The Socio-Economic Determinants of Child Educational Attainment in Pakistan

Amjid Iqbal [1], Ghulam Mustafa Sajid [2] and Sami Ullah Khan[3*]

[1] Statistical Assistant at Pakistan Institute of Medical Sciences (PIMS), Islamabad
[2] Assistant Professor at International Islamic University, Islamabad
[3] Lecturer in Economics at University of Swabi and PhD Scholar at Institute of Management Sciences, Peshawar

ABSTRACT

The main purpose of conducting this study was to explore the socio-economic determinants of child educational attainment in Pakistan. Data on selected variables is extracted from nationally representative survey of Pakistan Social and Living Standards Measurement (PSLM) 2013-14. The study considers the children of age 5-18 years who ever attended any or currently attending any educational institution. Censored Ordered Probit model is employed. The results at aggregate level reveal that child's gender, child's age, age of household's head, parental education, household assets and availability of private schools positively affect child educational attainment in Pakistan. Children belong to Baluchistan province and urban region of Pakistan also get more education as compare to reference categories. Gender of household head and distance to school has negative effect on child educational attainment. To explore the inconsistency in effect of these factors across region and across gender, separate analysis is conducted for urban, rural, male and female sample. The results of gender specific analysis indicate that income of the household, region of residence (urban) and annual school fee are the main factors causing gender disparity whereas estimates at regional level analysis show that parental education, agricultural land ownership and, distance to school are the factors responsible for regional disparity in child educational attainment.

* Corresponding Author: samiullahkhan@uoswabi.edu.pk

1. Introduction

The economic development of a nation mainly depends on two factors: human capital and physical capital stock. Human capital makes possible the production activities by using worker skills, knowledge, technology, and available capital stock. So, we must invest in human capital to develop them. According to Babalola (2003) the rationality of investment in human capital is based on three arguments. First appropriate knowledge must be transferred from accumulated knowledge of previous generation to new generation. Second new generation should think about that how existing knowledge can be utilized in better way. Third the development of entirely new ideas, products, processes and method through creative approaches should be encouraged. Three types of training or education such as education at school, training at workplace and other knowledge are important for human capital development (Dubra, 2004). Education is not only a consumption activity but also considered as an investment in formation of human capital. The human capital theory proposes that economic growth of a country is closely related to investment in education, job training, organized research, health and internal migration, and without investment in human being it is not possible to have capitalist development (Schultz, 1971). According to Lorey (1995) educated human capital is the most important source of growth and development for a country.

By signing the United Nations Millennium Declaration in September 2000, leaders from 189 countries agreed to the eight Millennium Development Goals (MDGs), of which two are related to the education that are to be achieved by 2015, First every child should complete primary education (universal primary education for both male and female), and Second is to remove gender disparities at all educational levels. This consensus reflects the view of most international development agencies and economists that education promotes economic growth and social development (Glewwe and Kremer, 2006). According to MDGs, Pakistan was supposed to achieve 100 percent primary school enrollment and completion (up to grade five) and 88% literacy rate by 2015, but according to Economic Survey of Pakistan 2015-16, the Gross Enrollment Rates (GER) and Net Enrollment Rates (NER) at the primary level was 89 percent and 57 percent respectively at the national level. The GER was 97 percent for male and 81 percent for female, whereas NER was 60 percent and 53 percent for male and female, respectively. The GER in Punjab, Khyber Pakhtunkhwa, Sindh, and Baluchistan was 97%, 90%, 79% and 71% respectively. The NER was 61% in Punjab, 56% in Khyber Pakhtunkhwa, 51% in Sindh and 46% in Baluchistan. These statistics show that regional and gender disparities are prevalent in Pakistan and MDGs could not be achieved. The question is why Pakistan could not achieve MDGs? There may be number of reasons of lower education level and not achieving MDGs which are related to education sectors. So, the main purpose of this study is to explore the factors which affect child education in Pakistan.

Education is the fundamental right of every child, both male and female, in all societies. According to the definition of the United Nations Convention on the Rights of the Child, "a child is a human being below the age of 18 years unless under the law applicable to the child, majority is attained earlier". This is approved by 192 of 194 member countries. As today child is the part of future human capital, so we must focus on child education, because according to Dubra (2004) education is the most important tool used for human capital development. According to previous studies child education is dependent on several factors i.e. age and gender of the child, school type, household, and community backgrounds etc. This study focuses on to explore all those socio-economic factors which determine child education in Pakistan. For this purpose, the study classified all factors into four categories per their characteristics. First category is about child characteristics which include age and gender of the child. Second category consists of household characteristics; gender and age of household head, father's and mother's education, dependency ratio, total assets, income, and agricultural land ownership. Third is community level characteristics including region (urban/rural and province) and distance to school. Final is the school characteristics category in which school type (public/ private) and annual school fee (admission/ tuition fee) are included.

In Pakistan, a limited amount of research work has been done about attainment of child education. Most of the previous studies are conducted about the determinants of child enrollment in Pakistan. For example, Baluch and Shahid (2008); Pervaiz (2012); Sajid and Khan (2016). One study about attainment of child education in Pakistan by Holmes (2003) is outdated and its findings and conclusions may not be applicable to current education condition/situation in Pakistan. Another issue is that existing literature observes mixed results about the impacts of age and gender of the child, and school type on child education. The results of Khan and Khan (2016) and Ngware *et al.* (2011) show that the effect of age and gender of the child, and school type on child education is positive while results of Conlisk (1969) and Kelley (1995) show that the effect of these variables on child education is negative. According to our knowledge no study in Pakistan has been conducted which focused on both gender and regional (rural/urban) disparities in child education.

Keeping in view the above gap in the literature, the focus of the study is to find the socio-economic determinants of child education in Pakistan. The child education means educational attainment of a child which is measured by years of education completed. First, all socio-economic determinants are classified into four categories per their characteristics, child characteristics, household characteristics, community characteristics, and school characteristics. Second, data censoring analysis is used to find the latent desire level of education of currently enrolled children. Third, in order to capture best picture of current educational conditions, the latest available data from Pakistan Social and Living standards Measurement (PSLM) survey 2013-14 is used. In

last, the analysis is made for whole Pakistan, separately for rural and urbans areas and gender-based analysis.

2. Literature Review

This section presents the review of relevant studies made by different authors and researchers. The focus is to review studies on the socio-economic determinants of child education. Once we provide the review of available literature, it helps us in finding literature gap which we try to fill. The determinants of child education highlighted in the literature are based on child characteristics, household characteristics, community characteristics and school characteristics. at the end of section conclusions are made on the basis of literature review.

Conlisk (1969) finds that child age negatively affects child education because at initial ages of child, education is free and compulsory while after matriculation education is neither compulsory nor free in the United States. Further he also finds that in the United States girls are attaining more education than boys. Liu (1998) uses age in quadratic form and finds that probability of child educational attainment increases with age in Vietnam. Maitra (2001), using censored ordered probit model for Bangladesh, concludes that the level of child education is higher for girls than that of boys.

Khan and Ali (2005) find that age of the child positively affects child education of both boys and girls but the impact of age is more pronounced for boy's education than that of girl in Pakistan. They also find that the education level of girls is low as compared to boys. Khan and Khan (2016) conclude that the impact of child age and square of the child age is positive and negative respectively on child educational attainment in Pakistan. They also find that male children get more level of education than that of female. Sajid and Khan (2016), by using logistic model, evidence that age and gender of the child positively affect child education in Pakistan.

Conlisk (1969) results show that parental education and income has positive and significant effect on child educational attainment in the United State of America. Ilon and Moock (1991) are of the opinion that mother's education level is an important determinant of child education, especially for poor households in Peru. Parker (2000) concludes that mother's and father's education is important for both boys and girls, but father's education is more important for a child belong to poor family in Mexico whereas Maitra (2001) for Bangladesh and Zhao and Glewwe (2010) for China, employing censored ordered probit regression, endorse that mother's education has strong effects on child educational attainment than that of father. Patrinos and Psacharopoulos (1997) find a negative impact of income on child educational attainment in Peru while Zhao and Glewwe (2010) evidence that in China household income has positive effect on years of schooling completed. Kafle *et al.* (2017) find that durable assets have positive impact on child educational attainment while the effect of agriculture land ownership on child education is negative especially for children who

belong to rural household. Olaniyan (2011) show that parents' education positively affects child educational attainment. Lloyd and Blanc (1996) find that children of age 10-14 years who belong to female headed household have higher education than that of male headed household in Sub Saharan Africa. They further find that the impact of female head is more for girl's education than boy's education.

Behrman *et al* (1997) provide evidence that the impact of household income on child educational attainment is positive for rural areas in Pakistan. They also find a significant positive effect of father's education on both girls' and boys' education and mother's education positively affect only girl's educational attainment. Khan and Ali (2003) and Khan and Ali (2005) find that parent's education, per capita income and household assets positively affect child educational attainment in Pakistan. They also find that household size has negative effect on child educational attainment. Holmes (2003) concludes that parental education, household wealth, land ownership and other assets have positive effect on child educational attainment and the wealth influence is greater for females. Hashmi *et al.* (2008) find that both father and mother's education positively affect girl education in Punjab. They also find that girls who belong to household having agricultural land have high level of education than that of household with no agricultural land. Khan and khan (2016) estimate that the impact of mother's education on female education is little more in rural region than that of urban areas. Sajid and Khan (2016) conclude that child education is positively affected by parental education and household assets while income has insignificant role in child education.

Honsi (1997) finds that Moroccan urban children perform better than that of rural counterpart. Cooksey *et al*. (2001) estimate that there is difference of 17%in net enrollment rates between rural and urban schools. Holmes (2003) concludes that male child belongs to Khyber Pakhtunkhwa and Baluchistan province get high level of education relative to male child who belongs to Punjab. Sajid and Khan (2016) find that child who belongs to urban areas get more education. Hamid and Siddique (2001) find that distance to school has positive impact on child educational attainment while most of the studies such Hashmi *et al*. (2008), Holmes (2003), Zhao and Glewwe (2010), Kondylis and Manacorda (2010), and Sajid and Khan (2016) found that distance to school negatively affects child educational attainment.

Coleman *et al*. (1982), and Coleman and Hoffer (1987) confirm that in USA, private school positively affect child educational attainment more than that of public school. Similar results are found by Gannicott (1997) and Long *et al.* (1999) and Buckingham (2000) for Australia. Ngware *et al.* (2011), comparing private and public schools in Nairobi, find that public schools are better than private schools and have positive impact on child educational attainment. Frenette and Chan (2015) and Kelley (1995) confirm that private schools positively affect child educational attainment. Astudy for India by

Kingdon (1996) finds that child educational attainment is positively affected by school tuition fees.

From the above reviewed past literature, it is concluded that impact of some determinants/ variables i.e. age and gender of the child, and school type on child education are conflicting. Some studies conclude that age and gender of the child, and school type positively affect child education (Khan and Khan, 2016; Ngware *et al.,* 2011) whereas some other studies come to the evidence of negative impact on child education (Conlisk, 1969; Kelley, 1995). So, there is need of proper consideration of the issue. To the best of our knowledge, no comprehensive study is available on child educational attainment for Pakistan which captures all four types of characteristics The study of Holmes (2003) is an exceptional study but it seems to be outdated and hence its findings and conclusions may not be applicable to current education situation/condition in Pakistan. However, in order to have a comprehensive view of the current situation of child education there is a need to use latest available data. The study attempts to explore the socio-economic determinants of child educational attainment in Pakistan. This study uses latest available data from Pakistan Social and Living standards Measurement (PSLM) survey 2013-14.

3. Material and Methods

3.1 Theoretical Background

As the focus of this study is to explore the socio-economic determinants of child education in Pakistan. Child education means the educational attainment level of a child. For this purpose, we need the support of theoretical background and model. First, educational attainment model was provided by Becker (1964) in their Human Capital Theory. According to this approach, education is an investment activity and people invest their resources on education. The decision regarding the investment on optimal level of education depends on cost and returns of additional level of schooling. On the one side, education is costly because of direct cost of books and tuition fees etc., and indirect cost in the form of opportunity cost i.e. the forgone earning during the period of education taken. On the other side education is beneficial as it is assumed that education increases one's productivity in the form of future earnings. So, an optimizing individual will choose the level of education that maximizes his/her net return and will continue his/her investment on education up to the point where marginal cost of additional investment become equal to marginal return. According to this theory, human capital investment varies from individual to individual because of differences in cost and returns conditions.

This theory was criticized on the ground that it considers education completely as a monetary phenomenon, and neglected consumption aspect of education. So, the model was extended by adding consumption motive. If education can increase the efficiency level of leisure allocation. Heckman (1976) includes consumption motive into the

human capital model. Kodde (1988) shows that demand for education becomes higher by integrating consumption motive in the model.

Becker (1965) extends the human capital model of child educational attainment into the household production model and argues that the process of the educational attainment is an aspect of household behaviour rather than individual behaviours. In this approach, child educational attainment is considered as a commodity in the household utility function, and the household is like a production unit generating some utility for its members by using some household inputs like time and family characteristics and market inputs like school quality. Adults specially parents in the household make decisions about how to generate and how to use household resources. The children outcomes may be affected directly by parent's decisions through the amount and nature of resource allocated or by their timing and may be indirectly through the decisions regarding family structure or location where children are growing up. The household production model has been improved continuously.

Engle (1980) hypotheses that the income of the mother is more relevant for child education as compared to other household income. Muller (1990) states, as students grow older, they will increasingly be able to make their own choices and will be less dependent on their family background. Hanushek (1992) comes to the fact that there is trade-off between quality and number of children for parents, because parents want to maximize household utility which is the function of children's quantity and quality, subject to budget and time constraint. Wilson (2001) integrates both human capital and production function models into a model of educational attainment and concludes that the factors that influence individual demand of education also affect educational attainment.

3.2 Econometric Model

In order to explore the socio-economic determinants of child educational attainment, the following model is used. This model is based on study conducted by Zhao and Glewwe (2010).

$$EDU_i = \alpha_0 + \beta_i INDC_i + \gamma_i HHC_i + \delta_i CC_i + \theta_i SC_i + e_i \tag{1}$$

Where, EDU_i measure education level attained by i^{th} child; $INDC_i$ is the vector of child's characteristics; HHC_i represents vector of household characteristics; CC_i shows vector of community level characteristics; SC_i is the vector of school characteristics and e_i stands for error term.

Extended form of the model is given as;

$$EDU_i = \alpha_0 + \beta_1 Gender_i + \beta_2 Age_i + \beta_3 Age_i^2 + \gamma_1 GenderH_i + \gamma_2 AgeH_i + \gamma_3 EduF_i + \gamma_4 EduM_i + \gamma_5 DR_i + \gamma_6 AgrL_i + \gamma_7 Assets_i + \gamma_8 Income_i + \delta_1 Region_i + \delta_2 DKP_i + \delta_3 DSindh_i + \delta_4 DBaluch_i + \delta_5 D1S_i + \delta_6 D2S_i + \delta_7 D3S_i + \theta_1 TypeS_i + \theta_2 FeeS_i + e_i \tag{2}$$

Definition of all variables in equation (2) is given in Table-3.1. Variables which are specific to child characteristics are. child age, age-square, and gender of the child. Theoretically, the effect of child age estimate is not explicit, but for some countries this effect is positive and quadratic. Bhalortra (2003) cited that as the age of male child increases the opportunity cost of education is expected to be increases because the labour productivity increases with age and become less harmful and socially acceptable. Alternatively, for girls both school and market-based work became less acceptable and decline in favour of home-based work with increase in age. In order to control for gender effect, gender dummy has been used and the results are mixed (Mansuri, 2006; Mckenzie and Repoport, 2007; Hanson and Woodruff, 2003; Sharpa, 2011). The important household level variables that might affect schooling outcomes for children, are dependency ratio, education level of mother, gender, and age of the household head. Gender of the household head is also an important control variable. Bhalotra (2003) mention that it is supposed that household with female headship has less economic resources. There is also wage discrimination faced by female in labour market. The other reason on including gender of head is that to capture the significant role of women decision making regarding their children education. Household head age is used as indicator for household lifecycle stage. The attitude to child education of aged individual might be different from younger individual. Parental education levels are expected to have positive effect on child schooling because of higher desire for education of educated parents, give more importance to education, and more knowledge regarding returns on education (Bhalotra, 2003; Miluka and Dabalen, 2008). Other reason is that more educated heads or parents have more income and thus in batter position to devote more resources to child education. The dependency ratio is uses as control variable because it is expected that large households have more individuals among which the resources are divided. Therefore, larger size households are associated with lower child schooling (Sherpa, 2011). Monthly per capita consumption expenditure, agriculture land ownership, and assets have been included to control wealth effect. In most of developing countries, education level is lower in rural areas as compare to urban areas. The main reasons for this are relative under development of market, social, economic, and school infrastructure (Bhalotra, 2003). In order to capture regional disparities, regional dummy and provincial dummies are included.

Table 3.1: Definition of Variables

Variable Name	Definition
Child Education EDU_i	Child education measures education level attained by child. It is a categorical variable having five different categories i.e. No education, Primary education, Middle education, Secondary education, Others.
Gender of Child $Gender_i$	Gender of child is a dummy variable having value one (1) if child is male, zero (0) otherwise
Age of Child Age_i	It measures the age of child in completed years.
Age Square of Child Age_i^2	To capture the non-linear effect of child, square of child age is taken.
Gender of Household Head $GenderH_i$	Dummy variable taking value one (1) if household is headed by male, zero (0) otherwise
Age of Household Head $AgeH_i$	It measures the age of child in completed years.
Education Level of Father $EduF_i$	Education level of child's father is also divided into five categories taking value from 0 to 4 i.e. 0 = No education,1 = Primary, 2 = High School, 3 = Higher Secondary and 4 = Higher Education and Others.
Education Level of Mother $EduM_i$	Mother education level is also divided into five categories taking value from 0 to 4 i.e. 0 = No education,1 = Primary, 2 = High School, 3 = Higher Secondary and 4 = Higher Education and Others.
Dependency Ratio DR_i	Dependency Ratio= (Sum of household's members younger than 15 and older than 64) divided by sum of household's members of age 15-64.
Land Ownership $AgrL_i$	The dummy variable taking value one (1) if household own any agricultural land, Zero (0) otherwise.
Total Assets $Assets_i$	Sum of the market value of all assets (financial + durable goods)
Income $Income_i$	Annual income of the household.
Region $Region_i$	It is a dummy variable taking value 1 if household belongs to urban region zero otherwise (1= Urban and 0= Rural).
Provincial Dummies	Three dummy variables are used in the study for four provinces. DKP_i=1 if Khyber Pakhtunkhwa, 0 otherwise; $DSindh_i$=1 if Sindh, 0 otherwise; $DBaluch_i$=1 if Baluchistan, 0 otherwise. Note: Punjab is used as reference category.
Distance to School	To measure the distance to school, three dummies are used; $D1S_i = 1$ if distance is up to 5 km, 0 otherwise; $D2S_i = 1$ if distance is 6 to 10 Km, 0 otherwise; $D3S_i = 1$ if distance is above 10 Km, 0 otherwise. Note: "Hostel and other" is used as reference category.
Annual School Fee $FeeS_i$	It is a continuous variable. It includes admission/ tuition fee (in PKRs.) of the school
School Type $TypeS_i$	It is a dummy variable taking value 1 if School is private, otherwise zero

3.3 Estimation Technique

In order to estimate equation 2, ordinary least square (OLS) technique can be utilized, but there are some problems with using OLS technique, and needs appropriate attention. First, we need to know about the completed final year of education of the children. Therefore, data censoring analysis is necessary for currently enrolled children. OLS did not consider the censoring and treat identically both currently enrolled children and those children who completed their education in past and will give biased results. Second important issue is that education attainment is a series of discrete ordered choices. In such case OLS cannot be used because it assumes continuous distribution. Therefore, due to the above-mentioned problems with OLS, King and Lillared (1987) and Zhao and Glewwe (2010) used extended form of Ordered Probit model called Censored Ordered Probit Model.

To estimate equation (2), we need to know about the child educational attainment. The level of education of children who have completed their education is directly observable whereas the level of education is not directly observable for currently enrolled children. Therefore, there is need to censor the data to find the latent desired level of education for currently enrolled children. We can get the latent desire level of education for currently enrolled children by following formulas:

$$EDU_i = 0 \ if \ EDU^* \leq \pi_0 \tag{3}$$
$$EDU_i = 1 \ if \ \pi_1 \leq EDU^* \leq \pi_5 \tag{4}$$
$$EDU_i = 2 \ if \ \pi_6 \leq EDU^* \leq \pi_8 \tag{5}$$
$$EDU_i = 3 \ if \ \pi_9 \leq EDU^* \leq \pi_{10} \tag{6}$$
$$EDU_i = 4 \ if \ EDU^* \geq \pi_4 \tag{7}$$

In the above system of equations π_i's are the upper and lower limits of any education level and showing the switching from one lower education level to other higher education level i.e., from primary to middle. For those individuals who have never attended school the value of EDU will be zero. For those individuals who have completed their education, we observe that discrete value of EDU which falls between two cut-off points. For currently enrolled individuals the data is rightly censored with latent desired level of education. We did not know the desired education level for those individuals but we know the current level of education. Therefore, it is assumed that they will complete at least that education level in which they are currently enrolled and therefore $EDU^* \geq \pi_{max}$.

The probability that the value of latent desired level of child's education fall within certain threshold can be written as:

$$P(EDU = 0) = \theta(\pi_0 - \alpha X) \tag{8}$$
$$P(EDU = 1) = \theta(\pi_1 - \alpha X) - \theta(\pi_0 - \alpha X) \tag{9}$$
$$P(EDU = 2) = \theta(\pi_2 - \alpha X) - \theta(\pi_1 - \alpha X) \tag{10}$$
$$P(EDU = 3) = \theta(\pi_3 - \alpha X) - \theta(\pi_2 - \alpha X) \tag{11}$$
$$P(EDU = 4) = 1 - \theta(\pi_{4-1} - \alpha X) \tag{12}$$

Here π_is are the cut off points and θ represent the Cumulative Density Function (CDF) of e_i. The CDF of e_i in our model is standardized normal because we have used censored ordered probit model which is just extension of the probit model. X is the vector of all explanatory and control variables used in the study.

Educational attainment is a series of discrete ordered choice. To attain next high level of education to attain an extra year of schooling within certain level of education are two completely different decisions/choices and should be treated differently (Khan and Khan 2016). Therefore, King and Lillared (1987), Holmes (2003) and Zhao and Glewwe (2010) proposed extended form of Ordered Probit model called Censored Ordered Probit Model. As child educational attainment is an ordered variable, therefore, Censored Ordered Probit Model has been implemented (Miluka and Dabalen, 2008; Zhao and Glewwe, 2009).

3.4 Data

To investigate the socio-economic determinants of child educational attainment in Pakistan, data from Pakistan Social and Living Standards Measurement (PSLM) survey 2013-14 is used. PSLM 2013-14 covers a large sample of about 17988 households from 1307 Primary Sampling Units (PSUs) across four provinces of Pakistan. 30513 children aged 5-18 has been selected of which 39% belongs to urban areas and remaining belongs to rural areas of Pakistan. 43%, 24%, 23% and 10% children belong to Punjab, Khyber Pakhtunkhwa, Sindh and Baluchistan respectively. 85% of the children are currently enrolled at different educational institutions.

4.   Results and Discussion

4.1 Descriptive Statistics

The summary statistics (minimum, maximum, mean and standard deviation) of main variables used in the study are reported in table 4.1. Child enrollment is a dummy variable and taking value one if child is enrolled. The mean value is 0.85 means that 85 percent children are currently enrolled. School attainment is a categorical variable having five different categories taking value from zero (no education) to 4 (higher secondary and above). The median of child education is 1.00 which means that most of the children are enrolled in primary level. The gender of child is a dummy variable having value one if the child is male. The mean value of gender is 0.57 means that about 57 percent children are male and the deviation from the mean value is 0.496. We consider children of aged 5 to 18 years in the study. The average age of child is more than 11 years. The mean variation of child age from their mean value is 3.923 years.

Table 4.1: Descriptive Statistics

Variable	Minimum	Maximum	Mean	St. Deviation
Child Enrollment (1 = if enrolled)	0	1	0.85	0.357
Child Education	0	4	1.00*	0.988
Gender (1= if male)	0	1	0.57	0.496
Age	5	18	11.37	3.923
Gender of Head (1 = if male)	0	1	0.90	0.298
Age of Head	15	99	46.54	11.742
Father Education	0	4	1.00*	1.310
Mother Education	0	4	0.00*	0.337
Dependency Ratio	0	9	1.30	1.017
Agriculture Land (1 = if yes)	0	1	0.08	0.269
Total Assets	0	9800000	24690.77	197863.81
Income	0	101880000	606948.49	1305324.07
Region (1 = if urban)	0	1	0.39	0.487
Punjab (1 = if Punjab)	0	1	0.43	0.495
KPK (1 = if KPK)	0	1	0.24	0.427
Sindh (1 = if Sindh)	0	1	0.23	0.420
Baluch (1 = if Baluchistan)	0	1	0.10	0.300
Distance to School	0	4	0.93	0.565
School Fee	0	700000	7034.14	15817.922
School Type (1 = if non-government)	0	1	0.33	0.469
Sample Size	30513			

* For education level, we have reported the median value.

Gender of head is also a dummy variable. The average value is 0.90 which means that 90 percent of the households are headed by male individuals. The range of head's age is from 15 years to 99 years and the mean age of head is more than 46 years. For parental education, we have used ordinal variable taking values from zero (no education) to four (higher education). The median value of father's education is 1.00 which means that mostly education level of the fathers is primary. The median education level of mother is zero means that almost mothers are illiterate. The minimum value of dependency ratio is zero and maximum is nine. The mean value of dependency ration is 1.30 means that on the average there are more than 1 dependent individual across households. Agriculture land is a dummy variable, and its mean value is 0.08 which shows that only eight percent of household owned agriculture land. Total assets and total income both are continuous variables. The minimum value of total assets is zero and maximum is Rs. 980000/-. The mean value of total assets is about Rs. 24690/-. Income is ranged from zero to Rs. 101880000/- per year. The mean value of household

income is Rs. 606946.49/- per year and the deviation of household income from its mean value is Rs. 1305324.07/-.

The mean value of regional dummy is 0.39 which shows that 39 percent of the sample is belong to urban region and the remaining 61 percent are from rural area. We have used four dummies for provinces and the average values show that 43 percent of the sample belongs to Punjab, 24 percent belongs to Khyber Pakhtunkhwa, 23 percent belongs to Sindh and the remaining 10 percent is from Baluchistan. Distance to school is also categorical variable and ranged from 0 to 4 and the mean value is 0.93 which means that the average school distance is 1 to 5 Kilometres (value=1). The minimum value of school tuition fee is zero and maximum is Rs, 700000/-. The average annual school tuition fee paid by household is Rs. 7034.14/-. School type is a dummy variable taking value one if school is non-government and its average value is 0.33 which shows that 33 percent children are enrolled in non-government schools.

4.2 Results of Censored Ordered Probit Model at Aggregate Level

The estimates of censored ordered probit model are reported in Table 4.2. The coefficient of child's gender (Gender) is significantly positive. It means that male children are favoured more in providing education than female in Pakistan. The main reason may be that our society is more biased toward male education and they want to educate male children on the cost of female education. Age and age-square of the child both show significantly positive impact on educational attainment but the coefficient of age-square is less than age coefficient which means as the child's age increases, that education level also increases but after some specific age point the positive impact start to decline. The main reason of diminishing the impact is that along with increase in age of the child, he opportunity cost of getting education also increases. Khan and Khan (2016) and Liu (1998) also concluded the same.

The effect of household head on educational attainment is negative and significant. It indicates that if child belong to the household for which the head is male person, the probability of getting higher education reduces. Alternatively speaking, children belong to those households headed by female are more likely to attain higher education. Age of household head, education level of both parents has significantly positive effect on child educational attainment. Mother's education has more positive effect on children educational attainment than that of father. The coefficient of household's total assets on child educational attainment is positive and statistically significant. Our results are consistent with Khan and Ali (2003), Olaniyan (2011), Khan and Khan (2016) and Sajid and Khan (2016).

Coefficient of region shows that children living in urban constituency are more likely to attain higher education than their rural counterpart. To capture the role of province, the study used three dummies for four provinces and Punjab province is used

as reference category. The coefficients of province dummies show that if child belongs to Khyber Pakhtunkhwa, the chances of getting higher education and transition from lower education level to higher education level is low but in case of Baluchistan, the results are contrary. These findings support the results of Honsi (1997), Cooksey *et al.* (2001), Sajid and Khan (2016) and Holmes (2003).

Table 4.2: Estimates of Censored Ordered Probit Model at Aggregate Level

Variable	Coefficient	P-Value
Constant	-20.9900	0.000
$Gender_i$	0.0971	0.000
Age_i	0.2501	0.000
Age_i^2	0.0088	0.000
$GenderH_i$	-0.0841	0.034
$AgeH_i$	0.0043	0.000
$EduF_i$	0.0882	0.000
$EduM_i$	0.1412	0.000
DR_i	-0.0174	0.122
$AgrL_i$	-0.0231	0.491
$Assests_i$	0.0059	0.005
$Income_i$	-0.0021	0.516
$Region_i$	0.0974	0.001
DKP_i	-0.0695	0.005
$DSindh_i$	0.0204	0.475
$DBaluch_i$	0.4026	0.000
$D1S_i$	-0.7867	0.000
$D2S_i$	-0.4693	0.000
$D3S_i$	-0.1914	0.111
$FeeS_i$	0.0051	0.782
$TypeS_i$	0.0989	0.029
Sample Size	30513	

To see the impact of distance to school on child education attainment, three dummies are used for distance. The results in table 4.1 enable us to conclude that distance to school decreases the chances of getting education for child when the distance is less or equals to 10 kilometres. If the distance is more than 10 Km, the negative impact becomes insignificant. Type of school, in which the child is enrolled, is used as proxy for capturing the quality of education. The coefficient of school type is significantly positive indicating that if child is going to private school, the likelihood to attain higher education is more. The results support the findings of previous studies of Kondylis and Manacorda (2010), Buckingham (2000), Gannicott (1997), Long *et al.* (1999), and Coleman *et al.* (1982).

4.3 Results of Gender Based Analysis

The estimates of gender-based analysis are reported in Table 4.3. It would help us to observe the disparities in effects of these socioeconomic factors on educational attainment for a child across gender. The coefficient of age variable is significantly positive, but the impact is more for male children as compared to his female counterpart. It means that chances of attaining higher education in older ages are more for males than for females. The studies of Khan and Ali (2005) and Sajid and Khan (2016) have also similar findings.

The coefficient of gender of household head is significantly negative only for male sample. It means that in male headed households the likelihood of getting more education is lower for male child. The coefficient of household head age indicates that the positive impact is significantly almost same for both genders. The effect of parental education level is same for both samples. These findings are in line with Parker (2000), Hashmi *et al.* (2008), Lloyd and Blanc (1996) and Khan and Khan (2016).

The coefficient of dependency ratio and land ownership is insignificant for each gender means that these two variables have no significant role in educational gender disparities. The impact of total assets on educational attainment of child is positive for both genders but significant only for male which shows that if assets of the household's increase, it will increase the chances of attaining higher education only for male child. In case of male sample, the coefficient of income is positive but insignificant while in case of female, it is significantly negative. It means that as income level increases, the probability of attaining education decreases for female child. The justification for the negative impact of household's income on female education level is that rich people of rural areas are more inclined toward socio-economic aspects (see Psacharopoulos, 1997; Khan and Ali, 2003).

The impact of region is significantly positive and almost same for both genders but slightly higher for male means that male children in urban region have slightly more chances to get education than female. The coefficient of Khyber Pakhtunkhwa dummy is negative in both gender but only significant in female sample. It indicates that in Khyber Pakhtunkhwa gender disparity in education is very high and females' children of Khyber Pakhtunkhwa have fewer chances to get higher education level. In Khyber Pakhtunkhwa, the educational attainment is lower for female because of law and order situation, social norms and people attitude toward female education. In Baluchistan province, the chances of higher level of education is little more for female than male. In Baluchistan, the data is taken only from economically developed areas and ignored the remote areas. Therefore, the results are biased toward female education. The results of Holmes (2003) and Sajid and Khan (2016) are supporting our findings.

Table 4.3: Estimates of Censored Ordered Probit Model at Gender base

Variable	Male		Female	
	Coefficient	P-Value	Coefficient	P-Value
Constant	-1.9402	0.000	-2.4232	0.000
Age_i	0.2218	0.000	0.2782	0.000
Age_i^2	0.0107	0.000	0.0071	0.000
$GenderH_i$	-0.1256	0.012	-0.0263	0.649
$AgeH_i$	0.0057	0.000	0.0024	0.070
$EduF_i$	0.0860	0.000	0.0900	0.000
$EduM_i$	0.1554	0.000	0.1277	0.000
DR_i	-0.0173	0.195	-0.0198	0.213
$AgrL_i$	-0.0485	0.217	0.0152	0.776
$Assets_i$	0.0066	0.012	0.0045	0.139
$Income_i$	0.0054	0.179	-0.0119	0.021
$Region_i$	0.1093	0.001	0.0858	0.018
DKP_i	-0.0291	0.390	-0.1265	0.000
$DSindh_i$	0.0550	0.101	-0.0292	0.454
$DBaluch_i$	0.2734	0.000	0.6274	0.000
$D1S_i$	-0.7290	0.000	-0.9147	0.000
$D2S_i$	-0.4221	0.001	-0.5799	0.004
$D3S_i$	-0.1141	0.400	-0.3242	0.122
$FeeS_i$	0.0404	0.043	-0.0163	0.495
$TypeS_i$	-0.0287	0.565	0.2091	0.000
Sample Size	17,289		13,224	

Distance to school almost has same negative effect on education level for both male and female. The impact of distance is negative because the availability of school facility played an important role in child educational attainment. The impact of school fee is significantly positive only for male child while the effect of school type is only positive for female significantly. These findings are consistent with the findings of Kelley (1995), Hamid and Siddique (2001), Holmes (2003), Kingdon (1996), Frenette and Chan (2015) and Colemon and Hoffer (1987).

4.4 Estimates of Region Based Analysis

In order to investigate the factors responsible for regional disparities in child educational attainment, we conducted separate analyses for both regions (see table 4.4). Individual level characteristics of child, i.e. gender, age and age square has almost same impact on education level in both regions, but the impact of age is slightly higher for urban sample. Our findings support the results of Liu (1998) and Khan and Khan (2016).

The coefficient of household head gender is significantly negative for rural areas only which means that male headed household is an obstacle for child to attain educational in rural areas. The age of household head has more or less the same significant positive impact on educational attainment of children in both regions. The effect parental education is positive and highly significant in both regions, but the

impact of father education is more pronounced in urban region while the impact of mother education is higher in rural region. It means that in urban areas, educated father increases the chances of their children's education while in rural areas, children of educated mother have more chances than their urban counterparts to get higher education. These findings are comparable with that of Ilon and Moock (1991), Maitra (2001), Conlisk (1969), Khan and Khan (2016) and Olaniyan (2011).

The coefficient of ownership of agriculture land by household is significantly positive in urban areas while significantly negative for rural sample which means that in urban area, if the household owned any land, the probability of getting education will be more for children. If rural household owned any agriculture land, the probability of their children's educational attainment will be lower because rural household may involve their children in agricultural activities. The impact of total assets is positive in both areas, but it is significant only for rural areas means that the possibility of attaining higher education is higher for a child who belongs to rural household having assets. The income of household has statistically insignificant impact on child educational attainment in both regions but negative for urban and positive for rural sample. Our results are in line with that of Holmes (2003), Kafle et al. (2017), Sajid and Khan (2016), Hashmi et al. (2008).

Table 4.4: Estimates of Censored Ordered Probit Model at Regional Level

Variable	Urban		Rural	
	Coefficient	P-Value	Coefficient	P-Value
Constant	-4.8027	0.114	0.5841	0.009
Gender$_i$	0.0945	0.000	0.0873	0.004
Age$_i$	0.2790	0.000	0.2357	0.000
Age$_i^2$	0.0093	0.000	0.0083	0.000
GenderH$_i$	-0.0830	0.241	-0.0820	0.084
AgeH$_i$	0.0056	0.010	0.0036	0.002
EduF$_i$	0.1050	0.000	0.0772	0.000
EduM$_i$	0.1277	0.000	0.1609	0.000
DR$_i$	-0.0188	0.404	-0.0186	0.156
AgrL$_i$	0.1211	0.050	-0.0741	0.060
Assets$_i$	0.0046	0.139	0.0066	0.016
Income$_i$	-0.0082	0.220	0.0007	0.850
DKP$_i$	-0.1173	0.002	-0.0241	0.464
DSindh$_i$	0.0233	0.571	0.0313	0.428
DBaluch$_i$	0.3827	0.000	0.4168	0.000
D1S$_i$	-0.8850	0.000	-0.7981	0.000
D2S$_i$	-0.6415	0.001	-0.4320	0.003
D3S$_i$	-0.2224	0.237	-0.1738	0.249
FeeS$_i$	0.0374	0.215	-0.0089	0.701
TypeS$_i$	-0.0347	0.608	0.2109	0.000
Sample Size	11782		18731	

The negative impact Khyber Pakhtunkhwa dummy is significantly negative only for urban sample means that the probability of switching from lower education level to higher education level is lower for child belongs to urban region of Khyber Pakhtunkhwa. The coefficient of Baluchistan dummy is significantly positive and almost same in both regions means child who belongs to Baluchistan possibly get more level of education irrespective of region to which he or she belongs. The results of Holmes (2003) and Sajid and Khan (2016) are supporting our findings.

The distance from home to school has significantly negative effect on child educational attainment up to 10 kilometres, after that distance to school becomes less effective in determining child educational attainment for both samples but the effect is little more for rural areas. It means that child educational attainment in rural areas is more adversely affected by distance to school than that of urban areas. The coefficient of the school type is negative and insignificant for urban areas but positive and significant for rural areas means child enrolled in rural private school may get more levels of education. These results are similar to the results of Zhao and Glewwe (2010), Hashmi et al. (2008), Sajid and Khan (2016), Buckingham (2000) and Coleman and Hoffer (1987).

5. Conclusion and Recommendations

This study investigates the socioeconomic determinants of child educational attainment in Pakistan. To do so, data from multidimensional nationally representative survey i.e. PSLM 2013-14 is used. Children of age 5-18 years who ever attended the school or currently attending school are considered and censored ordered probit model is implemented for analysis of data. In order to see disparities in effect of factors on educational attainment across region and across gender, separate analysis is carried out for both genders (male and female) and regions (urban and rural).

The results of the overall model reveal that gender and age of child, household head gender, parental education, assets of household, region, dummy for Baluchistan and school fee have significant positive effect on child educational attainment. Household income, dependency ratio and land ownership have no significant impact on child educational attainment. The distance to school is a hurdle in attaining education while private schools are contributing to child educational attainment in Pakistan.

Gender specific analysis shows that age and gender of household head, assets and school fee are the important determinants of educational attainment for male children only while the effect of household's income and type of school is significant only in female sample.

Region wise separate analysis reveal that gender and age of child and household head, parental education, land ownership, distance to school are the important determinant of educational attainment in both regions. School type is only significant in

rural sample only while the effect of agriculture land ownership is positive for urban sample and negative for rural sample.

The study findings recommended that to increase child education in Pakistan, In order to increase child education in Pakistan, there is a need of reducing gender differences in education by providing educational facilities to female and by increasing the value and importance of female education in society. There is a need of increasing higher education specially for female children by taking different steps i.e. increasing girl's schools and educational institutions, increasing awareness about female education in society etc. Our findings also suggest that by increasing the mother education level, the child education level could also increase especially female education in Pakistan. The study also suggests that distance to school is an important determinant of child education. Therefore, to increase child education level, we should reduce the distance to school by building new schools. Quality of school is an important determinant of child education in Pakistan. School attainment in non-government schools is higher. There is a need of improving quality of government school to increase child education level in Pakistan. General awareness about the value of education should increase so that people give more attention to educating their children. Furthermore, there is need of special focus on rural region to improve the educational attainment of children living in rural region.

The future direction of the study is that there is a need of provincial wise study at disaggregate level to explore the differences in child education among provinces. Further there is a need of national wise study which also includes observation from FATA, Gilgit Baltistan and Islamabad Capital Territory. The future direction of the study can be covered by continuing the PSLM and by including more primary and secondary sampling units to make it wide.

References

Babalola, J. B. (2003). Budget preparation and expenditure control in education. *Basic Text in Educational Planning. Ibadan Awemark Industrial Printers*.

Baluch, M. U. H., & Shahid, S. (2008). Determinants of enrollment in primary education: a case study of district Lahore. *Pakistan Economic and Social Review, 46*(2), 161-200.

Becker, G. S. (1964). Human Capital", National Bureau of Economic Research, *NewYork;11*

Becker, G. S. (1965). A Theory of the Allocation of Time. *The Economic Journal, 75*(299) 493-517.

Behrman, J. R., Khan, S., Ross, D., & Sabot, R. (1997). School quality and cognitive achievement production: A case study for rural Pakistan. *Economics of Education Review*, *16*(2), 127-142.

Bhalotra, S. (2003). Child labour in Asia and Africa. *Bristol, Background Research Paper for the EFA Monitoring Report, mimeo, University of Bristol*.

Buckingham, J. (2000). The truth about private schools in Australia. Centre for Independent Studies

Coleman, J., Hoffer, T., & Kilgore, S. (1982). Cognitive outcomes in public and private schools. *Sociology of Education*, *55*(2-3) 65-76

Coleman, J. S., & Hoffer, T. (1987). Public and private high school. *The Impact of Communities",* (Vol. 41). New York: Basic Books.

Conlisk, J. (1969). Determinants of school enrollment and school performance. *The Journal of Human Resources*, 140-157.

Cooksey, B., Levey, L., & Mkude, D. (2001). The Partnership for Higher Education in Africa: Higher Education in Tanzania: A Case Study. *New York, Carnegie Corporation*

Dubra, I. (2004). Investīcijas cilvēkkapitālā: teorētiskie aspekti, novērtēšanas metodes un pieejas pētniecībai Investment in Human Capital: Theory Aspects, Evaluation Methods and Research Approaches. *Ekonomika. Vadības zinātne*, *7*(4), 34.

Frenette, M., & Chan, P. C. W. (2015). Academic outcomes of public and private high school students: What lies behind the differences? *Statistics Canada*

Gannicott, K. (1997). Charter schools: a new paradigm for public education *policy: A Journal of Public Policy and Ideas*, *13*(2), 3.

Government of Pakistan (2016). Pakistan Economic Survey 2015-16. Finance Division, Economic Advisory Wing, Islamabad, Government of Pakistan

Hamid, S., & Siddiqui, R. (2001). Gender differences in demand for schooling. *The Pakistan Development Review*, 1077-1092

Hanson, G. H., & Woodruff, C. (2003). Emigration and educational attainment in Mexico: Mimeo., University of California at San Diego.

Hanushek, E. A. (1992). The trade-off between child quantity and quality. *Journal of political economy*, *100*(1), 84-117

Hashmi, N., Zafar, M. I., & Ahmad, M. (2008), Cultural Determinants of Female Educational Attainment in Rural Jhang, Punjab, Pakistan. *Pakistan Journal of Agricultural Sciences*, *45*(1)

Haveman, R., & Wolfe, B. (1993). Children's prospects and children's policy. *The Journal of Economic Perspectives*, *7*(4), 153-174

Heckman, J. J. (1976) A life-cycle model of earnings, learning, and consumption. *Journal of political economy*, *84*(4, Part 2), S9-S44

Holmes, J. (2003). Measuring the determinants of school completion in Pakistan: Analysis of censoring and selection bias. *Economics of Education Review*, *22*(3), 249-264.

Hosni, D. (1997). Schooling and cognitive achievements of children in Morocco: Can the government improve outcomes? World Bank Discussion Papers No. 264. Washington, DC: The World Bank, 1994. pp. ix+ 68. Price: US $7.95. *Economics of Education Review*, *16*(1), 97-98.

Ilon, L., & Moock, P. (1991). School attributes, household characteristics, and demand for schooling: A case study of rural Peru. *International review of Education*, *37*(4) p: 429-451.

Kafle, K., Jolliffe, D., & Winter-Nelson, A. (2017). Do different types of assets have differential effects on child education? Evidence from Tanzania.. *Policy Research Working Paper; No. 807,. World Bank, Washington, DC*

Kelley, J. (1995). Catholic schools and educational success in Australia" *Worldwide Attitudes*.19950731 (31 July 1995) 1-8. 53.

Khan, R. E. A., & Ali, K. (2003). Determinants of schooling in rural areas of Pakistan. *The Lahore Journal of Economics*, Vol.8, No.2

Khan, R. E. A., & Ali, K. (2005). Bargaining over sons and daughters' schooling: Probit analysis of household behaviour in Pakistan. Working Paper 01-05, Department of Economics, Islamia University, Bahawalpur, Pakistan

Khan, S. U., & Khan, M. J. (2016). The impact of remittances on child education in Pakistan. *The Lahore Journal of Economics*, *21*(1), 69

King, E. M., & Lillard, L. A. (1987). Education policy and schooling attainment in Malaysia and the Philippines. *Economics of education review*, *6*(2), 167-181.

Kingdon, G. (1996). The quality and efficiency of private and public education: a case-study of urban India. *Oxford Bulletin of Economics and Statistics*, *58*(1), 57-82.

Kodde, D. A. (1988). Unemployment expectations and human capital formation", *The European Economic Review*, *32*(8), 1645-1660.

Kondylis, F. & Manacorda, M. (2010). School proximity and child labor: evidence from rural Tanzania. CEP Discussion paper no 1035.

Liu, A. Y. (1998). School children's participation behaviour in Vietnam: An empirical analysis" in *Twelfth Annual Conference of the European Society for Population Economics, Amsterdam, Netherlands.*

Lloyd, C. and A.K. Blanc, (1996). Schooling in sub-Saharan Africa, the role of fathers, mothers and others. *Population and Development Review*, *22*(2):265-98.

Long, M., Carpenter, P., & Hayden, M. (1999). *Participation in education and training, 1980-1994. Longitudinal surveys of Australian Youth. Research Report*. ACER Customer Service, Private Bag 55, Camberwell, Victoria 3124 Australia (Code: A113LSA; $37.50 Australian).

Lorey, D. E. (1995). Education and the challenges of Mexican development", *Challenge*, *38*(2), 51-55

Maitra, P. (2001). Schooling and educational attainment: Evidence from Bangladesh. *Education Economics*, *11*(2), 129-153.

McKenzie, D., & Rapoport, H. (2006). Can migration reduce educational attainment? Evidence from Mexico. *Evidence from Mexico (June 1, 2006). World Bank Policy Research Working Paper* (3952).

Miluka, J., & Dabalen, A. (2008). Exploring the role of Albanian international migration on education. In *Albania-World Bank conference*

Müller, W. (1990). Does education matter? Evidence from cross-national comparisons. *University of Mannheim, manuscript*.

Ngware, M. W., Oketch, M., & Ezeh, A. C. (2011). Quality of primary education inputs in urban schools: Evidence from Nairobi. *Education and Urban Society*, *43*(1), 91-116.

Olaniyan, O. (2011). The determinants of child schooling in Nigeria. (No RP_217), *African Economic Research Consortium*

Parker, S. (2000). School and work in rural marginated communities of Mexico: Evidence from Progresa. *Population Association of America annual meetings, Los Angeles, CA*.

Patrinos, H. A., & Psacharopoulos, G. (1997). Family size, schooling, and child labor in Peru– An empirical analysis. *Journal of population economics*, *10*(4), 387-405.

Pervaiz, Z. (2012). What Factors Determine Primary Gross Enrollments in Schools Across Provinces in Pakistan? A Comparison of the four Provinces.

Rammohan, A., & Dancer, D. (2008). Gender differences in intra-household schooling outcomes: the role of sibling characteristics and birth-order effects. *Education Economics*, *16*(2), 111-126.

Sajid, G. M., & Khan, M. (2016). Determinants of primary school enrollment in Pakistan: Is poverty a hurdle in the way of educational attainment? *The Pakistan Journal of Social Issues*, Volume 7. 1-18

Schultz, T. W. (1971). Investment in human capital. The role of education and of research.

Sherpa, M. (2011). Essays on determinants of human capital accumulation.

Wilson, K. (2001). The Determinants of educational attainment: Modeling and estimating the human capital model and education production functions. *Southern Economic Journal*, *67*(3), 518-551.

Wolfe, B. L., & Behrman, J. R. (1984). Who is schooled in developing countries? The roles of income, parental schooling, sex, residence, and family size. *Economics of Education Review, 3*(3), 231-245

Zhao, M., & Glewwe, P. (2010). What determines basic school attainment in developing countries? Evidence from rural China. *Economics of Education Review*, *29*(3), 451-460.