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What Accounts for the Education Gender Gap in Pakistan's Khyber Pakhtunkhwa Province?

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Abstract

There are competing explanations for the persistence of the education gender gap in Pakistan's Khyber Pakhtunkhwa Province (KPK). Three reasons are given for this persistence, specifically parental and societal attitudes opposed to girls' education and women's employment outside the home; a lack of both family and public resources; and low labor market returns to women's education. We seek to contribute to this debate by analyzing the results of a survey of a random sample of 642 families in the Dir District of KPK with a high-school-aged girl that attended at least some primary school. Our study shows that guardians of a high school aged girl, irrespective of the guardian's gender, report very strong support for girls' education and for women's careers outside the home. These findings contradict the widespread belief that the persistence of the education gender gap in KPK is due to parental or societal attitudes opposed to girls' education and women's careers. Rather than parental attitudes opposed to girls' education, respondents report that the lack of family resources is an important impediment to girls' school attendance. To test the authenticity of the expressions of strong support for girls' education, we examine the ability of the survey responses to predict girls' school attendance beyond the 5th class by estimating a model of the determinants of girls' school attendance beyond the 5th class.

Keywords: girls' education, women's employment, education gender gap

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1. Introduction

According to the academic literature, there are three broad benefits from women's education: humanistic, societal, and economic. Janzen (2008), King and Hill (1997), Patel (1998), Rezai-Rashti and Moghadam (2011), and Ross et al. (2012) conclude that the humanistic benefits of women's education include increasing her sense of empowerment and self-esteem which enhances her ability to exercise her rights and responsibilities. Duflo (2012), Glewwe (1999), King and Hill (1997), Pervaiz et al. (2011), Rezai-Rashti and Moghadam (2011), and Shapiro (2012) find that the societal benefits of women's education include lower fertility rates, lower infant mortality rates, lower maternal mortality rates, improved children's health and nutrition, and increased child educational attainment. In addition to the humanistic and societal benefits of women's education, Aslam (2006), King and Hill (1997), and Pervaiz et al. (2011) provide evidence that there is an inverse relationship between a country's education gender gap (EGG) and the productivity of labor. Accordingly, a reduction in the EGG increases the productivity of labor which results in an increase in the rate of economic growth.

For these reasons, many believe that improving women's education is an important developmental goal. Despite investments aimed at increasing girls' school attendance, there are substantial and persistent EGGs in many developing countries, including the rural areas of Pakistan. The academic literature is divided on the reasons for the persistence of the EGG in Pakistan's Khyber Pakhtunkhwa Province (KPK). Generally speaking, the debate focuses on parental and societal attitudes opposed to girls' education; a lack of both family and public resources for girls' education, including a greater distance to female schools, a lack of separate sanitation facilities, of female teachers, and of gender segregated classrooms; and low labor

market returns to women's education.[1] The purpose of this study is to investigate the obstacles to girls' school attendance in KPK.

Certainly, Pakistan's EGG has not gone unnoticed by the central government and international development agencies, which have invested significantly in Pakistan's education system, with some projects specifically promoting girls' school attendance. These investments include enrollment campaigns, the Punjab Women's Empowerment Package, the National Education Policy, incentive-based programs, and flexible community schools.[2] The primary targets of these investments are increasing school accessibility and returns to women's education. Despite these investments, there is a substantial and persistent EGG in KPK.

Many apparently believe that societal and parental attitudes opposed to girls' education and women's employment outside the home are to blame for the persistence of the EGG in Pakistan. The media's portrayal of the attempted assassination of Nobel Laureate Malala Yousafzai and the Taliban insurgency in KPK help promote such beliefs. Nor are such beliefs limited to the public imagination. In an important study, Purewal and Hashmi (2014, p. 16) conclude that "[n]egative attitudes towards female education are a root cause of the low educational levels of girls in rural Pakistan." The debate about the root causes of the EGG is not merely of academic interest. To reduce the EGG, public policy must address the actual as opposed to the perceived obstacles to girl's school attendance. If, for example, there are strong parental attitudes opposed to girl's school attendance or women working outside the home, devoting more public resources to improving girls' access to schools may not be effective in reducing the EGG. On the other hand, girls may not attend school because the quality of schools

[1] See, for example, Burde and Linden (2012), Chaudhury et al. (2006), Gertler and Glewwe (1992), Kremer et al. (2005), Lokshin and Sawada (2001), Memon (2007), Muralidharan and Sundamaran (2011), and Qureshi (2004).
[2] For further details on these programs, see Chitrakar (2009), Government of the Punjab (2012), SDPI (2008), and Ismail (1996).

is poor. Ironically, policy-makers may fail to devote sufficient resources to girls' education because they may hold mistaken beliefs that parents are opposed to girls' school attendance. In contrast, girls and their parents may not invest in a girls' education if the market return to women's education is too low. For public policy to be effective in addressing EGGs, it is crucial to have a deep contextual understanding of the circumstances prevailing in a given country. In fact, the obstacles to girls' school attendance may differ from country to country or even among regions within a country.

To gain a better understanding of the obstacles to girls' school attendance in KPK, we conduct a survey of a random sample of 642 families in the Dir District of KPK with a high school aged (HSA) girl that attended at least some primary school. The Dir District was chosen because there has been considerable Talibanization and civil unrest in this district, and for this and other reasons, it is perceived to be particularly unfavorable for girls' school attendance compared to some other districts in KPK.

The survey was conducted in October 2014 and was administered through face-to-face interviews of the HSA girl's guardian in the local language. We employed both male and female enumerators in order to get the perspective of both male and female guardians towards girls' education and women's employment outside the home. To better understand the barriers to girls' school attendance in KPK, the survey queried respondents about household characteristics, attitudes toward education in general, attitudes toward girls' education in particular, attitudes toward women having careers outside the home, and reasons for the girl's nonattendance.

One of the most intriguing findings of this study is that respondents, irrespective of their gender, report very strong support for girls' education and women's careers. These findings contradict the seemingly widespread belief that the persistence of the EGG in KPK is due to

parental or societal attitudes opposed to girls' school attendance. Similarly, we find strong support for women pursuing careers outside the home. Therefore, societal norms opposed to women's careers do not appear to be a serious impediment to women participating in the labor force. According to our sample of respondents, family resources appear to be a major impediment to girls' school attendance.

The remainder of this article is organized as follows. The next section is a brief review of the literature on the determinants of girls' education in rural Pakistan. The subsequent section describes the sample design and survey instrument. Section 4 summarizes the main survey findings, and the final section concludes.

2. Brief review of the literature

The literature on the demand for girls' education in Pakistan is relatively sparse. Burde and Leigh (2013) provide evidence that village-based schools can eliminate the EGG. They conduct a randomized control trial in Northwest Afghanistan. They find that the provision of village-based schools increases girls' enrollment by 52 percentage points, which virtually eliminates the EGG, and increases girls' average test score by 0.65 standard deviations. In contrast, boys' enrollment increases by 35 percentage points, and average test scores increase by 0.40 standard deviations. They (Burde and Leight 2013, p. 37) conclude, "[t]he very fact that enrollment rates equalize in the treatment group suggests that demand for primary education is the same for both genders, as long as the school is place in the village." This result provides indirect evidence that traditional attitudes toward woman's role in society may not be as serious an obstacle to girls' education as some believe.

Using the Pakistan Integrated Household Survey (1991), Holmes (2001) reports that mother's educational attainment exerts a larger impact on daughters' education and father's

educational attainment exerting a stronger impact on son's education. Household wealth and male wages have a stronger impact on daughters' than sons' education. She also concludes that money would be better spent increasing access to middle and secondary schools because distances to middle and secondary schools are a significant determinant of final schooling level.

Purewal and Hashmi (2014) examine the relationship between the returns to girls' education in rural Punjab, Pakistan and parental attitudes toward girls' education. Using a survey of 350 households collected in 2011 in rural areas of the districts of Faisalabad and Chiniot in the providence of Punjab. They find that the population is split on their attitudes toward girls' education. More specifically, 52.0 percent of the respondents believe that education should be biased in favor of boys; whereas, 46.3 percent report believing that education should be unbiased. In addition, 52.3 percent of the respondents agree with the statement that "schooling causes girls to be rebellious towards parents," and 49.1 percent agree with the statement that "schooling encourages bad practices among girls." They (Purewal and Hashmi 2014, p. 16) conclude that "[t]he preoccupation with 'rebelliousness' and 'bad practices' that education evokes for rural society in Pakistan exhibits the obstacles to overcoming gender disparity in enrolment, attainment, and literacy when girl's education is societally viewed with suspicion."

In sum, the literature on the determinants of the demand for girls' education in rural Pakistan show that parental attitudes toward girls' education, distance to school, and household wealth play important roles. In addition, Purewal and Hashmi (2014) conclude that the household responses are sensitive to framing and advocate for using "leading" questions.

3. Sample design and the survey instrument

By way of background, KPK lies in the northwest region of Pakistan. The majority of KPK's inhabitants are Pashtuns, Hazarewal, Chitrali, and Kohistanis. KPK has a significant and

persistent EGG, with only 59 percent of girls aged six through ten enrolled in primary school, compared to 72 percent of boys in this age group. This is an EGG of 13 percentage points. As shown in Table 1, male literacy rates greatly exceed that of females in KPK. The Pashtuns of KPK practice *purdah* (seclusion of women), which may influence parental and societal attitudes toward girls' school attendance; the resources devoted to girls' education; and the market returns to women's education.

The target region for the survey is the area bordering Upper and Lower Dir. This area was selected because it is a blind spot between the highly pro-female education areas of Chitral and Malakand districts in KPK. This area also lies in the Taliban affected Swat District and Bajaur Agency in the east and west, respectively. Many girls' schools in this region were damaged or destroyed during the war on terror in KPK. Due to social and economic forces in Dir, the overall environment would seem to be particularly unfavorable to girls' school attendance. In short, the target area provides an interesting case study for determining whether parental attitudes opposing girls' education is the root cause of the substantial and persistent EGG in KPK.

We constructed a random sample of families with a HSA girl in the following manner. The Education Department of KPK provided us with a list of girls' high schools in the Dir District. Seventeen high schools were randomly selected from this list. We contacted the administrators of these high schools and asked them to identify the feeder schools from which their high school received students. Then, the administrators of the feeder schools were contacted and asked to provide a list of villages from which they draw their students. This formative research helped to identify the exact reach of each of the 17 high schools in the sample.

A random sample of families was drawn from the student registries from the previous three years. Between the 23rd of October, 2014 and the 27th of October 27, 2014, door-to-door surveys were carried out in the sample villages. A minimum of 40 families or the maximum number of qualified families was selected from each village. For purposes of this survey, only one respondent and one HSA girl was selected from each household. To get a balanced gender ratio among respondents, male and female enumerators were employed in approximately equal numbers to administer the surveys. This strategy allows us to examine whether female guardians hold different views than male guardians. Since the sample does not include respondents whose HSA girl never attended school, we expect that the respondents generally have a more favorable attitude toward girls' school attendance than the general population of Dir District.

The survey instrument consists of three sections. The first section collects information about the demographic profile of the respondent, including information about the respondent's relationship to the child as well as the respondent's education level, ethnic group affiliation, length of residence in the village, and several measures of household wealth (e.g., own a vehicle, own land, own home). The survey also gathers information on the child's means of transportation to school and the distance from the child's home to the nearest high school. Furthermore, we also collect information on the number of and ages of the other children under eighteen residing in the family residence. The second section concerns the respondent's attitudes toward education. Respondents are asked to indicate on a scale from one to five how strongly they disagree or agree with statements about education in general, boys' education, and girls' education in particular. The statements used to elicit a guardian's attitude toward girls' education are posed in a variety of ways to account for potential framing effects. The third section asks whether the HSA girl is currently attending school beyond the 5th class. If the respondent

answers affirmatively, the survey requests information on how often the girl attends school, why she attends, and reasons for her absence from school. For the girls that are not attending school past the 5th class, the survey asks about the reasons for her nonattendance. An English language version of the survey instrument is provided in an Appendix to this article; an Urdu version can be provided upon request.

To ensure that the survey protocols were correctly implemented, enumerators provided photographic evidence from the field. We also arranged for random field checks of completed surveys, which were conducted by field supervisors recruited from the faculty of the University of Peshawar. Finally, random spot checks were conducted by personnel from the Monitoring and Evaluation Directorate of the Government of KPK. Based on these three independent sources of information, we are confident that the survey was carried out as prescribed by the survey protocols.

4. Summary of findings

We begin by discussing the sample statistics for key variables, including differences in responses according to the respondent's gender. Then, we discuss the distribution of attitudes towards girls' education and women working outside the home. We proceed by investigating the reasons given for girls' nonattendance beyond the 5th class, including interesting differences given for nonattendance by gender of the respondent. We conclude this section by estimating a mixed-process, simultaneous equations model (SEM) of the determinants of girls' school attendance beyond the 5th class.

4.1 Descriptive statistics

A total of 642 families participated in the survey. Table 2 provides sample statistics for the full sample, as well as for the subsamples of male and female respondents. More specifically, 100 percent of the respondents are Pashtuns. Approximately 39 percent of the respondents report being the mother of the HSA girl, and 49 percent, the father. Grandfathers account for 11 percent of the sample. The remaining 1 percent has some other relationship to the HSA girl. In sum, approximately 40 percent of the respondents are female and 60 percent male. Approximately half of the respondents report that they did not attend secondary school. Approximately 28 percent of the sample report being farmers; 22 percent laborers in the Gulf States; and 36 Housewives. In terms of reported wealth, 25 percent report owning an automobile; whereas, 88 percent report owning less than 2 acres of land. The demographic characteristics of the sample reveal that the respondents on average have low levels of formal education and of wealth. This is generally consistent with the demographic characteristics of this region.

There are some interesting and statistically significant differences at conventional levels in the descriptive statistics, according to the gender of the respondent. In particular, female respondents are approximately five years older than male respondents. Furthermore, female respondents are more likely to have no formal education than male respondents; whereas, male respondents are more likely to report attending at least some high school than female respondents. Interestingly, female respondents are more likely than male respondents to report having attained some middle-school education as their highest level of education. However, male respondents are more likely to report having attended at least some high school as their highest level of education. Thus, the differences observed between female and male respondents at the middle-school level may be due to some females dropping out at the middle-school level while

more males continue with their schooling to attend some high school or beyond. These observations are consistent with the observed EGG in this region of Pakistan.

The differences in reported occupations by gender are to be expected. Interestingly, there is no statistically significant difference at convention levels in the proportion of females and males reporting that they are civil servants. Ironically, this may reflect the separation of males and females. Since girls do not attend school with boys, there must be qualified female teachers to staff girl schools and similarly for female doctors. Female respondents are more likely to report owning no land; whereas, male respondents are more likely to report owning land for every category greater than no land. Male respondents are more likely to report that the HSA girl walks to school than are female respondents. There is no statistically significance difference at conventional levels in reported home ownership, distance to school, or whether the HSA girl attends school beyond the 5^{th} class.

4.2 Attitudes towards girls' school attendance

On the whole, the respondents report strong support for girls' education. We solicited the respondent's attitude towards girls' education in a variety of different ways to control for potential effects based on the framing of the survey question.

We begin by asking respondents whether they strongly disagree, disagree, are undecided, agree, or strongly agree with the statement, "I believe that education is important." Figure 1a (see Appendix for all figures and tables) shows that over 90 percent of the respondents either agree or strongly agree with this statement. Respondents are then asked their reaction, using the same 5 point Likert scale, to the statement, "I believe that education is important for female children." Figure 1b shows that the responses are very supportive of girls' education, with 89 percent either agree or strongly agree with the statement. In Figure 2a, the responses are divided by gender of

the respondent. This figure shows that while most respondents agree that education is important for girl children, female respondents appear to agree more strongly with this statement; 65 percent of female respondents versus 46 percent of male respondents strongly agree with this statement.

Since it is possible that people may be in favor of girls' education in general but not in the particular case of their own HSA girl, we also elicit the respondent's attitude in a more personalized manner. Figure 1c shows that over 90 percent of the respondents either agree or strongly agree with the statement, "I encourage (name of child) to attend school." Regarding differences by gender, female respondents are more likely to strongly agree with this statement, as shown in Figure 2b; 75 percent of female respondents versus 57 percent of male respondents strongly agree with the statement. While both parents appear to encourage a girl child to attend school beyond the 5^{th} class, mothers seem to be somewhat more encouraging. Although the female respondents in this sample have less education than the sampled male respondents on average, the female respondents are more likely to report encouraging HAS girl to attend school.

Finally, we ask respondents to react to the statement, "I believe that education is important only for the male child." Figure 1d shows that over 90 percent of the respondents either disagree or strongly disagree with this statement. Female respondents are more likely to strongly disagree rather than simply disagree with this statement than male respondents, as shown in Figure 2c; 73 percent of female respondents versus 51 percent of male respondents strongly disagree with this statement. Again, female respondents seem to be more strongly in favor of girl child education than male respondents. Overall, there is considerable consistency in the responses to these statements. Taken in their totality, respondents express strong support for girls' school attendance and girls' education.

Furthermore, our sample of respondents report that members of their village support girls' school attendance beyond the 5th class. Regarding the statement, "In my village, people believe that it is important for female children to attend school beyond the 5th class," Figure 3 shows that over 90 percent of the sample report that they either agree or strongly agree with this statement. This statement not only gauges individual perceptions of societal attitudes toward girls' education, but it also provides a check on the authenticity of responses to the previous statements regarding their support for girls' school attendance and girls' education. If for some reason a respondent is reluctant to report that they are opposed to girls' education (school attendance), they may be more willing to report that members of their community are opposed to girls' education (school attendance). The fact that there is consistency between individual attitudes toward girls' education (school attendance) and individual perceptions of village-wide attitudes toward girls' school attendance is reassuring.

As reported in Figure 4, 93 percent of respondents report that they either disagree or strongly disagree with the statement, "[i]n my village, people believe that women should not have careers." Nearly every respondent reports that they do not believe that the community is opposed to women pursuing careers.

Parents express strong support for girls' education (school attendance). Despite our best efforts to expose potentially inauthentic responses by varying the statements, we cannot unequivocally rule out the possibility that respondents are misrepresenting their attitudes toward girls' education (school attendance). Given the violence directed at girls attending school and the destruction of girls' schools, the incentives would appear to incline respondents to falsely report opposing girls' education (school attendance), rather than falsely reporting that they support girls' education (school attendance).

As previously noted, the sample does not include respondents who never sent their HSA girl to school. Therefore, the sample is likely to be more favorably inclined toward girls' education, and by extension, more favorably inclined towards women having careers. However, our sample of respondents also reports believing that members of their village are favorably inclined toward women's careers. In sum, the respondents in our sample report a favorable attitude toward girls' education (school attendance) and toward women pursuing careers. This is in sharp contrast to widely held beliefs that the primary deterrent to girls' education (school attendance) in this region of Pakistan is parental and societal attitudes opposed to girls' education (school attendance) and women pursuing careers.

For those HSA girls attending school beyond the 5th class, Figure 5 shows the guardians' perceptions of the HSA girls' school attendance rate. To qualify for the girls' stipend of PKR 200 (US $2.00) per month for attending school beyond the 5th class, her attendance rate must exceed 80 percent. Approximately 70 percent of the guardians in our sample report that the HSA girl exceeds the threshold attendance rate to qualify for the girls' stipend, and nearly 90 percent report that she attends school more than 50 percent of the time.

4.3 Reasons HSA girl does not attend school beyond the 5th class

For those respondents who report that their HSA girl is not attending school beyond the 5th class, Figure 6 shows the frequency distribution of the reasons given for her nonattendance. The most common reasons given for her nonattendance include the following: she is needed at home to do chores; she is needed at home to take care of younger children; the school is too far away for her to get there; and she doesn't like school.[3] Needing the girls to stay at home to take

[3] While many respondents said the girl child needed to stay home to care for younger children, only 25 percent of these respondents had at least one child five years old or younger at home. Thus, these results could be exaggerated if the respondent felt that the enumerator expected a positive response and wanted to please the enumerator.

care of younger children and/or to do household chores may reflect a lack of family resources. The fact that the school is too far away for her to get there may reflect a lack of investment in girls' education by the government. While one cannot say for sure why some girls do not like school, it may reflect a lack of public investment in girls' education, such as poor infrastructure, teacher absence or low quality instruction, lack of books and supplies, and lack of sanitary facilities.

While the reasons cited above are the most common reasons cited for nonattendance, the primary reasons vary according to the gender of the respondent. With the exception of needing the child at home to do chores, female respondents tend to choose more "emotional" reasons for the girls' nonattendance; whereas, male respondents tend to choose more "practical" reasons. In regards to chores, 54.3 percent of female respondents choose this response as opposed to 27.3 percent of male respondents. Since most of the female respondents report being housewives, they are most likely the family member in charge of the household chores and may be more likely to see household chores as a valid reason for keeping the HSA girl at home. Also, the male guardians may not pay attention to chores since they are more likely to be working outside the home.

Otherwise, female respondents are more likely to report the girl does not attend school because she does not like school (27.6 percent of female respondents versus 8.4 percent of male respondents); she does not feel like she fits in with the other students (15.7 percent of female respondents versus 4.9 percent of male respondents); and girls from her family and/or village do not attend high school (3.1 percent of female respondents versus zero percent of male respondents). As few respondents say that girls from their families and/or villages do not attend

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However, the possibility also exists that the girls were caring for children over five years old or they were caring for other children (possibly relatives) who did not live in their home full time.

high school, we focus on the other two choices that differ significantly from the responses of male respondents. These two responses have more to do with the girl's personal preference and her feelings toward school. Further, male respondents are more likely to report that the HSA girl does not attend school because the school is too far away for her to get there (25.2 percent of male respondents versus 7.9 percent of female respondents); the school is in bad condition (11.9 percent of male respondents versus 0.8 percent of female respondents); the family cannot afford to educate her further (8.4 percent of male respondents versus 2.4 percent of female respondents); she has concerns about her personal safety (7.7 percent of male respondents versus 0.8 percent of female respondents); her school is unsafe (6.3 percent of male respondents versus zero percent of female guardians); and the teacher is often absent (2.8 percent of male respondents versus zero percent of female respondents). All of these reasons point towards the practicalities and usefulness of attending school. While it may be that girl children are more likely to divulge their dislike of school to their mothers, respondents are instructed to select all reasons that apply to their child's situation. Thus, if mothers believe that these practical reasons are valid, we would expect female respondents to select "practical" reasons as well as the "emotional" ones. However, fathers are more likely to choose the practical as opposed to the emotional reasons.

Another interesting aspect of these results is the implied discord between male and female respondents. These differences suggest the male and female guardians may not have discussed their girl child's school attendance thoroughly or that they disagree about the reasons their girl child does not attend school. Given these results, it appears females and males in this region of KPK may use different criteria in determining whether a girl child should attend high school. If the government undertakes a public awareness campaign to promote girl's school

attendance, this finding may have important implications for the conduct of such a campaign. The results suggest that male guardians may be more responsive to improvements in school quality, safety, and distance, while female guardians may be more responsive to changes in school curriculum and environment.

4.4 Modeling girls' school attendance

Next, we further investigate the authenticity of the respondents' reported support for girls' school attendance by examining whether their responses have predictive power. We estimate the following mixed process, simultaneous equation system:

$$y_{i1}^{*} = f_1\left(y_{i2}, X_{i1}\right) + \varepsilon_{i1} \quad (1)$$

$$y_{i2}^{*} = f_2\left(y_{i3}, X_{i2}\right) + \varepsilon_{i2} \quad (2)$$

$$y_{i3}^{*} = f_3\left(X_{i3}\right) + \varepsilon_{i3} \quad (3)$$

Where:

y_{i1}^{*} is a latent variable measuring the probability that the HSA girl attends school beyond the 5th class;

y_{i2}^{*} is a latent variable measuring the guardian's intention to encourage the HSA girls to attend school beyond the 5th class; and

y_{i3}^{*} is a latent variable measuring the guardian's support for girls' education.

Furthermore, the unobserved latent variable y_{ij}^{*} (j = 1, …, 3) is transformed into an observed indicator variable y_{ij} by a link function $g_j(y_{ij}^{*})$ as follows:

$y_{i1} = g_1(y_{i1}^*) = 1$ if the HSA girl i attends school beyond the 5th class, and zero otherwise;

$y_{i2} = g_2(y_{i2}^*) = 1$ if the guardian strongly disagrees with the statement, "I encourage my girl to attend school beyond the 5th class", …, and $y_{i2} = g_2(y_{i2}^*) = 5$ if the guardian strongly agrees with the statement; and

$y_{i3} = g_3(y_{i3}^*) = 1$ if the guardian strongly disagrees with the statement, "I believe that education is important for female children", …, and $y_{i3} = g_3(y_{i3}^*) = 5$ if the guardian strongly agrees with the statement.

X_{ij} (j = 1,…, 3) is a vector of predetermined random variables, and

$\varepsilon_{ij}|X_{ij} \sim$ i.i.d. N(0,Σ), where $\Sigma = \begin{pmatrix} 1 & \rho & \varphi \\ \rho & 1 & \psi \\ \varphi & \psi & 1 \end{pmatrix}$.

Equation 1 is a Probit regression, and (2) and (3) are Ordered Probit regressions. We estimate this mixed-process, simultaneous equations system, using Maximum Likelihood (ML) Seemingly Unrelated Regression (SUR). Pagan (1979) and Roodman (2011) show that ML SUR is equivalent to a Limited Information Maximum Likelihood (LIML) estimator. Gao and Lahiri (2000) show the superiority of the LIML estimator over the Two-Stage Least Squares (2SLS) estimator in the sense that the former is median unbiased while the latter is not.[4]

The estimates of the system of equations (1) – (3) are reported in Table 4. Beginning with the Ordered Probit equation for the statement (3) "Education is important for females," which is reported in the third panel of Table 4, we assume that this is a taste variable. We further assume that such tastes are explained by the demographic characteristics of the respondent. In this equation, we include the respondent's relationship to the HSA girl (mother = 1; zero otherwise),

[4] If the structural equation is just identified, which is not the case in our application, then ML SUR and 2SLS are equivalent to the LIML estimator.

respondent's age, and a dummy variable for respondents with more than a high school education (= 1; zero otherwise). In the column labelled "Model 1," which is our preferred specification, we see that the estimated coefficients are positive and statistically significant at conventional levels. For example, a female respondent is more likely to agree with the statement "Education is important for females" than a male respondent.

To address concerns about the linear specification of age in this equation, we also estimate a version of this equation with a quadratic specification of age. The estimates for this specification are reported in the column labelled "Model 2". A quadratic specification of age renders age and age-squared statistically indistinguishable from zero. Otherwise, the quadratic specification has little effect on the size and statistical significance of the remaining estimates coefficients.

Turning now to the Ordered Probit equation for the statement (2) "I encourage my daughter to go to school," we include the observed responses to statement (3), as well as variables that explain the ability of the family to send their HSA girl to school. More specifically, we include a dummy variable if the family has children under the age of five years old, a vector of dummy variables for occupation, and a vector of dummy variables for household measures of wealth, namely ownership of a vehicle and ownership of land.

The estimated coefficients of the responses to statement (2) are reported in the middle panel of Table 4. The response to statement (3) has a positive and statistically significant effect at conventional levels on the probability that the respondent encourages their daughter to go to school. In terms of occupation, the estimated coefficients of the dummy variables for civil servant, housewife, and unemployed/student are positive and statistically significant at conventional levels relative to the omitted occupation, which is farmer. The estimated

coefficients of the dummy variables for own a bicycle and for own a motorcycle are negative and statistically significant at conventional levels, relative to the omitted category, which is own an automobile. This suggests that high income or high wealth households are more likely to encourage their daughters to go to school beyond the 5th class. In contrast, the estimated coefficient of the dummy variable for owning some land but less than 2 acres is positive and statistically significant at conventional levels; whereas, the estimated coefficient for owning more than 8 acres of land is negative and statistically significant at conventional levels. This suggests that "rich" farmers are less likely to encourage their HSA girl to attend school. The omitted category in this case is owns no land.

Finally, the Probit equation for the statement "HSA girl attends school beyond the 5th class," which is reported in the upper panel labelled (1), we include variables that influence the daughter's decision to attend school, namely the observed response to the previous statement, distance to school in kilometers, a dummy variable equal to one if she walks to school, and a dummy variable equal to one if the family has a child under the age of five years old. We also include a vector of dummy variables for the school to control for unobserved characteristics of the schools.

The observed response to statement (2) "I encourage my daughter to attend school" has a positive and statistically significant effect at conventional levels on the probability that the HSA girl will attend school beyond the 5th class. As expected, walks to school and distance to school have a negative and statistically significant effect on the probability that the HSA girl attends school beyond the 5th class. The estimated coefficient of the dummy variable for a child under age five years old is indistinguishable from zero at convention levels of significance.

In Model 3, we exclude from equation 3 the dummy variable for having a child under the age of five years old. We see that the magnitude and significance of the remaining estimated coefficients are unchanged. Most importantly, the estimated coefficient of the dummy variable for having a child under age five years old in equation (2) remains statistically indistinguishable from zero. Although respondents, particularly female respondents, indicate this is a major reason for the HSA girl not attending school beyond the 5th class, it appears to have no effect on the probability of school attendance.

We believe that the system of equations (1) – (3) is a plausible model of the determinants of girls' school attendance beyond the 5th class. The estimated coefficients have the expected signs and are statistically significant at conventional levels of significant. More specifically, the response to the statement "I think that education is important for female children" has a positive and statistically significant effect at conventional levels on the guardian's response to the statement "I encourage my daughter to go to school," and, in turn, the response to the latter statement has a positive and statistically significant effect at conventional levels on the probability of the HSA attending school beyond the 5th class. These results give us some assurance that the reported attitudes toward girls' school attendance, and girls' education are authentic.

Taken as a whole, the model suggests that parental attitudes toward female education is an important determinant of whether she attends school beyond the 5th class. In addition, the model suggests that family resources, distance to school, and whether she walks to school are influential determinants of girls' school attendance beyond the 5th class.

5. Conclusion

We find little evidence of widespread disapproval of girls' education and school attendance in the Dir District of KPK. In fact, our results seem to indicate that the residents of Dir generally have moderate to strongly favorable attitudes towards girls' education. Furthermore, respondents feel that their neighbors share these positive sentiments. Asking about neighbors allows us to consider residents who presently do not have an HSA girl child. Given these results, we are able to better understand the reasons for the large education gender gap.

As many respondents cited financial constraints on their girl child not attending school, the evidence seems to point towards economic, rather than cultural, constraints creating the education gender gap in the Dir District. Specifically, respondents are most likely to cite their need for the girl child to do housework as the reason for nonattendance. If families had greater financial resources, they could utilize outside services to help with the chores and childcare, thus enabling the girl child to have time to go to school. Additionally, many respondents said that the girl child did not like school or that she had trouble arriving at school. Difficulty arriving at school is likely a matter of lack of financial resources and/or lack of available girl schools. If families had more money, they would be better able to procure transportation to school for their girl child. Furthermore, increasing funding and subsequently building more girl schools would make transportation to school easier. In terms of the girl child not liking school, these results are more difficult to interpret. While increasing funding to girl schools may help with this issue, more research should be done to ascertain what aspects of the girl schools need to be improved. Overall, the impediments to closing the gender gap seem to err on the side of economic constraints rather than sociocultural resistance.

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Appendix

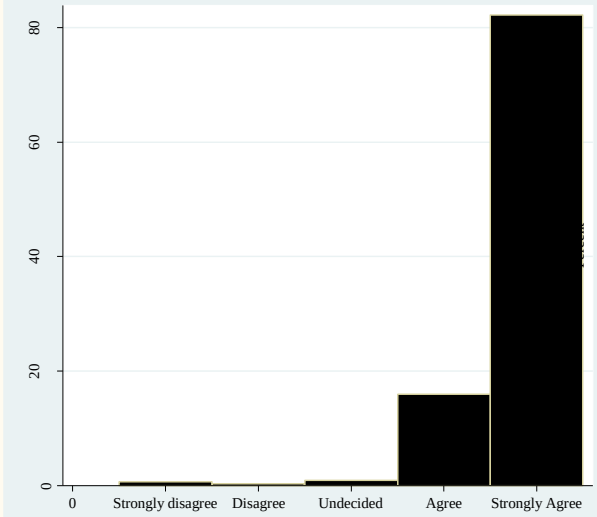

Figure 1a: "I believe that education is important."

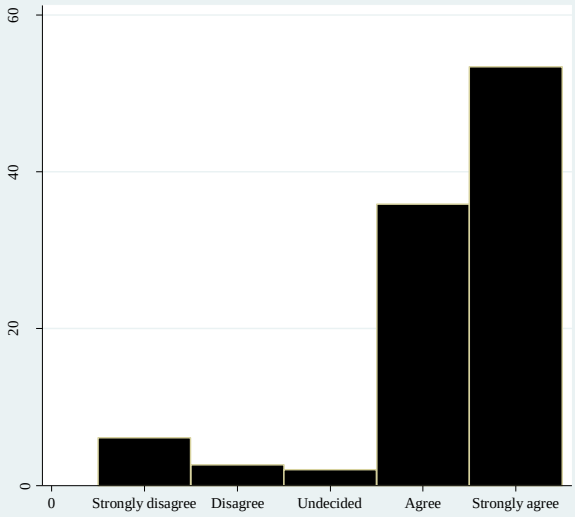

Figure 1b: "I believe that education is important for female children."

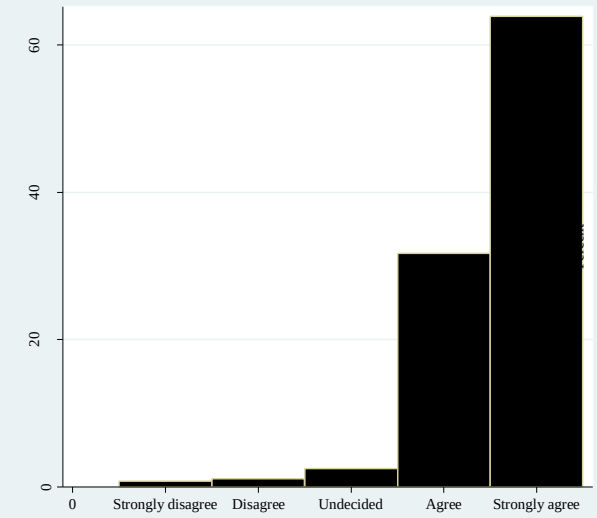

Figure 1c: "I encourage (name of student) to attend school.

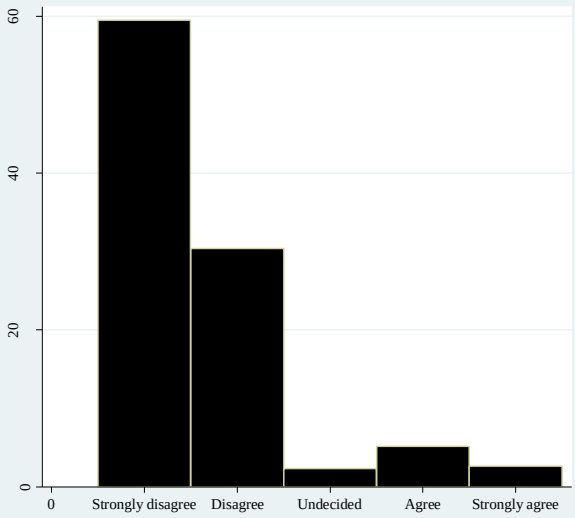

Figure 1d: "I believe that education is important only for male children."

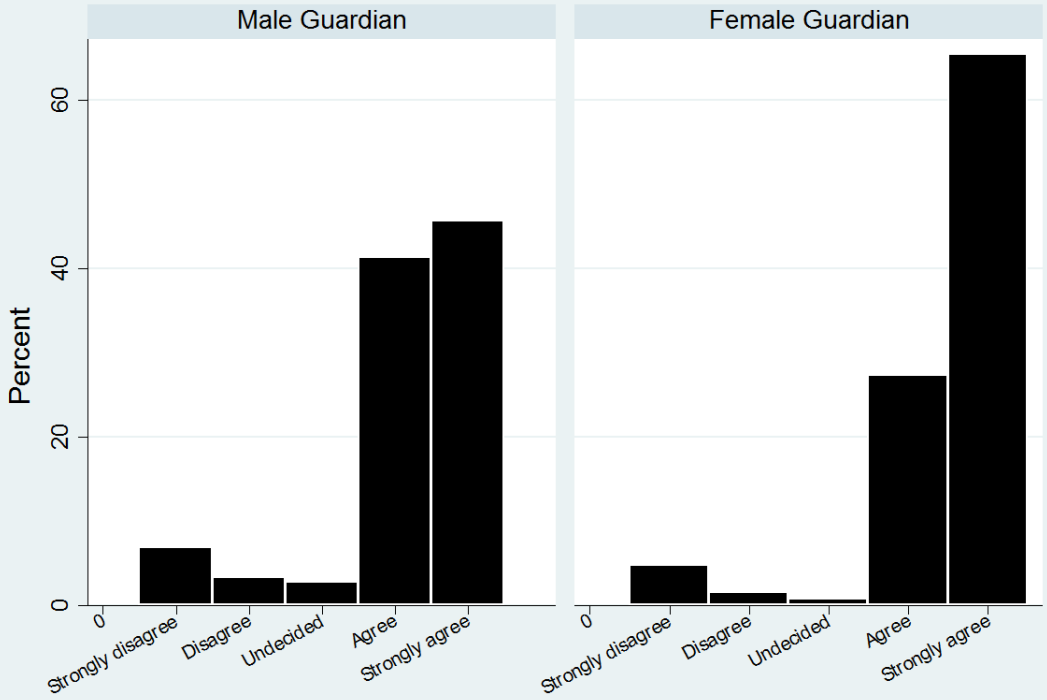

Figure 2a: "I believe that education is important for female children."

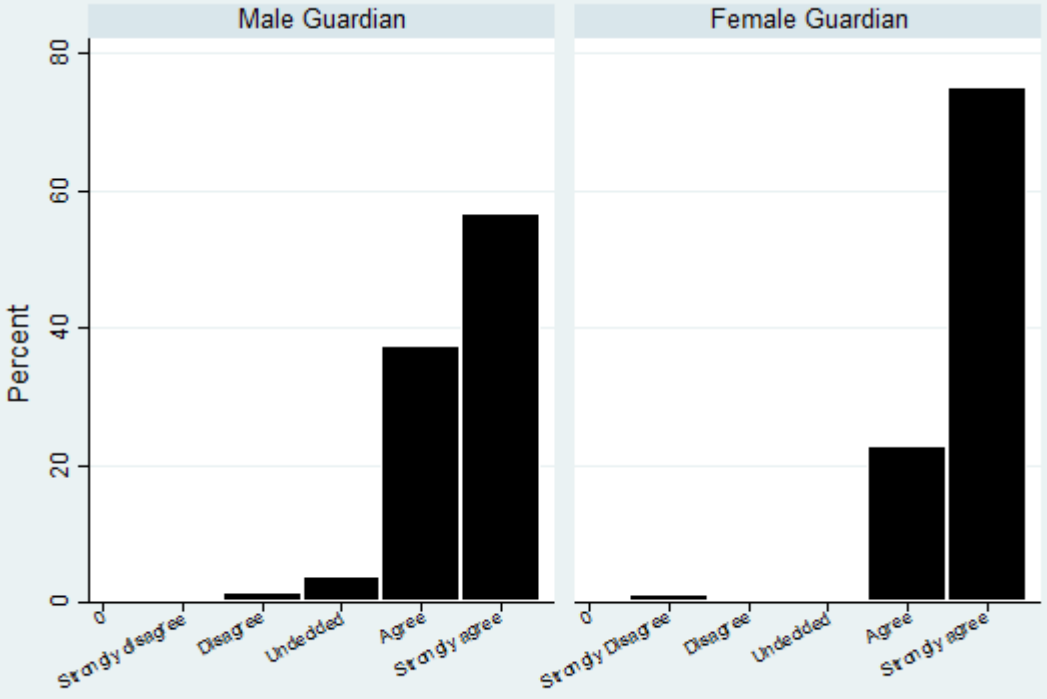

Figure 2b: "I encourage (name of student) to attend school."

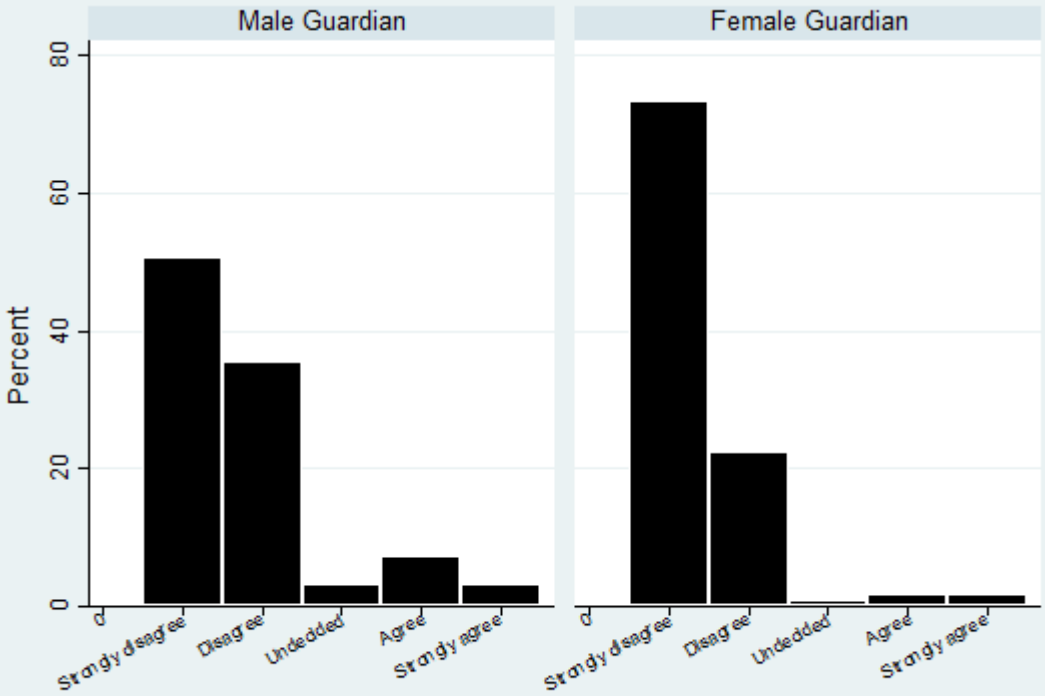

Figure 2c: "I believe that education is important only for male children."

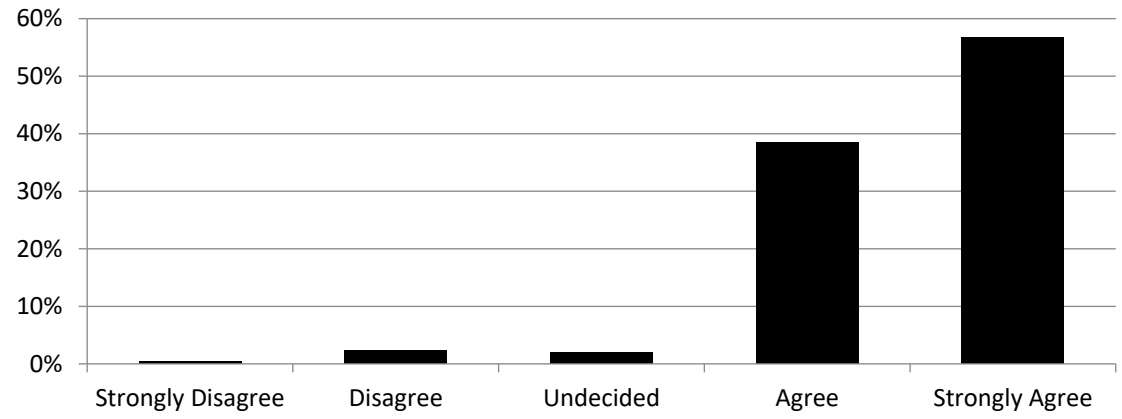

Figure 3
Statement: "In my village, people believe that it is important for female children to attend school beyond the 5th class?"

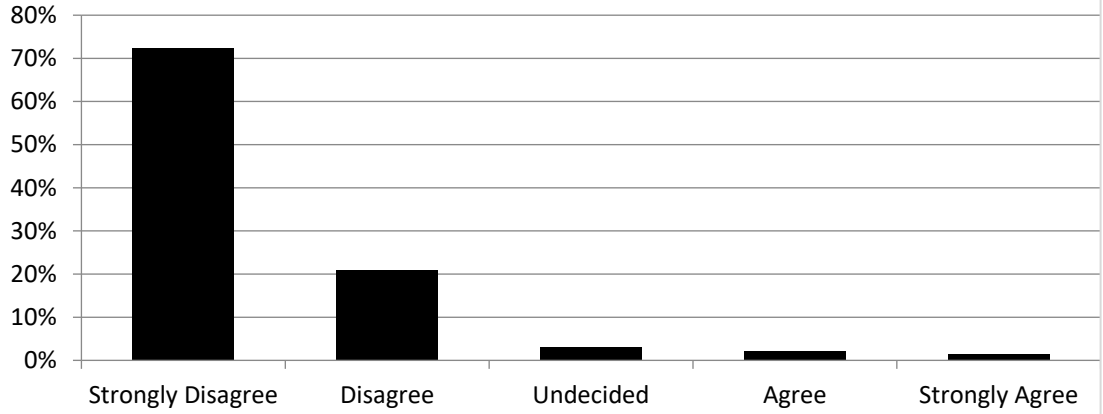

Figure 4
"In my village, people believe that women should not have careers?"

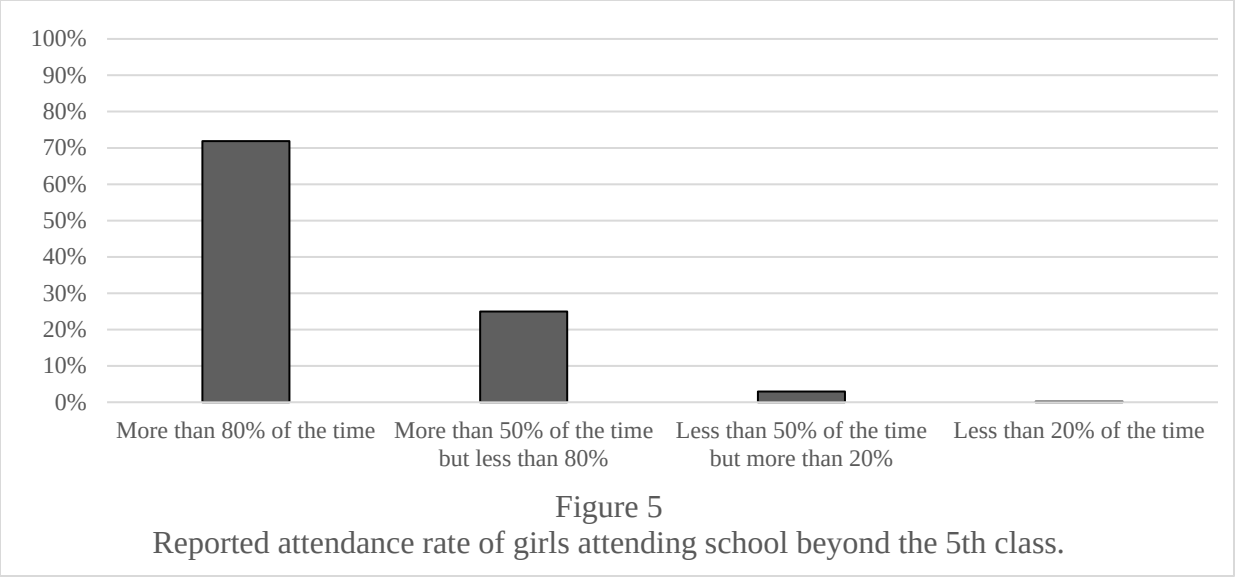

Figure 5
Reported attendance rate of girls attending school beyond the 5th class.

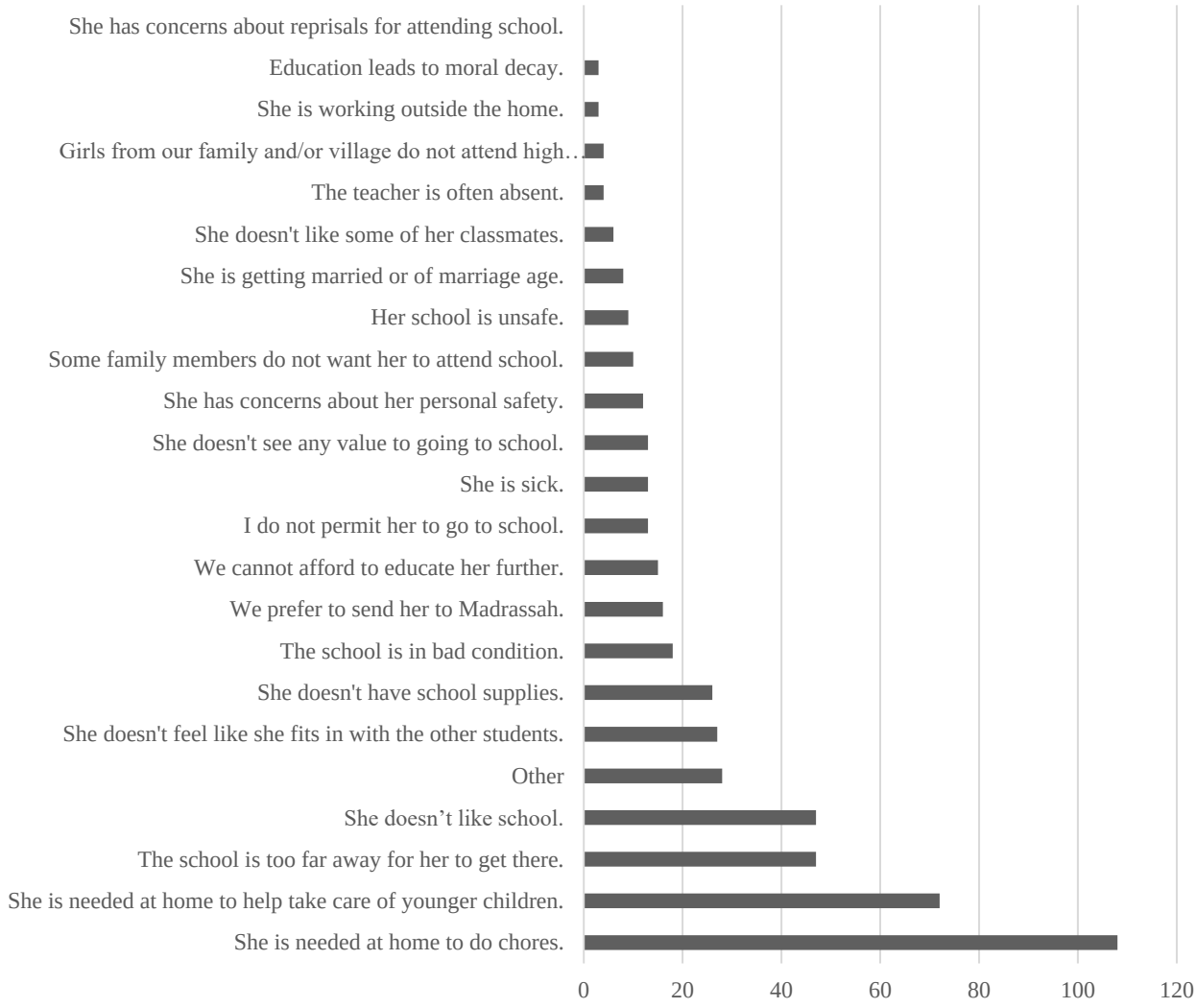

Figure 6
"Reasons given for high-school-aged girl not attending school beyond the 5th class."

Table 1: Literacy Rates for the Population 10 Years and Older

Region	2007-2008		2011-2012		2013-2014	
	male	female	male	female	male	female
Pakistan	69	44	70	47	70	47
Baluchistan	66	23	65	23	59	25
Khyber Paktunkhwa	68	33	72	35	72	36
Punjab	70	48	70	51	71	52
Sindh	69	42	72	47	67	43

Source: Government of Pakistan Statistics Division. (2013). Pakistan social and living standards measurement survey (2011-12). Islamabad, Pakistan: Pakistan Bureau of Statistics.

Table 2: Sample Means and Standard Deviations

Variable	Full sample	Female guardians	Male guardians	t-statistic (p-value)
Respondent's gender (Female = 1)	0.388 (0.488)	-	-	-
Respondent's age	43.555 (12.088)	46.618 (9.838)	41.613 (12.088)	5.739*** (0.000)
Respondent's education				
No formal education	0.398 (0.489)	0.474 (0.499)	0.366 (0.482)	2.707*** (0.007)
Some primary school	0.107 (0.310)	0.080 (0.272)	0.107 (0.331)	1.125 (0.261)
Some middle school	0.291 (0.455)	0.378 (0.486)	0.237 (0.426)	3.755*** (0.000)
At least some high school	0.204 (0.403)	0.068 (0.253)	0.290 (0.454)	7.941*** (0.000)
Respondent's occupation				
Farmer/business owner	0.277 (0.448)	0.016 (0.125)	0.444 (0.497)	16.279*** (0.000)
Laborer in Gulf States	0.223 (0.416)	0.004 (0.063)	0.361 (0.481)	14.518*** (0.000)
Civil servant	0.064 (0.245)	0.076 (0.266)	0.056 (0.230)	0.977 (0.329)
Housewife	0.358 (0.480)	0.900 (0.301)	0.015 (0.128)	43.946*** (0.000)
Unemployed/student	0.069 (0.253)	-	0.112 (0.306)	-
Other	0.009 (0.096)	0.004 (0.063)	0.012 (0.112)	1.156 (0.248)
Distance to school (kilometers)	1.663 (1.67)	1.572 (1.231)	1.721 (1.897)	1.207 (0.228)
Walk to school (YES = 1)	0.751 (0.433)	0.651 (0.478)	0.814 (0.389)	4.516*** (0.000)
High-school-aged girl attends school beyond 5th class	0.795 (0.404)	0.827 (0.379)	0.775 (0.418)	1.627 (0.104)
Measures of Household Wealth				
1. Own vehicle				
Own a motorcycle (YES = 1)	0.028 (0.165)	0.016 (0.126)	0.036 (0.186)	1.623 (0.105)
Own a bicycle (YES = 1)	0.016 (0.124)	0.004 (0.063)	0.023 (0.150)	2.221** (0.027)
Own an automobile (YES = 1)	0.246 (0.431)	0.245 (0.430)	0.245 (0.043)	0.000 (1.000)
Own another motorized vehicle (YES = 1)	0.711 (0.454)	0.735 (0.442)	0.696 (0.461)	1.071 (0.285)
2. Own land				
Own no land	0.338 (0.473)	0.591 (0.492)	0.179 (0.383)	11.232*** (0.000)
Own 0 < acres of land ≤ 2	0.541 (0.498)	0.365 (0.481)	0.652 (0.476)	7.396*** (0.000)
Own 2 < acres of land ≤ 4	0.066 (0.248)	0.028 (0.165)	0.090 (0.286)	3.480*** (0.001)
Own 4 < acres of land ≤ 8	0.027 (0.162)	0.008 (0.089)	0.038 (0.191)	2.687*** (0.007)
Own more than 8 acres of land	0.028 (0.165)	0.008 (0.089)	0.041 (0.198)	2.877*** (0.004)
3. Own home (YES = 1)	0.942 (0.233)	0.944 (0.231)	0.941 (0.235)	0.159 (0.874)
Number of observations	642	249	393	-

Table 3: Sample Means and Standard Deviations
"Reasons Given for High School Aged Girls' Nonattendance beyond the 5th class"

Variable	Female guardians	Male guardians	t-statistic (p-value)
I do not permit her to go to school	0.039 (0.195)	0.056 (0.231)	0.656 (0.513)
The school is too far away for her to get there.	0.079 (0.270)	0.252 (0.436)	3.965*** (0.000)
She is needed at home to do chores.	0.543 (0.500)	0.273 (0.447)	4.654*** (0.000)
She is needed at home to take care of younger children.	0.299 (0.460)	0.238 (0.427)	1.125 (0.262)
She is sick.	0.071 (0.258)	0.028 (0.165)	1.609 (0.109)
She doesn't like school.	0.276 (0.449)	0.084 (0.278)	4.162*** (0.000)
She is working outside the home.	0.016 (0.125)	0.007 (0.084)	0.685 (0.494)
The teacher is often absent.	-	0.028 (0.165)	2.029** (0.044)
The school is in bad condition.	0.008 (0.089)	0.119 (0.783)	1.683* (0.095)
She doesn't like some of her classmates	0.024 (0.152)	0.021 (0.144)	0.166 (0.868)
She doesn't feel like she fits in with the other students.	0.157 (0.366)	0.049 (0.217)	2.903*** (0.004)
She doesn't have school supplies.	0.094 (0.294)	0.098 (0.298)	0.111 (0.912)
She doesn't see any value to going to school.	0.071 (0.258)	0.028 (0.165)	1.609 (0.109)
She has concerns about her personal safety.	0.008 (0.089)	0.077 (0.267)	2.913*** (0.004)
She has concerns about reprisals for attending school	-	-	-
She is getting married or of marriage age.	0.063 (0.244)	0.070 (0.256)	0.230 (0.818)
Girls from our family and/or village do not attend high school.	0.031 (0.175)	-	1.996** (0.048)
Some family members do not want her to attend school.	0.024 (0.152)	0.049 (0.217)	1.106 (0.270)
We cannot afford to educate her further.	0.024 (0.152)	0.084 (0.278)	2.232** (0.027)
Education leads to moral decay.	0.016 (0.125)	0.007 (0.084)	0.685 (0.494)
We prefer to send her to Madrassah.	0.047 (0.213)	0.070 (0.256)	0.805 (0.421)
Her school is unsafe.	-	0.063 (0.244)	3.088*** (0.002)
Other	-	0.196 (0.398)	5.889*** (0.000)
Number of Observations	127	143	-

Table 4: Determinants of High School Aged Girls' School Attendance beyond the 5th Class
Limited Information Maximum Likelihood (LIML) Estimates of a Mixed-Process, Simultaneous Equations Model

Variable	Model 1	Model 2	Model 3
Probit (Yes = 1)	**(1) "High school aged girl attends school beyond 5th class?"**		
Encourage high school aged girl to attend school (endogeneous regressor, eq 2)	0.496**	0.501**	0.460**
	(0.224)	(0.230)	(0.224)
Distance to school (kilometers)	-0.083*	-0.083*	-0.082*
	(0.045)	(0.045)	(0.045)
Walks to school	-0.841***	-0.840***	-0.855***
	(0.241)	(0.241)	(0.240)
Respondent has at least one child less than 5 years old	0.163	0.164	-
	(0.172)	(0.172)	
Constant	1.613***	1.597***	1.674***
	(0.366)	(0.388)	(0.124)
Ordered Probit (Strongly disagree = 1, …, Strongly agree = 5)	**(2) "I encourage my daughter to go to school."**		
Education is important for female children (endogeneous regressor, eq 3)	0.432*	0.430*	0.440*
	(0.253)	(0.257)	(0.251)
Respondent has at least one child less than 5 years old	-0.189	-0.189	-0.169
	(0.125)	(0.125)	(0.124)
Laborer (= 1)	-0.104	-0.104	-0.104
	(0.136)	(136)	(0.136)
Civil servant (= 1)	0.548*	0.549*	0.543*
	(0.284)	(0.284)	(0.288)
Housewife (= 1)	0.349**	0.349**	0.355*
	(0.153)	(0.154)	(0.154)
Unemployed/student (= 1)	0.788**	0.786**	0.806***
	(0.319)	(0.321)	(0.315)
Other (= 1)	0.371	0.374	0.377
	(0.575)	(0.574)	(0.592)
Motorcycle (= 1)	-0.677***	-0.678***	-0.675**
	(0.260)	(0.260)	(0.264)
Bicycle (=1)	-0.717*	-0.719*	-0.709*
	(0.375)	(0.375)	(0.380)
Other motorized vehicle (=1)	-0.085	-0.085	-0.086
	(0.123)	(0.123)	(0.124)
Between 0 and 2 acres (= 1)	0.237**	0.237**	0.237**
	(0.117)	(0.117)	(0.118)
Between 2 and 4 acres (= 1)	0.338	0.338	0.332
	(0.230)	(0.230)	(0.232)
Between 4 and 8 acres (= 1)	-0.378	-0.378	-0.384
	(0.238)	(0.238)	(0.237)
More than 8 acres (= 1)	-0.798***	-0.799***	-0.794***
	(0.276)	(0.276)	(0.280)
Ordered Probit (Strongly disagree = 1, …, Strongly agree = 5)	**(3) "Education is important for females."**		
Respondent's relationship to high school aged girl (mother = 1)	0.434***	0.432***	0.435**
	(0.104)	(0.105)	(0.104)
Respondent's age	0.018***	0.021	0.018***
	(0.004)	(0.021)	(0.004)
Respondent's age-squared	-	-0.000	-
		(0.000)	
More than high school education	0.369***	0.370***	0.370***
	(0.121)	(0.121)	(0.121)
Number of observations	641	641	641
Wald X^2	141.0	141.0	140.3
(p-value)	(0.000)	(0.000)	(0.000)
Natural logarithm of the pseudolikelihood function	-1,380.2	-1,380.2	-1,380.6
Includes dummy variables for school district in equation (1)	Yes	Yes	Yes

Robust standard errors are reported in parentheses. *indicates statistical significance at the 10 percent level; ** indicates statistical significance at the 5 percent level; and *** indicates statistical significance at the 1 percent level.

Survey Instrument

(Note: Figures in parentheses reflect the frequency of responses to a given question)

Section A: Demographics

1	Name of the Student			2	Age of the Student				
3	Your relationship with the student	Mother (249)	Father (312)	Grandmother (0)	Grandfather (12)	Other (Please Specify) (69)			
4	Your age								
5	Name of the school last attended								
6	Name of the parent interviewed								
7	What is your occupation?								
8	Education	None (255)	Primary (69)	Middle (187)	SSC (78)	FA/FSc (24)	BA/BSc (15)	MA or Higher (12)	Professional Degree (MBBS Etc.) (1)	Darse Nizami (1)
9	Which of the following ethic group do you most identify yourself as a member of:	Pashtun (642)	Hindko speaking	Chitrali	Other (Please Specify):				
10	What type of vehicle do you own?	Car (157)	Motorcycle (18)	Bicycle (0)	Another motorized vehicle (10)	Do not own a Vehicle (455)			
11	Do you own your home?	Yes (605)			No (37)				
12	How much land do you Own	None (217)	Less than 2 acres (346)		2 to 4 acres (42)	4 to 8 acres (17)	8 or above acres (18)		
13	How far is the school from your house?								
14	How does your female child go to school? (means of transportation)								

13. Number of Children (Under the age of 18) in the household:

Number of Children	Gender	Age
Child 1		
Child 2		
Child 3		
Child 4		
Child 5		
Child 6		
Child 7		
Child 8		
Child 9		
Child 10		

14. How long have lived in this village? _____

Section B: Parental attitudes towards education:

S/No	Statement	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
01	I believe that education is important.	(4)	(2)	(6)	(102)	(527)
02	I believe that education is important only for male children.	(382)	(195)	(15)	(33)	(17)
03	I believe that education is important for female children.	(39)	(17)	(13)	(230)	(342)
04	I encourage (name of student) to attend school.	(5)	(7)	(6)	(203)	(409)
05	I believe that attending school beyond the 5th class will improve (name of student) career prospects?	(4)	(10)	(20)	(205)	(403)
06	I would like for (name of student) to have a career?	(5)	(7)	(14)	(201)	(405)
07	In my village, people believe that it is important for female children to attend school beyond the 5th class?	(3)	(15)	(13)	(246)	(363)
08	I encourage my male children to attend school?	(306)	(192)	(17)	(48)	(78)
09	I believe that attending school beyond the 5th class will improve the future career prospects of male children?	(11)	(13)	(4)	(270)	(344)
10	In my village, people believe that it is important for children to attend school beyond the 5th class?	(2)	(4)	(8)	(248)	(379)
11	In my village, people believe that it is important for children to attend school beyond the 10th class?	(6)	(6)	(17)	(259)	(352)
12	In my village, people believe that women should not have careers?	(464)	(135)	(20)	(14)	(9)

Section C. Knowledge about the stipend for attendance for female children

1	Are you aware that (name of student) is eligible for a PKR 200 for attending school beyond the 5th class?	Yes(511)		No(124)		Not Sure(7)
2	I believe that PKR 200 is adequate to promote attendance by female children beyond class 5.	Strongly Disagree(10)	Disagree (13)	Undecided (57)	Agree (192)	Strongly Agree(366)
3	(Name of student) is attending school beyond class 5?	Yes(509)			No(131)	

If the answer to 3 above is Yes, please answer the following question; otherwise skip to question 7.

4. (name of student) receives a stipend for attending school. How do you use the stipend? (circle all that apply).

1. To buy school supplies.	(436)
2. Household expenses.	(20)
3. Medical expenses.	(0)
4. (name of student) gets to spend the stipend on discretionary items.	(162)
5. Other (please specify)	(5)

5. To the best of my knowledge, (Name of student) attends school (circle the one that best applies)

1. More than 80 percent of the time	(363)
2. More than 50 percent of the time but less than 80 percent	(126)
3. Less than 50 percent of the time but more than 20 percent	(15)
4. Less than 20 percent of the time	(1)

6. Why does (name of student) attend school?

1. She enjoys school.	(64)
2. She wants to go to school.	(191)
3. An education will help her to attain a better career.	(141)
4. An education will aid her in her duties as a wife and mother.	(11)
5. She will be better able to provide for us in old age.	(11)
6. Her education improves her abilities in her household chores.	(28)
7. An education will make her a well-rounded person.	(22)
8. An education will make her more attractive to her future husband.	(5)
9. An education will increase her future earnings potential.	(26)
10. Her friends attend school.	(1)
11. Women in our family and/or village attend school.	(2)
12. The school is in good condition.	(1)
13. She has a good teacher.	(3)
14. Other (please specify)	(0)

If the answer to question 5 is 2, 3, or 4, please answer the following question; otherwise you can STOP here.

7. What are the main reasons for (name of student) for missing school? (circle all that apply)

1. She is needed at home to do chores. (117)
2. She is needed at home to help take care of younger children. (86)
3. She is sick. (18)
4. She doesn't like school. (61)
5. She cannot get to school due to a lack of transportation and/or bad weather. (58)
6. She is working outside the home. (2)
7. Teacher is often absent. (5)
8. The school is in bad condition. (6)
9. She doesn't like her teacher. (6)
10. She doesn't like some of her classmates. (4)
11. She doesn't feel like she fits in with the other students. (32)
12. She doesn't have school supplies. (28)
13. She doesn't see any value to going to school. (18)
14. She has concerns about her personal safety. (11)
15. She has concerns about reprisals for attending school. (3)
16. Her school is unsafe. (19)
17. Other (please specify) (18)

8. Why does (name of student) not attend school? (circle all that apply)

1. I do not permit her to go to school. (13)
2. The school is too far away for her to get there. (47)
3. She is needed at home to do chores. (108)
4. She is needed at home to help take care of younger children. (72)
5. She is sick. (13)
6. She doesn't like school. (47)
7. She is working outside the home. (3)
8. The teacher is often absent. (4)
9. The school is in bad condition. (18)
10. She doesn't like some of her classmates. (6)
11. She doesn't feel like she fits in with the other students. (27)
12. She doesn't have school supplies. (26)
13. She doesn't see any value to going to school. (13)
14. She has concerns about her personal safety. (12)
15. She has concerns about reprisals for attending school. (0)
16. She is getting married or of marriage age. (8)
17. Girls from our family and/or village do not attend high school. (4)
18. Some family members do not want her to attend school. (10)
19. We cannot afford to educate her further. (15)
20. Education leads to moral decay. (3)
21. We prefer to send her to Madrassah. (16)
22. Her school is unsafe. (9)
23. Other (please specify) (28)