evenly across the Two Genders?”					curve using OLS method / Heckman’s sample selection <sup>23</sup>	and boys in the household. This is reflected in both the decision of enrolment and through lower educational expenditure incurred (once enrolment has been done).
Lancaster, Maitra, Ray “Household expenditure patterns and gender bias: Evidence from selected Indian states”	2008	1993-94 and 1997-98	India, Uttar Pradesh, Bihar, Kerala and Maharashtra	1997-98 Uttar Pradesh-Bihar, Survey of Living Conditions data and 1993-94th round of the NSSO data	Estimation done through Collective household modelling	Results reveals active gender bias in favour of boys especially in the age group of children going to middle and high schools where parents' willingness to spend on the education of girls is lower than that of boys.  Results from the NSSO data reveal higher pro-male gender bias in parental expenditure in education of adults (17-60 years) vis-à-vis children (0-16 years).
Zimmerman “Reconsidering gender bias in intrahousehold allocation in India”	2012	2004-05	India, All states	2004-05, Indian Human Development Survey (IHDS-1)	Engel Curves Estimation using OLS Methodology and Hurdle Model estimation using individual-level data	Gender bias within household in the allocation of education expenditures both at the all-India and state level is observed. This biasness against girls is positively associated with an increase in the age of the girls and become universal

<sup>23</sup> According to Mare and Winship (1992), “the Heckman correction is a statistical technique to correct bias from non-randomly selected samples or otherwise incidentally truncated dependent variables, a pervasive issue in quantitative social sciences when using observational data.”

						for the age group of 15-19 years olds.
Azam and Kingdon  “Are girls the fairer sex in India? Revisiting intrahousehold allocation of education expenditure”	2013	2011-12	India, All states	2011-12, Indian Human Development Survey (IHDS-2)	Hurdle model estimation. Estimation through OLS model, Probit model and Conditional OLS	Pro-male gender bias in parental expenditure on education observed in most of the states. Rising levels of pro- male gender bias in both the enrolment decision and the parental expenditure on education of children has been found with an increasing age of the children.
Kaul  “Intra-household allocation of educational expenses: Gender discrimination and investing in the future”	2018	2011-12	India, All states	2011-12, Indian Human Development Survey (IHDS-2)	Household Fixed-Effects Model	Pro-male bias in educational expenditure has been found to be the highest in the Northern zone followed by the central zone.

According to Kingdon (2005), there are primarily two ways to detect gender discrimination in the allocation of household resources- (a) the direct method which involves the direct comparison of expenditure on males and females at the individual level and (b) the indirect method also commonly known as the Engel curve Approach which requires an indirect household expenditure methodology. The Engel curve method “seeks to detect differential treatment within the household indirectly by examining how household expenditure on a particular good changes with household gender composition” (Kingdon, 2005).<sup>24</sup> Though fairly uncomplicated, this methodology is not free of problems and has been questioned for its reliability in detecting gender bias. For instance, it remains *puzzling* as to why the Engel curve

<sup>24</sup> Lancaster, Maitra and Ray (2008) propose that “if one replaces a girl in a certain age group with a boy in that same age group, holding everything else constant, then the extent to which the expenditure share of an item changes gives us a measure of gender bias in the case of the expenditure allocation of that item.”

method fails to detect strong gender bias even when outcomes show differences between boys and girls (Deaton, 1997). Case and Deaton (2003, 2011) add that “it is not clear whether there really is no discrimination or whether, for some reason that is unclear, the method simply does not work.” Ahmad and Morduch (2002, 2017) add that “coupled with evidence on [significant gender differences in] mortality and health outcomes, the results on household expenditures pose a challenge in understanding consumer behaviour” (Lancaster, Maitra and Ray, 2008). Literature suggests various explanations for these issues.

According to Rose (1999), as cited in Lancaster, Maitra and Ray (2008), “this might be due to sample truncation bias: girls have been so discriminated against that they have died, and are missing from the sample.” For instance, in situations of adverse shocks in rural areas, the household may decide to forego any consumption on the daughters which may lead to higher mortality rates of girls in rural areas. Thus, “there may be no gender bias in resource allocations among surviving children but this masks prior gender bias in mortality selection” (Kingdon, 2005). Moreover, as per Jensen (2002), it is possible that the results won't be able to detect gender imbalance. Preferences may lead couples to continue having children until they have at least one or the desired number of sons. This may decrease the share of resources allotted to each child, even in the absence of any visible preferential treatment for sons.

Kingdon (2005) tests other possible reasons for the Engel curve method's ineffectiveness in detecting bias in household allocation and proposes “the estimation of separate equations for the two decisions (a) a probit or logit regression model for the decision of whether or not to invest in education and (b) a conditional OLS regression model for positive educational expenditure” (Chaudhuri and Roy, 2006). Kingdon (2005) argues that gender bias in parental investment in education is generally measured in a two-step process. In the first step, parents decide whether or not to enroll their sons and daughters in school. In the second step, conditional on enrolment, parents decide how much to spend on each child. Such conditional expenditures include private tuition, books, uniforms, transportation, and any other education-related expenses (Azam and Kingdon, 2013).

Kingdon (2005) uses both methods i.e., the Engel curve model and the two-step process to detect gender bias in parental investment in education and observes different results for the individual level analysis using the Hurdle Model and the household level analysis using the OLS Engel curves. He finds that the Engel curve method fails to detect any significant

discrimination and Kingdon (2005) attributes two reasons for the same. Firstly, the “Engel curve method as conventionally applied suffers from an incorrect functional form and the limitation that the effects of the household gender composition variables on both (a) the decision to enrol in school and (b) the decision of how much to spend conditional on enrolling are constrained to be in the same direction”. Secondly, due to the aggregation of data at the level of the household, it is harder to detect gender bias. Kingdon (2005) adds that “even when individual and household-level variables and equations are made as similar as possible, household-level equations consistently fail to capture the full extent of the gender bias.” Thus, she concludes the analysis by arguing that household level data cannot be a substitute for individual level expenditure data, and is in fact, a “poor substitute” for detecting and measuring the extent of gender bias reliably.<sup>25</sup>

Moreover, Lancaster, Maitra and Ray (2008) propose that “children of one gender may have different expenditure needs than children of the other gender”. “A positive change in one expenditure share may be counterbalanced with a negative change in another expenditure share”. Hence, this suggests that “the budget share-based methodology for detecting gender bias implies that a pro-male gender bias in the case of one item will be counterbalanced by pro-female gender bias in the case of another item or groups of items, even though some of the latter biases may not be statistically significant.” (Lancaster, Maitra and Ray, 2008).

Furthermore, using individual level data on expenditures in India i.e., the direct method, Zimmerman (2012) finds the existence of discrimination against girls on an all-India level. The study suggests that households make decisions at the extensive margin and at the intensive margin and warns against using regression techniques that club these decisions into one.<sup>26</sup> The study reveals that gender discrimination increases with age and becomes widespread in the 15–19 years age bracket. While studies have been conducted at the all-India level, Saha (2013) uses the individual level data from the 64<sup>th</sup> round of the National Sample Survey and attempts to measure differences in household educational expenses between sons and daughters in India.

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<sup>25</sup> Kingdon (2005) adds that household level data “understates the extent of the problem of gender discrimination” and thus the Engel curve method does not incorporate the “two distinct processes by which gender bias occurs in the within-household allocation of educational expenditure” and “dilutes the powerful gender differentiation that exists in many states in the main discriminatory mechanism.”

<sup>26</sup> Zimmerman (2012) refers to the ‘extensive margin’ decision as the decision of whether or not to spend any household resources on children’s education and refers to the ‘intensive margin’ decision as the extent of educational expenditure incurred, conditional on the decision to spend.

The study confirms the presence of significant gender bias at the all-India level and across states but finds no significant disparity between rural and urban households. Moreover, “the findings of this study are consistent with those of Chaudhuri & Roy (2006) and Kingdon (2005), and the results strengthen the claim of Kingdon (2005) with regard to the usefulness of individual-level data in detecting gender bias in household educational expenditure” (Saha, 2013).

Azam and Kingdon (2013) “use better data to test whether there exists bias in urban areas, and whether the extent and nature of intra-household gender bias changed during 1993-2005 in rural India.” The study suggests that using individual level data appears to be more effective than using household level data in detecting gender bias across different states and across rural and urban households. Conforming with previous studies on gender bias in intra household expenditure, Azam and Kingdon (2013) suggest that “unpacking education expenditure decisions into two parts (a) the decision to enrol in a school, and (b) the decision to how much to spend conditional on enrolling; provides additional insights into gender bias since in many states the direction of observed gender bias is opposite in the two decisions.” The study reveals that while there has been significant progress in gender equality in education in rural households during the 1993-2005 period, large regional disparities also exist.

More recent studies such as Kaul (2018) rest on the framework of Theories of Human Capital and examine intra-household differences in educational expenditure and enrolment for children by birth order. The study finds “the presence of a pro-male bias and an additional preference for the eldest son.” Moreover, parents in higher income groups discriminate less in favour of the eldest son as they are less likely to be dependent on their children for future support in old age. However, Saha (2013) and Azam and Kingdon (2013) find “evidence of gender bias in parental investment in both middle and higher expenditure, yet no gender bias in expenditure among households in the lowest expenditure category as expenditure in these cases are negligible.”

### **2.2.2. Studies examining Parents' Education and Differential Investment in Children's Education**

According to Maitra and Sharma (2009), parental education can influence educational outcomes of children through various channels. For instance, as proposed by Becker et al., (1990), “maternal education can improve efficiency of human capital production leading to increasing returns, across generations, in parental human capital.<sup>27</sup> Additionally there is an inter-generational effect: children born to parents with low levels of education are themselves more likely to end up with low levels of educational attainment” Maitra and Sharma (2009).

Saha (2013) conducts a study using the 64<sup>th</sup> round of the National Sample Survey to examine gender bias in household educational expenditure in India. He finds that higher levels of education of parents or guardians are associated with higher educational expenditure on children and particularly on daughters. He also constructs a measure of gender discrimination and finds that its value declines with increasing levels of parental education. Moreover, “the most severe level of inequality among discriminated girl students is observed in families in which both parents are illiterate, and it decreases with an increase in the combined educational status of the parents” Saha (2013).

While substantial literature has analysed the role of parental investment in influencing children's educational outcomes, there have been few studies which have examined how mothers' education affects gender bias in enrolment and household expenditures on education between male and female children. Drèze and Kingdon (2001) in a study conducted in rural north India reveal that “parental education matters, especially for girls, with the largest marginal effects pertaining to the influence of maternal education on girls' grade attainment.” They also find strong intergenerational effects with the education of the same sex parent having a larger impact on the schooling of children. Moreover, in a study conducted in Malaysia, Lillard and Willis (1994) find that while both parents' education has a significant and positive impact on educational attainment levels of children, maternal education affects education of daughters more compared to sons while paternal education affects the education of sons more. Thomas et al. (1996) also find similar results and conclude the same sex parent investing more in the education of children.

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<sup>27</sup> See Becker et al., (1990) for a more detailed explanation.

Similarly, Kingdon (2005) argues that “parents with higher educational aspirations for their children’s may work harder to generate income, education budget share and household per capita expenditure may be jointly determined.” She studies the association of both mothers’ and fathers’ education on school enrolment and finds that parental education has a significant effect on girls’ and not boys’ school enrolment. Moreover, mothers’ education has a larger effect on the girls’ enrolment when compared to fathers’ education. Chaudhuri and Roy (2006), find that “the education of the parents especially that of mothers has a favourable impact on the educational expenditure in each of the states in most cases.” They suggest that parental education may “capture the taste for education” and hence better educated households may have a higher “taste for education.”

#### **2.2.2.1. Channels between Mothers’ Education and Children’s Education**

Our study primarily examines two channels through which mothers’ education affects children’s education. Firstly, mothers’ education influences their decision-making power in households and secondly, it impacts their beliefs in egalitarian gender norms. While no studies have directly examined the role of these channels, we can make inferences about these relationships through the understanding of indirect associations. Various studies suggest that educated women have more decision-making power, autonomy and empowerment in their households (Acharya, Bell, Simkhada, Van Teijlingen, and Regmi, 2010; Bloom, Wypij, and Das Gupta, 2001). Subaiya and Vanneman (2016) use cross-sectional data from the India Human Development Survey (IHDS) and create a scale to measure women’s decision making regarding major purchases in the household and the number of children to have amongst other decisions. They find that education has an empowering effect on women’s decision-making in households. Moreover, Allendorf (2007) while conducting a study in Nepal finds similar results wherein primary education increases the decision-making power of women in the household significantly. More generally, studies find that education increases women’s decision-making power, although the effect may vary for different dimensions of decision-making power.

Although there is limited literature concerning the association between mothers’ decision-making power and children’s education, ample research documents the positive association between mothers’ education and child health. Hobcraft (1993) defines child health in terms of “complete physical, social, emotional, developmental and environmental well-being” and finds that more educated women have fewer stunted children and their children have better chances



of survival. Vikram et al (2012) use the India Human Development Survey (2004-05) and find that “maternal education continues to have a strong and positive relationship with child health after extensive controls.” Moreover, Adhikari and Sawangdee (2011) find that mother’s literacy is the most powerful predictors for reducing infant mortality and recommend ongoing female education to reduce infant mortality further. Bloom, Wypij, and Das Gupta (2001) find that higher economic and educational status were positively associated with the likelihood of using safe delivery care and on the freedom of their movement. Moreover, studies have also documented the positive association between maternal education and child immunization (Malhotra, Malhotra, Ostbye, and Subramanian, 2014) and feeding practices and infant growth (Shroff et al, 2011). Kambhupati (2009) tests “how mothers' autonomy in India affects their children's participation in school and the labor market” and finds mixed results such that “mother’s relative education decreases the probability of schooling for both boys and girls” in households above the poverty line but has no significant effect among households that are below the poverty line. Using the above literature as reference, we can hypothesize that there may be a positive association between maternal education and differential parental investment in children’s education via the increased decision-making and empowerment in the household.

Coming to the association between mothers’ education and their beliefs in egalitarian gender norms, studies suggest that mothers’ education can alter beliefs in traditional gender norms. For instance, Bryant (2003) suggests that “students who changed in a liberal direction with respect to gender-roles attitudes were more likely than traditional changers to have a living, educated and employed mother.” David and Greenstein (2009) propose that “maternal education and employment are both representative of mothers’ increased exposure to egalitarian beliefs and practices.” More generally, evidence suggests that education leads to a change in women’s beliefs in traditional gender roles and attitudes. However, no studies have tested the association between mothers’ beliefs in egalitarian gender norms and educational outcomes of children. In this context, the effort of the study will be to examine how maternal education affects the outcomes of children’s education in terms of their enrolment and educational expenditures.

In view of the above literature, certain gaps in knowledge must be acknowledged. For instance, studies such as Kingdon (2005), Saha (2013) and Azam and Kingdon (2013) have not examined the role of mothers’ education on their offspring’s’ educational expenditures (conditional on their enrolment) or how the association varies by gender or by the child’s age. Secondly, studies

which have examined the role of parental education in investment in children's education have not considered the channels through which these associations may take effect. They have also not investigated the role of mothers' decision-making power and their beliefs in egalitarian gender norms in influencing parental investment in the education of their offspring.

### **2.3. Contribution of the proposed study**

This study will examine the role of maternal and paternal education on enrolment outcomes and expenditures on children's education in India using the India Human Development Survey (IHDS) 2011-12 dataset. More importantly, it will assess whether these relationships differ by the gender of the child. Moreover, it will investigate how enrolment and child educational expenditures differ with increasing levels of maternal and educational expenditures for both genders and for different age groups of children. Lastly, it will highlight the role of contextual factors such as caste, religion, household economic position and income source, household exposure to media and regional dimensions in influencing these outcomes.

# Chapter 3

## Child Enrolment Outcomes

### **3.1 Introduction**

This section explores the determinants of enrolment outcomes of children in the age group of 6 to 18 years using the IHDS 2011-12 dataset. First, we examine if gender bias exists in the enrolment of children at an all-India level. Second, we explore the relationship between parental education and enrolment outcomes of children and attempt to analyse whether increasing levels of maternal education leads to an increase in enrolment outcomes for girls vis-à-vis boys. Furthermore, we explore the existence of gender bias in enrolment in public and private schools and the role played by maternal and paternal education.

### **3.2 Objectives**

We analyse the various determinants of child enrolment in educational institutions in India.

The detailed objectives of this chapter are as follows:

1. How do the age of the child, caste, religion, household economic position, school characteristics and region of residence affect the enrolment outcomes of children? Do these factors have a differential impact on the enrolment of boys and girls in public and private schools?
2. How does the gender of the child influence his or her enrolment outcomes? More specifically, we attempt to study whether there exists a gender bias in the enrolment of children in the age group of 6-18 years. How do maternal and paternal educational attainment levels affect enrolment outcomes of children? Which of the two play a larger role in affecting enrolment outcomes of children?
3. How does a household's economic position influence the gender bias in enrolment of children in educational institutions?

### **3.3 Sample**

For our analysis, the sample size is restricted to children aged between 6 to 18 years which amounts to 49,147 children of which 23,709 are girls and 25,438 are boys.

### 3.4 Methodology

In order to accomplish the above-mentioned objectives, we make use of the logistic regression model or the logit model. The logit model is a statistical probability model with two categories in the dependent variable. In the logistic model  $p(x)$  is defined as the probability of the dependent variable  $Y$  which equals to success rather than a failure. The standard form of the logistic regression is given as:

$$\log \frac{p}{1-p} = o + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_m x_m$$

In our case, the decision of whether parents get their child enrolled in a school has been estimated using a logistic regression where the dependent variable is a binary dummy variable which takes a value 0 if the child is not enrolled and 1 if the child is enrolled. Similarly, if the child gets enrolled in a public school, the dependent variable takes a value 1 and 0 if the child is enrolled in a private school. For our analysis, we will use the following Logistic regression model:

$$P(X_i) = F(\alpha + \sum \beta_i X_i + \sum \mu_i D_i)$$

where,  $F$  is the standard normal cumulative distributive function and  $Y_i$  is the qualitative dependent variable which has two outcomes:  $Y_i = 0$  if the child is not enrolled and  $Y_i = 1$  if the child is enrolled. “ $\alpha$ ” is the intercept term and “ $\beta_i$ ” is the vector slope coefficient for all the explanatory variables, “ $\mu_i$ ” is the vector slope coefficient for all the dummy variables included in the model.  $X_i$  is the set of all explanatory quantitative variables and  $D_i$  is the set of dummy variables. We apply the same logistic regression technique to determine the factors which have an impact on the enrolment of children in public or private schools.

### 3.5 Results

#### 3.5.1 Descriptive Statistics

Table 3.1: Investment in children's education by child age and gender

<b>Enrolment</b>	<b>Full Sample</b>	<b>Girls</b>	<b>Boys</b>	<b>Gender Gap (Percentage points)</b>
<b>Age 6-9 years</b>	99.63	99.65	99.61	-0.04
<b>Age 10-14 years</b>	95.60	94.90	96.25	1.35
<b>Age 15-18 years</b>	72.48	69.85	75.08	5.23

Source: IHDS-2 Dataset

Note: Figures are in percentage points.

Here, Table 3.1 represents the age wise enrolment rate for both boys and girls. From Table 3.1, we observe that there is not much notable difference in the enrolment rates for the age group of 6-9 years between boys and girls. The gender gap starts to appear after the age of 9 years wherein the gender gap in enrolment rates between boys and girls is approximately 1.35 percentage points for the age group of 10-14 years. The gender gap in the enrolment rates is even higher for the age group of 15-18 years where we find that the proportion of boys who are enrolled is approximately 5.2 percentage points higher than girls. Thus, we observe that gender gap in enrolment increases with the age of children.

Table 3.2: Investment in children's education by mothers' education and child gender

<b>Enrolment</b>	<b>Full Sample</b>	<b>Girls</b>	<b>Boys</b>	<b>Gender Gap (Percentage points)</b>
<b>Illiterate</b>	84.68	82.55	86.67	4.12
<b>Primary</b>	91.88	90.99	92.72	1.73
<b>Secondary</b>	96.80	96.52	97.05	0.53
<b>Bachelors</b>	98.36	98.06	98.64	0.58
<b>Above Bachelors</b>	99.12	98.89	99.36	0.47

Source: IHDS-2 Dataset

Note: Figures are in percentage points.

Table 3.2 shows the variation in the enrolment rates for both boys and girls with increasing levels of mothers' education. We find that the gender gap in the enrolment rates is higher in those households where the mothers have lower levels of education. For instance, the gender gap in enrolment is as high as 4 percentage points in households where mothers are illiterate. This gap starts declining as the mothers' educational attainment levels increase and ultimately falls to 0.47 percentage points for the highest levels of mothers' education (i.e. 'Above Bachelors').

Table 3.3: Investment in children's education by fathers' education and child gender

<b>Enrolment</b>	<b>Full Sample</b>	<b>Girls</b>	<b>Boys</b>	<b>Gender Gap (Percentage points)</b>
<b>Illiterate</b>	84.31	82.80	85.70	2.94
<b>Primary</b>	87.71	86.43	88.92	2.50
<b>Secondary</b>	93.92	92.64	95.13	2.49
<b>Bachelors</b>	97.55	96.28	98.78	2.51
<b>Above Bachelors</b>	98.45	97.70	99.18	1.30

Source: IHDS-2 Dataset.

Note: Figures are in percentage points.

Table 3.3 shows the variation in the enrolment rates for both boys and girls with increasing levels of fathers' education. We observe that although there is a decline in the gender gap with increasing levels of fathers' education; it is not as high as that of the rate of decline in gender gap due to an increase in the levels of mothers' education. Moreover, while the gender gap tends to be negligible as the mothers' education reaches to the above bachelors' level, the gender gap is still 1.30 percentage points for the same level of education of father.

Table 3.4: Enrolment in school by mothers' education, child age and gender

	<b>Full Sample</b>	<b>Girls</b>	<b>Boys</b>	<b>Gender Gap (Percentage points)</b>
<b>Age 6-9 years</b>	N= 14279	N=6818	N=7471	
<b>Illiterate</b>	99.37	99.45	99.29	-0.16
<b>Primary</b>	99.69	99.72	99.66	-0.06
<b>Secondary</b>	99.88	99.81	99.94	0.13
<b>Bachelors</b>	100	100	100	0
<b>Above Bachelors</b>	99.68	99.28	100	0.72

	<b>Full Sample</b>	<b>Girls</b>	<b>Boys</b>	<b>Gender Gap (Percentage points)</b>
<b>Age 10-14 years</b>	N= 20735	N=9385	N=10858	
<b>Illiterate</b>	92.51	91.09	93.82	2.73
<b>Primary</b>	97.32	97.31	97.33	0.02
<b>Secondary</b>	98.84	98.59	99.08	0.51
<b>Bachelors</b>	99.69	99.79	99.60	-0.19
<b>Above Bachelors</b>	99.72	100	99.40	-0.06

	<b>Full Sample</b>	<b>Girls</b>	<b>Boys</b>	<b>Gender Gap (Percentage points)</b>
<b>Age 15-18 years</b>	N= 13811	N=6870	N=6941	
<b>Illiterate</b>	60.17	55.70	64.48	8.78
<b>Primary</b>	74.84	72.58	77.12	4.54
<b>Secondary</b>	89.74	89.68	89.80	0.12
<b>Bachelors</b>	95.03	94.03	95.99	1.96
<b>Above Bachelors</b>	97.53	96.75	98.33	1.58

Source: IHDS-2 Dataset.

Note: Figures are in percentage points.

Table 3.4 shows the variation in the enrolment rates across different age groups, gender and mothers' education. In the first age group of 6-9 years, we find that there is not much variation in the gender gap associated with increasing levels of mothers' education. In fact, it is in the



age group of 10-14 years where the gender gap majorly begins to appear. For instance, in the households where the children's mother is illiterate, the gender gap is approximately 2.7 percentage points. It starts to decline with increasing levels of mothers' education and rather becomes negative as mothers acquire bachelors level education. Furthermore, we also observe that for the age group of 15-18 years, the gender gap in enrolment of children is as high as 9 percentage points for uneducated mothers. As mothers' level of education changes to primary level, we see a decline of almost 4.5 percentage points in the gender gap and this gap further declines with increasing levels of mothers' education.

Table 3.5: Enrolment in school by fathers' education, child age and gender

	<b>Full Sample</b>	<b>Girls</b>	<b>Boys</b>	<b>Gender Gap (Percentage points)</b>
<b>Age 6-9 years</b>	N= 14308	N=6818	N=7490	
<b>Illiterate</b>	99.07	99.07	99.07	0
<b>Primary</b>	99.60	99.73	99.49	-0.24
<b>Secondary</b>	99.87	99.86	99.87	0.01
<b>Bachelors</b>	99.92	99.82	100	0.18
<b>Above Bachelors</b>	99.81	99.62	100	0.38

	<b>Full Sample</b>	<b>Girls</b>	<b>Boys</b>	<b>Gender Gap (Percentage points)</b>
<b>Age 10-14 years</b>	N= 20878	N=9953	N=10925	
<b>Illiterate</b>	91.14	89.82	92.34	2.42
<b>Primary</b>	94.71	93.60	95.73	2.13
<b>Secondary</b>	98.45	98.37	98.52	0.15
<b>Bachelors</b>	99.69	99.49	99.88	0.39
<b>Above Bachelors</b>	99.41	99.37	99.44	0.07

	<b>Full Sample</b>	<b>Girls</b>	<b>Boys</b>	<b>Gender Gap (percentage points)</b>
<b>Age 15-18 years</b>	N= 13961	N=6938	N=7023	
<b>Illiterate</b>	56.27	51.20	60.54	9.34

<b>Primary</b>	64.66	62.40	66.86	4.46
<b>Secondary</b>	81.39	77.97	84.86	6.89
<b>Bachelors</b>	92.46	89.69	95.74	5.75
<b>Above Bachelors</b>	95.52	93.50	97.76	4.26

Source: IHDS-2 Dataset.

Note: Figures are in percentage points.

Table 3.5 shows the variation in the enrolment rates across different age groups, gender and fathers' education. In the age group of 6-9 years and 10-14 years, we find that the impact of fathers' education on the enrolment of children is almost similar to that of mothers' education. In the age group of 10-14 years, we find that with increasing levels of mothers' education the gender gap becomes negative. However, in the same age group, the gender gap still persists with increasing levels of fathers' education. Finally, for the age group of 15-18 years; we find that households where mothers are illiterate, on average, there is a gender gap of 8.78 percentage points whereas in households where fathers are illiterate, the gender gap increases to 9.34 percentage points. Furthermore, whereas a bachelors level education of the mother reduces the gender gap to 1.34 percentage points, when compared to the same level of education of the father, the gender gap is notably higher at 5.75 percentage points. Hence, although there is a continuous decline in the gender gap with increasing levels of both parents' education; the gender gap in enrolment is higher for *all* levels of fathers' education compared to the corresponding level of mothers' education. This reflects that the contribution of an extra year of education of a mother has a greater positive impact on reducing the gender gap in enrolment compared to an extra year of education of the father.

Table 3.6: Gender wise enrolment of children in rural and urban areas across different age groups

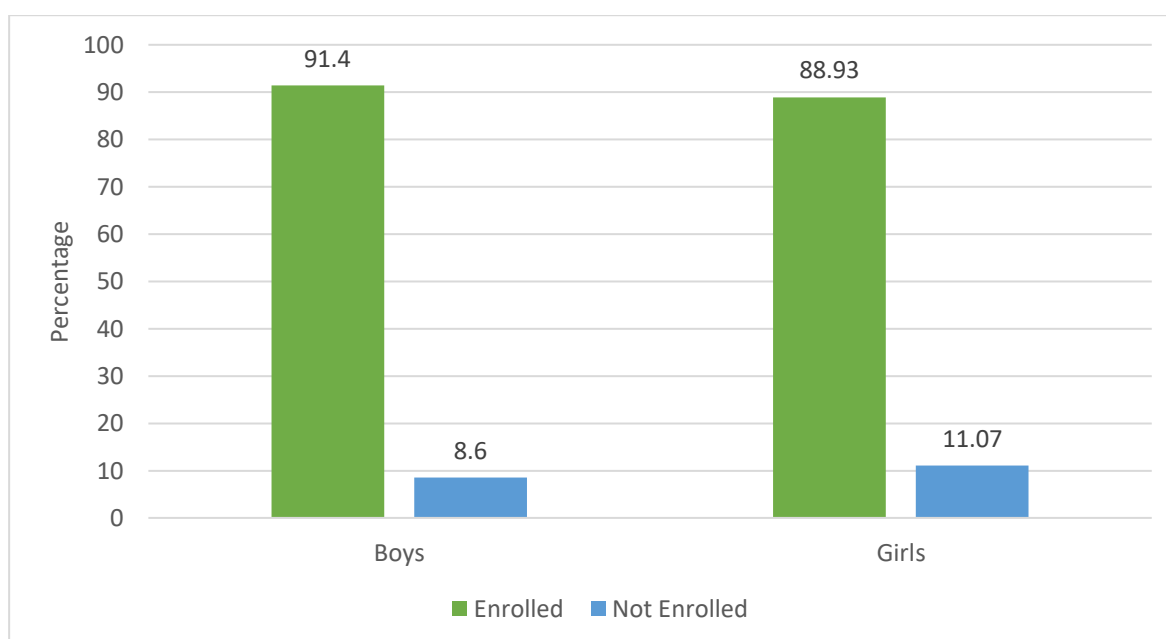
	Percentage of boys enrolled in urban areas	Percentage of girls enrolled in urban areas	Percentage of boys enrolled in rural areas	Percentage of girls enrolled in rural areas
<b>Age 6-9 years</b>	99.65	99.45	99.60	99.70
<b>Age 10-14 years</b>	96.54	96.27	96.11	94.28
<b>Age 15-18 years</b>	81.98	80.96	77.52	70.92

Source: IHDS-2 Dataset.

Note: Figures are in percentage points.

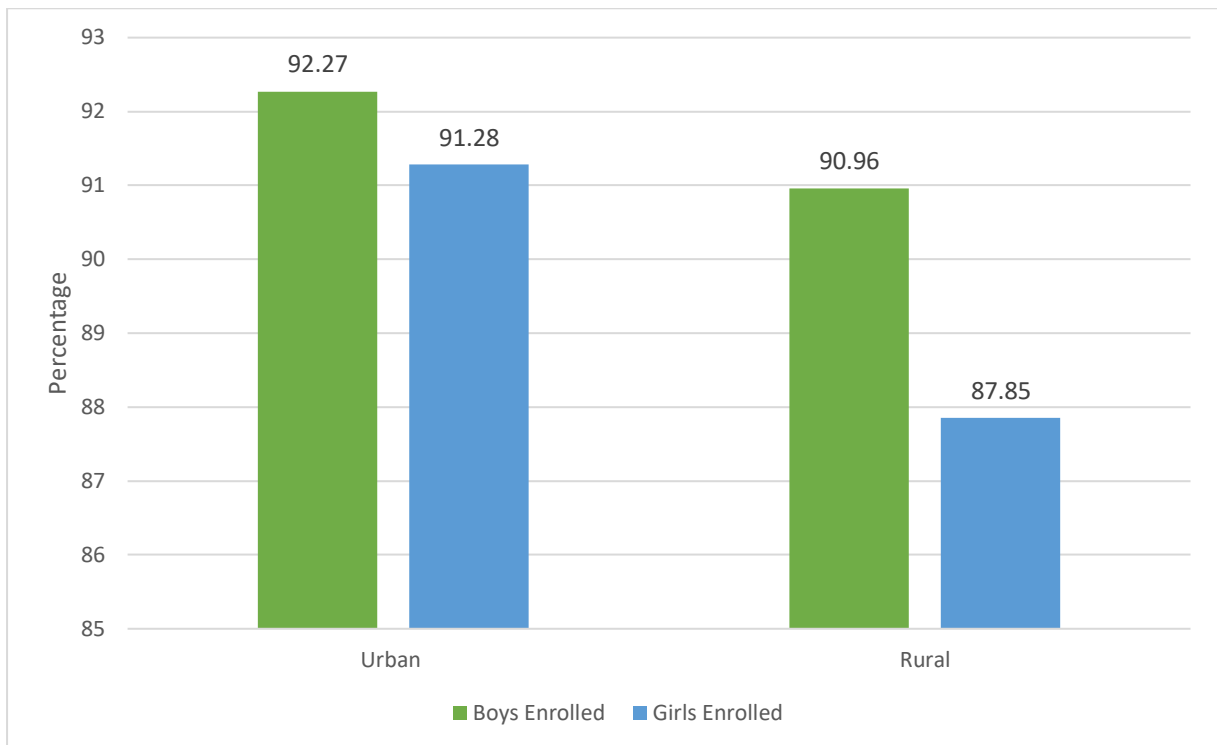
From Table 3.6, we observe that across all age groups, enrolment rate is higher for boys compared to girls except for children in age group of 6-9 years living in rural areas where the enrolment rate is only marginally higher for girls. Secondly, with increasing age of children, there is a decline in enrolment rate of *both* boys and girls for *both* rural and urban areas. However, the decline in enrolment rate is much greater for rural areas. We also find that while the gender gap in enrolment rate is quite small for urban areas across all age groups, it is approximately as high as 7 percentage points for children living in rural areas in the 15-18 age bracket.

Figure 3.1: Gender wise enrolment of children in schools



Source: IHDS-2 Dataset.

Figure 3.2: Gender wise enrolment of children in schools across rural/urban areas

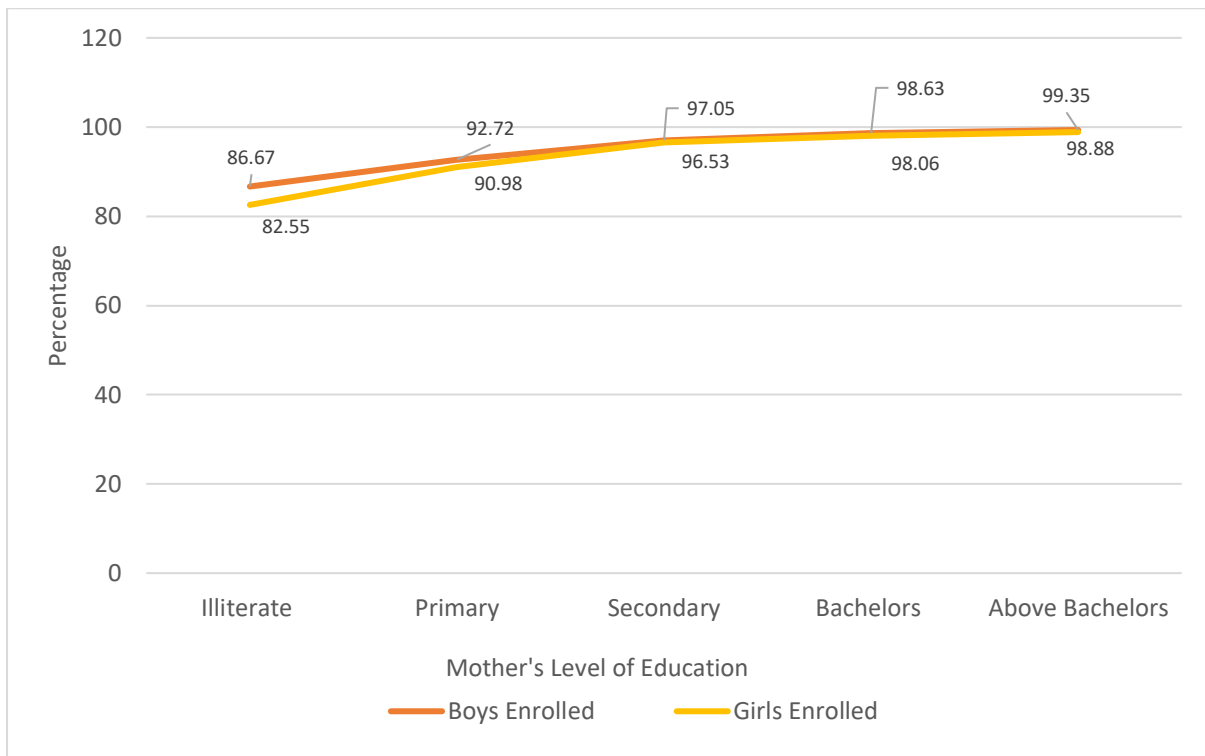


Source: IHDS-2 Dataset.

Figure 3.1 represents gender wise enrolment of children in schools for all age groups in the sample. We observe that the proportion of girls that have been enrolled in schools is lower than that of boys such that while the enrolment rate for girls is 88.93 percent, it is 91.40 percent for boys and the gender gap is approximately 2.5 percentage points. Figure 3.2 shows that enrolment rates are higher for urban areas than rural areas for both boys and girls.

Secondly, boys have higher enrolment rates than girls for both urban and rural areas. Thirdly, while the gender gap in enrolment rate is approximate 1 percentage for urban areas, it is approximately 3 times higher for rural areas.

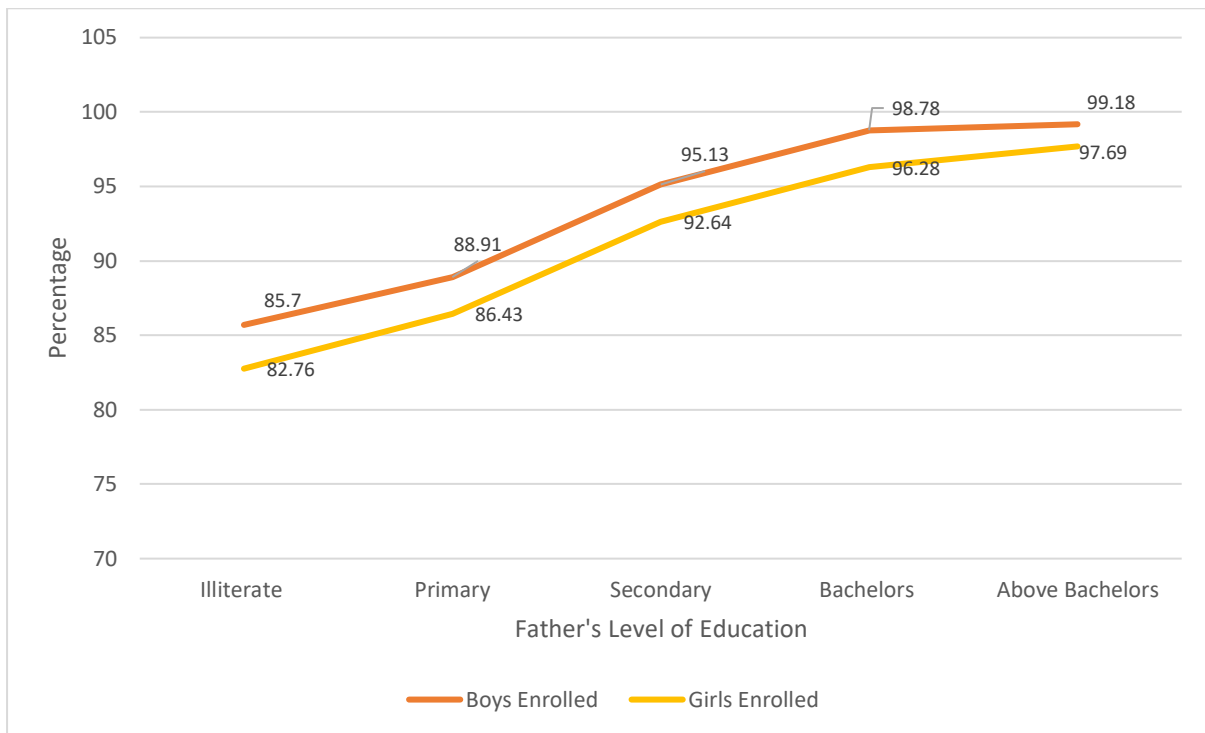
Figure 3.3: Gender wise enrolment of children with increasing levels of mother's education



Source: IHDS-2 Dataset.

Figure 3.3 represents the trend depicting the variation in child enrolment with increasing levels of mothers' education. With increasing levels of mothers' education, enrolment rates of both boys and girls increase. Moreover, we find that for all those mothers who are illiterate or have primary level of education, the enrolment rate for boys is higher compared to girls. But with increasing levels of education mothers', the gender gap begins to decline and almost diminishes once mothers attain secondary level of education.

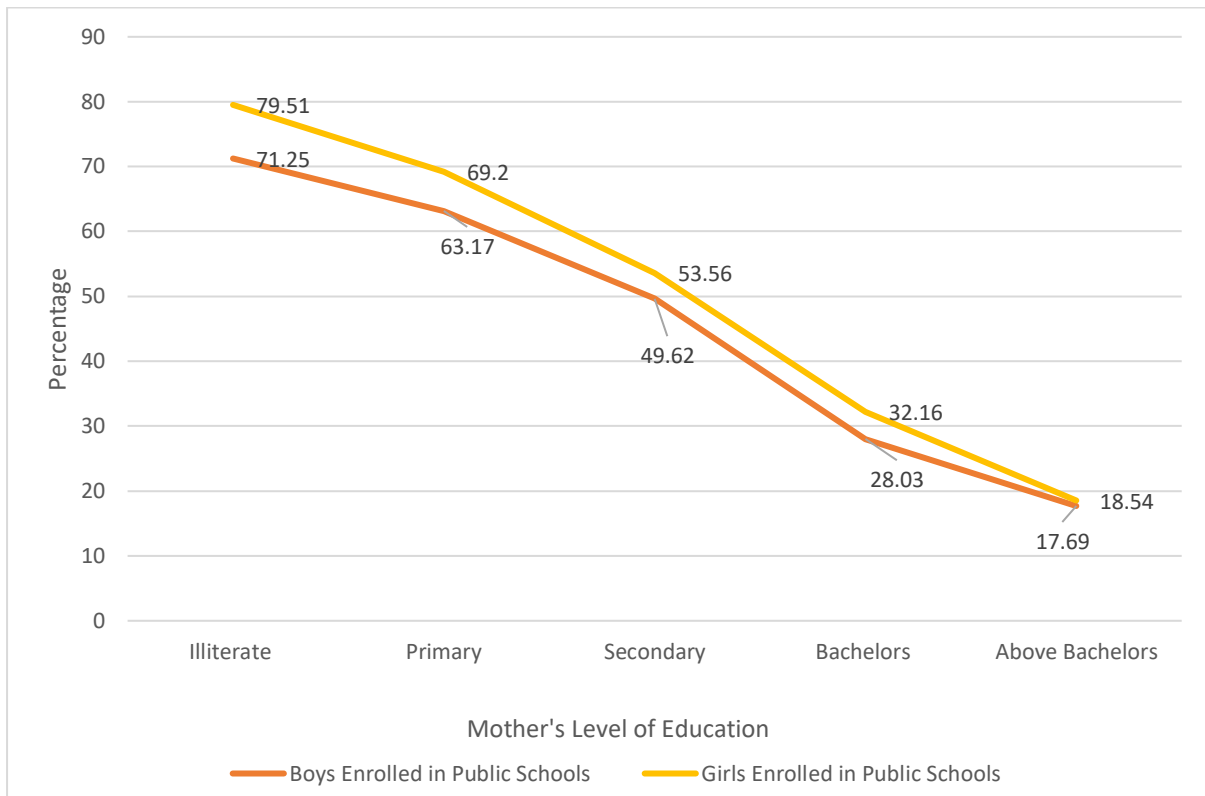
Figure 3.4: Gender wise enrolment of children with increasing levels of father’s education



Source: IHDS-2 Dataset.

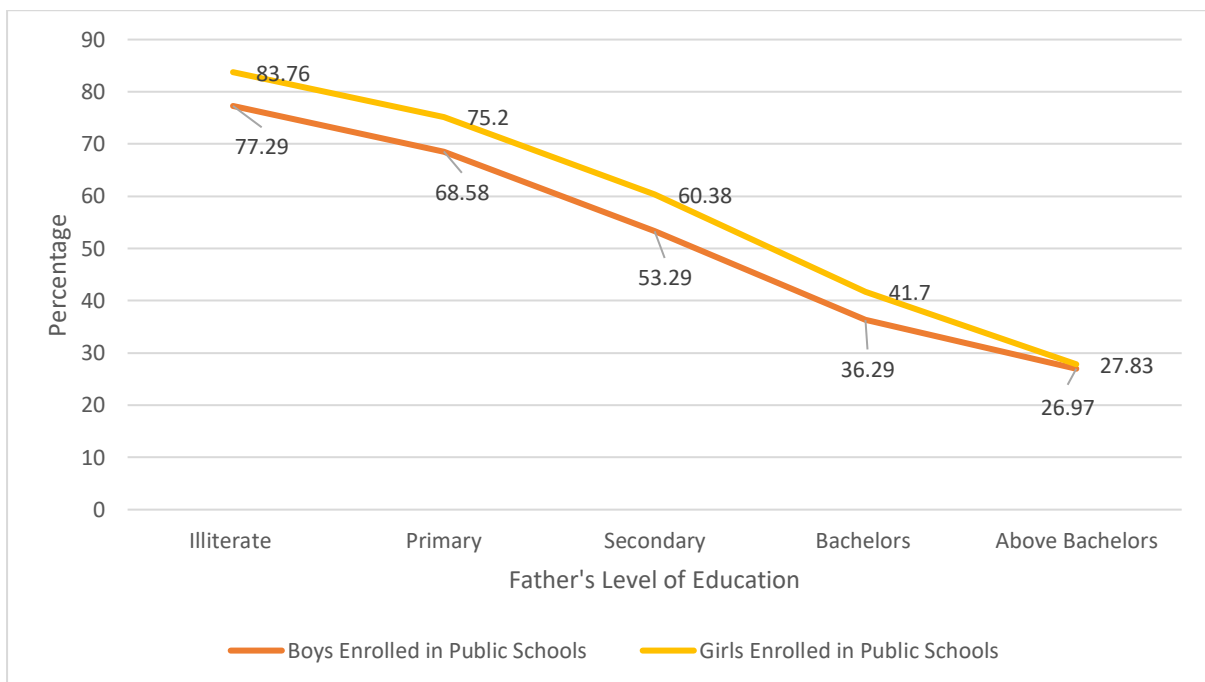
Figure 3.4 represents the trend depicting the variation in child enrolment with increasing levels of fathers’ education. With increasing levels of fathers’ education, there is an increase in the enrolment rate of both boys and girls and a decline in the gender gap. With increasing levels of mothers’ education, we notice a convergence in the enrolment rates, however, the same is not true for increasing levels of fathers’ education. For instance, at the highest level of education of the father, the gender gap still persists and is substantial. Thus, we may infer that a mother’s education has a positive and a higher impact on reducing the gender gap in enrolment of the children. In order to see this impact more clearly, we estimate regression models in the next section.

Figure 3.5: Gender wise enrolment of children in public schools with increasing levels of mother's education (Panel 1)



Source: IHDS-2 Dataset.

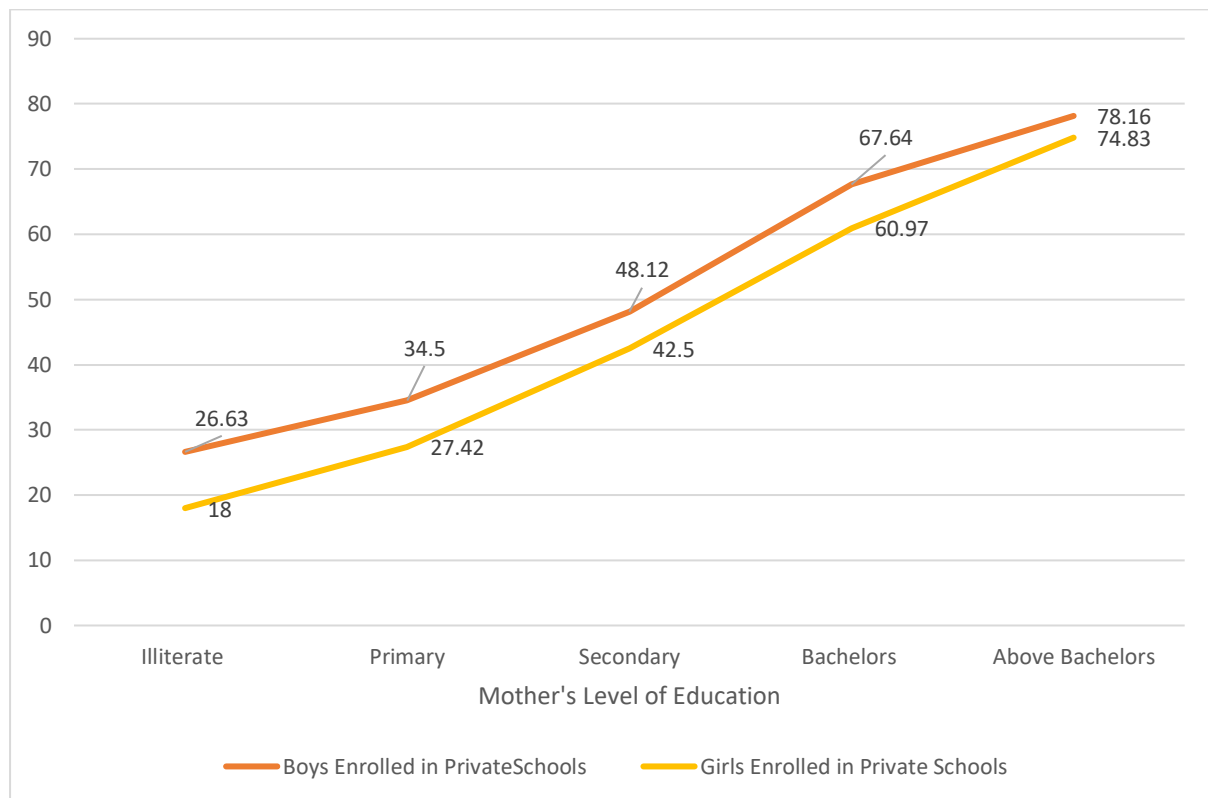
Figure 3.5: Gender wise enrolment of children in public schools with increasing levels of father's education (Panel 2)



Source: IHDS-2 Dataset.

Figure 3.5 shows the impact of mothers' and fathers' education on the enrolment rates in public schools. Comparing panel 1 to panel 2; we find that with increasing levels of mothers' education, the gender gap in enrolment rate diminishes and ultimately vanishes when mothers' education level is 'Above Bachelors'. On the contrary, with increasing levels of fathers' education, we witness a decline in the gender gap in enrolment only when the fathers' education is bachelors or above bachelors. This reflects higher marginal contribution of a mother's education compared to a father's education in increasing enrolment rates of girls in public schools.

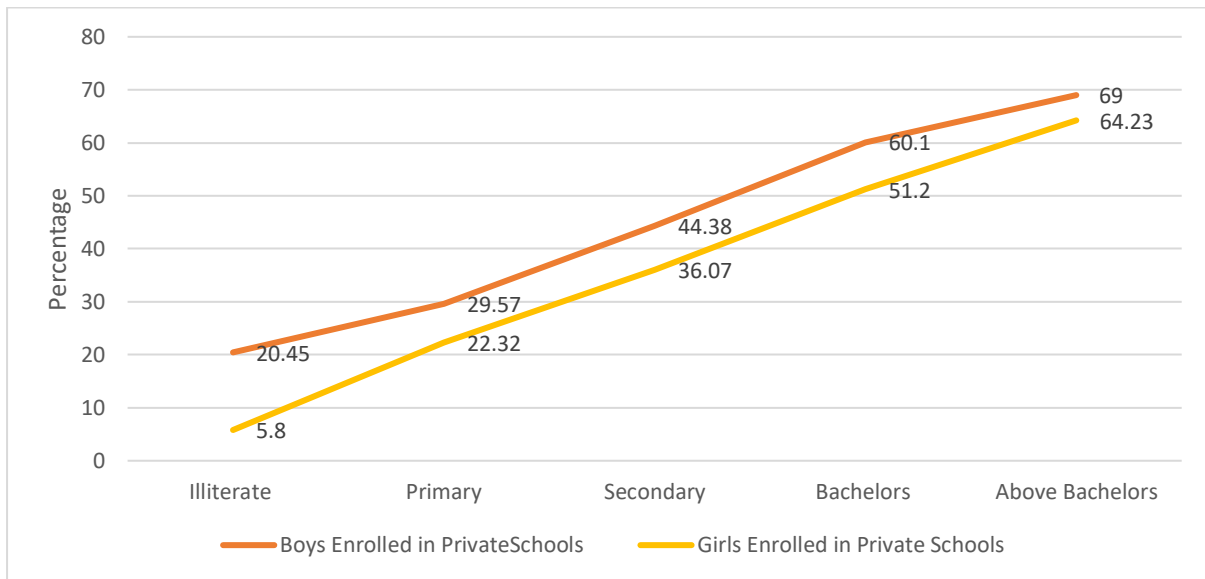
Figure 3.6: Gender wise enrolment of children in private schools with increasing levels of mother's education (Panel 1)



Source: IHDS-2 Dataset.



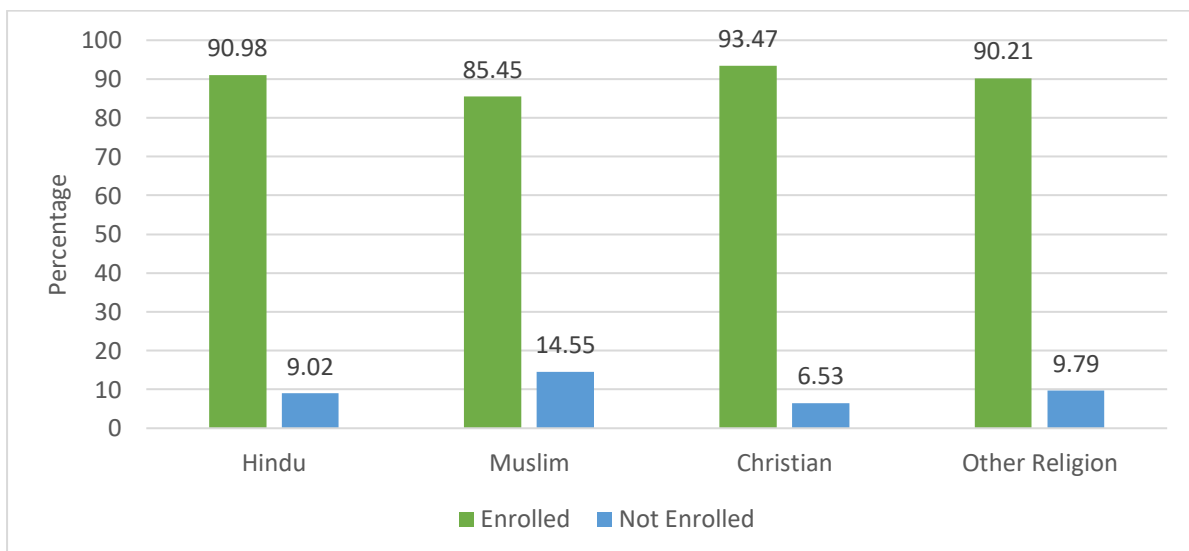
Figure 3.6: Gender wise enrolment of children in private schools with increasing levels of father’s education (Panel 2)



Source: IHDS-2 Dataset.

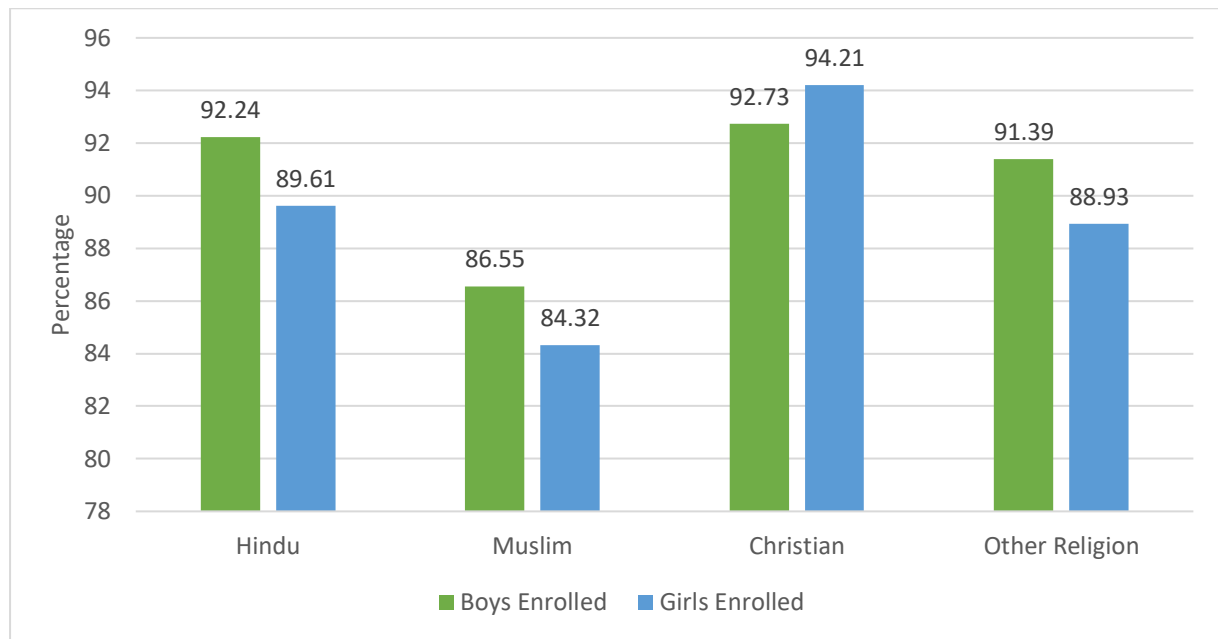
Figures 3.6 shows the impact of mothers’ and fathers’ education on the enrolment rates in private schools. Comparing the figures in panel 1 to panel 2; we again find that with increasing levels of mothers’ education the gender gap in enrolment slowly decreases which does not occur with corresponding increase in fathers’ education levels. This reflects that irrespective of the type of school; increasing levels of mothers’ education has a higher positive impact on the enrolment of the children and in further narrowing the gender gap in enrolment.

Figure 3.7: Enrolment of children across religious groups



Source: IHDS-2 Dataset.

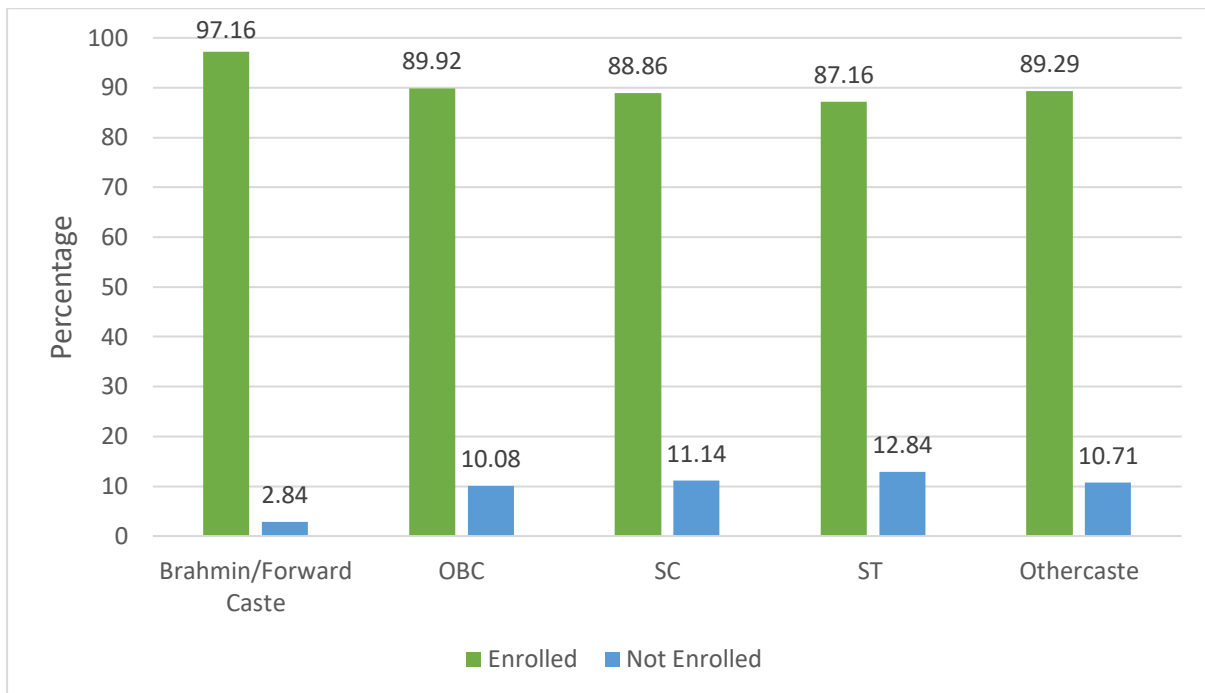
Figure 3.8: Gender wise enrolment of children in schools across religious groups



Source: IHDS-2 Dataset.

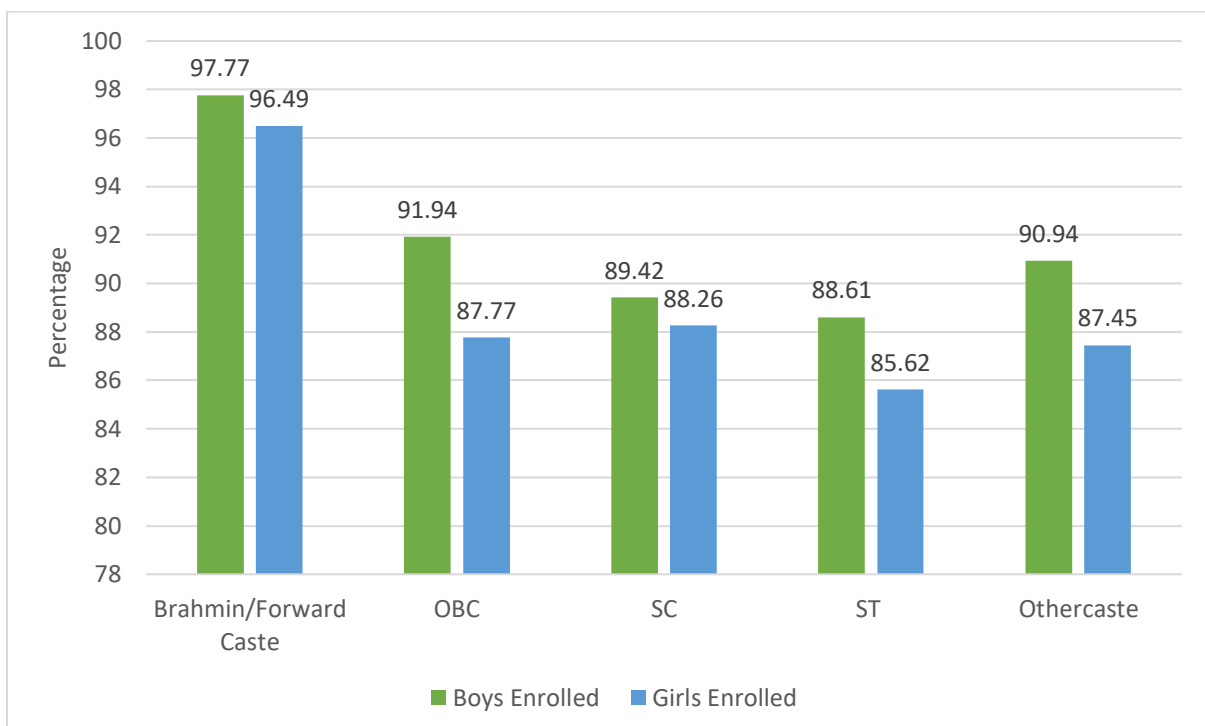
Figure 3.7 represents the enrolment rates across different religious communities. The figure shows that the enrolment rate of children is the lowest for the Muslim community at 85.45 percentage points. Meanwhile enrolment rate is the second highest in the case of Hindu children at approximately 91 percentage points while children belonging to the Christian community have the highest rate of enrolment at approximately 93.45 percentage points. Figure 3.8 which represents the gender wise distribution of enrolment across various religious communities reveals some interesting results. While the enrolment rates of boys' vis-à-vis girls is higher for Hindus and the Muslims; we find that children belonging to Christian households have a higher enrolment rate for girls. For instance, the enrolment rate for Christian girls is approximately 2 percentage points higher compared to a Christian boy. Comparing this with Hindu or Muslim children; we find that the enrolment rate for boys is almost 3 percentage points higher compared to girls.

Figure 3.9: Enrolment of children across caste groups



Source: IHDS-2 Dataset.

Figure 3.10: Gender wise enrolment of children in schools across caste groups



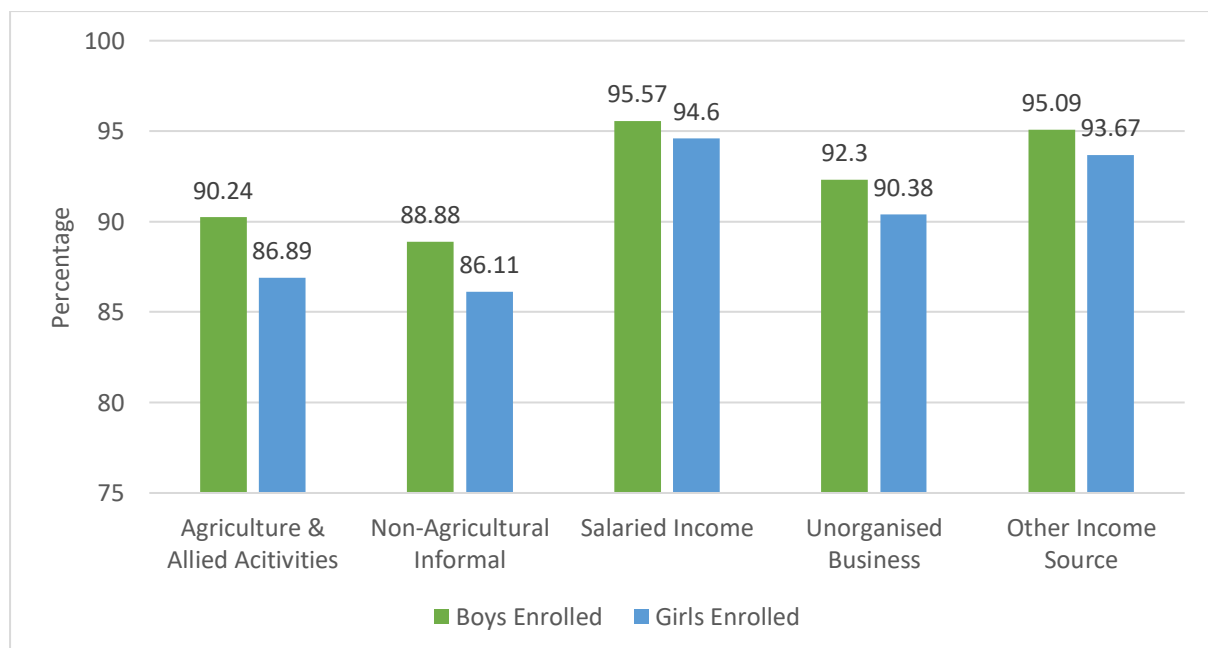
Source: IHDS-2 Dataset.

Figure 3.9 represents the variation in enrolment of children across different caste groups. We observe that the levels of enrolment are the highest (approximately 97 percentage points) for

Brahmin/Forward caste category. However, enrolment rates decline for OBC, SC, ST and ‘Other’ Caste groups. The percentage of OBC children who are enrolled is lower when compared to Brahmin/Forward caste children by almost 7 percentage points. For children belonging to SC & ST caste groups; the proportion of those enrolled declines to 88.86 percentage points and approximately 87 percentage points, respectively. Even for the ‘Other’ caste categories; the enrolment rate is lower when compared to the Brahmins/Forward Caste groups. This means that children belonging to the SC and ST households have the lowest rates of enrolment amongst all the caste groups.

Figure 3.10 represents the gender wise distribution of enrolment of children across different caste groups. We observe that irrespective of the caste category; the proportion of boys getting enrolled in schools is higher vis-à-vis girls. The gender gap in enrolment is the least in the case of Brahmin/Forward caste category and it is the highest in OBC households where the enrolment rate of boys is approximately 5 percentage points higher than that of girls. Furthermore; gender gap in enrolment rates lie in the range of 3-4 percentage points for children belonging to the SC and ST households.

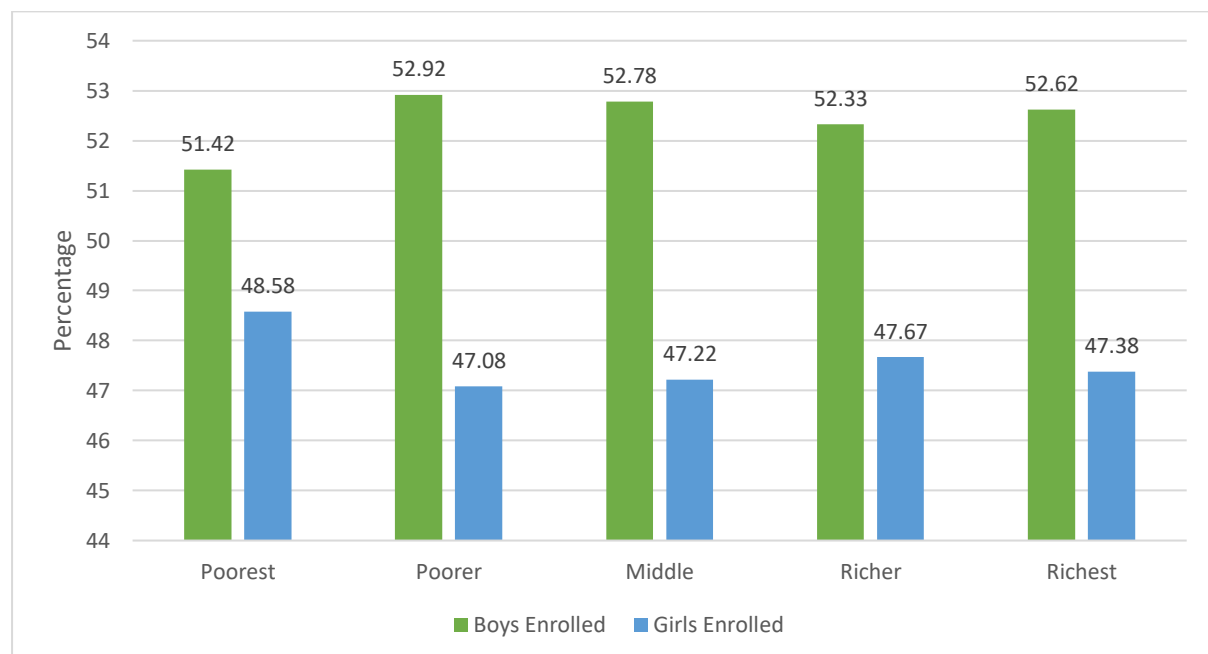
Figure 3.11: Gender wise enrolment of children in schools across different income source of the households



Source: IHDS-2 Dataset.

Figure 3.11 represents how the enrolment rates differ between boys and girls for different income sources of households. From the figure it is evident that irrespective of the income source of the household; the enrolment rates of boys are higher than that of girls. Secondly; we observe that the enrolment rate is the highest for children belonging to those households where parents have a salaried job and the gender gap is the least for such households. The difference is the highest for children belonging to those households in which parents' primary source of income is from agriculture and allied activities where the gender gap is almost 4 percentage points. The same is true for households in which parents' primary source of income is from non-agricultural informal sector where the gender gap is approximately 3 percent.

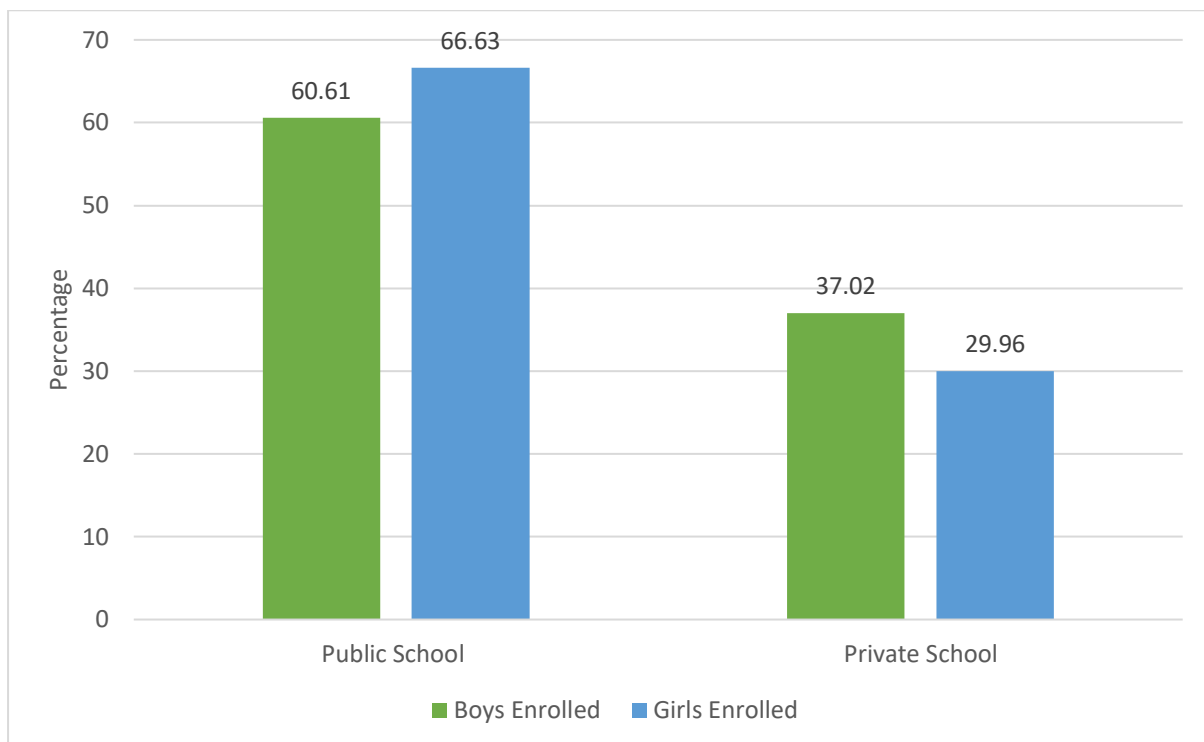
Figure 3.12: Gender wise enrolment of children in schools across consumption quintiles



Source: IHDS-2 Dataset.

Figure 3.12 shows gender wise distribution of enrolment rates across different consumption quintile categories. As expected, irrespective of the economic status of the household; the proportion of girls who are enrolled is lower vis-à-vis boys. An interesting observation is that the enrolment rate of girls is the lowest in poorer households (47 percentage points) and not the poorest households. In fact, enrolment of girls is the highest in the poorest households (48.5 percentage points) and not in the richer or richest households.

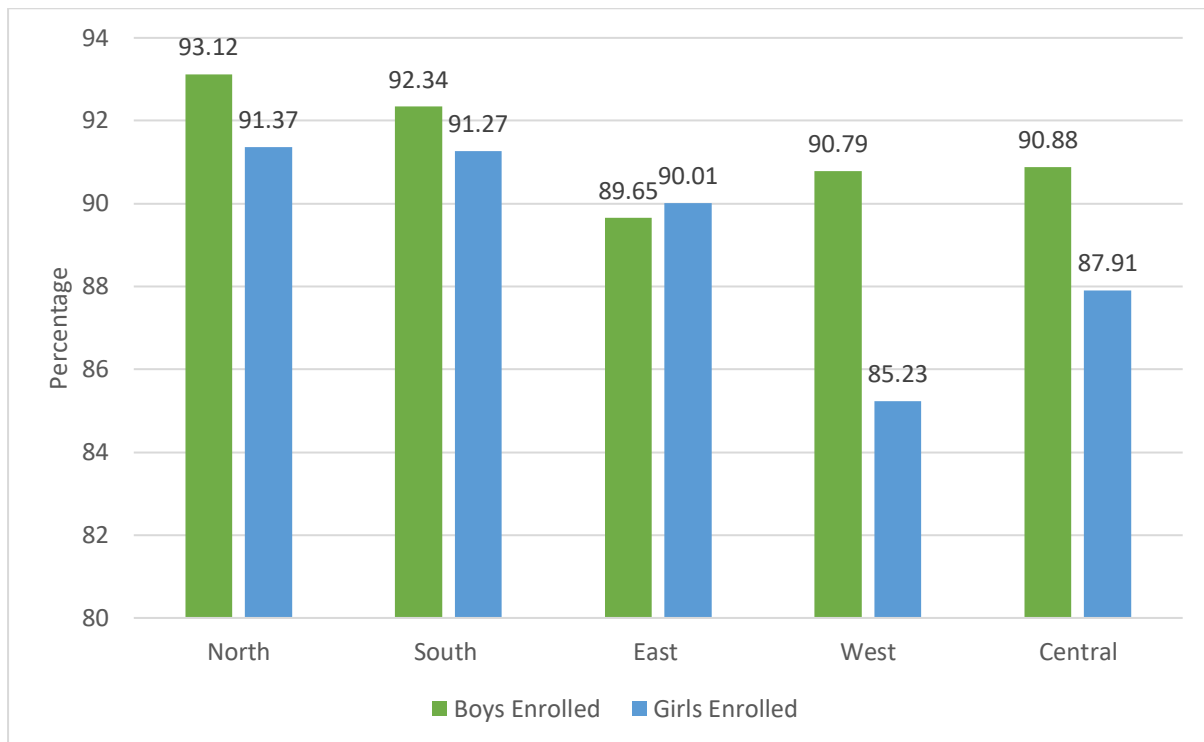
Figure 3.13: Gender wise enrolment of children in Public and Private schools



Source: IHDS-2 Dataset.

Figure 3.13 represents the gender wise enrolment of children in public and private schools. From the figure we observe that the proportion of girls enrolled in public school is slightly higher than boys. But this changes for private schools where the enrolment is higher for boys. In private schools, the gender gap in enrolment is approximately 8 percentage points while it reduces to 5 percentage points in the case of public schools.

Figure 3.14: Gender wise enrolment of children in schools across regions



Source: IHDS-2 Dataset.

Figure 3.14 represents the region wise distribution of enrolment of boys and girls. An interesting observation which we find is that the proportion of girls that are enrolled in the eastern states is slightly higher when compared to boys. However, looking at the gendered composition of enrolment in the western states; we find that there is approximately a difference of 8 percentage points in the enrolment rate of boys compared to girls which reveals that the gender gap in enrolment is the most in the western part of the country. Moreover; the overall enrolment rate is also the lowest for western states followed by the central states.

### 3.5.2. Regression Results

We now analyse the determinants of enrolment outcomes of children aged between 6 to 18 years and we estimate three models. Model 1 factors in child characteristics and education levels of household members and includes explanatory variables such as gender of the child, age of the child, mother's education, father's education and grandparent's education (paternal grandfather). Model 2 factors in child characteristics, household education levels and household characteristics such as the number of male and female siblings, religion, caste,

household assets and the household's main source of income. Model 3 factors in child characteristics, household education levels, household characteristics and regional effects.

Table 3.7: Estimates of logit regression for children aged 6-18 years with being enrolled in school as dependent variable

	Model 1			Model 2			Model 3		
	Coefficient Value	Standard Error	P Value	Coefficient Value	Standard Error	P value	Coefficient Value	Standard Error	P Value
Child Gender	-0.022	0.002	0.000	-0.022	0.003	0.000	-0.023	0.003	0.000
Age of Child	-0.035	0.001	0.000	-0.036	0.004	0.000	-0.036	0.000	0.000
Mother's Education	0.008	0.003	0.000	0.005	0.005	0.000	0.004	0.000	0.000
Father's Education	0.006	0.002	0.000	0.004	0.002	0.000	0.003	0.000	0.000
Grandfather's Education	0.003	0.001	0.000	0.002	0.003	0.004	0.001	0.000	0.040
Male Siblings				-0.006	0.001	0.000	-0.005	0.001	0.000
Female Siblings				-0.003	0.001	0.002	-0.003	0.001	0.007
Muslim				-0.051	0.003	0.000	-0.048	0.003	0.000
Christian				-0.017	0.009	0.056	-0.030	0.009	0.001
Other Religions				-0.007	0.007	0.295	-0.001	0.001	0.750
OBC				-0.012	0.003	0.000	-0.008	0.003	0.009
SC				-0.019	0.004	0.000	-0.012	0.004	0.000
ST				-0.028	0.004	0.000	-0.025	0.005	0.000
Other Caste				-0.007	0.011	0.493	-0.010	0.011	0.345
Household Assets				0.004	0.001	0.000	0.004	0.001	0.000
Agricultural Income				0.004	0.003	0.101	-0.001	0.003	0.718
Salaried Income				0.021	0.004	0.000	0.021	0.004	0.000
Unorganised Business Income				0.003	0.004	0.417	0.004	0.004	0.378
Other Income Sources				0.026	0.009	0.004	0.023	0.009	0.011
Men's exposure to newspaper				0.013	0.002	0.000	0.012	0.002	0.000
Women's exposure to newspaper				0.015	0.003	0.000	0.014	0.002	0.000
North							0.018	0.003	0.000
South							0.017	0.003	0.000
West							-0.024	0.003	0.000
East							0.014	0.004	0.000
Urban							-0.027	0.003	0.000

Source: IHDS-2 Dataset.



### *Child Characteristics:*

We find that increasing child age significantly and negatively impacts enrolment outcomes of children. For instance, in model 1 we find that the predicted probability of a child being enrolled decreases by 3.5 percentage points as the age of the child increases by one year. This reveals that as the age of a child increases, the predicted probability of him or her being enrolled in a school decreases. This may be true because as children get older, they become more likely to drop out of their schools or colleges to join alternative employment opportunities or stay at home to do household chores. We find that compared to boys, girls are less likely to be enrolled in a household. For instance, we find that the predicted probability of a girl being enrolled is 2.2 percentage points lower than that of a boy, while keeping all other variables as constant. This result is significant at one percent level of significance and we find this result to be consistently true for all the three models.

### *Parental Education:*

Next, we wish to analyse the impact of the education of parents and paternal grandfather on enrolment outcomes of children. We find that as maternal education attainment increases by one year, the predicted probability of a child being enrolled increases by approximately 0.8 percentage points, while keeping all other variables as constant. We also find the impact of father's education to be slightly lower. For instance, as father's education attainment increases by one year, the predicted probability of a child being enrolled increases by 0.6 percentage points. Moreover, we find the impact of education attainment of paternal grandfather to be negligible on enrolment outcomes.

### *Household Characteristics:*

We find that as the number of female and male siblings in a household increase, a child becomes less likely to be enrolled. For instance, as male and female siblings increase in number, the predicted probabilities of a child being enrolled decrease by 0.6 and 0.3 percentage points respectively. It can be observed that the number of male siblings in a household has more impact on enrolment outcomes compared to the number of female siblings. Next, we observe that compared to Hindu children, Muslim and Christian children are less likely to be enrolled in a school. The predicted probabilities of a Hindu child being enrolled in a school is 5.1 and 1.7 percentage points higher when compared to a Muslim and Christian child, respectively, while holding all other variables as constant. Similarly, compared to Brahmin and Forward caste households, parents from OBC, SC and ST households are less likely to have

their children enrolled. We find that the predicted probability of a child belonging to a Brahmin or Forward caste being enrolled in a school is 1.2, 2 and 3 percentage points higher than that of a child belonging to OBC, SC and ST caste groups, respectively. Household economic position measured by the number of household assets has a positive impact on the enrolment of children which is examined more closely in the next section. We also find that children belonging to households which have a salaried source of income are more likely to be enrolled by 2.2 percentage points more compared to households whose main source of income comes from non-formal and non-agricultural employment. Moreover, households in which women are more likely to read newspapers are also households in which children are more likely to be enrolled.

### *Regional Effects:*

We now analyse enrolment across different regions of India. We observe that compared to households from central India, Indian households from the northern, southern and eastern regions are more likely to have children enrolled in schools. The predicted probabilities of a child being enrolled who belongs to northern and southern India is approximately 2 percentage points higher than a child who belongs to central India. Surprisingly, a child belonging to a rural household is more likely to be enrolled by 2.7 percentage points compared to a child belonging to an urban household.

Table 3.8: Estimates of logit regression for boys and girls aged 6-18 years with being enrolled in school as dependent variable

	Model 1		Model 2		Model 3	
	Boys Coefficient values	Girls Coefficient values	Boys Coefficient values	Girls Coefficient values	Boys Coefficient values	Girls Coefficient values
<b>Age of Child</b>	-0.032*** (0.000)	-0.039*** (0.000)	-0.033*** (0.000)	-0.040*** (0.000)	-0.033*** (0.000)	-0.040*** (0.000)
<b>Mother's Education</b>	0.006*** (0.000)	0.009*** (0.000)	0.004*** (0.000)	0.007*** (0.000)	0.003*** (0.000)	0.006*** (0.000)
<b>Father's Education</b>	0.006*** (0.000)	0.006*** (0.000)	0.004*** (0.000)	0.004*** (0.000)	0.003*** (0.000)	0.003*** (0.000)
<b>Grandfather's Education</b>	0.001** (0.000)	0.004*** (0.000)	0.001 (0.000)	0.002*** (0.000)	0.000 (0.000)	0.001** (0.000)
<b>Male Siblings</b>			-0.005*** (0.001)	-0.007*** (0.002)	-0.005*** (0.001)	-0.005*** (0.002)
<b>Female Siblings</b>			-0.002 (0.001)	-0.005*** (0.001)	-0.002 (0.001)	-0.004*** (0.001)
<b>Muslim</b>			-0.054*** (0.004)	-0.050*** (0.005)	-0.005*** (0.004)	-0.046*** (0.005)

<b>Christian</b>			-0.032*** (0.011)	-0.002 (0.014)	-0.042*** (0.011)	-0.020 (0.015)
<b>Other Religions</b>			-0.006 (0.009)	-0.009 (0.011)	-0.001 (0.001)	-0.001 (0.002)
<b>OBC</b>			-0.003 (0.004)	-0.029*** (0.005)	-0.006 (0.004)	-0.024*** (0.005)
<b>SC</b>			-0.017*** (0.005)	-0.024*** (0.006)	-0.016*** (0.005)	-0.023*** (0.006)
<b>ST</b>			-0.018*** (0.006)	-0.039*** (0.007)	-0.017*** (0.006)	-0.035*** (0.007)
<b>Other Caste</b>			0.008 (0.015)	-0.027* (0.016)	-0.008 (0.015)	-0.033** (0.015)
<b>Household Assets</b>			0.004*** (0.000)	0.003*** (0.000)	0.004*** (0.000)	0.003*** (0.000)
<b>Agricultural Income</b>			0.007** (0.003)	0.001 (0.004)	-0.001 (0.004)	-0.002 (0.004)
<b>Salaried Income</b>			0.018*** (0.006)	0.025*** (0.006)	0.018*** (0.006)	0.024*** (0.006)
<b>Unorganised Business Income</b>			-0.003 (0.005)	0.009* (0.006)	-0.002 (0.005)	0.011* (0.006)
<b>Other Income Sources</b>			0.034*** (0.013)	0.018 (0.013)	0.031** (0.012)	0.015 (0.013)
<b>Men's exposure to newspaper</b>			0.018*** (0.003)	0.010*** (0.003)	0.016*** (0.003)	0.010*** (0.003)
<b>Women's exposure to newspaper</b>			0.012*** (0.004)	0.020*** (0.004)	0.010*** (0.004)	0.018*** (0.004)
<b>North</b>					0.009* (0.005)	0.028*** (0.005)
<b>South</b>					0.005 (0.004)	0.028*** (0.005)
<b>West</b>					-0.014*** (0.004)	-0.034*** (0.004)
<b>East</b>					-0.002 (0.005)	0.030*** (0.005)
<b>Urban</b>					-0.033*** (0.005)	-0.021*** (0.005)

Source: IHDS-2 Dataset.

Note: Significance Levels: \*\*\* p<0.001, \*\* p<0.01, \* p<0.05

Table 3.8 attempts to analyse the determinants of enrolment outcomes of boys and girls aged between 6 to 18 years using three models. Model 1 factors in child characteristics and education levels of household members and includes explanatory variables such as gender of the child, age of the child, mother's education, father's education and grandparent's education (paternal grandfather). Model 2 factors in child characteristics, household education levels and household characteristics such as the number of male and female siblings, religion, caste, household assets and the household's main source of income. Model 3 factors in child characteristics, household education levels, household characteristics and regional effects.

#### *Child Characteristics:*

Results reveal that with increasing age, the likelihood of being enrolled decreases for both boys and girls. More specifically, we find that as the age of a boy and girl increases by one year, the predicted probability of being enrolled for a boy and girl decreases by 3.2 percentage points and 3.9 percentage points, respectively, while keeping all other variables as constant. It may be noted that the decrease in probability with age is higher for girls than it is for boys.

#### *Parental Education:*

We find that increasing maternal education turns out to be more impactful for the enrolment outcomes of girls as compared to the enrolment outcomes of boys. This holds true across different models as can be seen in Table 3.8. As mother's education attainment increases by one year, we find that the predicted probabilities of a boy and girl being enrolled increase by 0.6 and 0.9 percentage points, respectively, while keeping all other variables as constant. Increasing paternal education has a similar impact on the enrolment outcomes of both boys and girls. For instance, results reveal that as father's education attainment increases by one year, the predicted probability of a boy and girl being enrolled increases by 0.6 percentage points, while keeping all other variables as constant. However, we find that increasing maternal education has a stronger impact on the enrolment outcomes of girls compared to increasing paternal education.

#### *Household Characteristics:*

In analysing the effect of the number of male and female siblings in a household, we find that increasing number of siblings decreases the likelihood of enrolment of both boys and girls. Increasing numbers of male siblings has a stronger impact on enrolment of both boys and girls, with a larger effect on the enrolment of girls. For instance, as the number of male siblings

increase, we find that the predicted probabilities of a boy and girl being enrolled decrease by 0.5 and 0.7 percentage points, respectively. Meanwhile, as the number of female siblings increase, the predicted probabilities of a boy and girl being enrolled decrease by 0.2 and 0.5 percentage points, respectively. It may be inferred that the decline in probabilities is higher for girls, with the number of male siblings having a larger effect.

Furthermore, the caste and religion of a household have a significant impact on enrolment outcomes as well. Boys belonging to Hindu households have a higher predicted probability of being enrolled (5.4 and 5.0 percentage points higher) than boys who are Muslim and Christian. Similarly, girls belonging to Hindu households have a higher predicted probability of being enrolled compared to girls who are Muslim by 5 percentage points. Children belonging to the Brahmin and forward caste groups are more likely of being enrolled compared to children belonging to OBC and SC caste groups. For instance, the predicted probabilities of boys who are Brahmin or Forward caste being enrolled are 1.7 and 1.8 percentage points higher than boys who belong to SC and ST caste groups, respectively. Meanwhile, the predicted probability of a girl who belongs to a Brahmin or Forward caste group being enrolled is 2.4 and 3.9 percentage points higher than a girl who belongs to SC and ST caste group groups, respectively.

#### *Regional Effects:*

We find that when compared to households located in central India, households in north India are more likely to have higher enrolment for both boys and girls. The predicted probability of a boy being enrolled in North India is 0.9 percentage points higher than a boy belonging from central India. Moreover, the predicted probabilities of a girl belonging to northern and eastern regions of India being enrolled are 2.8 and 3.0 percentage points higher compared to a girl belonging to central India. However, an urban household is less likely to have both boys and girls enrolled compared to rural households. For instance, in urban areas, the predicted probabilities of a male and female child being enrolled are 3.3 and 2.1 percentage points lower than boys and girls belonging to rural areas.

Table 3.9: Estimates of logit regression for boys and girls aged 6-18 years with type of school enrolment (public/private school) being dependent variable

	Model 1		Model 2		Model 3		Model 4	
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
<b>Age of Child</b>	0.008*** (0.000)	0.003*** (0.000)	0.012*** (0.000)	0.006*** (0.000)	0.012*** (0.000)	0.007*** (0.000)	0.011*** (0.000)	0.007*** (0.000)
<b>Mother's Education</b>	-0.012*** (0.000)	-0.016*** (0.000)	0.000 (0.000)	-0.004*** (0.000)	0.002*** (0.000)	-0.002*** (0.000)	-0.001 (0.000)	-0.004*** (0.000)
<b>Father's Education</b>	-0.018*** (0.000)	-0.016*** (0.000)	-0.008*** (0.000)	-0.008*** (0.000)	-0.006*** (0.000)	-0.005*** (0.000)	-0.005*** (0.000)	-0.005*** (0.000)
<b>Grandfather's Education</b>	-0.008*** (0.000)	-0.008*** (0.000)	-0.003*** (0.000)	-0.003*** (0.000)	-0.002*** (0.000)	-0.003*** (0.000)	-0.002** (0.000)	-0.002*** (0.000)
<b>Male Siblings</b>			-0.005** (0.000)	-0.009*** (0.003)	-0.006** (0.002)	-0.013*** (0.002)	0.0079*** (0.002)	-0.002 (0.000)
<b>Female Siblings</b>			-0.009*** (0.002)	0.009*** (0.002)	-0.011*** (0.002)	0.004** (0.002)	0.001 (0.002)	0.015*** (0.002)
<b>Muslim</b>			-0.024*** (0.009)	-0.035*** (0.009)	-0.028*** (0.009)	-0.040*** (0.008)	-0.024*** (0.008)	-0.035*** (0.008)
<b>Christian</b>			0.008 (0.020)	-0.033* (0.019)	0.024 (0.021)	-0.017 (0.019)	-0.036* (0.020)	-0.062*** (0.019)
<b>Other Religions</b>			0.003** (0.001)	-0.000 (0.000)	-0.049*** (0.014)	-0.012 (0.015)	-0.024* (0.015)	0.024 (0.015)
<b>OBC</b>			-0.015** (0.007)	-0.021*** (0.007)	-0.029*** (0.007)	-0.033*** (0.007)	-0.010 (0.007)	-0.009 (0.007)
<b>SC</b>			0.088*** (0.009)	0.083*** (0.009)	0.048*** (0.009)	0.041*** (0.009)	0.049*** (0.009)	0.042*** (0.009)
<b>ST</b>			0.088*** (0.014)	0.099*** (0.014)	0.068*** (0.013)	0.078*** (0.014)	0.044*** (0.013)	0.061*** (0.014)
<b>Other Caste</b>			0.058** (0.028)	0.020 (0.027)	0.055** (0.028)	0.026 (0.027)	0.024 (0.026)	0.008 (0.025)
<b>Household Assets</b>			-0.022*** (0.000)	-0.019*** (0.000)	-0.018*** (0.000)	-0.016*** (0.000)	-0.015*** (0.000)	-0.013*** (0.000)
<b>Agricultural Income</b>			-0.018** (0.008)	-0.001 (0.008)	-0.008 (0.008)	0.004 (0.008)	-0.039*** (0.008)	-0.026*** (0.008)

<b>Salaried Income</b>			-0.064*** (0.009)	-0.048*** (0.009)	-0.054*** (0.009)	-0.040*** (0.009)	-0.047*** (0.009)	-0.042*** (0.009)
<b>Unorganised Business Income</b>			-0.067*** (0.010)	-0.047*** (0.010)	-0.062*** (0.010)	-0.041*** (0.010)	-0.057*** (0.009)	-0.037*** (0.010)
<b>Other Income Sources</b>			-0.051*** (0.016)	-0.041*** (0.016)	-0.038** (0.016)	-0.028* (0.015)	-0.047*** (0.015)	-0.053*** (0.015)
<b>Men's exposure to newspaper</b>					-0.032*** (0.005)	-0.018*** (0.005)	-0.013*** (0.005)	-0.004 (0.005)
<b>Women's exposure to newspaper</b>					-0.009 (0.006)	-0.022*** (0.005)	-0.010* (0.005)	-0.020*** (0.005)
<b>School Distance</b>					-0.011*** (0.001)	-0.012*** (0.001)	-0.012*** (0.001)	-0.012*** (0.001)
<b>Scholarship</b>					0.212*** (0.009)	0.182*** (0.008)	0.255*** (0.008)	0.217*** (0.008)
<b>North</b>							0.216*** (0.009)	0.210*** (0.009)
<b>South</b>							0.283*** (0.008)	0.223*** (0.008)
<b>West</b>							0.142*** (0.008)	0.124*** (0.008)
<b>East</b>							0.361*** (0.009)	0.320*** (0.009)
<b>Urban</b>							-0.087*** (0.007)	-0.077*** (0.007)

Source: IHDS-2 Dataset

Note: Significance Levels: \* indicates significance at 5 percentage points

Table 3.9 attempts to analyse the type of school enrolment (public or private school) of boys and girls aged between 6 to 18 years.

#### *Child Characteristics:*

We find that as the age of a child increases, the predicted probabilities of a boy and girl being enrolled in a public-school increase by 0.8 and 0.3 percentage points, respectively. Since the coefficients were estimated using a logit Model, the dependent variable takes value 1 if the

child attends a public school and 0 if the child attends a private school. Thus, we may also infer that with an increase in the age of a child, the likelihood of the child attending a private school decline. The reason may be that with increasing age, children drop out of private schools and get enrolled in public-schools instead.

*Parental Education:*

We find that with increasing parental education, the probability of a child being enrolled in a public-school decrease while that of a child being enrolled in a private school increase. With increasing educational attainment levels of the mother in the household, the predicted probabilities of a boy and girl being enrolled in a public-school decrease by 1.2 and 1.6 percentage points, respectively. Similarly, with increasing educational attainment levels of the father in the household, the predicted probability of a boy and girl being enrolled in a public-school decrease by 1.8 and 1.6 percentage points, respectively, *ceteris paribus*. However, the opposite is true for enrolment in private schools. For instance, with increasing levels of father's education, the predicted probability of a boy and girl being enrolled in a private school increases by 1.8 and 1.6 percentage points, respectively.

*Household Characteristics:*

For boys and girls belonging to Muslim households, the predicted probabilities of them being enrolled in a public-school are 2.4 and 3.5 percentage points lower than that of boys and girls who belong to Hindu households. However, the results of enrolment in private schools for Muslim children are not significant. For girls belonging to Christians households, the predicted probability of her being enrolled in a public school is 3.5 percentage points lower than that of girls who belong to Hindu households. Analysing the effect of caste on enrolment, we find that compared to Brahmin and Forward caste children, boys and girls belonging to Other Backward Castes are 1.5 and 2.1 percentage points less likely to be enrolled in public schools, respectively. Looking at the enrolment of children belonging to Scheduled Castes in private and public schools, we find that when compared to Brahmin and Forward caste children, boys and girls belonging to Scheduled Castes are 8.8 and 8.3 percentage points more likely to be enrolled in public schools, respectively. Furthermore, we find that as the number of assets in a household increase, the predicted probabilities of a girl and boy being enrolled in a private school increase by 2.2 and 1.9 percentage points respectively. Moreover, households in which women are more likely to read newspapers are also the households in which girls are more likely to be enrolled in private schools. For instance, the predicted probability of a girl being



enrolled in a private school increases by 1.8 percentage points as women in the household are increasingly exposed to newspaper reading.

*School Characteristics:*

As school distance increases by 1 km, the predicted probabilities of a boy and girl being enrolled in a public-school decrease by 1.1 and 1.2 percentage points, respectively. Students who receive scholarship from their schools are also more likely to be enrolled in public-schools compared to private schools. For instance, as scholarship amount increases by ₹1, the predicted probabilities of boys and girls being enrolled in public-schools increases by 21.2 and 18.2 percentage points, respectively.

*Regional Effects:*

Comparing region-wise enrolment outcomes for boys and girls, we find that children who reside in northern, southern and eastern regions are more likely to attend public schools compared to children who reside in central regions of India. For instance, we find that the predicted probabilities of a boy and girl being enrolled in a public school are 21.6 and 21 percentage points (for northern regions), 28.3 and 22.3 (for southern regions) and 36.1 and 32 percentage points (for eastern regions) more when compared to boys and girls residing in central regions. Moreover, compared to rural areas, children residing in urban areas are more likely to attend private schools compared to government schools. For instance, the predicted probabilities of boys and girls who reside in an urban area of being enrolled in a private school are 8.7 and 7.6 percentage points vis-à-vis boys and girls residing in rural areas.

Table 3.10: Estimates of logit regression for boys and girls aged 6-18 years with being enrolled in school as dependent variable for different consumption quintiles

	<b>Coefficient Value (Gender of Child; Reference: Male)</b>	<b>P Value</b>	<b>Mother's Education</b>	<b>P value</b>	<b>Father's Education</b>	<b>P Value</b>
<b>Poorest Households</b>	-0.018 (0.005)	0.002*	0.009 (0.001)	0.000*	0.005 (0.000)	0.000*
<b>Poorer Households</b>	-0.016 (0.005)	0.004*	0.008 (0.001)	0.000*	0.006 (0.001)	0.000*
<b>Middle Households</b>	-0.032 (0.005)	0.000*	0.007 (0.006)	0.000*	0.0064835 (0.000)	0.000*
<b>Richer Households</b>	-0.024 (0.005)	0.000*	0.008 (0.000)	0.000*	0.006 (0.000)	0.000*
<b>Richest Households</b>	-0.022 (0.044)	0.000*	0.005 (0.000)	0.000*	0.005 (0.000)	0.000*

Source: IHDS-2 Dataset.

Note: Significance Levels: \* indicates significance at 5 percentage points

The next regression results given in Table 3.10 attempt to examine how a household's economic position influences enrolment outcomes for boys and girls. We use consumption quintiles as a proxy for income to determine a household's economic position and categorize them as 'poorest', 'poorer', 'middle', 'richer' and 'richest'. For poorest and poorer households, the predicted probabilities of girls being enrolled are approximately 1.8 and 1.5 percentage points lower compared to boys. Moreover, it is in the 'middle' households in which girls are least likely to be enrolled compared to boys. For instance, the predicted probability of a girl being enrolled is 3.2 percentage points lower vis-à-vis boys in the 'middle' households. This gender bias in enrolment then decreases for the 'richer' and 'richest' households.

We find that with increasing levels of mother's education, the predicted probabilities of a child being enrolled increases by 0.90, 0.80, 0.70, 0.70 and 0.50 percentage points for poorest, poorer, middle, richer and richest households, respectively. Comparing this with the impact of father's education on enrolment outcomes, we find that with increasing education levels of the father, the predicted probabilities of a child being enrolled increases by 0.47, 0.63, 0.64, 0.62

and 0.47 percentage points for poorest, poorer, middle, richer and richest households, respectively. Thus, we find a higher increment in the probabilities of a child being enrolled with increasing maternal education compared to paternal education across different consumption categories.

### **3.6. Discussion**

We find enrolment to be approximately equal for boys and girls in the age group of 6-9 years. However, with increasing age of the child, the gender gap in enrolment also widens. Moreover, enrolment rates are higher for urban regions compared to rural regions with a higher proportion of boys being enrolled vis-à-vis girls. We find that in the age brackets of 6-9 years and 10-14 years, the enrolment of boys and girls is approximately equal. However, the gender gap in enrolment begins to emerge and is the highest for boys and girls in the age bracket of 15-18 years. Our results are consistent with Azam and Kingdon (2013) where they find that “the near achievement of universal enrolment at the elementary level in India has not been translated into higher enrolment at the secondary and senior secondary levels, especially in the rural areas. Not only there exists a large gender gap in enrolment in age group 15–19 in rural areas of many states, the overall enrolment rate in these states remains extremely low, especially for girls” Azam and Kingdon (2013).

We witness that an increase in maternal education leads to an increase in enrolment of both boys and girls and with a decrease in the gender bias in enrolment. Meanwhile, an increase in paternal education also leads an increase in the enrolment of both boys and girls and with a decline in the gender bias in enrolment. However, the rate of decline in gender bias with increasing mother’s level of education is higher than the rate of decline in the gender bias with increasing father’s level of education.

We observe that boys and girls who are Hindus are more likely to be enrolled in a school compared to those belonging to Muslim and Christian communities. Moreover, when compared to children belonging to Brahmin and Forward castes, children belonging to OBC, SC and ST households are less likely to be enrolled. Except for Christian groups wherein girls have a higher enrolment compared to boys, enrolment is greater for boys compared to girls for all religious and caste groups. These results are in accordance with Drèze and Kingdon (2001) where they observe that “even after controlling for other household variables, children

belonging to “scheduled castes and scheduled tribes” (SC/ST) and “other backward castes” (OBC) are less likely to go to school than children belonging to the general castes where this effect is particularly strong for girls” (Dreze and Kingdon, 2001).

To conclude this chapter, we find that increasing maternal and paternal education are associated with a reduction in the gender gap in enrolment outcomes for girls. However, in comparison to increasing levels of paternal education, maternal education plays a larger role in increasing enrolment of girls and thereby reducing the gender bias to a substantial extent.

# Chapter 4

## Child Expenditure Outcomes

## 4.1. Introduction

This section examines the relationship between parental education and expenditure on education of children. First, we examine whether gender bias in educational expenditure of children occurs at the intensive margin, i.e., is there a gender bias in the decision to spend or not on the education of children? Next, conditional on the decision to spend at all, we examine whether gender bias exists at the extensive margin. Finally, we investigate how parental education, and particularly, maternal education impacts child expenditures for boys and girls. Does maternal education close the gender gap in educational expenditure?

## 4.2. Objectives

We analyse the various determinants of educational expenditures of children in schools in India. The detailed objectives of this chapter are as follows:

1. To examine the determinants of parental decision to spend or not on the education of their children. More specifically, we determine if there is an *existence* of gender bias in household expenditure allocation on education.
2. Conditional on the decision to spend, we analyse the determinants of the child educational expenditures. How do the age of the child, parents' educational attainment levels, caste, religion, household economic position, school characteristics and region of residence affect a child's educational expenditures?
3. How do the above factors have a differential impact on the educational expenditures of boys and girls? How do maternal and paternal educational attainment levels affect child expenditure outcomes of boys and girls differently? Which of the two play a larger role in affecting educational expenditure outcomes of children?

## 4.3. Sample

The sample for the research is restricted to children aged 6-18 years. From the IHDS-2 dataset, we have taken two sets of samples – one for calculating gender bias at the intensive margin wherein we have taken all children aged 6-18 years for which the sample size is 41,966 children

of which 20,008 are girls and 21,958 are boys. In order to examine gender bias at the extensive margin, we have a sample of children aged 6-18 years who are already enrolled. Of these, 21,287 are boys and 19,296 are girls.

#### **4.4. Methodology**

Our first analysis is concerned with two decisions i.e., to measure gender bias at the extensive margin and at the intensive margin. To do so, the following regression models are used, respectively:

##### **4.4.1. Logistic Regression**

We use the logistic regression model in order to analyse whether parents decide to incur educational expenditure on their child, given that a child is male or female. The dependent variable is a binary dummy variable where we have two categories 0 and 1. When there is no expenditure incurred on a child's education the dependent variable takes value 0 and any positive expenditure greater than 0 takes value 1. The regression model is of the form:

$$P (X_i) = F (\alpha + \sum \beta_i X_i + \sum \mu_i D_i)$$

Where, F is the standard normal cumulative distributive function and  $Y_i$  is the qualitative dependent variable which has two outcomes:  $Y_i = 0$  if no expenditure is incurred on a child's education and  $Y_i = 1$  if any positive expenditure is incurred. " $\alpha$ " is the intercept term and " $\beta_i$ " is the vector slope coefficient for all the explanatory variables, " $\mu_i$ " is the vector slope coefficient for all the dummy variables included in the model.  $X_i$  is the set of all explanatory quantitative variables and  $D_i$  is the set of dummy variables.

##### **4.4.2. Ordinary Least Squares (OLS) Regression**

*Conditional OLS:* According to Zimmerman(2012), "the decision of how much to spend on education, conditional on having decided to spend any money at all, is modelled by estimating a conditional OLS regression using the observations with positive budget, assuming that the budget of education follows a lognormal distribution for positive budget." A conditional dependent variable (i.e., only positive expenditure on education) has been taken in order to

avoid biased results that could arise due to the significant number of households which incur zero expenditure on education. We use simple classical linear regression model using the OLS technique for our regression analysis which captures the average change in the value of the dependent variable due to a unit change in the independent variable while keeping all other variables as constant. The regression model is given as follows:

$$Y_i = \alpha + \sum \beta_i X_i + \sum \mu_i D_i$$

Where  $Y_i$  is the educational expenditure incurred on child ‘i’ in the age bracket of 6-18 years.  $Y_i$  is the quantitative dependent variable capturing the conditional (i.e., positive) educational expenditure spent on each child in the age bracket of 6-18 years. “ $\alpha$ ” is the intercept term and “ $\beta_i$ ” is the vector slope coefficient for all the explanatory variables and “ $\mu_i$ ” is the vector slope coefficient for all the dummy variables included in the model.  $X_i$  is the set of all explanatory quantitative variables and  $D_i$  is the set of dummy variables.

#### **4.4.3. Oaxaca Blinder Decomposition Method**

The Oaxaca-Blinder decomposition method is used widely in order to analyse the mean difference between the two groups (say  $\bar{y}_1$  and  $\bar{y}_2$ ). In our case the two groups are parental expenditure on education of a boy and parental expenditure on education of a girl in the age group of 6-18 years. We use the Oaxaca Blinder decomposition technique such that we decompose the mean difference which is the difference between  $\bar{y}_1$  and  $\bar{y}_2$  into two components. The first component is the coefficient effect which is also known as the rate effect and measures the unexplained difference. The unexplained difference quantifies how much of the mean differences between the two groups can be attributed to the different treatment on the same characteristics. This is the ‘bias’ or ‘discrimination’ that we can measure through the coefficient effect. In our case we wish to estimate the bias in educational expenditures between boys and girls. Moreover, we wish to analyse the extent of this bias and how the education of mothers and fathers affects this bias.

The second component is the endowment effect which is also known as the distributional effect captures the explained difference between the two groups. It quantifies the extent of mean difference between the two groups which can be attributed to the different distributions between the groups. As per Hlavac(2013) the endowment term represents “the contribution of differences in explanatory variables across groups, and the coefficient term is the part that is



due to group differences in the coefficients.” For our purpose we use a twofold Blinder-Oaxaca decomposition. The twofold approach decomposes the mean outcome difference with respect to a vector of reference coefficients ( $\hat{\beta}_i$ ),

$$\Delta \bar{Y} = \underbrace{(\bar{X}_A - \bar{X}_B)' \hat{\beta}_R}_{\text{explained}} + \underbrace{\bar{X}'_A (\hat{\beta}_A - \hat{\beta}_R)}_{\text{unexplained A}} + \underbrace{\bar{X}'_B (\hat{\beta}_R - \hat{\beta}_B)}_{\text{unexplained B}}$$

unexplained

We use the decomposition technique as given by Ganji (2019) where the equation given above represents “the twofold decomposition which divides the difference in mean outcomes into a portion that is explained by cross-group differences in the explanatory variables, and a part that remains unexplained by these differences. The unexplained portion of the mean outcome gap has often been attributed to discrimination, but may also result from the influence of unobserved variables.” (Ganji, 2019). It can be further decomposed into two sub-components, labelled unexplained A and unexplained B above but for our purpose we restrict ourselves to the unexplained portion.

## 4.5. Results

### 4.5.1. Descriptive Statistics

Table 4.1: Investment in children’s education by child age and gender

<b>Expenditures</b>	<b>Full Sample</b>	<b>Girls</b>	<b>Boys</b>	<b>Gender Gap (Percentage Points)</b>
<b>Age 6-9 years</b>	3630.34	3211.64	4011.94	800.30
<b>Age 10-14 years</b>	3890.82	3417.18	4317.13	899.95
<b>Age 15-18 years</b>	7368.71	6863.90	7839.86	975.96

Source: IHDS-2 Dataset.

From Table 1, we observe that while the average expenditure on education for the full sample for the age group 6-9 years and 10-14 years is approximately the same, the average expenditure on education for the age group of 15-18 years of the full sample is much higher. Taking into consideration the gender of the child; we find that the mean educational expenditure on boys is much higher vis-à-vis girls for all age groups. From the last column in the table, we can see

that the mean expenditure on education for boys is approximately ₹800 higher when compared to the education expenditure on girls. This gender gap increases with an increasing age of the children. For example, we observe that for the age bracket of 10-14 years the gender gap increases to approximately ₹900 and ₹975 for age group of 15-18 years.

Table 4.2: Investment in children’s education by mothers’ education and child gender (in rupees)

<b>Conditional Expenditures</b>	<b>Full Sample</b>	<b>Girls</b>	<b>Boys</b>	<b>Gender Gap (Percentage Points)</b>
<b>Illiterate</b>	2311.81	1941.58	2636.00	694.42
<b>Primary</b>	3848.30	3450.33	4215.75	765.42
<b>Secondary</b>	7243.93	6611.54	7826.70	1215.16
<b>Bachelors</b>	12261.51	11182.93	13277.12	2094.19
<b>Above Bachelors</b>	18364.31	17520.1	19171.57	1651.47

Source: IHDS-2 Dataset.

Table 4.3: Investment in children’s education by fathers’ education and child gender (in rupees)

<b>Conditional Expenditures</b>	<b>Full Sample</b>	<b>Girls</b>	<b>Boys</b>	<b>Gender Gap (Percentage Points)</b>
<b>Illiterate</b>	1935.66	1595.20	2229.54	634.34
<b>Primary</b>	2976.85	2649.01	3272.35	623.34
<b>Secondary</b>	5655.55	5082.14	6179.69	1097.55
<b>Bachelors</b>	10053.13	9127.26	10931.31	1804.05
<b>Above Bachelors</b>	13551.47	12649.66	14408.26	1758.6

Source: IHDS-2 Dataset.

Tables 4.2 and 4.3 show how conditional expenditures on education vary corresponding to different levels of mothers’ and fathers’ education for girls, boys and the full sample. We observe that irrespective of the child’s gender, increasing levels of maternal and paternal education are associated with higher levels of child educational expenditures. However, increasing maternal educational levels lead to a larger increment in educational expenditures for both boys and girls compared to increasing levels of paternal education. Moreover, we observe that there exists a gender gap in educational expenditure in favour of boys.

From the last column of Table 4.2 we find that the average expenditure on education is much higher for boys when compared to girls for different levels of mothers' education. Table 4.3 shows that with increasing levels of education of fathers, the gender gap in educational expenditure increases as well. The gender gap in educational expenditure rises till 'Bachelors' level of education of the father and mother and declines with 'Above Bachelors' education.

Table 4.4: Conditional expenditures on children's education by mothers' education, child age and gender (in rupees)

	<b>Full Sample</b>	<b>Girls</b>	<b>Boys</b>	<b>Gender Gap</b>
<b>Age 6-9 years</b>	N= 14437	N=6882	N=7555	
<b>Illiterate</b>	1382.93	1138.51	1602.90	464.39
<b>Primary</b>	2756.36	2455.81	3030.58	574.77
<b>Secondary</b>	5918.32	5289.25	6493.34	1204.09
<b>Bachelors</b>	13246.64	10520.87	12975.34	2454.47
<b>Above Bachelors</b>	15980.04	15690.48	16199.40	508.92

	<b>Full Sample</b>	<b>Girls</b>	<b>Boys</b>	<b>Gender Gap</b>
<b>Age 10-14 years</b>	N= 20699	N=9869	N=10830	
<b>Illiterate</b>	1928.15	1581.57	2235.72	654.15
<b>Primary</b>	3309.65	2858.14	3716.56	858.42
<b>Secondary</b>	6617.14	5892.92	7244.90	1351.98
<b>Bachelors</b>	10854.86	10184.23	11478.6	1294.37
<b>Above Bachelors</b>	17235.61	14972.22	15851.73	879.51

	<b>Full Sample</b>	<b>Girls</b>	<b>Boys</b>	<b>Gender Gap</b>
<b>Age 15-18 years</b>	N= 14361	N=7216	N=7145	
<b>Illiterate</b>	4382.07	3867.64	4809.64	942
<b>Primary</b>	6398.12	5868.38	6919.35	1050.97
<b>Secondary</b>	10081.2	9388.47	10796.6	1408.13
<b>Bachelors</b>	14617.56	13161.74	16027.62	2865.88
<b>Above Bachelors</b>	23061.1	23611.38	22525.17	-1086.21

Source: IHDS-2 Dataset.

In Table 4.4, we analyse how conditional expenditure on child education varies by mothers' education, age of children and gender of the child. We observe that boys have significantly higher expenditures than girls across all age groups and categories of mothers' education. The gender gap in expenditures is consistently lower among children with illiterate or primary educated mothers when compared to children with mothers who are highly educated for all three age groups. An interesting finding is that if mothers have an education level of above bachelors, this gender gap decreases with increasing age group of children. Furthermore, this gender gap becomes negative for the age group of 15-18 years showing that households in which mothers have higher levels of education incur higher educational expenditure on girls.

Table 4.5: Conditional expenditures on children's education by fathers' education, child age and gender (in rupees).

	<b>Full Sample</b>	<b>Girls</b>	<b>Boys</b>	<b>Gender Gap</b>
<b>Age 6-9 years</b>	N= 14308	N=6818	N=7490	
<b>Illiterate</b>	1180.17	1036.95	1310.87	273.92
<b>Primary</b>	2260.21	1990.34	2504.61	514.27
<b>Secondary</b>	4733.651	4292.66	5142.63	849.97
<b>Bachelors</b>	8619.41	7433.48	9605.68	2172.2
<b>Above Bachelors</b>	11203.67	10656.73	11719.06	1062.33

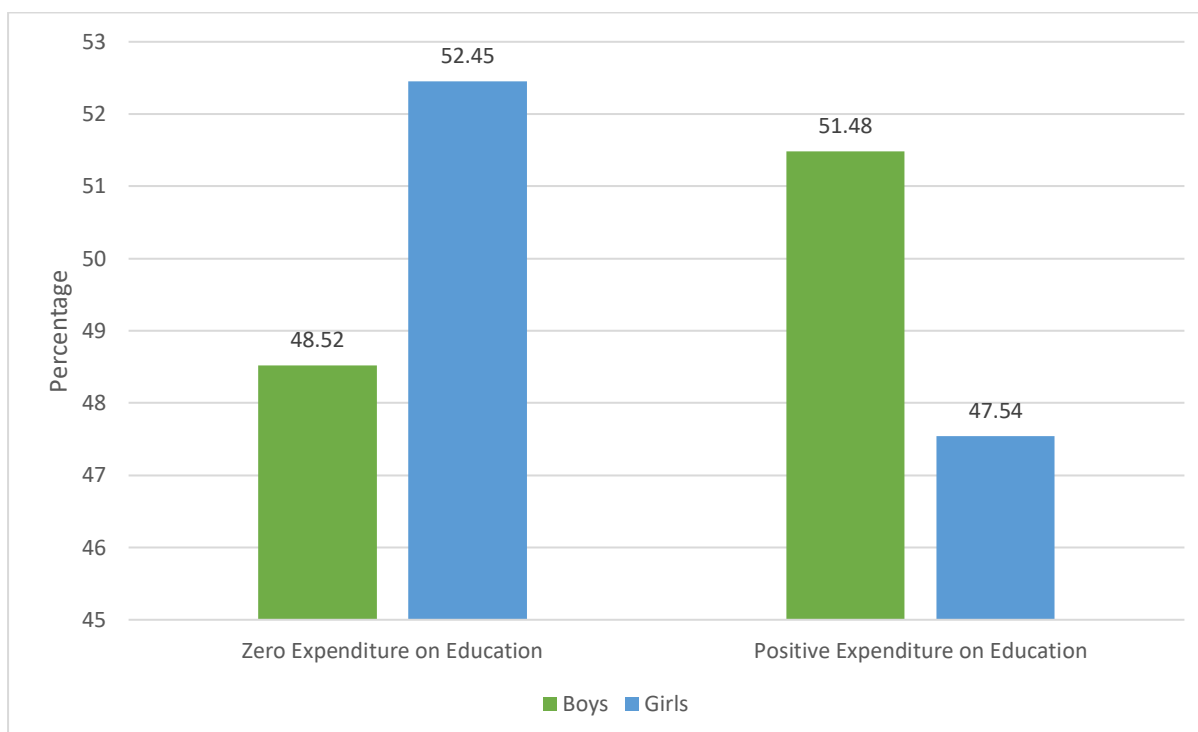
	<b>Full Sample</b>	<b>Girls</b>	<b>Boys</b>	<b>Gender Gap</b>
<b>Age 10-14 years</b>	N= 20878	N=9953	N=10925	
<b>Illiterate</b>	1735.90	1432.70	2006.78	574.08
<b>Primary</b>	2568.48	2260.13	2842.59	582.46
<b>Secondary</b>	4930.86	4308.52	5478.87	1170.35
<b>Bachelors</b>	8931.15	8100.88	9694.10	1953.22
<b>Above Bachelors</b>	12064.77	10730.7	13278.29	2547.59

	<b>Full Sample</b>	<b>Girls</b>	<b>Boys</b>	<b>Gender Gap</b>
<b>Age 15-18 years</b>	N= 13961	N=6938	N=7023	
<b>Illiterate</b>	3791.30	3218.22	4194.92	976.70
<b>Primary</b>	4905.02	4425.39	5347.28	921.89
<b>Secondary</b>	7977.90	7256.27	8667.13	1410.86
<b>Bachelors</b>	13076.6	11890.26	14419.85	2529.59
<b>Above Bachelors</b>	18582.71	17639.35	19548.64	1909.29

Source: IHDS-2 Dataset.

In table 4.5 we analyse how conditional expenditure on children’s education varies by fathers’ education, age of the child and gender of the child. We observe that boys have consistently higher expenditures than girls across all age groups and categories of fathers’ education. The gender gap in expenditures is consistently lower among children with illiterate or primary educated fathers as compared to children with fathers who are highly educated for all three age groups.

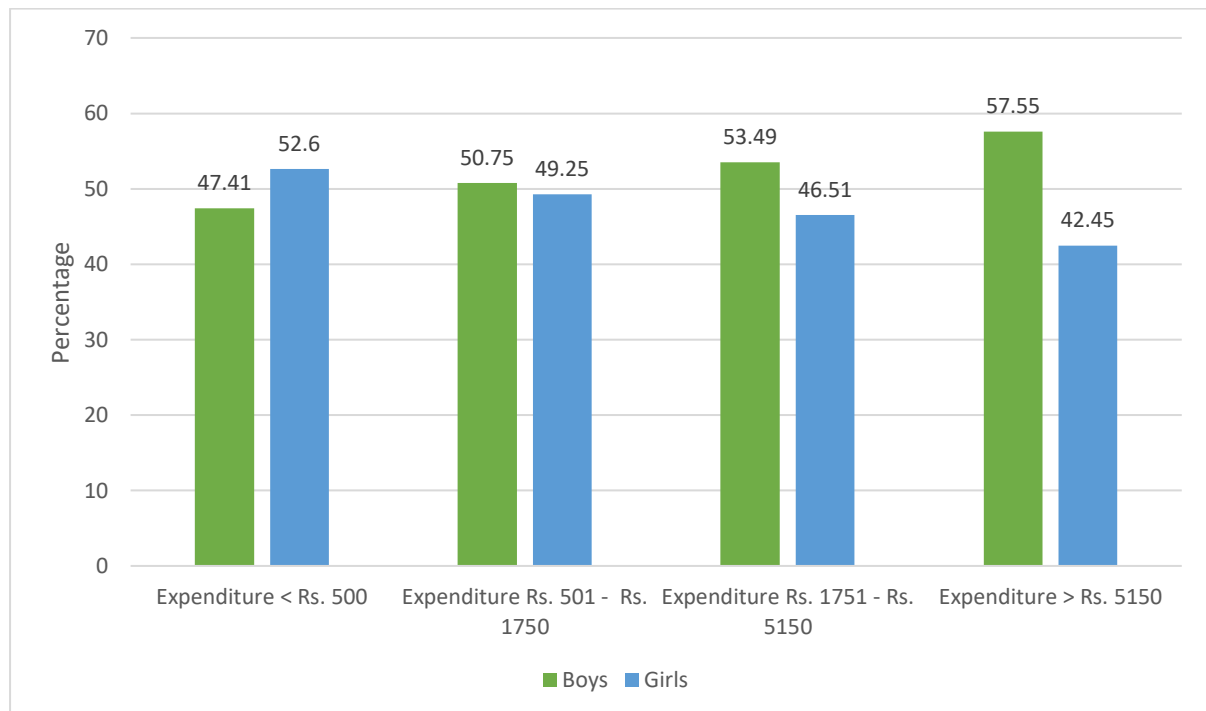
Figure 4.1: Conditional expenditure on education on boys and girls within the household



Source: IHDS-2 Dataset.

Figure 4.1 shows the distribution of conditional expenditure on education on boys and girls within the household and we observe that there is a gender gap in educational expenditure. Amongst the households in which parents do not expend on their child's education; the proportion of girls is approximately 4 percentage points higher when compared to boys. Next; taking into consideration all those households where a positive expenditure is incurred on the education on children; we find that there is a gender gap in favor of boys. The proportion of boys on which positive expenditure on education is incurred is approximately 51.50 percentage points. This proportion is lower in the case of girls (47.5 percentage points). We may infer that parent choose to invest more on boys' education than girls'. This will be investigated later in the chapter.

Figure 4.2: Gendered distribution of expenditure on education of children within households



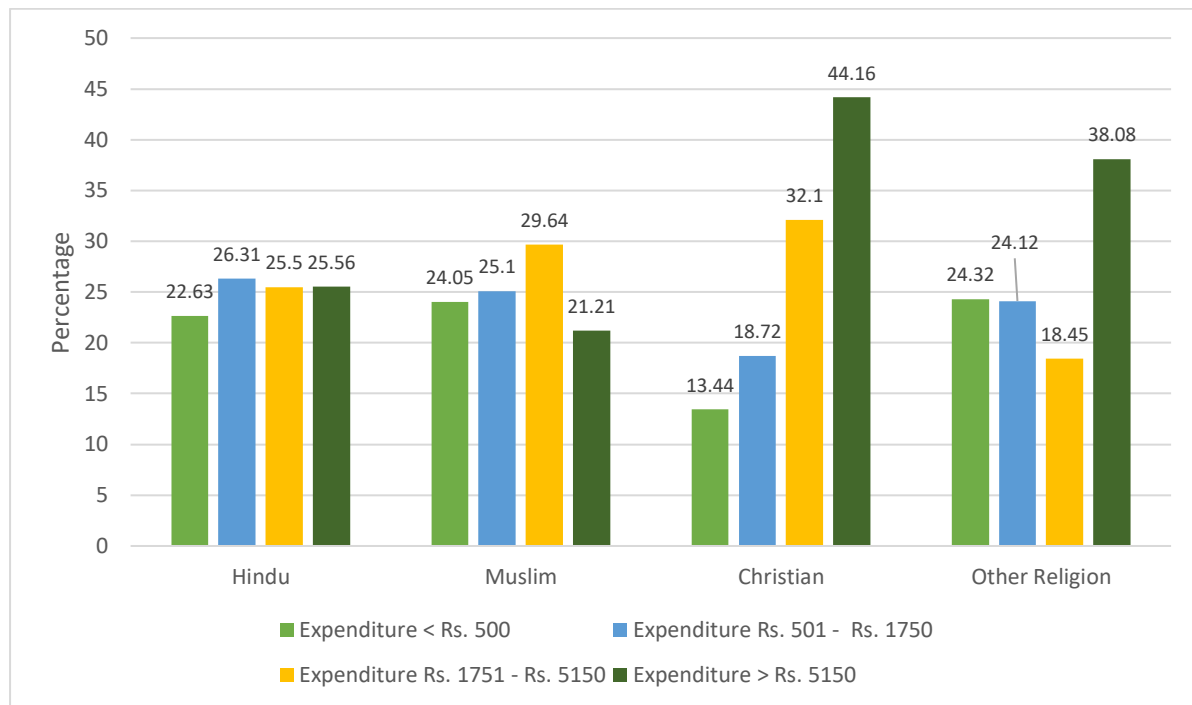
Source: IHDS-2 Dataset.

Figure 4.2 shows gendered distribution of expenditure on education of children within households. We consider four expenditure brackets: educational expenditure less than ₹500, educational expenditure between ₹501 and ₹1750, educational expenditure between ₹1751 and ₹5150 and educational expenditure greater than ₹5150.<sup>28</sup> We observe that it is only in the first

<sup>28</sup> To arrive at these expenditure brackets, we have divided educational expenditure given in the sample into quartiles.

expenditure bracket that the proportion of girls (on which expenditure incurred is less than ₹500) is higher compared to boys. For all other expenditure brackets; we find that expenditure on education is biased in the favor of boys. Interestingly, this difference in the level of expenditure of education increases as we move from lower to higher expenditure brackets i.e., from the expenditure bracket of ₹501-Rs. ₹1750 to the category where expenditure is greater than ₹5150.

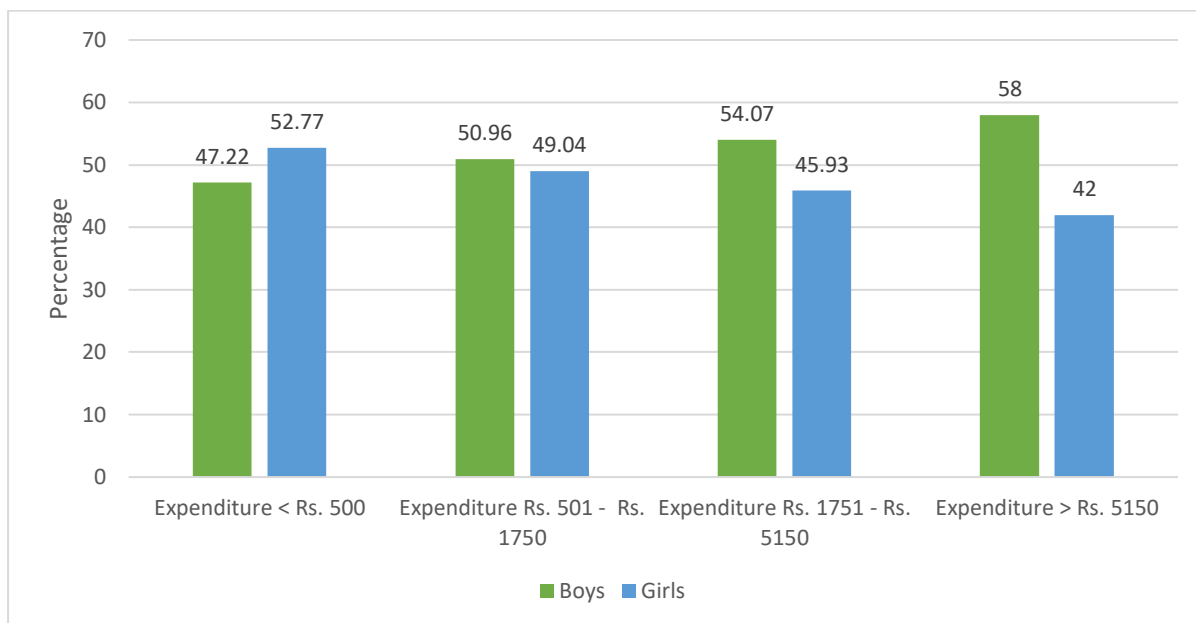
Figure 4.3: Parental expenditure on education across different religious groups



Source: IHDS-2 Dataset.

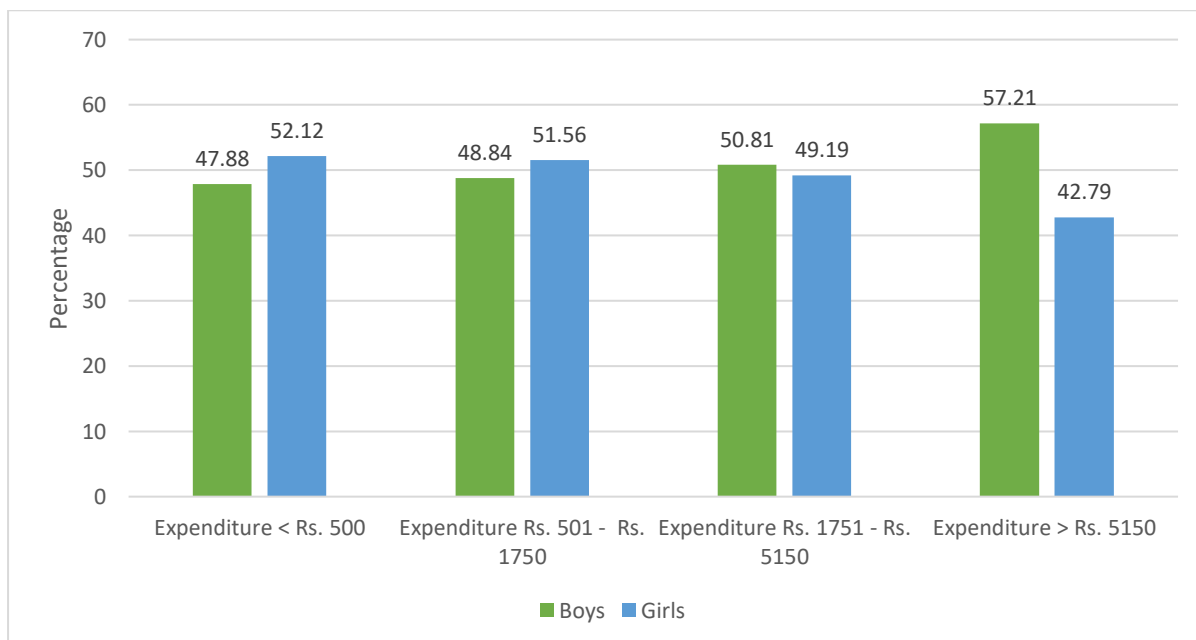
Figure 4.3 shows how parental expenditure on education varies across different religious groups. Comparing across the different expenditure brackets; we find that consistently roughly equal proportion of Hindu households lie in each expenditure bracket. 50 percent of Muslim households spend less than ₹1750 on the education of their children. In the last and highest expenditure bracket, Christian households form the highest proportion, while Muslim households form the least proportion among all religious groups. One interesting finding is that for the households belonging to the Christian religious group; there is a positive increasing trend across the different expenditure categories which is not the case with other religious groups.

Figure 4.4: Parental expenditure on education on boys and girls across for Hindu households (Panel 1)



Source: IHDS-2 Dataset.

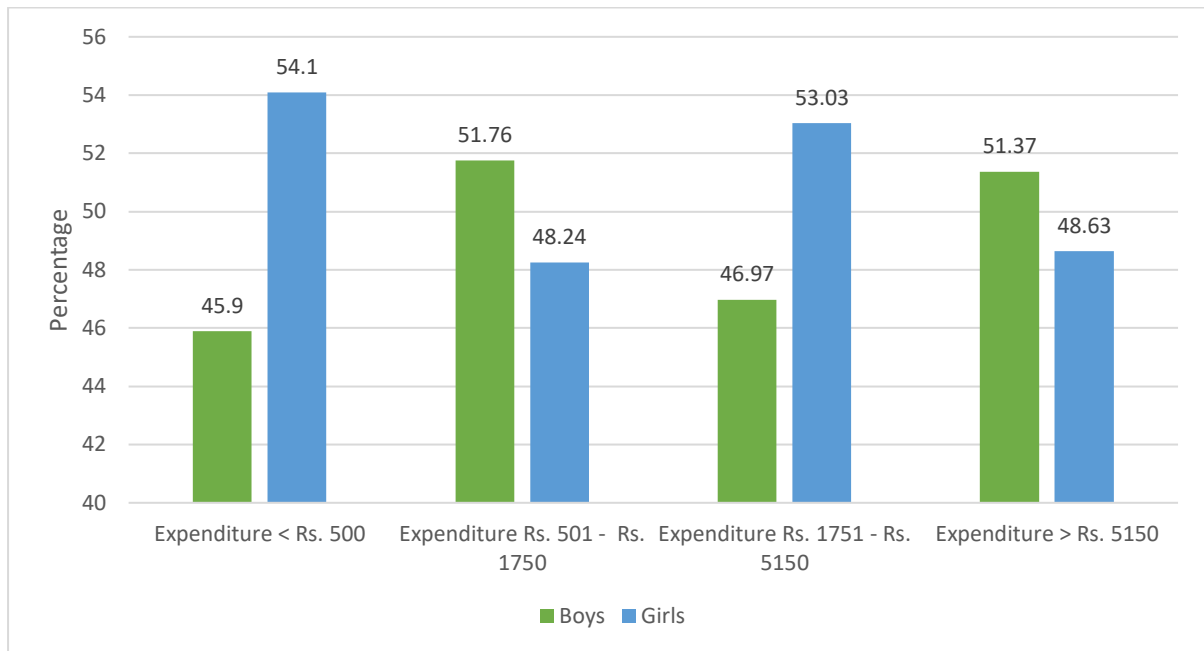
Figure 4.4: Parental expenditure on education on boys and girls across for Muslim households (Panel 2)



Source: IHDS-2 Dataset.



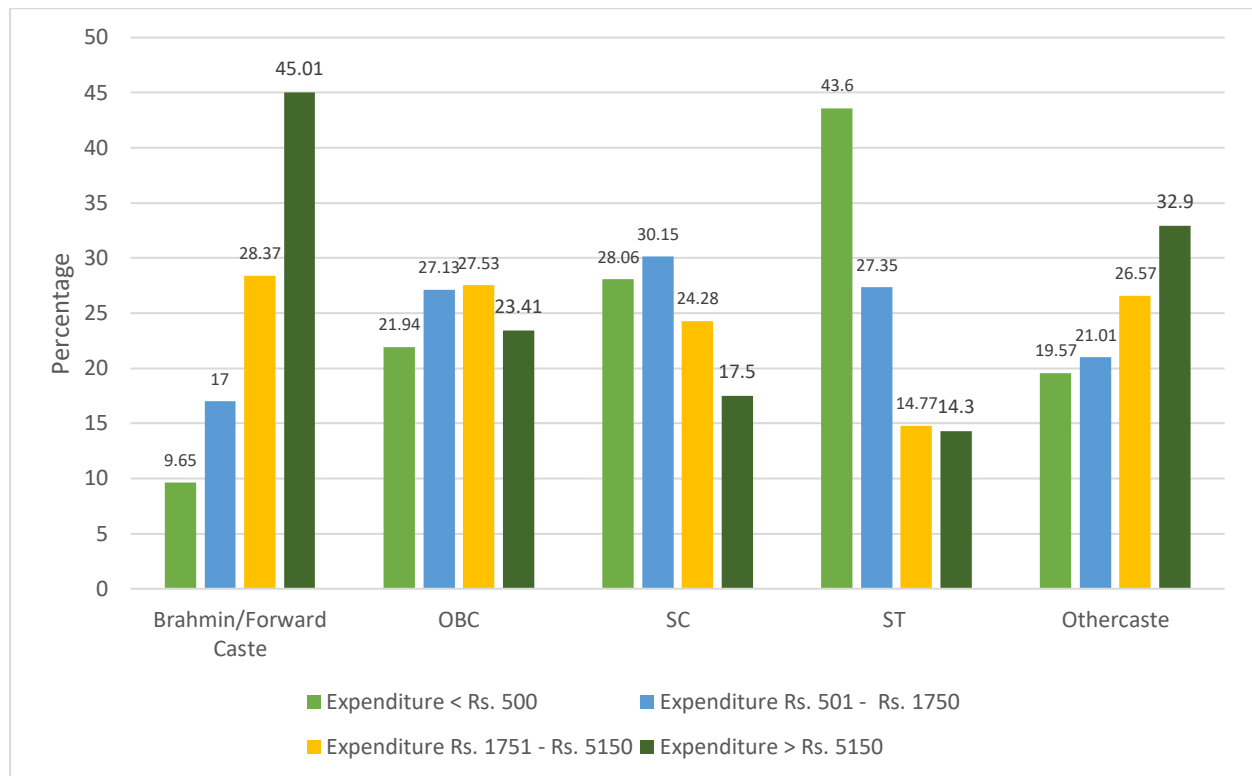
Figure 4.4: Parental expenditure on education on boys and girls across for Christian households (Panel 3)



Source: IHDS-2 Dataset.

Figure 4.4 represents the gendered distribution of parental expenditure on education across different religious groups. Panel 1 in the above figure shows that with increasing expenditure brackets; the gender gap increases showing that a larger share of the household budget on education is spent on boys vis-à-vis girls. For Muslims we see an equitable distribution in expenditure on boys and girls for all expenditure brackets except the last bracket. Panel 3 shows mixed results for Christians in the third expenditure bracket of ₹1750-₹5150; in which the proportion of expenditure on girls is higher than that of boys. But this is reversed when the expenditure bracket changes to ₹5150 and above. Moreover, we find that there exists gender gap within the households and this gap increases consistently with an increasing level of expenditure bracket for the ‘Other’ religious group as well.

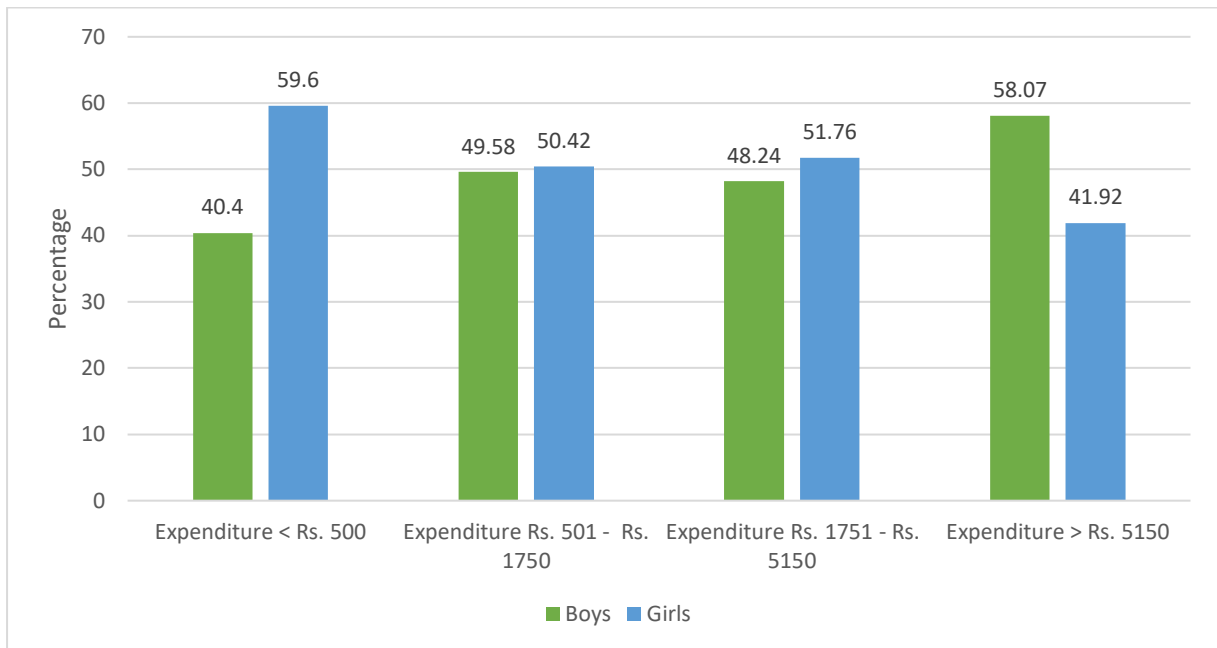
Figure 4.5: Caste-wise distribution of expenditure on education among households



Source: IHDS-2 Dataset.

Figure 4.5 represents the caste-wise distribution of expenditure on education among households. For the first expenditure bracket; where the expenditure on education is less than ₹500; we find that the highest proportion of households which lie in this expenditure bracket belong to ST caste group. The least proportion of households in this expenditure bracket are the Brahmins/ Forward caste households. Comparing with the last expenditure bracket (where expenditure is greater than ₹5150); we observe that Brahmins/Forward Caste groups incur the highest proportion of expenditure compared to other caste groups while the SC and ST caste groups incur the lowest proportion of expenditure among all caste categories.

Figure 4.6: Parental expenditure on the education of boys and girls among Brahmin/Forward Caste households (Panel 1)



Source: IHDS-2 Dataset.

Figure 4.6: Parental expenditure on the education of boys and girls among OBC households (Panel 2)



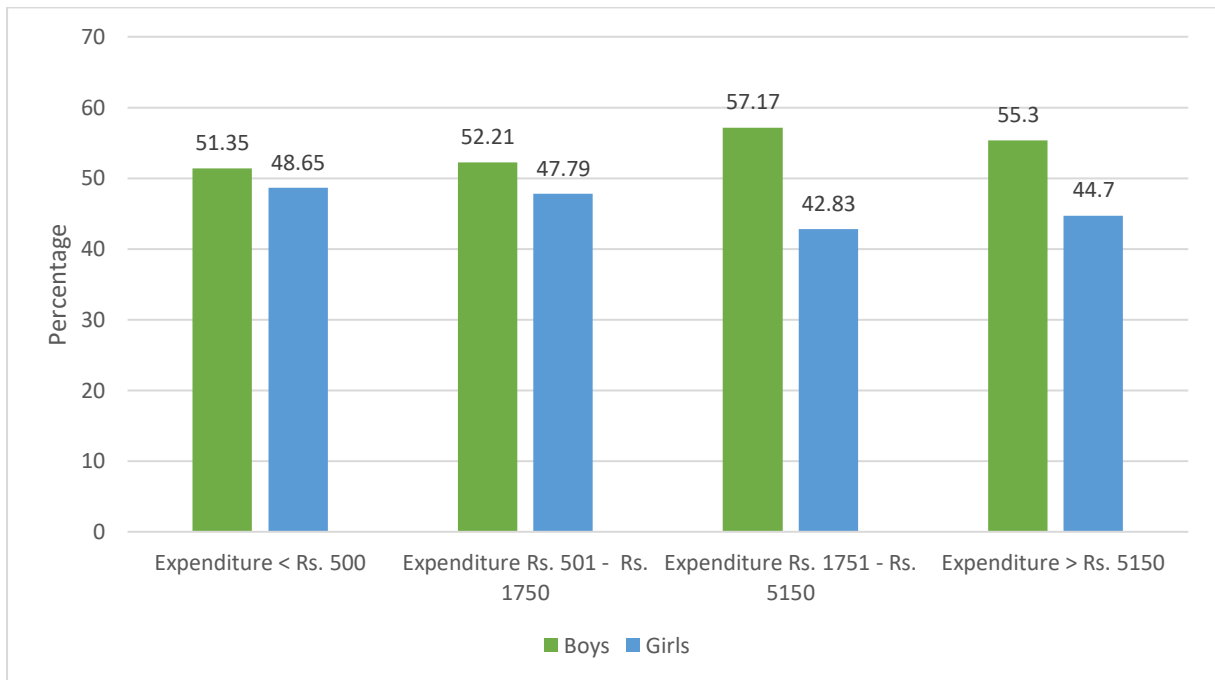
Source: IHDS-2 Dataset.

Figure 4.6: Parental expenditure on the education of boys and girls among SC households (Panel 3)



Source: IHDS-2 Dataset.

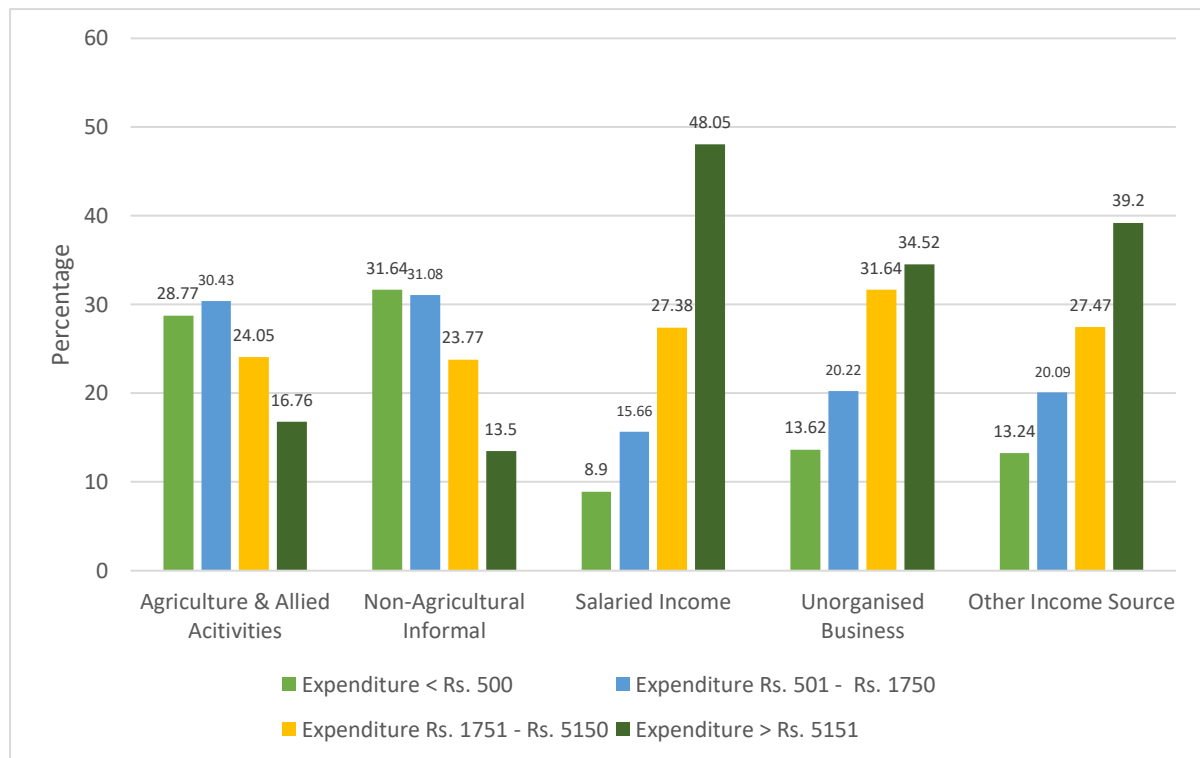
Figure 4.6: Parental expenditure on the education of boys and girls among ST households (Panel 4)



Source: IHDS-2 Dataset.

Figure:4.6 represents the gendered distribution of parental expenditure on education across different caste groups. From Panel 1; we observe that other than the first (less than ₹500) & last expenditure category (expenditure greater than ₹5050); the proportion of expenditure on education that is incurred on boys and girls is approximately equal for Brahmin/Forward caste households. From Panel 2 which consists of OBC households; we observe that the household educational expenditure on females is lower for all the expenditure categories other than the first category. Moreover, we also see that for this caste category with the increasing levels of expenditure on education; the proportion of expenditure that is incurred on a girl child is decreasing. Panel 3 and 4 show the gendered distribution of expenditure on education for SC and ST caste groups and the proportion of girls on whom the expenditure is incurred is lower when compared to boys. As education expenses increase, the proportion of expenditure incurred on girls reduces vis-à-vis boys.

Figure 4.7: Parental expenditure on education across different income source of the households

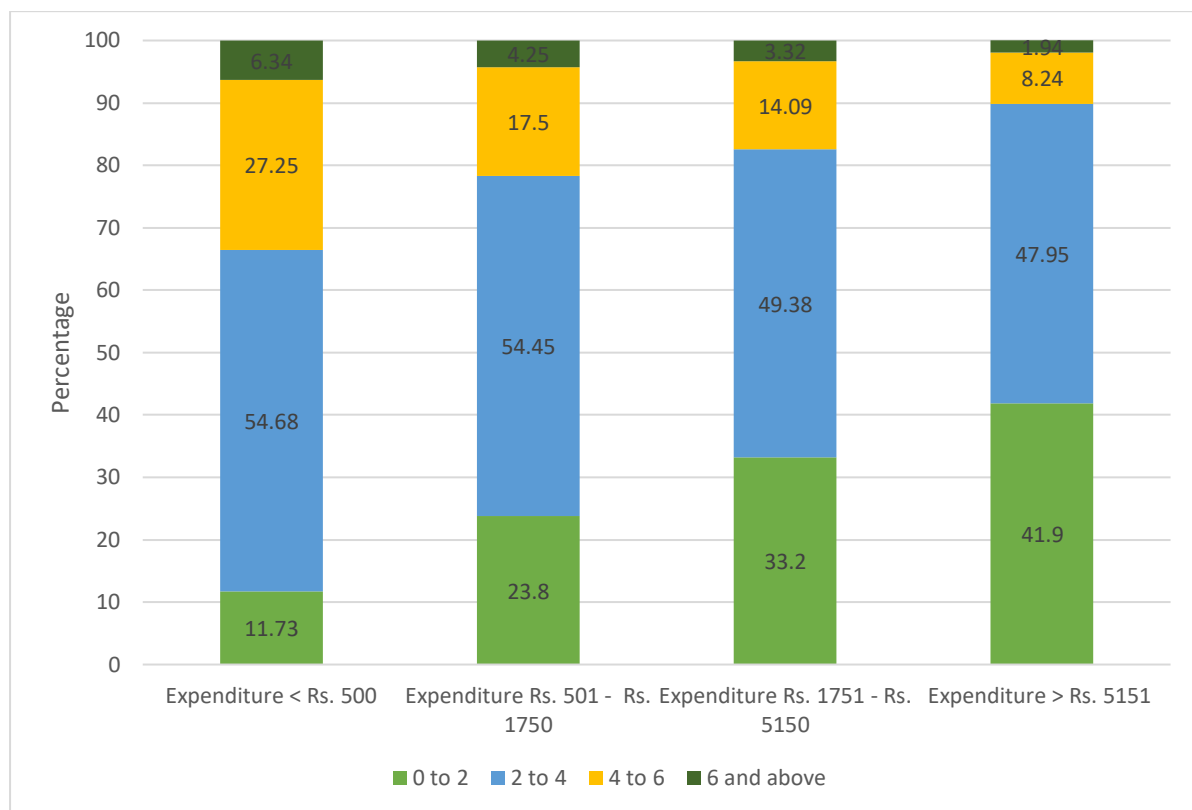


Source: IHDS-2 Dataset.

Figure 4.7 shows how parental expenditure on education varies with the household's income source of income. Across different household income sources, the proportion of educational expenditure being in the last expenditure bracket is the most for households in which the main income source is from salaried jobs while it is the least for households in which parents are

involved in non-agricultural informal employment. We witness that for households which derive their main incomes from agricultural and allied activities and non-agricultural employment sources, most of the expenditure being incurred belongs to the lowest expenditure bracket (i.e. less than ₹500) and least expenditure is incurred in the highest expenditure bracket (i.e. greater than ₹5150). However, the opposite is seen for households whose main income source comes from salaried jobs and from unorganised businesses. In their case, most expenditure is incurred in the highest expenditure bracket and least expenditure is incurred in the lowest income bracket.

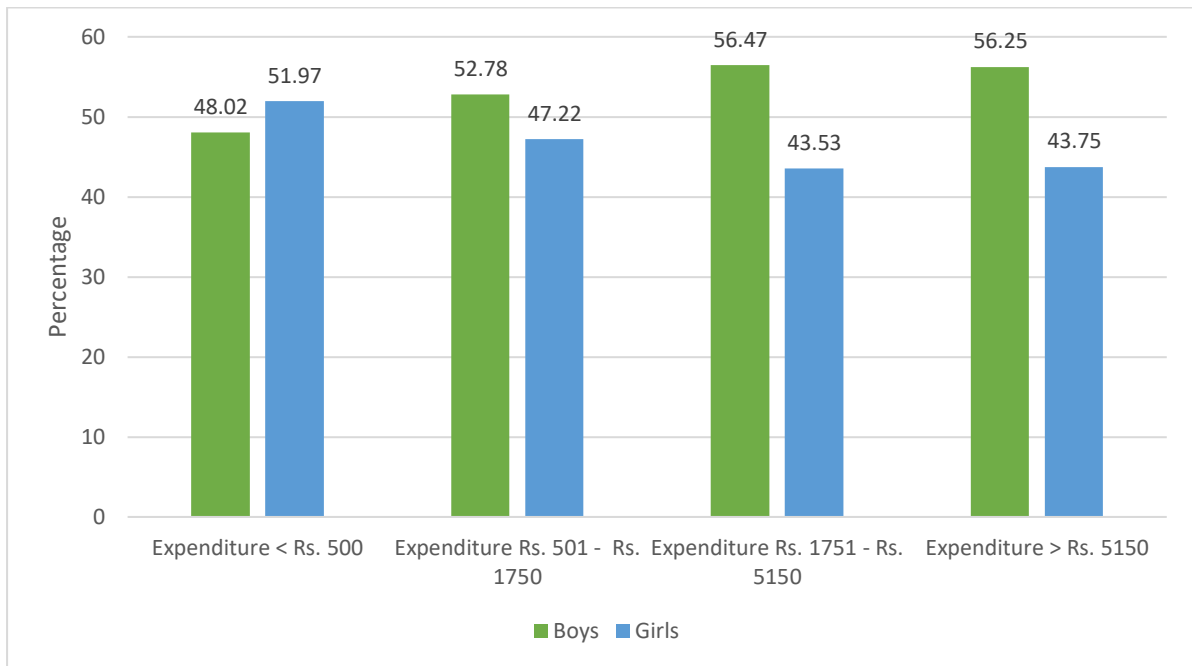
Figure 4.8: Parental expenditure on education for number of siblings in the household



Source: IHDS-2 Dataset.

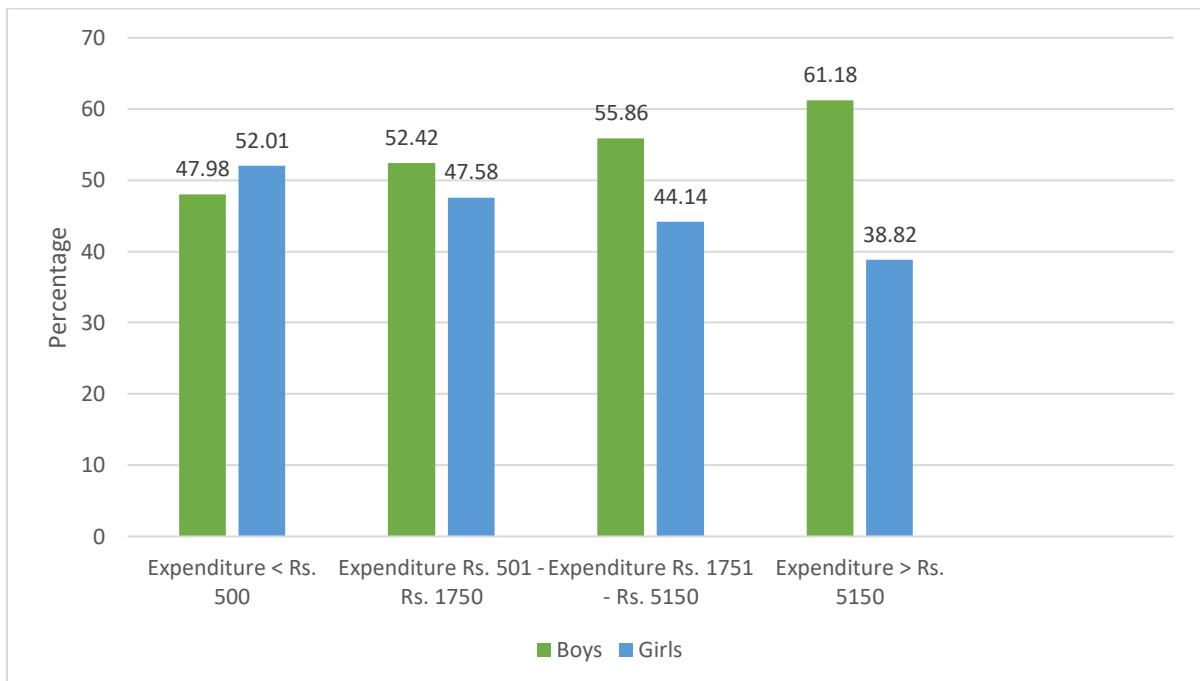
Figure 4.8 shows how the proportion of parental expenditure on education changes with the number of siblings in the household across different expenditure brackets. As the expenditure brackets increase, we observe that there is an increase in the proportion of households which have only 0 to 2 children. And there is a decrease in the proportion of households which have more than 2 children. The parental expenditure on education is highest (i.e. belonging to the last expenditure bracket) in the households in which the number of siblings is between 2 and 4 across different expenditure brackets.

Figure 4.9: Parental Expenditure on education for the poorest consumption quintile (Panel 1)



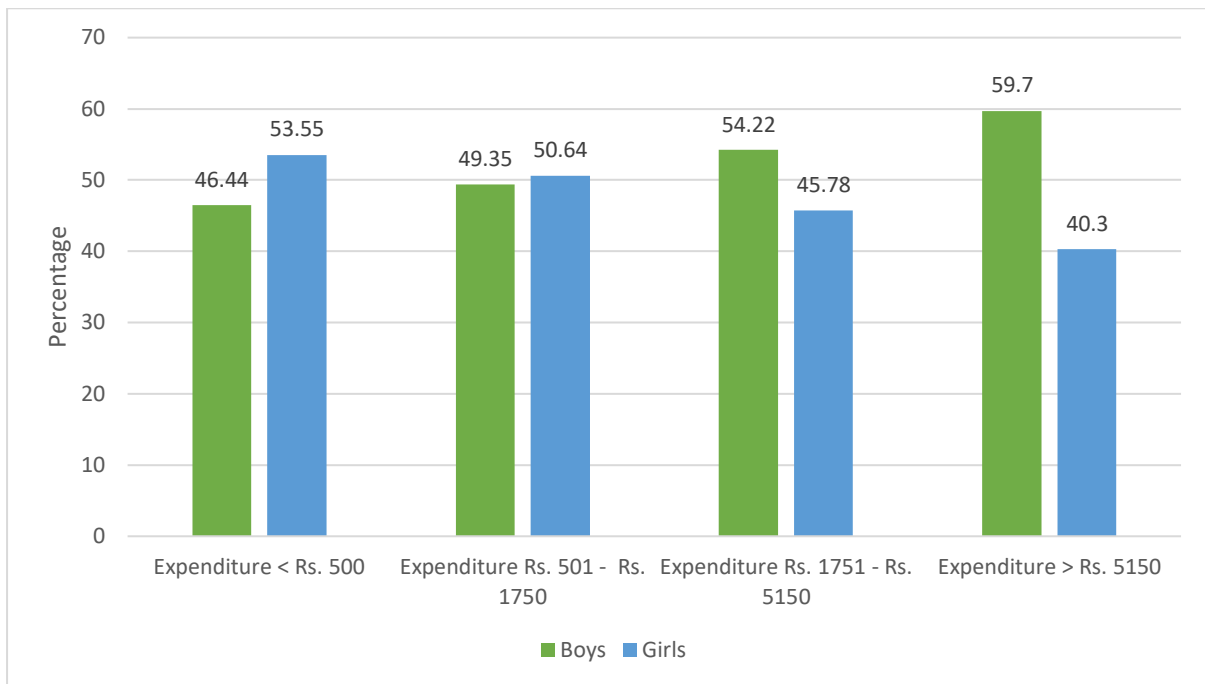
Source: IHDS-2 Dataset.

Figure 4.9: Parental Expenditure on education for poorer consumption quintile (Panel 2)



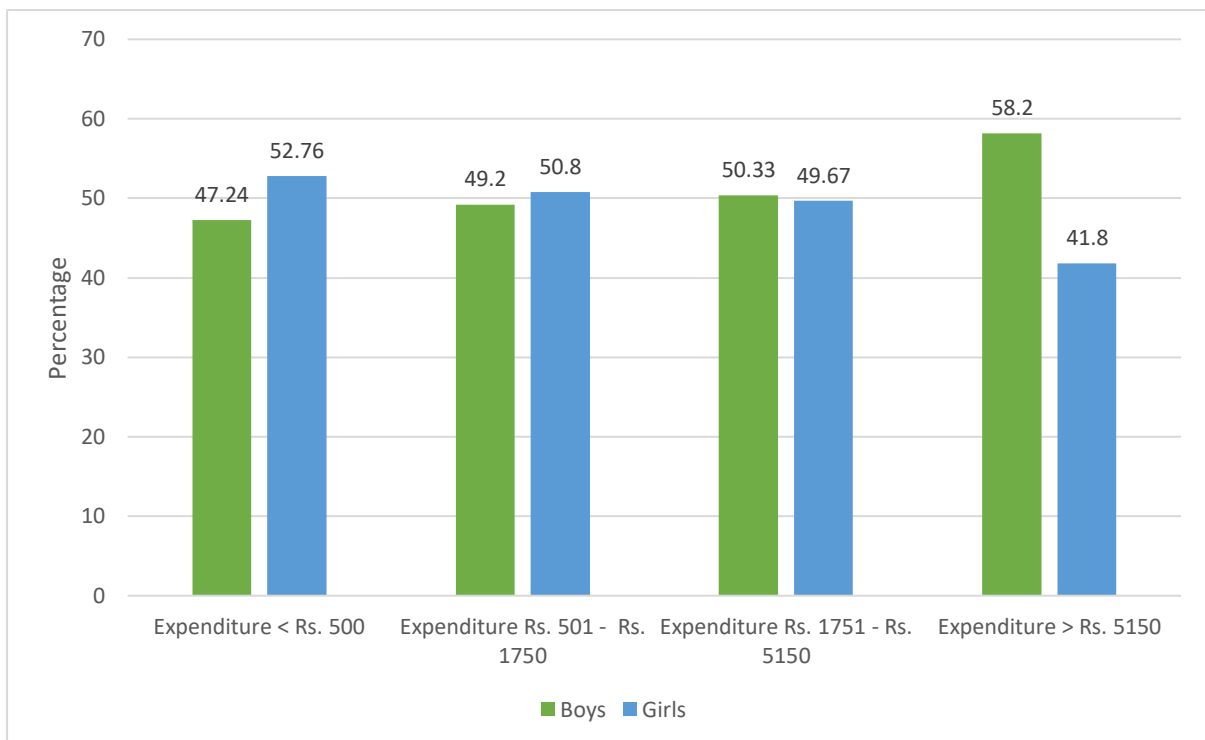
Source: IHDS-2 Dataset.

Figure 4.9: Parental Expenditure on education for middle consumption quintile (Panel 3)



Source: IHDS-2 Dataset.

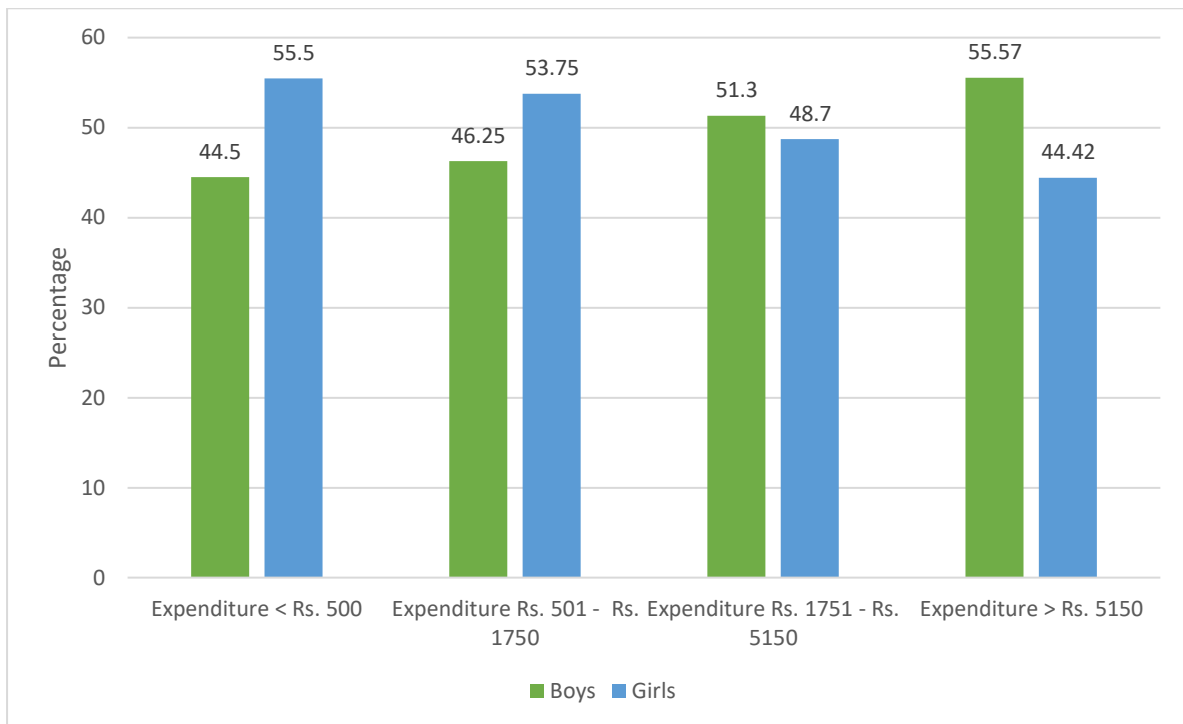
Figure 4.9: Parental Expenditure on education for richer consumption quintile (Panel 4)



Source: IHDS-2 Dataset.



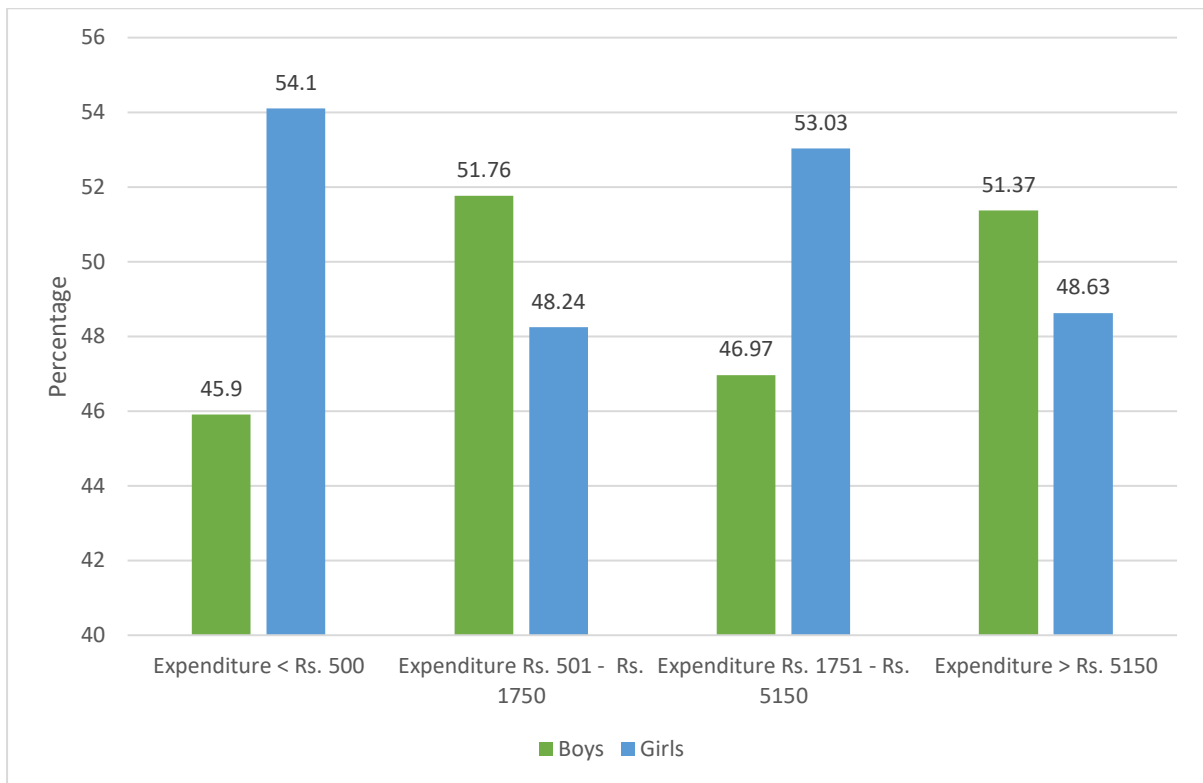
Figure 4.9: Parental Expenditure on education for richest consumption quintile (Panel 5)



Source: IHDS-2 Dataset.

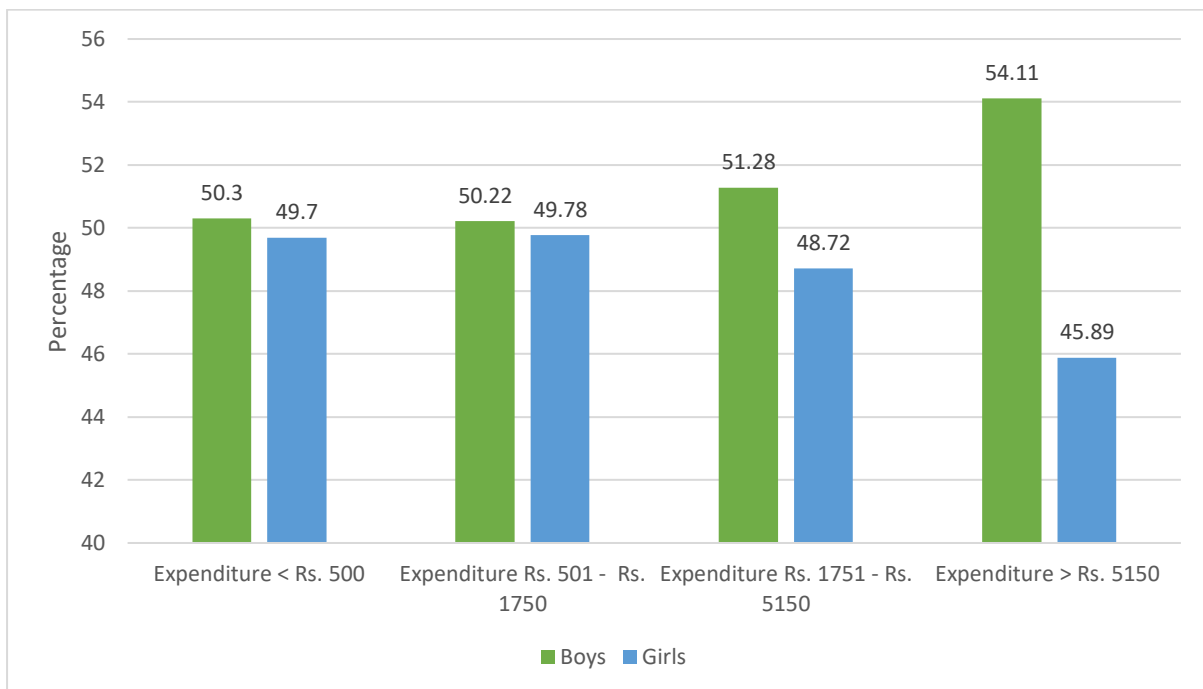
Figure 4.9 shows the distribution of parental expenditure on education across different consumption quintile groups. Other than the richest households; we observe that there exists biasness towards boys such that educational expenditure across almost all the expenditure brackets is higher for boys. Moreover, even in the richer and richest households the same trend can be seen reflecting that the gender gap in educational expenditure is observed irrespective of the economic position of the household.

Figure 4.10: Parental expenditure on education on boys and girls in northern states (Panel 1)



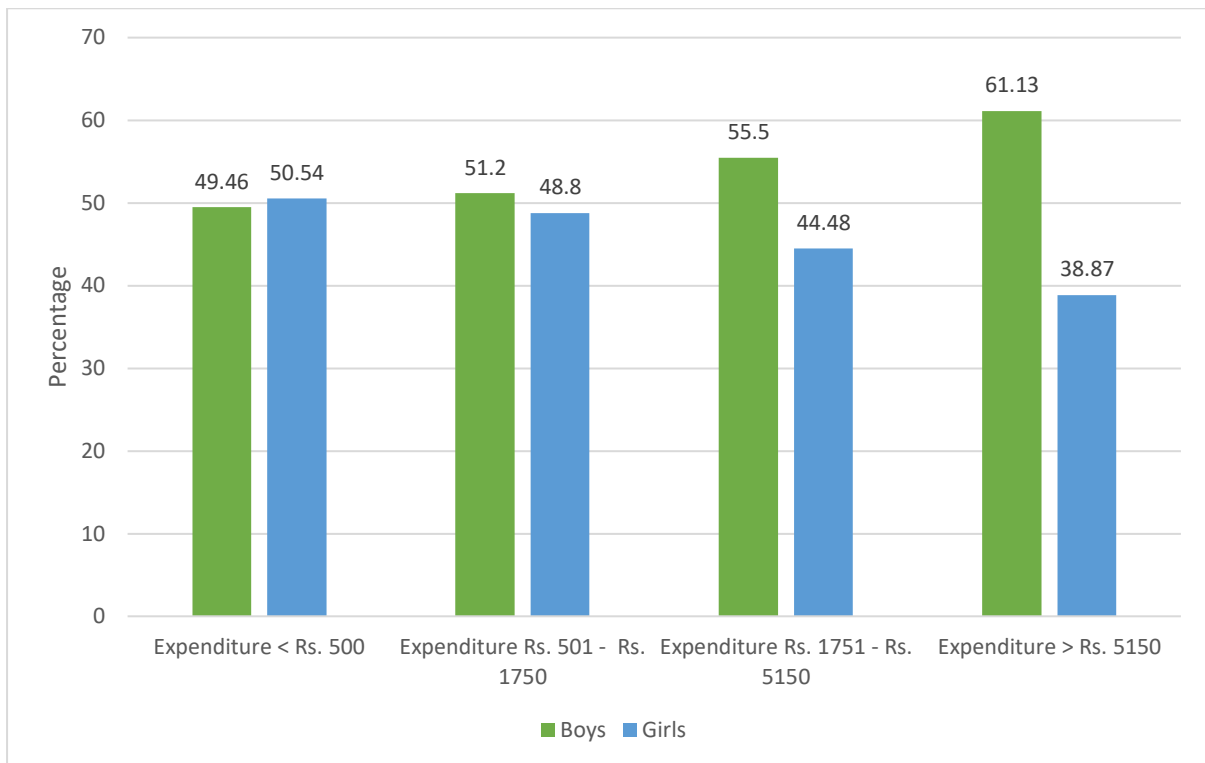
Source: IHDS-2 Dataset.

Figure 4.10: Parental expenditure on education on boys and girls in southern states (Panel 2)



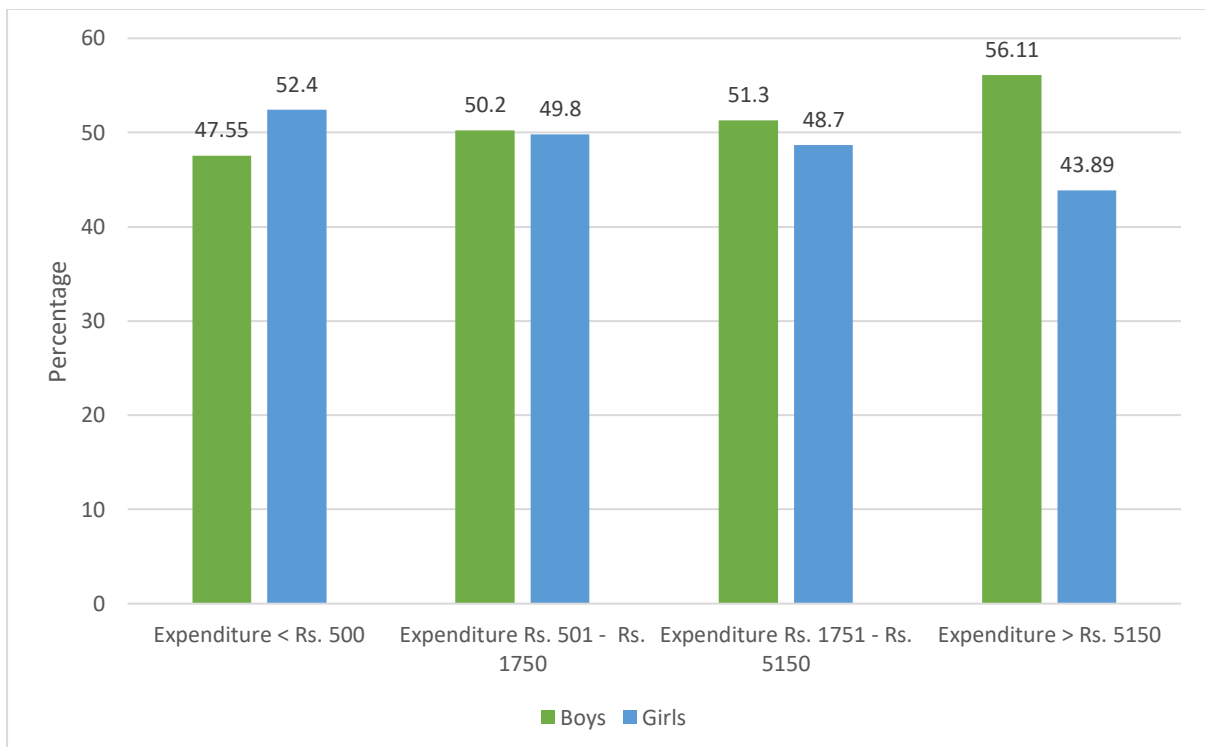
Source: IHDS-2 Dataset.

Figure 4.10: Parental expenditure on education on boys and girls in western states (Panel 3)



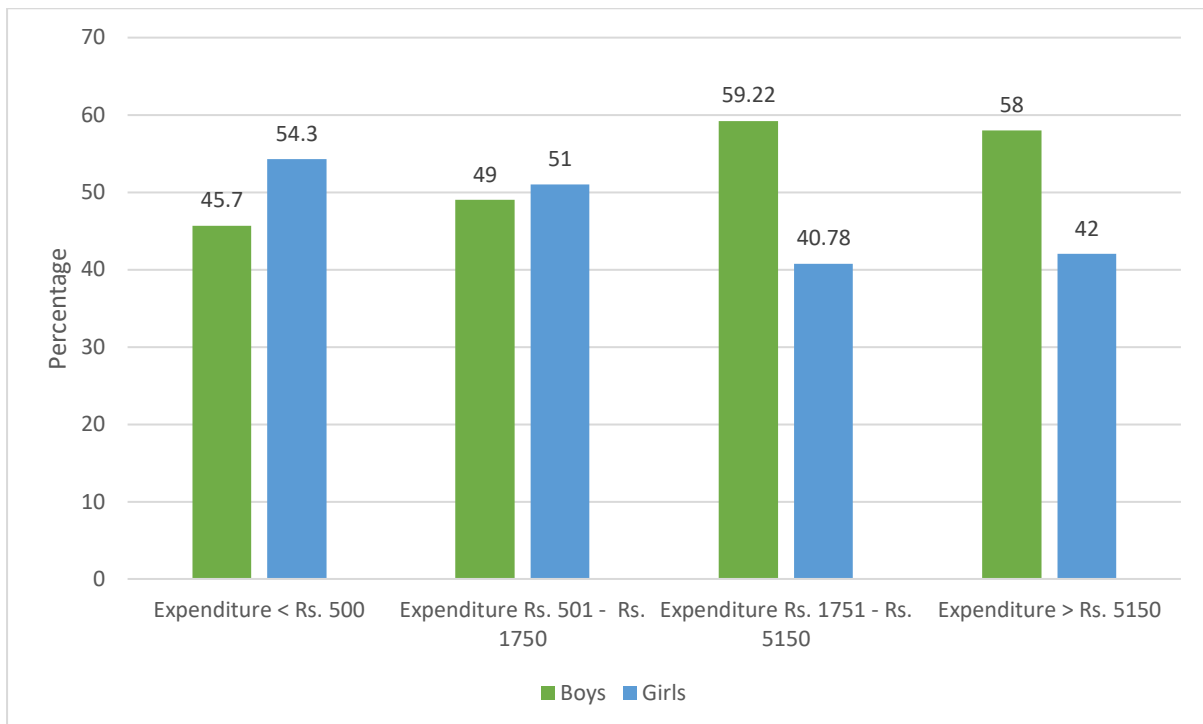
Source: IHDS-2 Dataset.

Figure 4.10: Parental expenditure on education on boys and girls in eastern states (Panel 4)



Source: IHDS-2 Dataset.

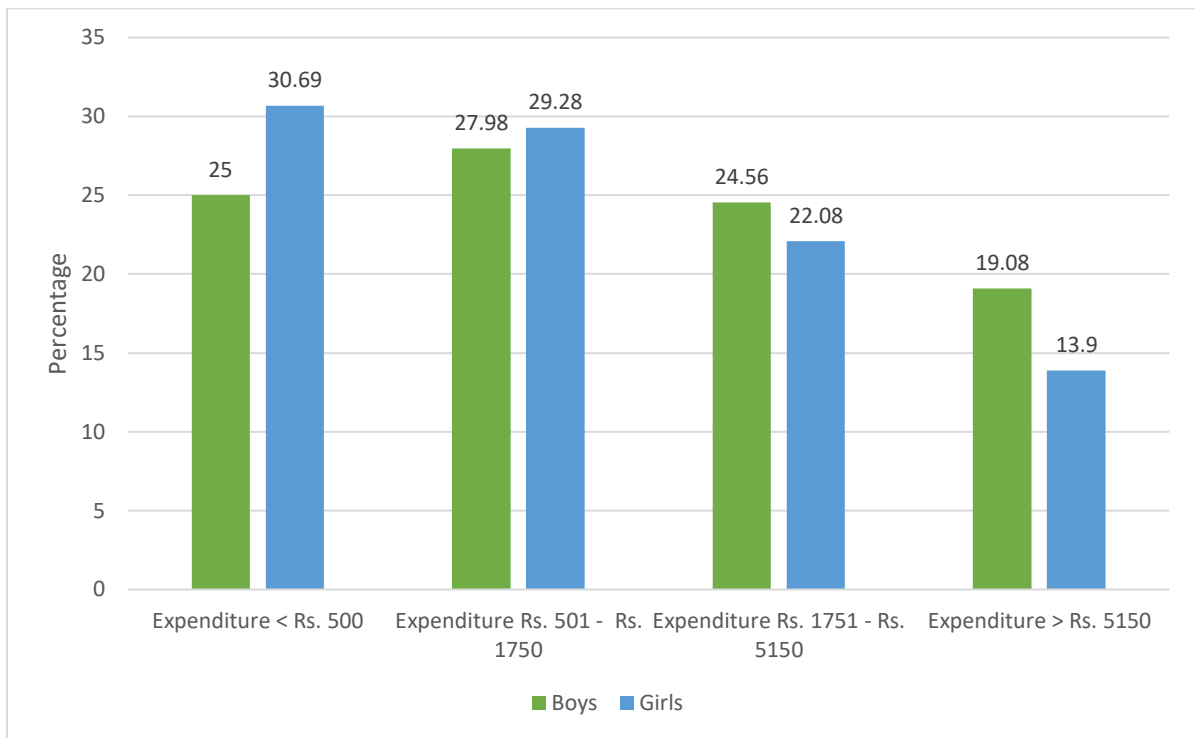
Figure 4.10: Parental expenditure on education on boys and girls in central states (Panel 5)



Source: IHDS-2 Dataset.

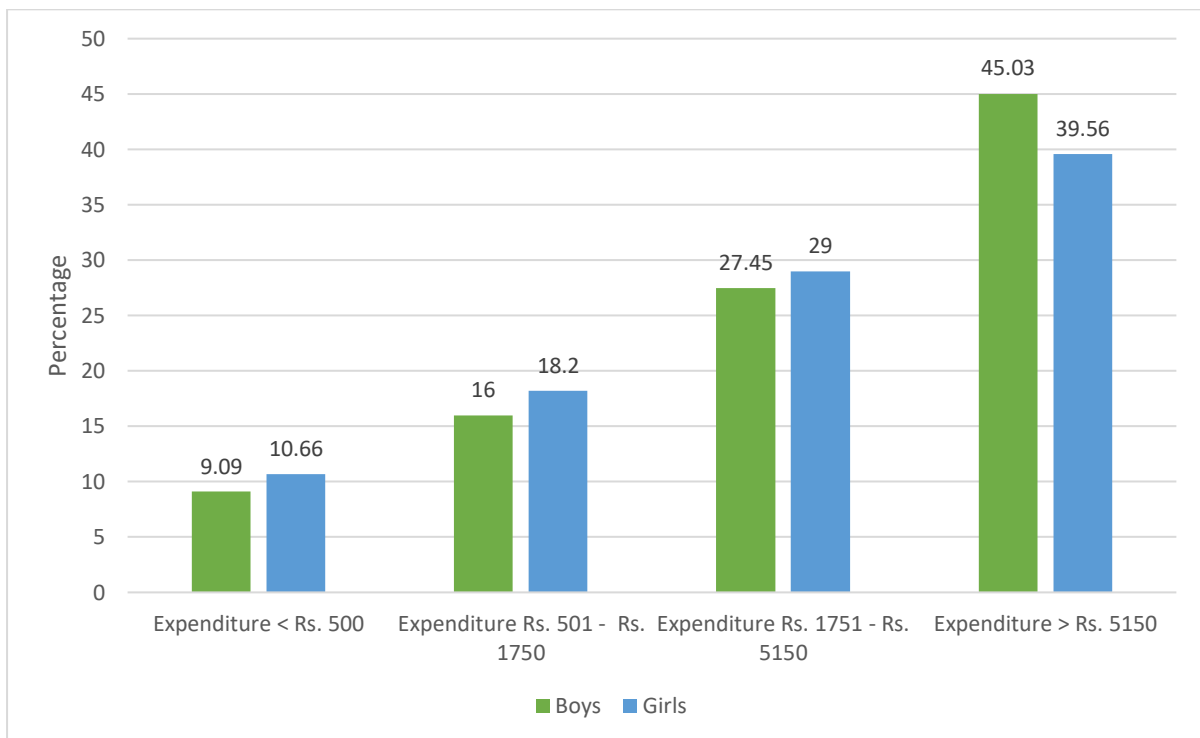
In Figure 4.10 we observe the regional variation in the levels of parental expenditure in education between boys and girls. Irrespective of the region of residence, the expenditure on education tends to be biased towards boys. Majorly it is in the first expenditure bracket (expenditure less than ₹500); where we find that the proportion of expenditure on girls is higher vis-à-vis boys. The least amount of biasness between boys and girls across different expenditure brackets is observed for the Eastern states while all other regions have a large bias between boys and girls at higher levels of expenditure brackets. Moreover, the most biased regions for the last expenditure bracket (expenditure greater than ₹5150) are the western and northern states.

Figure 4.11: Parental expenditure on education on boys and girls in rural areas (Panel 1)



Source: IHDS-2 Dataset.

Figure 4.11: Parental expenditure on education on boys and girls in urban areas (Panel 2)



Source: IHDS-2 Dataset.

From Figure 4.11 for rural areas, we observe that the proportion of girls on whom parental expenditure incurred is less than ₹500 is approximately 5.5 percentage points higher than the proportion of boys while this gap is approximately 1 percentage points for urban areas and lower than the gap for rural areas. Secondly, for rural areas, the proportion of girls on whom parental expenditure is greater than ₹5150 is approximately 6 percentage points lower than boys on whom parental expenditure incurred is greater than ₹5150 while this gap is approximately 5.5 percentage points for urban areas. Thirdly, for rural areas we observe that with increasing levels of educational expenditure incurred, the proportion of girls and boys on whom it is incurred decline. This trend is reversed in the case of urban areas.

#### 4.5.2. Regression Results

Table 4.6: Estimates of logit regression for children aged 6-18 years with parents' decision to incur-expenditure as dependent variable

<b>Explanatory Variables</b>	<b>Coefficient Value</b>	<b>Standard Error</b>	<b>P value</b>
<b>Child Gender</b>	-0.002	0.002	0.325
<b>Age of Child</b>	0.003	0.001	0.000***
<b>Mother's Education</b>	0.001	0.000	0.000***
<b>Father's Education</b>	0.003	0.000	0.212
<b>Male Siblings</b>	-0.003	0.000	0.000***
<b>Female Siblings</b>	-0.001	0.000	0.000***
<b>Agricultural Income</b>	0.014	0.002	0.000***
<b>Salaried Income</b>	0.010	0.003	0.000***
<b>Unorganized Business Income</b>	0.012	0.003	0.000***
<b>Other Income Sources</b>	-0.001	0.005	0.970
<b>School Distance</b>	0.007	0.000	0.710
<b>Scholarship</b>	-0.004	0.002	0.040**
<b>Muslim</b>	-0.016	0.002	0.000***
<b>Christian</b>	0.007	0.007	0.290
<b>Other Religions</b>	-0.026	0.007	0.000***
<b>OBC</b>	-0.006	0.002	0.000***
<b>SC</b>	-0.008	0.002	0.000***
<b>ST</b>	-0.003	0.003	0.380
<b>Other Caste</b>	0.015	0.010	0.140
<b>Household Assets</b>	0.047	0.000	0.030**

<b>Urban Area</b>	0.008	0.002	0.730
<b>North</b>	-0.025	0.003	0.000***
<b>South</b>	0.038	0.003	0.000***
<b>West</b>	0.013	0.003	0.000***
<b>East</b>	-0.030	0.003	0.000***
<b>Age of Child</b>	0.003	0.000	0.000***
<b>Grandfather's Education</b>	-0.007	0.000	0.770
<b>Men's Exposure to newspaper</b>	0.008	0.002	0.000***
<b>Women's Exposure to newspaper</b>	-0.003	0.002	0.110
<b>School Type: Govt. School</b>	-0.067	0.004	0.000***
<b>School Type: Others</b>	-0.054	0.010	0.000***

Source: IHDS-2 Dataset

Note: Significance Levels: \*\*\* p<0.001, \*\* p<0.01, \* p<0.05

Our first level of analysis is to examine the *existence* of gender bias at the extensive margin in the allocation of household expenditure on education using logistic regression model.

*Child Characteristics:* -

To start with, we find that as the age of a child increases by a year, the predicted probability of the parents' decision to spend on education increases by 0.3 percentage points, while keeping all other variables as constant.

*Parental Education:*

Next, considering the effect of parental characteristics such as their education on child educational expenditure, we find that mother's and father's education is positively associated with the decision to spend on the education of their children. Moreover, the number of children in a household are negatively related to the decision to spend. We find that household assets have a positive relationship with the parental decision to spend on education. Furthermore, we find that the predicted probabilities of household's decision to spend on the education of their child who earn incomes from agricultural and salaried sources is 1.4 and 1.1 percentage points higher when compared to household with incomes from non-agricultural informal sources, respectively.

### *Household Characteristics:*

Next, we consider the effect of religion on the household decision to spend on education of a child. We find that when compared to a Hindu household, the predicted probabilities of the decision to spend on the education of a child for a Muslim household decreases by 1.6 percentage points and increases by 0.8 percentage points for a Christian household. Focusing next on the caste variables, we find that the predicted probabilities of the decision to spend on the education of a child belonging to the OBC, SC and ST caste households decrease by 0.67, 0.87 and 0.34 percentage points respectively when compared to Brahmin/Forward caste households, while keeping other variables as constant. Exposure to media in the form of newspaper reading for men shows a positive and significant impact on the decision of the household to spend on educational expenditure of a child.

### *School Characteristics:*

The type of school i.e., private or public turns out to be highly significant in our analysis. We find that the predicted probability of spending positively on education for a public school is 6.7 percentage points lower than that of a private school.

### *Regional Effects:*

Region wise results indicate that compared to the central region, households across southern India have a higher predicted probability of parents' decision to spend positively on the education of children by 3.8 percentage points, *ceteris paribus*. For households belonging to the northern region the predicted probability of parents' decision to spend is 2.5 percentage points lower than that of a household from central India.

We find that the predicted probability of the parental decision to spend on the education of a girl is 0.2 percentage points lower when compared to the parental decision to spend on the education of a boy. Since this probability is negligible and insignificant, we can infer that the household's decision to spend or not on the education of their child at the extensive margin is not influenced by the gender of the child, but by some other factor. This has been examined further in this study.



Table 4.7: Estimates of OLS regression for children aged 6-18 years with “conditional expenditure incurred by parents” as dependent variable

	<b>Model 1</b>	<b>Model 2</b>	<b>Model 3</b>	<b>Model 4</b>
<b>Explanatory Variables</b>	<b>Coefficient Value</b>	<b>Coefficient Value</b>	<b>Coefficient Value</b>	<b>Coefficient Value</b>
<b>Gender of Child</b>	-987.724*** (84.55)	-782.373*** (90.98)	-442.891*** (86.91)	-443.770*** (86.37)
<b>Age</b>	376.734*** (15.42)	284.975*** (14.50)	248.924*** (15.11)	246.334*** (15.14)
<b>Mother’s Education</b>	432.698*** (12.34)	177.697*** (13.55)	104.425*** (13.94)	103.463*** (14.56)
<b>Father’s Education</b>	223.109*** (10.24)	71.2641*** (9.76)	26.309** (9.94)	25.0733* (9.87)
<b>Grandfather’s Education</b>	241.579*** (243.05)	144.770*** (18.24)	109.615*** (17.37)	98.1041*** (17.42)
<b>Male Siblings</b>		-338.097*** (30.48)	-317.223***	-316.845*** (28.93)
<b>Female Siblings</b>		-359.423*** (28.88)	-309.921***	-301.051*** (27.16)
<b>Muslim</b>		-537.245*** (128.41)	-478.122***	-586.478*** (126.24)
<b>Christian</b>		-333.574 (225.07)	-785.457**	-810.402* (330.47)
<b>Other Religion</b>		-565.765* (271.11)	-501.773**	-144.463 (246.36)
<b>OBC</b>		-650.597*** (118.93)	-721.279*** (112.99)	-473.388*** (110.53)
<b>SC</b>		-1161.780*** (122.81)	-638.667*** (117.82)	-589.718*** (116.52)
<b>ST</b>		-51.737 (152.83)	206.512 (144.20)	289.772* (143.34)
<b>Other Caste</b>		1261.027 (1317)	1238.556 (1322.56)	1697.922 (1305.97)
<b>Household Assets</b>		380.871*** (8.45)	245.737*** (7.74)	245.341*** (8.80)
<b>Agricultural Income</b>		113.658 (78.74)	-78.219 (84.45)	223.104** (82.95)

<b>Salaried Income</b>		1405.086*** (156.73)	1174.405*** (145.47)	951.789*** (139.82)
<b>Unorganized Business Income</b>		147.986 (132.51)	-102.350 (122.59)	-301.974* (123.8)
<b>Other Income Sources</b>		829.268*** (257.39)	333.629 (228.10)	175.633 (225.35)
<b>Men's Exposure to newspaper</b>		-378.6741*** (68.13)	-367.674*** (68.33)	-296.475*** (67.71)
<b>Women's Exposure to newspaper</b>		1126.147*** (95.20)	1112.147*** (95.49)	1100.2*** (95.18)
<b>School Distance</b>			297.995*** (33.39)	305.089*** (33.88)
<b>Scholarship</b>			-381.166*** (97.73)	-395.272**** (106.35)
<b>School Type: Govt. School</b>			-4406.230*** (97.06)	-4467.738*** (108.80)
<b>School Type: Others</b>			-3136.023*** (306.38)	-3022.937*** (316.70)
<b>North</b>				1128.785*** (105.22)
<b>South</b>				-379.569** (124.74)
<b>West</b>				-289.606** (101.74)
<b>East</b>				1188.175*** (107.07)
<b>Urban</b>				667.723*** (133.89)

Source: IHDS-2 Dataset \*

Note: Significance Levels: \*\*\* p<0.001, \*\* p<0.01, \* p<0.05

Table 4.6 estimates gender bias at the intensive margin i.e., the parental decision of how much to spend on education, conditional on having decided to spend any money at all. Hence, we attempt to estimate the extent or amount of household expenditure dedicated to the education of boys and girls and whether there exists any gender bias for the same. In order to do so we have modelled four regressions based on different control variables. For instance, model 1 contains the explanatory variables - gender of the child, age of the child, mother's education, father's education and grandfather's education. Model 2 builds on model 1 and includes other

household characteristics such as the number of male siblings, female siblings, religion, caste, household assets and the main source of household income. Model 3 includes other variables of interest such as distance from the school, the exposure of men and women in the household to newspapers and the type of school (government school or others). Model 4 incorporates regional effects and the variables of interest are urban or rural area and different regions of the country.

#### *Child Characteristics:*

From model 1 we find that on average, the expenditures incurred on the education of a girl is lower by about ₹988 when compared to a boy. Moreover, as the age of a child increases by one year, the average expenditure incurred on the child increases by approximately ₹377.

#### *Parental Education:*

We also find that the mother's and father's education have a positive influence on the expenditure incurred on education of the children in the family. As the mother's and father's education increases by one year the average expenditure incurred on the education of a child increases by ₹433 and ₹223 respectively. Similarly, as grandfather's education increases by one year the average expenditure incurred on the education of a child increases by approximately ₹241. Thus, we observe that on average, the expenditure incurred on a girl in the family is lower when compared to a boy. Moreover, we find that higher household education levels are associated with higher expenditure on the education of children.

#### *Household Characteristics:*

Model 2 factors in household characteristics and reveals that lower expenditure is still incurred on the education of a girl by approximately ₹782 when compared to a boy. We also find that as the number of female and male siblings increase, the expenditure incurred on the education of the child decrease by approximately ₹340 and ₹360 respectively. Moreover, when compared to a Hindu household, the educational expenditure incurred on children is lower for Muslim and Christian households' by approximately ₹540 and ₹330 rupees. In examining the effect of caste on educational expenditure of a child, we find that for a child belonging to an 'Other Backward Caste', the expenditure on education is approximately ₹650 lower when compared to a child who belongs to a Brahmin/Forward caste. Similarly, the expenditure on education is almost ₹1162 higher for Brahmin/Forward caste when compared to a child who belongs to a Scheduled Caste. Furthermore, as expected, the

number of household assets have a positive relationship with the educational expenditure on children. i.e., for an additional asset in the household, the expenditure incurred on child education increases by approximately ₹380 on average. Taking into account the income source of the household, we find that when compared to the base category non-agricultural informal income source, as expected, households whose main income source is salaried income spend on an average ₹1400 more on educational expenditure of their child. In observing the effect of men and women's exposure to newspaper reading where we find that women's exposure to newspaper reading has a significantly positive impact on child educational expenditure. As the frequency of newspaper reading for women increases, child educational expenditure on an average increase by ₹1112.

#### *School Characteristics:*

In analysing how schools affect the parents' educational expenditure on children, we find that government assistance in the form of scholarship is negatively related to child educational expenditure. We also find that when compared to a private school, the expenditure incurred for education in a government school is lower by approximately ₹4400. We also find school distance to be highly significant in our analysis. As the school distance increases by 1 km, the expenditure on education, increases on average approximately by ₹300.

#### *Regional Effects:*

Model 4 captures regional variations in educational expenditure and results reveal that on average, parents who reside in the northern region of India spend approximately ₹1120 more when compared to parents who reside in the central region of India.

Additionally, we observe that as control variables increase in each subsequent model, the impact on the dependent variable can be seen by the changing coefficient values of the control variables. However, we find that even as we add more control variables to each subsequent model, the coefficient value of educational expenditure for girls is *consistently* lower when compared to boys in the household. Thus, this could be indicative of the presence of gender bias in household educational expenditure at the intensive margin.

However, previous results reveal that the gender of the child may not be the reason for the decision to incur any educational expenditure. In this context, we wish to examine if the household's economic position could be the reason for the same. In order to see the effect of

income on this bias, we take consumption of household as a proxy for household income and conduct OLS regressions for households based on different consumption quintiles such as the lowest consumption quintile (poorest households), the lower consumption quintile (poorer households), the middle consumption quintile households, the higher consumption quintile (richer) and the highest consumption quintile (richest) households. The results have been presented in Table 4.7 below:

Table 4.8: Estimates of OLS regression for children aged 6-18 years with “conditional expenditure incurred by parents” as dependent variable for different consumption quintiles

	<b>Coefficient Value (Gender of Child; Reference: Male)</b>	<b>P Value</b>	<b>Mother’s Education</b>	<b>P value</b>	<b>Father’s Education</b>	<b>P Value</b>
<b>Poorest Households</b>	-96.473 (43.214)	0.026*	25.370 (8.246)	0.001*	2.593 (6.167)	0.674
<b>Poorer Households</b>	-193.98 (110.468)	0.079	54.771 (26.791)	0.041*	4.271 (9.511)	0.0653
<b>Middle Households</b>	-432.308 (109.816)	0.000*	76.060 (14.541)	0.000*	5.254 (14.123)	0.710
<b>Richer Households</b>	-598.287 (173.344)	0.001*	90.777 (23.062)	0.000*	3.517 (22.948)	0.878
<b>Richest Households</b>	-1357.638 (317.984)	0.000*	176.937 (50.073)	0.000*	101.007 (41.671)	0.015*

Source: IHDS-2 Dataset

Note: Significance Levels: \* indicates significance at 5 percentage points.

From the results given in Table 4.7, we observe that as household consumption level increases, on average, the expenditure on education spent on a girl decreases (when compared to a boy) and this gap in educational expenditure widens. This could explain why logit results estimate that the predicted probability of expenditure on education for a girl decreases *only* by 0.2 percentage points and is insignificant when compared to a boy. The reason could be that at the extensive margin, those families who decide not to spend on education at all may be the ones belonging to the lowest income groups and those who do not have enough monetary resources to expend on child education. Thus, this decision of not to spend is made irrespective of the

gender of the child. However, as the household consumption increases, we see that the gender gap in educational expenditure increases which confirms the presence of a gender bias in Indian households.

Moreover, we find that increasing maternal education across all consumption quintiles significantly and positively impacts child educational expenditures while the father's education only has a significant and positive impact on child educational expenditures in the highest consumption category. This leads us to investigate how parental education influences child expenditure outcomes more closely in the next section.

Table 4.9: Estimates of OLS regression for boys and girls aged 6-18 years with “conditional expenditure incurred by parents” as dependent variable

	Model 1		Model 2		Model 3		Model 4	
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.
<b>Age of Child</b>	405.13** * (20.84)	348.22** * (22.80)	301.58*** (19.60)	271.32*** (21.93)	287.46*** (19.71)	211.15*** (24.02)	283.52*** (19.64)	209.23*** (24.21)
<b>Mother's Education</b>	455.07** * (17.31)	408.50** * (17.57)	174.49*** (17.87)	180.54*** (20.50)	115.75*** (17.02)	93.33*** (22.33)	115.19*** (17.35)	91.17*** (23.77)
<b>Father's Education</b>	255.48** * (13.86)	187.90** * (15.11)	84.78*** (13.27)	56.91*** (14.07)	27.15** (13.34)	26.196* (14.50)	23.85* (13.40)	27.06* (14.18)
<b>Grandfather's Education</b>	205.70** * (24.75)	279.59** * (27.95)	103.26*** (24.33)	190.64***	66.72*** (23.62)	158.23*** (5.54)	56.37** (23.68)	146.26*** (25.78)
<b>Male Siblings</b>			-364.15*** (44.16)	-297.69*** (41.41)	-340.36*** (42.09)	-274.67*** (39.53)	-338.67*** (42.44)	- 268.75*** (38.35)
<b>Female Siblings</b>			-283.75*** (43.40)	-438.81*** (38.13)	-304.61*** (40.96)	-330.67*** (37.49)	-301.50*** (40.60)	- 315.31*** (36.63)
<b>Muslim</b>			-425.76** (207.51)	-677.65*** (152.14)	-296.37 (204.70)	-700.16*** (150.92)	-400.94** (205.72)	- 811.89*** (146.75)
<b>Christian</b>			-758.52* (432.00)	-116.36 (509.59)	- 1224.28*** (423.11)	-294.39 (495.18)	- 1226.02*** (418.20)	-359.29 (503.85)
<b>Other Religion</b>			-485.90	-626.73	-480.86	-510.69	-89.33	-217.53

			(389.10)	(367.88)	(349.52)	(342.91)	(350.35)	(338.87)
<b>OBC</b>			-783.19*** (178.20)	-510.19*** (154.14)	-813.38*** (172.53)	-606.55*** (141.24)	-509.73*** (167.03)	- 427.82*** (140.01)
<b>SC</b>			- 1306.16*** (184.40)	-996.67*** (157.90)	-684.55*** (179.30)	-576.92*** (148.46)	-612.63*** (176.80)	- 558.33*** (148.66)
<b>ST</b>			-126.46 (230.98)	37.26 (192.32)	229.38 (221.36)	188.86 (175.80)	334.57 (219.51)	252.29 (175.15)
<b>Other Caste</b>			-935.79* (559.31)	3796.17 (2766.05)	-697.72 (538.44)	3528.63 (2823.67)	-62.76 (532.07)	3818.6 (2788.52)
<b>Household Assets</b>			418.99*** (12.15)	338.23*** (11.36)	267.07*** (11.48)	221.24*** (10.19)	268.97*** (12.34)	217.98*** (12.56)
<b>Agricultural Income</b>			354.13*** (101.24)	-148.69 (121.98)	85.21 (96.68)	-262.87* (138.70)	423.17*** (101.15)	-5.28 (133.09)
<b>Salaried Income</b>			1790.92*** (199.09)	985.41*** (245.30)	1436.58*** (190.03)	887.21*** (218.35)	1202.82*** (189.91)	688.85*** (231.25)
<b>Unorganized Business Income</b>			227.16 (173.21)	70.74 (202.95)	-136.08 (163.28)	-60.61 (183.37)	-362.42** (165.93)	-220.79 (183.63)
<b>Other Income Sources</b>			983.87* (346.29)	673.48* (383.26)	440.46 (314.37)	226.56 (330.25)	263.96 (309.06)	104.37 (326.57)
<b>Men's Exposure to newspaper</b>					271.86*** (28.77)	334.63 (69.33)	281.33*** (29.15)	338.80*** (70.28)
<b>Women's Exposure to newspaper</b>					-479.93*** (98.77)	-297.63* (171.66)	-480.33*** (103.82)	-329.67* (188.57)
<b>School Distance</b>					-244.39** (100.30)	-518.11*** (90.55)	-181.78* (99.83)	- 441.07*** (89.39)
<b>Scholarship</b>					1167.05*** (129.54)	1062.87*** (137.99)	1176.73*** (127.88)	1031.55** * (140.19)
<b>School Type: Govt. School</b>					- 4711.12*** (118.37)	- 4029.60*** (158.67)	- 4757.12*** (125.88)	-4097.024 (181.99)
<b>School Type: Others</b>					- 3831.21*** (453.44)	- 2189.33*** (380.75)	- 3662.62*** (478.05)	-2133.652 (385.43)
<b>North</b>							696.34*** (145.11)	635.81*** (299.35)
<b>South</b>							1227.77*** (158.73)	973.78*** (136.18)

<b>West</b>								-571.75*** (170.15)	-152.43 (184.92)
<b>East</b>								-172.42 (146.98)	- 433.18*** (139.40)
<b>Urban</b>								1388.18*** (154.33)	936.49*** (145.27)

Source: IHDS-2 Dataset \*

Note: Significance Levels: \*\*\* p<0.001, \*\* p<0.01, \* p<0.05

Regression results from Table 4.8 attempt to examine the various factors which influence educational expenditure for both boys and girls. Moreover, we attempt to study how parental education influences the expenditure incurred on boys and girls, among other factors.

#### *Household Education:*

Results from models 1 to 4 reveal that both father's and mother's education have a positive and significant impact on educational expenditures for both boys and girls. For instance, the results of model 1 suggest that as maternal education increases by a year, educational expenditure on boys and girls on average, increases by ₹455 and ₹408 respectively. We consistently find that as more control variables are added to each subsequent model, with an additional year of mother's educational attainment, there is an increase in the child expenditures; however, the increment is greater for boys than for girls. Moreover, with an additional year of father's educational attainment, we witness an increase in the educational expenditure of boys and girls by ₹255 and ₹187 respectively. Comparing the impact of father's and mother's education on child expenditures, we find that increasing levels of mother's education leads to a higher increase in spending on education for both boys and girls compared to a corresponding increase in the levels of father's education. Thus, we may infer that maternal education has a greater role to play in influencing educational expenditures of both boys and girls. In factoring the role played by grandfather's education on child expenditures, we find that the paternal grandfather's education also has a positive and significant impact on child expenditures. For instance, for girls, an increase in grandfather's education by one year leads to an increase in her educational expenditure on an average by ₹280 while this increase in the amount is ₹205 for boys.



### *Household Characteristics:*

We find that as the number of male and female siblings increase, on an average there is a decrease in child educational expenditure. For instance, as the number of male siblings increase, the educational expense on average decreases by ₹365 for a boy and ₹297 for a girl. The result is consistent as we add more explanatory variables to our model. Thus, this confirms the Resource dilution hypothesis which suggests that as the number of children in a household increase, the resource spent on each child decreases.

Next, we find that when compared to a Hindu household, Muslim and Christian households spend less on the education of boys and girls. For boys and girls belonging to Muslim households, the expenditure is on average ₹425 and ₹677 lower when compared to boys and girls belonging to Hindu households. For Christian households, the same results hold true. For instance, for boys and girls, the expenditure is on average ₹760 and ₹116 lower when compared to boys and girls belonging to Hindu households. This expenditure decreases as we add more explanatory variables. Furthermore, we find that for a girl belonging to an 'Other Backward Caste', the expenditure on education is approximately ₹500 lower when compared to a girl who belongs to a Brahmin/Forward caste.

Similarly, the expenditure on education for a girl belonging to a Brahmin/Forward caste is almost ₹1000 higher when compared to a girl child who belongs to a Scheduled Caste. These results consistently hold valid across models 1 to 4. Thus, we find that there is an immense variation in gendered child expenditures across different social groups.

Household economic position captured in terms of the number of household assets also has a positive and significant impact on the child expenditures of both boys and girls with a higher increment for boys. For instance, for an additional asset in the household, the educational expense on average, on boys' and girls' increases by ₹418 and ₹340 respectively. Thus, we find that improvement in a household's economic position benefits boys more than girls.

### *School Characteristics:*

The type of school i.e., private or public turns out to be highly significant in our analysis. We find that the educational expense of boys and girls who study in government schools is on average ₹4,711 and ₹4,030 lower when compared to private schools. This could reflect the higher fee structure prevalent in private schools compared to government schools in India.

However, the costs of private schooling seem to be higher for boys than for girls. This indicates that parents who send their children to private schools also tend to spend, on average, lesser on the education of girls compared to boys. We also find that as school distance increases, the costs of education increase for both boys and girls significantly (but more so for girls). For instance, as school distance increases by 1 km, the expense on education increases on average by ₹281 for boys but by ₹340 for girls. Since parents have to spend more on the education of girls as school distance increases, we may infer that school distance acts as a disincentive for parents to send girls to schools which are farther from home.

#### *Regional Effects:*

As expected, the educational expenditure for boys and girls residing in an urban area on an average increase by almost ₹ 696 and ₹635 when compared to a child residing in a rural area. The reason could be the higher costs of education in urban areas compared to rural areas. Looking at region specific statistics, we find that when compared to boys and girls residing in the central states of India (Madhya Pradesh and Chhattisgarh), educational expenditure for boys and girls in northern states is higher by approximately ₹ 1227 and ₹ 973. The same holds true for the eastern states. However, we find opposite results for the southern and western states, the reasons for which can be analysed in future studies.

In order to estimate the extent of gender bias in the mean parental educational expenditure, we have divided the sample into two groups: Group 1 and Group 2. Group 1 represents average expenditure on education for boys while Group 2 represents average expenditure on education for girls. Group 1 is the mean educational expenditure incurred on boys and is ₹5042.16. Meanwhile Group 2 is the mean educational expenditure incurred on girls and is ₹ 4197.97. Applying the Oaxaca-Blinder decomposition technique, we find that there is a difference of approximately ₹862 between the mean expenditures of boys and girls. The difference in mean expenditures of boys and girls can be broken down into two components: the 'explained' and the 'unexplained' portion. From Table 4.9, we find that the coefficient of the first component which captures the endowment effect (explained effect) is ₹473.60 which means that of the total difference of ₹862, ₹473.60 variation in the mean expenditure is due to the differential impact of the explanatory variables between the two groups.

Table 4.10: Estimates of Oaxaca-Blinder decomposition

<b>Child Expenditure</b>	<b>Coefficients</b>	<b>Std. Err.</b>	<b>P&gt;z</b>
<b>Group 1</b>	5042.165	64.670	0.000***
<b>Group 2</b>	4179.975	63.682	0.000***
<b>Difference</b>	862.188	90.761	0.000***
<b>Endowments</b>	473.606	81.143	0.000***
<b>Coefficients</b>	423.213	101.443	0.000***

Source: IHDS-2 Dataset

Note: Significance Levels: \*\*\*  $p < 0.001$ , \*\*  $p < 0.01$ , \*  $p < 0.05$

The second component which measures the unexplained effect or coefficient effect quantifies the extent of the difference in the mean expenditure between Group 1 and Group 2 can be attributed to the different treatment on the same characteristics. In other words, this measures the ‘bias’ or ‘discrimination’ due to the gender of the child which is the basis of the difference between the two groups. Of the total difference, we observe that ₹423 is the coefficient term which captures the bias in mean educational expenditures of boys and girls.

Thus, we observe that there is a difference in the mean educational expenditures incurred on boys and girls with a higher mean educational expenditure incurred on boys which we find to be ₹862. While ₹473 is the amount of difference in expenditure due to the explanatory variables, ₹423 is the component of the difference in expenditures which exists due to a pro-male bias.

So far, we have examined whether there exists a gender bias in educational expenditure and find that higher educational expenditure has been incurred on the education of boys compared to girls by estimating different regression models. We have also attempted to determine the various factors which affect educational expenditures of both boys and girls and the role played by parental education in determining educational expenditures. We find that increasing levels of mother’s education increases educational expenditures for girls more than when compared to increasing levels of father’s education. In the next section, we attempt to study how parental education affects educational expenditures of boys and girls for different age groups. We take children belonging to three age brackets viz. 6-9 years, 10-14 years and 15-18 years and attempt to analyse the determinants of educational expenditures of boys and girls belonging to these age brackets.

Table 4.11: Estimates of OLS regression for boys and girls aged 6-9 years with “conditional expenditure incurred by parents” as dependent variable

	Model 1		Model 2		Model 3		Model 4	
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
<b>Mother's Education Level: Primary</b>	908.61*** (134.44)	818.50*** (142.84)	508.14*** (133.26)	323.83** (142.91)	351.8521*** (127.30)	311.73** (140.19)	367.05*** (126.17)	353.92** (141.14)
<b>Mother's Education Level: Secondary</b>	3562.25*** (252.98)	2927.79*** (197.32)	691.09*** (248.89)	398.64** (204.83)	546.0075** (244.18)	29.70 (206.01)	570.60** (245.93)	119.94 (200.09)
<b>Mother's Education Level: Bachelors</b>	8772.44*** (789.22)	7274.51*** (761.00)	4703.76*** (828.40)	4058.99*** (797.08)	3498.84*** (876.77)	2873.83*** (829.37)	3438.01*** (861.99)	2700.13*** (823.46)
<b>Mother's Education Level: Above Bachelors</b>	11764.24*** (1006.90)	11819.82*** (1334.59)	6919.18*** (1010.39)	8168.90*** (1252.45)	5834.17*** (1013.83)	6689.40*** (1277.71)	5768.87*** (1003.31)	6565.21*** (1268.42)
<b>Father's Education Level: Primary</b>	172.98 (144.06)	171.4789 (142.68)	425.71*** (143.87)	397.63*** (149.71)	300.78** (132.91)	259.61 (161.39)	355.17*** (134.22)	266.22* (162.56)
<b>Father's Education Level: Secondary</b>	1093.68*** (199.52)	930.38*** (188.11)	204.40 (202.98)	205.90 (204.79)	398.83** (201.24)	112.35 (231.30)	387.33* (200.70)	59.04 (230.53)
<b>Father's Education Level: Bachelors</b>	149.476*** (25.93)	116.44*** (24.37)	40.02 (24.49)	20.17 (23.03)	11.00 (22.85)	17.47 (22.66)	13.22 (22.59)	25.37 (23.14)
<b>Father's Education Level: Above Bachelors</b>	205.86*** (42.82)	185.97*** (43.79)	57.17 (41.38)	39.88 (38.71)	9.47 (39.65)	3.48 (37.40)	13.25 (39.46)	13.14 (37.03)
<b>Grandfather's Education</b>	169.58*** (30.62)	160.30*** (30.49)	74.20*** (28.85)	83.55*** (29.04)	51.65* (27.99)	71.95** (28.52)	50.44* (27.94)	63.31** (28.35)
<b>Male Siblings</b>			-326.80*** (54.71)	-197.80*** (54.001)	-284.25*** (51.75)	-189.45*** (51.22)	-256.75*** (51.98)	-157.03*** (53.66)
<b>Female Siblings</b>			-278.76*** (53.75)	-417.72*** (51.51)	-280.43*** (50.85)	-312.22*** (50.94)	-258.36*** (51.12)	-290.07*** (49.34)
<b>Muslim</b>			-472.38** (214.96)	-904.37*** (171.34)	-409.82*** (221.72)	-825.75*** (161.28)	-473.22** (224.41)	-914.64*** (166.84)
<b>Christian</b>			608.73 (736.23)	-211.78 (533.76)	324.10 (717.28)	-142.17 (531.95)	405.32 (707.62)	-232.26 (534.33)
<b>Other Religion</b>			-257.02 (585.27)	-220.66 (442.73)	-225.23 (541.01)	29.150 (405.76)	81.85 (540.88)	161.69 (402.35)
<b>OBC</b>			-311.08 (208.58)	-402.77* (213.03)	-428.05** (198.74)	-362.92* (205.41)	-181.24 (194.60)	-269.20 (201.80)
<b>SC</b>			-595.06** (235.60)	-1017.2*** (216.81)	-247.64 (261.18)	-560.90*** (199.52)	-189.90 (224.62)	-589.79*** (199.13)
<b>ST</b>			-387.19 (260.61)	-545.83** (251.53)	39.57 (240.44)	-175.59 (235.64)	132.71 (239.77)	-93.02 (235.61)
<b>Other Caste</b>			1350.89 (1050.77)	1471.00 (1017.89)	619.21 (1036.90)	620.44 (868.29)	1019.18 (1029.51)	713.41 (864.27)
<b>Household Assets</b>			379.46*** (16.22)	313.30*** (14.83)	228.84*** (16.18)	193.58*** (14.22)	212.57*** (17.48)	179.52*** (15.77)
<b>Agricultural Income</b>			226.09* (137.12)	-61.91 (160.32)	51.81 (125.37)	-99.73 (157.47)	325.01** (127.86)	84.40 (143.52)
<b>Salaried Income</b>			980.19*** (267.75)	343.55 (239.58)	770.14*** (253.95)	213.16 (227.48)	631.16** (248.74)	110.48 (226.04)
<b>Unorganized Business Income</b>			379.13 (238.46)	427.98* (245.55)	137.62 (222.17)	148.59 (232.08)	-10.23 (222.84)	109.31 (229.56)
<b>Other Income Sources</b>			634.52* (379.56)	232.38 (363.91)	212.79 (399.60)	-49.69 (393.33)	132.42 (392.45)	-59.86 (388.95)
<b>Men's Exposure to newspaper</b>					426.63 (48.95)	424.79*** (101.31)	438.56*** (50.13)	428.93*** (103.81)
<b>Women's Exposure to newspaper</b>					-80.90 (119.82)	-253.01*** (82.12)	9.041 (130.37)	-261.86*** (94.06)
<b>School Distance</b>					-73.57	-408.51***	-44.38	-345.43***

					(132.96)	(133.21)	(31.14)	(129.31)
Scholarship					676.00*** (186.30)	721.64*** (166.28)	680.67*** (187.53)	670.56*** (165.84)
School Type: Govt. School					-3677.64*** (145.62)	-3336.4*** (187.67)	-3691.0*** (164.15)	-3339.3*** (214.17)
School Type: Others					-2195.23*** (397.43)	-2156.6*** (342.28)	-1991.3*** (389.85)	-2015.7*** (356.20)
North							764.69*** (196.88)	679.60*** (186.11)
South							1309.29*** (190.22)	768.27*** (162.93)
West							-132.46 (233.19)	294.46 (226.71)
East							-1.97 (171.54)	-432.95** (190.55)
Urban							946.87*** (184.82)	527.50*** (163.85)

Source: IHDS-2 Dataset

Note: Significance Levels: \*\*\* p<0.001, \*\* p<0.01, \* p<0.05

Table 4.12: Estimates of OLS regression for boys and girls aged 10-14 years with “conditional expenditure incurred by parents” as dependent variable

	Model 1		Model 2		Model 3		Model 4	
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
Mother's Education Level: Primary	839.60*** (122.36)	810.26*** (98.72)	564.71*** (120.51)	303.71*** (93.45)	517.12*** (112.90)	399.40*** (82.99)	524.03*** (115.45)	426.41*** (83.26)
Mother's Education Level: Secondary	3200.46*** (227.63)	3042.17*** (188.29)	455.24** (211.82)	789.70*** (177.67)	243.72 (209.35)	490.93*** (168.94)	298.16 (221.47)	516.42*** (168.64)
Mother's Education Level: Bachelors	6017.86*** (587.48)	6043.59*** (502.74)	2348.23*** (566.74)	2959.42*** (461.62)	1458.91*** (547.28)	2037.84*** (440.63)	1392.48** (550.85)	1967.87*** (436.75)
Mother's Education Level: Above Bachelors	13785.45*** (1866.25)	10372.97*** (864.52)	9347.98*** (186.02)	6546.81*** (826.07)	8509.96*** (1881.45)	5640.86*** (800.55)	8391.43*** (1851.54)	5543.62*** (791.86)
Father's Education Level: Primary	49.57 (125.99)	23.58*** (97.46)	642.83*** (128.74)	475.66*** (97.59)	599.12*** (125.73)	250.77*** (83.32)	701.29*** (126.24)	291.65*** (83.23)
Father's Education Level: Secondary	1232.77*** (174.07)	726.22*** (144.99)	159.22 (170.94)	204.42 (135.04)	407.65** (172.89)	203.02* (124.96)	490.77*** (171.53)	226.83* (123.86)
Father's Education Level: Bachelors	188.32*** (24.49)	145.88*** (20.59)	70.45*** (23.57)	66.12*** (19.35)	26.23 (22.83)	35.50** (18.13)	19.01 (22.41)	33.58* (17.89)
Father's Education Level: Above Bachelors	319.25*** (57.76)	205.19*** (34.99)	155.93*** (51.63)	97.82*** (33.80)	68.15 (48.23)	58.05* (30.62)	68.76 (48.27)	62.30** (30.17)
Grandfather's Education	211.92*** (30.56)	199.97*** (22.40)	100.61*** (29.98)	107.76*** (21.07)	64.13** (29.94)	85.91*** (20.13)	52.41* (30.06)	72.40*** (19.77)
Male Siblings			-339.37*** (48.87)	-226.86*** (41.91)	-306.03*** (46.48)	-217.89*** (37.96)	-309.06*** (49.44)	-217.90*** (38.48)
Female Siblings			-257.42*** (55.21)	-397.18*** (34.67)	-297.08*** (52.28)	-334.01*** (31.02)	-299.81*** (51.23)	-320.34*** (31.63)
Muslim			-261.05 (217.39)	-347.62** (146.84)	-131.66 (214.46)	-333.38** (141.93)	-231.40 (215.84)	-449.30*** (142.56)

Christian			274.85 (612.39)	817.77 (541.04)	-248.22 (580.87)	145.29 (484.17)	-316.68 (571.31)	47.55 (485.39)
Other Religion			-408.14 (473.30)	-168.89 (330.79)	-250.10 (420.02)	-85.40 (293.36)	296.50 (420.23)	210.33 (294.37)
OBC			-613.56*** (224.63)	-555.96*** (146.55)	-545.88** (225.17)	-565.80*** (137.22)	-211.65 (217.08)	-395.85***  (134.44)
SC			-1255.44*** (208.78)	-853.52*** (163.38)	-626.23*** (210.31)	-416.25*** (157.48)	-543.05*** (204.08)	-401.37***  (154.48)
ST			-71.91 (251.67)	-246.94 (213.41)	220.023 (239.42)	-82.22 (192.91)	299.95 (235.38)	-48.84 (191.86)
Other Caste			-1403.75*** (476.99)	303.60 (570.41)	-1018.16** (470.42)	442.53 (499.09)	-278.32 (453.57)	760.95 (486.221)
Household Assets			397.58*** (14.88)	300.66*** (11.49)	266.95*** (14.13)	198.35*** (10.77)	266.86*** (15.53)	196.37*** (11.75)
Agricultural Income			466.82*** (119.88)	-80.14 (95.32)	143.51 (119.40)	-119.48 (90.40)	512.20*** (126.29)	164.80* (94.08)
Salaried Income			1215.49*** (221.52)	875.60*** (181.63)	1056.09*** (213.76)	725.38*** (168.81)	815.42*** (212.17)	494.04***  (167.69)
Unorganized Business Income			553.59*** (211.83)	456.87*** (180.03)	125.50 (197.94)	194.71 (164.00)	-75.43 (196.99)	-6.91 (163.96)
Other Income Sources			641.45* (348.53)	553.83* (289.53)	180.00 (327.73)	157.36 (290.86)	54.30 (323.65)	40.86 (286.59)
Men's Exposure to newspaper					346.02*** (50.54)	276.30*** (45.56)	353.17*** (51.19)	284.85*** (47.21)
Women's Exposure to newspaper					-297.27*** (84.86)	-264.21*** (70.68)	-334.24*** (94.81)	-316.26*** (82.98)
School Distance					-227.12* (120.20)	-182.00** (87.35)	-126.76 (116.27)	-112.08 (87.54)
Scholarship					785.54*** (153.94)	461.31*** (127.76)	791.63*** (150.74)	420.46*** (125.66)
School Type: Govt. School					-4334.13*** (139.12)	-3796.54*** (134.88)	-4394.88*** (147.09)	-3855.38*** (145.49)
School Type: Others					-3372.71*** (345.75)	-2920.03*** (237.28)	-2919.21*** (374.69)	-2839.27*** (245.06)
North							647.64*** (170.38)	720.88*** (132.12)
South							1551.72*** (182.87)	906.48*** (152.55)
West							-532.26** (212.55)	-204.86 (148.84)
East							-123.70 (160.95)	-437.01*** (125.19)
Urban							1537.91*** (171.72)	940.59*** (150.37)

Source: IHDS-2 Dataset

Note: Significance Levels: \*\*\* p<0.001, \*\* p<0.01, \* p<0.05

Table 4.13: Estimates of OLS regression for boys and girls aged 15-18 years with “conditional expenditure incurred by parents” as dependent variable

	Model 1		Model 2		Model 3		Model 4	
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
<b>Mother's Education Level: Primary</b>	1305.49*** (315.07)	953.02*** (355.11)	747.66** (322.52)	459.98 (350.22)	640.07** (303.89)	661.64* (358.39)	756.37** (303.48)	799.99** (352.85)
<b>Mother's Education Level: Secondary</b>	3881.14*** (477.95)	3263.91*** (512.90)	3238.96 (477.98)	3146.94 (531.51)	3334.47 (447.69)	3130.09 (575.63)	3181.84 (455.85)	3350.52 (629.69)
<b>Mother's Education Level: Bachelors</b>	7301.05*** (1072.02)	5074.64*** (1035.49)	2246.95** (1070.27)	1435.92 (1157.58)	1681.04 (1067.34)	177.43 (1210.43)	1488.58 (1079.18)	79.68 (1214.86)
<b>Mother's Education Level: Above Bachelors</b>	11913.55*** (2661.45)	13777.03*** (3057.77)	6015.08** (2598.51)	9912.80*** (3046.13)	5394.75** (2606.05)	7532.18*** (2829.46)	5227.73** (2602.45)	7210.93*** (2788.44)
<b>Father's Education Level: Primary</b>	254.82 (288.93)	278.13 (367.05)	776.27*** (289.49)	786.78* (420.26)	886.43*** (275.04)	612.73 (432.25)	871.43*** (2754.46)	614.42 (426.88)
<b>Father's Education Level: Secondary</b>	1702.46*** (377.61)	1083.98*** (428.41)	1600.57 (366.85)	1045.59 (486.14)	647.82* (356.38)	200.34 (513.34)	647.22* (356.29)	184.80 (512.59)
<b>Father's Education Level: Bachelors</b>	312.06*** (53.42)	205.39*** (41.17)	177.42*** (50.38)	97.51** (44.91)	98.82** (48.91)	52.58 (44.24)	97.18** (48.81)	49.89 (44.39)
<b>Father's Education Level: Above Bachelors</b>	554.42*** (104.35)	480.46*** (170.94)	360.63*** (98.73)	324.95** (163.46)	266.28*** (96.94)	255.37 (157.12)	271.12*** (96.68)	267.06* (156.73)
<b>Grandfather's Education</b>	195.79*** (57.72)	447.71*** (75.71)	19.74 (56.72)	298.55*** (71.74)	-24.37 (57.95)	266.70*** (69.03)	-37.83 (58.01)	258.89*** (70.20)
<b>Male Siblings</b>			-697.92*** (141.09)	-650.74*** (130.89)	-690.41*** (137.27)	-598.62*** (126.36)	-680.52*** (134.62)	-564.54*** (119.25)
<b>Female Siblings</b>			-447.70*** (139.51)	-526.36*** (135.91)	-415.40*** (134.34)	-397.41*** (137.64)	-392.96*** (132.35)	-322.27** (137.78)
<b>Muslim</b>			-918.93 (699.40)	-1570.87*** (560.94)	-731.30 (688.74)	-1388.06** (581.90)	-845.18 (686.65)	-1600.30*** (554.47)
<b>Christian</b>			-2510.84*** (906.91)	853.44 (1513.27)	-3645.43*** (951.13)	-335.09 (1515.04)	-3693.66*** (949.38)	-830.64 (1551.05)
<b>Other Religion</b>			148.14 (104.09)	263.26** (115.54)	102.58 (91.36)	233.24** (109.44)	66.11 (92.39)	172.40 (108.49)
<b>OBC</b>			-1251.86*** (477.84)	-141.73 (463.28)	-1376.43*** (493.29)	-548.14 (441.24)	-981.16** (480.89)	-275.70 (436.38)
<b>SC</b>			-2340.53*** (493.00)	-1290.80*** (444.84)	-1500.36*** (518.67)	-974.00** (421.96)	-1389.49*** (512.55)	-960.82** (424.38)
<b>ST</b>			-754.49 (716.87)	326.14 (558.00)	-212.32 (747.85)	373.10 (543.12)	-133.26 (742.45)	474.55 (543.49)
<b>Other Caste</b>			-75.78 (1785.35)	14758.14 (1292.36)	-69.51 (1715.86)	15565.31 (1388.89)	731.76 (1725.68)	15538.57 (1373.25)
<b>Household Assets</b>			561.80*** (34.35)	470.56*** (35.84)	406.18*** (33.00)	353.28*** (32.21)	421.99*** (34.67)	364.50*** (40.58)
<b>Agricultural Income</b>			555.11* (300.16)	-69.43 (483.57)	-43.82 (292.47)	-636.91 (558.03)	207.83 (307.95)	-484.26 (573.63)
<b>Salaried Income</b>			2327.04*** (534.11)	824.66 (763.25)	2020.68 (528.94)	753.02 (707.28)	1646.02*** (537.69)	549.94 (735.43)
<b>Unorganized Business Income</b>			-207.93 (485.23)	-650.82 (653.48)	-572.37 (469.86)	-525.23 (627.33)	-878.23* (485.41)	-588.15 (609.33)

Other Income Source			696.72 (681.83)	20.99 (943.84)	-15.09 (681.78)	-460.79 (878.42)	-310.42 (671.4)	-648.81 (880.10)
Men's Exposure to newspaper					204.18*** (37.12)	301.30*** (95.43)	213.85*** (37.59)	297.32*** (97.13)
Women's Exposure to newspaper					-567.42* (308.14)	-208.97 (580.97)	-455.00 (313.08)	-34.65 (591.18)
School distance					-28.46 (255.81)	-609.35** (246.01)	32.571 (257.81)	-432.86* (245.33)
Scholarship					750.55** (304.94)	953.18*** (310.21)	760.28** (300.69)	943.60*** (318.56)
School Type: Govt. School					-5990.32*** (348.09)	-4656.3*** (476.44)	-6291.05*** (355.11)	-5122.14*** (512.13)
School Type: Others					-8306.57*** (1360.88)	-2854.83* (1560.38)	-8726.02*** (1407.40)	-2862.93* (1543.65)
North							575.92 (423.54)	34.63 (715.80)
South							1599.68*** (482.26)	2194.97*** (375.06)
West							-128.76 (495.72)	1003.04* (587.44)
East							146.46 (437.90)	-368.57 (496.01)
Urban							2639.94*** (464.26)	2748.65*** (433.95)

Source: IHDS-2 Dataset \*

Note: Significance Levels: \*\*\* p<0.001, \*\* p<0.01, \* p<0.05

### *Household Education:*

For regression models whose results are presented in the above tables, we have categorized maternal and paternal education attainment levels in 4 groups – primary education, secondary education, bachelor's education and above bachelors' education. The reason for this exercise is to evaluate the impact of different levels of parental education on child expenditure.

For the age bracket 6-9 years, we find that as maternal education attainment levels increase from illiterate to above bachelors, the educational expenditure increases for both boys and girls. Model 1 reveals that households with mothers who have attained primary education spend on average approximately ₹910 and ₹820 more on educational expenses of boys and girls, respectively, when compared to the households in which mothers are illiterate. Similarly, households where mothers have attained an education of bachelors' level spend on average ₹8770 and ₹7275 more on the education of boys and girls respectively, when compared to households in which mothers are illiterate. Thus, we observe that with the increasing levels of maternal education, child expenditure significantly goes up for both boys and girls with a higher increment in educational expenditure for boys between ages 6-9 years. This result



consistently holds true across models 1 to 4. For paternal education, we find that the highest increase in child expenditures (for both girls and boys) is observed with an education attainment level of secondary education. Here, we find that compared to the households in which fathers are illiterate, households in which fathers attain secondary level education spend on average ₹1093 and ₹930 more on the education of boys and girls respectively. We observe that increasing educational levels of fathers is associated with a higher increase in educational expenditure for boys when compared to girls.

For ages 10- 14 years, we observe that compared to mothers who are illiterate, households with mothers who have attained a primary education spend on average ₹840 and ₹810 more on the education of boys and girls, respectively. The highest increase in educational expenditure (compared to the base category of illiterate mothers) is observed in the households in which mothers have an above bachelor's level education. Here, households decide to spend on average ₹13,785 and ₹10,372 more on the education of boys and girls, respectively. Increasing age brackets are associated with higher expenses, for both boys and girls. For ages 15- 18 years, we observe that compared to mothers who are illiterate, households in which mothers have attained a primary education spend on average ₹1300 and ₹953 more on the education of boys and girls, respectively. The highest increase in educational expenditure (compared to the base category of illiterate mothers) is observed in the households in which mothers have an above bachelor's level education. Here, households decide to spend on average ₹11,913 and ₹13,372 more on the education of boys and girls respectively. Thus, we observe that in the case of the most educated mothers, the rise in educational expenditure is greater for girls compared to boys, with a gender gap on educational expenditure running in favour of girls. For paternal education we observe that the highest increase in educational expenditure of boys and girls occurs as fathers attain a secondary level of education. For instance, when compared to fathers who are illiterate, households in which fathers have attained a secondary level of education spend on average ₹1702 and ₹1083 more on the education of boys and girls, respectively. Thus, we find that the increments in educational expenditure across all age groups and both genders are greater with rising levels of maternal education compared to paternal education. Analysing the impact of grandfather's educational attainment levels on child expenditure outcomes, as grandfather's educational attainment increases by a year, it leads to an increase in educational expenditures by ₹170 and ₹160 (for ages 6 to 9), ₹211 and ₹200 (for ages 10 to 14) and ₹196 and ₹448 (for ages 14-18) for boys and girls,

respectively. We find that increasing grandfather's education levels lead to more equitable increases in expenditures of both boys and girls in the age group of 6-9 years and 10-14 years.

#### *Household Characteristics:*

As male siblings increase in a household, child educational expenditure decreases by ₹327 and ₹198 (for ages 6-9 years), ₹340 and ₹227 (for ages 10-14 years) and ₹698 and ₹650 (for ages 14-18 years) for boys and girls respectively. With an increase in the age of the child, the extent of decline in educational expenditure also increases. The reason could be that educational costs increase with higher education. As the number of female siblings increase in a household, child educational expenditure decreases by ₹279 and ₹418 (for ages 6-9 years), ₹257 and ₹398 (for ages 10-14 years) and ₹448 and ₹526 (for ages 14-18 years) for boys and girls respectively. Thus, we observe that as the age bracket of a child increases, there is a greater decline in expenditure incurred. We analyse the educational expenditures across different social groups and find that compared to Hindu households, Muslim households on an average spend less on education of both boys and girls. For instance, compared to Hindu children, an amount of ₹472 and ₹904 (for ages 6-9 years), ₹261 and ₹348 (for ages 10-14 years) and ₹918 and ₹1571 (for ages 15-18 years) lesser is spent on the education of boys and girls respectively. Lower expenditures are observed for girls across all age groups. Considering the effect of caste on child educational expenditure, we find that for OBC households, when compared to Brahmin/Forward caste households, the expense is lower across all age groups. For instance, for ages 6-9 years, OBC households on average, spend approximately ₹311 and ₹403 lesser for boys and girls respectively. For ages 10-14 years, the figures are ₹613 and ₹556, and for ages 15-18 years they are ₹1252 and ₹1417 for boys and girls, respectively. For Scheduled Caste households, we find that compared to Brahmin/Forward caste households the educational expenditure on average is lower by ₹595 and ₹1017 (for ages 6-9 years), ₹1255 and ₹853 (for ages 10-14 years) and ₹2340 and ₹1290 (for ages 15-18 years) for boys and girls, respectively. We observe that as age brackets increase, fall in expenditure for both genders across caste groups declines. This fall in expenditure is higher for girls compared to boys. Furthermore, we find that as the economic position of a household increases, there are increases in educational expenditures for both genders with a higher increase in the favour of boys. For instance, for ages 6-9 years, we find that for an additional asset in the household, the expenditure on education on an average increases by ₹379 and ₹313 (for ages 6-9 years), ₹397 and ₹300 (for ages 10-14 years) and ₹561 and ₹470 (for ages 15-18 years) for boys and girls respectively. We also find that as the women in a

household are more frequently exposed to newspaper reading, child expenditures significantly increase for both the genders and across all age brackets.

#### *School Characteristics:*

School Distance: As school distance increases by 1 km, the expenditure on education increases by ₹424 for girls in the age group of 6-9 years, ₹346 and ₹276 (for ages 10-14 years) and ₹204 and ₹301 (for ages 15-18 years) for boys and girls respectively. There is no significant effect on the expenditure of boys in the age group of 6-9 years. Compared to public schools, private schools are associated with higher expenditure for both genders and all age groups. Parents who send their children to private schools spend on average ₹3,678 and ₹3336 (for ages 6-9 years), ₹4,334 and ₹3796 (for ages 10-14 years) and ₹5,990 and ₹4,656 (for ages 15-18 years) more compared to public schools on the education of boys and girls, respectively. We note that the increase in expenditures is higher for boys than for girls. Moreover, if a child receives scholarship from school, we find that the expenditure on education decreases by ₹81 and ₹253 (for ages 6-9 years), ₹297 and ₹264 (for ages 10-14 years) and ₹567 and ₹281 (for ages 15-18 years) for boys and girls, respectively.

#### *Regional Effects:*

We find that across all age brackets, urban households on average, spend more on educational expenditure of both boys and girls. Compared to rural areas, the educational expenditure incurred in urban areas significantly increase approximately by ₹765 and ₹680 (for ages 6-9 years) and ₹677 and ₹720 (for ages 10-14 years) for boys and girls respectively. However, the results are insignificant for children in the age bracket of 15-18 years. We also find that on average, compared to central India, households across northern and eastern states spend more on child educational expenditure.

## **4.6. Discussion**

Our results are consistent with Azam and Kingdon (2013) where they find that the existence of a pro-male bias in the educational expenditure for children in the 10-14 year and 15-19-year age bracket. We find that with increasing age, the educational expenditure of children increases. Moreover, the gender gap in educational expenditure also widens with age. We observe that boys have consistently higher expenditures than girls across all age groups and it is only in the first expenditure bracket that the proportion of girls (on which expenditure

incurred is less than ₹500) is higher compared to boys. For all other expenditure categories; we find that expenditure on education is biased in the favour of boys.

Moreover, we observe that higher household education levels are associated with higher expenditure on the education of children. For instance, as the education attainment levels of the mother and father rise by one year, on average the expenditure on the education of a child increases by Rs 433 and Rs 223 respectively. The reason could be attributed to positive externalities that familial education has. As the education level of the adults in the family increases, the family income may increase, thereby increasing the budget share of educational expenditure for the child. We observe that irrespective of the child gender, increasing levels of maternal and paternal education are associated with higher levels of child educational expenditures. However, increasing maternal educational levels lead to a larger increment in educational expenditures of both boys and girls compared to increasing levels of paternal education.

# Chapter 5

## Conclusion

## 5.1. Introduction

Our study “Gender Differential in Parental Investment in Education: A Study of the Factors Determining Children’s Educational Investment in India” attempts to gain an understanding of gender disparity in child educational outcomes. We investigate gender differences in enrolment outcomes and parental expenditure on education of children aged from 6-18 years at an all-India level using the India Human Development Survey (IHDS) 2011-2012 dataset.

Literature suggests that compared to girls, boys typically attend school for longer periods of time because of the following reasons: (a) boys have higher expected returns to education vis-à-vis girls or (b) the cost of education for boys is lesser or (c) it is possible that parents prefer to educate sons over daughters. Since women typically face more discrimination in the labour market in terms of lower earnings or employment opportunities, parents’ incentive to invest in their education may decline.

In this context, our research attempts to delve deeper into questions such as how do socio-economic factors and school characteristics affect the enrolment outcomes and parental expenditure on education of children? Is there a gender bias in these outcomes and if so, how do maternal and paternal education play a role in influencing these outcomes? Which of the two play a larger role in affecting educational expenditure outcomes of children? In order to achieve the desired objectives of the study, we use the logit model to detect gender bias in enrolment. Moreover, we use an OLS regression and Oaxaca-Blinder decomposition analysis to detect the existence and extent of gender bias in parental investment by utilizing all-India individual-level data.

## 5.2. Empirical Findings

Our study finds the following results for enrolment outcomes which have been summarised here. *First*, we find that as age of a child increases the likelihood of his or her enrolment in school reduces. With an increase in age, the likelihood of enrolment for both boys and girls decreases, however, the reduction is more for girls. This may be true because as children get older, they become more likely to drop out of their schools or colleges to join alternative employment opportunities or stay at home to do household chores. *Second*, enrolment is highest for children belonging to Brahmin/Forward Caste and the lowest for

children belonging SC and ST castes since these children may have an “intrinsic disadvantage” and thus a lower chance of going to school. Moreover, we find that irrespective of the caste category; the proportion of a boy getting enrolled in a school is higher vis-à-vis a girl. The gender gap is the least for Brahmin/Forward caste children and the highest for children belonging to an ‘Other Backward Caste’ followed by children belonging to Scheduled Tribes. Among religious groups, children belonging to Christian communities have the highest enrolment followed by Hindu children while Muslim children have the lowest enrolment. *Third*, an increase in school distance, reduces the likelihood of enrolment for both boys and girls, with the reduction being more for girls. Interestingly, a child belonging to a rural household is more likely to be enrolled compared to a child belonging to an urban household. *Fourth*, we find that compared to boys, girls are less likely to be enrolled in a household and the existence of gender bias in enrolment is observed even as more control variables are added to our model. *Fifth*, while both maternal and paternal education reduce the gender gap in enrolment, maternal education turns out to be more impactful for the enrolment outcomes of girls as compared to the enrolment outcomes of boys. It also plays a more significant role in reducing gender bias in enrolment compared to paternal education. Our results are partly in accordance with Pal (2004) where she finds that “paternal and maternal education significantly encourages boys’ and girls’ enrolment and in a differential manner: while father’s education favorably affects boys’ schooling, mother’s education is essential for girls’ schooling only” (Pal, 2004). *Sixth*, in comparison to boys, the likelihood of girls enrolling is approximately 1.8 and 1.5 percentage points lower in the poorest and poorest households. Furthermore, compared to boys, girls are less likely to enrol in school in ‘middle’ households. For example, the probability of a girl enrolling is 3.2 percentage points lower than that of boys for ‘middle’ households. The enrolment gap between boys and girls narrows for the ‘richer’ and ‘richest’ households. *Seventh*, the gender gap in enrolment is higher in private schools vis-à-vis public schools.

Furthermore, we present the results of parental investment in educational expenditure. *First*, on average, the expenditures incurred on the education of a girl is lower by about approximately ₹1000 when compared to a boy. *Second*, increasing levels of mother’s education leads to a higher increase in spending on education for both boys and girls compared to a corresponding increase in the levels of father’s education. Thus, we may infer that maternal education has a greater role to play in influencing educational expenditures of both boys and girls. Increasing maternal education across all consumption quintiles significantly and

positively impacts child educational expenditures while the father's education only has a significant and positive impact on child educational expenditures in the highest consumption category. *Third*, we find that there is an immense variation in gendered child expenditures across different social groups. When compared to a Hindu household, Muslim and Christian households spend less on the education of boys and girls. The expenditure incurred on education for a girl belonging to a Brahmin/Forward caste is almost ₹1000 higher when compared to a girl child who belongs to a Scheduled Caste. *Fourth*, we find that improvement in a household's economic position benefits boys more than girls. *Fifth*, parents who send their children to private schools also tend to spend, on average, lesser on the education of girls compared to boys. We also find that as school distance increases, the costs of education increase for both boys and girls significantly (but more so for girls).

Our results have meaningful implications for policy purposes. While we recognise that supply side factors such as school characteristics are influential in reducing gender bias in education, our findings suggest that demand side factors also play an important role. Our findings reveal that maternal education is significant in improving educational outcomes of girls, perhaps more so than paternal education. Thus, education policies can incorporate measures which pertain to educating women, making them more well informed and thereby improving their decision making abilities in the household.

### **5.3. Limitations and Scope for Future Studies**

Some noteworthy data challenges warrant discussion. *First*, we have used the variable we use the variable 'Highest Female Adult Education' and 'Highest Male Adult Education' as a proxy for the child's father's and mother's educational attainment level, respectively. These variables represent the educational attainment level of the adult male and female members in the household who have received the highest education level amongst all adult members. Proxy variables have been used in the analysis, since the highest education level of an adult is highly correlated to parental education in a household. *Second*, we have restricted our sample size to children in the age group of 6-18 years and have not been able to study gender bias in higher education. *Third*, for future studies, the effect of parental employment, and particularly, maternal employment on educational outcomes of children can be analysed. *Fourth*, the IHDS-2 contains data on gender relations which provide information on decision making power and



empowerment of women within a household. Using this, future studies can examine the impact of mothers' gender empowerment measure on gender bias in educational outcomes of children. Fifth, multigenerational effects of education can be analysed, where the impact of grandparents' education can be examined on the educational outcomes for the third generation.

### Select Bibliography and References

- Acharya, D. R., Bell, J. S., Simkhada, P., Van Teijlingen, E. R., and Regmi, P. R. (2010). 'Women's Autonomy in Household Decision-making: A Demographic Study in Nepal.' *Reproductive Health*, 7(1), 15.
- Adhikari, R., and Sawangdee, Y. (2011). 'Influence of Women's Autonomy on Infant Mortality in Nepal.' *Reproductive Health*, 8(1), 7.
- Agarwal, Bina (1988). *Structures of Patriarchy*. London: Zed Books
- Allendorf, K. (2007). 'Do Women's Land Rights Promote Empowerment and Child Health in Nepal?' *World Development*, 35(11), 1975-1988.
- ASER Centre. (2017). *Annual Status of Education Report (Rural) 2016*. New Delhi: ASER Centre.
- 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.
- Basu, A. M., and Basu, K. (1991). 'Women's Economic Roles and Child Survival: The Case of India.' *Health Transition Review*, 83-103.
- Becker, G., Murphy, K. M., and Spenkuch, J. L. (2016). 'The Manipulation of Children's Preferences, Old-age Support, and Investment in Children's Human Capital.' *Journal of Labor Economics*, 34(2).
- Becker, G., & Lewis, H. (1973). 'Interaction between quantity and quality in children'. *Journal of Political Economy*, 81(Suppl.), 279-288.
- Becker, G., and Tomes, N. (1976). 'Child Endowments and the Quantity and Quality of Children.' *Journal of political Economy*, 84(4, Part 2), S143-S162.
- Becker, G. S., Murphy, K. M., & Tamura, R. (1990). Human Capital, Fertility, and Economic Growth. *Journal of Political Economy*, 98(5), S12-S37.
- Bhan, G., Bhandari, N., Taneja, S., Mazumder, S., Bahl, R., and Zinc Study, G. (2005). 'The Effect of Maternal Education on Gender Bias in Care-Seeking for Common Childhood Illnesses.' *Social Science and Medicine*, 60(4), 715-724.
- Bhatkal, T. (2017). 'Gender Bias in the Allocation of Education Expenditure: Evidence from Andhra Pradesh, India.'
- Bhatty, K. (2014). 'Review of Elementary Education Policy in India: Has it Upheld the Constitutional Objective of Equality?' *Economic and Political Weekly*, 49(43 and 44), 100-107.
- Blake, J. (1981). Family Size and the Quality of Children. *Demography*, 18(4), 421-442.

- Blinder AS (1973). "Wage Discrimination: Reduced Form and Structural Estimates." *Journal of Human Resources*, 8(4), 436–455.
- Bloom, S. S., Wypij, D., and Das Gupta, M. (2001). 'Dimensions of Women's Autonomy and the Influence on Maternal Health Care Utilization in a North Indian city.' *Demography*, 38(1), 67-78.
- Bolzendahl, C. I., and Myers, D. J. (2004). 'Feminist Attitudes and Support for Gender Equality: Opinion Change in Women and Men, 1974–1998.' *Social forces*, 83(2), 759-789.
- Borooah, Vani K and Sriya Iyer, (2005). 'Vidya, Veda and Varna: The Influence of Religion and Caste on Education in Rural India.' *The Journal of Development Studies*, 81(4): 1369–1404.
- Bourne, K. L., and Walker, J. G. M. (1991). 'The Differential Effect of Mothers' Education on Mortality of Boys and Girls in India.' *Population Studies*, 45(2), 203-219.
- Bryant, A. N. (2003). 'Changes in Attitudes Toward Women's Roles: Predicting Gender-role Traditionalism among College Students.' *Sex roles*, 48(3-4), 131-142.
- Cameron, A., and Trivedi, P., K. (2008). *Microeconometrics: Methods and Applications*. Cambridge: Cambridge Univeristy Press.
- Chakraborty, P., and Anderson, A. K. (2011). 'Maternal Autonomy and Low Birth Weight in India.' *J Women's Health (Larchmt)*, 20(9), 1373-1382.
- Chaudhuri, K., and Roy, S. (2006). 'Do Parents Spread Educational Expenditure Evenly across the Two Genders Evidence from Two North Indian States.' *Economic and Political Weekly*, 51(41), 5276-5282.
- Corrigall, E. A., and Konrad, A. M. (2007). 'Gender Role Attitudes and Careers: A Longitudinal Study.' *Sex roles*, 56(11-12), 847-855.
- Cragg, John G. (1971). 'Some Statistical Models for Limited Dependent Variables with Application to the Demand for Durable Goods.' *Econometrica*. 39 (5): 829–844.
- Crosen, R., and Gneezy, U. (2009). 'Gender Differences in Preferences.' *Journal of Economic Literature*, 47(2), 448-474.
- Cunningham, M. (2005). 'Gender in Cohabitation and arriage: The influence of gender ideology on housework allocation over the life course.' *Journal of Family Issues*, 26(8), 1037-1061.
- Das Gupta, M. (1987). Selective discrimination against female children in rural Punjab, India. *Population and Development Review*, 13(1), 77–100.
- Das Gupta, M. (1983). 'Selective Discrimination against Female Children in Rural Punjab, India.' *Population and Development Review*, 13(1), 77-100.

- Das Gupta, M., Zhenghua, J., Bohua, L., Zhenming, X., Chung, W., and Hwa-Ok, B. (2003). 'Why is Son Preference So Persistent in East and South Asia? A Cross-Country Study of China, India and the Republic of Korea.' *Journal of Development Studies*, 40(2), 153-187.
- Davis, S. N., and Greenstein, T. N. (2009). 'Gender ideology: Components, predictors, and consequences.' *Annual Review of Sociology*, 35(1), 87-105.
- Deaton, A. (1989). 'Looking for Boy-Girl Discrimination in Household Expenditure Data.' *The World Bank Economic Review*, 3(1):1-15.
- Desai, S., Dubey, A., Vanneman, R., & Banerji, R. (2008, June). Private schooling in India: A new educational landscape. In *India Policy Forum* (Vol. 5, No. 1, pp. 1-58). Global Economy and Development Program, The Brookings Institution.
- Desai, S., & Dubey, A. (2012). Caste in 21st century India: Competing narratives. *Economic and political weekly*, 46(11), 40.
- Desai, S., and Jain, D. (1994). 'Maternal Employment and Changes in Family Dynamics: The Social Context of Women's Work in Rural South India.' *Population and Development Review*, 20(1), 115-136.
- Desai, S., and Kulkarni, V. (2008). 'Changing Educational Inequalities in India in the Context of Affirmative Action.' *Demography*, 45(2), 245-270.
- Desai, S., and Vanneman, R. (2012). *India Human Development Survey-II (IHDS-II), 2011-12*.
- Desai, S., and Vanneman, R. (2015). *India Human Development Survey II User Guide*. College Park, MD: University of Maryland.
- Desai, S., Vanneman, R., and National Council of Applied Economic Research, N. D. (2005). *India Human Development Survey (IHDS), 2005*.
- Desai, S., Vanneman, R., and National Council of Applied Economic Research, N. D. (2008). *India Human Development Survey (IHDS), 2005: Weighting and other study documentation*. College Park, MD: University of Maryland.
- Downey, D. B. (1995). 'When Bigger is Not Better: Family Size, Parental Resources, and Children's Educational Performance.' *American sociological review*, 746-761.
- Drèze, Jean, and Geeta Gandhi Kingdon. 2001. 'School Participation in Rural India.' *Review of Development Economics* 5 (1): 1-24.
- Duflo, E. (2012). 'Women empowerment and economic development.' *Journal of Economic Literature*, 50(4), 1051-1079.
- Duncan, T. (1994). 'Like father, like son; like mother, like daughter: Parental resources and child height.' *Journal of Human Resources*, 29(4), 950-988.
- Dyson, T., and Moore, M. (1983). 'On kinship structure, female autonomy, and demographic Behavior in India.' *Population and Development Review*, 9(1), 35-60.

- Ebenstein, A. (2013). *Why do parents abort girls? Patrilocality and its historical origins*. Hebrew University of Jerusalem.
- Eccles and Davis-Kean (2005), 'Influences of parents' education on their children's educational attainments: the role of parent and child perceptions.' *London Review of Education*, Vol.3, No.3, November 2005, pp. 191-204
- Filmer, D. and Schady, N. (2006), 'Getting Girls into School: Evidence from a Scholarship Program in Cambodia', Human Development Sector Reports, No. 38727-KH, Washington: World Bank.
- Ganatra, B., Hirve, S., and Rao, V. N. (2001). 'Sex-Selective Abortion: Evidence from a Community-Based Study in Western India.' *Asia Pacific Population Journal*, 16(2).
- Ganji, N. (2019). Male-female wage differentials in the San Francisco Bay Area.
- 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(1), 63-87.
- Hlavac, M. (2014). *oaxaca: Blinder-Oaxaca decomposition in R*.
- Hobcraft, J. (1993). 'Women's Education, Child Welfare and Child Survival: A Review of the Evidence.' *Health Transition Review*, 159-175.
- Huisman, AHM., Rani, U., and Smits, JPJM. (2010). 'School Characteristics, Socio-Economic Status and Culture as Determinants of Primary School Enrolment in India.'
- Jensen, R. (2012). 'Do Labor Market Opportunities Affect Young Women's Work and Family Decisions? Experimental Evidence from India.' *The Quarterly Journal of Economics*, 127(2), 753-792.
- Jha, P., Kesler, M. A., Kumar, R., Ram, F., Ram, U., Aleksandrowicz, L., . . . Banthia, J. K. (2011). 'Trends in Selective Abortions of Girls in India: Analysis of nationally representative birth histories from 1990 to 2005 and census data from 1991 to 2011.' *The Lancet*, 377(9781), 1921-1928.
- Jha, P., and Parvati, P. (2010). 'Right to Education Act 2009: Critical Gaps and Challenges.' *Economic and Political Weekly*, 45(13), 20-23.
- Kabeer, N. (2000a). 'Inter-generational Contracts, Demographic Transitions and the 'Quantity-Quality' Trade-off: Parents, Children and Investing in the Future.' *Journal of International Development*, 12(4), 463-482.
- Kabeer, N. (2000b). 'Resources, Agency, Achievements, Reflections on the Measurement of Women's Empowerment.' *Development and Change*, 30, 435-464.
- Kambhampati, U. S. (2009). 'Child schooling and Work Decisions in India: The role of household and regional gender equity.' *Feminist Economics*, 15(4), 77-112.

- Kandiyoti, D. (1988). 'Bargaining with Patriarchy.' *Gender and Society*, 2: 274–289.
- Karlson, K. B., Holm, A., and Breen, R. (2012). 'Comparing Regression Coefficients between Same-Sample Nested Models using Logit and Probit.' *Sociological Methodology*, 42(1), 286-313.
- Kaul, T. (2018). 'Intra-household Allocation of Educational Expenses: Gender Discrimination and Investing in the Future.' *World Development*, 104, 336-343.
- Kingdon, G. G. (2002). 'The Gender Gap in Educational Attainment in India: How Much Can Be Explained?' *Journal of Development Studies*, 39(2), 25-53.
- Kingdon, G. G. (2005). 'Where Has All The Bias Gone? Detecting Gender Bias in the Intra-household Allocation of Educational Expenditure.' *Economic Development and Cultural Change*, 3(52), 409-451.
- Kingdon, G. G. (2007). 'The Progress of School Education in India.' *Oxford Review of Economic Policy*, 23(2), 168-195.
- Kingdon, G. G. (2017). 'The Private Schooling Phenomenon in India: A Review.' *Centre for the Study of African Economies*.
- Kingdon, G. G., and Theopold, N. (2008). 'Do Returns to Education Matter to Schooling Participation? Evidence from India.' *Education Economics*, 16(4), 329-350.
- Kishor, S., and Subaiya, L. (2008). 'Understanding Women's Empowerment: A Comparative Analysis of Demographic and Health Surveys (DHS) Data.' Calverton, Maryland: Macro International Inc; Comparative Reports No. Oct. 2008.
- Klasen, S., and Pieters, J. (2015). 'What Explains the Stagnation of Female Labor Force Participation in Urban India?' *The World Bank Economic Review*, 29(3), 449-478.
- Klein, E. (1994). 'Gender politics.' Cambridge, MA: Harvard University.
- Kumar, V., and Maral, P. (2015). 'Involvement in decision making process: Role of non-working and working women.' *Journal of Psychosocial Research*, 10(1), 73.
- Lancaster, G., Maitra, P. and Ray, R. (2003) 'Endogenous Power, Household Expenditure Patterns, and New Tests of Gender Bias: Evidence from India.' Technical Report Discussion Paper no. 20/03, Department of Economics, Monash University.
- Lancaster, G., Maitra, P., and Ray, R. (2008). 'Household Expenditure Patterns and Gender Bias: Evidence from Selected Indian States.' *Oxford Development Studies*, 36(2), 133-157.
- Maithreyi, R., and Sriprakash, A. (2018). 'The Governance of Families in India: Education, Rights and Responsibility.' *Comparative Education*, 1-18.

- Maitra, Pushkar, and Anurag Sharma. 2009. 'Parents and children: Education across generations in India.' 5th annual conference on economic growth and development, ISI Delhi, Delhi.
- Malhotra, C., Malhotra, R., Ostbye, T., and Subramanian, S. V. (2014). 'Maternal Autonomy and Child Health Care Utilization in India: Results from the National Family Health Survey.' *Asia Pac J Public Health*, 26(4), 401-413.
- Mehrotra, S. (2012). 'The Cost and Financing of the Right to Education in India: Can we Fill The Financing Gap?' *International Journal of Educational Development*, 32(1), 65-71.
- Ministry of Human Resource Development. (1992). *National policy on education 1986*. Delhi: Government of India.
- Ministry of Human Resource Development. (2017). *Annual report 2015-16*. New Delhi: Government of India.
- Ministry of Statistics and Program Implementation. (2015). 'Key Indicators of social consumption in India: Education.' New Delhi: Government of India.
- Ministry of Statistics and Program Implementation. (2017). 'Women and Men in India.'
- Mohapatra, S., and Luckert, M. K. (2012). 'Uncertain Educational Returns in a Developing Economy.' *International Journal of Educational Development*, 32(4), 590-599.
- Mood, C. (2010). 'Logistic regression: Why We Cannot Do What We Think We Can Do, and What We Can Do About It.' *European Sociological Review*, 26(1), 67-82.
- Moore, L. M., and Vanneman, R. (2003). 'Context Matters: Effects of the Proportion of Fundamentalists on Gender Attitudes.' *Social forces*, 82(1), 115-139.
- Mullahy, John (1986). 'Specification and testing of some modified count data models.' *Journal of Econometrics*. 33 (3): 341-365.
- Muralidharan, K., and Sundararaman, V. (2015). 'The Aggregate Effect of School Choice: Evidence from a Two-Stage Experiment in India.' *The Quarterly Journal of Economics*, 130(3), 1011-1066.
- Nanwani, D. (2017). 'Right to education.' *Economic and Political Weekly*, 52(31), 21-25.
- National Council of Education Research and Training. (2014). 'National Achievement Survey, Class III (Cycle 3), 2012-13.' New Delhi: NCERT.
- National University of Education Planning and Administration. (2016). 'School Education in India.' New Delhi: NEUPA.
- Oaxaca RL (1973). "Male-Female Wage Differentials in Urban Labor Markets." *International Economic Review*, 14(3), 693-709.

- Pitt, M.M., Khandker, S.R., Chowdhury, O.H. and Millimet, D.L. (2003). ‘*Credit programs for the poor and the health status of children in rural Bangladesh.*’ *International Economic Review*, 44(1): 87–118.
- Puri, S., Adams, V., Ivey, S., and Nachtigall, R. D. (2011). ‘There is Such a Thing as Too Many Daughters, But Not Too Many Sons’: A Qualitative Study of Son Preference and Foetal Sex Selection Among Indian Immigrants in the United States.’ *Social Science and Medicine*, 72(7), 1169-1176.
- Rahman, L., and Rao, V. (2004). ‘The Determinants of Gender Equity in India: Examining Dyson and Moore's Thesis with New Data.’ *Population and Development Review*, 30(2), 239-268.
- Rammohan, A., and Vu, P. (2017). ‘Gender Inequality in Education and Kinship Norms in India.’ *Feminist Economics*, 24(1), 142-167.
- Rose, E. (1999) Consumption smoothing and excess female mortality in rural India, *The Review of Economics and Statistics*, 81, pp. 41–49.
- Rosenzweig, M. R., and Wolpin, K. I. (1994). ‘Are There Increasing Returns to the Intergenerational Production of Human Capital? Maternal Schooling and Child Intellectual Achievement.’ *The Journal of Human Resources*, 29(2), 670-693.
- Saha, A. (2013). ‘An Assessment of Gender Discrimination in Household Expenditure on Education in India.’ *Oxford Development Studies*, 41(2), 220-238.
- Sahn, David E. & Alderman, Harold, 1988. ‘The Effects of Human Capital on Wages, and the Determinants of Labor Supply in a Developing Country,’ *Journal of Development Economics*, Elsevier, vol. 29(2), pages 157-183, September.
- Sahoo, S. (2016). ‘Intra-household Gender Disparity in School Choice: Evidence from Private Schooling in India.’ *The Journal of Development Studies*, 53(10), 1714-1730.
- Sandberg, J., and Rafail, P. (2013). ‘Measurement Models of Women’s Autonomy using the 1998/1999 India DHS.’ *Journal of Population Research*, 30(4), 367-381.
- Sen, A. K. 2000 (1999). *Development as freedom*. New York: Anchor Books .
- Shroff, M., Griffiths, P., Adair, L., Suchindran, C., and Bentley, M. (2009). ‘Maternal Autonomy is Inversely Related to Child Stunting in Andhra Pradesh, India.’ *Matern Child Nutr.*, 5(1), 64-74.
- Shroff, M., Griffiths, P. L., Suchindran, C., Nagalla, B., Vazir, S., and Bentley, M. E. (2011). ‘Does Maternal Autonomy Influence Feeding Practices and Infant Growth in Rural India?’ *Soc Sci Med*, 73(3), 447-455.
- Sikdar, S., & Mukherjee, A. N. (2012). ‘Enrolment and Dropout Rate in School Education.’ *Economic and Political Weekly*, 47(1), 27–31.



- Smits, J., and Hoşgör, A. G. (2006). 'Effects of Family Background Characteristics on Educational Participation in Turkey.' *International Journal of Educational Development*, 26(5), 545-560.
- Song, L., Appleton, S., and Knight, J. (2006). 'Why Do Girls in Rural China have Lower School Enrollment?' *World Development*, 34(9), 1639-1653.
- Srivastava, P. (2008). 'School choice in India: Disadvantaged groups and low-fee private schools.' United Kingdom: Symposium Books.
- Srivastava, P., and Noronha, C. (2016). 'The Myth of Free and Barrier-Free Access: India's Right to Education Act—Private Schooling Costs and Household Experiences.' *Oxford Review of Education*, 42(5), 561-578.
- StataCorp (2015). Stata Base Reference Manual, Release 14.
- Strauss, J. and Thomas D. (1995) 'Human Resources: Empirical Modeling of Household and Family Decisions.' *Handbook of Development Economics*, Elsevier, Amsterdam, 3A, 1883-2023.
- Subaiya, L., and Vanneman, R. (2016). 'The Multi-Dimensionality of Development and Gender Empowerment: Women's Decision Making and Mobility in India.'
- Subramanian, S., Deaton, A. (1990) 'Gender Effects in Indian Consumption Patterns.' Discussion Paper no.147, Research Program in Development Studies, Woodrow Wilson School, Princeton University.
- Subramaniam, S (1995): '*Gender Discrimination in Intra-Household Allocation in India*' mimeo, Department of Economics, Cornell University.
- Sundaram, A., and Vanneman, R. (2008). 'Gender Differentials in Literacy in India: The Intriguing Relationship with Women's Labor Force Participation.' *World Development*, 36(1), 128-143.
- Tallichet, S. E., and Willits, F. K. (1986). 'Gender-Role Attitude Change of Young Women: Influential Factors from a Panel Study.' *Social Psychology Quarterly*, 219-227.
- Tilak, J. B. G. (2012). 'Higher Education Policy in India in Transition.' *Economic and Political Weekly*, 47(13), 36-40.
- Thomas, D. (1992). '*Gender differences in household resource allocations.*' Living Standards Measurement Working Paper No. 79, World Bank, Washington, DC.
- UNESCO, (2008). Education for All by 2015: Will we make it? Paris: UNESCO.
- UNESCO, (2010). *Education For All Global Monitoring Report 2010: Reaching the Marginalized*. Paris: UNESCO.
- UNESCO Institute for Statistics. (2016). 'Estimating the Number of Out-of-School Children: Methodological Problems and Alternative Approaches.'

- Velaskar, P. (2010). 'Quality and Inequality in Indian Education: Some Critical Policy Concerns.' *Contemporary Education Dialogue*, 7(1), 58-93.
- Vikram, K., Vanneman, R., and Desai, S. (2012). 'Linkages between Maternal Education and Childhood Immunization in India.' *Soc Sci Med*, 75(2), 331-339.
- World Bank (2006). 'World Development Report 2007: Development and the Next Generation.' Washington: The World Bank.
- Woodhead, M., Frost, M., and James, Z. (2013). 'Does Growth in Private Schooling Contribute to Education for all? Evidence from a Longitudinal, Two Cohort Study in Andhra Pradesh, India.' *International Journal of Educational Development*, 33(1), 65-73.
- Woolridge, J.,M. (2012). 'Introductory Econometrics: A Modern Approach.' Mason, Ohio: South Western Cengage Learning
- Zhang, Y., Kao, G., and Hannum, E. (2007). 'Do Mothers in Rural China Practice Gender Equality in Educational Aspirations for Their Children?' *Comparative Education Review*, 51(2), 131-157.
- Zimmermann, L. (2012). 'Reconsidering Gender Bias in Intrahousehold Allocation in India.' *Journal of Development Studies*, 48(1), 151-163.

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This certificate is awarded to Prof/Dr./Sri/Smt. **Saumya Kumar** of *Center for the Study of Regional Development of Jawaharlal Nehru University* for successfully presenting her/his paper on 'Gender Differential in Parental Investment in Education: A Study of the Factors Determining Children's Educational Investment in India' held online from **27<sup>th</sup> – 29<sup>th</sup> September 2021**

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