Bargaining Over Sons' and Daughters' Schooling:

Probit Analysis of Household Behavior in Pakistan

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Abstract: This paper examines the differential effects of child characteristics, head of household characteristics, parent characteristics, and household characteristics on the acquisition of schooling by sons and daughters. Evidence is found that a strong preference for sons' schooling exists in Pakistani households. We did this by comparing results for sons and daughters. Birth-order of the child has shown opposite effect on sons' and daughters' schooling while a number of explanatory variables have shown the effect in the same direction for sons and daughters, but a reasonably varying magnitude is observed.

1. Introduction:

Pakistan like South Asian countries, is a country having rigidly patrilineal and patrilocal kinship system in the households. Lineages are strictly exogenous and are defined in terms of male alone so men are reproducers and confer an identity to the children. Rights to a woman are transferred to the household's family at the time of marriage. The woman's future productivity and services belong to the husband's family, whatever her parents' needs may be. Consequently, a daughter is far less welcome than that of a son. The kinship system is these settings leads to strong son preference and accompanying discrimination against daughters. Such type of discrimination may be in the form of distribution of consumption/expenditure in the household. Education of children is one head of resource allocation among children. There is a vast body of literature on child schooling in Pakistan (e.g. see Summers 1991; Behrman 1994; Khan 1997; Sawada and Lokshin 2000). This literature identifies both demand and supply factors as explanations of low schooling achievement in the country. Many of these studies find evidence of gender differences in schooling (e.g. Rosati and Rossi 2001; Barki and Shahnaz 2003), though there has been relatively much fewer attempts to explain gender differences in schooling as such. In this context, we investigate the possible causes of gender differences in child schooling among 5-15 years old boys and girls in Pakistan, and also to what extent the observed gender differences is explained by the child, head of household, parents and household characteristics.

Investment in education of children is very significant in raising productivity and efficiency of individuals in an economy which largely depends on the household's behavior towards their sons' and daughter' education. One of the factors of low school

enrolment of children is the gender bias in child schooling by households. It is also important to analyze, as gender discrimination is the single most important reason of poverty in South Asia (Human Development Report 1997:106). Pakistan ranked 92nd out of 94 on gender empowerment index (Haq 1997). Ranis et. al. (2000:393) opined that human development in Pakistan has suffered a lot due to discrimination against females. The women literacy rate in the country (for the year 2004) is 41.75 percent as compared to 66.25 percent of men. This is a consequence of low enrolment rate of girls at school level. All this is despite the fact that rate of return on investment on girl's education is the highest in Pakistan (Summers 1991; see also Khan 1997). Female schooling has important externality in that it plays a significant beneficial role on fertility (Pall and Makepeace 2003) and child health outcomes (Pall 1999) in low-income countries. Thus boosting female literacy is necessary not only for itself, but also for the wider social benefits (see also ADB 2002:49).

The paper is organized as follows: Section 2 deals with the introduction of the issue of gender bias in sons' and daughter' education. Section 2 describes the data and methodology while 3 discusses the probit results. Section 4 deals with the conclusions.

3. Data and Methodology:

The empirical analysis of gender differences in child schooling in this paper is based on the data from two districts of Pakistan, i.e. Pakpattan and Faisalabad. The survey covered 4000 households where households having at least one school-age child were segregated. The heads of the household were questioned for information about themselves, parents of children, and children. The distinguishing feature of this survey is that it covers 5-15 years old boys and girls, while previous studies, for instance, Barki

and Shahnaz (2003) have covered 10-14 years age group of children for gender analysis of child activities.

2.1 Data Description. The eight clusters taken together capture a good deal of the diversity present in the country. Though there are primary schools in all the clusters, access to high schools is difficult in some clusters. There are also significant differences in adult labor force participation, income and education.

Focusing on children aged 5-15 years in the sample, there is a gender difference noted here: average per capita household income for girls' household sample was Rs.2114 as opposed to Rs.1720 for the boys. Similarly, among the children attending school, the average household incomes were Rs.9877 and Rs.10684 respectively for boys and girls. Also differences in parental literacy make a difference for boys and girls in the sample. For example, 61 percent of male school-going children (as against 69 percent of girls) had literate father; in contrast, 52 percent of female children (as against 42 percent of boys) enrolled in schools had literate mothers.

2.2 Methodology. In the literature, generally two approaches are used to detect gender bias in the intra-household allocation of resources: the direct comparison of expenditure on males and females where data is available at the level of individual, and the indirect household expenditure methodology commonly refereed to as the Engel curve approach. Since information on the consumption/expenditure on each individual member of the household is typically difficult to get and even it is not available in the household surveys, so researchers must prefer use Engel curve method. It seeks to detect differentiated treatment within the household indirectly by examining how household expenditures on a particular good change with household gender

composition. However, the reliability of the Engel curve methodology as a way of detecting gender bias has been called into question because it has generally failed to confirm discrimination even where it is known to exist. For example, the use of Engel curve method failed to detect significant treatment in the intra-household distribution of food consumption in Maharashtra (Subramaniun and Deaton 1990), in Thailand and Cote d Ivoire (Deaton and Paxon 1998). Similarly, Ahmed and Morduch (2002) found no evidence in favor of boys in Bangladesh, Deaton (1997:240) and Bhalotra and Attfield (1998) in Pakistan, and Case and Deaton (2003) in India. These are the countries from which much of the other evidences come on differentiated treatment by gender (see Kingdon 2003 for details). To analyze the gender bias, we examined the determinants of schooling for sons and daughters separately by using a series of probit model. In the first regression, son's schooling (SON) is function of several explanatory variables: 1 if the son goes to school and 0 if he does not. The paper estimated non-linear maximum likelihood for the normal probability (probit model). The function is

$$SON = f(X_1 \ldots \ldots X_n) \ldots \ldots \ldots \ldots \ldots (1)$$

Four groups of explanatory variables ($X_1 \ldots \ldots X_n$) have been selected to distangle the gender bias in child schooling, i.e. child characteristics, head of household characteristics, parent characteristics, and household characteristics. For the second regression, the model is the same where daughter's schooling (DAUG) is a function of same explanatory variables. The dependent variable can take only two binary values:1 if the daughter is going to school and 0 if she is not going. The function is as:

$$DAUG = f(X_1 \ldots \ldots X_n) \ldots \ldots \ldots \ldots \ldots (2)$$

The definitions of explanatory variables are presented in table No.1

Table No.1. Definitions of Explanatory Variables Used in the Models

VARIABLES	DEFINITIONS

1. Child Characteristics

BORD (Birth-order of child)	• Birth-order of child in his/her brothers and sisters
CAGE (Child's age)	• Child's age in completed years
CAGESQ (Child's age squared)	• Child's age squared
CEDU (Child's education)	• Child's education in completed years

2. Head of household Characteristics

HGEN (Gender of the head of household)	• 1 if the head of household is male, 0 otherwise
HAGE (Head of household's age)	• Head of household's age in completed years
HAGESQ (Head of household's age squared)	• Head of household's age squared in completed years
HEDU (Head of the household's education)	• Head of the household's completed years of education
HLIT (Head of the household's literacy status)	• 1 if the head of the household is literate, 0 otherwise
HEMP(Head of household's employment)	• 1 If head of household is employed, 0 otherwise
HY (Head of household's income)	• Head of household's income per month (in 000 Rupees)

3. Parent characteristics

FEDU (Father's education)	• Father's education in completed years of education
FLIT (Father's literacy status)	• 1 if father is literate, 0 otherwise
FEMP (Father' employment)	• 1 if father is employed, 0 otherwise
FY (Father's income)	• Father's income per month (in 000 Rupees)
MEDU (Mother's education)	• Mother's completed years of education
MLIT (Mother's literacy status)	• 1 if mother is literate, 0 otherwise
MEMP (Mother's employment)	• 1 if mother is employed, 0 otherwise
MEMP.MLIT (Mother's employment and literacy status simultaneously)	• 1 if mother is employed and literate, 0 otherwise
MEMP.POVTY (Mother's employment and household's poverty status simultaneously)	• 1 if mother is employed and belongs to poor household, 0 otherwise
MY (Mother's income)	• Mother's income per month (in 000 Rupees)

4. Household Characteristics

ASST (Household's ownership of assets)	• 1 if the household owns of assets, 0 otherwise
HHY (Household's total income)	• Household's total income per month (in 000 Rupees)
HHPCY (Household's per capita Income)	• Household's per capita income (in 00 Rupees) per month
HPOVTY[1] (Household's poverty status)	• 1 if household's per capita income per month is Rs.670 or below, otherwise 0
HHSIZ (Household/family size)	• Number of household/family members
HHSSIZ (Household/family's small family)	• 1 if household members are less or equal to 5, otherwise 0
NCHILD	• Number of children (15 or less than 15 years) in the household
CHILD04	• Number of children ages 4 or less than 4 years in the household
BOY04	• Number of boys ages 4 or less than 4 years in the household
GIRL 04	• Number of girls ages 4 or less than 4 years in the household
CHILD515	• Number of children (5-15 years) in the household
BOY515	• Number of boys (5-15 years) in the household
GIRL515	• Number of girls (5-15 years) in the household
CHILD16	• Number of elder siblings (16 years or above) of children in the household
BOY16	• Number of male elder siblings (16 years or above) of children in the household
GIRL16	• Number of female elder siblings (16 years or above) of children in the household
LOC (Locality of the household)	• 1 if the household is urban, 0 otherwise

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[1] The official Poverty Line of Pakistan is Rs.848.79 per capita per month [Economic Survey 2003-2004]

3. Results and Discussion: The study has estimated gender differences in child's schooling. We analyze the sub-sample of sons and daughters separately. The summary statistics and sequential probit results for sons are shown in table-2 and for daughters in table-3 (See Appendix A). The results show the probability of going to school for sons and daughters separately. Here we make a comparison of the impact of explanatory variables on sons and daughters of the household. The analysis of some of the key variables of interest is shown below.

3.1 Child Characteristics: There is an extensive literature on gender differences in human capital investments in children. A number of studies (see, e.g. Behrman 1988; Thomas 1994) have shown that sons are favored in the intra-household allocation of nutrients, so the sons have better anthropometric outcomes. Ahmed (1990) has shown that in Pakistani society, the sons are favored in the intra-household allocation of resources. Burki and Shahnaz (2003:11) explained that boys get preference over girls in schooling in Pakistan because of their conventional role as chief bread-winner for the family. The first-ever explanatory variable, birth-order, of present study also shows the preference for sons' schooling. It depicts that first-born sons are more likely to go to school while first-born daughters are less likely to attend school (see also Emerson and Souza 2002:13 for Brazil). It may be explained in the case of Pakistan by segregation of household tasks by sex, where women and female children have overlapping household tasks of fetching water, collecting fuel wood, livestock care, and child care. The elder daughters usually help their mothers in household tasks.

We have found that probability for going to school for both sons and daughters increases by increase in their age at a decreasing rate, but sons are 24 percent more

likely to go to school by an incremental change in age, while daughters are 12 percent more likely to go to school. It means the first enrolment of daughters is more delayed as compared to sons. The school participation of sons is maximum at the age of 9.64 years, while for daughters it is at the age of 8.15 years.[2] It means that daughters are dropped out of the school earlier than boys. Similarly, the current years of education of sons and daughters have a positive impact on their probability to continue schooling. An incremental change in the years of education makes the sons continue schooling by 28 percent, while the girls by 8 percent. It reflects a stark gender disparity in the continuation of schooling, alternatively daughters are more likely to drop out from school than sons. The result is corroborated by the summary statistics, where average years of education of sons are 3.41 years and of daughters are 3.04 years. The possible explanation may be that, due to lack of facilities for secondary education, girls have to travel long distance to go to school. The problem for girls are augmented because of low value attached to female education coupled with severe restriction imposed on their movement after reaching the age of puberty.

3.2 Head of Household characteristics: It is found that headship of the head of household affects the son's and daughter's schooling in the same way, i.e. sons and daughters (separately) from the female-headed households are more likely to go to school. But the matriarchal households favor daughters' schooling slightly more than sons.

Age of the head of household indicates the stage in life cycle, which is generally expected to influence the schooling of sons and daughters. It is found that the sons'

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[2] The parameter estimates of CAGE (child's age) for sons are 0.0897 and CAGESQ (child's age squared) is –0.0046. For the daughters the CAGE=0.0455 and CAGESQ=-0.0027.

schooling is positively affected by the stage in life cycle of head of household. The older the head of household, the more likely it is that he/she will send the son to school. For the daughters, there is no significant result of life cycle of head of household.

It is found that education of the head of household[3] (as a continuous variable---number of years of education) enhances the prospects of the education of both sons and daughters (see also Lokshin et. al. 2000 for Kenya). It means there exists complementarities between the education of the head of household and sons' schooling, and education of head of household and daughters' schooling. The results further indicate an important notion that education of head of the household favors daughters' schooling more than the sons. The literacy status of the head of household (as a binary variable---whether head of household is literate or illiterate) has shown positive impact on sons' and daughters schooling. But sons from literate head of household are more likely to go to school as compared to daughters. Similarly, both the employment status and income level of the head of household impact both the sons' and daughters' schooling positively. The employment status of head of household supports the sons' schooling more than daughters. Similarly income of the head of household also supports the sons more than the daughters. It may be concluded that enhancing adult education, employment and income may be an important policy intervention for enhancing child schooling, but not for elimination of gender discrimination in child schooling. The explanation is that sons are viewed as assets worthy of investment for higher returns, and daughters do not promise any long-term financial returns to parents. However,

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[3] The explanatory variables like the education of head of household (HEDU), employment status of head of household (HEMP) and income level of head of household (HY) are likely to be endogenous and thus may result in biased estimation. We have applied the sensitivity test for the robustness of the results, i.e. by including and excluding the income of head of household (HY) the econometric estimates remained almost unchanged.

wittingly or unwittingly daughters are viewed as liability because of their marriage expenses (see also, Burki and Shahnaz 2003).

3.3 Parent Characteristics: Parental preferences may also be important in explaining gender differences in child schooling. Behrman (1988) argued that parents are generally averse to inequality among children. It is however difficult to have a direct measure of parental preferences and thus most of the existing evidence in this respect is of indirect nature. For instance, Kingdon (2002) used a variable relating to parental opinion about gender inequality in education and finds that girls whose parents believe in gender equality attained significantly more education than other girls. Furthermore, parental preferences may not always be converage, for example, mothers may have more empathy for daughters and fathers for sons. The sequential probit results of the present study show that parent education[4] (separately of fathers and mothers) have positive impact (as a continuous variable---number of years of education) on the sons and daughter's schooling but the impact on son's schooling is stronger than daughters. The sons are 6.3 and 4.7 percent more likely to go to school by an incremental change in years of education of fathers and mothers respectively, but the daughters are 2.7 and 3.6 percent more likely to go to school by the same kind of change for fathers and mothers. At this stage a question arises as to why does parents' education level (as well as head of household literacy status---head of household characteristics) favors sons' schooling? A possible explanation is that the returns from the education of sons are generally higher than of daughters and parents, who care about the human capital of all children, direct human resources to the children with the highest marginal returns (see also

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[4] We have included father's and mother's education, employment and income as explanatory variables by taking the sensitivity test (see footnote 3)

Kingdon 1998; 2002 for India)[5]. Alternatively, it may be that the opportunity cost of schooling is higher for daughters than for sons as, for instance, household activities are normally performed by daughters. Finally it could be that in many families it is the role of sons to take care of the parents when they are old. If this is so, both parents may prefer to ensure that their sons have higher human capital as compared to their daughters whose human capital returns may soon be shifted to another family through marriage. What is interesting to note here is that in the case of the sons, father's educational level has a higher effect on school attendance as compared to mother's educational level. On the other hand, mother's educational level has a larger effect on school attendance of daughters as compared to father's educational level. Thus the effect of parent's educational level on school attendance of children is stronger for a given sex than across sexes (see also Lillard and Willis 1994 for Malaysia; Kambhampathi and Pal 2001 for rural Bengal in India). The parent's education as a binary variable, i.e. literacy status of the parents (whether parents---separately father and mother--- are literate or illiterate) has shown positive impact on both sons' and daughters' school participation. The sons from literate fathers and mothers are 18 and 15 percent more likely to go to school respectively. The daughters from literate fathers and mothers are 13 and 16 percent more likely to go to school. It is obvious from the figures that literate parents are more particular about the education of children of their own sex. It suggests that within the household, father's literacy could lead to an advantage to sons' schooling and mother's literacy could lead to an advantage to daughter's schooling. It is obvious that educated women are better able to understand the ramifications of being educated. With the same bargaining power, there is a change

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[5] Duraisamy (2002) and Kingdon and Unni (2001) have found mixed evidence on returns to men and women's education. However, neither study could control for omitted family background bias, which substantially reduces women's returns but not men' (Kingdon 1998). Kingdon (1998) do not conform the worldwide pattern (see for instance Schultz 1993) for higher returns to women's education than mens'.

in preference of literate women, who encourage school attendance of their female children (see also Jayachandran 2002 for India; Emerson and Portela 2001 for Brazil). The result matches with a number of studies (see, e.g. Thomas 1994 for child health), which show that there exists intra-household gender bias in the allocation of resources with the mother favoring daughters and the fathers favoring sons. In the policy context, female adult education may be devised to eliminate gender discrimination in child schooling.

The present study finds that employment status of father and mother has a positive impact on son's and daughter's schooling, i.e. sons and daughters, separately, from the employed parents (father and mother separately) are more likely to go to school. The sons and daughters from employed father are 6.2 and 5.4 percent more likely to go to school. It means the father's employment supports son's schooling more than daughter's schooling. Similarly, the sons and daughters from employed mothers are 8.1 and 6.1 percent more likely to go to school separately. Again the son's schooling is supported more by mother's employment as compared to daughter's schooling. It is evident that impact of father's and mother's employment is stronger for sons as compared to daughters.

The mother's employment impact on daughter's education is weaker as compared to on sons' schooling. The possible explanation may be that, although the employment status of mothers positively affects the daughters' schooling, the impact is partially weakened by the fact that when mothers work outside the household, daughters (especially elder daughters) are often expected to stay at home to look after younger siblings and do household chores (Tiefanthaler 1997; Connelly 1996; Lokshin et. al. 2000).

3.4 Household Characteristics: The household characteristics are important to analyze the gender aspect of child schooling. There may persist some complex inter-relation between household resource constraint and household preferences in intra-household allocation of resources. Quisumbing (1993) argued that families with different land constraints have significantly different pattern of schooling investments resulting in inequality among girls' education. We have found that ownership of assets by the household has positive impact on the schooling of sons and daughters. If the household owns assets, sons are 6.3 percent more likely to go to school while daughters are 19.6 percent more likely to go to school. The positive relation of sons and daughters schooling with ownership of assets by household is due to the economic status of household. It is evident from the figures that daughters from households having assets are more likely to go to school as compared to sons. It means the households having assets are more inclined towards daughters' schooling. The possible explanation may be that households with assets at liberty to involve their boys in household enterprises, so the daughters are more likely to go to school as compared to sons.

Becker and Lewis (1965) argued that investment in the quality of children increases at higher levels of household income. There is also some evidence that the gender gap closes at higher levels of income, especially if households resources are constrained. On the other hand there is an evidence from South Asia that poor discriminate less against their daughters. It negates the hypothesis being that sharper resource constraints force poor parents to allocate resources to the more valued sons. Krishnaji (1997) and Murthi et. al. (1995) using district-level data from India found that the rich discriminate more than the poor (see also Das Gupta et. al. 1997 for South Korea). We have found that, as

the household income and household per capita income increase, the school participation of both sons and daughters increases. An increment of Rs.1000 in the household income enhances school participation of sons by 9.7 percent and of daughters by 3.6 percent. Similarly, an increase of Rs.100 in the household per capita income increases the school participation of sons by 0.08 percent and of girls by 0.04 percent.

There are striking differences in the effects of household's poverty on school enrolment of sons and daughters. The household poverty[6] impacts the schooling of the sons and daughters negatively. The sons from poor households are 9 percent less likely to go to school and daughters from such households are 29.9 percent less likely to go to school. It means that the poverty status of the household impacts the girls' schooling more severely. When a household's income, or per capita household income decreases or the household falls into poverty, the daughter's schooling is more severely affected. That is, the economic constraints affect the sons and daughters differently in their schooling decision. For families facing difficulties in survival, daughters' schooling may be considered much less critical. This is specially true in Pakistani setting, where girl's education does not prove beneficial to poor parents while boys' education may guarantee economic relief for such families.

Conceptually the household size is an important variable for school participation of children. Two alternative hypotheses are postulated. One is that, a larger household means a lower probability to go to school for both sons and daughters or lower probability for one of them, usually for daughters (Emerson and Souza 2002b:14 for Brazil) due to household income dilution effect. The other is that larger households

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[6] We have included the household income (HHY) and household poverty (HPOVTY) as explanatory variables in the model after taking sensitivity test (see footnote 3).

have more earning hands, therefore they are more likely to put their sons and daughters in school. We have included two types of explanatory variables in the model to analyze the impact of household size on sons' and daughters' schooling. They are (i) continuous variable, i.e. number of household members, and (ii) binary variable, i.e. whether the household is small (having maximum of 5 members) or large. It is found that an incremental change in family size decreases the schooling probability for sons by 3.6 percent while for daughters by 9.9 percent. The impact is more severe for daughters than sons, that is, as household size increases the daughters drop out of school earlier than sons. Similarly, if the family size is small, the daughters are 14 percent more likely to go to school, while the results are insignificant for sons.

The household composition can also render varying effects on household choice for school participation of boys and girls. Each household has different requirements for different members of the household for household chores. These household requirements are critical in determining whether the boy will attend school or the girl will, alternatively who will perform the household chore. This may be explained in the case of Pakistan by segregation of household tasks by sex, where men and boys work for wages generally and women and girls have household-tasks to do. We have found that the household composition exerts an impact on sons' and daughter's schooling. The impact depends on the number of children in the household, their age composition and gender. The number of children (up to the age of 15 years) in the household has shown a negative effect on schooling of school-age children. The effect is stronger for daughters than sons. That is, the larger the number of children in the household, the more likely it is for daughters than sons not to go to school. Similarly, the presence of school-age children (5-15 years) in the household decreases the sons' and daughters'

probability for schooling and the daughters are at more disadvantage. It is likely to be explained by greater demand for daughters for custodial care of younger children. The presence of male school-age children in the household decreases the schooling of both sons and daughters, but the presence of female school-age children decreases the schooling of daughters only.

It is estimated that the presence of prime-age siblings (16 years or above) in the household has shown the positive impact on the schooling probability of both sons and daughters. But it supports the sons' schooling more than daughters. The presence of male prime-age siblings in the household increases the schooling probability for both sons and daughters. On the other hand, the presence of female prime age siblings increases the school participation of girls only.

Locality of the households matters for sons' and daughters' schooling. We have estimated that from the urban households, both the sons and daughters are more likely to go to school than from rural households. The sons from urban households are 8.6 percent more likely to go to school as compared to rural households. The daughters for urban households are 18 percent more likely to go to school than those from rural households. It shows that rural-urban disparity is higher for daughters' schooling. It explains the fact that urban areas have adequate schooling facilities unlike in rural areas. It seems that cultural and religious norms shape the attitude of parents differently in urban and rural areas.

4. Conclusion:

The model and estimations we presented above allows us to analyze gender differences in the household for children's education. To test how differently various parameters

effect the schooling of children of different gender, we estimated our model separately for sons and daughters. We have found that school participation of sons and daughters is varied, which is linked to a combination of economic, social and cultural factors that shape the attitude of households, sometimes leading to gender bias in child schooling. Some fundamental causes are the low value attached to female education; restriction imposed on girl's movement after reaching the age of puberty; and poverty, adult literacy and larger family size which make the households behavior biased. It appears, in other words, that socio-cultural norms shape the attitude of households differently, which in turn are also reflected in their attitude towards female children's education.

One of the reasons for this bias relates to the traditional expectations of families that sons will provide them economic support after marriage. The other seems to relate to conservative socio-cultural norms, under which households favor restrictions on movement of girls, and thus have real reservations about female children traveling to attend school, where schools in their own vicinity are not available. It seems that awareness-raising strategies at the level of communities by local non-governmental organizations are likely to induce parents to increase female school participation.

Our study also points out the need to consider the supply side of schooling facilities when investigating household's behavior towards their children schooling. If certain facilities and institutions such as schools are not locally available and there are social taboos or difficulties about girls' use of non-local facilities, or if there are affirmative action policies in place for girl's participation in certain levels of education, household's behavior towards girls may be negatively biased not due to parental discrimination per se but rather due to these supply side conditions.

Our results have shown very significant gender bias regarding son's and daughter's schooling in Pakistan but explanations underlying this differential are not fully explored here. Gender differential could be due to son preference or due to an investment motive. The investment motive attributes to the children due to differentiated returns of sons and daughters. Differentiated returns may arise from dowry, differed labor returns of male and females, or patrilocal family structure (Rose 2000). Foster and Rosenzweig (2000) have found that where there are economic returns to women's human capital, parents do invest in girl's education. Further evidence on return to men and women's education in Pakistani labor market would be useful in analyzing whether gender bias in children's education is attributable to gender differentials in the return to education.

As expected from prior research, our results also confirm that households with educated parents (especially mothers) are better placed to appreciate the need and benefits of educating their children, and hence are more likely to enroll their children in school irrespective of their gender. As a policy perspective the adult education specifically of females is needed.

The results of this study indicate that in addition to increasing the future productivity of children, provision of urban utilities specifically education would likely produce the effects of allowing girl siblings to participate in school. Thus well-targeted rural programs may be seen as optimal economic investment that affects both the current and future welfare of households and children (specifically of girls).

Appendix A

Table-2 Summary Statistics and Probit Estimation for Sons

Variable	Mean	Standard Deviation	Probability Derivative	Parameter Estimates	T-Statistics
Constant	-	-	-1.8696	-10.2374	(-3.0329)
1. Child Characteristics					
BORD	2.08527	(1.0310)	-0.0016	0.9141	(-1.4671)*
CAGE	9.1938	(2.7812)	0.2409	1.3519	(4.03975)**
CAGESQ	92.2015	(52.4562)	-0.0121	-0.0846	(-4.6908)**
CEDU	3.4105	(2.5788)	0.2869	0.1569	(1.9046)**
2. Head of Household Characteristics					
HGEN	0.9794	(0.0734)	-0.1537	-1.2095	(-2.4873)**
HAGE	41.4268	(6.8954)	0.0384	0.2102	(1.4677)*
HAGESQ	1784.58	(579.58)	-0.0003	-0.2138	(-1.3436)*
HEDU	7.9302	(6.1226)	0.1694	6.4070	(10.5253)*
HLIT	0.5675	(0.5914)	0.2486	1.5289	(1.3245)*
HEMP	0.9147	(0.2803)	0.1121	0.6139	(1.1083)
HY	6031.39	(7617.87)	0.0193	0.1746	(1.6640)**
3. Parent Characteristics					
FAGE	42.2378	(7.6587)	0.0259	1.8176	(2.0861)**
FAGESQ	1891.92	(891.62)	-0.0343	-1.6443	(1.0471)*
FEDU	7.9147	(6.1416)	0.0737	1.0703	(0.5182)*
FLIT	0.6176	(0.5730)	0.1832	1.1283	(2.2465)**
FEMP	0.9147	(0.2803)	0.0627	0.1535	(2.3415)**
FY	5996.51	(7623.19)	-8.5949	-0.4705	(-0.1661)
MAGE	38.9172	(6.7401)	0.0652	1.3051	(1.5067)*
MAGESQ	1562.59	(526.49)	-0.1398	-1.1642	(-1.9537)**
MEDU	7.4573	(6.6930)	0.0477	0.1517	(1.9874)**
MLIT	0.4224	(0.6224)	0.1534	1.1147	(1.7628)*
MEMP	0.9023	(0.2557)	0.0815	0.4462	(1.9296)**
MY	2974.03	(3015.41)	0.0001	0.6371	(0.2846)
4. Household Characteristics					
ASST	0.8759	(0.3309)	0.0631	0.3459	(1.6273)
HHY	9877.63	(4361.67)	0.0971	1.4318	(2.7496)**
HHPCY	1720.62	(2088.29)	0.0008	0.4674	(1.8214)*
HPOVTY	0.4092	(0.5284)	-0.0916	-1.0628	(-1.7539)**
HHSIZ	6.4031	(1.7832)	-0.0362	-0.1986	(-1.8126)**
HHSSIZ	0.3720	(0.4852)	0.0405	0.2219	(0.4958)
NCHILD	3.4263	(1.3737)	-0.0552	-0.3021	(-1.6181)*
CHILD04	0.4418	(0.6835)	-0.0694	-0.3799	(-1.9733)**
BOY04	0.1924	(0.5409)	-0.1692	-0.3527	(-0.9765)
GIRL04	0.2143	(0.5457)	-0.1936	-0.8271	(-0.9254)
CHILD515	3.0000	(1.1792)	-0.0618	-0.5289	(-1.6339)
BOY515	1.9379	(0.9333)	-0.0509	-0.2789	(-0.6592)
GIRL515	1.0620	(1.0133)	0.0097	0.0536	(0.1339)
CHILD16	0.9491	(0.8941)	0.1854	1.2568	(2.6391)**
BOY16	0.3023	(0.5810)	0.0487	0.2669	(1.9595)**
GIRL16	0.3255	(0.6016)	0.0627	0.2332	(0.9569)
LOC	0.7241	(0.6754)	0.0863	1.2564	(1.5342)*

Log of Likelihood Function   -3274.4871

Number of Observation   6911

R-Squared   0.7553

Percent Correct Prediction   0.8296

** Indicates significant at 5 percent level and * indicates significant at 10 percent level.

Table-3 Summary Statistics and Probit Estimation for Daughters

Variables	Mean	Standard Deviation	Probability Derivative	Parameter Estimates	T-Statistics
Constant	-	-	-0.7515	-5.8396	(-1.4503)
1. Child Characteristics					
BORD	2.4770	(1.3023)	0.0019	-0.1492	(1.1580)*
CAGE	8.9082	(2.5910)	0.1207	0.9383	(2.0494)**
CAGESQ	86.0091	(50.7757)	-0.0674	-0.8462	(-3.2719)**
CEDU	3.0412	(2.569)	0.0803	1.6243	(3.5587)**
2. Head of Household Characteristics					
HGEN	0.9808	(0.0957)	-0.1824	-0.5128	(-1.9735)**
HAGE	41.3669	(8.9749)	0.0066	0.7150	(0.5333)
HAGESQ	1791.03	(671.0702)	-0.0001	-0.1347	(-1.0749)
HEDU	8.6146	(6.2448)	0.1842	5.6279	(1.4683)*
HLIT	0.5293	(0.7382)	0.2175	1.2306	(1.2963)*
HEMP	0.9541	(0.2101)	0.0482	0.3746	(0.9878)
HY	7646.78	(11250.46)	0.0018	1.444	(1.2971)*
3. Parent Characteristics					
FAGE	42.2561	(8.3124)	0.0456	0.9747	(1.9743)**
FAGESQ	1869.63	(783.75)	-0.0237	-0.8409	(-1.0541)
FEDU	8.5963	(6.2688)	0.0274	5.4896	(1.4568)*
FLIT	0.6937	(0.6547)	0.1386	1.2147	(2.8739)**
FEMP	0.9541	(0.2101)	0.0543	0.5059	(1.9643)**
FY	7851.37	(11247.82)	0.0017	0.1385	(1.8491)**
MAGE	39.5672	(6.9616)	0.2385	1.4694	(1.0098)
MAGESQ	1597.39	(624.95)	-0.2156	-0.5136	(-0.9564)
MEDU	7.4954	(6.6647)	0.0696	0.6539	(1.5156)*
MLIT	0.5276	(0.7548)	0.1639	1.1213	(1.6286)*
MEMP	0.9449	(0.2291)	0.0610	0.4747	(0.5718)*
MY	3627.06	(5421.18)	-0.0004	-0.3686	(-0.9805)
4. Household Characteristics					
ASST	0.8715	(0.3361)	0.1961	1.5238	(3.3957)**
HHY	10684	(4872.87)	0.0362	1.3082	(1.4813)*
HHPCY	2114.61	(3601.27)	0.0004	0.3409	(1.2781)*
HPOVTY	0.3386	(0.4854)	-0.2995	-1.5942	(-2.4564)**
HHSIZ	6.8807	(1.7623)	-0.0995	-0.7734	(-1.3752)*
HHSSIZ	0.3119	(0.4654)	0.1407	1.0938	(1.1865)**
NCHILD	3.9541	(1.4362)	-0.0346	-0.2694	(-0.5737)
CHILD04	0.4311	(0.6578)	-0.0303	-0.2357	(-0.3551)
BOY04	0.2386	(0.5287)	-0.0648	-0.6721	(0.8743)
GIRL04	0.2343	(0.4765)	1.7675	1.2942	(0.0975)
CHILD515	3.5504	(3.5504)	-0.0954	-0.0764	(-1.9635)**
BOY515	1.5137	(1.1754)	-0.0283	-0.6455	(-0.0902)**
GIRL515	2.0367	(1.0357)	-0.0857	-0.6660	(-0.9109)
CHILD16	0.8654	(0.9876)	0.1765	1.4220	(1.9432)**
BOY16	0.3211	(0.6509)	0.0946	0.7355	(1.2643)**
GIRL16	0.3201	(0.6365)	0.0395	0.3072	(0.4888)*
LOC	0.7532	(0.6423)	0.1823	1.0234	(1.6295)*

Log of Likelihood Function -2242.48
Number of Observation   6655
R-Squared   0.6874
Percent Correct Prediction   0.9125

** Indicates significant at 5 percent level and * indicates significant at 10 percent level.

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