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Essays on Educational Disparities: gender, Disabilities, and Schooling Outcomes in Pakistan

Sumeet Ashok

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de l'Université de Pau et des Pays de l'Adour
Spécialité : Économie

Essays on Educational Disparities: Gender, Disabilities, and
Schooling Outcomes in Pakistan

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"In the garden of life, my parents have been the roots that nurtured and guided me to bloom. This work is dedicated to them, a testament to their unwavering love, support, and belief in my journey."

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Abstract

The research conducts a thorough investigation into the critical and overlooked issues of gender differentials and disability-based exclusion in Pakistan's education landscape. Through three different studies, it explores these problems from multiple perspectives, contributing to an understanding of the challenges faced by marginalized groups. The first empirical essay in this series investigates the intergenerational effects of women's marriage on gender differentials in children's educational outcomes. The primary finding of this study is that a mother's age at marriage has no gender-specific impact on children's educational investment perspectives. However, the beneficial effects of delaying a mother's marriage yield substantial benefits for girls in terms of progress at school, primary education completion, and completed years of schooling. This underscores the role of maternal human capital in shaping educational trajectories, particularly for daughters. The second and third empirical essays focus on the same theme: disabilities, but they address different sets of questions. The second essay considers issues relating to the educational exclusion of children with disabilities (CWDs). The study analyses the impact of disabilities on school access and dropout rates among school-age children in Pakistan. It finds that CWDs are disproportionately out of school. 69% of CWDs of school going age have never been to school, compared to 31% of children without disabilities. Even when they get enrolled in school, they remain vulnerable to completing their basic education. The third essay explores the intersection of gender and disability in educational attainment. Analysing educational outcomes for individuals aged 18–30, it reveals a significant gender-specific effect of disability on educational attainment, particularly for females with disabilities, who are more vulnerable. These gender differentials in educational attainment are prominent

across middle and high-school levels, and persist regardless of the severity or the type of disability (cognitive, sensory, multiple). In sum, these essays shed light on the challenges preventing equitable education in Pakistan. They advocate policies that address issues like early marriage, gender inequality, and the exclusion of people with disabilities, paving the way for a just and inclusive educational system.

Keywords: Education, Early marriage, Gender differentials, Disabilities, Pakistan

Jel Codes: I21, I14, I24, J17, I32

Résumé

Cette recherche étudie de façon approfondie les questions importantes de la différence entre les sexes et l'exclusion fondée sur le handicap dans le paysage éducatif pakistanais. À travers trois études différentes, elle explore ces problèmes sous multiples perspectives, contribuant ainsi à la compréhension des défis que confrontent les groupes marginalisés. Le premier essai empirique de cette série étudie les effets intergénérationnels de l'âge au mariage des femmes sur les différences entre les sexes dans les résultats scolaires des enfants. La principale conclusion de cette étude est que l'âge de la mère au moment du mariage n'a pas d'impact significatif au choix d'investissement des parents sur l'éducation des garçons et des filles. Cependant, les effets bénéfiques du report du mariage de la mère se traduisent par des avantages substantiels pour les filles en termes de progrès à l'école, d'obtention de l'enseignement primaire, et du nombre d'années de scolarité accomplies. Cela souligne le rôle du capital humain maternel dans l'élaboration des trajectoires éducatives, en particulier pour les filles. Le deuxième et le troisième essai empirique portent sur le thème du handicap, en abordant des questions différentes. Le deuxième essai examine les questions relatives à l'exclusion scolaire des enfants handicapés. L'étude analyse l'impact des handicaps sur l'accès à l'école et le taux d'abandon parmi les enfants d'âge scolaire au Pakistan. Elle constate que les enfants handicapés ne sont pas scolarisés de manière disproportionnée. 69 pourcent des enfants handicapés de l'âge de scolarisation n'ont jamais été à l'école, contre 31 pourcent des enfants non handicapés. Même lorsqu'ils sont scolarisés, ils ne parviennent pas à obtenir le niveau minimum d'éducation. Le troisième essai explore l'intersection du genre et le handicap dans la réussite scolaire. L'analyse des résultats scolaires des personnes âgées de 18 à 30 ans révèle un effet significatif du handicap sur le

niveau d'instruction en fonction du sexe, en particulier pour les femmes handicapées, qui sont plus vulnérables. Ces différences entre les sexes en matière de niveau d'éducation sont importantes au niveau du collège et du lycée, et persistent indépendamment de la gravité ou du type de handicap (cognitif, sensoriel, multiple). En résumé, ces essais mettent en lumière les défis qui empêchent l'accès équitable à l'éducation au Pakistan. Ils préconisent des politiques qui s'attaquent à des problèmes tels que le mariage précoce, l'inégalité entre les sexes et l'exclusion des personnes handicapées, ouvrant ainsi la voie à un système éducatif juste et inclusif.

Chapter 1

Introduction

1.1 Foreword

“Until we get equality in education, we won’t have an equal society.”

Sonia Sotomayor

In a world defined by development and unexplored potential, education as a social institution is one of the leading ways in reshaping societies, transforming lives, and exploring the untapped potential within each individual. It plays a pivotal role in driving the economic growth and development across all facets of society. In the realm of labour market outcomes, several studies demonstrated a positive relationship between individual’s educational level and favourable labour market outcomes, including employment rate and higher earning (see for instance, [Psacharopoulos and Patrinos \(2018\)](#); [Hanushek et al. \(2015\)](#)). The study by [Krueger and Lindahl \(2001\)](#) found one additional year of schooling on average within a country is associated with an 8 percent rise in GDP per capita. In relation to health, education has a profound impact, individuals with higher levels of education are more likely to have access to health information and adopt healthier lifestyles ([Cohen et al., 2013](#); [Cutler and Lleras-Muney, 2006](#); [Hampson et al., 2007](#); [Montez and Hayward, 2014](#); [Morton et al., 2016](#)). Education is intensely intertwined with the principle of human rights, equality, social inclusion, and poverty reduction. According to Amartya Sen’s capabilities approach, education is an essential element of human development that strengthens a person’s capabilities and freedom ([Sen, 1997](#)). Moreover, education dismantles the social barriers regarding gender, caste, colour, and location, enhancing the equitable distribution of resources ([Heß, 2020](#); [de Bruin and Liu, 2020](#)).

Indeed, education offers phenomenal advantages in sustainable development of society. However, when disparities within education sector are not addressed, the transcendent impact of education remains unattained, and the consequences can be detrimental to society. Educational disparities are described as unequal opportunities and allocation of educational resources across various social groups. When it begins to affect how people live their lives, the situation gets problematic. Recognising the pressing issue of inequalities and realising the transformational power of education, the majority of governments

throughout the world have ratified or committed to implementing the Sustainable Development Goals (SDGs). The SDGs, which were accepted in September 2015 by all United Nations Member States, represent a collective commitment to tackle global concerns, including the objective of achieving inclusive and equitable quality education for everyone (SDG 4) also endorsing education as a fundamental human right.

Despite the growing recognition and realisation of the issue, the presence of out of school children remains a global crisis. An estimated 258 million children of school going age (5-16) worldwide, constituting 17% of the global total, are out of school (UNESCO, 2020). The problem of out of school children is pressing issue in many developing countries, including Pakistan. Approximately 23 million Pakistani children are not attending school, contributing to a global total of 258 million and the literacy rate is approximately 60 percent (Durrani et al., 2017). Several factors besides prevailing lower literacy rate contribute to the prevalence of out of school children. Gender differences stand out as a significant barrier in developing countries, as cultural norms and conventional beliefs limit females' access to school, resulting in lower enrolment rates than boys (Alderman and King, 1998; Jayachandran, 2015; Wamalwa and Burns, 2017). Societal expectations, coupled with early marriages, limit girls' educational opportunity even further, perpetuating gender inequity and impeding progress toward inclusive education (Field and Ambrus, 2008). Furthermore, societal norms and geographical disparities worsen the problem, especially in rural and underprivileged groups like persons with disabilities (PWDs) where economic restrictions and a lack of educational infrastructure obstruct access to quality education (Singal et al., 2020; Ullah, 2022; Ejaz and Mallawaarachchi, 2023). Poverty-stricken families frequently prioritize immediate needs before education, continuing a cycle of educational inequality and impeding social mobility.

The ramifications of this catastrophe are far-reaching, since lack of education limits the potential of millions of children and youth, stifling their personal growth and socioeconomic development of the country. Despite the alarming rise in educational exclusion and the persistence of gender disparities in education, empirical research has not kept pace with analysing the various frictions within societies, such as intergenerational characteristics, early marriage, social norms, and disability-related difficulties. In this thesis, our objective

is to fill this void by addressing certain empirical concerns about educational outcomes of individuals in Pakistan.

Before examining the empirical questions, it is important to give an overview of the educational profile of Pakistan. This will offer a thorough understanding of the contemporary status of education in the country, highlighting key indicators, challenges, and trends.

1.2 An Overview of the Educational Indicators in Pakistan

Pakistan, a country in South Asia, is strategically important due to its location at the junction of South and Central Asia as well as the Middle East, see figure 1.1. It shares borders with India, China, Afghanistan, and Iran, and it has a 1,200-square-kilometer coastline on the Arabian Sea. Pakistan comprises a surface area of 796,096 square-kilometre and population of around 220 million people with GDP per capita approximately \$1,362, which places Pakistan in the category of low-middle-income countries (World Bank, 2021). Pakistan stands as the world's fifth most populous country, and the second most populous nation in South Asia.

Since its inception in 1947, Pakistan has achieved substantial increase and development in its education sector. At the time of independence, Pakistan had 8,413 primary schools, 2,190 middle schools, 408 secondary schools, 40 intermediate colleges, 19 degree-colleges, 46 technical and vocational institutions, and only two universities. However, in the last 73 years, Pakistan had made remarkable strides in expanding its educational infrastructure. The number of primary schools had increased to 180,217, middle schools to 47,182, secondary schools to 34,210, and higher secondary schools or intermediate colleges to 7,102. The number of degree colleges reached 3,021, technical and vocational 3,740 offering specialized training and skills development. Moreover, the country has 202 universities, providing a wide range of academic and research opportunities (Pakistan Education Statistics 2020-21, 2023)¹.

The expansion of educational infrastructure signifies the government's commitment to

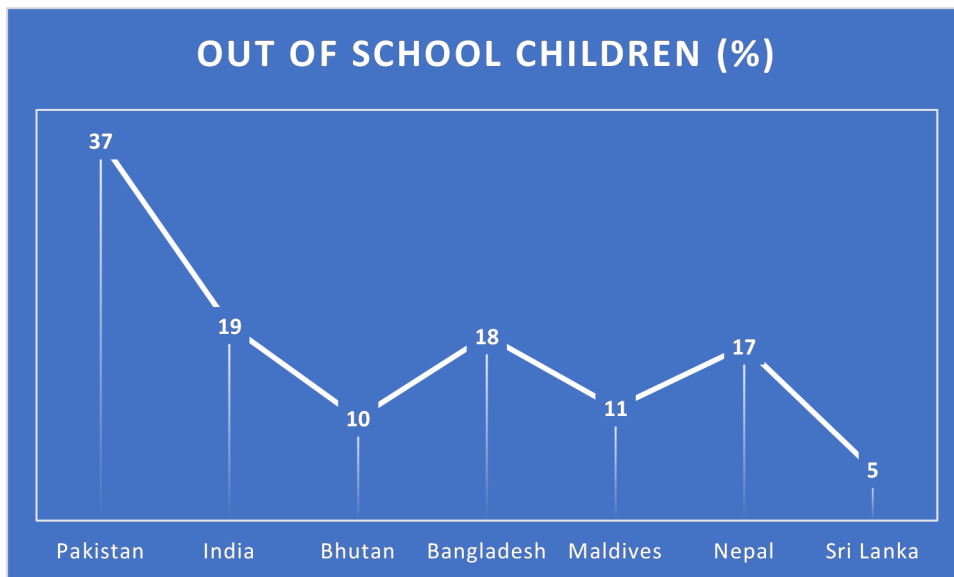
¹<https://library.aepam.edu.pk>

Figure 1.1: Administrative Map of Pakistan



Source: National Online Project

Figure 1.2: Comparative Rates of Out-of-School Children Across South Asia



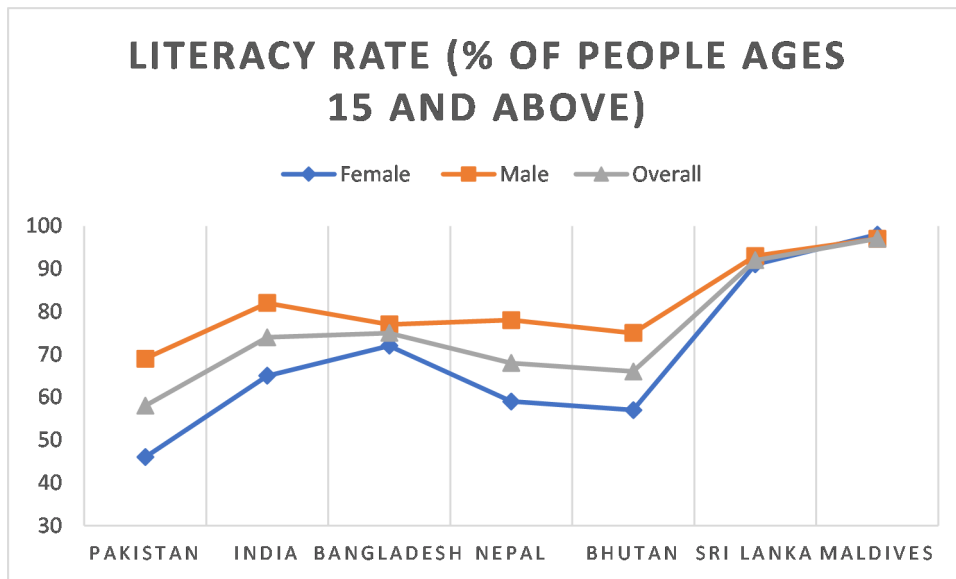
Source: Authors' calculation using the UNESCO Institute of Statistics 2019-20

improving educational access for all segments of the population. This expansion resonates with the overall population growth in Pakistan. However, despite this progress, the education sector grapple to ensure inclusive educational policy particularly in rural and marginalised communities. A critical issue is the significant number of children who are out of school in Pakistan, an issue that ranks the country second globally and first in South Asia.

Figure 1.2 shows the rates of out of school children in Pakistan alongside its comparison to other South Asian countries. This issue holds importance as Pakistan ranks at the forefront in South Asia. The chart shows that 37% of school-age children in Pakistan are not attending school. Other countries in the region have lower percentages: India has 19 percent, Bangladesh has 18 percent, and Nepal has 17 percent. Notably, Bhutan, Maldives, and Sri Lanka indicate considerably lower percentages of children out of school with 10%, 11%, and 5%, respectively.

Figure 1.3 compares literacy rates among individuals aged 15 and above in South Asian countries using data from World Development Indicators. Literacy rate refers to the percentage of persons aged 15 and above who can read and write with understanding a brief, simple statement about their everyday life. In comparison to its other regional counterparts, Pakistan records a low literacy rate of 58 percent. Literacy rates in India

Figure 1.3: Comparative Literacy Rates in South Asia



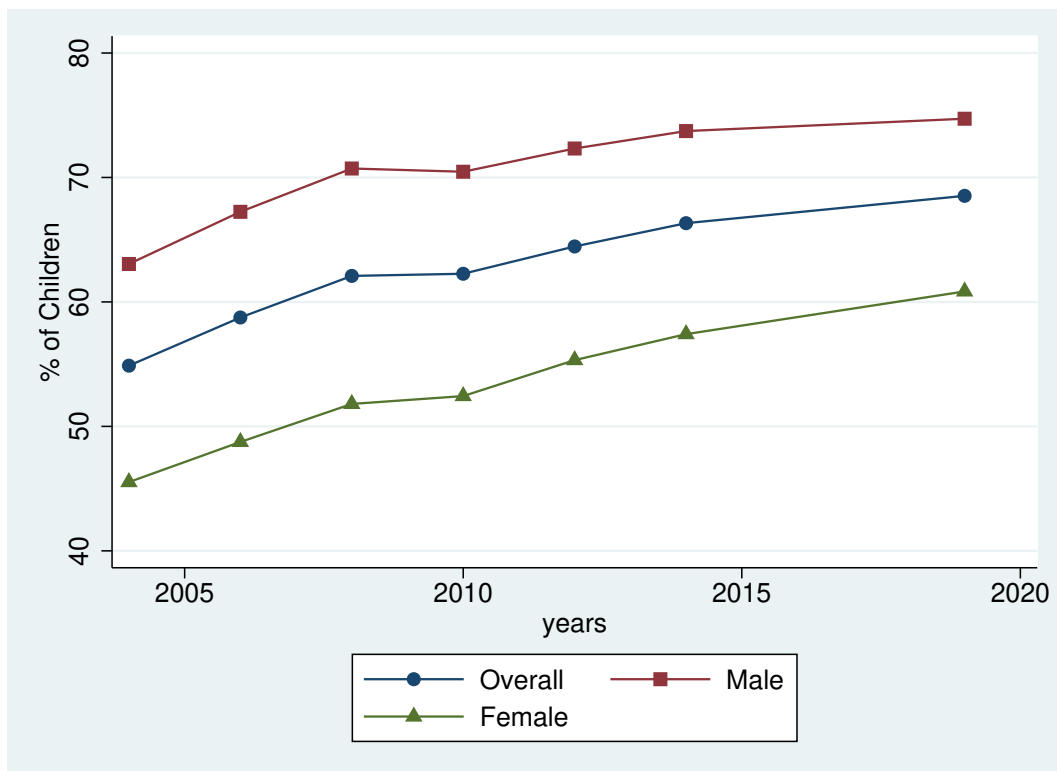
Source: World Development Indicators (2019-20)

are 74 percent, 75 percent in Bangladesh, 68 percent in Nepal, 66 percent in Bhutan, 92 percent in Sri Lanka, and 98 percent in the Maldives. The data reveal a substantial gender disparity in literacy rates across four countries: Pakistan, India, Nepal, and Bhutan (see lower and upper bands in 1.3). However, in Sri Lanka and the Maldives, outstanding literacy rates not only contribute to general literacy but also aid in establishing gender parity. This graph emphasizes the need for solving literacy difficulties, particularly gender gaps, in order to promote inclusive and equitable educational outcomes across South Asian countries. The statistics of out-of-school children and lower literacy rates, coupled with gender disparities, underscores the need for a comprehensive analysis of historical patterns in school enrolment in Pakistan by gender and rural-urban dynamics.

1.3 School Enrolment by Gender and Region in Pakistan

Observing school enrolment trends over time, particularly disaggregated by gender and rural-urban settings in Pakistan, helps us to uncover patterns and disparities. This approach can assist to understand if progress is being uniform or whether certain groups

Figure 1.4: Trend of School Enrolment Rate (2004-2019) by Gender

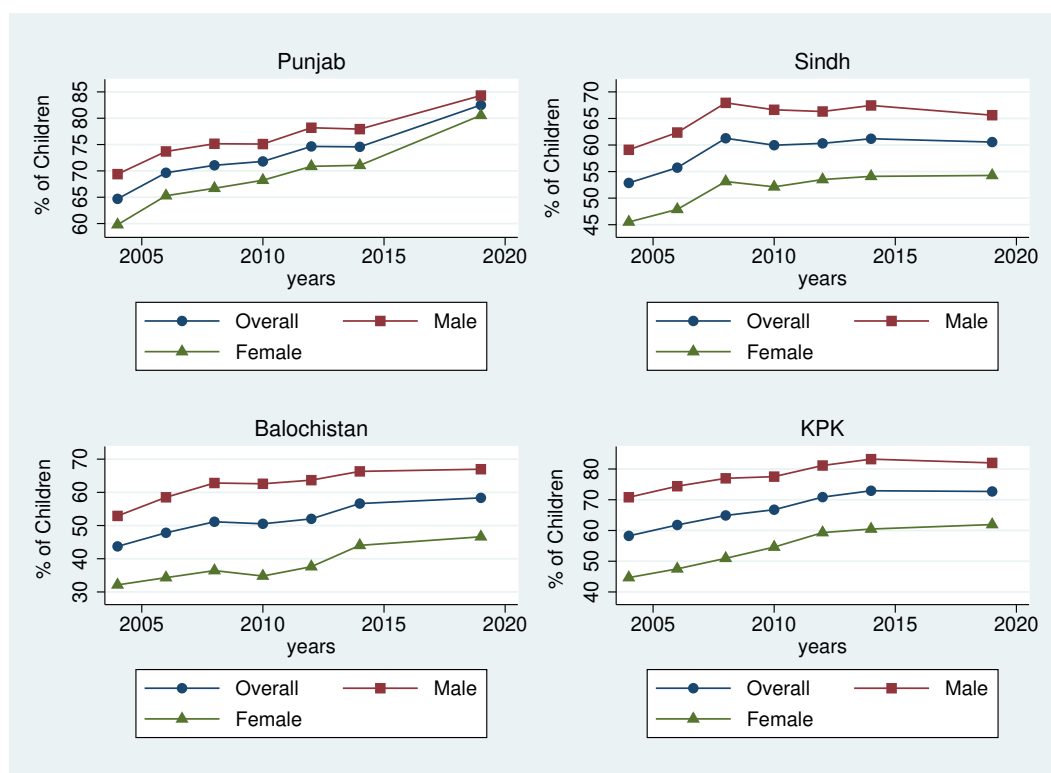


Source: Authors' calculation using PSLM dataset from 2004-05 to 2019-20

are left behind. Gender discrepancies in enrolment are especially important as it reflect societal norms, gender norms, access issues, and inequalities in educational possibilities. Similarly, differences in enrolment between rural and urban areas shed light on the disparities between regions within the country. Figure 1.4 depicts the pattern in school enrolment of children aged (5-16) years over the past 15 years (2004 to 2019), classified by the gender of the child. The data show that overall school enrolment has increased significantly, rising from 55% in 2004 to 69% in 2019. When analysing the patterns by gender, the lowest band of the chart portrays a troubling picture for female school enrolment.

In 2004, approximately 36% of girls were enrolled in school, lagging far behind the upper band's 63 percent enrolment rate for boys. Despite advancements throughout the years and reduction of gender gap, gender disparities persist. In 2019, while 75% of male children were enrolled in school, just 61% of female children were enrolled. These findings highlight the ongoing challenge of gender disparities in school enrolment and highlight the

Figure 1.5: Provincial Trend of School Enrolment Rate (2004-2019) by Gender

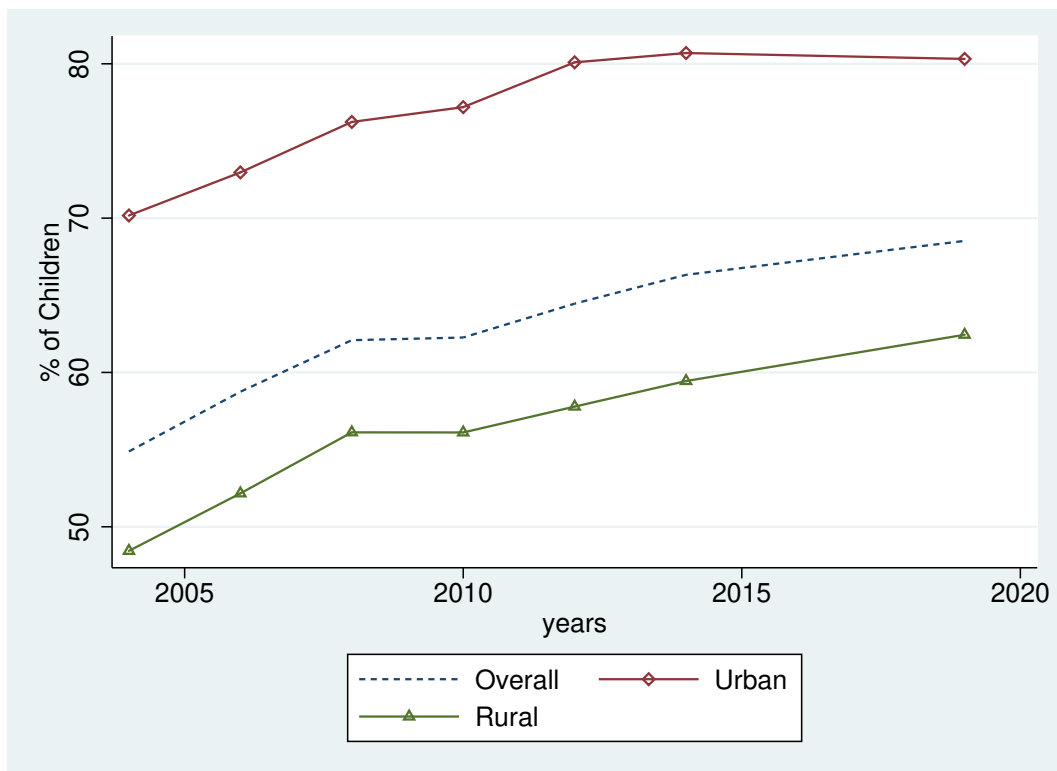


Source: Authors' calculation using PSLM dataset from 2004-05 to 2019-20

need for focused measures to close this gap and promote fair access to education for all children.

Pakistan's diversity encompasses a myriad of ethnicities, language, cultures, and social norms across different provinces. Exploring provincial data provides significant insights, particularly in a country like Pakistan, where education is now a provincial matter following the 18th amendment. Figure 1.5 depicts an overview of the enrolment rates across each province over the last fifteen years, disaggregated by child gender. Notably, in terms of educational enrolment, Punjab emerges as the most developed province. Punjab had a noteworthy enrolment rate of 65 percent in 2004, followed by Khyber Pakhtunkhwa (KPK) with 59 percent, Sindh with 53 percent, and Balochistan with 42 percent. Over the next fifteen years, a marked progress is evident across all provinces. Punjab continues its lead with the highest enrolment rate of 82 percent, followed by KPK at 73%, Sindh at 62%, and Balochistan at 59%. A critical view of the figure lies in its gender attribute, enrolment rates for female and male children. In 2004, gender gap in enrolment rates is

Figure 1.6: Trend of School Enrolment Rate (2004-2019) by Rural/Urban Setting

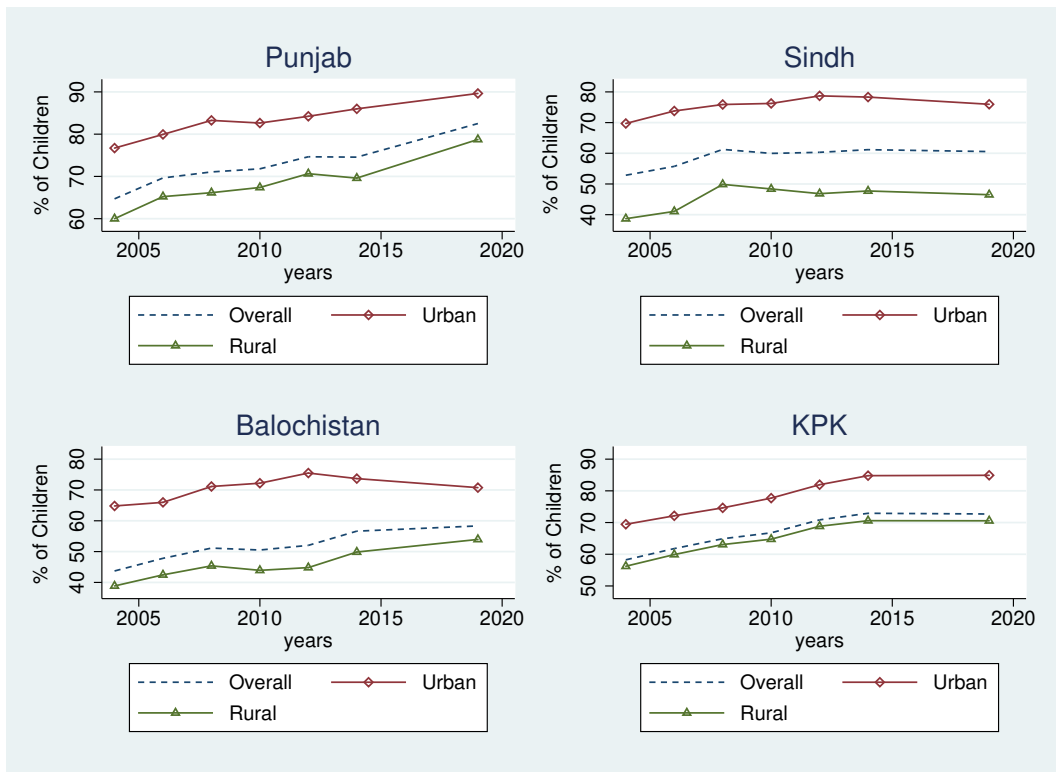


Source: Authors' calculation using PSLM dataset from 2004-05 to 2019-20

evident across all provinces. However, in 2019, there remains a noteworthy persistence of gender gaps across three provinces: Sindh, Balochistan, and KPK. In contrast, Punjab, which has the highest percentage of school enrolment, has made remarkable progress in narrowing the gender gap in education over the years. These provincial trends shed light on the persistent issues of educational access and emphasize the critical need for targeted interventions aimed at resolving gender-based inequities in education.

Moving ahead, we look at enrolment rates in rural and urban areas, starting with the overall country data and then moving on to each province. In Figure 1.6, enrolment rates for urban and rural areas are shown in upper band and lower band respectively over 15-year period (2004 to 2019). This visual representation reveals significant disparities between these regional settings. In 2004, a noticeable regional disparity is evident, with 45 percent of children in rural areas enrolled in school, compared to 71 percent in urban areas. This disparity decreased over the 15-year period, as evidenced by the 2019 data. The country's urban areas had a commendable enrolment rate of 81 percent for children

Figure 1.7: Provincial Trend of School Enrolment Rate (2004-2019) by Region



Source: Authors' calculation using PSLM dataset from 2004-05 to 2019-20

in school, but rural areas trailed with 62 percent attendance. This high degree of disparity highlights the necessity of tackling the unique obstacles that rural areas face in terms of educational access.

The enrolment statistics of each province, as illustrated in Figure 1.7, provide critical information into the educational landscape. It is worth noting that regional inequalities in enrolment rates exist across all four provinces. Lower enrolment rates were found, particularly in rural Sindh and Balochistan. In 2004, both provinces reported an estimated enrolment rate of 40%, compared to rates of 60% in Punjab and Khyber Pakhtunkhwa (KPK). Over the next 15 years, unique patterns of progress emerged.

In rural Sindh, progress is relatively lesser, with the enrolment rate reaching 49 percent in 2019. Rural areas of Punjab, Balochistan, and KPK, on the other hand, have made improvement. The enrolment rate rural Punjab increased from 60% in 2004 to 80% in 2019. Similarly, Balochistan showed significant development, rising from 40% in 2004 to 55% in 2019. KPK likewise had a good trend, with enrolment rates increasing from 58%

in 2004 to 71% in 2019. Similar patterns of progress can be observed in urban areas as well. However, the existence of regional disparities in enrolment rates is present despite progress. Notably, the differences are particularly pronounced in Sindh and Balochistan.

1.4 Objectives

After giving a brief overview of the widely acknowledged potential of education, juxtaposing Pakistan's educational indicators with its regional countries and showing trend of the children's access to schooling in relation to gender, and rural and urban settings. Amidst improvement in the enrolment rate, gender and regional disparities in education remains intact. In light of these critical imperatives, it is important to embark on a more profound exploration into the empirical dimensions that have remained relatively unexplored in the country. The objective of the thesis is to study the educational outcomes of the marginalized segment of society, particularly focusing on gender differentials and disability related issue. Addressing these issues can help unlock the potential of marginalised groups and eventually can lead to long-term economic gains in a society.

In the first study of the thesis, presented in chapter 2, we focus on examining the potential gender differences in educational outcomes attributed to mother's early marriage in Pakistan. Educational outcomes encompass two main categories that collectively define the educational landscape of the children. The first category, viewed as the parental educational investment perspective includes school enrolment, the discerning choice of between private and public schools, and the educational expenditure. The second category shows the children's educational performance and encompasses the grade progression, primary education completion, and completed years of schooling. The empirical investigation aims to scrutinize this question thoroughly, taking into account complex dynamics and frictions that might contribute to shaping these disparities. By examining the complex factors such as social norms, behavioural biases favouring sons, dynamics of birth order, mother's education, and maternal autonomy, we aim to shed light on the involved pathways through which early marriage may impact the educational outcomes of children, particularly in relation to gender.

In the second study of the thesis, which unfolds in chapter 3, we undertake a significant research question, are children with disabilities (CWDs) disproportionately out of school? This analysis extends to include both categories of out-of-school children, distinguished as those who have never been enrolled and those who were previously enrolled but are not anymore. Each category unveils two distinct zones of educational exclusion. The choice to exclude CWDs from educational environments could arise due to the stigma attached to disabilities, prompting parents to keep ways from school altogether. However, for case where CWDs are initially enrolled, specific supply factors and environmental barriers might lead to their subsequent dropout. We perform thorough empirical analysis to see whether an intra-household disability gap in children's schooling outcome. Our investigation aims to determine if parents discriminate between children with and without disabilities when it comes to their school enrolment process. In addition, we analyse the situation where parents manage to enrol children with disabilities into schools and observe whether these CWDs are able to complete their basic education. Furthermore, examining a more detail, we analyse each distinct type of disability (visual, hearing, mobility, self-care, communication, and memory), shows the unique challenges associated with each and highlight the prospects of assistive devices. Taking into consideration factors such as gender, wealth, and parental attributes, this exploration provides insight into the complexity of the issue. We address the genetic component, by analysing the twin siblings, offering more comprehensive understanding of the impact of disability on education.

The third study of the thesis (chapter 4) explores the intersection of disabilities and gender in educational attainment. We seek to unravel whether the adverse effects of disabilities are same across genders, or if they exhibit variations. The analysis encompasses different educational levels, primary to higher education, to determine the scope to which gender-specific effect of disabilities vary across different level. We also explore the role of different types of disabilities—physical, cognitive, and multiple disabilities—in determining the gender gap in educational attainment. The analysis takes into account for demographic factors, maternal characteristics, regional attributes, and wealth status to see the heterogeneity in the effect. This detailed approach provides the complex interactions

between disabilities and gender which comprehend the better understanding the challenges that people with disabilities face when trying to get an education. In conclusion (chapter 5), we summarize our findings and put forth policy recommendations aimed at enhancing educational outcomes in Pakistan.

1.5 Data

We employ two different data sets, first, data used in the first study of the thesis is the latest round of Household Integrated Economic Survey (HIES) 2018-19, conducted by Pakistan Bureau of Statistics (PBS). HIES, a nationally representative, data covered 24,809 household from all the four provinces based on 1802 urban and rural Primary sampling units (PSUs). The second data set is Pakistan Social and Living Standard Measurements (PSLM), 2019-20. The PSLM provides comprehensive information on education, health, housing and sanitation and is the biggest source of data on socio-economic indicators in Pakistan. PSLM follows the two-stage stratification sampling method. In the first stage, the primary sampling units/enumeration areas are randomly chosen, while in the second stage, households are selected using a simple random sampling technique (Pakistan Bureau of Statistics, 2019). The 2019-20 survey provided information on 855,000 individuals from 176,790 households from all over the country.

1.6 Thesis Outline

The thesis is comprised of five distinct chapters. The first chapter serves as an introduction to the thesis. The second chapter empirically analyse the impact of mother's age at marriage and gender-based differences in child schooling in Pakistan. Chapters three and four revolve around a common theme: disabilities, but they address different questions. The third chapter analyse the impact of disabilities on school access and dropout rates among school-age children in Pakistan. The fourth chapter centres on Disabilities and Gender-Differentials in Educational Attainment, presenting evidence from Pakistan. The final chapter concludes the discourse presented in these chapters and proposes policy recommendations based on the research findings.

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Chapter 2

Mother's Age at Marriage and Gender-Differential in Child Schooling: Evidence from Pakistan

Abstract

In this study, we provide empirical evidence in support of intergenerational effects of women's marriage age on gender differentials in children's education using a nationally representative household survey from Pakistan. Our key findings are four-fold: First, we find that mother's age at marriage has no gender-specific impact on parental investment on children's education, be it school enrolment, the choice of school (public vs private) or the amount of expenditure allocated by the household. However, the beneficial effect of delaying mother's marriage is more pronounced among girls in terms of progress at school, primary school completion and completed years of schooling, implying that mothers transfer their human capital advantages/disadvantages more to the daughters. Second, gender disparities in children's educational outcomes are not only driven by disproportionate preference for boys prevalent in the society, but also by mothers' marriage age. Third, we find that the beneficial effect of delaying mother's marriage is more evident among the first-born girls. Girls born to later-marrying women get more time and resources to pursue their education and are able to attain more schooling compared to girls born to early marrying women. Fourth, we found that educational inequality in children is not entirely mediated through mother's education and autonomy, the role of mother's age at marriage still matters. Taken together, these findings suggest that delay in women's marriage is contributing to a narrowing down of gender inequalities in education across the current generation. The findings underscore the need to promote social and behavioural changes which lead to lower incidence of early marriage and incentivize girls' education. Delay in women's marriage is not only helpful for their own socioeconomic uplift through higher education but is also a catalyst to better educational outcomes and lower gender differentials in subsequent generation.

Keywords: Gender Differentials, Early Marriage, Education, Human capital, Pakistan.

JEL Codes: J15, J12, I24, J24, I25

2.1 Introduction

“Women share this planet 50/50 and they are underrepresented—their potential astonishingly untapped.”

EMMA WATSON

From educational attainment to household decision making, economic and social indicators in the developing countries favour men at large (Jayachandran, 2015). Gender inequalities have profound roots in South Asia, arising from patriarchal values and socio-cultural norms that manifests in male-favouring behaviour across the life cycle, from birth of a child (Edlund, 1999; Almond et al., 2013; Pörtner, 2022) to marriage market norms (Caldwell et al., 1983; Anderson, 2007; Makino, 2019). These features shape the general economic behaviour of a society as a whole, where female has disproportionately low access to opportunities particularly in education. Studies such as Alderman and King (1998); Sawada and Lokshin (2009); Maitra et al. (2016); Sahoo (2017) shed light on gender disparity in school enrolment, access to quality education, grade progression and education expenditure among households in the developing countries. Apart from economic conditions, cultural traditions and gender norms, an important factor that hinders women’s educational attainment is the practice of early marriage (Field and Ambrus, 2008; Raj et al., 2009; Parsons et al., 2015). According to article 1 of the Convention of the Rights of Child (CRC), early marriage- also known as child marriage- is formal or customary marriage that takes place before the person’s 18th birthday. The fifth sustainable development goals (SDGs) aim at ensuring gender parity and women empowerment by eliminating child marriage.

There are number of studies that report a negative relationship between early marriage of the women and their educational and health outcomes (see for instance, Jensen and Thornton (2003); Clark (2004); Nour (2006); Raj et al. (2009); Nasrullah et al. (2014)). Field and Ambrus (2008) estimate that a one year delay in women’s marriage age leads to 0.22 years of additional schooling for Bangladeshi women. The age at which a woman marries not only alters her educational and health trajectory but also has substantial

effect on future generations. Some studies (for instance, [Sekhri and Debnath \(2014\)](#); [Chari et al. \(2017\)](#)) identify the inter-generational effects of mother's age at marriage on child educational and health well-being. However, evidence on the gender-specific effects of mother's marriage age on children's educational outcomes is scarce. The issue is particularly pertinent in the context of Pakistan where 39 percent of women get married before the age of 18 ([Javed and Mughal, 2021](#)). The country ranks second in the world for the number of out of school children, majority of whom are girls ([UNICEF, 2017](#)). Moreover, many of the country's cultural and ethnic groups display strong preference for male child ([Zaidi and Morgan, 2016](#); [Javed and Mughal, 2022](#)). High prevalence of female early marriage combined with low level of literacy and cultural preference for boys create profound disadvantages for female child, which may accentuate the problem of gender inequality in a country that ranks 151 out of 153 countries on the gender parity index ([Schwab et al., 2020](#)). Although the effect of mother's marriage age on child well-being is well documented, the gender dimension of the impact on children's educational outcomes has remained relatively unnoticed.

This study aims to fill this research gap by investigating the gender specific effects of mother's marriage age on two categories of educational indicators. The first of these reflects the parental educational investment perspective while second category corresponds to the child's school performance. We examine whether mother's age at first marriage serves as a conduit for the transmission of gender gap in education. We seek to understand how mother's age at marriage, that exists within the society's cultural and gender norms, interacts with other individual characters to predict gender gap in education, and what might be the factors that underpin this gender gap in educational outcomes. To answer these questions, we used the latest round of Household Integrated Economic Survey (HIES) 2018-19, conducted by Pakistan Bureau of Statistics (PBS).

Our study mainly contributes to the literature in three ways:

First, we look for possible gender differences in educational indicators that may arise from mother's early marriage. Mothers pass on a measure of their social and human capital endowment advantage or disadvantage to their children. We are interested in identifying whether it is the sons or daughters who benefit more from this transmission.

For this purpose, we employ a simple linear regression model with an interaction term to capture the gender specific effect of mother's marriage age on children's educational indicators. Educational indicators belong to two categories: the first one, the parental educational investment perspective, includes school enrolment, choice of school (private vs public) and the amount of educational expenditure allocated by the household, the second category corresponds to child's educational performance, and includes grade progression, primary education completion and years of schooling. We take care of confounding factors by including demographic characteristics and culture-fixed effects to capture the time-invariant social norms that predict the decisions pertaining to girls' education. The results show that the beneficial effect of a delay in woman's marriage age is not dissimilar for male and female child's education in terms of parental financial commitment. The coefficients of interaction term are insignificant for school enrolment, private school choice, and log of educational expenditure. However, there is some evidence that girls born to late marrying mothers progress further in school, are more likely to complete primary education and attain more years of schooling, implying that postponement of women's marriage improves their education or say in the household, which may reduce or eliminate gender disparity in children's education.

Second, the study unpacks the demographic characteristics i.e., son preference and birth order, which may mediate the gender differentials in child's outcome on the one side, and mother's characteristics that may influence gender differentials in educational outcome on the other. Son preference is one of the important defining factor of household gender inequality and gender gap in education ([Wang et al., 2020](#)). Bearing a son is associated with mother's higher say in overall household decision making in Pakistan, particularly for mothers who get married before 18 years of age ([Javed and Mughal, 2019](#)). Moreover, the tendency to embrace traditional gender role is more common in early married women ([Asadullah and Wahhaj, 2019](#)). Cultural preferences for traditional gender role can be better understood through the children's birth order. The gender of the first-born is decisive: if the first-born is female, she would be expected to assist the mother in household chores. To substantiate our baseline findings, we restrict the sample to those mothers who have equal number of male and female children (sex ratio = 1). In this sample, one

can assume that gender differentials in child's outcome are not associated with the son preference. Instead, mother's age at marriage determines the gender gap in education. We find that the beneficial effect of delaying mother's age at marriage is more evident for the first born female child, suggesting that mother's early marriage have strong influence on the continuity and school performance of the first born girl.

Third, we explore the channels through which mother's age at marriage impacts children's gender-specific educational outcomes, including mother's education and say in household decision making. Early marriage is found to impede a woman's education prospects ([Field and Ambrus, 2008](#)). As a result, she lacks the social networking exposure that educational institutions provide ([Asadullah and Wahhaj, 2019](#)). Women who marry later are more likely to be educated, have more say at home, and have more educated husbands, all of which help her play a stronger role in her children's education. We find that mother's education and autonomy are among important channels which drive the gender-specific effects of marriage age on the child's education.

This paper is organized as follows. Section 2.2 briefly discusses relevant literature and the study's conceptual framework. Section 2.3 introduces the HIES dataset used in the study and provides descriptive statistics. Section 2.4 presents the empirical methodology employed. Section 2.5 reports the results and discusses key findings. Section 2.6 concludes and suggests policy implications.

2.2 Literature Review and Conceptual Framework

The fourth Sustainable Development Goal (SDG4) of the United Nations is to achieve universal enrolment and ensure that every child have access to free and quality primary and secondary education. Progress on reducing the global number of out-of-school children, adolescents and youth remains limited ([Jones, 2018](#)). One reason for this lacklustre performance is the lower demand for education among the disadvantaged households. This would particularly be the case if access to education differs by gender. Besides poverty, gender norms and cultural practices, prevalence of early marriage is a major cause of girls not completing primary education ([Lloyd and Mensch, 2008](#); [Malhotra](#)

et al., 2011; Yount et al., 2018). Extant literature provides empirical evidence for the effects of female early marriage on fertility rate, education, social disparity, and wealth redistribution (Fernández and Rogerson, 2001). Girls who marry before the age of 18 attain lower education, have less autonomy in the spousal household, higher birth rates and greater exposure to domestic violence (Jensen and Thornton, 2003).

In an important theoretical and empirical work, Field and Ambrus (2008) demonstrate the causal effect of women's age at marriage on the woman's educational outcomes and her children's well-being including their health and educational trajectory. Sekhri and Debnath (2014) find a strong relationship between women's age at marriage and their children's learning outcomes in India. A one-year delay in mother's marriage age increases the probability that the child can solve challenging arithmetic problem and perform reading task by 3.5 percentage points. In the same vein, Chari et al. (2017) report that a one-year delay in mother's age at marriage in India increases by 4.6 percent the probability that the child will get vaccinated, and by 3.1 percent the probability that the child will get enrolled in school.

Age at marriage determines a woman's education attainment, health status and say in the spousal household, which can also further influence the family composition including the number of children and preference for sons. These factors constraint the distribution of resources and raise the opportunity cost of schooling (Nishimura and Yamano, 2013). Durrant and Sathar (2000) report a strong link between Pakistani women's status at the micro and macro level and their children well-being. Their findings show that improvement of women's status within household will improve child health whereas improvement of women's status at the community level will enhance the educational opportunities of children, especially for girls. Early marriage excludes women from the social support structure that educational institutions provide, which in turn drives the tendency to accept and support traditional gender role (Asadullah and Wahhaj, 2019). Daughters of early married women are more likely to get married earlier because of existing social norms on age of marriage that put further constraints on the girls' educational attainment. The decisions about the daughters' marriage and its timing depends on various social, cultural and demographic factors that shape the parental preferences. These preferences

are formed by the existing social and cultural norms, and reflect collective social practices which are influenced by the prevailing beliefs, education and norms leading to conformity (Bicchieri et al., 2014; Delprato et al., 2017). Failing to conform can result in social disapproval and shame for the family.

Another dimension of cultural norms that shapes the parental preferences is the transfer of wealth between the bride's and groom's families at the time of marriage. Dowry, the transfer of gifts, gold, property, and durable items from the brides to the groom's family, is the predominant tradition in the Indian Subcontinent. In contrast, in the bride price tradition, more common in the two western provinces of Pakistan (Khyber PakhtunKhwa and Balochistan), payment is made by the groom's to the bride's family. In dowry-based societies, girls' families have greater incentive to marry off the girl child early as the dowry requirements increase with the girl's age (Parsons et al., 2015). Delay in marriage is therefore costly (Anderson, 2007). In bride price-based societies, an opposite monetary incentive is at work: families of adolescent and young girls get paid more given their higher perceived value (Makino, 2019).

2.3 Data

We employ data from the latest round of Household Integrated Economic Survey (HIES) 2018-19, conducted by Pakistan Bureau of Statistics (PBS)¹. HIES is conducted under the Pakistan Social and Living measurement Survey (PSLM) project since 2004. The current round covered 24,809 household from all the four provinces² based on 1802 urban and rural Primary sampling units (PSUs). The HIES is a comprehensive, nationally representative survey that collects information on various aspects of Pakistani households, including education, employment, income, health, demographic characteristics, water, and sanitation. The survey allots unique identification codes to fathers and mothers, which helps identify the couple's biological children. This attribute of the data helps us to establish mother's characteristics and their effects on child schooling in the respective household. The unit of analysis is children of school going age. We restrict our sample

¹downloaded from www.pbs.gov.pk

²Federally Administered Tribal Areas (FATA) and Gilgit Baltistan were not included in survey.

to children of school going age (aged 6-18) for whom mother's characteristics including age at marriage, sequence of birth, number of births, health, and education status are available in the dataset.

To identify the effect of mother's marriage on child schooling, we consider two categories of educational indicators of school going age children. The first category comprises of three variables of outcomes representing the parental educational investment perspective: The first variable is the school enrolment of the children who ever went to school. It is dichotomous variable which takes the value 1 if a child who ever attended school is currently attending the school, otherwise 0. The second is a binary indicator of children attending private school as compared to public school (private school choice). The third indicator is the log of educational expenditure. This category captures the resource constraint of the household and parental aspirations for educational investment on their children. The second category presents the education trajectory of the children who are enrolled in school. This category again includes three indicators. The first is the relative grade progression ratio which defined as the ratio of completed years of schooling over potential years of schooling, and can be given by the following formula:

$$\text{Relative grade progression} = \left(\frac{\text{COMPLETED YEARS OF EDUCATION}}{\text{AGE}-6} \right)$$

Our useable sample contains observations for 30,561 children from 11,740 households for the first education indicator, 20,624 children from 9,551 households for the second indicator, 20,645 children from 9,561 households for the third indicator, 15,143 children from 7,652 households for the fourth indicator, 7,144 children from 4,905 households for the fifth indicator, and 11,195 children from 6,580 households for the third indicator.

Table 2.1 shows summary statistics of children's educational indicators by mother's marriage age. The enrolment rates of children born to mothers who married after 18 are higher compared to those born to early-marrying mothers. For instance, 72 percent of the children born to women who married after turning 18 ever went to school, compared to 64 percent of children of early marrying-women. Enrolment in private schools and log of educational expenditure for children of late-marrying women are likewise higher. In the similar vein, once the child get to school, their performance in terms of grade

progression, primary education completion and years of schooling is higher for mothers who got married after the age of 18. Overall, school enrolment, enrolment in private school, educational expenditure, relative grade progression, primary completion, and years of schooling increase steadily with the mother’s marriage age. Figures 2.1-2.4 illustrate the

Table 2.1: Mother’s age at marriage and children’s education

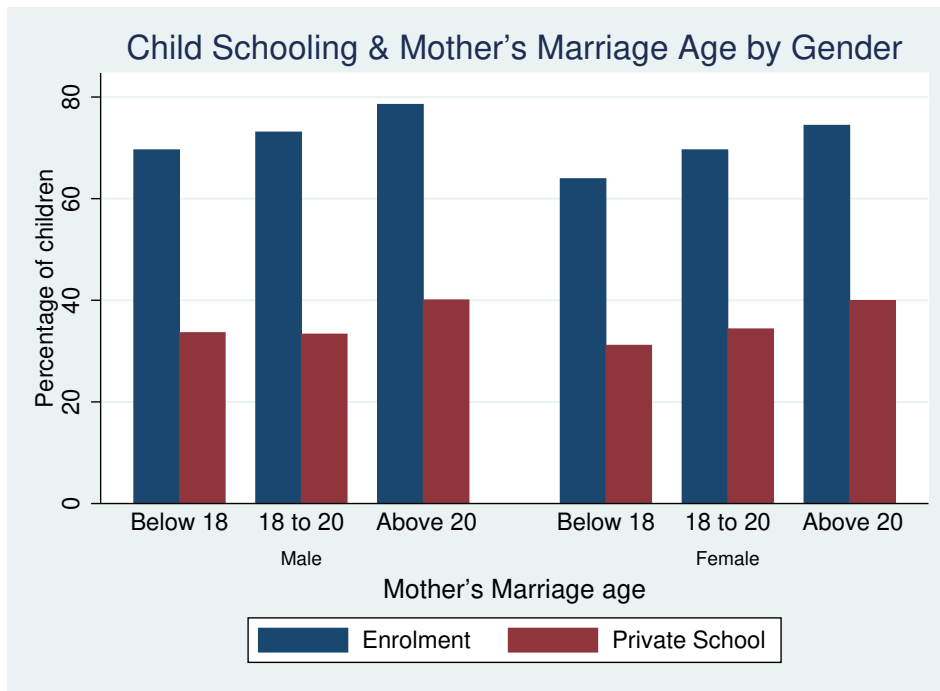
Variables	Overall		Age below 18		Age 18 to 20		Age above 20	
	Mean	Sd	Mean	Sd	Mean	Sd	Mean	Sd
Enrollment N	.677 30574	.468	.638	.48	.67	.47	.722	.448
Private Schooling N	.336 24229	.472	.307	.461	.32	.467	.377	.485
Expenditure on education N	8.65 20656	1.274	8.547	1.242	8.623	1.258	8.764	1.308
Relative Progression N	.742 15143	.249	.702	.258	.745	.248	.769	.24
Primary Completion N	.614 7148	.487	.551	.498	.623	.485	.662	.473
Years of Schooling N	5.026 11202	2.515	4.77	2.538	5.109	2.538	5.145	2.448

Source: Authors’ calculations using HIES 2018-19.

Notes: The table presents the mean and standard deviation of outcome variables used in the analysis. The sample contains information on individual level data for school-going age children aged 6-18, for each of the three subsamples of mothers.

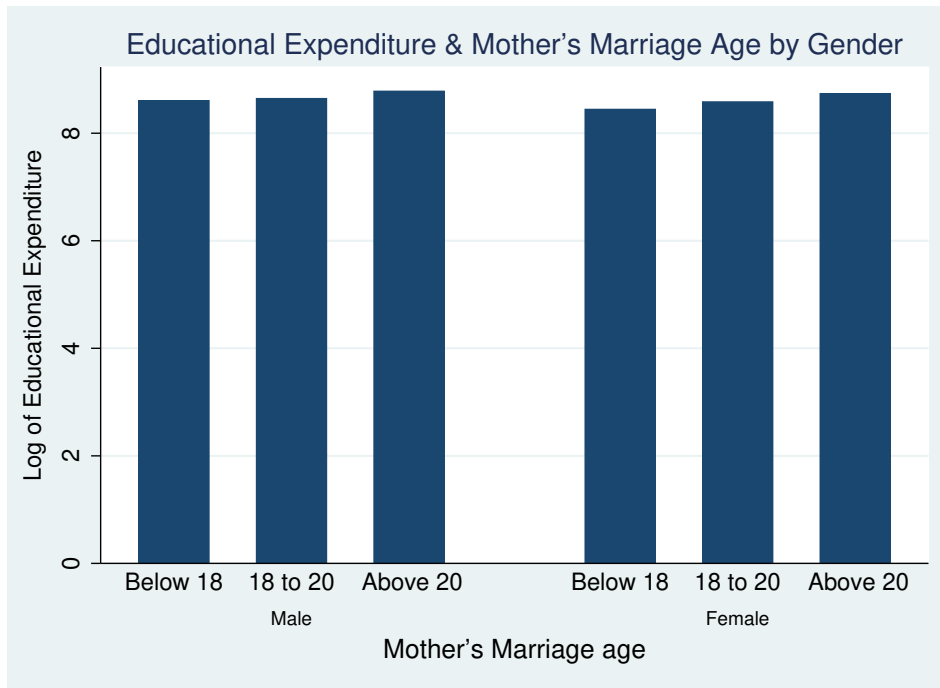
relationship between mothers age at marriage and child education outcomes by the gender of the child. Figures 2.1 and 2.2 plot the distribution of children’s school enrolment and educational expenditures by mother’s marriage age for both boys and girls. The proportion of children who ever attended the school and the proportion of private school enrolment and educational expenditure increase correspondingly with mother’s marriage age for both boys and girls. For instance, 31 percent of boys born to early-marrying mothers are reported to have never attended school compared to 35% of girls. The proportion of children who never attended the school decreases as the mother’s marriage age increases. Figures 2.3 and 2.4 show the relationship between the children’s educational outcomes and marriage age of mothers by gender of the child.

Figure 2.1: Child schooling and mother's marriage age by child's gender



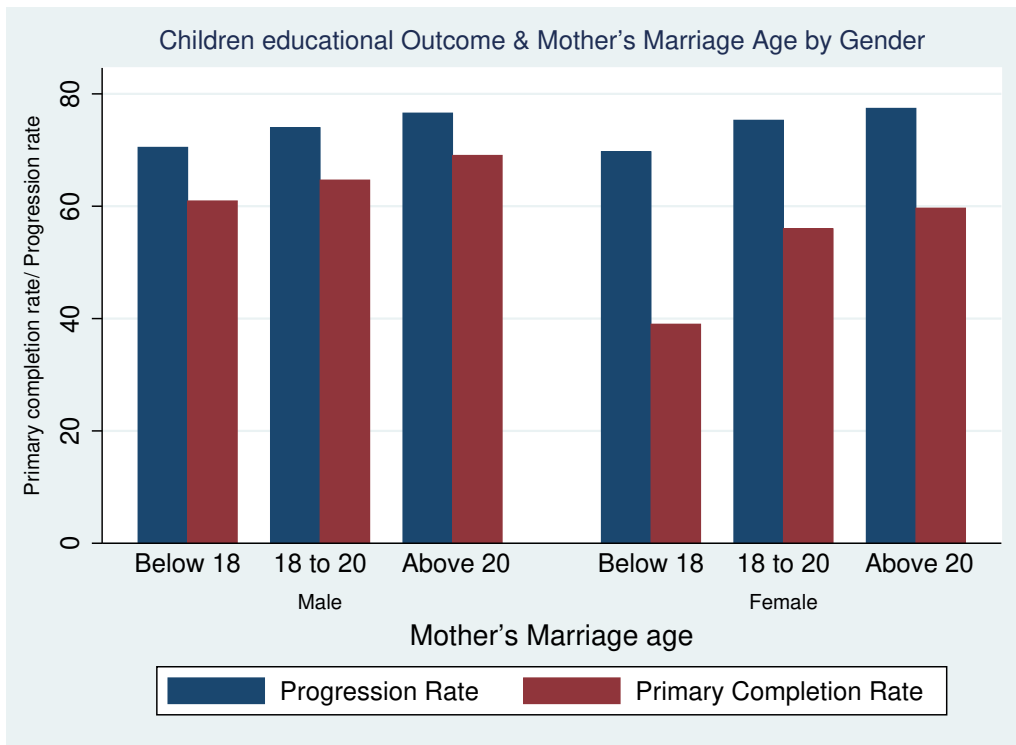
Source: Authors' calculations using HIES 2018-19.

Figure 2.2: Expenditure on child's education and mother's marriage age by child's gender



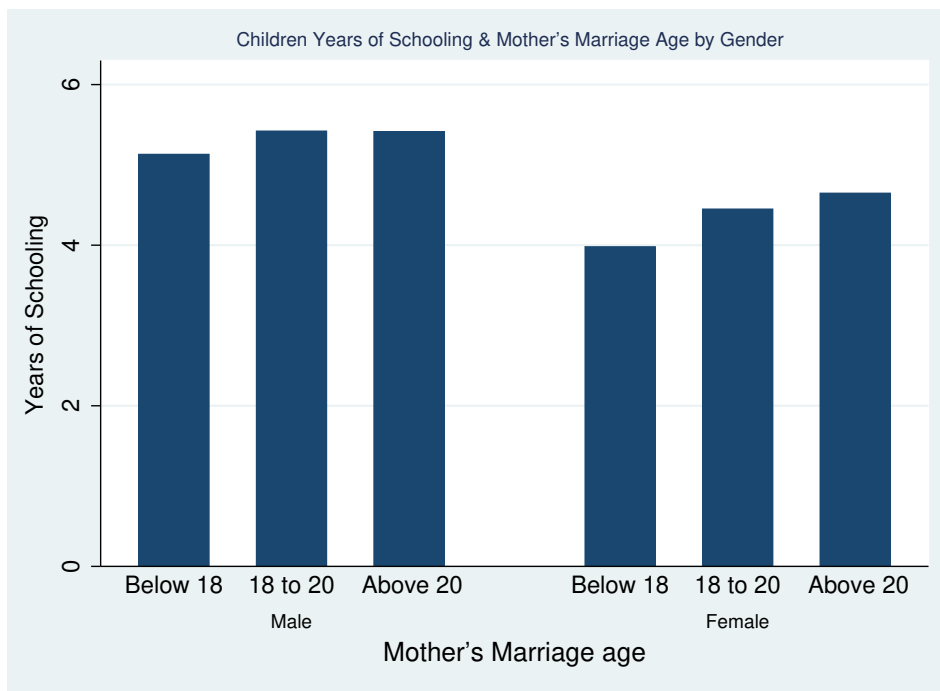
Source: Authors' calculations using HIES 2018-19.

Figure 2.3: Child schooling and mother's marriage age by child's gender



Source: Authors' calculations using HIES 2018-19.

Figure 2.4: Children's Years of Schooling and mother's marriage age by child's gender



Source: Authors' calculations using HIES 2018-19.

Progression ratio and primary completion increase as mothers' marriage age increases, but the beneficial effect of delaying mothers' marriage age is more evident for girls (Figure 3). For instance, 61% of girls born to early married women didn't complete primary schooling as compared to 40% of boys. A similar pattern can be observed in figure 4. The number of years of schooling for girls whose mothers got married before 18 is lower compared to that of boys born to early married mothers.

2.4 Empirical Methodology

2.4.1 Model

We begin by employing a fixed effects model. The baseline specification of the model can be given as follows.

$$Y_{CMH} = \beta_0 + \beta_1 \text{Marriage Age}_{MH} + \beta_2 \text{Female}_{CMH} + \beta_3 (\text{Marriage Age}_{MH} \times \text{Female}_{CMH}) + \beta_4 X_{CMH} + \alpha_C + u_{CMH} \quad (1)$$

Here, Y_{CMH} is the set of educational indicators that comprise two categories of educational outcomes for the child 'C' born to the mother 'M' in the household 'H'. MarriageAge_{CMH} is an indicator for marriage age of mother M in household H, defined as the age at woman's first marriage. Female_{CMH} is an indicator for the child's gender. Our variable of interest is the interaction of mother's marriage age and female child, β_3 is the coefficient of the variable of interest, which indicates gender-specific impact of mother's marriage age on children's educational outcomes. X is the vector of covariates at the child, parent, and household level. Child level controls include age, birth order, and sibling size. Parental controls include mother's education, mother's autonomy and father's education and household covariates include income and region of residence. Mother's autonomy, defined as the ability of women to make decisions within the household, is measured by creating the female autonomy index using a unique survey design that collects information on

domestic decision making by employing . The HIES interviews women in the household independently about who makes the decision- herself, her spouse or both on a wide range of household activities such as the decisions pertaining to children’s education, marriage, food, clothing, use of birth controls and whether or not to continue childbearing. We generate the women autonomy index through principal component analysis (PCA) by including the above-described decision-making variables within a given household³.

Table 2.2 presents summary statistics for the variables of interest and other child, parental, and household characteristics. The average age of school going children is 10.5 years, 41.1% of them are girls, and each child has on average 2.2 siblings. The average age at marriage for mothers is 19 years. Mothers have 2.3 years of education on average compared to 5.2 years for fathers. Mother’s autonomy increases with marriage age. Women who marry before and after 18 years of age have an autonomy score of 0.004 and 0.14, respectively. On the same lines, women who married before and after 18 attained 1.49 and 3 years of education respectively.

Women’s marriage age may plausibly be correlated with the error terms shown in equation 1, and may not vary randomly and independently from the system of variables given in equation (1). Another challenge may arise due to measurement errors in marriage age which was self-reported by the women at the time of the survey. Besides, children’s developmental outcomes may also result from mother’s unfavourable socioeconomic conditions, which may to a certain extent, determine the age at which the mother got married. Using mother-fixed effects is not possible as it would not only sweep out the effect of mother’s unfavourable characteristics but also the effect of mother’s age at marriage on children’s schooling.

Unobserved factors determining women’s age at marriage may also correlated with children’s educational outcomes. For example, characteristics such as the linguistic and ethnic diversity found in various regions of Pakistan, and cultural traits or social norms pertaining to marriage market may determine women’s marriage age at the one hand, and the decisions regarding girls’ schooling at the other. The marital traditions of dowry and

³Scree plot was used to retain the number of component. Plot given in appendix, which shows levelling of eigenvalues after the two principal components and retained three component

Table 2.2: Summary statistics by mother's marriage age

Variables	Overall		Marriage age below 18		Marriage age b/w 18 to 20		Marriage age above 20	
	Mean	Sd	Mean	Sd	Mean	Sd	Mean	Sd
Child's Characteristics								
Female	.411	.492	.406	.491	.404	.491	.426	.495
Age	10.554	3.364	10.767	3.391	10.642	3.409	10.246	3.257
Birth order	2.489	1.557	2.596	1.601	2.509	1.57	2.368	1.492
Sibling size	2.237	1.453	2.311	1.434	2.236	1.466	2.173	1.45
Parental Characteristics								
Mother's marriage age	19.561	3.269	16.089	.858	18.947	.882	23.478	2.443
Mother's Education	2.322	4.125	1.49	3.191	2.299	4.029	3.098	4.791
Father's education	5.209	5.08	4.72	4.913	5.087	5.017	5.808	5.252
Household Characteristics								
Income	12.715	.598	12.715	.586	12.7	.583	12.733	.626
Women autonomy	.069	1.704	.004	1.699	.065	1.712	.134	1.695
Region if rural	.664	.472	.683	.465	.665	.472	.645	.478

Source: Authors' calculations using HIES 2018-19.

Notes: The table presents the mean and standard deviation of selected individual, parental, and household level variables for each of the three subsamples of mothers.

bride price, for instance, play an important role in determining incidence of early marriage, and at the same time, impede the educational attainment of girls (Parsons et al., 2015). Therefore, it is important to consider the time invariant factors that may confound our results. The tradition of bride price is commonly practiced among the Pashtuns and the Baloch, the ethnic groups belonging to the Khyber-PakhtunKhwa (KPK) and Balochistan provinces. In contrast, Dowry is widely practised among other ethnic groups of the country (Makino, 2019). The HIES survey allow us to disaggregate the data by ethnicity on the basis of the language spoken at home. Given the fact that the dominant ethnicities of the country's differ in their marital traditions provides us the required variation to control for the social norms (dowry/bride price) prevalent in the marriage market. We include these culture-fixed effects to control for cultural differences in the marriage market.

Another problem may occur from the recall bias/measurement error in the marriage age. To address this issue, we restrict the sample to the cohort of mothers who married in recent years. Our estimations may also suffer from self-selection bias if the child's gender is endogenous. Son preference is widespread in Asian countries, with Pakistan being no exception, for instance see, Edlund (1999); Guilmoto (2009); Javed and Mughal (2019). Preference for sons is commonly attributed to the patriarchal and patrilineal family system. It expresses itself in sex selection methods used by parents to ensure male births, leading to sex-selective abortions witnessed in China and India. However, strong religious injunctions against female infanticide make them unacceptable in the conservative Pakistani society (Zaidi and Morgan, 2016). Son preference in such a case mostly manifests itself in differential birth-stopping (Javed and Mughal, 2022). According to the biosocial theory, sex differences provide legitimacy to the differential roles of boys and girls (Wood and Eagly, 2002). This discriminatory behaviour arises from the influence of social norms in deciding gender roles, for instance, female as a role of homemaker and male as breadwinner. In Pakistan, girls are generally expected to assist their mothers with domestic work, and the first-born girl is often responsible for looking after siblings and other family members. As a result, her education is not considered a priority. This role of birth order in educational outcomes is well documented in the economics literature, for instance see, Booth and Kee (2009); De Haan (2010); Oliveira (2019).

We address the potential of selection bias in our sample due to cultural norms such as son preference in two ways: first, by restricting the sample to mothers who have equal number of male and female children (Children Sex ratio=1), and second, by comparing the results for the subsamples of firstborn and later-born children.

2.4.2 Gender differential in Mother's Marriage Age Effect – Transmission Mechanism

We investigate how the differential impact of the mother's age at marriage on children's educational outcomes gets transmitted. We consider two possible transmission channels, namely mother's education and autonomy. We examine these mechanisms by comparing the differential impact of mother's marriage age on the child's education of two sets of subsamples pertaining to less-educated and highly educated mothers, and mothers with below-median and above-median autonomy.

Early marriage is a major obstacle to women's education ([Field and Ambrus, 2008](#)). It can affect women's preference for education as well as their bargaining power in the spousal household. On the one hand, mother's education acts as a key driver of children's education, and on the other hand, influences the age at which the mother gets married. In a patriarchal set up, women enjoy little autonomy as household decisions are mostly made by either the husband or elders in the spousal household. The HIES data allow us to distinguish such households where women have a say in household decisions pertaining to education, marriage, food, clothing, use of birth control methods and number of children. We generate a women autonomy index through principal component analysis. The sample is then divided into quantiles. As shown in Table 2, women's autonomy score and education increases by women's marriage age, indicating that women who marry before 18 years of age attained less education and hold less autonomy in the household decision making.

2.5 Results

In this section, we summarize the results of our analysis. We begin by estimating the gender differential effect of mother age at marriage on the two sets of child schooling and educational outcomes. Next, we consider the role of son preference and children's birth order. In the next step, we examine the two transmission channels through which mother age at marriage may have differential effect on child schooling and educational outcomes. Finally, we present the results of some robustness measures.

2.5.1 Baseline Findings

Table 2.3 reports estimation for the six indicators of children educational outcomes representing the two broad categories. Each estimation includes the interaction of child gender with mother's marriage age along with full sets of controls and culture fixed effects. We are interested in the sign and significance of the interaction term $MarriageAge_{MH} * Female_{CMH}$. A positive sign would suggest a beneficial role of mother's late marriage on girls' education. Columns 1-3 show the results for first category of educational indicators including school enrolment, private schooling and educational expenditure on the child. The coefficients of the interaction term in all the three estimations are found to be insignificant, implying that mother's age at marriage has no gender-specific impact on children's education investment. However, the impact of mother's late marriage on girl's educational attainment is significant. Columns 4-6 present the coefficients of the interaction term for the child's relative grade progression ratio, primary school completion, and years of schooling indicators, respectively. The coefficient of the interaction term is positive and significant at 1 or 5% level of significance, implying that a woman's later marriage affects the educational outcomes of girls more strongly than boys.

2.5.2 Role of Son Preference and Birth Order

Now we examine if the afore described interaction effects are a reflection of selection bias that appears in the sample due to the prevalent son-preferring social norms. We restrict the sample to mothers who have an equal number of boys and girls, i.e. the gender

Table 2.3: Mother's marriage age and gender differentials in children's educational outcomes

VARIABLES	School	Private School	Educational	Grade	Primary	Years of
	Enrolment	Enrolment	Expenditure	Progression	Completion	schooling
	(1)	(2)	(3)	(4)	(5)	(6)
Mother's Marriage Age	0.001 (0.001)	-0.001 (0.001)	0.005* (0.003)	0.003*** (0.001)	0.006*** (0.002)	0.028*** (0.006)
Female Child	-0.089*** (0.030)	-0.055 (0.037)	-0.099 (0.088)	-0.065** (0.026)	-0.140* (0.074)	-0.462** (0.191)
Mother's Marriage Age* Female Child	0.001 (0.001)	0.001 (0.002)	0.003 (0.004)	0.003** (0.001)	0.011*** (0.004)	0.029*** (0.009)
Constant	0.187*** (0.062)	-1.736*** (0.079)	-0.874*** (0.197)	0.438*** (0.054)	-2.068*** (0.137)	-9.853*** (0.399)
Observations	30,561	20,624	24,129	15,143	7,144	11,195
R-squared	0.192	0.287	0.402	0.058	0.299	0.656
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Culture Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The table presents the gender-specific effects of mother's marriage age on child's education indicators: School enrolment, Private School enrolment, educational expenditure, Relative Progression Ratio, Primary completion, and Years of Schooling. All regressions include Culture fixed effects, and control for the individual, mothers, fathers, and household-level characteristics. Robust standard errors in parentheses. *** = significant at the 1% level; ** = significant at the 5% level; * = significant at the 10% level. The estimates, along with their corresponding covariates, are provided in Appendix Table A1

ratio of the children is 1. Here, we can assume that the gender differentials in children's outcomes are not driven by the preference for a male child, but rather that the mother's age at marriage matters itself in determining the gender gap in education. The results for the restricted sample reported in Table 2.4 are similar to our baseline results. As before, results shown in Columns 1-3 do not indicate any significant evidence of gender differentials in parental educational investment. Likewise, Columns 4-6 show that there is a strong evidence that female children benefit differentially in terms of grade progression, primary education completion and years of schooling.

Another way through which gender-specific effects of mother's marriage age can vary is the children's birth order. As discussed earlier, firstborn girls are often required to take up household chores and responsibilities to care for other siblings. Consequently, the impact on the firstborn girls should be greater than that on later-order girls. Table 2.5 presents the results of gender differentials among first-born and later-born children. As seen in our preceding estimates, we do not find any gender differentials in the effect of a mother's marriage on children's school enrolment, private school choice, and educational expenditure Columns 1– 6. These effects remain insignificant regardless of whether or not the child is a firstborn, suggesting that gender-specific parental investment in children's education does not differ by birth order. However, we find strong evidence of gender differential impact on children's grade progression, primary education completion and years of schooling Columns 7, 9, and 11. These effects are more evident among the first-born children as gender differential impact for later born children is insignificant for grade progression and years of schooling Column 8 and 12. This corroborates our argument that the beneficial effect of delaying the mother's marriage age is more pronounced for first-born female children and suggests that mothers pass on their social or human capital endowment advantages/disadvantages disproportionately to their first-born daughters relative to the later-born girls. Compared to early-marrying women, later-marrying women are on average more educated and have fewer children (Javed and Mughal, 2021), and their firstborn girls can be expected to get the time and resources required to continue their schooling. This indicates that marriage market is one of the important channels through which a mother's characteristics have a strong influence on a girl's education.

Table 2.4: Mother's marriage age and gender differentials in children's educational outcomes (sex ratio=1)

VARIABLES	School	Private School	Educational	Grade	Primary	Years of
	Enrolment	Enrolment	Expenditure	Progression	Completion	schooling
	(1)	(2)	(3)	(4)	(5)	(6)
Mother's Marriage Age	-0.002 (0.003)	-0.001 (0.003)	0.007 (0.008)	-0.001 (0.002)	-0.007 (0.005)	-0.012 (0.017)
Female Child	-0.115 (0.072)	0.015 (0.088)	-0.057 (0.203)	-0.211*** (0.059)	-0.307* (0.157)	-1.321*** (0.448)
Mother's Marriage Age* Female Child	0.002 (0.004)	-0.004 (0.004)	-0.001 (0.010)	0.010*** (0.003)	0.020** (0.008)	0.077*** (0.022)
Constant	0.500*** (0.150)	-1.546*** (0.196)	-0.712 (0.513)	0.710*** (0.133)	-1.918*** (0.375)	-8.701*** (1.015)
Observations	4,950	3,404	3,404	2,525	1,009	1,677
R-squared	0.179	0.308	0.418	0.085	0.315	0.653
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Culture Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes

Notes: In this table, we repeat the baseline estimations on the sample of mothers who have an equal number of male and female children (sex ratio=1) in order to isolate the role of son preference in determining gender differentials in children's educational outcomes. All regressions include Culture fixed effects, and control for the individual, mothers, fathers, and household-level characteristics. Robust standard errors in parentheses. *** = significant at the 1% level; ** = significant at the 5% level; * = significant at the 10% level. The estimates, along with their corresponding covariates, are provided in Appendix Table A2

Table 2.5: Mother's marriage age and gender differentials in children's educational outcomes (role of children's birth order)

VARIABLES	School Enrolment			Private School Enrolment			Educational Expenditure			Grade Progression			Primary Completion			Years of Schooling		
	Birth Order			Birth Order			Birth Order			Birth Order			Birth Order			Birth Order		
	First Born	Later Born		First Born	Later Born		First Born	Later Born		First Born	Later Born		First Born	Later Born		First Born	Later Born	
Mother's Marriage Age	0.005*** (0.001)	0.004** (0.002)		0.003 (0.002)	0.001 (0.002)		0.004 (0.004)	-0.005 (0.004)		0.002** (0.001)	0.004*** (0.001)		0.002 (0.003)	0.004 (0.003)		-0.013 (0.012)	-0.001 (0.013)	
Female Child	-0.018 (0.054)	-0.078* (0.044)		-0.015 (0.065)	-0.014 (0.051)		-0.299* (0.166)	-0.427*** (0.130)		-0.088** (0.042)	-0.053 (0.036)		-0.719*** (0.157)	-0.271** (0.112)		-2.810*** (0.579)	-1.354*** (0.424)	
Mother's Marriage Age* Female Child	-0.002 (0.003)	-0.000 (0.002)		-0.001 (0.003)	0.000 (0.003)		0.004 (0.008)	0.019 (0.006)		0.004* (0.002)	0.003 (0.002)		0.026*** (0.008)	0.009* (0.006)		0.067** (0.028)	0.031 (0.021)	
Constant	-0.132 (0.104)	0.216** (0.097)		-1.855*** (0.120)	-1.837*** (0.110)		-0.165 (0.305)	-0.746*** (0.280)		0.367*** (0.077)	0.350*** (0.078)		-0.513** (0.212)	-1.090*** (0.226)		-1.761* (0.931)	-2.742*** (0.885)	
Observations	10,236	13,463		7,181	9,187		7,216	9,186		5,775	6,710		3,009	3,287		4,544	5,146	
R-squared	0.178	0.200		0.289	0.275		0.354	0.365		0.068	0.063		0.080	0.087		0.119	0.097	
Controls	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Cultural Fixed Effects	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	

Notes: In this table, we repeat the baseline estimations on the subsamples of firstborn and later-born children. All regressions include Culture fixed effects, and control for individual, mother's, father's, and household-level characteristics. Robust standard errors in parentheses. *** = significant at the 1% level; ** = significant at the 5% level; * = significant at the 10% level.

2.5.3 Mediating Channels

Results reported in Table 2.6 focus on the mediating role of the mother's education. For this purpose, we repeat the estimations reported in Table 2.3 on two sub-samples based on mothers with below- and above-primary education, indicating the education profile of mothers. Delayed marriage age helps improve the education attainment of women (Field and Ambrus, 2008). This, in turn, can lead to greater intergenerational transmission of knowledge and enhance girls' educational attainment. Our results show that mother's education plays a strong mediating role in explaining the gender differentials in the effect of the mother's marriage age on children's educational attainment. The interaction term is significant in all the estimations involving school completion for the less-educated women subsample Columns 7, 9 and 11. The effect of the mother's marriage age on the child's educational attainment (grade progression, primary completion, and years of education) is more pronounced for girls. The coefficient of interaction term for primary school completion Column 10 is also significant in case of more educated mothers but it is insignificant for grade progression and years of schooling Column 8 and 12, implying gender differentials in the effect of the mother's marriage age are not entirely mediated through educational channel. However, the gender-specific impact of marriage age on parental investment remains mostly insignificant as before Columns 1-6, suggesting that the complementary effect of mother's education do not pass through financial dimension of parents' commitment to the child's education (e.g. private schooling, greater spending on education).

Next, we focus on women's autonomy channel. Table 2.7 presents the results of estimations carried out on the subsamples of women with below- and above-median autonomy in household decision making. Irrespective of the degree of autonomy the mother enjoys, mother's marriage age is found to have a persistently strong effect on a girl's educational trajectory Columns 7-12. The impact of mother's age on child grade progression, primary education completion, and years of schooling is greater for girls for mothers with low as well as high level of autonomy. The impact on parental education investment, just as seen previously, does not vary by the child's gender Columns 1-6. These findings show that out

Table 2.6: Mother's marriage age and gender differentials in children's educational outcomes (by mother's education)

VARIABLES	School Enrolment		Private School Enrolment		Educational Expenditure		Grade Progression		Primary Completion		Years of Schooling	
	Mother's Education		Mother's Education		Mother's Education		Mother's Education		Mother's Education		Mother's Education	
	Below Primary	Above Primary	Below Primary	Above Primary	Below Primary	Above Primary	Below Primary	Above Primary	Below Primary	Above Primary	Below Primary	Above Primary
Mother's Marriage Age	0.004*** (0.001)	0.005*** (0.001)	-0.001 (0.001)	-0.001 (0.003)	0.002 (0.003)	0.009 (0.006)	0.004*** (0.001)	0.004*** (0.001)	0.008*** (0.002)	-0.001 (0.003)	0.036*** (0.006)	0.016** (0.009)
Female Child	-0.084** (0.036)	0.116*** (0.040)	-0.054 (0.042)	-0.036 (0.080)	-0.191* (0.099)	0.135 (0.184)	-0.072** (0.029)	-0.006 (0.038)	-0.105 (0.080)	-0.143 (0.109)	-0.554** (0.225)	-0.114 (0.275)
Mother's Marriage Age* Female Child	-0.001 (0.002)	-0.004 (0.002)	0.001 (0.002)	-0.001 (0.004)	0.008* (0.005)	-0.010 (0.009)	0.002* (0.001)	0.001 (0.002)	0.007** (0.004)	0.014*** (0.005)	0.026** (0.011)	0.020 (0.013)
Constant	-0.104 (0.078)	0.597*** (0.074)	-1.895*** (0.095)	-1.356*** (0.146)	-0.568** (0.227)	-1.380*** (0.379)	0.456*** (0.062)	0.322*** (0.075)	-2.455*** (0.156)	-1.554*** (0.206)	-10.693*** (0.457)	-9.345*** (0.535)
Observations	25,095	5,466	15,507	5,117	15,516	5,129	11,480	5,281	5,432	2,440	8,527	3,851
R-squared	0.167	0.058	0.173	0.218	0.298	0.317	0.037	0.043	0.314	0.253	0.625	0.718
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cultural Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: In this table, we repeat the baseline estimations on the subsamples of mothers with below- and above-primary schooling. All regressions include Culture fixed effects, and control for the individual, mother's, father's, household-level characteristics. Robust standard errors in parentheses. *** = significant at the 1% level; ** = significant at the 5% level; * = significant at the 10% level.

Table 2.7: Mother's marriage age and gender differentials in children's educational outcomes (by mother's autonomy)

VARIABLES	School Enrolment		Private School Enrolment		Educational Expenditure		Grade Progression		Primary Completion		Years of Schooling	
	Mother's Autonomy		Mother's Autonomy		Mother's Autonomy		Mother's Autonomy		Mother's Autonomy		Mother's Autonomy	
	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Mother's Marriage Age	0.001 (0.001)	0.002 (0.001)	-0.001 (0.001)	0.002 (0.002)	0.005 (0.004)	0.005 (0.004)	0.003*** (0.001)	0.003*** (0.001)	0.007*** (0.002)	0.004 (0.003)	0.035*** (0.007)	0.018** (0.008)
Female Child	-0.155*** (0.040)	-0.059 (0.043)	-0.138*** (0.047)	0.059 (0.051)	-0.187 (0.119)	-0.049 (0.129)	-0.088*** (0.034)	-0.035 (0.036)	-0.123 (0.093)	-0.137 (0.098)	-0.509** (0.258)	-0.424 (0.268)
Mother's Marriage Age* Female Child	0.001 (0.002)	-0.000 (0.002)	0.004* (0.002)	-0.005 (0.003)	0.006 (0.006)	0.001 (0.006)	0.003* (0.002)	0.002 (0.002)	0.008* (0.005)	0.012** (0.005)	0.024* (0.013)	0.028** (0.013)
Constant	-0.055 (0.082)	-2.102 (1.581)	-1.751*** (0.092)	-3.211* (1.900)	-0.284 (0.235)	-11.746** (4.811)	0.455*** (0.066)	-0.486 (1.344)	-2.093*** (0.169)	-4.716 (3.213)	-10.261*** (0.489)	-27.694*** (9.401)
Observations	18,290	12,271	11,548	9,076	11,556	9,089	8,576	6,567	4,038	3,106	6,272	4,923
R-squared	0.215	0.191	0.281	0.294	0.359	0.405	0.051	0.067	0.316	0.307	0.657	0.656
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cultural Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: In this table, we analyze the effect of mother's marriage age on children's educational outcomes based on mother's autonomy. All regressions include Culture fixed effects and control for individual, mother's, father's, and household-level characteristics. Robust standard errors in parentheses. *** = significant at the 1% level; ** = significant at the 5% level; * = significant at the 10% level.

of the two mediation channels examined, women’s autonomy appears to play little role in modifying the gender-specific impact of marriage age. In contrast, mother’s education channel does have a role, but operates mainly through less-educated women.

All in all, the results reported in tables 3–6 confirm that there are no gender differentials in the effect of the mother’s marriage age on school enrolment, private school choice, and educational expenditure. However, we found pervasive evidence of gender differentials in the effects of mother’s marriage age on children’s educational performance, continuity, and attainment. In all results, the coefficient of interaction term for relative grade progression, primary education completion, and years of schooling is significant and positive, implying that the beneficial effect of delaying a mother’s marriage age on educational performance is more pronounced for girls. The results are highly similar across specifications and techniques and provide a coherent picture.

2.5.4 Robustness checks

Although major challenges to our empirical analysis that may occur due to confounding factors and sample selection have already been addressed, the problem of recall bias/measurement error in marriage age still needs to be addressed. To address the issue of recall bias, we restrict the sample to those mothers who got married in recent years. In our sample, the earliest marriage took place in 1983. We consider the latter half of the useable sample ordered by marriage age, i.e. women who married after 1999. Table 2.8 presents the evidence for the gender-specific effect of a mother’s marriage on children’s educational outcomes. The results remain the same as in our baseline estimations. The coefficients of the interaction term for parental education investment (school enrolment, private school choice, and educational expenditure) are all statistically insignificant see columns 1–3. However, there is consistent evidence for gender differentials in children’s grade progression, primary completion, and years of schooling because of the mother’s marriage age. Columns 4, 5 and 6 show that the coefficients of the mother’s marriage - female child interaction term are positive and significant at 1 or 5% level, and the corresponding values are similar to the baseline coefficients.

Finally, we focus on the two groups of women by age at marriage by replacing the

Table 2.8: Mother's marriage age and gender differentials in children's educational outcomes (recent cohort)

VARIABLES	School Enrolment	Private School Enrolment	Educational Expenditure	Grade Progression	Primary Completion	Years of Schooling
Mother's Marriage Age	0.000 (0.001)	0.000 (0.001)	0.007** (0.003)	0.003*** (0.001)	0.005* (0.003)	0.022*** (0.007)
Female Child	-0.149*** (0.035)	-0.036 (0.042)	-0.129 (0.105)	-0.068** (0.029)	-0.194** (0.097)	-0.639*** (0.230)
Mother's Marriage Age* Female Child	0.003 (0.002)	-0.001 (0.002)	0.003 (0.005)	0.003** (0.001)	0.014*** (0.005)	0.034*** (0.011)
Constant	0.110 (0.077)	-1.726*** (0.090)	-0.294 (0.224)	0.533*** (0.063)	-2.795*** (0.212)	-8.979*** (0.491)
Observations	17,672	12,797	12,779	9,912	2,824	5,367
R-squared	0.214	0.316	0.402	0.069	0.320	0.600
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Culture Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes

Notes: In this table, we repeat the baseline estimations on the subsample of mothers who married in or after the year 2000. All regressions include Culture fixed effects and control for individual, mother's, father's, and household-level characteristics. Robust standard errors in parentheses. *** = significant at the 1% level; ** = significant at the 5% level; * = significant at the 10% level.

Table 2.9: Mother's marriage age and gender differentials in children's educational outcomes (binary early-marriage indicator)

VARIABLES	School Enrolment	Private School Enrolment	Educational Expenditure	Grade Progression	Primary Completion	Years of schooling
	(1)	(2)	(3)	(4)	(5)	(6)
Mother's Early Marriage	-0.002 (0.007)	0.024*** (0.009)	-0.003 (0.022)	-0.030*** (0.006)	-0.031** (0.013)	-0.228*** (0.043)
Female Child	-0.073*** (0.006)	-0.038*** (0.007)	-0.033* (0.017)	-0.000 (0.005)	0.115*** (0.016)	0.157*** (0.037)
Mother's Early Marriage * Female Child	-0.017 (0.011)	-0.010 (0.014)	-0.024 (0.034)	-0.020* (0.010)	-0.125*** (0.026)	-0.180** (0.073)
Constant	0.217*** (0.058)	-1.750*** (0.075)	-0.766*** (0.187)	0.507*** (0.051)	-1.956*** (0.130)	-9.309*** (0.375)
Observations	30,561	20,624	20,645	15,143	7,144	11,195
R-squared	0.195	0.291	0.400	0.061	0.301	0.656
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Culture Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes

Notes: In this table, we replace the continuous indicator of mother's age at marriage by a binary indicator. All regressions include Culture fixed effects, and control for the individual, mother's, father's, and household-level characteristics. Robust standard errors in parentheses. *** = significant at the 1% level; ** = significant at the 5% level; * = significant at the 10% level.

continuous marriage age variable by a binary variable for early marriage. Mothers who had married before the age of 18 are assigned a value of 1, while those who married after the age of 18 are assigned a value of 0. We repeat the set of estimation given in equation 1 with the interaction term of binary indicator of mother's early marriage and female child including the full set of controls and culture fixed effects. As expected, the interaction term is insignificant for the three indicators of parental education investment Table 2.9, Columns 1-3 but significant and negative for the other three Columns 4-6. This again implies that the impact of mothers' early marriage appears more strongly in the continuation and completion of their daughters' schooling.

2.6 Conclusion

In this study, we looked for empirical evidence in support of intergenerational effects of women's marriage age on gender differentials in a broad set of education indicators using a nationally representative household survey from Pakistan. Our findings are robust to the use of different techniques and empirical specifications that addresses sample selection bias and confounding factors. The study has the following four main findings:

First, mother's age at marriage has no gender-specific impact on parental investment on children's education, be it school enrolment, the choice of school (public vs private) or the amount of expenditure allocated by the household. However, the beneficial effect of delaying mother's marriage is more pronounced among girls in terms of progress at school, primary school completion and completed years of schooling, implying that mothers transfer their human capital advantages/disadvantages more to the daughters. Taken together, these findings suggest that delay in women's marriage is contributing to a narrowing down of gender inequalities in education across the current generation.

Second, gender disparities in children's educational outcomes are not only driven by disproportionate preference for boys prevalent in the society, but also by mothers' marriage age. The latter matters by itself because of pre-existing traditional gender role and socio-cultural norms observed in the marriage market.

Third, we find that the beneficial effect of delaying mother's marriage is more evident

among the first born girls. Girls born to later-marrying women get more time and resources to pursue their education and are able to attain more schooling compared to girls born to early-marrying women.

Fourth, we found that educational inequality in children is not entirely mediated through mother's education and autonomy, the role of mother's age at marriage still matters. The findings of this study underscore the need to promote social and behavioural changes which lead to lower incidence of early marriage and incentivise girls' education. Delay in women's marriage is not only helpful for their own socioeconomic uplift through higher education, but is also a catalyst to better educational outcomes and lower gender differentials in the next generation.

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Chapter 3

Do Specially-Abled Children Learn Differently? Disability and schooling outcomes in Pakistan

Abstract

In this study, we chart the schooling trajectory of Children with Disability (CWDs) in Pakistan, focusing on the prevalence, severity and type of disability. We utilize the nationally representative 2019-20 Pakistan Social and Living Standard Measurement survey to examine data on children of school going age. We find that CWDs face significant challenges in education regardless of the type or severity of disability, the household's socioeconomic status or the inter-generational transmission of advantages. Our findings are five-fold: First, CWDs of both primary and secondary school-going age are disproportionately out of school. 69% of CWDs of school-going age never attend school compared to 31% of children without any disability. Besides, CWDs drop out of school earlier (age 7-8) than children without disability. Second, children with any level of disability and moderate/severe disability are 12.6 and 39.5 percentage points less likely to get enrolled in school respectively, as compared to their siblings without disability. Even when CWDs get enrolled in school, they remain less likely to complete their schooling. Third, the adverse effect of disability on schooling is more pronounced for girls compared to boys. We find a significant role of the households' wealth in driving the disability gap in school enrolment. However, its impact on school dropout is limited, suggesting that supply constraints and school quality are more influential factors. Fourth, children with auditive, cognitive and intellectual impairments are much less likely to ever attend school and to continue education beyond primary or secondary level. In comparison, CWDs with visual and mobility impairments are less affected. Fifth, neither the genetic endowment nor the mother's education level substantially alters the likelihood of CWDs getting enrolled in or dropping out of school. These findings provide rationale for structural reforms in the educational sector aimed at ensuring the inclusion of the CWDs.

Keywords: Child disability, schooling, out-of-school children, developing country, Pakistan.

3.1 Introduction

“Disability is a matter of perception. If you can do just one thing well, you’re needed by someone.”

Martina Navratilova

Inclusive education is one of the important issues in development economics that remains relatively unexplored in the context of developing countries. The term inclusive education refers to equal access and opportunities for quality education, respecting diversity and different needs and abilities, eliminating all forms of discrimination (UNESCO, 2012)¹. One of the main agenda of sustainable development goals (SDGs) is to promote inclusive education policies which focus on the need to get out-of-school children (OOSC) to school and to ensure that all children of school going age have access to free, equitable and quality primary and secondary education. Article 24/2 of the United Nations Convention on the Rights of Persons with Disabilities (UN-CRPD) underscores the need for comprehensive inclusive educational policies, particularly focusing on children with disabilities (CWDs) across the countries that signed and ratified the CRDP (MacKay, 2006). However, inclusive education is not merely the rationalization of a special education system. The Salamanca Statement Framework highlighted the need and urgency of providing regular schools with inclusive orientation, a solution that is not only cost-effective but also helps combat the discrimination and stigma attached to disabilities, consequently leading to more welcoming communities and inclusive societies (United Nations Educational and Organization, 1994).

Despite an ostensible international policy consensus, approximately 263 million children between the ages of 5 to 16 are out of school around the world (Deloumeaux, 2018), including 23 million children in Pakistan (about 44% of the country’s population in this age group). The country stood second on the world ranking of OOSC, with the highest proportion in South Asia (UNICEF, 2017). A number of studies has examined

¹Addressing exclusion in education – A guide to assessing education systems towards more inclusive and just societies: <https://unesdoc.unesco.org/ark:/48223/pf0000217073>

the out-of-school children's plight tied to discrimination and inequalities in educational opportunity based on gender, parental, social, and geographical characteristics (Alderman and King, 1998; Maurin, 2002; Delprato et al., 2017). However, the situation of CWDs has received little attention, in part due to lack of consistent methods for collecting data on disabilities across countries in surveys, which may mislead the policy formulations to mitigate the educational exclusion of CWDs. Our study attempts to fill this gap in the literature by providing a comprehensive picture of CWDs of school-going age (5 to 16) and their schooling trajectory. We use educational indicators measuring two zones of educational exclusion which identify two population groups: firstly, the children who never attended the school or whose access to schooling is denied (Zone-1), and secondly, those who got enrolled in the school but were less likely to complete their basic education and dropped out prematurely (Zone-2).

Notwithstanding the growing realization and reaffirmation of the need for a comprehensive inclusive education policy, CWD's education continues to be a neglected issue in Pakistan. The Japan International Cooperation Agency (JICA, 2003)² and the Economist Intelligence Unit (EIU, 2014)³ noted that Persons with Disabilities (PWDs) are the largest overlooked minority group in Pakistan. There is no reliable information regarding the prevalence rate of disabilities among children and how many children with disabilities attend school. One of the objectives of our study is to address these issues by asking the research questions that uncover the schooling trajectory of CDWs: First, are CWDs disproportionately out of school as compared to their peers without disabilities? Do the CWDs who get enrolled complete their basic schooling? Second, are parents less likely to send their disabled children to school as compared to children without disabilities? Which factors underpin the intra-household disability gap in educational outcomes? In short, we investigate whether, and to what extent, are CWDs in Pakistan disproportionately out of school as compared to the peers without disabilities. Moreover, we document the impact of disability on the children's educational trajectory in Pakistan.

²JICA's activities on Disability and Development: <https://www.jica.go.jp/Resource/english/publications/reports/annual/2003/pdf/200307.pdf>

³Moving from the margins: Mainstreaming persons with disabilities in Pakistan: https://www.britishcouncil.pk/sites/default/files/moving_from_the_margins_final.pdf

To answer our research questions, we utilize the nationally representative Pakistan Social and Living Standard Measurement (PSLM) 2019-20 survey. It is the biggest source of data to monitor the SDGs, and provides comprehensive information on education, health, housing and sanitation of households at the national, provincial, district and regional (urban/rural) level. The latest round includes a short set of questions designed as per the guidelines of the United Nations–Washington Group on Disability Statistics (UN-WG) to assess the prevalence of disabilities based on functional difficulties.

Our contribution to the existing literature is four-fold. First, we estimate intra-household disparities in educational opportunity for children with disabilities using a household fixed-effects model. This empirical strategy helps reduce confounding due to household specific factors such as general investment on children, genetic endowment and supply constraints. Our second contribution is to capture the role of heterogeneity in children’s gender and socio-economic diversity of the households in explaining the intra-household disability gap in children’s schooling trajectory. Our third contribution is to unpack the variation in education impact by type of disability. Treating children with different disabilities all put together accounts for CWDs’ common constraints to access to schooling. However, the environmental constraints faced by children with physical impairments vary from those with cognitive and intellectual disabilities. Children with physical impairments usually have better educational outcomes than those with cognitive and intellectual disabilities ([Organization and Bank, 2011](#)). Our fourth contribution is to address the issue of genetic factors and uncover the channels which mediate intra-household inequality in educational opportunities for the CWDs. Our survey measures are based on self-assessment of functional difficulties. However, disabilities often result from genetic variations which need to be taken into account while estimating the impacts of disabilities ([Davillas and Pudney, 2020](#)). We separate these potential confounders by restricting the sample to twin siblings, the so called identical children because of their identical genes ([Björklund and Salvanes, 2011](#)). Finally, we investigate the mitigation channels of disability’s effects on the CWDs’ schooling outcomes. Mothers’ education has been recognized as one of the main indicators that affect intra-household decision making pertaining to child health and education. It is widely acknowledged that mother’s with no education are generally less able to advocate

for their preferences for investment in children’s health and education within the household (Beegle et al., 2001; Yun et al., 2009; Aslam and Kingdon, 2012; Delprato et al., 2017). We separate the impact of mothers’ education from the CWDs’ disability effects by restricting the sample to children of educated mothers, that is, mothers who have at least completed secondary education. A second mitigating factor that we consider is the role of parental disabilities which negatively affect children’s educational outcomes (Mont and Nguyen, 2013), and at the same time, may be decisive in determining the health of the children. We control for this factor by restricting the sample to children of parents without any disabilities.

The chapter is structured as follows: The subsequent section overviews the relevant literature and elaborates the conceptual framework. Section 3.3 defines the data and provides a brief description of disability and schooling outcomes of the children of school-going age. Section 3.4 presents the empirical model and the estimation strategy. Key findings are reported and discussed in Section 3.5 followed by some robustness checks in Section 3.6. The final section concludes and offers some policy recommendations.

3.2 Review of Literature and Conceptual Framework

3.2.1 Relevant literature

The adverse socioeconomic effects of disabilities are well-documented. Disabilities are considered as one of the main cause and consequence of poverty (Thomas, 2005). A significant proportion of people with disabilities belong to poor families with limited access to health care and education, consequently lacking employment opportunities. This leads to a vicious poverty trap (Singal et al., 2011; Organization and Bank, 2011). The capability approach developed by Amartya Sen explained such inequality in access to basic services as social exclusion (Sen, 1992). A study by Duffy (1995) showed that disabilities-based exclusion increasingly took precedence over poverty, geographical and ethnic-based exclusion. Room (1995) added the societal attribute to the definition by developing the rights-based approach, in which he explained that social exclusion is

the denial or non-realization of the educational, social, political, and economic rights of the individual. The post-2015 development agenda unconditionally adopted by the 193 member states of the United Nations (UN) enumerates the sustainable development goals (SDGs) which explicitly focus on disability. The SDGs propagate the rights-based approach to include all people in the development process and to ensure that no one is left behind. The focus on the prevalence of disabilities is highly pertinent in the case of developing countries where other factors, such as poverty, gender discrimination and stigmatization eventually lead to profound disadvantages.

Despite the importance of the issue, both awareness and information on disabilities and the role they play in determining children's education outcomes is lacking. In particular, studies on children with disabilities and their educational trajectory are scarce in developing countries. Majority of these studies are descriptive and highlight the disability gap in school attendance, for instance see [Filmer \(2008\)](#); [Trani and Cannings \(2013\)](#); [Lamichhane and Kawakatsu \(2015\)](#); [Singal et al. \(2020\)](#). A few investigate the disability – education relationship empirically, but often suffer from lack of quality data or definition coherence and comparability. [Fennell \(2020\)](#) highlight the challenges of stigmatization and under-reporting of disabilities in the developing countries. The study by [Filmer \(2008\)](#), for example, shows the disability gap in school attendance of thirteen countries, and finds that disability is a significant and much stronger determinant of school attendance as compared to gender, geographical location and socioeconomic status. However, the study does not precisely define disabilities. Additionally, the measures of disabilities vary substantially across the countries included as household surveys in the countries relied on different questions to conceptualize the disability measures. The study by [Mizunoya et al. \(2018\)](#) uses data on disabilities from fifteen developing countries collected from a short set of questions on impairments following a technique developed by United Nations–Washington Group on Disability Statistics (UN-WG). The findings showed that the disability gap in school enrolment was persistent in all countries in the analysis, and this gap was not explained by gender, geographic location and socioeconomic status of the household. However, the study did not address the heterogeneous effects of disabilities by type and parental attributes.

3.2.2 Conceptual Framework

Parents make educational choices for their children depending on the marginal cost and marginal benefits of education subject to the given credit constraints (Black et al., 2010). Parents' investments in children's education may be low if their aspirations for the children are limited due to their own low educational attainment (Genicot and Ray, 2017). The latter can further affect the family composition like number of children and son preference (Javed and Mughal, 2019) that lead to differences in the redistribution of resources and the opportunity cost of schooling (Alderman and King, 1998). These factors operate at both the individual and the household level. In this context, individual factors like children's ability and gender affect the educational investments made by parents.

According to Becker (1960), parents gain utility from both the quantity of children (that is, the number of children) as well as their quality which may be estimated as the sum of money spent on each child at given prices. Quality can be gauged by observing, for instance, whether the children are sent to nursery school and private universities or take part in extracurricular activities. It may be inferred from Becker's (1960) study that a child's disability may affect parents' aspirations and their investment in the child's schooling. A child's ability is partially determined by the genetic component which in turn affects the expected returns from the child's schooling (Becker and Tomes, 1986). In particular, a child's cognitive abilities may suffer due to a lack of care around birth, for example in the case of early married women. Early married women are most likely to be less educated (Field and Ambrus, 2008) and start childbearing soon after marriage (Mughal et al., 2023). This can increase complications in pregnancy and can put a child's health at risk (Chari et al., 2017). Disability may therefore negatively affect a child's learning abilities (Malik et al., 2022), which decreases the marginal benefits of schooling. In the same vein, disability could increase the marginal cost of schooling because of the environmental constraints. Consequently, parental perception of limited benefits of schooling coupled with social stigma attached to disabilities can lead to the CWD being denied basic right to education. Moreover, parents might be concerned for the safety and security of their disabled child while travelling to and from the school. As a whole, the

marginal benefits of CWD's education are limited by the social environment, which in turn limits their attendance and progress at school.

3.3 Data and Descriptive Statistics

We utilize data from the Pakistan Social and Living Standard Measurements (PSLM), 2019-20 survey in our study. This survey was conducted by the Pakistan Bureau of Statistics (PBS) to monitor the progress on the SDGs. The PSLM is the biggest source of data on socio-economic indicators in Pakistan, providing comprehensive information on education, health, housing and sanitation. In addition, the latest round provides, for the first time, information on disability and migration. PSLM follows the two-stage stratification sampling method. In the first stage, the primary sampling units/enumeration areas are randomly chosen, while in the second stage, households are selected using a simple random sampling technique (Pakistan Bureau of Statistics, 2019). The 2019-20 survey provided information on 855,000 individuals from 176,790 households from all over the country. Our sample contains data on 233,814 children of school going age (5-16) years from 92,056 households.

3.3.1 Measures of disability

PSLM, like other nation-wide surveys in Pakistan, did not use to gather data on disability. This was mostly because of the complications over the conceptual understanding of disability and how to design the questionnaire in an effective way to capture the disability status in large scale household surveys.

The number of persons with disability remains uncertain in Pakistan. The 1998 National Population Census reported the prevalence of disability to be 2.49%, while the 2017 census reported that only 0.48% of the population was disabled. In both of these censuses, the question asked was: "Do you have any type of disability?" Seven categories of disabilities were covered, including: mentally retarded, seeing problem, hearing problem, crippled, mute, and others. The prevalence of disability in the two censuses appears to be substantially under-reported. The binary questions on the basis of which someone is

classified as disabled or not disabled have come under scrutiny because such questioning stigmatizes individuals and prevents people to declare themselves as disabled. A milestone improvement in this regard is the UN-WG's questions on disabilities based on the bio-psycho-social model of human functioning established by the World Health Organisation (WHO). The UN-WG has developed a short set of six questions for assessing functional difficulties among adults. Later on, these questions were extended to the Child Functioning Module (CFM) in order to include children age 5-17. The WG short set employs four level Likert-scaling (no difficulty, some difficulty, a lot of difficulty, and cannot do at all) in six basic physical and sensory domains (seeing, hearing, walking, self-care, remembering and concentrating, and communication) to capture the degree of functional difficulty. This framework has been more extensively tested in developing countries as compared to other available tools such as Activities of Daily Living (ADLs) and World Health Organization Disability Assessment Schedule 2.0 (WHO-DAS). This short set of questions has been concisely developed to address disabilities in diverse functional domains and is internationally comparable because of the given benchmarks to identify functional difficulties ([Madans et al., 2011](#)).

On the same lines, the PSLM 2019-20 survey asked questions to their respondents on functional difficulties in six recommended WG short set domains (seeing, hearing, walking, self-care, remembering and concentrating, and communication). A four-level scale (no difficulty, some difficulty, a lot of difficulty, and cannot do at all) is used to capture an individual's functional difficulty. Disability is identified by using the severity cut-off points in the six given domains recommended by UN-WG.

3.3.2 Prevalence of disability by type and severity

Identifying persons with disabilities in a population is essential for two reasons. Firstly, prevalence gives the number of persons with disabilities. It is important to observe patterns of prevalence by age, gender, region, and other socioeconomic factors, as they help to understand the scalability of possible policy needs, and to gauge where and how resources need to be allocated. Secondly, prevalence of disabilities is used to measure exclusions. Data helps us find out how persons with disabilities are getting along in different field of

life as compared to their peers without disability. If there are statistical differences in the participation rates in different sectors (education, employment, marriage, voting) for persons with and without disabilities, then these differences are termed as ‘exclusion’.

Disability prevalence is computed for population (5+) and children for age (5-16) as follows:

$$\text{Prevalence rate}_i = \frac{\text{Number of Disabled}_i}{\text{Total Population}_i}$$

Where i denotes the criteria for defining a population: age 5+ and usable sample in the study for children of school going age (5-16). The estimated prevalence rate of disability is based on the level of the severity cut-off as the response categories of the questions asked about the given six domains. Table 1 presents the four comprehensive measures generated to estimate the disability rate for the sample population (5+) and school going age children (5-16).

The first measure, termed any difficulty, is a broad measure, comprising everyone who reports ‘some difficulty’, ‘a lot of difficulty’ or ‘cannot perform at all’ in at least one domain. The second captures ‘some difficulty’ in at least one domain and it is termed as mild difficulties. The third measure, termed moderate/severe difficulty, is computed by including the answer ‘a lot of difficulty’ and ‘cannot do at all’ in at least one domain.

The prevalence rate of the sample population aged 5+ in the any, mild, and moderate/severe disability category is 9.28%, 7.33% and 2.27%, respectively. These estimates are much closer to WHO’s estimate that around 10-15% of the population suffers from some form of disabilities ([Organization and Bank, 2011](#)).

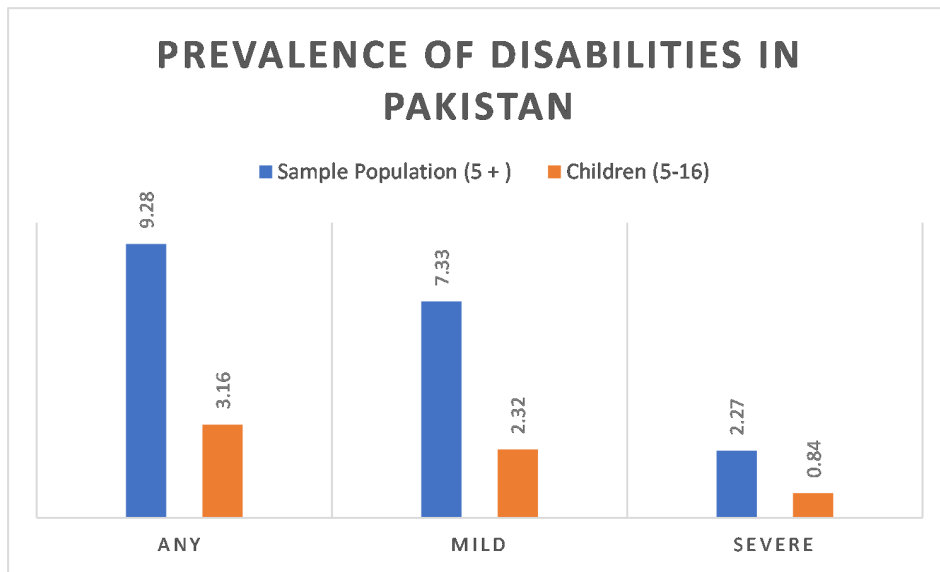
Table 3.1 presents statistics on the degree of severity of disability among the children of school going age (5-16). 7,392 children were reported to have some level of functional difficulty in at least one of the six domains, constituting 3.16% of children of this age group, out of these 5,429 children (2.32%) were reported to have mild disability and 1,963 (0.84%) were reported by their parents as having moderate/severe disabilities.

Table 3.1: Prevalence of disability in Pakistan by level of severity

	Sample Population (5 +)		School age Children (5 – 16)	
	N	%	N	%
Any	69,034	9.28	7,392	3.16
Mild	53,332	7.33	5,429	2.32
Severe	15,702	2.27	1,963	0.84
Total Sample	753,592		233,871	

Source: Authors' calculation using PSLM 2019-20.

Figure 3.1: Prevalence of disability in population age 5+ and children age 5-16.

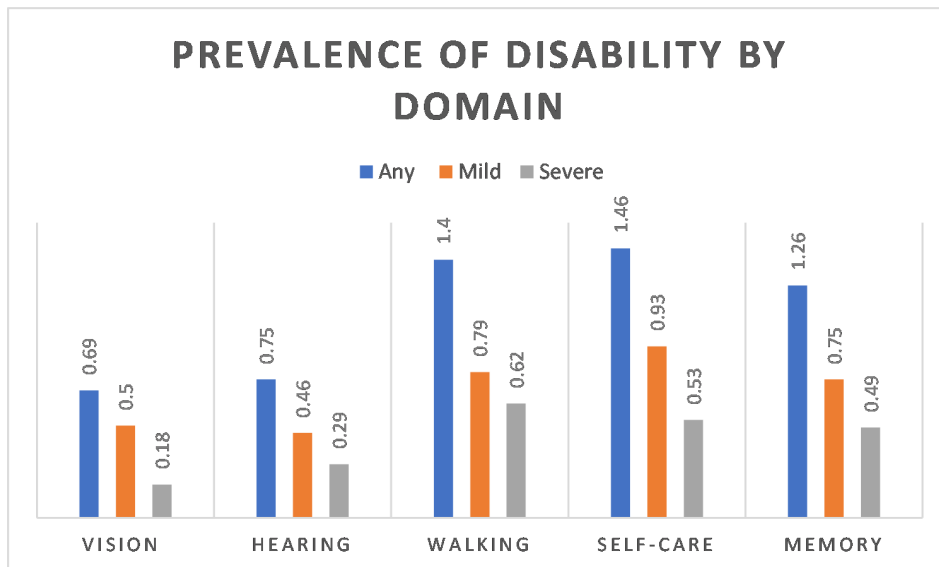


Source: Authors' calculation using PSLM 2019-20

Figure 3.1 shows comparable prevalence rates among the sample population (5+ years) and the sample of children aged 5-16 years. Figure 3.2 shows prevalence of disability among children age (5-16) who reported having functional difficulties in any of the given six domains by level of severity. The estimated prevalence rate of any level of disability ranges from 0.69% (vision) to 1.46% (self-care). The estimated prevalence of mild level of disability ranges from 0.46% (hearing) to 0.93% (self-care), while the estimates of the prevalence of the severe level of disability range from 0.18% (vision) to 0.60% (walking). Walking and self-care are the most commonly stated disabilities in children of school going age. These estimated prevalence rate of disabilities are close to the estimated average rate

of disabilities in several other developing countries (Mizunoya et al., 2018).

Figure 3.2: Prevalence of disability among CWD age 5–16 by domain



Source: Authors' calculation using PSLM 2019-20

Table 3.2 provides the descriptive analysis of a child's schooling indicators, individual and parent characteristics, and household-level attributes by level and severity of disability. The means of the group of children with and without disabilities are tested for any differences in their schooling and other characteristics. Our data shows a systematic difference in terms of schooling indicators and other individual and household-level characteristics between children with and without disabilities. Children with disabilities are less likely to get enrolled in school, and even if they do get enrolled, they end up dropping out prematurely without completing their schooling. A sizeable proportion of children with any level of disability (44%) never attended school, compared to 31% of children without any disabilities. The corresponding share for children with moderate or severe disabilities who never attended school is even higher at 69%. It is important to note that the estimates of out-of-school children in this study—both those with and without disabilities—are greater than those in a prior study carried out by (Malik et al., 2022). This difference may be attributed to the fact that the previous study was based on data from only three districts of central Punjab, which lacked national representation. The mean difference

Table 3.2: Children and Household Characteristics by Children's Disability Level

Variables	Any Difficulty			Mild Difficulty			Severe Difficulty		
	Child without disability	Child with disability	Mean Difference	Child without disability	Child with disability	Mean Difference	Child without disability	Child with disability	Mean Difference
School Enrolment	0.69	0.56	-0.131***	0.69	0.64	-0.042***	0.69	0.31	-0.379***
School Dropout rate	.073	0.101	0.028***	.073	0.082	0.008	.073	0.20	0.126***
Female	0.46	0.43	-0.029***	0.46	0.44	-0.018***	0.46	0.40	-0.059***
Child age	9.9	10.2	0.28***	9.9	10.1	0.19***	9.9	10.4	0.54***
Mother's Disability	0.014	0.021	0.007***	0.014	0.015	0.001	0.014	0.037	0.023***
Father's Disability	0.026	0.033	0.007***	0.026	0.028	0.002	0.026	0.045	0.019***
Mother's Education	2.84	2.96	0.115	2.84	3.12	0.282***	2.85	2.49	-0.360***
Father's Education	5.38	5.22	-0.15***	5.38	5.41	0.032	5.38	4.70	-0.68***
Rural	0.65	0.63	-0.019*	0.65	0.62	-0.029**	0.65	0.66	-0.010
Wealth (Quartile)	2.43	2.42	-0.014	2.43	2.47	0.041	2.43	2.26	-0.17***
Income	12.3	12.2	-0.088	12.3	12.1	-0.142**	12.3	12.4	0.068
Siblings	3.12	3.12	-0.008	3.12	3.11	-0.017	3.12	3.14	0.018
Birth Order	2.05	1.98	-0.072***	2.05	1.9	-0.063***	2.05	1.96	-0.094***
Household size	7.07	6.95	-0.114***	7.07	6.93	0.144***	7.07	7.04	-0.257

The means comparison uses a three-sample independent t-test. The null hypothesis is: $H_0 : \text{diff} = 0$ and the alternative hypothesis is $H_a : \text{diff} \neq 0$.

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.

between children with and without disabilities is significant, indicating that children with disabilities are significantly more likely to drop out of school prematurely. 10.1% of children with any type of disability drop out of school as compared to 7.5% of children without any disabilities. The proportion of dropouts from school is higher for children with moderate or severe disabilities (20%).

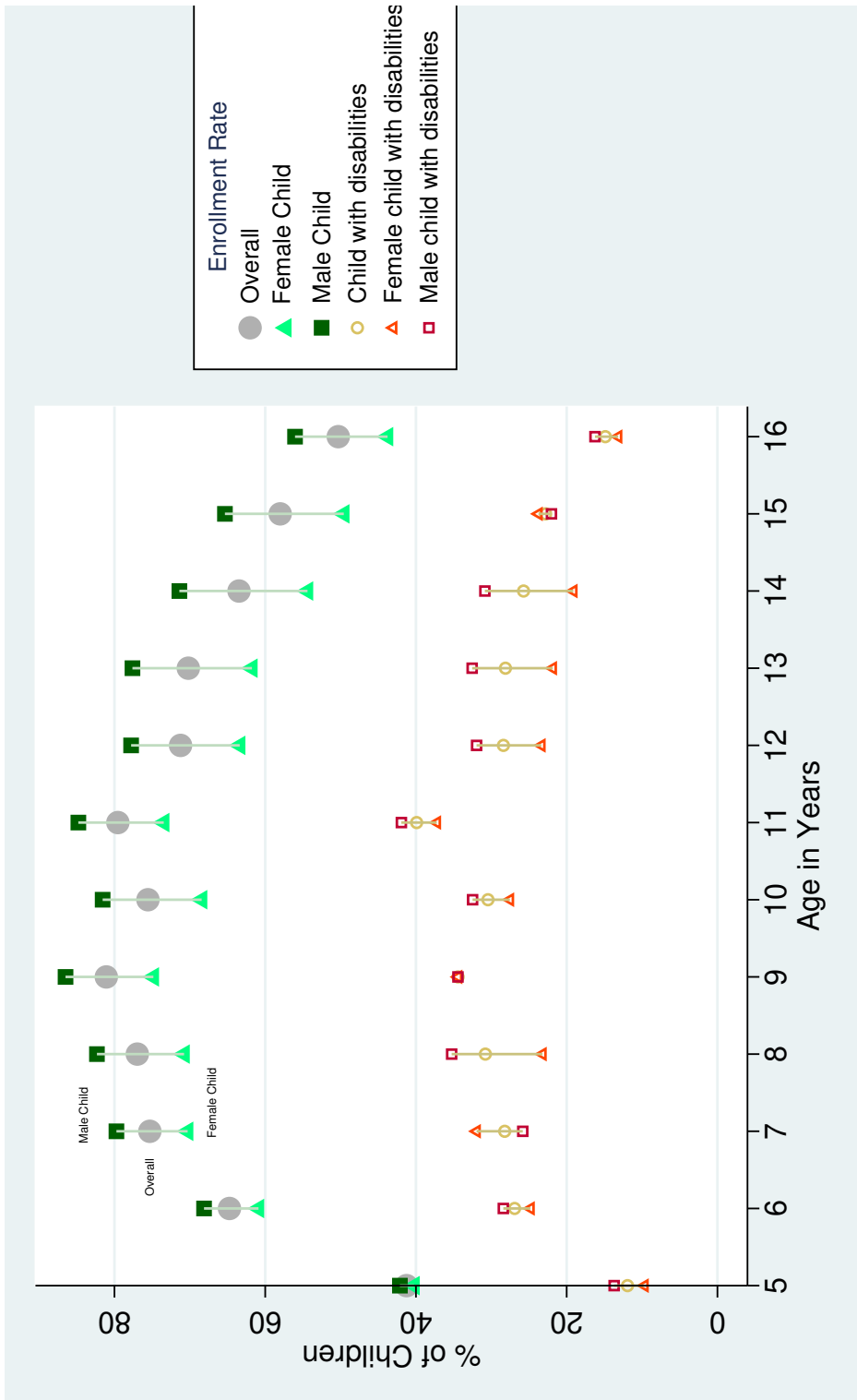
The prevalence rates of disability among girls are less than those among boys. Moreover, the incidence of disabilities is higher among the children born to parents with disabilities as compared to those born to parents without any disabilities. The prevalence of disability is also higher among children born to parents in the lower wealth quartiles and low income households. Moreover, children of educated parents have lower rates of disabilities.

3.3.3 Out of School Children with and without Disabilities

According to article 25-A of the constitution of Pakistan, the mandatory range of school going age is specified as (5-16) years. Out of School Children (OOSC) are children of school going age that are not currently attending school. They comprise two types of children: those who never attended school, and those who attended school in the past but are currently not attending. Each of the two types corresponds to different set of factors, for instance, parents may never send children with disabilities to school because of their perception of stigma attached to disability. Children with disabilities may get enrolled into the school but dropout due to supply and environmental constraints. Figure 3.3 shows school enrollment rates of children with and without disabilities for all children between 5 and 16 years of age. The curve of overall enrollment rates for children is inverse U-shaped and rises steadily from age 5 (42%) to 9 (82%) for children without disabilities. Gender disparity in school enrollment remains persistent for children of all ages as enrollment among girls is invariably lower as compared to that among boys. A similar pattern can be observed for children with disabilities in the lower bands of the Figure. Overall enrollment increases steadily from five years of age (13%) to eleven years of age (40%).

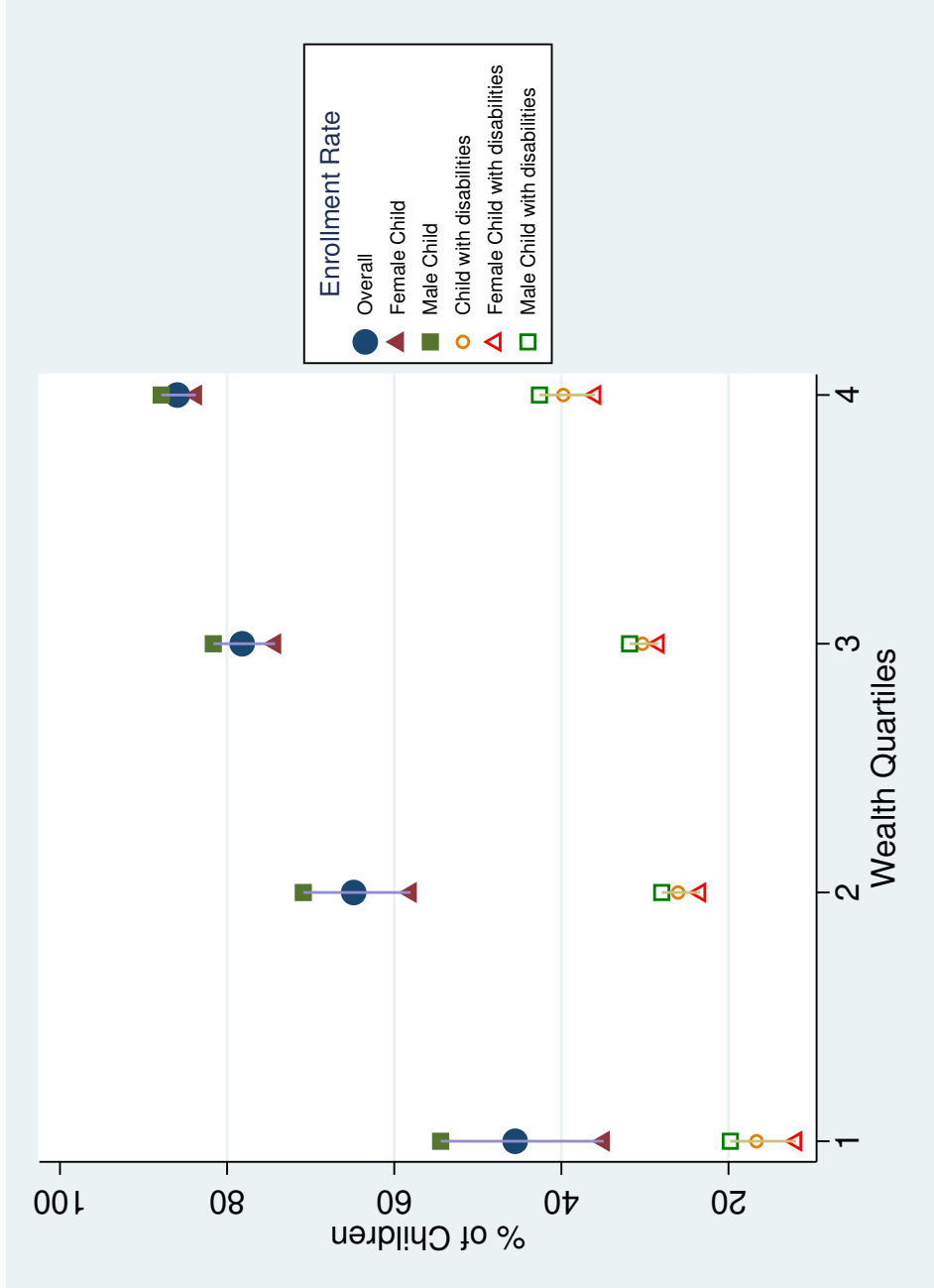
The data for school enrollment show some interesting patterns: first, there is significant disability gap in school enrollment, as children with disability of all ages have lower school enrollment rates as compared to children without any disability. Second, the highest

Figure 3.3: School enrollment for children with and without disability by age and gender



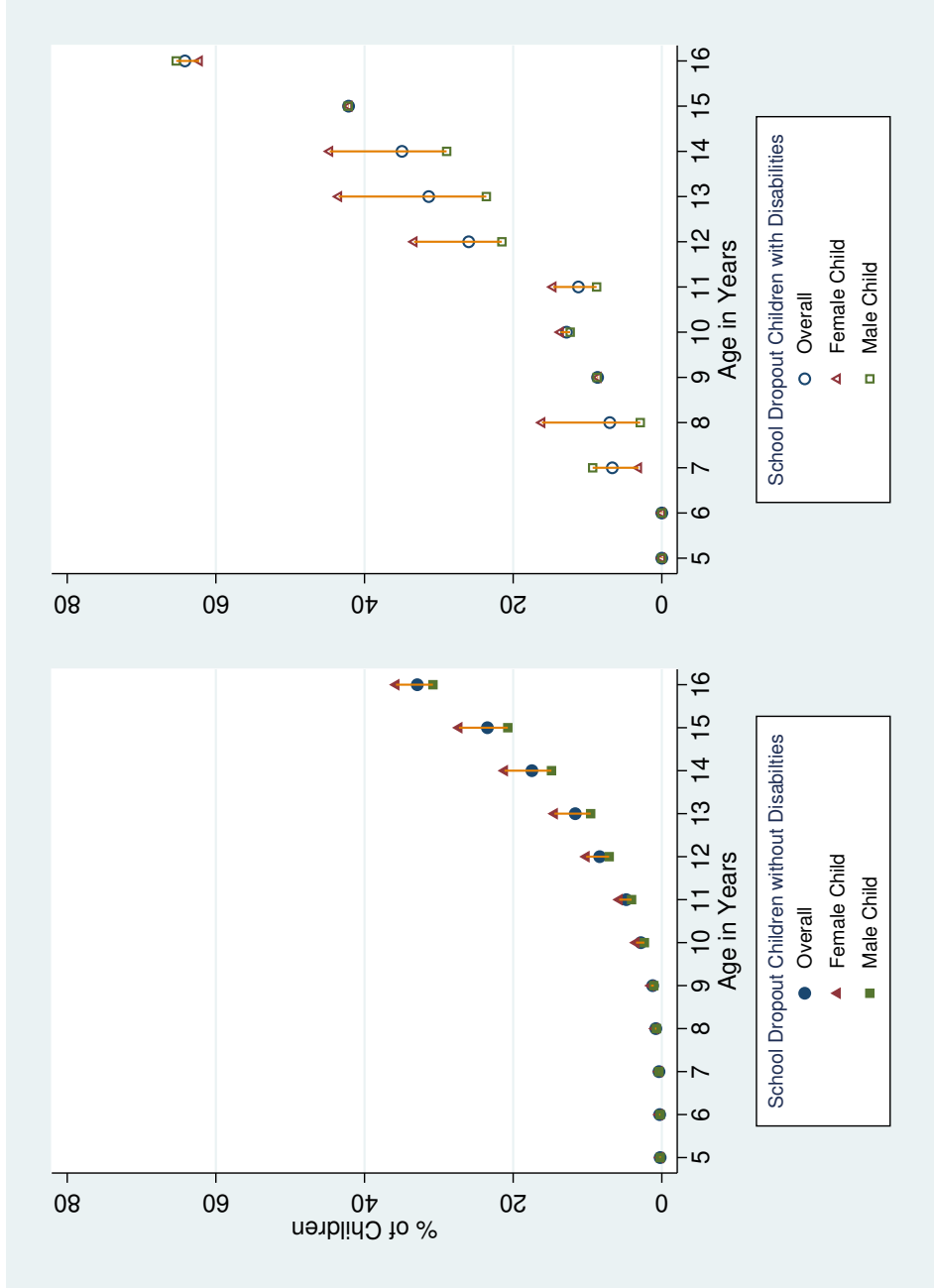
Source: Authors' calculation using PSLM 2019-20.

Figure 3.4: School enrollment for children with and without disability by household wealth



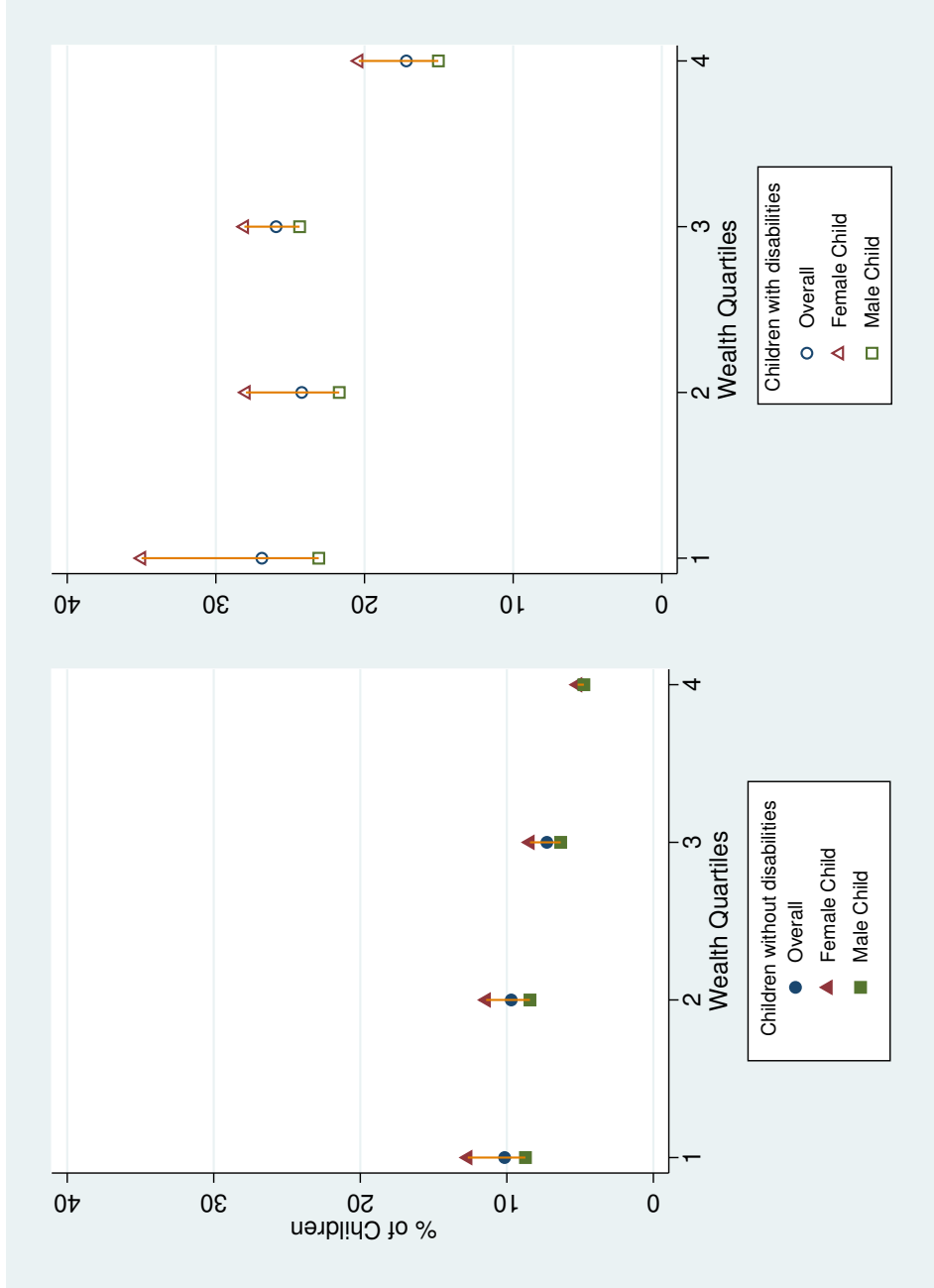
Source: Authors' calculation using PSLM 2019-20.

Figure 3.5: School dropout rate for children with and without disability by age and gender



Source: Authors' calculation using PSLM 2019-20.

Figure 3.6: School dropout rate for children with and without disability by household wealth



Source: Authors' calculation using PSLM 2019-20.

enrollment rate for children without disability is observed among nine years old while the highest enrollment rate for children with disability is observed among the 11 years olds. This indicates that the lack of emphasis on early education and the age effect are even more pronounced for the CWDs. School enrollment rate for children age 5 without any disability is approximately equal to CWDs age 11. Third, gender disparity in school enrollment has remained persistent in both types of children with and without any disabilities.

Figure 3.4 shows school enrollment rates for children with and without disabilities by socioeconomic status of the household. The data show that overall school enrollment is much lower in the lower wealth quartile. The overall enrollment rates for children with and without disabilities are 18% and 43%, respectively, implying that 82% children with disabilities and 57% children without any disabilities have never attended school. School enrollment rises steadily with wealth. For example, the enrollment rate for children without disability born in the households in the fourth quartile is much higher (82%) compared to children with disability (40%). An important point to be noted here is that disability gap for school enrollment persists irrespective of the socioeconomic status of the household, while the gender gap is more pronounced in households of lower socioeconomic status.

Figure 3.5 shows the school dropout rates of children with and without disabilities for all children between the ages of 5 and 16. Overall dropout rates among children without disability continue to rise steadily with age and get steeper from age 11-12 onwards. This points to limited access to middle and high schools which are typically few and far off compared to primary schools. Gender disparity in school dropout remains persistent for children of all ages. Female dropout rate is greater than male dropout rate, indicating that girl CWDs are more vulnerable than boy CWDs.

Figure 3.6 shows the school dropout rate for children with and without disability by the socioeconomic status of the household. The overall dropout rate is much higher in the households belonging to the lower wealth quartile. The corresponding overall dropout rates for children with and without disabilities are 28% and 10% respectively, suggesting that environmental constraints are more binding for CWDs from poor households.

3.4 Empirical Methodology

3.4.1 Model and Variables

We estimate a multivariate probit model in order to identify the effect of child disability on schooling and obtain marginal effects as follows:

$$Pr(Y_{CH}) = \gamma(\beta_0 + \beta_1 \text{Disability}_{CH} + \beta_2 \text{Age}_{CH} + \beta_3 \text{Age}_{CH}^2 + \beta_4 \text{Female}_{CH} + \beta_5 X_{CH} + u_{CH}) \quad (1)$$

where Y_{CH} represents the schooling of child c living in the household h . Schooling of children age 5 – 16 is measured by two variables: i) School enrollment and ii) school dropout. The former variable represents those children who are currently attending school ($Y=1$) and those who never attended school ($Y=0$), and the latter variable represents those children who attended school in the past but are not currently enrolled ($Y=1$) and those who are currently attending school ($Y=0$). Our main variable of interest is the dichotomous variable measuring whether a child has a disability ($\text{Disability}=1$), 0 otherwise. To capture age-based heterogeneity adequately, we include age of the children in both linear and quadratic forms. Female is a dummy variable for the child's gender, equaling 1 for female, 0 otherwise. X_{CH} in equation (1) represents other individual characteristics (birth order and sibling's size), the matrix of covariates representing the parental characteristics (mother's year of schooling, father's year of schooling, mother with disabilities and father with disabilities), and household level characteristics including (wealth, household size and region). Following Filmer Pritchett (2001), we generated a wealth index through Principal Component Analysis (PCA). We used the information typically collected in the PSLM, for example: dwelling type (house is part of a compound, an apartment/flat or independent house), type of house (kutcha, semi-pucca or pucca), number of rooms, whether the house has electricity, sewerage system, source of clean water, television, refrigerator, washing machine, iron, geyser, bike, car, computer and internet connection and ownership of agriculture and non-agriculture land, residence, and livestock. All the aforementioned variables are incorporated to estimate the wealth index

of the urban and rural households. The sample is then divided into quartiles in order to assess the socio-economic status of the household.

Table B1 in the appendix provides summary statistics of the variables used in the empirical estimations. Overall, 69% of children are enrolled in school. Nearly 7% of children of school-going age dropout prematurely without completing their primary and secondary schooling. Average age of the children is 10 years, and 46.2% are girls. The mothers and fathers of the children have on average 2.3 and 5.3 years of schooling, respectively. About 1.7% of mothers and 3% of fathers are reported to have a disability. The total number of households in the usable sample is 92,056, out of which 65% live in the rural areas.

3.4.2 Methodology

First, we estimate a multivariate probit model. The coefficients in the probit model represent the magnitude of change in the predicted probability of child school enrolment and child school dropout for the children with disability with reference to children with no disability. Marginal effects of disability on child's schooling are evaluated holding the other explanatory variables constant at their sample means.

The model described above could suffer from omitted variable bias. Unobserved factors that determine child disability may also correlate with child education decisions. For example, household's general investment in children and mothers' characteristics such as education and health could influence both child disability and schooling. Likewise, lack of maternal health care services affect both children's cognitive abilities and their educational returns (Santhya et al., 2010). Using household fixed effects can help solve the problem of endogenous selection (Chen, 2005). Consequently, we employ the household fixed-effects model to compare the educational outcomes of children with and without disabilities living in the same household. However, fixed effects estimators of probit model suffer from incidental parameter problem which may causes inconsistency of the parameter (Cruz-Gonzalez et al., 2017). This entails estimating the linear probability model on the subset of those households with at least one child disability and one child without disability. We set up the multivariate linear probability model with household fixed effects

as follows:

$$Y_{CH} = \alpha_0 + \alpha_1 \text{Disability}_{CH} + \alpha_2 X_{CH} + \gamma_H + u_{CH} \quad (2)$$

where Y_{CH} indicates the educational outcome of the child C belonging to the household H. α_1 is the marginal effect of disability that captures the intra-household disability gap in child schooling. X_{CH} presents the individual level covariates includes age, age square, female dummy, birth order, and sibling's size. γ_H denotes household fixed effects which help control for confounding factors due to household-specific (investment over children), co-resident/sibling invariant factors (differential access to education and economic opportunities), and parental characteristics (maternal care) to compare the outcomes of the children living in the same household. We also investigate the heterogeneous effects of child gender and the household's wealth status in determining the intra-household disability gap in schooling. We separately estimated equation 2 for both the male and female children, and the households in each wealth quartile.

Although model 2 solves the problem of omitted bias to certain extent, it still remains susceptible to endogeneity. The occurrence of disability may not be random. For instance, certain disabilities may be preventable and therefore be more likely to occur among children born to more deprived households or underdeveloped regions. There may also be other unobservable factors, such as genetic endowment and the intergenerational transmission of advantages or disadvantages from parents to children, that affect both the child's health and cognitive abilities and schooling outcomes (Chari et al., 2017; Delprato et al., 2017; Sekhri and Debnath, 2014). To overcome these concerns, we estimate model 2 for different sub-samples. Given our data constraints, we are unable to assess which type and level of disability is preventable. However, we take advantage of the possibility that school enrollment and school dropout rates may vary by type of disability, as barriers for physical impairment may differ from those involving cognitive or sensory impairments. We estimated the impact of disability on child schooling outcomes across all the six broad categories of disabilities, i.e. visual, hearing, mobility, self-care, communication, and memory and concentration problems. Furthermore, we apply three successive sample

restrictions to isolate the impact of genetic factors and the intergeneration transmission of disadvantages in education and health from parents to their children. First, we restrict the sample to twin siblings who presumably have the same genetic makeup (Björklund and Salvanes, 2011). This eliminates the problem of time-varying differences within family well-being. Second, we restrict the sample to educated mothers, i.e. mothers who have at least completed their secondary education (ten or more years of schooling). We can assume that prevalence of disabilities in children is not associated with intergenerational transmission of disadvantages from mothers because mother's education is positively linked to the child's health, cognitive ability and behavioral development (Carneiro et al., 2013). Finally, we restrict the sample to children from parents without any disabilities. In this sub-population, the prevalence of disabilities in children is not determined by parental disabilities which may partly account for the child's genetic endowment. Parental disabilities are a strong determinant of child schooling outcomes (Mont and Nguyen, 2013).

3.5 Results and Discussion

In this section, we present the main findings of our paper. Table 3.3 summarizes the results of Model 1 which examines the effect of a child's disability by level of severity on their schooling outcomes. The analysis reveals a consistently negative and statistically significant association between children's disabilities and school enrollment. Children with any level of disability across the six domains of functional difficulties are less likely to be enrolled in school compared to children without any disability. The negative effect is even more pronounced for children with moderate or severe disabilities. The marginal effects reported in bottom of the table indicate that children with any level of disability are 14.3 percentage points less likely to be enrolled in school (Column 1), When considering mild and moderate/severe disabilities separately, the likelihood of enrollment decreases by 5.2 and 37.4 percentage points, respectively (Column 2), compared to children without disabilities. Furthermore, the findings demonstrate a positive and significant association between disabilities and the probability of dropping out of school. Children

Table 3.3: Child disability and schooling: Probit estimations

VARIABLES	School Enrollment		School Drop Out	
	(1)	(2)	(3)	(4)
Any Disability	-0.433*** (0.019)		0.151*** (0.034)	
Mild Level		-0.163*** (0.022)		0.016 (0.039)
Moderate/Severe Level		-1.156*** (0.041)		0.606*** (0.058)
Constant	-2.601 *** (0.041)	-2.623*** (0.042)	-4.201*** (0.158)	-4.195*** (0.159)
Marginal Effects	-0.140*** (0.006)	-0.052*** (0.007)	0.008*** (0.002)	0.0009 (0.002)
		-0.374*** (0.013)		0.033*** (0.003)
Observations	231,187	231,187	167,227	167,227
Controls	Yes	Yes	Yes	Yes

Notes: The table presents the results of Probit model regressions in which the dependent variables are the child schooling indicators: school enrolment and school dropout for children between the ages of 5 and 16 years. The independent variables of interest are the incidence and degree of severity of disability. Marginal effects are reported at the bottom of the table. All regressions include the full set of controls.

The controls include individual (gender, age, age square, birth order and sibling's size), parental (mother's education, father's education, mother's disability, father's disability) and household characteristics (wealth, log of income, region). Robust standard errors in parentheses. *** = significant at the 1% level; ** = significant at the 5% level; * = significant at the 10% level. The estimates, along with their corresponding covariates, are provided in Appendix Table B2

Table 3.4: Child schooling and disability: Household fixed effects estimates

VARIABLES	School Enrollment		School Drop Out	
	(1)	(2)	(3)	(4)
Any Disability	-0.126*** (0.008)		0.010*** (0.005)	
Mild Level		-0.040*** (0.008)		0.003 (0.005)
Moderate/Severe Level		-0.395*** (0.017)		0.076*** (0.016)
Constant	-0.146** (0.061)	-0.153*** (0.038)	0.333*** (0.040)	0.335*** (0.022)
Observations	14,554	14,554	12,370	12,370
R-squared	0.144	0.184	0.137	0.141
Controls	Yes	Yes	Yes	Yes
Household Fixed Effects	Yes	Yes	Yes	Yes

Notes: The table presents the results of Linear probability household fixed effects model, in which the dependent variables pertain to child schooling: school enrolment and school dropout for children between the ages of 5 and 16 years. The independent variables of interest are the incidence of severity of disability. All regressions control for the child's gender, age and age square, birth order, sibling's size and household fixed effects. Robust standard errors in parentheses. *** = significant at the 1% level; ** = significant at the 5% level; * = significant at the 10% level. The estimates, along with their corresponding covariates, are provided in Appendix Table B3

with disabilities, on average, are 0.8 percentage points more likely to prematurely drop out of school (Column 3), while those with moderate or severe disabilities are 3.3 percentage points more likely to do so without completing their basic education (Column 4). The results presented in Table 3.4, using a linear probability model with household fixed effects, provide further evidence of the negative impact of disability on school enrollment. The results show a consistent and statistically significant negative association between disability and school enrollment among children within the same household. Children with any disability are 12.6 percentage points less likely to be enrolled in school compared to their siblings without any disabilities (Column 1). Furthermore, when examining the impact of different levels of disability, the results show that children with mild disabilities

are 4 percentage points less likely to be enrolled in school compared to their siblings without disabilities. The effect is even more pronounced for children with moderate or severe disabilities, as they are 39.5 percentage points less likely to be enrolled in school compared to their siblings without disabilities (Column 2). The sign and magnitude of the impact of disabilities on school enrollment obtained here align closely with the findings of [Mizunoya et al. \(2018\)](#) who employ a similar model specification. The results in Table 3.4, specifically in columns 3 and 4, demonstrate a significant positive association between disabilities and school dropout. Children with any disability are 1 percentage points more likely to drop out prematurely from school (Column 3). Moreover, children with moderate/severe disability are 7.6 percentage points more likely to dropout from school without completing their basic education as compared to the siblings without any disabilities (Column 4). The estimates obtained from the household fixed effects model for moderate level of disabilities are generally larger in magnitude than those from the probit regression model reported in Table 3.3. This suggests that the fixed effects model, by accounting for unobserved family characteristics that may affect both disability outcomes and educational indicators, helps reduce the downward bias resulting from omitted variable bias in the probit model estimates. The presence of similar external environments, such as parental care and health risks, among most siblings within a household mitigate the influence of unobserved factors on disability's effect on schooling outcomes.

Our analysis shows significant evidence of educational exclusion experienced by children with disabilities compared to those without any disabilities. The impact of disability is more pronounced in zone 1 of educational exclusion, referring to children who never attend school, rather than in zone 2, which includes children who could not complete their schooling and drop out prematurely.

3.5.1 Intra-Household Disability Gap in Schooling by Gender and Wealth

Here we address two important notions, those of the child's gender and the household's wealth status. Girls may face differential treatment in terms of educational investment

Table 3.5: Disability and child schooling by gender and household wealth status: Household fixed effects estimates

Panel A: Dependent Variable School Enrollment						
VARIABLES	Female Child (1)	Male Child (2)	Wealth Quartile 1 (3)	Wealth Quartile 2 (4)	Wealth Quartile 3 (5)	Wealth Quartile 4 (6)
Disability	-0.408*** (0.026)	-0.384*** (0.028)	-0.408*** (0.037)	-0.371*** (0.033)	-0.405*** (0.031)	-0.359*** (0.037)
Constant	-0.361*** (0.107)	-0.137* (0.083)	-0.343** (0.173)	-0.264* (0.137)	-0.018 (0.104)	0.004 (0.099)
Observations	6,753	7,801	2,838	4,368	4,179	3,169
R-squared	0.186	0.184	0.231	0.181	0.201	0.160
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Household Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Panel B: Dependent Variable School Dropout						
VARIABLES	Female Child (1)	Male Child (2)	Wealth Quartile 1 (3)	Wealth Quartile 2 (4)	Wealth Quartile 3 (5)	Wealth Quartile 4 (6)
Disability	0.114*** (0.028)	0.077*** (0.022)	0.051 (0.037)	0.090*** (0.032)	0.103*** (0.029)	0.043* (0.026)
Constant	0.463*** (0.079)	0.284*** (0.054)	0.395*** (0.115)	0.397*** (0.091)	0.336*** (0.074)	0.183*** (0.055)
Observations	5,485	6,885	2,172	3,658	3,686	2,854
R-squared	0.158	0.144	0.192	0.176	0.135	0.082
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Household Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes

Note: The table presents the results of Linear probability household fixed effects model for male and female child separately and children from each wealth quartile. The dependent variables pertain to child schooling: school enrolment and school dropout for children between the ages of 5 and 16 years. The child's disability is our independent variable of interest. All regressions control for the child's gender, age and age square, birth order, sibling's size and household fixed effects. Robust standard errors in parentheses. *** = significant at the 1% level; ** = significant at the 5% level; * = significant at the 10% level.

and environmental constraints to schooling, irrespective of their disability status. Discrimination against girls and its implications for girls' education in the developing countries are widely documented, for instance see, [Alderman and King \(1998\)](#); [Sawada and Lokshin \(2009\)](#); [Maitra et al. \(2016\)](#); [Sahoo \(2017\)](#). We obtain gender-wise estimates to detect evidence of any disability-specific gender bias in schooling. Similarly, studies such as [Madanipour et al. \(2015\)](#); [Mitra et al. \(2013\)](#); [Eide and Ingstad \(2013\)](#); [Singal et al. \(2011\)](#); [Grech \(2009\)](#); [Filmer \(2008\)](#) highlight the role of household economic status in determining child education. We control for the potential association between children's disability and educational exclusion related to household wealth.

Table 3.5 presents the impact of disabilities on educational exclusion by gender of the child and by household wealth quartiles. Results reported in panel A show that female children with disabilities are 40.8 percentage points less likely to be enrolled in school, while male children with disabilities are 38.4 percentage points less likely to be enrolled compared to their counterparts without disabilities (columns 1 and 2). Additionally, the effect of disability varies across different wealth quartiles. The disability gap in school enrollment is statistically significant across all quartiles but is stronger among households in the lower wealth quartiles. For instance, children with disabilities from the first, second, third and fourth wealth quartiles are 40.8, 37.1, 40, and 35.9 percentage points less likely to be enrolled in school, respectively, compared to their siblings without disabilities. Differences are relatively small, and not monotonous (columns 3-6).

Panel B presents the impact of disabilities by gender and wealth quartile on zone 2 of educational exclusion, which pertains to school dropout. Female children with disabilities are found to be less likely to continue their schooling than male children with disabilities. This may possibly be due to environmental or supply constraints which affect girls more than boys. We find that male children with disability are 7.7 percentage points more likely to drop out prematurely from school (Column 2), while female children with disability are 11.4 percentage points more likely to dropout from school (Column 1). This implies a adverse effects of disabilities is higher on the completion of basic education for female CWDs.

Furthermore, the effect of disability appears to be similar across the first three quartiles

of the wealth index. However, among children born into households within the fourth quartile of the wealth distribution, the coefficient of disability is insignificant (columns 3-6).

3.5.2 Intra-Household Disability Gap in Schooling by Types of Disabilities

The estimations reported in Table 3.5 take children with disabilities as a homogenous group and ignore differences in disabilities. This may lead to misleading conclusions based on an oversimplification of the constraints CWDs face in their education. Children with physical disabilities usually face lower barriers to schooling compared to children with cognitive impairments (Organization and Bank, 2011). To relax this homogeneity assumption, we estimate the household fixed effects model for the six types of impairments. Panel A in Table 3.6 shows the impact of disabilities on children's school enrollment by the type of impairment (Columns 1-6). The impact of disability is found to be consistently negative and significant, irrespective of the type of impairment. However, the magnitude of disabilities' impact on school enrollment varies by the type of disability, with children with auditive and cognitive difficulties being the most affected. Children with visual, hearing and mobility impairments are 22.3, 49.4 and 51.9 percentage points less likely to get enrolled in school respectively, as compared to the siblings without any impairment (Columns 1-3). Worse still, children with self-care, communication, and memory problems are 63.4, 59.7 and 65.8 percentage points less likely to be enrolled in school respectively, compared to siblings without disability. Panel B presents the impact of disabilities of different types on the likelihood of the CWDs dropping out from school (Columns 1-6). The impact of visual impairment on school dropout is insignificant. However, children with hearing and mobility impairments are 17.2 and 13.2 percentage points more likely to drop out from school without completing their basic education compared to their peers without any impairment. Children with cognitive and intellectual impairments are also vulnerable: Children with self-care, communication, and memory problems are 13.3, 12.6 and 10.3 percentage points more likely to drop out prematurely from school, respectively.

Table 3.6: Disability and Child Schooling by Type of Disability: Household Fixed Effects Estimates

Panel A: Dependent Variable School Enrollment						
VARIABLES	Visual	Hearing	Mobility	Self-Care	Communication	Memory
	(1)	(2)	(3)	(4)	(5)	(6)
Disability	-0.223*** (0.039)	-0.494*** (0.032)	-0.519*** (0.025)	-0.634*** (0.026)	-0.597*** (0.024)	-0.658*** (0.028)
Constant	-0.196*** (0.075)	-0.162** (0.073)	-0.155** (0.072)	-0.154** (0.073)	-0.164** (0.072)	-0.149** (0.073)
Observations	10,206	10,276	10,439	10,328	10,414	10,287
R-squared	0.148	0.185	0.206	0.217	0.221	0.217
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Household Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Panel B: Dependent Variable School Dropout						
VARIABLES	Visual	Hearing	Mobility	Self-Care	Communication	Memory
	(1)	(2)	(3)	(4)	(5)	(6)
Disability	0.024 (0.025)	0.172*** (0.037)	0.132*** (0.029)	0.133*** (0.042)	0.126*** (0.033)	0.103** (0.049)
Constant	0.317*** (0.049)	0.318*** (0.049)	0.326*** (0.050)	0.309*** (0.049)	0.319*** (0.049)	0.309*** (0.050)
Observations	8,906	8,902	8,953	8,846	8,903	8,825
R-squared	0.153	0.161	0.156	0.152	0.152	0.150
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Household Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The table presents the results of Linear probability household fixed effects model, in which the dependent variables pertain to child schooling: school enrollment and school dropout for children between the ages of 5 and 16 years. The independent variables of interest are the types of disability. All regressions control for the child's gender, age and age square, birth order, sibling's size and household fixed effects. Robust standard errors in parentheses. *** = significant at the 1% level; ** = significant at the 5% level; * = significant at the 10% level.

These children with cognitive disabilities are more likely to be excluded from the education system, especially in zone 1 of educational exclusion (i.e. those who never attend school), as compared to children with sensory and physical impairments (visual, hearing, and mobility disabilities).

3.6 Robustness checks

Although, household fixed effects eliminate the cross-sectional variation across different households. Due to the single wave of cross-sectional survey data, we cannot capture the time variation in the general composition of household i.e., when the household has a disabled child. Thus, to address this limitation we restrict the sample to twin's siblings allowing for the eliminate the problem of time-varying differences in family well-being and also isolation of the genetic component's effect from the impact of disabilities on education. Moreover, the second sub-sample focuses on children of educated mothers who have at least 10 years of schooling. This sub-sample helps exclude the mediating effects of intergenerational disadvantages by considering children from educated mothers who are more likely to provide better health, cognitive abilities, and behavioral development for their children. The third sub-sample comprises children from parents without any disabilities, ensuring that the prevalence of disabilities among children is not influenced by parental disabilities. This sub-sample allows for the isolation of the genetic component's role and controls for the impact of parental disabilities on children's schooling outcomes. A study by [Mont and Nguyen \(2013\)](#) shows that parental disabilities are a strong determinant of children's schooling outcomes.

Tables [3.7](#) and [3.8](#) report the results of the mediating effects of genetic component and the intergenerational transmission in determining the disability gap. The effect of disability on school enrollment is persistently negative and significant even in the sample of twin siblings. Children with any level of disability and moderate to severe disability are 13.2 and 39.1 percentage points less likely to get enrolled in school, respectively (Columns 1 and 2 in table [3.7](#)). Columns 4 show the results of disability's impact on school dropout. Children with disability are 11.7 percentage points more likely to dropout prematurely

Table 3.7: Child Schooling and Disability: (Twins Sub-sample) Household Fixed Effects Estimates

VARIABLES	School Enrollment		School Drop Out	
	(1)	(2)	(3)	(4)
Any Disability	-0.132*** (0.040)		0.030 (0.024)	
Mild Level		-0.038 (0.041)		0.015 (0.026)
Moderate/Severe Level		-0.391*** (0.098)		0.117* (0.060)
Constant	0.236 (0.294)	0.258 (0.282)	-0.087 (0.099)	-0.089 (0.155)
Observations	719	719	586	586
R-squared	0.096	0.134	0.013	0.021
Controls	Yes	Yes	Yes	Yes
Household Fixed Effects	Yes	Yes	Yes	Yes

Note: The table presents the results of Linear probability household fixed effects model. The dependent variables pertain to child schooling: school enrolment and school dropout for twin siblings between the ages of 5 and 16 years. The independent variables of interest are the types of disability. All regressions control for the child's gender, age and age square, birth order, siblings' size, and household fixed effects. Robust standard errors in parentheses. *** = significant at the 1% level; ** = significant at the 5% level; * = significant at the 10% level.

Table 3.8: Disability and Child Schooling by Mother's Education and Parents' Disability Status: Household Fixed Effects Estimates

Panel A: Mother's Education				
VARIABLES	School Enrollment		School Dropout	
	(1)	(2)	(3)	(4)
Any Disability	-0.090*** (0.014)		0.012* (0.007)	
Mild level		-0.027** (0.012)		0.007 (0.007)
Moderate/Severe level		-0.350*** (0.043)		0.046* (0.027)
Constant	0.338** (0.150)	0.323** (0.129)	0.083* (0.045)	0.089* (0.046)
Observations	2,064	2,064	1,949	1,949
R-squared	0.102	0.181	0.038	0.042
Controls	Yes	Yes	Yes	Yes
Household Fixed Effects	Yes	Yes	Yes	Yes
Panel B: Parents without any Disability				
VARIABLES	School Enrollment		School Dropout	
	(1)	(2)	(3)	(4)
Any Disability	-0.125*** (0.008)		0.010** (0.005)	
Mild level		-0.042*** (0.008)		-0.002 (0.005)
Moderate/Severe level		-0.396*** (0.018)		0.073*** (0.016)
Constant	13,926 0.144	13,926 0.183	11,851 0.135	11,851 0.139
Observations	15,351	15,351	12,940	12,940
R-squared	0.156	0.167	0.136	0.138
Controls	Yes	Yes	Yes	Yes
Household Fixed Effects	Yes	Yes	Yes	Yes

Notes: The table presents the results of Linear probability household fixed effects model. The dependent variables pertain to child schooling: school enrolment and school dropout for children between the ages of 5 and 16 years. The independent variables of interest are the types of disability. All regressions control for the child's gender, age and age square, birth order, sibling's size, and household fixed effects. Robust standard errors in parentheses. *** = significant at the 1% level; ** = significant at the 5% level; * = significant at the 10% level.

without completing their basic education, as compared to sibling without any disability. Panel A of Table 3.8 shows that the effect of disability on educational outcome is persistent even in children of educated mothers. Children with any level of disability, mild disability, and moderate to severe disability are respectively 9, 2.7 and 35 percentage points less likely to get enrolled in school as compared to the siblings without any disability (Column 1 and 2). In the same vein, children with any level of disability and moderate/severe disability are 1.2 and 4.6 percentage points more likely to dropout prematurely without completing their basic education as compared to their peers without any disability (Columns 3 and 4). In Panel B, we show results for the sub-sample of children born to parents without any disability. Children with any level of disability, mild disability, and moderate/severe disability are 12.5, 4.2, and 39.6 percentage points less likely to get enrolled in school respectively, as compared to siblings without any disability (Columns 1 and 2). Likewise, children with any level of disability and moderate/severe disability are 1 and 7.3 percentage points more likely to dropout prematurely without completing their basic education, as compared to peers without any disability (Columns 3 and 4). These results are similar to our baseline estimations reported in Table 3.4. Overall, our results confirm that disabilities have important implications for children’s educational outcomes. We find that these effects are not solely mediated by intergenerational transmission of disadvantages, implying that the disabilities matter by themselves in determining the educational outcomes of the children. The disadvantageous effects of disabilities are not undone by intergenerational transmission of advantages, as is clear from the fact that the effect of disabilities on educational outcomes persist across all quartiles of household wealth, twins subsample, and children of more educated mothers and parents without disabilities.

3.7 Conclusion

In this study, we used nationally representative data from Pakistan to examine the role of disabilities in determining differences in children’s schooling outcomes. We considered the role of gender, wealth and intergenerational transmissions channels in determining the disability gap in schooling. Our main findings are five-fold:

First, CWDs of both primary and secondary school-going age are disproportionately out of school. 69% of CWDs of school-going age never attend school as compared to 31% of children without any disability. We found that the overall enrollment rate declines beyond age 11 as children go beyond the primary school age and the access to secondary and higher schooling becomes limited. However, school dropout among CWDs starts much earlier at age 7-8, possibly due to greater barriers to schooling, environmental constraints or social stigma.

Second, we investigated the intra-household disparity in schooling opportunities between the CWDs and their siblings. We estimated a linear probability model with household fixed effects to obtain the coefficient of disability 's association with the probability of school enrolment and school dropout. We found that children with any level of disability and moderate/severe disability are 12.6 and 39.5 percentage points less likely to get enrolled in school respectively, as compared to the siblings without any disability. Even when CDWs get enrolled in school, they remain less likely to complete their schooling. Children with any level of disability and moderate/severe disability are 1 and 7.6 percentage points more likely to dropout prematurely from school without completing their basic education respectively, as compared to their siblings without any disability. Disabilities affect both zones of education exclusion. Firstly, access to school, social stigma and parental perceptions about disabilities make it more likely for CWDs to never go to school. Secondly, inadequate schooling and transport facilities coupled with social and environmental constraints force CWDs to leave school earlier than other children of their age cohort, including their siblings.

Third, we captured the role of gender and socioeconomic heterogeneity in explaining the intra-household disability gap in children's schooling. The adverse effect of disability on educational outcomes, namely school enrolment and school dropout, is more pronounced for female children as compared to male children, suggesting that the environmental constraints are more binding for female CWDs. We find a substantial role of the households' wealth status in driving the disability – school enrolment relationship. However, its impact on school dropout is limited, suggesting that supply constraints and school quality are more influential factors.

Fourth, we uncovered the differences in schooling outcomes between children with six types of disabilities. We found that children with auditive, cognitive and intellectual impairments are much less likely to ever attend school and to continue education beyond primary or secondary level. In comparison, CWDs with visual and mobility impairments are relatively less affected, in part, due to better availability of assistance devices and accessibility material.

Fifth, we attempted to empirically isolate intergenerational transmission of the disadvantages which affect disability's impact on education. We considered two possible channels, namely genetic endowment and mother's education level. We found that these factors do not substantially alter the likelihood of CWDs getting enrolled in or dropping out of school.

To sum up, we find that children with disability face non-negligible challenges in education regardless of the type or nature of disability they suffer from, the household's socioeconomic status or the intra-generational transmission of advantages. This provides a rationale for direct policy intervention in order to carry out structural reforms in the educational sectors aimed at ensuring the inclusion of children with disabilities. This will require making the school infrastructure more accessible, sensitizing the teachers and providing them better means to accommodate the CWDs, opening more specialized schools and ensuring the availability of one such school in every district, and launching public awareness campaigns to destigmatize disability. Enhancing the employment opportunities for persons with disabilities too will help counter parental apprehensions and societal norms that impede the education of children with disabilities. Improving the educational outcomes of children with disabilities would contribute in making the society more inclusive and achieving sustain economic development.

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Chapter 4

Disabilities and Gender-Differentials in Educational Attainment: Evidence from Pakistan

Abstract

Gender disparities in education and the adverse effects of disabilities on educational outcomes have each been studied separately. However, the intersection of these two issues needs further investigation to develop targeted policies and interventions. The study attempts to fill this gap by utilizing the nationally representative 2019–20 Pakistan Social and Living Standard Measurement Survey to examine the gender-specific disability gap in educational attainment for individuals aged 18–30. The findings reveal that females age 18–30 are disproportionately affected with an average of three years of schooling attained by females with disabilities compared to six years of schooling for males with disabilities. These gender differentials in educational attainment are prominent across middle and high-school levels, and persist regardless of the severity or the type of disability (cognitive, sensory, multiple). The prevalent gender bias does not differ by mother’s characteristics, birth order or the children’s sex composition. However, the impact matters more in urban and wealthy households. The study’s robustness checks using alternate specifications confirm substantial gender differences in the disability gap, supporting the validity of the findings. Overall, the study highlights the urgent need for gender-specific interventions and support systems to address barriers faced by females with disabilities in accessing and completing their education, emphasizing the importance of targeted policies to ensure equitable educational opportunities for individuals with disabilities, particularly females in Pakistan.

Keywords: Disability, Gender Differentials, Educational Attainment, Household Survey, Pakistan.

JEL Codes: I14, I24, J13, J17, I32.

4.1 Introduction

“Girls With Disabilities Are Still Denied Their Right To Education ”

United Nations Girl’s Education Initiative

One of the main concerns for policymakers in developing countries is addressing gender disparities and mitigating the adverse effects of disabilities on social and economic outcomes. Developing countries have prominently and well-documented gender gaps in educational outcomes (Alderman and King, 1998; Maitra et al., 2016; Sahoo, 2017; Oliveira, 2019; Schwab et al., 2020). For example, most of the out of school children in Pakistan, the country with the second highest rate of school drop out, are girls (UNICEF, 2017). Pakistan ranks 151 out of 153 countries on the gender parity index (Schwab et al., 2020). The country’s cultural and ethnic groups show strong preference for male child (Zaidi and Morgan, 2016; Javed and Mughal, 2022), which exacerbates gender inequality in education.

Another challenge to achieving inclusive education in developing countries is the prevalence of disabilities. Educational disparities between persons with disabilities (PWDs) and those without disabilities are widely recognized. Compared to individuals without disabilities, those with disabilities tend to have lower educational attainment (see for instance, Madans et al. (2011); Hoogeveen (2005); Bakhshi et al. (2021); Mete et al. (2008); Braithwaite and Mont (2009); Quinones et al. (2021); Organization and Bank (2011)). This oversight is evident in the inadequate consideration given to the particular needs and difficulties experienced by PWDs within educational institutions, which can have far-reaching consequences like social exclusion and denial of basic human rights and affect their participation in society. Moreover, it reinforces challenges that prevent equal opportunities for PWDs and exacerbates existing inequalities. The incidence of disabilities and gender differences in educational outcomes hold particular importance in the context of developing countries like Pakistan. According to Japan International Cooperation Agency (JICA, 2003)¹ and

¹JICA’s activities on Disability and Development: <https://www.jica.go.jp/Resource/english/publications/reports/annual/2003/pdf/200307.pdf>

the Economist Intelligence Unit (EIU, 2014)², PWDs are the most marginalized group in Pakistan. 9.28% of the total population in Pakistan experiences some form of disability (PSLM 2019-20). The situation for PWDs in Pakistan is dismal in various sector of the society (ESCAP, 2017). They face serious educational difficulties and obstacles, with literacy rate (only 28 percent) and the literacy rate among women with disability is a mere 18 percent. Children with disabilities encounter barriers to participation in education, resulting significant 52.7 percent drop in the enrollment rate between primary school to secondary school. In addition, PWDs are on average two to six times less likely to be employed as compared to persons without any disabilities, for Women with Disabilities, the situation is even more complex. They face dual discrimination in the labor market due to their sex and disability.

Although gender gaps in education and disabilities have each been studied separately, a substantial research gap exists in the intersectionality of these two issues. In this study, we seek to investigate whether there is consistent gender-specific disparities in educational attainment based on disabilities in Pakistan. We identify the specific types of disabilities that induce gender differentials in educational outcomes. By observing this relationship, the findings can shed light on the unique challenges faced by different groups (physical/cognitive disabilities or multiple disabilities) and inform targeted interventions. A third objective is to explore whether gender-differentials in the disability gap persist across different levels of education completion, such as primary, middle, secondary, and higher education. We examine the role of socio-cultural and economic factors, such as son preference, birth order, region, wealth, maternal education, and maternal age at first birth on the educational prospects of persons with disabilities and the gender-differentials in the disability gap. Understanding the influence of these factors can help policymakers design effective strategies to promote inclusive and equitable education for all individuals, regardless of their gender or disability status.

We utilize the nationally representative 2019-20 Pakistan Social and Living Standard Measurement survey to examine gender-specific disability gap in educational attainment

²Moving from the margins: Mainstreaming persons with disabilities in Pakistan: [https://www.britishcouncil.pk/sites/default/files/moving from the margins final.pdf](https://www.britishcouncil.pk/sites/default/files/moving_from_the_margins_final.pdf)

for 81,685 individuals aged (18-30). This nationally representative survey provides, for the first time, information on disability measures using the modules on functional limitation based on the United Nations–Washington Group on Disability Statistics (UN-WG) standards, allowing accurate measurement of the prevalence of disabilities in the country’s population. Our results show that the adverse effects of disabilities on educational attainment significantly differ across gender. This is true regardless of the type of disability (physical, cognitive, multiple) and its severity. The gender differentials in the disability gap continue to become more evident after primary education level, suggesting a lack of gender-specific facilities at middle and secondary schools. The differentials are clearer among urban and wealthier households. However, the gender-specific impact of disability on educational attainment does not appear to significantly vary by mother’s characteristics and children’s birth order and sex composition.

This paper is organized as follows. Section 4.2 introduces the PSLM data set used in the study and briefly discusses the overview of prevalence of disabilities in Pakistan. Section 4.3 provides detailed descriptive analysis. Section 4.4 presents the empirical methodology employed. Section 4.5 reports the results and discusses key findings. Section 4.6 comprises of robustness checks. Section 4.7 concludes and suggests policy implications.

4.2 Data

The national population censuses in 1998 and 2017 adopted a binary approach to identify those who had disabilities. These censuses dealt with seven categories of disabilities were covered, including: mentally retarded, seeing problem, hearing problem, crippled, mute, and others and asked a single question about the existence of any type of disability. The prevalence rate of disability varied from 2.49% in the 1998 census to 0.48% in the 2017 census. The prevalence of disability appears to be substantially understated in the two censuses. There are indeed significant disadvantages to the two-tier classification approach used in the 1998 and 2017 censuses to identify individual as either disabled or not.

In this study, we use the data from the 2019-20 wave of the Pakistan Social and Living Standard Measurements (PSLM) survey carried out by the Pakistan Bureau of Statistics

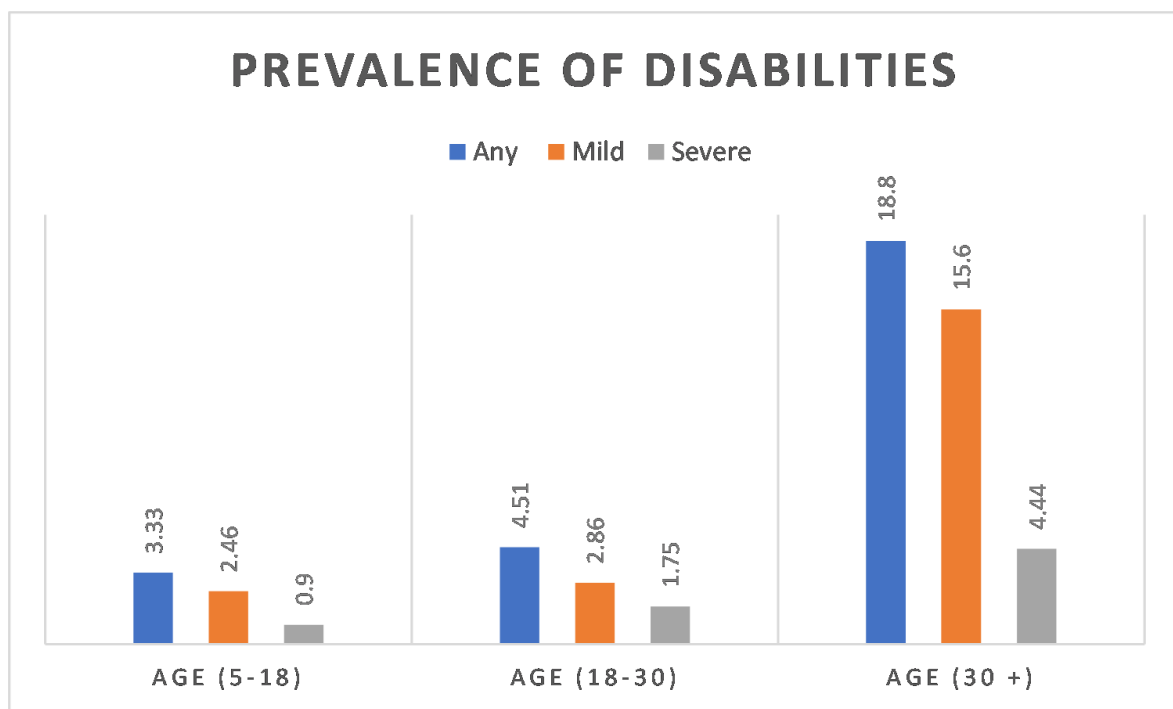
(PBS). The PSLM asked detailed and comprehensive questions that are aligned with recent standard tools given by United Nations–Washington Group on Disability Statistics (UN-WG) to assess the prevalence of disabilities based on functional difficulties. The development of the Washington Group short set questionnaire based on biopsychosocial model of human functioning given by the world health organization (WHO) is an important breakthrough in addressing the shortcomings of the binary approach to disability assessment. A succinct set of six questions was created by (UN-WG) on Disability Statistics to evaluate functional difficulties in persons. The (WG) short set uses a Likert scale with four response levels (No difficulty, some difficulty, a lot of difficulty, and cannot do at all) to measure functional difficulty in six basic physical and sensory domains (seeing, hearing, walking, self-care, memory, and communication). Compared to other existing disability’s measuring criteria such as Activities of Daily Living (ADLs) and World Health Organization Disability Assessment Schedule 2.0 (WHO-DAS), this framework is concisely developed to address disabilities in diverse functional domains, and is internationally comparable because of the given benchmarks to identify functional difficulties (Madans et al., 2011).

The PSLM tracks Pakistan’s progress toward the Sustainable Development Goals (SDGs). The survey provides information at National/Provincial/District level on socioeconomic, education, health, housing and sanitation indicators. Moreover, the survey provides detailed information on the demographics of each household member and educational profile for every individual. A two-stage stratified sampling approach is used to carry out the survey. Primary sample units/enumeration regions are chosen at random for the first stage, while households are selected at random on the second stage (Pakistan Bureau of Statistics, 2019). The current round of PSLM covered information on 855,000 individuals from 176,790 households from all over the country.

We focus on the educational attainment of the adult population aged 18-30 years in Pakistan, as this age group is generally expected to have completed their formal education. By examining this specific age cohort, the study captures the educational trajectory of individuals who experienced disabilities during their school years. Available data do not provide information on the timing disability diagnosis. Restricting the sample to adult

population reduces the risk of including disabilities that may have developed later in life, i.e. those acquired after the completion of education (Male Wodon, 2017). Figure 4.1 shows the prevalence rates of disabilities across different age groups, including (5-17), (18-30) and (30+). The prevalence of disabilities for the first two age groups (5-17 and 18-30) are similar, but considerably increase in the latter age group (30+).

Figure 4.1: Prevalence of disability in Pakistan by age cohorts.



Source: Authors' calculation using PSLM 2019-20

Table 4.1 provides a breakdown of the prevalence rates of disabilities in Pakistan across the six domains (Seeing, Hearing, Walking, Cognition, Self-care, and Communication) based on the severity measures and responses collected through the UN-WG brief set of questions in the PSLM survey. The first measure, termed "any difficulty," includes those who reported "some difficulty," "a lot of difficulty," or "cannot perform at all" in at least one category for the sample group of persons ages 5 and above. This measure's prevalence rate is 9.28%. The second measure is known as "mild difficulties" and has a prevalence rate of 7.38%. It captures "some difficulty" in at least one category. The prevalence rate

Table 4.1: Prevalence of disability in Pakistan by level of severity

	Sample Population (5+)		Adults (18 – 30)		Multiple Disabilities among Adults	
	N	%	N	%	N	%
Any	69,034	9.28	3,686	4.51	1,177	1.44
Mild	53,332	7.38	2,300	2.86	696	0.88
Severe	15,702	2.27	1,386	1.75	481	0.60
Total Sample	743,598		81,685			

Source: Authors' calculation using PSLM 2019-20.

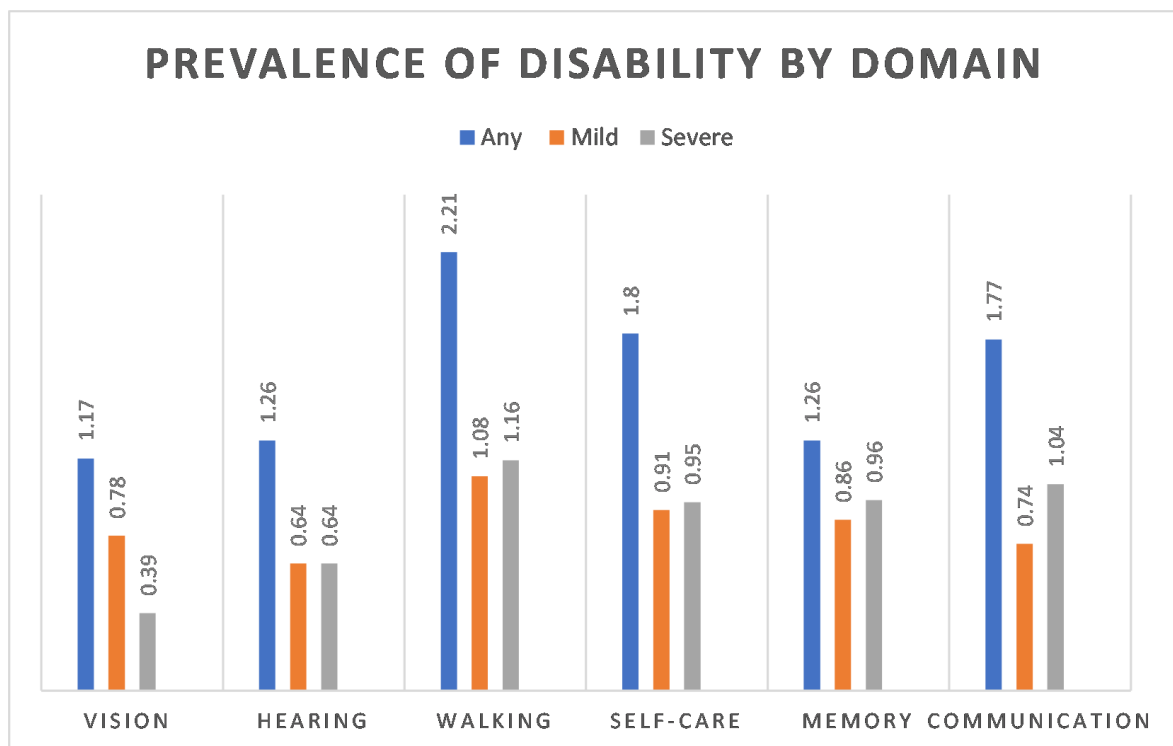
for the third measure, "moderate/severe difficulty," which covers those who reported "a lot of difficulty" or "cannot do at all" in at least one category, is 2.27%. 3,686 individuals, constituting 4.51% of the sample in the 18-30 age group, were identified as having some degree of functional impairment in at least one domain. Persons with multiple disabilities included 1,177 individuals comprising 31.9% of adults with any disability and 1.44% of the total sample who reported experiencing functional difficulties in at least two of the six domains assessed. Out of the total sample, 23,00 individuals (2.86%) and 1,386 individuals (1.75%) were reported to have mild and moderate or severe disabilities respectively. 696 individuals (0.88%) were found to have multiple mild disabilities among the given of sample of adults. In the same line, among 1,386 individuals, 481(0.60%) individuals reported to have multiple severe disabilities, indicating a higher degree of functional difficulties across various domains.

Figure 4.2 shows the prevalence of disabilities among individuals of age (18-30) years by domain and degree of severity. The prevalence rates of any level of disability varies across the six domains of functional difficulty, with the lowest prevalence rate of 1.17% observed for visual impairment, and the highest proportion of prevalence with of 2.21% for walking. As far as mild and severe levels of difficulties are concern, variation across the six domains can be observed as well, in preceding levels with the lowest prevalence rate of impairments is hearing with proportions 0.64% and highest prevalence rate is walking domain with 1.08%. The prevalence rates of to severe levels of disability are approximately 1% across

domains such as walking, self-care, memory, and communication. Visual and hearing impairments are less commonly reported among individuals aged 18-30 years.

Our usable sample contains data on 81,685 individuals of (18-30) years of age from 48,042 households, whose information on educational attainment, status disability and parental information is available.

Figure 4.2: Prevalence of disability among Individuals aged 18–30 by domain



Source: Authors' calculation using PSLM 2019-20

4.3 Disability and Educational Attainment in Pakistan- Descriptive Analysis

Table 4.2 provides the summary statistics of educational attainment. The sample is split according to the individual's disability status and level of education completion. We categorize the levels of education completion by using individual's information on years of schooling completed. Primary education completion refers to people who have completed at least 5 years of schooling. Middle level education is attained by individuals who have

Table 4.2: Educational Outcomes of Individuals by Disability Level.

Variables	Any Difficulty			Severe Difficulty		
	Individual without disability	Individual with disability	Mean Difference	Individual without disability	Individual with disability	Mean Difference
Years of Schooling	7.33	5.62	-1.71***	7.33	3.43	-3.90***
Primary Education Completion	0.71	0.56	-0.15***	0.71	0.35	-0.36***
Middle Education Completion	0.57	0.43	-0.13***	0.57	0.27	-0.30***
Secondary Education Completion	0.43	0.31	-0.12***	0.43	0.17	-0.25***
Higher Education Completion	0.24	0.17	-0.07***	0.24	0.09	-0.15***

Notes: The means comparison uses a two-sample independent t-test. The null hypothesis is: $H_0: \text{diff} = 0$ and the alternative hypothesis is $H_a: \text{diff} \neq 0$.

completed at least 8 years of schooling, including primary education and three additional years of schooling. Secondary education completion, this level specifies those individuals who have completed at least 10 years of schooling. Higher education completion refers to those who have completed at least 12 years of schooling.

The data shows the disparities in educational attainment between persons with and without disabilities. Individuals without any disability attained on average 7.33 years of schooling, whereas those with any disabilities attained on average 5.62 years of schooling. The corresponding difference is further magnified for individual with severe disabilities, who had an average of 3.43 years of schooling. The mean difference is not only substantial but also statistically significant, indicating the existence of disability gap in educational outcomes.

Furthermore, 29% of individuals without any disability did not complete their primary education as compared to 44 percent individuals with any disability, the corresponding percentage is even higher 65% for those with severe disability. Similarly, this trend of lower education completion rates among individuals with disabilities is consistent across middle, secondary, and higher education levels. For instance, 73% of individuals with disability didn't complete their middle education as compared to 43% without any disability. Likewise, 83% of individuals with disability did not attain secondary education as compared to 57% without any disability. The disparity persists in higher education, where 91% of persons with disabilities don't attain higher education as compared to 76% without any disabilities.

Table 4.3 examines the descriptive analysis of individuals with and without disabilities, grouped by personal, parental, and household-level attributes. The means of the group of persons with and without disabilities are tested for any differences by their gender, age, birth order, number of siblings, parental characteristics including mother's education, father's education, mother's disability, father's disability in their individual, other characteristics like socioeconomic status and region. The data show that the prevalence rates of disabilities are higher among male compared to female. The incidence of disabilities seems to be influenced by parental characteristics, particularly, persons born to parents with disabilities exhibit higher rates of disabilities compared to those born to parents

Table 4.3: Individual and Household Characteristics by Individual's Disability Level.

Variables	Any Difficulty			Severe Difficulty		
	Individual without disability	Individual with disability	Mean Difference	Individual without disability	Individual with disability	Mean Difference
Female	0.52	0.47	-0.05***	0.52	0.43	-0.09***
Age	22.62	22.93	0.31***	22.62	23.13	0.51***
Birth Order	1.92	1.85	-0.05**	1.92	1.87	-0.05
Siblings	2.66	2.56	-0.10***	2.66	2.57	-0.09
Mother's Education	2.00	1.75	-0.25***	2.00	1.71	-0.28**
Father's Education	3.68	3.42	-0.26***	3.68	3.34	-0.33**
Mother's Disability	0.041	0.049	0.008*	0.041	0.061	0.02**
Father's Disability	0.046	0.053	0.007*	0.046	0.061	0.015*
Sex ratio	1.41	1.40	.010	1.41	1.41	0.00
Wealth (Quartile)	2.85	2.73	-0.12***	2.85	2.62	-0.23***
Household Income	12.79	12.55	-0.24***	12.78	12.54	-0.23***
Rural	0.593	0.596	0.003	0.593	0.616	0.023

Notes: The means comparison uses a two-sample independent t-test. The null hypothesis is: $H_0: \text{diff} = 0$ and the alternative hypothesis is $H_a: \text{diff} \neq 0$.

without disabilities. Children of educated parents tend to have lower rates of disabilities, pointing out possible mitigating role for parental education in preventing the incidence of disabilities in their offspring. Additionally, individuals born into households with low income and lower wealth status had more prevalence rates of disability. The association between a lower socioeconomic status and a higher incidence of disabilities, aligns with previous study by [Filmer \(2008\)](#), reinforcing the notion that individuals from disadvantaged backgrounds are at higher risk of experiencing preventable disabilities.

Table 4.4 presents the statistics of individual years of schooling, both overall and by gender, disaggregated by different household characteristics in each panel. It includes the disaggregation by urban and rural households in panel A, the wealth status of households in panel B, mother's education in panel C, mother's age at first birth in panel D for individuals with and without disabilities. Notably, the average years of schooling for individuals with disabilities are consistently lower compared to those without disabilities across all three panels. Panel A reveals that, on average, individuals without disabilities in rural households attain 6.28 years of schooling, while individuals with disabilities achieve 2.89 years of schooling (columns 1 and 2). In urban households, individuals without disabilities attain an average of 9 years of schooling, while individuals with disabilities attain 4.31 years of schooling. Importantly, the mean difference in years of schooling between individuals with and without disabilities is greater in urban households, and columns 3 and 6 confirm that these differences are statistically significant.

These patterns also hold when examining each gender, which presents years of schooling for females and males, respectively. Females with disabilities, irrespective of the region, attain fewer years of schooling compared to males with disabilities. However, the mean differences in years of schooling are much greater among urban households. This does not imply that educational prospects for individuals with disabilities in rural households have improved, but rather that educational gaps are relatively smaller due to the lower educational attainment of all rural individuals without disabilities.

Panel B shows that, on average, individuals without disabilities living in households with a wealth status below the median attain 4.39 years of schooling, while individuals with disabilities attain 1.64 years of schooling (columns 1 and 2). In households with a wealth

Table 4.4: Years of School for Individuals with and without Disability by Region, Wealth Status, and Mother's Education.

Panel A: Region						
Variables	Rural Households			Urban Households		
	Individual without disability	Individual with disability	Mean Difference	Individual without disability	Individual with disability	
	(1)	(2)	(3)	(4)	(5)	
(6)	Mean Difference					
Years of Schooling (Overall)	6.28	2.89	-3.39***	8.86	4.31	-4.54***
Years of Schooling (Males)	6.54	3.33	-3.20***	8.51	4.81	-3.69***
Years of Schooling (Females)	5.68	2.05	-3.62***	9.62	3.33	-6.28***
Panel B: Wealth status of Household						
Variables	Below Median			Above Median		
	Individual without disability	Individual with disability	Mean Difference	Individual without disability	Individual with disability	
	(1)	(2)	(3)	(4)	(5)	
(6)	Mean Difference					
Years of Schooling (Overall)	4.39	1.64	-2.75***	9.00	4.91	-4.08***
Years of Schooling (Males)	4.62	1.99	-2.63***	8.87	5.48	-3.38***
Years of Schooling (Females)	3.86	0.98	-2.87***	9.29	3.82	-5.47***
Panel C: Mother Education						
Variables	Below Primary			Above Primary		
	Individual without disability	Individual with disability	Mean Difference	Individual without disability	Individual with disability	
	(1)	(2)	(3)	(4)	(5)	
(6)	Mean Difference					
Years of Schooling (Overall)	6.18	2.94	-3.24***	11.12	5.41	-5.71***
Years of Schooling (Males)	6.37	3.46	-2.91***	10.75	5.85	-4.89**
Years of Schooling (Females)	5.72	1.91	-3.80***	11.81	4.69	-7.12***
Panel D: Mother Age at first birth						
Variables	Age ≤ 18			Age > 18		
	Individual without disability	Individual with disability	Mean Difference	Individual without disability	Individual with disability	
	(1)	(2)	(3)	(4)	(5)	
(6)	Mean Difference					
Years of Schooling (Overall)	7.19	2.64	-4.55***	7.34	3.52	-3.82***
Years of Schooling (Males)	7.29	3.32	-3.96***	7.33	3.97	-3.35***
Years of Schooling (Females)	6.97	0.98	-5.99***	7.30	2.67	-4.71

Notes: The means comparison uses a two-sample independent t-test. The null hypothesis is: $H_0: \text{diff} = 0$ and the alternative hypothesis is $H_a: \text{diff} \neq 0$.

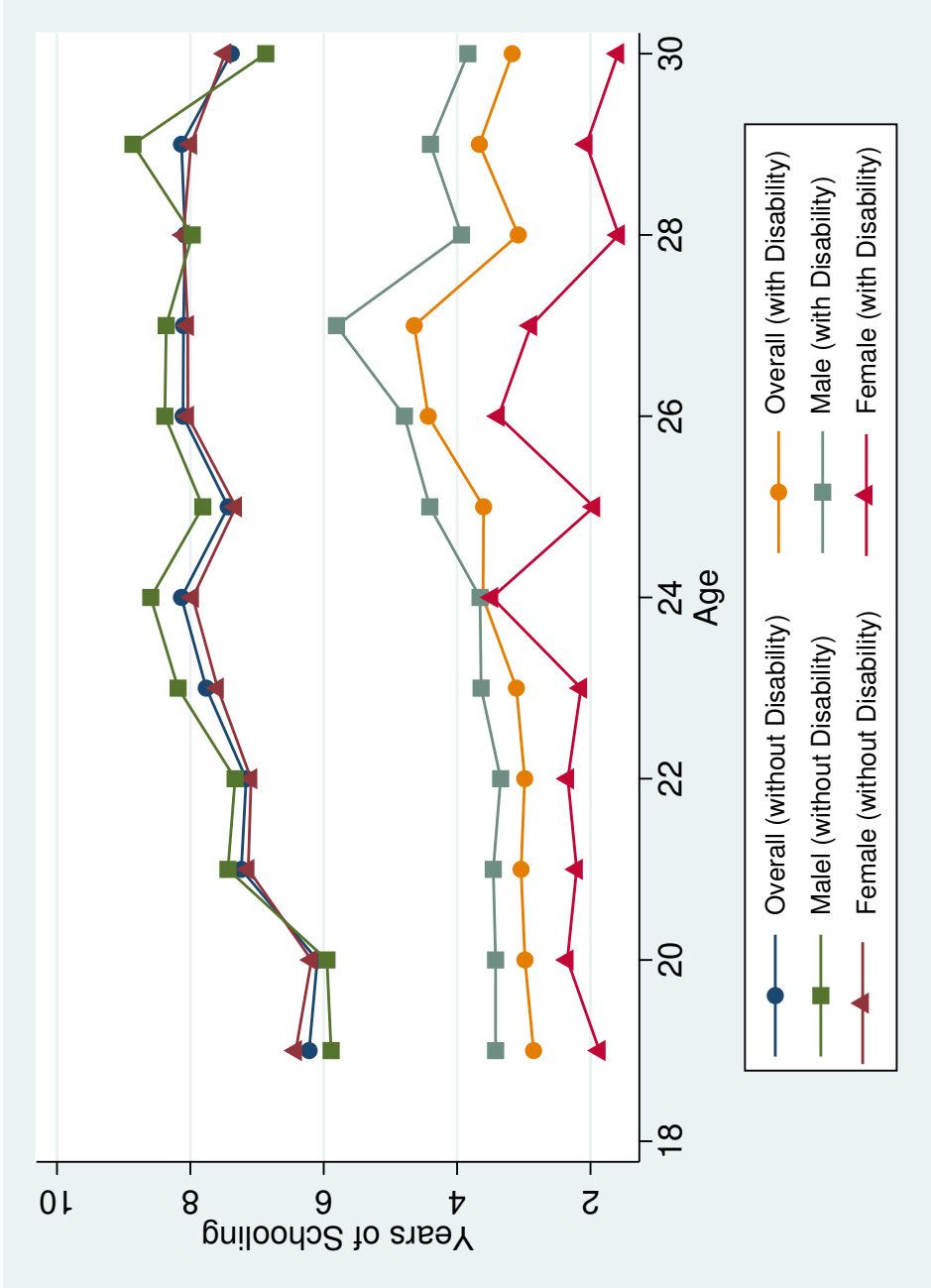
status above the median, individuals without disabilities attain an average of 9 years of schooling, while individuals with disabilities attain 4.91 years of schooling (columns 4-5). Importantly, the mean differences in years of schooling between individuals with and without disabilities are greater in households with wealth status above the median; columns 3 and 6 show that these differences are statistically significant. These patterns are the same when examining each gender separately; the disability gap in educational attainment by gender is consistently maintained compared to males with disabilities. It is interesting to note here that females with disabilities, irrespective of wealth status, attain fewer years of schooling compared to males with disabilities. However, the mean difference in educational attainment between individuals with and without disabilities is higher among wealthier households. As in both poorer and wealthier households, the educational gaps between individuals with and without disabilities may be influenced by the already lower educational attainment of individuals without disabilities in the respective settings. A similar trend in panel C can be observed among individuals with mothers who have below-primary education compared to those with mothers who have above-primary education. Individuals without disabilities from mothers with below-primary education attain 6.18 years of schooling, while individuals with disabilities attain 2.94 years of schooling (Columns 1 and 2). Among individuals with mothers above the primary education level, individuals without disabilities attain an average of 11.12 years of schooling, while individuals with disabilities attain 5.41 years of schooling (columns 4-5). Importantly, mean differences in years of schooling between individuals with and without disabilities are greater in households with more educated mothers; columns 3 and 6 show these differences are statistically significant. When examining each gender separately, the disability gap in educational attainment by gender is consistently maintained. Females with disabilities, regardless of the mother's education, attain fewer years of schooling compared to males with disabilities. This shows the presence of gender-specific barriers and difficulties that hinder the educational trajectory of women with disabilities. It is important to recognise that mean differences in years of schooling are much greater among children with more education, as mothers' education plays a crucial role in determining children's educational prospects in general.

Panel D presents the disability gap in educational outcome among individuals with mothers who started childbearing at or below 18 years and those above 18 years. Individuals without disabilities from mothers with childbearing age below 18 attain 7.19 years of schooling, while individuals with disabilities attain 2.64 years of schooling (Columns 1 and 2). Among individuals with mothers who started childbearing above the age 18, individuals without disabilities attain an average of 7.34 years of schooling, while individuals with disabilities attain 3.52 years of schooling (columns 4-5). Unlike the preceding patterns, mean differences in years of schooling between individuals with and without disabilities are greater among individuals from mothers who experienced early motherhood, particularly those who started childbearing at or below 18 years of age (Column 3 and 6). However, females with disabilities, regardless of the mother's age at first birth, attain fewer years of schooling compared to males with disabilities.

Figure 4.3 shows mean years of schooling for individuals aged 18-30. Six groups are considered: overall individuals with and without disabilities, male with and without disabilities and female with and without disabilities. Disability gaps in educational attainment could be underestimated because of the possibility that adults acquired a disability after finishing school. Thus, age-based heterogeneity is controlled to see the pattern of disability gap across all given ages. It is evident that substantial gap persists in terms of educational attainment among individuals with and without disabilities across all age groups, approximately individuals with disabilities attain 3 fewer years of schooling as compared to individuals without any disabilities. Besides, upper band in figure 2 show individuals without disabilities attained 7 years of schooling while lower band indicates individual with disabilities attained 4 years of schooling on average across given age group. Moreover, among individuals with disabilities, compared to men, women are more vulnerable in terms of educational attainment. The mean year of schooling is invariably lower for women with disabilities than it is for men.

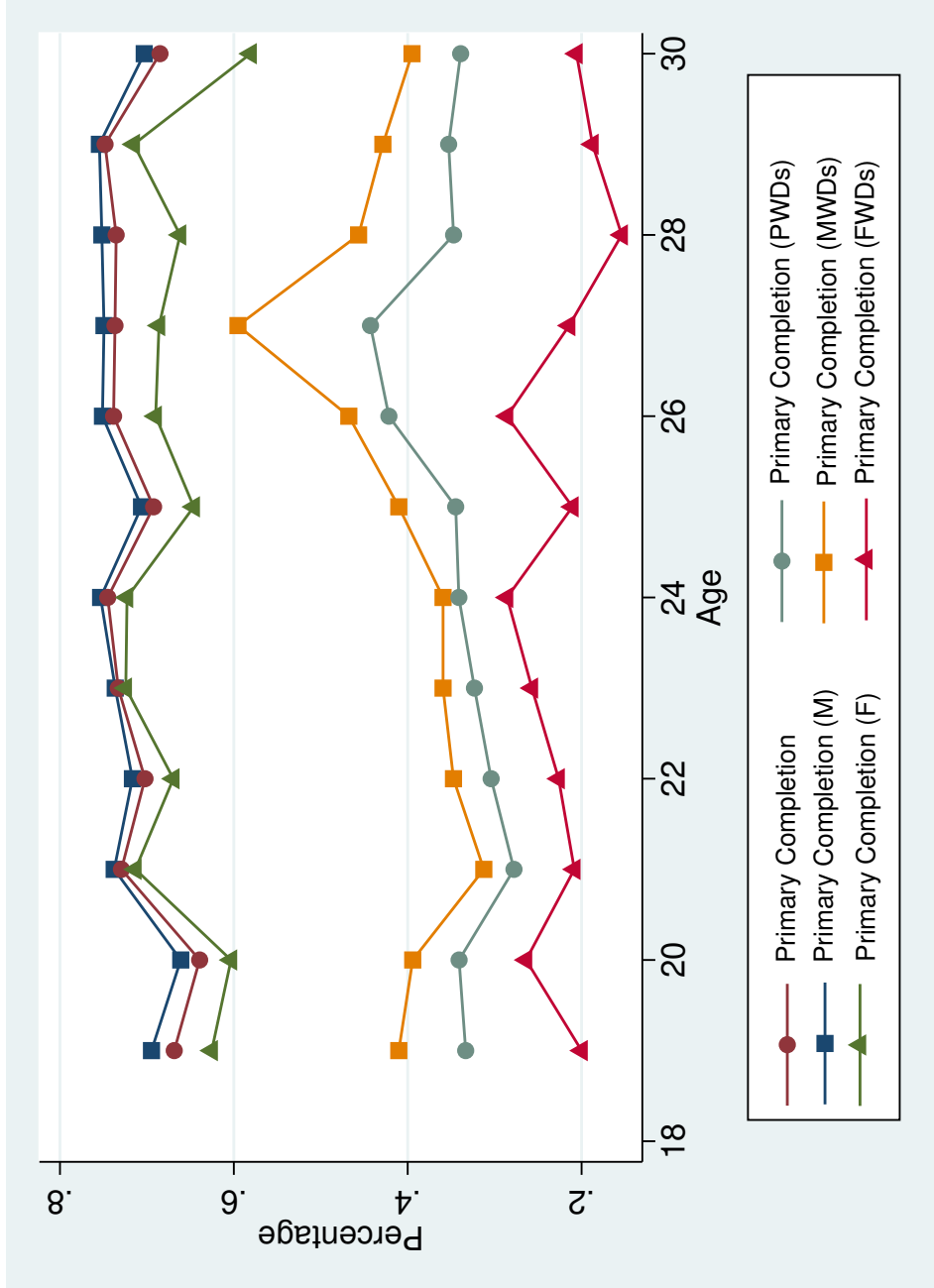
Figure 4.4 provides primary education completion rates for individuals with and without disabilities, disaggregated by gender within the given age group. For individuals without disabilities, primary completion rates are considerably higher than those with disabilities across all age groups. Similarly, within the category of individuals with disabilities,

Figure 4.3: Years of School for Individual with and without Disability by Age and Gender



Source: Authors' calculation using PSLM 2019-20.

Figure 4.4: Primary Education Completion Rates for Individual with and without Disability by Age and Gender



Source: Authors' calculation using PSLM 2019-20.

primary completion rates for women are much less as compared to males. Specifically, the lower band with triangles represents the primary completion rate for females with disabilities, which on average stands at 20 percent as compared to 50 percent males shown in the lower band with squares. The gender-specific disability gap in even primary education completion is evident, highlighting the additional challenges faced by female with disabilities.

4.4 Empirical Strategy

4.4.1 Model and Variables

We set up a multivariate regression fixed effects model to examine the gender-specific disability gap in educational attainment, while controlling for other relevant factors that influence educational outcomes.

$$Y_{IH} = \beta_0 + \beta_1 \text{Disability}_{IH} + \beta_2 \text{Female}_{IH} + \beta_3 (\text{Disability}_{IH} \times \text{Female}_{IH}) + \beta_4 X_{IH} + \alpha_C + u_{IH} \quad (1)$$

Here, Y_{IH} represents the educational attainment of Individual i living in the household h . educational attainment of individual aged (18-30) is measured by completed years of schooling. Disability_{IH} is an indicator of disability in individual I in household H , defined as severe functional difficulties in any given six domain described above. Female is an indicator for gender that takes the value 1 if female, 0 otherwise. Our variable of interest is the interaction of $(\text{Disability}_{IH} \times \text{Female}_{IH})$, β_3 is the coefficient of the variable of interest, which indicates gender-specific impact of disabilities on person's educational outcomes. X is a vector of other controls including individual, parental, household, and region-specific variables. The individual specific variables are age in linear and quadratic form so that age-based heterogeneity can be captured adequately. It has been noted in the literature that birth order and number of siblings not only has significant impact on educational attainment but also heterogenous effects across gender (Oliveira, 2019). Thus, we control

birth order and sibling's size. Birth order is calculated using information on the year of birth and sorted by mother id. Parental characteristics including mother's and father's education control for the impact on child's health (Basu, 2014; Aslam and Kingdon, 2012). Higher parental level of education tends to coincide with higher educational goals and expectations for their offspring. Parental status of disabilities is incorporated in covariates to control for potential hereditary component of disabilities. The study of Mont and Nguyen (2013) showed negative impact of parental disabilities on child's educational outcome, highlighting the importance of considering parental disabilities as a control variable. Besides, it is widely acknowledged in the literature that various kinds of gender-specific discrimination become evident as result of imbalances in the population sex ratio (Guilmoto, 2009; Dasgupta and Fletcher, 2018). To control for such prevailing gender bias in the household, the model includes children sex ratio (male children/female children) for each mother in the given household.

In order to consider the distinct measure of socioeconomic status of household, we control for wealth and income that capture different aspect of an individual or household's financial resources. We followed the approach given by Filmer and Pritchett (2001) who used Principal Component Analysis (PCA) to generated a wealth index. This index was constructed using the indicators typically collected in the PSLM, for example: dwelling type (part of a compound, an apartment/flat or independent house), type of house construction (kutcha, semi-pucca or pucca), number of rooms, presence of facilities such as house has electricity, sewerage system, source of clean water, television, refrigerator, washing machine, iron, geyser, bike, car, computer and internet connection and ownership of agriculture and non-agriculture land, residence, and livestock. By incorporating all these indicators, we estimated the wealth index of the urban and rural households. The sample is then divided into quartiles. Scree plot is used to retain the components, figure C1 in appendix shows substantial levelling of eigen values after the 2 principle component, which retain three components and explaining 18 percent of the variation.

The income measure provides insight into the current financial capacity to meet expenses and make investments, thus helpful in accounting for the immediate financial resources available to the households that may affect educational opportunities. We also control

for the regional attributes by including the regional dummies and district fixed effects to account for regional heterogeneity in access and learning which may also impact on whether individual with disability have access to education. The error term u_{IH} capturing the unobserved factors affecting educational outcomes, particularly to individuals in households. While estimating the above model, standard errors are clustered at household level to allow for any correlation between the household specific unobserved effects.

4.5 Results and discussion

4.5.1 Gender-specific disability gap in educational outcome

In this section, we present the results of our analysis. Table 4.5 contains the results of gender-specific effect of disability on educational attainment for individuals aged (18-30) years. We show the results separated out by level of disabilities, first two columns show estimates from equation (1) where the variable of interest is any level of disability. Columns 3 and 4 show the corresponding results for individuals having severe disabilities, for each of these models, we present a regression with no controls, and another with the full set of control variables. Columns 1-4 show the impact of disability is consistently negative on an individual's educational attainment. On average, an individual with any form of disability attains 1.34 fewer years of schooling as compared to their peers without any disability. Similarly, individuals with severe disabilities attain 3.05 fewer years of schooling compared to those without disabilities.

The interaction term ($\text{Disability}_{IH} \times \text{Female}_{IH}$) is negative and significant, suggesting that the adverse effect of disabilities, irrespective of the level of difficulties, are more pronounced for females with disabilities as compared to male with disabilities. This gender differentials in disability gap in education could be attributed to environmental or supply constraints that disproportionately affect women more than men. According to the World Health Organization ([Organization and Bank, 2011](#)), in comparison to individual with cognitive disabilities, those with physical disabilities might face less challenges to education. Physical impairments may be more readily apparent and not necessarily have a direct impact on cognitive function or aptitude for learning. However, people with cognitive

Table 4.5: Gender Differentials in Effect of Disabilities on Persons' Educational Outcomes.

Dependent Variable: Years of Schooling				
VARIABLES	Any Level		Moderate/Severe	
	(1)	(2)	(3)	(4)
Disability	-1.637*** (0.128)	-1.351*** (0.112)	-3.495*** (0.208)	-3.059*** (0.195)
Female	-0.167*** (0.052)	0.015 (0.044)	-0.167*** (0.052)	0.017 (0.044)
Disability*Female	-0.408* (0.221)	-0.424** (0.197)	-1.322*** (0.298)	-1.171*** (0.294)
Constant	9.545*** (0.230)	-11.193*** (0.788)	9.592*** (0.234)	-11.080*** (0.798)
Observations	81,685	81,685	79,385	79,385
R-squared	0.105	0.368	0.111	0.372
Controls	No	Yes	No	Yes
District Fixed Effects	Yes	Yes	Yes	Yes

Notes: The table presents the gender-specific effect of disabilities on educational attainment indicators:

Years of Schooling. All regressions include District fixed effects, and with and without control for individual (age, age2, birth order, number of Siblings), parental (mothers' and fathers' educational and disability status, children sex ratio), and household-level characteristics (Wealth quartiles, Log of Income, regional dummy). Standard errors are clustered at the household level, with robust standard errors in parentheses. *** = significant at the 1% level; ** = significant at the 5% level; * = significant at the 10% level. The estimates including all controls is reported in appendix table C1.

Table 4.6: Gender Differentials in Effect of Disabilities by Types on Persons' Educational Outcomes.

Dependent Variable: Years of Schooling			
VARIABLES	Cognitive Disabilities	Physical Disabilities	Multiple Disabilities
	(1)	(2)	(3)
Disability	-4.185*** (0.330)	-1.469*** (0.200)	-4.585*** (0.240)
Female	-0.050 (0.045)	-0.055 (0.045)	0.003 (0.045)
Disability*Female	-1.266*** (0.472)	-1.115*** (0.401)	-0.762*** (0.33)
Constant	-11.159*** (0.802)	-11.056*** (0.800)	-11.63*** (0.814)
Observations	78,558	78,772	79,385
R-squared	0.372	0.371	0.372
Controls	Yes	Yes	Yes
District Fixed Effects	Yes	Yes	Yes

Notes: The table presents the gender-specific effect of disabilities by types on educational attainment indicators: Years of Schooling. All regressions include District fixed effects, and control for individual (age, age2, birth order, number of Siblings), parental (mothers' and fathers' educational and disability status, children sex ratio), and household-level characteristics (Wealth index score, Log of Income, regional dummy). Standard errors are clustered at the household level, with robust standard errors in parentheses. *** = significant at the 1% level; ** = significant at the 5% level; * = significant at the 10% level. The estimates including all controls is reported in appendix table C2.

and multiple disabilities may face particular difficulties that have a distinct impact on learning. The estimates shown in Table 4.5 may be oversimplified by treating people with disabilities as a homogeneous population. We group the six domains of disabilities into two broad categories. Category one includes impairments related to visual, hearing, and walking are termed as physical and sensory disabilities, while the second category pertains to cognitive disabilities and encompasses self-care, memory, and communication problems. We also examine educational attainment of persons with multiple disabilities by focusing on the subsample of individuals with functional difficulties in at least two of the six domains assessed.

The results pertaining to the impact of the intersectionality of gender and disability by type of disabilities on educational attainment are presented in Table 4.6. The results provide insights into how cognitive, physical, and multiple disabilities vary in their effects on educational attainment. It shows that individuals with cognitive and multiple disabilities are more vulnerable in educational outcome, with a difference of 4.185 and 4.58 fewer years of schooling compared to their peers without disabilities. However, on average individuals with physical disabilities attain 1.469 fewer years of schooling, compared to those without disabilities. For all type of disabilities, the coefficient of interaction term is negative and significant at 1 percent level of significance, implying that regardless of the type of disabilities, adverse effects of disabilities on educational attainment are more pronounce for females.

4.5.2 Gender-specific disability gap by level of Education

In this section, we extend the analysis and investigate the role of disabilities in explaining gender gap by level of education completion. We categorized the variable of years of schooling into four groups based on the number of years schooling completed by each individual, i) primary education completion ii) middle education completion, iii) Secondary completion iv) Higher education completion.

Table 4.7 shows the results of gender differences in disability gap in educational attainment across each level of education completion. The findings reveal substantial gender differences across all levels of education. Column 1 shows that PWDs are 1.4 percentage points less

Table 4.7: Gender Differentials in Effect of Disabilities on Persons' Level of Education Completion

VARIABLES	Primary Education Completion	Middle Education Completion	Secondary Education Completion	Higher Education Completion
	(1)	(2)	(3)	(4)
Disability	-0.014** (0.007)	-0.038*** (0.011)	-0.055*** (0.013)	-0.041*** (0.012)
Female	0.004 (0.002)	0.006* (0.003)	0.067 (0.004)	0.082 (0.004)
Disability*Female	-0.015 (0.011)	-0.039** (0.018)	-0.063*** (0.020)	-0.069*** (0.018)
Constant	-1.171*** (0.038)	-1.488*** (0.068)	-1.763*** (0.077)	-1.817*** (0.071)
Observations	79,385	79,385	79,385	79,385
R-squared	0.819	0.501	0.372	0.284
Controls	Yes	Yes	Yes	Yes
District Fixed Effects	Yes	Yes	Yes	Yes

Notes: The table presents the gender-specific effect of disabilities on educational attainment by level of education completion: Primary, Middle, Secondary, and Higher Education. All regressions include District fixed effects and controls for individual (age, age2, birth order, number of Siblings), parental (mothers' and fathers' educational and disability status, children sex ratio), and household-level characteristics (Wealth index score, Log of Income, regional dummy). Standard errors are clustered at the household level, with robust standard errors in parentheses. *** = significant at the 1% level; ** = significant at the 5% level; * = significant at the 10% level. The estimates including all controls is reported in appendix table C3.

likely to complete their primary education as compared to person without disabilities. The coefficient of interaction between disability and female dummy is insignificant, implying that adverse effects of disability on basic education completion are equally severe for females and males with disabilities.

Moving ahead to the next education levels, the results show that individuals with disabilities are 3.8, 5.5 and 4.1 percentage points less likely to complete their middle, secondary, and higher education respectively as compared to their peers without any disability (columns 2 to 4). The findings consistently reveal that PWDs face challenges in completing their education at all levels, and the gap gets wider as they advance to higher level of education. Furthermore, the gender disparities in the disability gap continue at all educational levels. In contrast to their male counterparts, female with disabilities have a disproportionately low educational achievement, as shown by the coefficient of the interaction term between disability and the female dummy variable, which is continuously negative and statistically significant at the 1 percent level of significance (columns 2 – 4). As one advances through higher level of education, the magnitude of the interaction term increases, indicates the amplifying effect of female’s disabilities on educational outcome across these levels.

4.6 Heterogeneity Analysis

4.6.1 Role of Son Preference

Disproportionate preferences for male children leads to imbalances in the sex ratio and have important social and demographic consequences (Guilmoto, 2009; Wang et al., 2020). These son-preference norms can exacerbate existing gender gap in children’s health and educational outcomes. Resources and opportunities may be distributed disproportionately within families by favoring male offspring, which might result in differences in girls’ access to school, healthcare, and nutrition. The desire for sons is an established trend observed in Pakistan and other Asian countries (Javed and Mughal, 2022; Almond et al., 2013; Edlund, 1999). Pakistani parents continue to have children until they have a son (Mughal et al., 2023). The parents’ son-preferring behavior manifests more strongly at higher birth

order.

We examine the role of son preference by restricting the sample to those mothers who have an equal number of male and female children i.e., sex ratio is equal to 1, and compare these results with those obtained from the sub-sample of households with unbalanced sex ratio. The results reported in Table 4.8 show that for the sample of families with equal number of male and female children, the coefficient of female dummy is insignificant. However, in the sample for unbalanced children's sex ratio, the coefficient of female dummy is negatively significant (column 2), implying that preference for more male offspring reduces the educational opportunities for female children. The coefficient of the disability and gender interaction term in column 1 and 2 is consistently negative and statistically significant at the 1% level of significance. This implies that females with disabilities have worse educational achievements than males with disabilities that do not substantially differ in households with differing child sex composition.

4.6.2 Role of Birth Order

Differences in parental investment perspectives and expectations may vary depending on a child's order of birth within the family. The study by Oliveira (2019) highlighted the significant role of birth order in educational attainment and variations in its effect observed by gender. The daughter's years of schooling decreases with the number of younger siblings, while the son's years of schooling increases with number of younger siblings. To capture the heterogeneity in birth order, we alternatively restrict the sample to first born, later born and last-born individuals. Table 4.8 columns 3-5 show the coefficient of the interaction term, $(\text{Disability}_{\text{IH}} \times \text{Female}_{\text{IH}})$, is consistently negative and statistically significant. The findings indicate that, irrespective of birth order, the adverse impacts of disabilities on schooling are more severe for girls than for boys.

4.6.3 Role of Mother's Characteristics

A number of studies show improvement in children's educational and health outcomes among educated mothers; for instance, see Andrabi et al. (2012); Vikram et al. (2012);

Table 4.8: Gender Differentials in Effect of Disabilities on Persons' Educational Outcomes—Mediating Channels (Son preferences and Birth Order).

Dependent Variable: Years of Schooling					
VARIABLES	Balanced Sex Ratio (1)	Unbalanced Sex Ratio (2)	First Born (3)	Later Born (4)	Last Born (5)
Disability	-3.025*** (0.268)	-3.038*** (0.280)	-2.962*** (0.248)	-3.185*** (0.286)	-3.103*** (0.349)
Female	0.064 (0.079)	-0.325*** (0.057)	-0.085 (0.063)	-0.023 (0.059)	0.131 (0.092)
Disability*Female	-1.380*** (0.492)	-1.144*** (0.378)	-1.194*** (0.399)	-1.057** (0.431)	-2.016*** (0.558)
Constant	-10.364*** (1.164)	-11.036*** (1.114)	-9.854*** (1.095)	-12.796*** (1.228)	-11.729*** (1.608)
Observations	36,144	43,241	40,941	38,444	18,354
R-squared	0.378	0.375	0.389	0.357	0.401
Controls	Yes	Yes	Yes	Yes	Yes
District Fixed Effects	Yes	Yes	Yes	Yes	Yes

Notes: The table presents the gender-specific effect of disabilities on educational attainment indicators: Years of Schooling. On five sets of sub-samples, the first and second sample includes those families where the children sex ratio is equal to 1 and the sex ratio not equal to 1. The third to fifth sub-sample includes first and later born and last-born individuals. All regressions include District fixed effects and controls for individual (age, age2, birth order, number of Siblings), parental (mothers' and fathers' educational and disability status, children sex ratio), and household-level characteristics (Wealth index score, Log of Income, regional dummy). Standard errors are clustered at the household level, with robust standard errors in parentheses. *** = significant at the 1% level; ** = significant at the 5% level; * = significant at the 10% level. The estimates including all controls is reported in appendix table C4.

Augustine et al. (2009); Prickett and Augustine (2016). Women with higher levels of education have exposure to progressive ideas that are often provided through the formal education system, consequently inducing gender equality behavior. In contrast, mothers with limited access to education may be more influenced by traditional gender norms and pass on these traditional norms to their children; consequently, this might perpetuate the gender gap in education outcomes. Likewise, the age at which a mother gives birth to her first child signifies important consequences on children's health and educational outcomes. The study by Gebreegziabher et al. (2023) shows that delaying the first the first birth from adolescence to adulthood may improve birth outcome like anthropometric measures, and birth weight. Likewise, delaying maternal age at birth have benefit effects on children educational outcome, the mother's age at birth in the 30s provide optimal opportunities for higher educational attainment (Fishman and Min, 2018).

We repeat the estimation of equation (1) by restricting the sample to individuals with mothers with below and above primary education and mothers with first child birth before or after 18 years. Table 4.9 columns 1 and 2 show that individuals with disabilities whose mothers have below and above primary education acquire, on average, 2.60 and 4.8 fewer years of schooling, respectively, compared to individuals without disabilities. Interestingly, the impact of disability appears to be relatively less pronounced among individuals with less educated mothers. This observation can be attributed to the fact that educational attainment among individuals without disabilities is generally lower when their mothers have limited education, as demonstrated in table 4.4. As a result, this reduces the overall average disability gap in educational achievement. Columns 3 and 4 show results of the disability gap in years of schooling for mothers who started childbearing at or below 18 years and those above 18 years. On average, individuals with disabilities attain 3.6 and 3 fewer years of schooling, respectively, depending on whether their mothers began childbearing at an early age or later. However, our coefficient of interest is the interaction of disability and gender dummy, which consistently shows a negatively significant result across all sub-sample. This means that, regardless of mother's characteristics, the adverse effects of disabilities on educational attainment are more pronounced for female and do not vary by mother's education or early motherhood.

Table 4.9: Gender Differentials in Effect of Disabilities on Persons' Educational Outcomes—Heterogeneity (Mother's Characteristics).

Dependent Variable: Years of Schooling				
VARIABLES	Mother's Education		Mother Childbearing age	
	Below Primary	Above Primary	Age<=18	Age>18
	(1)	(2)	(3)	(4)
Disability	-2.603*** (0.189)	-4.800*** (0.561)	-3.633*** (0.521)	-2.975*** (0.205)
Female	-0.520*** (0.053)	1.369 (0.074)	-0.265* (0.144)	0.004 (0.046)
Disability*Female	-0.666** (0.285)	-1.964** (0.791)	-1.263* (0.754)	-1.184*** (0.304)
Constant	-11.546*** (0.886)	-17.985*** (1.443)	-8.910*** (2.575)	-13.551*** (0.787)
Observations	63,634	15,751	7,363	75,441
R-squared	0.245	0.309	0.342	0.359
Controls	Yes	Yes	Yes	Yes
District Fixed Effects	Yes	Yes	Yes	Yes

Notes: The table presents the gender-specific effect of disabilities on educational attainment indicators:

Years of Schooling. On two sets of sub-samples, mother's education (below and above primary) and mother's age at first birth (at and below 18 and above 18). All regressions include District fixed effects and control for individual (age, age2, birth order, number of Siblings), parental (mothers' and fathers' educational and disability status, children sex ratio), and household-level characteristics (Wealth index score, Log of Income, regional dummy). Standard errors are clustered at the household level, with robust standard errors in parentheses. *** = significant at the 1% level; ** = significant at the 5% level; * = significant at the 10% level. The estimates including all controls is reported in appendix table C5.

4.6.4 Role of Household Characteristics

The analysis may be evaluated by heterogeneous effect of region (rural/urban), and wealth (poor/rich) in determining gender differentials in disability gap in educational attainment. Table 4.10 columns 1 and 2 show that individuals with disabilities attain on average 2.90 and 3.2 fewer years of schooling in rural and urban households respectively. It is important to note that effect of disabilities on individual's educational attainment in rural household is smaller as compared to individuals in urban settings. It is not implying that prospective of educational attainment is better in rural areas, but rather overall educational attainment in rural settings in Pakistan are much less as compared to urban settings (Alderman et al., 2003; Mahmood, 2004; Ullah, 2022; Ejaz and Mallawaarachchi, 2023). We found no gender differentials in the impact of disabilities on educational outcomes in rural settings, as coefficient of interaction term disability and female dummy is insignificant. Implying the adverse effects of disabilities are pronounced on educational attainment in rural areas irrespective of gender, smaller relative disability gap in educational attainment eventually equalizes effect of disabilities among male and females. However, in urban settings, we find strong evidence of gender differentials in disability gap in educational attainment (column 1 and 2).

Likewise, the studies of Filmer and Pritchett (1999); Filmer (2008) show improvement in children's educational and health outcomes among wealthier households. Our data reveals a similar pattern. Irrespective of disabilities there is substantial educational attainment gap among the individuals from poor and rich household. To capture the heterogeneous effect of wealth status, we estimate the gender-differentials in disability gap in education attainment for the individual in households with a wealth status above and below the median.

Column 3-4 in table 4.10 shows impact of disability is consistently negative and significant on educational attainment. Though, the relative impact of disability is less in among individuals in poor household (column 3), because the educational attainment of individuals without disabilities is generally lower among such households (shown in table 4.4) which reduces average disability gap in educational attainment. The coefficient of interaction

Table 4.10: Gender Differentials in Effect of Disabilities on Persons' Educational Outcomes—Heterogeneity (Household Characteristics).

Dependent Variable: Years of Schooling				
VARIABLES	Region		Wealth Status	
	Rural	Urban	Below Median	Above Median
Disability	-2.990*** (0.189)	-3.196*** (0.405)	-2.698*** (0.190)	-3.281*** (0.318)
Female	-0.900*** (0.053)	1.206*** (0.074)	-0.959*** (0.067)	0.503*** (0.057)
Disability*Female	-0.108 (0.300)	-2.706*** (0.588)	0.068 (0.287)	-1.977*** (0.479)
Constant	-11.189*** (0.900)	-16.760*** (1.354)	-9.129*** (1.188)	-17.825*** (1.015)
Observations	53,618	25,767	31,649	47,736
R-squared	0.310	0.356	0.175	0.263
Controls	Yes	Yes	Yes	Yes
District Fixed Effects	Yes	Yes	Yes	Yes

Notes: The table presents the gender-specific effect of disabilities on educational attainment indicators: Years of Schooling. On two sets of sub-samples, urban and rural households. The second includes wealth status (below and above median). All regressions include District fixed effects and control for individual (age, age2, birth order, number of Siblings), parental (mothers' and fathers' educational and disability status, children sex ratio), and household-level characteristics (Wealth index score, Log of Income, regional dummy). Standard errors are clustered at the household level, with robust standard errors in parentheses. *** = significant at the 1% level; ** = significant at the 5% level; * = significant at the 10% level. The estimates including all controls is reported in appendix table C6.

term is insignificant among these households because of relative effect, implying adverse effects of disabilities are similar among male and females. However, we find strong evidence of the presence of gender differentials in disability gap in educational outcome among individual from wealthier households (column 4).

4.7 Robustness Checks

In our analysis, we restricted the sample to the adult population between the ages of 18 and 30 to reduce the likelihood of the prevalence of disabilities that may develop later in life with age. However, it would still lead to a selection bias if individuals in this age group acquired disabilities after finishing school. To address this concern, we consider two sets of age cohorts by breaking down the sample into two age groups (18–25 and 26–30),. Table 4.11, columns 1 and 2 present the results of individuals aged 18–25 and 26–30, respectively. We found the impact of disabilities is consistently negative across both groups. On average, individuals with disabilities attain 3 fewer years of schooling as compared to individuals without disabilities in both age groups, similar to our baseline findings in Table 4.5 (Column 4). Moreover, the coefficient of interaction term ($\text{Disability}_{\text{IH}} \times \text{Female}_{\text{IH}}$), is consistently negative and statistically significant in both age groups, implying the adverse effects of disabilities are more pronounced for females with disabilities, irrespective of their age.

Unobserved indicators such as pre- and post-natal maternal care not only have strong link with children’s educational outcomes but also on their health outcomes (Chari et al., 2017; Delprato et al., 2017). In addition, temporal characteristics like changes in policies, societal norms, or general economic and health conditions can impact the health prospects of individual at the time of birth. To control for such unobservable maternal, households-level characteristics, and temporal characteristics, we perform two sets of estimation, first, by including mother fixed effects, and second, by including birth year and household fixed effects. We repeat the estimation of equation 1, firstly by including mother’s fixed effects and secondly with birth year and household fixed effect in which parental, household, regional level variable was replaced by household fixed effects, for

Table 4.11: Gender Differentials in Effect of Disabilities on Persons Level of Education Completion by Age Cohorts.

Dependent Variable: Years of Schooling		
VARIABLES	Age Cohort (18-25) (1)	Age Cohort (25-30) (2)
Disability	-2.910*** (0.225)	-3.187*** (0.375)
Female	-0.045 (0.047)	0.216* (0.120)
Disability*Female	-0.947*** (0.344)	-1.951*** (0.553)
Constant	-20.851*** (1.786)	-22.634 (16.601)
Observations	61,511	17,874
R-squared	0.345	0.371
Controls	Yes	Yes
District Fixed Effects	Yes	Yes

Notes: The table presents the gender-specific effect of disabilities on educational attainment indicators: Years of Schooling. On two sets of sub-samples, the first sample includes individuals aged 18-25. The second sub-sample includes individuals aged 26-30 years. All regressions include District fixed effects and control for the individual (age, age2, birth order, number of Siblings), parental (mothers' and fathers' educational and disability status, children sex ratio), and household-level characteristics (Wealth index score, Log of Income, regional dummy). Standard errors are clustered at the household level, with robust standard errors in parentheses. *** = significant at the 1% level; ** = significant at the 5% level; * = significant at the 10% level. The estimates including all controls is reported in appendix table C7.

Table 4.12: Gender Differentials in Effect of Disabilities on Persons Level of Education Completion (Mother's Fixed Effects and Household Fixed Effects).

VARIABLES	Years of Schooling	Years of Schooling
	(1)	(2)
Disability	-3.119*** (0.148)	-2.412*** (0.251)
Female	-0.575*** (0.036)	-0.600*** (0.207)
Disability*Female	-0.744*** (0.246)	-1.418*** (0.456)
Constant	0.756 (3.994)	-50.615 (52.123)
Observations	79,385	5,058
R-squared	0.158	0.135
Controls	Yes	Yes
Mother's Fixed Effects	Yes	No
Household Fixed Effects	No	Yes
Birth Year Fixed Effects	No	Yes

Notes: The table presents the gender-specific effect of disabilities on educational attainment within the household: Years of Schooling employing mother's fixed effects in Column 1, which includes controls for individual characteristics (age, age2, birth order, number of Siblings) and household-level characteristics (fathers' educational and disability status, children sex ratio), as well as household-level characteristics (Wealth index score, Log of Income, regional dummy). In Column 2, regressions include household fixed effects and control for individual characteristics (age, age2, birth order, number of Siblings). Household characteristics are replaced by household dummies. Robust standard errors in parentheses. *** = significant at the 1% level; ** = significant at the 5% level; * = significant at the 10% level. The estimates including all controls is reported in appendix table C8.

the subsample of individuals of aged (18-30) living in the same households with at least one person with disability and one person without disability. This compares educational attainments for individuals with and without disabilities living in the same household and explore the disproportionate effects of disability by gender. The findings of these additional regressions with mother's fixed effects and household and birth year fixed effects consistently supported our previous results. We observed a persistent gender differential in disability gap in years of schooling. Table 4.12 shows that the coefficient of the interaction terms across both sets of estimation is consistently negative and significant. Column 1 presents the results with mother's fixed effects, indicating individual with disability attain 3.11 fewer years of schooling as compared to individuals without disability. The coefficient of interaction term disability and female dummy is negatively significant, suggesting that females with disabilities are disproportionately affected by disabilities in terms of education progression as compared to their male counterparts. The estimates of disability gap with mother's fixed effects are quite similar to our baseline estimates in table 5 column 4. After including the mother's fixed effects the gender differentials in disability gap in educational attainment persist irrespective of maternal characteristics.

Column 2 presents the results of household and birth year fixed effects, in which we compare the individual's educational attainment with and without disabilities living in the same household. The results show individual with disability attain 2.41 fewer years of schooling as compared to siblings without disability. The coefficient of interaction term disability and female dummy is negatively significant, suggesting that females with disabilities are more vulnerable in terms of education progression as compared to their male counterparts within a household.

4.8 Conclusion

Using the PSLM a nationally representative data from Pakistan, we examine the gender-specific effect of disabilities on educational attainment for individuals aged 18-30 years. We observed prominent disability gap in educational attainment, with a difference of 4 fewer years of schooling compared to their peers without disabilities across all age groups.

This difference is higher for females with disabilities. The findings show a significant disparity in educational attainment among individuals aged 18–30, specifically affecting females. On average, females with disabilities have completed three years of schooling, whereas males with disabilities have attained six years of education. Implying females with disabilities in Pakistan are not completing even their basic education. Employing multivariate regression model and a fixed effect, we analyze the gender differentials in disability gap in educational attainment. Our main findings are as follows.

First, we find significant gender-specific effect of disability on educational attainment, adverse impacts of disabilities are more pronounced for females with disabilities as compared to male with disabilities in educational outcomes, implying females with disabilities face additional barriers in educational completion. Second, we analyzed the gender-specific effect of cognitive, physical, and multiple disabilities. We find gender differentials in disability gap in educational attainment is persistent irrespective of the type of disabilities. Third, we demonstrate that PWDs face challenges in completing their education at primary, middle, secondary, higher levels, the gap becomes more manifest as they progress to higher level of education. The findings reveal continuing gender differentials in disability gap across middle to higher education. Fourth, we explored the heterogeneous effects of son preferences (proxied via family's children sex ratio), birth order, rural, urban setting, wealth status of household, mother's education, and maternal age at first birth. We found that mother's characteristics and the siblings' sex composition do not alter the gender bias in PWD's education. However, the gender bias matters more in the urban and wealthy households.

The findings remain same in sensitivity analysis of selection bias to evaluate the robustness checks. The results of different age cohorts show consistently gender gap in education based on disabilities. Similarly using mother's fixed effect and household and birth year fixed effect, and findings indicate substantial gender differences in the disability gap educational attainment continue to exist within the households, supporting the validity of our empirical strategy.

These results underscore the need for gender-specific interventions and support systems to overcome the barriers that females with disabilities encounter in accessing and completing

their education. To ensure equitable chances for females with disabilities, efforts should focus on eliminating obstacles, creating accessible educational settings, and providing specialized support services.

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Chapter 5

Conclusion

This chapter signifies the culmination of the thesis and comprises three different sections. The first section summarizes the main findings of the study. The subsequent section proposes some policy implications. Finally, the last section illustrates the prospects that lie ahead, alongside the potential challenges that must be navigated to fully realize the transformative impact of education.

5.1 Summary of the Main Findings

The thesis focused on the landscape of education in Pakistan, as shown across the preceding four chapters. Each of these studies offers a distinct understanding of marginalised segments of society and the perceived multifaceted challenges in the realm of education within a country. In a global context characterized by the quest for equal opportunity of education, chapter 1 illuminates as the transformative potentials of education in fostering economic and social development. It highlights the overall education profile of Pakistan by comparing its educational indicators vis-à-vis those of neighbouring countries. Comparative assessment using different metrics reveals that Pakistan's educational standing remains below that of other South Asian nations. Pakistan is notable for being at the top of the list with a troubling 37 percent of its children are out of schools, a number that highlights the magnitude of the educational crisis. Additionally, comparison shows the country also struggles with low literacy rates coupled with gender disparities further compounding the issue. Thus, this comparative analysis highlights the need to identify specific trends and pattern of school enrolment rate by gender and rural/urban settings. While analysing these trends and patterns across different dimensions reveals a clear picture, it becomes evident that despite an overall increase in enrolment rates over the past fifteen years, the substantial existence of gender and regional disparities in school enrolment continue to persist.

Our study attempt to see the educational challenges faced by an often-marginalized segment of Pakistani society. We shed light on issues like gender differences and difficulties associated with disabilities, issues which have overlooked within the country. Our three following chapters make an empirical effort to close this gap in the context of Pakistan.

In the second chapter, using data from a nationally representative household survey, we present robust empirical investigations into the effect of mother's marriage age on gender differentials in educational outcomes. Our analysis indicates that mother's marriage age does not exhibit a gender-specific impact on parental investment perspective in their children education. This includes decisions about enrolling children in school, choosing a school's type (public or private), and allocating household educational expenses. However, an important finding shows that postponing a mother's marriage has a more marked favourable impact on daughters' academic advancement. This is manifested through indicators such as school performance, primary school completion, and the overall years of schooling. Implying mothers tend to pass on to their daughters more prominently either their advantages or disadvantages in terms of human capital. Moreover, the study also explores the impact of many other factors that may have an impact on the development of these disparities. Our study reveals a crucial insight educational disparity among children, particularly in terms of gender, are influenced not only by the prevailing societal norms, and son-favouring biases, but also by the age of maternal marriages. Our results reinforce the idea that although mother's autonomy and education do contribute to educational disparities among children, the age at which a mother gets married still has a significant role.

The second set of questions pertains to the association between prevalence of disability and the occurrence of educational exclusion, which are addressed in the third chapter. we examine two distinct zones of educational exclusion, each encompassing different groups that face denial in access to schooling and are unlikely to complete their basic education. The first zone encompasses those children who have never attended school (Zone 1), while the second zone includes those who were initially enrolled but subsequently dropped out prematurely (Zone 2). Our findings reveal children with disabilities (CWDs) are more likely to be excluded from educational sectors. The CWDs of both primary and secondary school-going age are disproportionately out of school. 69% of CWDs of school-going age never attend school compared to 31% of children without any disability. Furthermore, our research shows that CWDs, regardless of disability severity, face enrolment challenges. Those with moderate to severe impairments have even greater hurdles, with much lower

enrolment rates compared to their non-disabled peers. Even if CWDs get into school, they are less likely to finish their degree. To achieve deeper insight, we empirically examine the intra-household disability gap in children's schooling. Our analysis uncovers that the presence of a significant disability gap in children's schooling within the household. The likelihood of enrolment for CWDs is 12.6 percentage points lower, while those with moderate/severe disabilities face a staggering 39.5 percentage point lower likelihood compared to their non-disabled siblings. Even if CWDs manage to enrol, they are less likely to complete their basic education and dropout prematurely as compared to their siblings without any disabilities. Household wealth has a significant role in driving the disability gap in school enrolment, but its impact on school dropout rates is comparably minimal. This emphasizes the importance of supply constraints and school quality. Our findings indicate unique patterns by type of disabilities, children with auditory, cognitive, and intellectual impairments had much lower chances of attending and progressing beyond primary or secondary school. Children with visual and mobility limitations, on the other hand, experience relatively less pronounced adverse effects on their educational access. Neither genetic component nor parental characteristics substantially influences CWDs enrolment or dropout, implying the necessity for comprehensive policy interventions.

In the fourth chapter, we empirically examine the intersection of disabilities and gender in educational attainment. The question we seek to answer whether the adverse effects of disabilities are same across genders, or if they exhibit variations. We looked at various educational levels, from primary to higher education, to see how disabilities affect gender differences. We also studied different types of disabilities, like physical, cognitive, and multiple disabilities. The outcomes of the study highlight the uneven impact of disability on female's education attainment, on average, female complete just three years of schooling, but males with disabilities complete six years. This disparity in educational attainment is persistent throughout middle and high school, regardless of the kind or severity of impairment (cognitive, sensory, or multiple). Notably, this gender disparities persists regardless of circumstances such as mother's characteristics, birth order, or the composition of children's sex ratio. Moreover, the study identifies that the gender-specific influence is more prominent in urban and wealthier households. The considerable gender-specific

effect of disability are confirmed by robustness checks using various specification, adding legitimacy to the results.

5.2 Policy Implications

The findings of this thesis have major policy implications and can play a critical role in tackling the complex educational issues that various segments of Pakistan's population confront. These implications highlight the significance of multifaceted approach to reform the education landscape and ensure equal access to quality education for everyone.

The study underscores the need to combat early marriages, particularly among girls, as mean to bridge gender disparities in education not only within the current generation but also to impact the education trajectory of generations to come. This requires the launch of public awareness campaigns and behavioural change activities to educate communities about the detrimental impact of early marriages on girls' education. To reduce the gender gap, it is important to foster an atmosphere that prioritizes education over early marriage. Furthermore, the research emphasizes the urgency of inclusive education for children with disabilities (CWDs). Policymakers must develop and execute policies that address CDWs unique requirements, such as accessible infrastructure, specialized teaching techniques, and assistive technologies. These kinds of activities will ensure that no child is left behind because of their disability.

Policymakers should develop programs that give targeted assistance to females with disabilities, taking into account characteristics such as socioeconomic position, rural-urban differences, and the specific type of disability. Gender-neutral policies, that does not discriminate against or favor any particular gender, should be supported for equitable educational opportunities. Government should work towards an environment where both genders have equal access to education opportunities, irrespective of societal norms or preconceived biases.

Addressing regional disparities in education necessitates coordinated efforts to improve school quality and access in marginalized communities. Policymakers may reduce the educational disparity across areas by building school infrastructure, teacher training, and

curriculum. It is important to raise awareness and sensitize stakeholders about gender and disability inequalities. This includes parents, teachers, and policymakers who should be informed and educated through awareness campaigns that challenge stereotypes and biases.

The policy implications of this thesis emphasize the importance of comprehensive policies that include all parts of the education system. Pakistan may make substantial progress toward equal educational opportunities for all its citizens by adopting focused interventions, raising awareness, and encouraging inclusion.

5.3 Prospects and Challenges

The thesis gives promising prospects for the education landscape in Pakistan. Its detailed insights into the gender disparities and the challenges faced by individuals with disabilities can inform the formulation of effective policies. Policymakers can utilize the evidence-based interventions proposed in the thesis to address these issues systematically. By incorporating these recommendations into the education system, Pakistan has the potential to create a more equitable and inclusive learning environment. Additionally, the thesis holds the academic contribution. It not only fills existing research gaps but also serves as a foundation for further scholarly exploration of the complicated challenges within the education sector.

However, along with these prospects, we also bring attention to several challenges that need to be navigated. One key challenge lies in the implementation of the proposed interventions because of the red tapes in the public sectors. Moreover, deeply rooted cultural and social norms can act as barriers, particularly when addressing sensitive issues such as early marriages and gender disparities. Additionally, Pakistan's education sector operates under resource constraints with, which may impede the deployment of comprehensive interventions. A healthy allocation of resources is crucial for effective implementation.

Moreover, the study acknowledges the limitations of the survey data, as the prevalence of disabilities is self-reported. In addition to assessing the level of severity and type

of disability, the timing of diagnosis should also be included in future surveys so that preventive and non-preventive disabilities can thoroughly analysed. Achieving lasting impact in areas like gender equality and disability inclusion necessitates continuous efforts and commitment from all stakeholders involved.

In conclusion, this thesis presents promising opportunities to bring about positive transformations in Pakistan's education system by addressing these disparities. However, it is crucial to confront the challenges associated with implementing the proposed interventions, navigating cultural norms, securing necessary resources, and overcoming data limitations. By proactively addressing these challenges, Pakistan can take substantial steps towards establishing an inclusive, equitable, and efficient education system that caters to the diverse needs of its entire population. This endeavour stands to not only improve educational outcomes but also contribute to the overall progress and development of the nation.

Appendix Chapter 2

Table A1: Extension of Table 2.3 with Full Sets of Controls

VARIABLES	School Enrolment	Private School Enrolment	Educational Expenditure	Grade Progression	Primary Completion	Years of schooling
Mother's Marriage Age	0.001 (0.001)	-0.001 (0.001)	0.005* (0.003)	0.003*** (0.001)	0.006*** (0.002)	0.028*** (0.006)
Female Child	-0.089*** (0.030)	-0.055 (0.037)	-0.099 (0.088)	-0.065** (0.026)	-0.140* (0.074)	-0.462** (0.191)
Mother's Marriage Age* Female Child	0.001 (0.001)	0.001 (0.002)	0.003 (0.004)	0.003** (0.001)	0.011*** (0.004)	0.029*** (0.009)
Age	-0.023*** (0.001)	-0.022*** (0.001)	0.049*** (0.003)	-0.003*** (0.001)	0.136*** (0.003)	0.897*** (0.008)
Birth Order	-0.008*** (0.002)	-0.025*** (0.003)	-0.059*** (0.006)	0.008*** (0.002)	-0.012** (0.005)	-0.015 (0.014)
Siblings Size	-0.010*** (0.002)	-0.021*** (0.003)	-0.065*** (0.007)	-0.011*** (0.002)	-0.000 (0.004)	-0.008 (0.013)
Mother Education	0.012*** (0.001)	0.016*** (0.001)	0.045*** (0.002)	0.005*** (0.001)	0.011*** (0.001)	0.047*** (0.004)
Father Education	0.017*** (0.001)	0.006*** (0.001)	0.018*** (0.002)	0.004*** (0.000)	0.004*** (0.001)	0.036*** (0.003)
Mother Autonomy	0.014*** (0.002)	0.010*** (0.002)	0.013*** (0.005)	0.004*** (0.001)	0.009*** (0.003)	0.043*** (0.010)
Income	0.056*** (0.005)	0.194*** (0.006)	0.723*** (0.015)	0.019*** (0.004)	0.049*** (0.010)	0.214*** (0.029)
Rural	-0.047*** (0.006)	-0.157*** (0.008)	-0.313*** (0.017)	-0.005 (0.005)	0.004 (0.012)	-0.010 (0.035)
Constant	0.187*** (0.062)	-1.736*** (0.079)	-0.874*** (0.197)	0.438*** (0.054)	-2.068*** (0.137)	-9.853*** (0.399)
Observations	30,561	20,624	24,129	15,143	7,144	11,195
R-squared	0.192	0.287	0.402	0.058	0.299	0.656
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Culture Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes

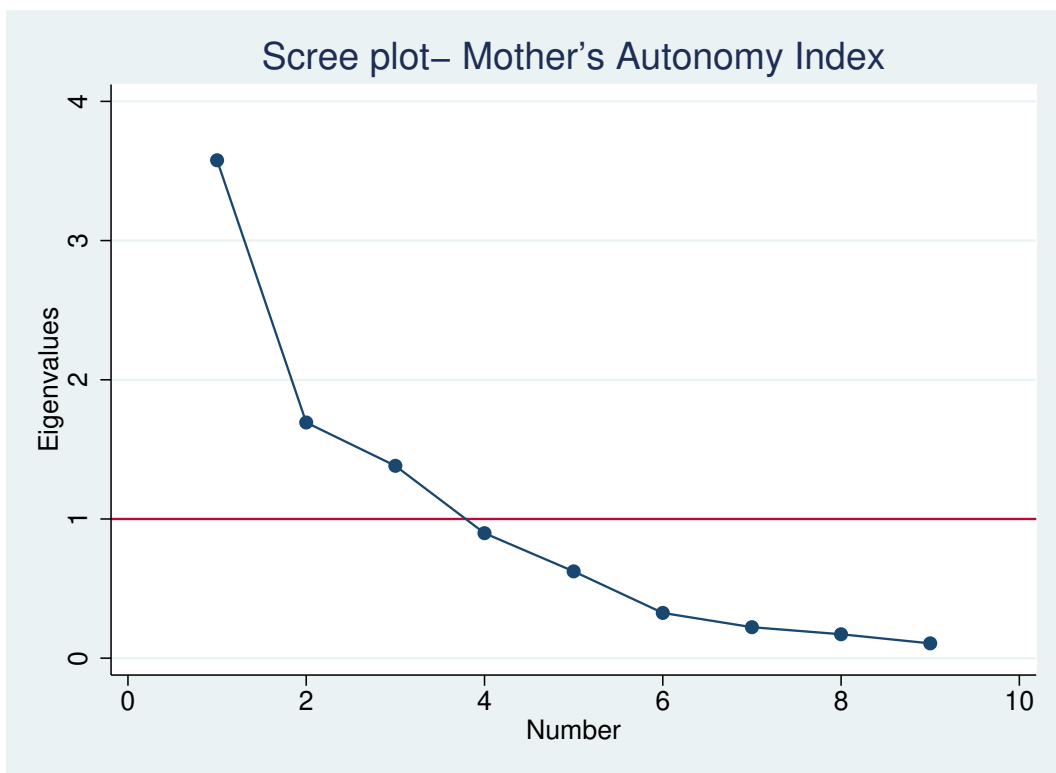
Note: This table presents the extension of the previous table with a full set of controls. For more details, please refer to Table 2.3.

Table A2: Extension of 2.4 with Full Sets of Controls

VARIABLES	School Enrolment	Private School Enrolment	Educational Expenditure	Grade Progression	Primary Completion	Years of schooling
Mother's Marriage Age	-0.002 (0.003)	-0.001 (0.003)	0.007 (0.008)	-0.001 (0.002)	-0.007 (0.005)	-0.012 (0.017)
Female Child	-0.115 (0.072)	0.015 (0.088)	-0.057 (0.203)	-0.211*** (0.059)	-0.307* (0.157)	-1.321*** (0.448)
Mother's Marriage Age* Female Child	0.002 (0.004)	-0.004 (0.004)	-0.001 (0.010)	0.010*** (0.003)	0.020** (0.008)	0.077*** (0.022)
Age	-0.017*** (0.002)	-0.013*** (0.003)	0.058*** (0.007)	-0.005** (0.002)	0.153*** (0.009)	0.925*** (0.023)
Birth Order	-0.007 (0.006)	-0.013* (0.007)	-0.024 (0.016)	0.014*** (0.005)	-0.011 (0.016)	-0.033 (0.042)
Siblings Size	-0.012** (0.006)	-0.029*** (0.007)	-0.083*** (0.016)	-0.010** (0.005)	-0.003 (0.016)	-0.008 (0.042)
Mother Education	0.015*** (0.001)	0.016*** (0.002)	0.045*** (0.005)	0.008*** (0.001)	0.015*** (0.003)	0.052*** (0.009)
Father Education	0.016*** (0.001)	0.005*** (0.002)	0.020*** (0.005)	0.005*** (0.001)	0.010*** (0.003)	0.044*** (0.009)
Mother Autonomy	0.011*** (0.004)	0.018*** (0.005)	0.045*** (0.013)	0.004 (0.003)	0.011 (0.009)	0.028 (0.024)
Income	0.031*** (0.011)	0.177*** (0.015)	0.706*** (0.037)	0.004 (0.010)	0.033 (0.027)	0.151** (0.073)
Rural	-0.039*** (0.014)	-0.203*** (0.019)	-0.384*** (0.042)	0.005 (0.012)	-0.008 (0.029)	0.004 (0.081)
Constant	0.500*** (0.150)	-1.546*** (0.196)	-0.712 (0.513)	0.710*** (0.133)	-1.918*** (0.375)	-8.701*** (1.015)
Observations	4,950	3,404	3,404	2,525	1,009	1,677
R-squared	0.179	0.308	0.418	0.085	0.315	0.653
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Culture Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes

Note: This table presents the extension of Table 2.4 with a full set of controls. For more details, please refer to Table 2.4.

Figure A1: Scree Plot - Mothers Autonomy Index



Note: Scree plots of eigenvalues based on core set of 9 variables

Appendix Chapter 3

Table B1: Variable description and summary statistics

Variables	Definition	Measurement	Observation	Mean (st.d)	Min	Max
Outcome Variables						
School Enrolment	Takes the value 1 if child (age 5-16) is currently enrolled in school, otherwise 0.	1= currently enrolled 0 = never been to school	231,187	0.69 (0.003)	0	1
School Dropout	Takes the value 1 if child (age 5-16) ever attended school, otherwise 0.	1= attended school in past 0= currently enrolled	167,227	.074 (0.001)	0	1
Child characteristics						
Female	If the child is female.	1= female, 0 otherwise	231,187	0.46 (0.001)	0	1
Age	Age of the child	Years completed	231,187	9.9 (0.010)	5	16
Birth order	Birth order of the children	Count	231,187	7.0 (0.012)	2	42
Sibling's size	Number of Siblings.	Number of siblings	231,187	3.12 (0.022)	0	13

Source: Authors' calculation using PSLM 2019-20

Notes: The table presents the definition, mean and standard deviation of variables used in the analysis.

Table B1: Continued: Variable description and summary statistics

Variables	Definition	Measurement	Observation	Mean (st.d)	Min	Max
Parental characteristics						
Mother's education	Mother's number of years of schooling	Completed years of schooling	231,187	2.8 (0.034)	0	18
Father's education	Father's number of years of schooling	Completed years of schooling	231,187	5.3 (0.037)	0	18
Mothers with disability	If Mother of the child is disabled	1= disabled, 0 otherwise	231,187	.017 (0.0005)	0	1
Fathers with disability	If Father of the child is disabled	1= disabled, 0 otherwise	231,187	0.03 (0.0007)	0	1
Household characteristics						
Wealth Quartiles	Based on wealth index score.	Count	231,187	2.43 (0.009)	1	4
Log of total Income	Based on total annual Income.	Count	231,187	12.3 (0.009)	0	17.7
Rural	If household is in rural area.	1=rural, 0 otherwise	231,187	0.65 (0.003)	0	1

Source: Authors' calculation using PSLM 2019-20

Notes: The table presents the definition, mean and standard deviation of variables used in the analysis.

Table B2: Extension of Table 3.3 with full sets of covariates.

VARIABLES	School Enrollment		School Drop Out	
	(1)	(2)	(3)	(4)
Any Disability	-0.433*** (0.019)		0.151*** (0.034)	
Mild Level		-0.163*** (0.022)		0.016 (0.039)
Moderate/Severe Level		-1.156*** (0.041)		0.606*** (0.058)
Female	-0.316*** (0.007)	-0.316*** (0.007)	0.188*** (0.012)	0.188*** (0.012)
Age	0.715*** (0.007)	0.716*** (0.007)	0.221*** (0.024)	0.221*** (0.024)
Age ²	-0.035*** (0.000)	-0.035*** (0.000)	0.001 (0.001)	0.001 (0.001)
Mother Education	0.054*** (0.001)	0.054*** (0.001)	-0.037*** (0.002)	-0.037*** (0.002)
Father Education	0.041*** (0.001)	0.041*** (0.001)	-0.031*** (0.001)	-0.031*** (0.001)
Father Disability	-0.010 (0.010)	-0.015 (0.010)	0.056*** (0.016)	0.058*** (0.016)
Mother Disability	-0.021* (0.012)	-0.031** (0.012)	0.061*** (0.019)	0.066*** (0.019)
Wealth	0.198*** (0.003)	0.198*** (0.003)	-0.094*** (0.005)	-0.094*** (0.005)
Household Size	-0.028*** (0.001)	-0.028*** (0.001)	0.018*** (0.002)	0.018*** (0.002)
Rural	-0.025*** (0.009)	-0.024*** (0.009)	-0.024 (0.015)	-0.025* (0.015)
Constant	-2.601*** (0.041)	-2.623*** (0.042)	-4.201*** (0.158)	-4.195*** (0.159)
Marginal Effects	-0.140*** (0.006)	-0.052*** (0.007)	0.008*** (0.002)	0.0009 (0.002)
		-0.374*** (0.013)		0.033*** (0.003)
Observations	231,187	231,187	167,227	167,227
Controls	Yes	Yes	Yes	Yes

Table B3: Extension of Table 3.4 with full sets of covariates.

VARIABLES	School Enrollment		School Drop Out	
	(1)	(2)	(3)	(4)
Any Disability	-0.126*** (0.008)		0.010*** (0.005)	
Mild Level		-0.040*** (0.008)		0.003 (0.005)
Moderate/Severe Level		-0.395*** (0.017)		0.076*** (0.016)
Age	0.043 (0.080)	0.225*** (0.008)	-0.059*** (0.005)	-0.060*** (0.005)
Age^2	-0.002 (0.004)	-0.011*** (0.000)	0.004*** (0.000)	0.004*** (0.000)
Female	-0.114*** (0.008)	-0.117*** (0.008)	0.027*** (0.005)	0.027*** (0.005)
Constant	-0.146** (0.061)	-0.153*** (0.038)	0.333*** (0.040)	0.335*** (0.022)
Observations	14,554	14,554	12,370	12,370
R-squared	0.144	0.184	0.137	0.141
Controls	Yes	Yes	Yes	Yes
Household Fixed Effects	Yes	Yes	Yes	Yes

Note: Please refer to table 3.4.

Appendix Chapter 4

Table C1: Extension of Table 4.5 with full sets of covariates.

Dependent Variable Years of Schooling				
VARIABLES	Any Level		Moderate/Severe	
	(1)	(2)	(3)	(4)
Disability	-1.637*** (0.128)	-1.351*** (0.112)	-3.495*** (0.208)	-3.059*** (0.195)
Female	-0.167*** (0.052)	0.015 (0.044)	-0.167*** (0.052)	0.017 (0.044)
Disability*Female	-0.408* (0.221)	-0.424** (0.197)	-1.322*** (0.298)	-1.171*** (0.294)
Constant	9.545*** (0.230)	-11.193*** (0.788)	9.592*** (0.234)	-11.080*** (0.798)
Age		1.184*** (0.065)		1.176*** (0.065)
Age2		-0.023*** (0.001)		-0.023*** (0.001)
Birth Order		-0.056** (0.022)		-0.057** (0.022)
Siblings size		-0.145*** (0.012)		-0.145*** (0.012)
Mother Education		0.267*** (0.007)		0.267*** (0.007)
Mother Disability		-0.094 (0.101)		-0.073 (0.102)
Father Education		0.216*** (0.005)		0.216*** (0.005)
Father Disability		-0.280*** (0.098)		-0.254** (0.099)
Sex Ratio		-0.108*** (0.022)		-0.106*** (0.022)
wealth		1.486*** (0.025)		1.474*** (0.025)
Income		0.068*** (0.012)		0.068*** (0.012)
Rural		-0.554*** (0.057)		-0.544*** (0.057)
Observations	81,685	81,685	79,385	79,385
R-squared	0.105	0.368	0.111	0.372
Controls	No	Yes	No	Yes
District Fixed Effects	Yes	Yes	Yes	Yes

Table C2: Extension of Table 4.6 with full sets of covariates.

Dependent Variable Years of Schooling			
VARIABLES	Cognitive Disabilities	Physical Disabilities	Multiple Disabilities
	(1)	(2)	(3)
Disability	-4.185*** (0.330)	-1.469*** (0.200)	-4.585*** (0.240)
Female	-0.050 (0.045)	-0.055 (0.045)	0.003 (0.045)
Disability*Female	-1.266*** (0.472)	-1.115*** (0.401)	-0.762*** (0.33)
Age	1.176*** (0.066)	1.164*** (0.066)	1.181*** (0.067)
Age2	-0.023*** (0.001)	-0.022*** (0.001)	-0.023*** (0.001)
Birth Order	-0.055** (0.023)	-0.057** (0.023)	-0.116*** (0.023)
Siblings size	-0.146*** (0.013)	-0.145*** (0.013)	-0.097*** (0.013)
Mother Education	0.269*** (0.007)	0.270*** (0.007)	0.361*** (0.006)
Mother Disability	-0.081 (0.103)	-0.079 (0.103)	-0.061 (0.107)
Father Education	0.217*** (0.005)	0.218*** (0.005)	0.288*** (0.005)
Father Disability	-0.255** (0.100)	-0.271*** (0.100)	-0.086 (0.106)
Sex Ratio	-0.104*** (0.022)	-0.108*** (0.022)	-0.128*** (0.023)
wealth	1.473*** (0.026)	1.480*** (0.025)	1.718*** (0.025)
Income	0.066*** (0.013)	0.065*** (0.013)	0.105*** (0.013)
Rural	-0.547*** (0.057)	-0.554*** (0.057)	-0.580*** (0.059)
Constant	-11.159*** (0.802)	-11.056*** (0.800)	-11.63*** (0.814)
Observations	78,558	78,772	79,385
R-squared	0.372	0.371	0.372
Controls	Yes	Yes	Yes
District Fixed Effects	Yes	Yes	Yes

Table C3: Extension of Table 4.7 with full sets of covariates.

	Primary Education Completion	Middle Education Completion	Secondary Education Completion	Higher Education Completion
VARIABLES	(1)	(2)	(3)	(4)
Disability	-0.014** (0.007)	-0.038*** (0.011)	-0.055*** (0.013)	-0.041*** (0.012)
Female	0.004 (0.002)	0.006* (0.003)	0.067 (0.004)	0.082 (0.004)
Disability*Female	-0.015 (0.011)	-0.039** (0.018)	-0.063*** (0.020)	-0.069*** (0.018)
Age	0.019*** (0.003)	0.065*** (0.005)	0.100*** (0.006)	0.114*** (0.006)
Age2	-0.000*** (0.000)	-0.001*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)
Birth Order	-0.000 (0.001)	-0.000 (0.002)	-0.004* (0.002)	0.002 (0.002)
Siblings size	-0.002*** (0.001)	-0.010*** (0.001)	-0.011*** (0.001)	-0.009*** (0.001)
School Enrolment	0.909*** (0.002)	0.622*** (0.004)	0.410*** (0.004)	0.177*** (0.003)
Mother Education	0.003*** (0.000)	0.012*** (0.000)	0.018*** (0.001)	0.023*** (0.001)
Mother Disability	0.005 (0.004)	0.018** (0.008)	0.006 (0.009)	-0.007 (0.008)
Father Education	0.002*** (0.000)	0.009*** (0.000)	0.012*** (0.000)	0.013*** (0.000)
Father Disability	-0.008* (0.004)	-0.015** (0.008)	-0.021** (0.009)	-0.007 (0.008)
Sex Ratio	-0.003*** (0.001)	-0.008*** (0.002)	-0.007*** (0.002)	-0.006*** (0.002)
wealth	0.021*** (0.001)	0.063*** (0.002)	0.071*** (0.002)	0.056*** (0.002)
Income	0.000 (0.001)	0.001 (0.001)	0.002** (0.001)	0.005*** (0.001)
Rural	0.000 (0.002)	-0.016*** (0.004)	-0.020*** (0.005)	-0.026*** (0.005)
Constant	-1.171*** (0.038)	-1.488*** (0.068)	-1.763*** (0.077)	-1.817*** (0.071)
Observations	79,385	79,385	79,385	79,385
R-squared	0.819	0.501	0.372	0.284
District Fixed Effects	Yes	Yes	Yes	Yes

Table C4: Extension of Table 4.8 with full sets of covariates.

Dependent Variable Years of Schooling					
VARIABLES	Balanced Sex Ratio (1)	Unbalanced Sex Ratio (2)	First Born (3)	Later Born (4)	Last Born (5)
Disability	-3.025*** (0.268)	-3.038*** (0.280)	-2.962*** (0.248)	-3.185*** (0.286)	-3.103*** (0.349)
Female	0.064 (0.079)	-0.325*** (0.057)	-0.085 (0.063)	-0.023 (0.059)	0.131 (0.092)
Disability*Female	-1.380*** (0.492)	-1.144*** (0.378)	-1.194*** (0.399)	-1.057** (0.431)	-2.016*** (0.558)
Age	1.051*** (0.094)	1.213*** (0.093)	1.053*** (0.091)	1.297*** (0.103)	1.133*** (0.133)
Age2	-0.020*** (0.002)	-0.023*** (0.002)	-0.020*** (0.002)	-0.025*** (0.002)	-0.021*** (0.003)
Birth Order	-0.132*** (0.036)	-0.003 (0.029)	- -	- -	- -
Siblings size	-0.154*** (0.020)	-0.194*** (0.018)	-0.124*** (0.014)	-0.182*** (0.018)	-0.066 (0.075)
Mother Education	0.258*** (0.009)	0.272*** (0.009)	0.263*** (0.008)	0.270*** (0.009)	0.262*** (0.011)
Mother Disability	-0.163 (0.138)	0.019 (0.150)	-0.099 (0.123)	-0.040 (0.137)	-0.073 (0.156)
Father Education	0.223*** (0.007)	0.210*** (0.007)	0.218*** (0.006)	0.215*** (0.007)	0.185*** (0.009)
Father Disability	-0.234 (0.142)	-0.251* (0.139)	-0.265** (0.118)	-0.234* (0.132)	-0.119 (0.163)
Sex Ratio	- -	- -	-0.073*** (0.027)	-0.132*** (0.029)	-0.277*** (0.071)
wealth	1.550*** (0.036)	1.414*** (0.035)	1.535*** (0.029)	1.405*** (0.035)	1.722*** (0.043)
Income	0.062*** (0.017)	0.079*** (0.018)	0.062*** (0.014)	0.075*** (0.019)	0.099*** (0.019)
Rural	-0.408*** (0.081)	-0.631*** (0.079)	-0.503*** (0.065)	-0.574*** (0.078)	-0.694*** (0.095)
Constant	-10.364*** (1.164)	-11.036*** (1.114)	-9.854*** (1.095)	-12.796*** (1.228)	-11.729*** (1.608)
Observations	36,144	43,241	40,941	38,444	18,354
R-squared	0.378	0.375	0.389	0.357	0.401
Controls	Yes	Yes	Yes	Yes	Yes
District Fixed Effects	Yes	Yes	Yes	Yes	Yes

Table C5: Extension of Table 4.9 with full sets of covariates.

Dependent Variable	Years of Schooling			
	Mother's Education		Mother Childbearing age	
	Below Primary	Above primary	Age<=18	Age>18
VARIABLES	(1)	(2)	(3)	(4)
Disability	-2.603*** (0.189)	-4.800*** (0.561)	-3.633*** (0.521)	-2.975*** (0.205)
Female	-0.520*** (0.053)	1.369 (0.074)	-0.265* (0.144)	0.004 (0.046)
Disability*Female	-0.666** (0.285)	-1.964** (0.791)	-1.263* (0.754)	-1.184*** (0.304)
Age	1.078*** (0.076)	1.635*** (0.124)	0.854*** (0.221)	1.215*** (0.067)
Age2	-0.021*** (0.002)	-0.029*** (0.003)	-0.016*** (0.005)	-0.023*** (0.001)
Birth Order	-0.036 (0.026)	-0.009 (0.043)	-0.139** (0.070)	-0.044* (0.023)
Siblings size	-0.150*** (0.014)	-0.182*** (0.025)	-0.134*** (0.040)	-0.148*** (0.013)
Mother Education	-	-	0.258*** (0.022)	0.265*** (0.007)
Mother Disability	-0.177 (0.122)	0.169 (0.173)	0.271 (0.518)	-0.108 (0.104)
Father Education	0.271*** (0.006)	0.131*** (0.008)	0.218*** (0.016)	0.224*** (0.005)
Father Disability	-0.323*** (0.113)	-0.191 (0.218)	-0.270 (0.322)	-0.297*** (0.103)
Sex Ratio	-0.099*** (0.025)	-0.121*** (0.046)	-0.016 (0.060)	-0.113*** (0.024)
wealth	1.572*** (0.026)	0.978*** (0.058)	1.562*** (0.075)	1.529*** (0.024)
Income	0.044*** (0.013)	0.058*** (0.018)	0.019 (0.048)	0.056*** (0.012)
Rural	-0.391*** (0.061)	0.001 (0.081)	-0.340** (0.159)	-0.315*** (0.052)
	(0.886)	(1.443)	(2.575)	(0.787)
Observations	63,634	15,751	7,363	75,441
R-squared	0.245	0.309	0.342	0.359
Controls	Yes	Yes	Yes	Yes
District Fixed Effects	Yes	Yes	Yes	Yes

Table C6: Extension of Table 4.10 with full sets of covariates.

VARIABLES	Dependent Variable Years of Schooling			
	Region		Wealth Status	
	Rural	Urban	Below Median	Above Median
	(1)	(2)	(3)	(4)
Disability	-2.990*** (0.188)	-3.196*** (0.405)	-2.698*** (0.190)	-3.281*** (0.318)
Female	-0.900*** (0.053)	1.206*** (0.074)	-0.959*** (0.067)	0.503*** (0.057)
Disability*Female	-0.108 (0.300)	-2.706*** (0.588)	0.068 (0.287)	-1.977*** (0.479)
Age	1.012*** (0.077)	1.440*** (0.115)	0.907*** (0.103)	1.518*** (0.085)
Age2	-0.020*** (0.002)	-0.027*** (0.002)	-0.019*** (0.002)	-0.028*** (0.002)
Birth Order	-0.064** (0.026)	-0.020 (0.040)	-0.030 (0.036)	-0.021 (0.028)
Siblings size	-0.096*** (0.014)	-0.219*** (0.024)	-0.072*** (0.016)	-0.218*** (0.017)
Mother Education	0.274*** (0.010)	0.254*** (0.009)	0.396*** (0.018)	0.251*** (0.007)
Mother Disability	-0.025 (0.116)	-0.127 (0.186)	-0.101 (0.160)	-0.048 (0.133)
Father Education	0.237*** (0.006)	0.199*** (0.008)	0.303*** (0.011)	0.202*** (0.006)
Father Disability	-0.203* (0.111)	-0.351* (0.189)	-0.306** (0.154)	-0.297** (0.129)
Sex Ratio	-0.101*** (0.025)	-0.111*** (0.042)	-0.075** (0.035)	-0.133*** (0.029)
wealth	1.405*** (0.029)	1.466*** (0.048)	- -	- -
Income	0.061*** (0.015)	0.056*** (0.020)	0.030** (0.015)	0.069*** (0.018)
Rural	- -	- -	-0.356*** (0.095)	-0.275*** (0.059)
Constant	-11.189*** (0.900)	-16.760*** (1.354)	-9.129*** (1.188)	-17.825*** (1.015)
Observations	53,618	25,767	31,649	47,736
R-squared	0.310	0.356	0.175	0.263
Controls	Yes	Yes	Yes	Yes
District Fixed Effects	Yes	Yes	Yes	Yes

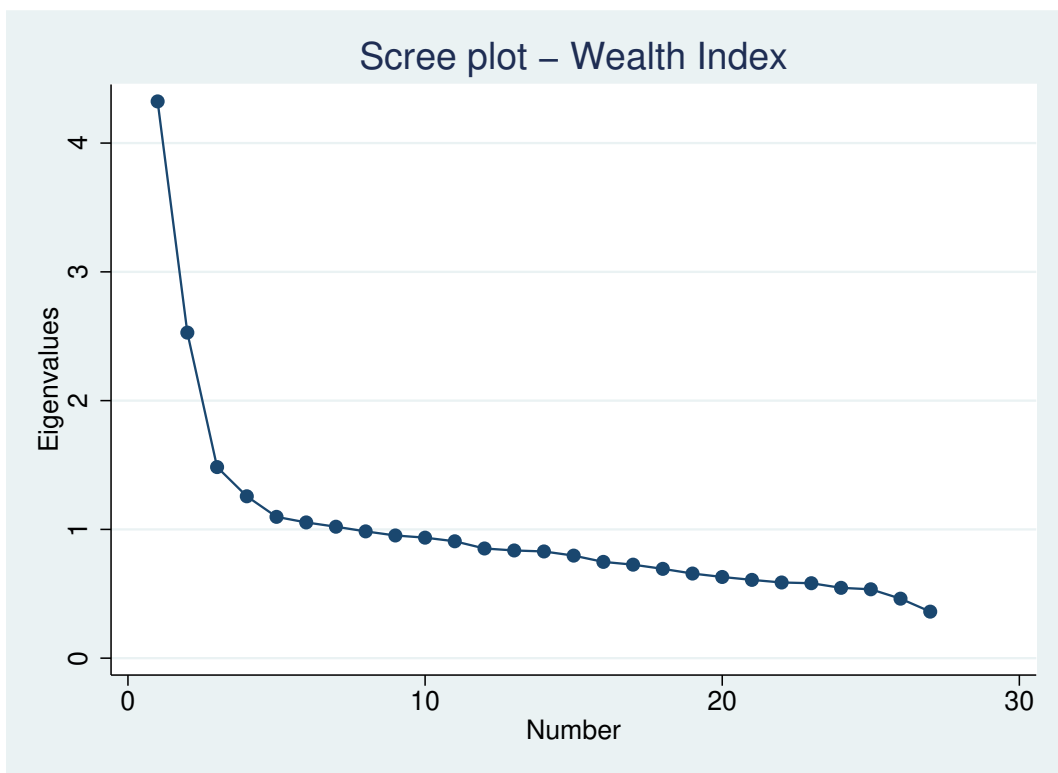
Table C7: Extension of Table 4.11 with full sets of covariates.

Dependent Variable Years of Schooling		
VARIABLES	Age Cohort (18-25)	Age Cohort (25-30)
	(1)	(2)
Disability	-2.910*** (0.225)	-3.187*** (0.375)
Female	-0.045 (0.047)	0.216* (0.120)
Disability*Female	-0.947*** (0.344)	-1.951*** (0.553)
Birth Order	-0.088*** (0.025)	-0.174*** (0.060)
Siblings size	-0.105*** (0.013)	-0.086*** (0.028)
Mother Education	0.356*** (0.007)	0.377*** (0.011)
Mother Disability	0.003 (0.120)	-0.249 (0.182)
Father Disability	-0.256** (0.117)	0.178 (0.187)
Sex Ratio	-0.117*** (0.024)	-0.194*** (0.050)
wealth	1.668*** (0.025)	2.043*** (0.046)
Income	0.049*** (0.012)	0.195*** (0.032)
Rural	-0.326*** (0.057)	-0.421*** (0.098)
Constant	-20.851*** (1.786)	-22.634 (16.601)
Observations	61,511	17,874
R-squared	0.345	0.371
Controls	Yes	Yes
District Fixed Effects	Yes	Yes

Table C8: Extension of Table 4.12 with full sets of covariates.

VARIABLES	Years of Schooling	Years of Schooling
	(1)	(2)
Disability	-3.119*** (0.148)	-2.412*** (0.251)
Female	-0.575*** (0.036)	-0.600*** (0.207)
Disability*Female	-0.744*** (0.246)	-1.418*** (0.456)
Age	1.074*** (0.059)	5.691 (3.831)
Age2	-0.021*** (0.001)	-0.127* (0.075)
Birth Order	-0.146*** (0.018)	0.052 (0.125)
Siblings size	-0.069*** (0.010)	0.167 (0.284)
Father Education	0.216*** (0.004)	- -
Father Disability	-0.182** (0.081)	- -
Sex Ratio	-0.115*** (0.017)	- -
wealth	1.397*** (0.022)	- -
Income	0.087***	-
Constant	0.756 (3.994)	-50.615 (52.123)
Observations	79,385	5,058
R-squared	0.158	0.135
Controls	Yes	Yes
Mother's Fixed Effects	Yes	No
Household Fixed Effects	No	Yes
Birth Year Fixed Effects	No	Yes

Figure C1: Scree Plot - Wealth Index



Note: Scree plots of eigenvalues based on core set of 27 variables

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