Gender Discrimination in Education Expenditure in Nepal: Evidence from Living Standards Surveys

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There is a significant amount of literature on the role of parental gender preferences in determining the level of education expenditure for children. In this study, I examine the effects of such preferences on parents' education expenditure in Nepal. Using longitudinal data from three Nepal Living Standards Surveys, I apply several decomposition methods to determine the level of bias that parents display in spending on their children's education. I find that parents indeed spend more on boys than girls in both rural and urban areas in Nepal. I also find that this bias is reflected in the higher enrollment levels of boys than girls in private schools.

Keywords: decomposition, education expenditure, gender discrimination, household decisions, Nepal Living Standards Surveys
JEL codes: H52, I24

I. Introduction

Nepal has made remarkable progress in achieving a degree of gender parity in the field of education. Net enrollment rates have achieved parity at all levels of schooling, reflecting the government's success in ensuring the equal participation of girls in schools. However, while improvements in enrollment rates are a positive first step, this does not imply gender parity in the education sector. Various forms of discrimination—such as the reproduction of discriminatory norms in the process of socialization and in the classroom (e.g., a curriculum that favors traditional gender roles), encouragement for continuing traditional course selection (Collins 2009), and at times outright discriminating behavior—have been observed in schools (Hickey and Stratton 2007, Bandyopadhyay and Subhramaniam 2008). At the household level as well, girls are expected to spend more time on chores rather than on education (Mason and Khandker 1996, Levison and Moe 1998); are more likely to drop out of school (Sabates et al. 2010); and are less likely to continue their

education at higher levels. Another form of household discrimination, which forms the topic of this study, is differential treatment in education expenditure in which parents spend more on boys' education than they do on girls' education.

Gender parity is a basic precondition for a just and equitable society. Arguments for gender equality also go beyond reasons of justice and equality. Empowering women is crucial for the socioeconomic development of any country. Studies report that higher levels of education in women lead to higher economic growth (Coulombe and Tremblay 2006); reductions in child and infant mortality rates (Cochrane 1982, LeVine 1987); and better outcomes for all children in the family (Schultz 1961; Alderman and King 1998; Strauss, Mwabu, and Beegle 2000). Yet, despite governments promoting the participation of women in schooling and education, societies continue to observe disparities in women's access to education and the labor force. The feminist movement attributes this phenomenon to (i) the existing sexual division of labor that assigns women to domestic tasks; and (ii) men's control over women's sexuality, which includes strict supervision of movements outside the home and limits on societal interactions (Stromquist 1992). Economic models explain that such disparities arise out of differential parental preferences (assuming parents to be rational economic agents) due to differences in children's cognitive endowment, birth order, and (more importantly) variations in expected returns on investment between boys and girls (Behrman, Pollak, and Taubman 1982; Lehmann, Nuevo-Chiquero, and Vidal-Fernandez 2012).

In Nepal, societal norms dictate that women after a certain age are married away. Additionally, patriarchy is pervasive in Nepal's legal and socioeconomic environments, a fact substantiated by the widespread inequality observed in legal outcomes (Nowack 2015); wealth (Bhadra and Shah 2007); employment opportunities (ADB 2010, Bhadra and Shah 2007); and education (UNESCO 2015). The incentives for parents to pay for girls' education are lower compared with boys not only because women are likely to face unequal opportunities in the labor force, but also because boys are expected to look after their parents and the family estate when the parents grow old.

While much has been written on gender discrimination in education in Nepal, very little empirical work has been done to analyze the extent of the discrimination. This paper tries to fill that gap by examining the nature and extent of one form of discrimination—inequality in household expenditure—faced by women in the education sector by comparing expenditure on education for girls versus boys, and then decomposing the observed gap in expenditure into explained and unexplained components. The paper is organized as follows. Section II presents the motivation behind the research, including an identification of the research gap that this paper addresses. The methodology and the data set used in this study are described in section III. Section IV details the major results and the findings. Section V consists of conclusions and policy recommendations.

II. Motivation

The right to an education is a fundamental human right. Yet, women in the developing world are underrepresented at all levels of education (see, for example, Annex 1 of the Global Campaign for Education 2012). While progress has been made globally in improving the net enrollment ratio at primary levels, a noticeable decline is observed in girls' participation at higher levels of education (Global Campaign for Education 2012). Inequality is not only observed in terms of ability to participate in schooling, but also in terms of quality of schooling.[1] The participation of girls is also found to be lower in private schools compared with public schools in developing economies (Harma 2011; Maitra, Pal, and Sharma 2011; Woodhead, Frost, and James 2013; Sahoo 2014).

As was mentioned earlier, one of the reasons behind the ineffective inclusion of girls in educational opportunities is the unequal investment made by parents in their male and female children's education. The prevalence of unequal returns to education in terms of wages and work opportunities in the labor market implies that parents are likely to invest more in boys' education than in girls' (Garg and Morduch 1998 as cited in Sahoo 2014, Leclercq 2001). Results are further skewed in favor of boys if women are expected to leave their parents' home after they get married while men are expected to remain at home to eventually take care of their elderly parents.[2] Various studies have found differential treatment resulting from parents' investment decisions. For example, Burgess and Zhuang (2000) and Gong, van Soest, and Zhang (2005) find significant bias in favor of boys in education expenditure in the People's Republic of China. Similarly, in India, Kingdon (2005) and Saha (2013) find evidence of differential education expenditure between boys and girls in certain states. Similar findings were presented in the cases of Pakistan (Aslam and Kingdon 2008), Paraguay (Masterson 2012), and Bangladesh (Shonchoy and Rabbani 2015).

Considering the cultural and socioeconomic similarities between many of the above-mentioned countries and Nepal, and the existence of widespread patriarchy in Nepal, we can expect to find significant levels of gender bias in education expenditure patterns among Nepalese households. Unequal access to and outcomes in education with respect to gender are characteristic features of the Nepalese education system. School enrollment has long skewed in favor of boys (World Bank 2014). More recently, there has been a drive to make education (along with other social services) equitable and inclusive. The Constitution of Nepal 2015 has made

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[1]Discrimination against girls is also pervasive in a school environment. However, the focus of analysis in this study concerns parental expenditure choices that are biased in favor of boys.

[2]In the Indian subcontinent, men are expected to live with their parents and look after them in their old age, while women are expected to live with their husbands. This practice contributes significantly to the unequal treatment of women and girls in terms of human capital development, marriage, and other critical life decisions including inheritance.

the right to an education an inalienable right for all (Government of Nepal 2015). Gender equality and social inclusion guidelines have been formulated across all government sectors to make policies, strategies, and outcomes gender sensitive. The *Education for All* initiative and the *School Sector Reform Plan* prioritize equal participation for girls at all levels of education (Ministry of Education and Sports 2003). As a consequence, net enrollment ratios have risen for all children and are now comparable for both boys and girls at primary and secondary schools (National Planning Commission 2013). Yet, the participation of boys in private education and higher education remains higher when compared with girls (Department of Education 2015). Therefore, while the gender gap in terms of school enrollment at primary and secondary levels has almost disappeared, instances of gender discrimination can still be observed among Nepalese households both in terms of education quality and expenditure.[3]

Decomposing such discrimination can provide policy makers with valuable insights into understanding and minimizing the extent of such bias and incentivizing households to achieve better education outcomes for girls. However, studies on gender discrimination and education in Nepal are scarce. Most reports on discrimination typically analyze participation rates and do not consider other forms of discrimination (see, for example, Unterhalter 2006, Herz 2006, and Huxley 2009).

Similar patterns can be observed in academic studies. One of the earliest studies in the field incorporating historical data was conducted by Stash and Hannum (2001), who find evidence of a significant gender gap in primary school participation rates. Using data from the 1991 Nepal Fertility, Family Planning, and Health Survey, they find that the educational attainment of head of households and rural–urban households bore no effect on school participation rates for girls. Therefore, they conclude that traditional indicators of development had little impact on discriminatory educational outcomes. LeVine's (2006) ethnographic study of Nepal examines the determinants of school attendance of girls and the reasons behind their dropping out of school. The study finds that since the 1990s, profound socioeconomic transformations have led to a more equitable attitude of parents toward their children's education, although girls were still less likely to complete their education or attain higher education because of marriage. A recent study by Devkota and Upadhyay (2015) examines inequality in education outcomes owing to various household factors like income, sex, ethnicity, and location of the household

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[3]Private schools are generally considered to provide higher quality education in Nepal than public schools. They are more expensive to attend, spend more on children's education per student, have lower rates of teacher absenteeism, have better school management systems, and exercise more stringent grade promotion systems. As a consequence, private schools produce better results in School Leaving Certificate exams. In 2012, the success rate of private school students taking School Leaving Certificate exams was 93.1% compared with only 28.2% for public school students (Sharma 2012). Parents prefer private schools provided they can afford them. Therefore, the higher rate of participation of boys in private schools is indicative of discriminatory expenditure decisions at the household level.

and the school. They find that while men in Nepal were likely to attain a higher level of education, their advantage had significantly declined between 1996 and 2004.

Some studies have looked at the effects of migration on education outcomes in Nepal. Bontch-Osmolovski (2009) studies the role of migration in education and finds significant positive effects of parental migration on their children's enrollment in school. However, the author finds no significant difference, on average, of the effect of migration by the gender of the child, which is contrary to Nepal (2016), who finds higher levels of school enrollment, greater incidence of private schooling, and shorter working hours for boys in migrant households when compared with girls. Bansak and Chezum (2009) also find that remittances positively affect school attendance, with a greater positive impact among boys than girls.

The aforementioned studies rely primarily on enrollment and school participation rates as the basis of analysis of gender discrimination, assuming parental decisions only affect the participation of children at school and ignore other forms of discrimination between boys and girls already enrolled in schools. This discussion becomes even more pertinent given rising enrollment and participation rates for both boys and girls at the primary and secondary school levels. Considering the clear evidence of unequal expenditure in favor of boys' education in comparable societies, there is a need to investigate whether this trend exists in Nepal as well. Vogel and Korinek (2012) were the first to evaluate the expenditure allocation decisions of households on education in Nepal. Their study examines how remittance income is allocated in terms of schooling expenditure for boys and girls within the same family. They find that households that receive substantial remittances tend to increase education spending for boys but not for girls. Therefore, more remittances do not necessarily result in increased investment in girls' education. However, the study primarily limits itself to remittance-based households and does not take nonmigrating households into consideration.

This paper aims to build on the findings of Vogel and Korinek (2012) by looking at the education expenditure allocation decisions of Nepalese households. It focuses on the extent of discrimination practiced against girls in terms of expenditure patterns on education and examines the possible reasons behind such inequality. Using the Blinder–Oaxaca decomposition method (along with decomposition using quantile regressions), the study examines the extent of explained differences and unexplained differences (proxied as discrimination) in education expenditure for families across Nepal.

III. Data and Methodology

Data for the study comes from the three rounds of the Nepal Living Standards Survey (NLSS) conducted in 1995–1996, 2003–2004, and 2010–2011.[4]

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[4]Henceforth, NLSS I, NLSS II, and NLSS III will imply surveys conducted in 1995–1996, 2003–2004, and 2010–2011, respectively.

The surveys follow the methodology developed by the World Bank in its Living Standards Measurement Study and collect information from all over Nepal on wide-ranging variables including, among others, poverty; income, wealth, and expenditure sources; household composition; and migration. The latest survey collected data from 5,988 households (in addition to 1,032 households used for the panel sample) from 71 districts (499 primary sampling units) across Nepal over a 12-month period. For the study, I use samples from both rural and urban households from all three geographical regions surveyed in the study. Due to a lack of observations among students of higher studies and for schools under other systems of education, I have confined the samples for the regression analysis to include students until the 10th standard of their schooling and who have studied in either community schools or private schools.[5] To arrive at total education expenditure per student, I have calculated total school fees of individual children by adding the costs of uniforms, text books, transportation, private tuition, and other fees, and then deducting the monetary value of any scholarships. Fees are presented on a nominal basis and have not been converted to real terms. The sample for education expenditure per child was trimmed by the top 0.1% and the bottom 0.1% to remove potential outliers.

Two methods have been popularly used to disaggregate biases in education expenditure in popular research. The first methodology makes use of Engel Curves, which observes household-level expenditure data and analyzes the relationship between changes in household gender composition and patterns of expenditure. In the absence of individual-level data on expenditure patterns, this method can provide valuable insights into inferring the level of bias from the overall household expenditure data (Aslam and Kingdon 2008). However, the validity of this methodology has also been challenged (Kingdon 2005).

Where individual-level data are available, the use of decomposition provides far more useful results. First used by Blinder (1973) and Oaxaca (1973), this method decomposes the expenditure gap into an endowment gap and a coefficient gap. The endowment gap explains differences in expenditure based on differences in endowments and the coefficient gap is the discrimination coefficient (Madheswaran and Attewell 2007). While the Blinder–Oaxaca decomposition is popularly used to decompose bias in wage gaps in the labor market, the methodology is as effective in understanding the bias in education expenditure as well, and has been

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[5]The education system in Nepal is classified into primary (1st–5th grade), lower secondary (6th–8th grade), secondary (9th–10th grade), higher secondary (11th–12th grade), and tertiary levels. Classification is made based on national level examinations and students are required to attend. All students must clear the School Leaving Certificate examinations in 10th grade to qualify for higher-level studies in which students can choose boards and areas of interest. School Leaving Certificate examinations are traditionally considered the entry gate for higher education in Nepal. The government has prioritized the elimination of gender disparity in education through the secondary level under the Education for All Initiative (Ministry of Education and Sports 2003). The NLSS classifies primary and secondary schools into four categories: (i) community or government-owned schools, (ii) institutional or private schools, (iii) technical schools, and (iv) religious schools. As can be observed from Table 1, the share of students studying in the latter two categories is extremely small.

used in studies analyzing decomposition of education expenditure. Here, I use the Blinder–Oaxaca decomposition method to disaggregate bias in the expenditure gap that can be explained by differences of endowments and the unexplained gap.

The basic equation can be represented as

$$
\begin{aligned}
\log{(Exp)}_{ijt} = {} & \alpha_{ijt} + \beta_1 poor_{jt} + \beta_2 rural_{jt} + \beta_3 ethni_{ijt} + \beta_4 Income_{jt} \\
& + \beta_5 Schooltype_{it} + \beta_6 Currentclass_{ijt} + \beta_7 distschool_{ijt} \\
& + \beta_8 birthorder_{ijt} + \beta_9 Motheredu_{ijt} + \beta_{10} Fatheredu_{ijt} \\
& + \beta_{11} HHsize_{jt} + \beta_{12} Female_{ij} + \varepsilon_{ijt}
\end{aligned}
\tag{1}
$$

where Exp_{ijt} is the expenditure by household j on child i in year t. $Female_{ij}$ is the dummy variable where $Female_{ij}$ has a value of 1 if the child is a girl and 0 if the child is a boy. Similarly, $Female_{ij}$, $poor_{jt}$, $rural_{jt}$, and $ethni_{ijt}$ are dummy variables for families that are poor, live in rural areas, or belong to upper castes, respectively, in year t.[6] $Income_{jt}$ is the total income of the household in thousands of Nepalese rupees (NRs). $Schooltype_{it}$ is a dummy variable where 0 equals government school and 1 equals private school. $Currentclass_{ijt}$ is a vector of grade levels ranging from 1st until 10th grade. $Distschool_{ijt}$ represents the distance from the child's house to the school (measured in kilometers for NLSS III and in hours for NLSS I and NLSS II). $Birthorder_{ij}$ is a categorical variable that quantifies the order of the child's birth in the family where a value of 1 represents the firstborn child, 2 is the second child, and so on. $Motheredu_{ij}$ and $Fatheredu_{ij}$ represent the level of the parents' education with a value of 10 signifying completion of 10th grade. Additionally, $HHsize_{jt}$ describes the total size of the household of the student under consideration. For the ordinary least squares (OLS) regression, I have included $Female_{ij}$ as a dummy variable where a value of 1 implies a girl student and 0 implies a boy.

I use the Blinder–Oaxaca decomposition where the gross education expenditure differential for years t can be defined as

$$
G_t = \frac{Exp_{mt} - Exp_{ft}}{Exp_{ft}}
\tag{2}
$$

where Exp_m and Exp_f represent education expenditure on boys and girls, respectively. In the absence of any discrimination, the differences in expenditure could be explained only by the household-related variables where

$$
Q_t = \frac{Exp_{mt}^0 - Exp_{ft}^0}{Exp_{ft}^0}
\tag{3}
$$

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[6] For the purpose of this study, Brahmin (hills and terai) and Chettris (hills and terai) are considered to be members of the upper castes.

The discrimination coefficient D_t can therefore be understood as

$$D_t = \frac{\left(Exp_{mt}/Exp_{ft}\right) - \left(Exp_{mt}^0/Exp_{ft}^0\right)}{\left(Exp_{mt}^0/Exp_{ft}^0\right)} \tag{4}$$

The logarithmic transformation of gross differential $\ln(G_t + 1)$ can therefore be equated as

$$\ln(G_t + 1) = \ln(Q_t + 1) + \ln(D_t + 1) \tag{5}$$

Following equation (1),

$$\ln(Exp_{mt}) = \sum \beta_{mt} X_{mt},$$

$$\ln(Exp_{ft}) = \sum \beta_{ft} X_{ft},$$

where $\sum \beta X$ represents a vector of determinants of education expenditure as elaborated in equation (1):

$$\ln(G_t + 1) = \ln(Exp_{mt}) - \ln(Exp_{ft}) = \sum \beta_{mt} X_{mt} - \sum \beta_{ft} X_{ft} \tag{6}$$

Then, the explained and unexplained expenditure gaps can be divided into

$$\ln(\overline{Exp}_{mt}) - \ln(\overline{Exp}_{ft}) = (\overline{X}_{mt} - \overline{X}_{ft})\hat{\beta}_{mt} + \overline{X}_{ft}(\hat{\beta}_{mt} - \hat{\beta}_{ft}) = E + D \tag{7}$$

where the first term E is considered the difference in endowment and D represents the difference in expenditure between girls and boys with identical endowments, which can be interpreted as the bias (Madheswaran and Attewell 2007).

While the Blinder–Oaxaca decomposition method is very popular, it tends to ignore what is referred to as the common support problem in which chances of misspecification can arise because characteristic features of two cohorts being examined are generally ignored while computing the outcomes. In such cases, nonparametric decomposition methods like Black et al. (2008) and Ñopo (2008) have been used to simulate results for subsamples with comparable characteristics (Fortin, Lemieux, and Firpo 2010). Here, I also employ the Ñopo (2008) nonparametric estimation where the difference in education expenditure is given by

$$\ln(\overline{Exp}_{mt}) - \ln(\overline{Exp}_{ft}) = D_{xt} + D_{mt} + D_{ft} + D_{0t} \tag{8}$$

where D_x represents differences in expenditure due to uneven distribution of gender-specific characteristics across the two gender cohorts; D_m represents differences in expenditure due to differences in endowment between males and females, and the possibility of extent of an increase in expenditure provided that females have

Table 1. **Summary Statistics of Education Enrollment and Fees across School Categories**

School Category	Boys			Girls		
	1995–1996	2003–2004	2010–2011	1995–1996	2003–2004	2010–2011
Enrollment (%)						
Community or government	86.61	77.07	71.80	87.37	78.50	77.89
Institutional or private	11.39	21.59	27.32	10.88	19.78	21.06
Technical or vocational	–	0.21	0.26	0.61	0.26	0.07
Gurukul–madrasa–gumba	0.73	–	0.55	0.09	–	0.90
Other	1.27	1.13	0.07	1.05	1.45	0.07
Total students	1,650	2,835	2,720	1,140	2,270	2,673
Expenditure (NRs)						
Community or government	911.57	1,290.12	2,867.21	869.98	1,137.01	2,454.53
Institutional or private	6,522.88	10,151.52	16,450.57	7,148.99	10,459.88	18,264.95
Technical or vocational	–	12,309.17	23,820.71	2,100	1317.5	14,015
Gurukul–madrasa–gumba	1257.67	–	857	383.71	–	1,982.3
Other	391.43	715.63	9,558	183.75	237.18	2,739.33
Total expenditure	1,546.82	3,219.89	6,864.54	1,543.83	2,968.45	5,978.48

Note: NLSS I does not contain the gurukul–madrasa–gumba category but instead includes a category for community schools. Similarly, NLSS II only categorizes government schools, private schools, technical schools, and other schools.

Source: Author's calculation based on Nepal Living Standards Surveys.

male characteristics; D_f represents differences in the characteristics of males and females, and the potential decline in male expenditure if they had female endowments; and D_0 represents unexplained discrimination.

Considering the possibility of differential effects of various control variables across the expenditure distribution, I also use the quantile decomposition methodology of Melly (2005) to evaluate levels of discrimination across various points in the distribution of the education expenditure. The methodology goes beyond the mean and decomposes differences in education expenditure between the two groups (girls and boys) at different quantiles of the variable of interest.

IV. Findings

Analysis of the descriptive summary of the variables suggests the existence of a discrepancy in spending between boys and girls, with the total expenditure pattern showing that education expenditure on boys is slightly greater than that on girls (Table 1). While there is not much difference in the fees paid among various school categories,[7] in fact expenditure in private schools is higher in the case of

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[7]Since the proportion of schools other than government schools and private schools is less than 2%, the focus in the remainder of this paper will be on community (public) and institutional (private) schools. Policy documents, including the *Education for All Initiative* and the annual *Flash Report* of the Department of Education, also focus on these two school structures. Therefore, leaving out religious schools and vocational schools will not detract from the analytical discussion (Ministry of Sports and Education 2003, Department of Education 2015).

Table 2. **Summary Statistics on Enrollment and Fees across School Categories in Rural Areas**

School Category	Boys			Girls		
	1995–1996	2003–2004	2010–2011	1995–1996	2003–2004	2010–2011
Enrollment (%)						
Community or government	93.39	88.59	80.74	95.44	89.42	87.13
Institutional or private	4.30	9.95	18.33	2.34	8.41	11.45
Technical or vocational	–	0.05	0.18	0.86	0.19	0.05
Gurukul–madrasa–gumba	0.80	–	0.71	0.12	–	1.24
Other	1.51	1.40	0.04	1.23	1.98	0.14
Total students	1,256	1,999	2,258	811	1,569	2,175
Expenditure (NRs)						
Community or government	746.36	976.22	2,477.87	612.34	844.42	2,056.99
Institutional or private	3,507.80	5,648.92	10,906.9	2,956.37	4,476.68	10,984.11
Technical or vocational	–	1,500	18,136.25	2,100	1,000	4830
Gurukul–madrasa–gumba	783.7	–	711.63	383.71	–	1,982.3
Other	418.95	378.21	3,024	181.5	248.29	2,739.33
Total expenditure	860.43	1,433.28	4,038.86	661.80	1,138.53	3,080.28

Note: NLSS I does not contain the gurukul–madrasa–gumba category but instead includes a category for community schools. Similarly, NLSS II only categorizes government schools, private schools, technical schools, and other schools.

Source: Author's calculation based on Nepal Living Standards Surveys.

girls,[8] the representation of boys in private schools is much higher than that of girls.[9] Worryingly, the overall difference in expenditure between boys and girls increased over the course of the three surveys. The mean of actual expenditure shows that while the difference in expenditure per student was only NRs3 in 1995–1996, it had risen to NRs886 by 2010–2011. Since mean expenditure in private schools is almost 8 times the mean expenditure in government schools, the faster rate of private school enrollment among boys when compared with girls over the last 15 years has proved to be the major source of expenditure bias and discrimination against girls.

The rural–urban classification of enrollment and expenditure echoes the findings of the national aggregate (Tables 2 and 3). While in absolute terms the amount of expenditure on education (for both girls and boys) is higher in urban areas, the share of girls' fees to boys' fees is significantly lower in rural areas (0.76) than in urban areas (0.93), suggesting a higher degree of discrimination among rural populations.[10] However, over time while the inequality in terms of expenditure has

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[8]The declassification of expenditure, which is not shown in Table 1, reveals that parents spend more for girls' transportation and other costs compared with boys' in private schools, leading to higher expenditure per student for girls among private schools. It is not clear why this is the case. An examination of school distances and modes of transportation do not provide an answer.

[9]See footnote 3.

[10]After accounting for all categories of schools, differences in expenditure in rural areas could be observed in terms of textbook and supplies, private tuition fees, and other fees not described in the NLSS. This suggests corrective measures require not only making schools more attractive for girls but a more thorough approach of changing parental mindsets by discouraging patriarchy and promoting equality of girls at the household level.

Table 3. **Summary Statistics on Enrollment and Fees across School Categories in Urban Areas**

School Category	Boys			Girls		
	1995–1996	2003–2004	2010–2011	1995–1996	2003–2004	2010–2011
Enrollment (%)						
Community or government	64.97	49.52	38.17	67.78	54.07	46.33
Institutional or private	34.01	49.40	60.92	31.91	45.22	53.15
Technical or vocational	–	0.60	0.39	–	0.43	0.13
Gurukul–madrasa–gumba	0.51	–	0.26	–	–	0.39
Other	0.51	0.48	0.26	0.61	0.29	–
Total students	394	836	765	329	701	762
Expenditure (NRs)						
Community or government	1,668.60	2632.90	5,297.97	1,768.25	2,220.13	4,588.66
Institutional or private	7,737.93	12,321.05	21,375.64	7,907.66	12,951.31	22,741.32
Technical or vocational	–	14,471	31,400	–	1,635	23,200
Gurukul–madrasa–gumba	3,627.5	–	2020	–	–	1,983.3
Other	130	3,077.5	12,735	195	65	–
Total expenditure	3,734.92	7,064.96	15,204.92	3718.07	7,064.23	14,250.89

Note: NLSS I does not contain the gurukul–madrasa–gumba category but instead includes a category for community schools. Similarly, NLSS II only categorizes government schools, private schools, technical schools, and other schools.

Source: Author's calculation based on Nepal Living Standards Surveys.

remained fairly stable in rural areas, there has been a marginal rise in expenditure on boys in urban centers (with the share of girls' fees to boys' fees dropping from 0.99 to 0.93). This trend is noticeable in rising gaps across the years in expenditure levels in both private and public schools in addition to a faster rate of growth in private school participation for boys (from 34% to 61%) compared with girls (from 32% to 51%). In rural areas, rising gaps in expenditure in public schools were observed over time, although surprisingly the average expenditure gap in private schools became negative. However, this negative expenditure gap is offset by a disparity in private school participation growth rates with the enrollment of boys in private schools increasing from 4% to 18% compared with the rate of girls increasing from 2% to 11%.[11]

The first set of regressions were simple OLS models with gender as a dependent variable (Table 5). The coefficient of the major variable of interest (female) was significant with the semi-elasticity of fees at between –0.098 and –0.202, indicating lower levels of education expenditure for girls. Other control variables showed the expected outcomes. The semi-elasticity of total family income was positive and significant, but the level of influence on total education expenditure

[11]Inequality in private school enrollment extends far beyond gender. Spatially, private schools constitute only 1% and 20% of all secondary schools in mountainous areas of the far-western and mid-western regions in Nepal, respectively. Similarly, enrollment of other marginalized groups such as Dalits, ethnic minorities, and the disabled—is also found to be disproportionately low in private schools (Department of Education 2015). Differences in rural–urban private school enrollment rates can be observed in Tables 2 and 3.

Table 4. **Descriptions of Control Variables**

Variable	Description
Exp	Total expenditure on education
Female	Dummy variable where 1 is girl and 0 is boy
Income	Total income of the households in thousands of Nepalese rupees
Poor	Dummy variable where 1 implies a household is poor and 0 implies it is not[a]
Birthorder	Ordinal variable where 1 represents a firstborn child, 2 represents a second child, and so on
HHsize	Size of the household
Fatheredu	Education qualification of father with 10 representing 10th grade
Motheredu	Education qualification of mother with 10 representing 10th grade
Ethni	Dummy variable where 1 represents member of the upper caste and 0 represents other ethnicities
Currentclass	Current grade of the student
Distschool	Distance from home to school (in kilometers in 2010–2011 and hours in 1995–1996 and 2003–2004)
Schooltype	Dummy variable where 1 and 0 mean enrollment in private and public schools, respectively
Rural	Dummy variable where 1 represents rural and 0 represents urban

[a]The poverty line has been drawn based on nutritional requirements included in the NLSS.
Source: Author's compilation.

Table 5. **Ordinary Least Squares Regression with Gender as a Dependent Variable**

Log(exp)	1995–1996	2003–2004	2010–2011
Female	−0.105***	−0.098***	−0.202***
Income	0.011	0.021***	0.003***
Poor	−0.609***	−0.708***	−0.601***
Birthorder	0.024	−0.017	−0.054***
HHsize	−0.027***	−0.004	−0.021***
Fatheredu	0.037*	0.026***	0.029***
Motheredu	0.121	0.048***	0.034***
Ethni	0.096**	0.123***	0.054*
Currentclass	0.221***	0.203***	0.158***
Schooltype	0.502***	1.067***	0.882***
Distschool	0.006	0.073***	−0.0005***
Rural	−1.153***	−0.698***	−0.483***

Note: ***, **, and * denote significance at the 1%, 5%, and 10% level, respectively. See Table 4 for a description of the variables.
Source: Author's calculations based on NLSS Surveys.

was very low. This perhaps is indicative of the poor quality of income data collected in the survey since data on income are notoriously unreliable (see, for example, Deaton 1997, 29–31). As expected, poverty has a strong negative influence on total education expenditure, with poor families expected to spend up to 50% less on education expenditure than nonpoor families. Expenditure fell as household size increased and rose with the educational attainment of parents. Similarly, the grade of students and type of school had the expected strong and positive impact on

Table 6. **Ordinary Least Square Regressions with Separate Results for the Population Cohorts**

	Boys			Girls		
	1995–1996	**2003–2004**	**2010–2011**	**1995–1996**	**2003–2004**	**2010–2011**
Income	0.247***	0.0153***	0.005**	−0.001	0.092***	0.002
Poor	−0.589***	−0.719***	−0.596***	−0.611***	−0.682***	−0.587***
Birthorder	0.022	−0.004	−0.080***	0.028	−0.026	−0.033
HHsize	−0.028***	0.002	−0.016*	−0.037***	−0.014**	−0.025**
Fatheredu	0.040	0.025***	0.029***	0.025	0.023***	0.028***
Motheredu	0.139	0.036	0.026***	0.057	0.062**	0.041***
Ethni	0.056	0.103**	0.034	0.173***	0.138***	0.073*
Currentclass	0.213***	0.198***	0.147***	0.223***	0.209***	0.168***
Schooltype	0.430***	1.071***	0.944***	0.574***	1.022***	0.805***
Distschool	−0.007	0.071**	−0.0005***	0.037	0.078**	−0.015***
Rural	−0.979***	−0.710***	−0.430***	−1.213***	−0.640***	−0.494***

Note: ***, **, and * denote significance at the 1%, 5%, and 10% level, respectively. See Table 4 for a description of the variables.
Source: Author's calculation based on NLSS Surveys.

education expenditure. Interestingly, regressions also showed that members of the upper caste were more likely to spend more on education than people from other ethnicities.[12]

Gender-wise classification of the OLS regression also provided interesting insights (Table 6). For variables like poverty, grade, and school types, the coefficients were comparable for boys and girls, while other variables impacted the two cohorts unequally. The impact of the size of the household was found to be relatively insignificant for boys but was highly significant and negative for girls, suggesting that a reduction in education expenditure per child due to an increase in household size primarily impacts girls. Therefore, a focus on family planning measures would lead to increased education opportunities for girls.[13] The importance of the mother's education was also reflected unequally. A woman's level of education is likely to play a more important role in a daughter's education compared with a son's; that is, the semi-elasticity of a mother's education on education expenditure is higher for girls than boys.[14] Distance from school had

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[12]This discrepancy is explained both by differences in school preferences and expenditure categories. Not only were upper caste households more likely to send their children to private schools (22% private school enrollment for households from other ethnicities compared to 28% for members of the upper caste), but they also were more likely to spend on other educational expenditure and tuition fees. The cultural reasons behind these differences are beyond the purview of this study. However, basic analysis reveals that parents from the upper caste earn more than everyone else and are more likely to be educated than counterparts from other ethnicities.

[13]The average household size in the sample was 5.94 persons, which provides sufficient space for family planning interventions.

[14]The reasons behind this phenomenon are not clear but evidence suggests that mothers prefer allocating educational resources to daughters and fathers to sons (Glick and Sahn 2000). Education empowers women and increases their bargaining power in the family, thus allowing them to spend more resources on girls. This finding is supported by additional evidence from Africa and Asia (King and Lillard 1987, Lillard and Willis 1992, Tansel 1997).

Table 7. **Results from Blinder–Oaxaca Decomposition**

Log(exp)	1995–1996	2003–2004	2010–2011
Difference	−0.045	−0.098[**]	−0.264[***]
Explained	0.054	−0.008	−0.020
Unexplained	−0.099[**]	−0.089[***]	−0.243[***]

Note: [***], [**], and [*] denote significance at the 1%, 5%, and 10% level, respectively.
Source: Author's calculation based on NLSS Surveys.

Table 8. **Results from Ñopo Decomposition**

Log(exp)	1995–1996	2003–2004	2010–2011
Difference	−0.007	−0.014	−0.030
D_x	0	0	0.0003
D_m	0.014	−0.025	−0.179
D_f	−0.013	0.032	−0.190
D_o	−0.008	−0.021	−0.018

Source: Author's calculation based on NLSS Surveys.

a larger negative impact on girls than boys, suggesting proximity to school is an important factor contributing to a better education for children.[15]

To differentiate the roles of endowments and discrimination in explaining the differences in education expenditure between boys and girls, I conducted a Blinder–Oaxaca decomposition analysis on the same observations (Table 7). Results from NLSS II show that in log terms, expenditure on boys was 0.098 higher than on girls, of which only about 9% could be explained by differences in the control variables and about 90% could be attributed to discrimination. Similarly, results from NLSS III show that expenditure on girls is lower than expenditure on boys by around NRs0.264 per child in log terms. Only about 8% of this gap can be explained via differences in household characteristics and the remaining 92% can be attributed to discrimination.

Results from the Ñopo decomposition also display an incidence of discrimination, although the extent of discrimination appears to be much smaller (Table 8). This technique shows that in 2010–2011, almost 60% of the expenditure gap was due to unexplained factors (discrimination). The results were more dramatic in 1995–1996 and 2003–2004, when in both cases the endowment effects of men and women constituted more than 100% of the expenditure gap. Therefore, if boys and girls were to have the same distribution across the controlled variables, the expenditure gap would be even higher, suggesting that, given prevailing conditions, socioeconomic status and other factors are more favorable in households incurring girls' expenditure compared to boys'. The Blinder–Oaxaca and Ñopo

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[15]The distance needed to travel to attend school is an important impediment to educating girls. In developing societies, girls' safety is a crucial consideration. The United Nations Girls' Education Initiative (2014) has made reducing the distance to the nearest school an important component of its activities.

Table 9. **Decomposition Results Based on Quantile Regressions**

Log(exp)	1995–1996	2003–2004	2010–2011
Quantile 0.2			
Raw difference	−0.100	−0.084**	−0.306***
Endowment	0.027	−0.015	−0.070**
Coefficients	−0.127**	−0.069*	−0.235***
Quantile 0.4			
Raw difference	−0.045	−0.031	−0.228***
Endowment	0.029	−0.017	−0.088***
Coefficients	−0.075*	−0.014*	−0.140***
Quantile 0.6			
Raw difference	0.024	−0.024	−0.211***
Endowment	0.048	−0.019	−0.113***
Coefficients	−0.024	−0.004	−0.098***
Quantile 0.8			
Raw difference	0.063	−0.102**	−0.325***
Endowment	0.072	−0.062	−0.186***
Coefficients	−0.009	−0.040	−0.138***

Note: ***, **, and * denote significance at the 1%, 5%, and 10% level, respectively.
Source: Author's calculation based on NLSS Surveys.

methodologies both demonstrate the existence of widespread gender discrimination in household education expenditure, albeit to different degrees.

The results of the quantile decomposition reinforce the findings of the Blinder–Oaxaca decomposition method by using four quantiles (20th, 40th, 60th, and 80th percentiles) of education expenditure (see Table 9). While in NLSS I and II, there are significant differences in expenditure, large differences are observed in NLSS III. Among all four quantiles, education expenditure on girls was lower and significant in comparison with boys. Differences in expenditure were found to be the largest among the highest and the lowest spenders, and smallest among the 60th percentile. The ratio of unexplained to total differences fell among the higher quintiles, with the largest share of unexplained differences found in the poorest population segments.[16] The regressions suggest that, despite controlling for factors such as school enrollment (which already displays a significant source of discrimination in favor of boys), parents still choose to spend more on boys' education than on girls' education, which is clearly indicative of the differential

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[16]In the lower quintiles, the participation of students in private schools is almost negligible, with only about 4% of boys and 3% of girls enrolled in private schools at these income levels. In the upper two quintiles, the participation ratio of boys in private schools is about 62% compared with 56% for girls. Therefore, while the unexplained differences are larger in poorer segments of the population, discrimination is also prevalent at higher income levels, primarily through the school selection process.

treatment of boys and girls in Nepalese households. Worryingly, this phenomenon is new and coincides with rising average costs of education in Nepal.

V. Conclusions

Discrimination in school participation has been widely reported in the literature as a major source of gender inequality in Nepal. Even with improving participation rates for girls at all grade levels, the inequality persists. This study has explored discrimination among school-going boys and girls by analyzing the expenditure behavior of their parents and found that boys are better represented in private schools and girls are better represented in public schools, which stands as the most important form of discrimination. This phenomenon is more pronounced in rural Nepal, although a noticeable difference in participation is observed in urban areas as well.

Through simple OLS regressions, the effects of various control variables on total education expenditure across two genders were investigated. The data substantiate the findings of existing literature, including Vogel and Korinek (2012), that parental expenditure patterns in education are discriminatory. My analysis finds that even after controlling for school type, parents spend as much as 20% less on girls compared with boys. The data show that differences in expenditure comprise unequal spending on private tuition, textbooks and supplies, and other education-related expenditure. The paper also found that while the mother's education is an important equalizer, household size and distance to the school disproportionately affect household expenditure on a girl's education.

The Blinder–Oaxaca decomposition method, the Ñopo decomposition method, and a decomposition based on quantile regressions were used to further investigate the level of gender discrimination in education expenditure. All three of these methods revealed a high level of discrimination in education expenditure in favor of boys among households in Nepal. At times, more than 60% of the difference in education expenditure between genders could be explained by such bias. Findings from the quantile decomposition show that discrimination has risen over time and that households in the lowest and highest quintiles of income were the ones most likely to discriminate between boys and girls. The latter result is counterintuitive and therefore should be a matter of further research. Another area for further research could be the impact of such differential treatment on the performance of children at schools.

The study finds sufficient evidence to conclude that discrimination in education expenditure is prevalent among Nepalese households. It also suggests that such discrimination might be on the rise. Therefore, it is imperative for the government to improve the quality of education at public schools to not only provide better quality education for girls, but also to encourage parents to review

the decision-making processes in which they are more likely to send boys than girls to private schools. I also find that educating parents (especially mothers) and improving access to schools can potentially reduce unequal expenditure, albeit to a small extent. To the extent that unexplained differences (discrimination) still account for the largest share of differences in education expenditure, I conclude that parental choices are still largely governed by a patriarchal mindset within Nepalese society, even among families at the highest income levels. Therefore, the medium-term approach should be accompanied by a longer-term strategy of changing the perception of women's roles in Nepalese society so that household investment decisions are not biased against girls.

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