

The implications of changing educational and family circumstances on children's grade progression in rural Pakistan - 1997-2004

Cynthia B Lloyd
Population Council

Cem Mete
World Bank

Monica Grant
Population Council

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Introduction

Over the last decade, the schooling landscape in rural Pakistan has changed dramatically. In the absence of effective government efforts to expand the supply of adequate government primary schools sufficiently to meet demand, there has been a sharp increase in the number of private primary schools in rural Pakistan. Recent empirical evidence suggests that the increased number of private schools, particularly private-for-profit schools, has been accompanied by a substantial shift in the distribution of overall primary enrollment in favor of private schools as well as some improvement in primary completion rates, particularly for girls (Sathar et al 2003). Thus, at a point in Pakistan's educational development when primary schooling is still far from universal, an increasingly significant proportion of primary students are receiving their education outside the public sphere.

The achievement of universal primary completion by 2015, Millennium Development Goal No 2, will require that all children in Pakistan not only enroll in school but also stay in school through the end of the primary cycle. There is increasing recognition in the international community that school quality and access to post-primary schooling within or very near the community are critical factors, particularly for girls in rural communities, in achieving this goal (National Research Council/Institute of Medicine 2005; U.N. Millennium Project 2005). Other factors affecting demand for schooling on the part of the parents are also likely to remain critical in an environment where fertility rates are high, poverty remains persistent and rural households have few forms of insurance against risk except the labor services of their children.

This paper will assess the effects of primary school characteristics (such as school type, the availability of post-primary grades and various indicators of school quality) along with household characteristics and recent household economic and demographic shocks on progress through primary school since 1997 in rural Punjab and North West Frontier Province (NWFP). The analysis will be based on panel data drawn from 12 rural villages. The first wave of the panel was collected in December 1997 and the second wave was collected roughly 6 years later in January 2004. As far as we know, these data are among the first to be collected in a developing country that track both changes in the school environment and in the household environment over time while at the same time measuring behavioral change within the same settings for a panel of women and their children.

The paper begins with a brief review of literature which is followed by a description of our panel data. A description of recent changes in the schooling environment as well as in enrollment and primary school completion rates over the past 6 years in rural Punjab and NWFP provides the context within which to interpret the results of the multivariate analysis. We use discrete time hazard models to model the determinants of school dropout between waves 1 and 2. We conclude with some implications of these findings for future schooling trends and for education policy in Pakistan.

Review of Literature

There is a rich literature on the determinants of school enrollment, retention and academic achievement in developing countries. Here, we discuss selected insights from that literature by summarizing findings on three groups of explanatory variables that are often considered in empirical studies: (1) household and community characteristics; (2) economic and other unexpected “shocks” experienced by the household, and (3) school and teacher characteristics.

On the importance of household and community characteristics: The strong correlation between household characteristics and children’s schooling outcomes is established without a doubt universally. In some cases it is possible and informative to learn more about the workings of this relationship; although for the most part the policy implications of these findings are limited in the short run because in practice it is not feasible to design interventions to change the occupation of parents; or their schooling levels; or their world-view that is influenced by a lifetime of experiences. However, it may be possible to change household consumption levels in the short run through programs targeting subsidies or grants to the poor if school enrollment at the primary level is found to be sensitive to household consumption (more on this later when discussing household level shocks).

As for the role of community characteristics on schooling outcomes, a particularly salient issue for progression beyond primary is the availability of post-primary classes in the community. For example in rural Ghana, Lavy (1996) found convincing evidence that supply constraints at the community level in terms of the availability of middle and secondary school options are important factors in holding down enrollments in primary school and prompting

premature dropout. As far as basic enrollment decisions are concerned, the availability of a primary school within the community as well as some aspects of school choice and quality at the community level have also been found to be important (Lloyd, Mete and Sathar 2005).

Another linkage with community characteristics is through factors affecting the demand for child labor including labor market conditions and community infrastructure affecting the demand for domestic chores: in settings where the demand for children's time is strong, schooling can be negatively impacted. On the other hand, in settings where the returns to quality school and higher levels of schooling are high, children are more likely to attend and progress in school.

On the importance of unexpected (adverse) shocks: Longitudinal household data following school progress among a group of children or adolescents over time are increasingly available. A topic that is of particular interest to researchers is the extent to which economic shocks have an impact on the school enrollment and attendance patterns of children. There is a large literature that investigates the impact of negative economic shocks on household consumption patterns (see, for example, Townsend 1994; Gertler and Gruber 2002) as well as on children's schooling and labor force participation. The flourishing literature on the latter essentially consists of two types of studies: the majority of studies explore the effect of an economic crisis that affects everyone in a community simultaneously (e.g. Frankenberg et al. 1999; Thomas et al. 2003; Frankenberg, Smith and Thomas 2003 in the case of the Indonesia economic crisis; Behrman, Deolalikar, Tinakon and Chandoevwit 2000 for Thailand after the 1997 financial crisis; Skoufias and Parker 2005 for parental job loss and divorce during the Mexican peso crisis) and few studies that aim to understand how individual households react to unexpected adverse events, even when there is no country-wide economic crisis (e.g. Duryea, Lam and Levison 2003 for male job loss in Brazil).¹ The former group of studies tends to find large impacts on school enrollments and attendance (sometimes positive and sometimes negative, with the exception of Skoufias and Parker who find some negative effect for female children's school attendance but not for their grade advancement), while Duryea, Lam and Levison find that male household head's unemployment have a small negative effect on the grade advancement of girls

¹ The broad-economic-crisis versus a household-level one may have different implications for the extent to which households can turn to others for support; the extent to which the crisis in question is a long-term one or not; the extent to which the public safety net serves effectively to smooth the impact of the shock etc.

and no effect on boys' grade advancement, leading the authors to conclude: "The results suggest that children's time allocation to work and school are not a major source of adjustment by households to short-run economic shocks, although there do appear to be negative effects on girls". This is also consistent with the findings of Jacoby and Skoufias (1997) for rural India, which conclude that seasonal fluctuations in school attendance are a form of self-insurance, but one which does not result in substantial loss of human capital on average. Most likely because of the unavailability of information on different types of unexpected economic shocks, the implications of unexpected household shocks other than job loss and crop loss are rarely explored.

On the importance of school and teacher characteristics: There is strong empirical evidence testifying to statistically significant associations between school/teacher characteristics and individual schooling outcomes in developing countries.² However, the particular elements of schooling that matter appear to vary substantially from study to study depending on the context as well as on the data and statistical approach. Researchers seeking to measure the importance of school and teacher characteristics face numerous challenges. The first is determining the extent to which one can treat variations in school and teacher characteristics across communities as exogenous. In the absence of experimental/random allocation of schools and teaching resources, the correlations between school characteristics/availability and community characteristics must be explored. In cases where these correlations are found to be rather weak, the interpretation of findings is made easier (e.g. for public schools in Pakistan, see Alderman, Orazem and Paterno 2001; Lloyd, Mete and Sathar 2005). The second challenge is determining whether or not measured school and teacher characteristics are adequate proxies for learning conditions in schools. The third is determining whether or not parents have sufficient or accurate information about the learning conditions in schools to allow these conditions to directly affect enrollment and retention decisions at the primary level – decisions which remain largely in the hands of parents.

In cross-sectional studies of retention and dropout which are confined to children that have entered school, there have now been a few studies based on cross-sectional data that have attempted to link students to the characteristics of the specific schools they have attended. One

² For a thorough review, see Chapter 3 in NRC/IOM (2005).

approach has been to construct latent school-quality variables which can be derived by regressing individual standardized test scores on various explanatory factors at the individual and family level and a set of dummy variables to represent each of the schools attended by students in the sample. Two studies using this approach have found statistical confirmation of the importance of school quality for enrollment, dropout, or attainment at the individual level but no direct evidence of which elements of school quality might matter (Khandker, Lavy and Filmer 1994; Hanushek and Lavy 1994). More recently, studies that combine household and school survey data at one point in time suggest that various elements of school quality matter, that effects vary by sex (partly because the school environment experienced by boys and girls differs and partly because the effects of the school environment on boys and girls differ) and finally that some aspects of the school environment that are not traditionally linked to the development of cognitive competencies may also be important to retention, such as teachers' attitudes and behaviors towards their students, in particular differential treatment of boys and girls (e.g. Lloyd, Mensch and Clark 2000 using data from Kenya; Lloyd, El Tawila, Clark and Mensch 2003 using data from Egypt).

For the sake of brevity, we end this subsection by pointing out an issue that is crucial for the study of duration of schooling: the need to collect information on the schooling conditions of children before they drop out, so that one can make the linkage between the conditions that prevailed at the time of school attendance and drop out which occurs at a later date. For example, Mete (2004) uses a two-stage survey design to investigate the progression in basic education cycle in a (centralized examination based) highly selective education system in Tunisia — the results of which may apply to a number of African and Latin American countries with similar education systems but not to Pakistan for example. Since most studies of the determinants in developing countries are based on cross-sectional data, our understanding of the determinants of dropping out is limited at this time. Most of the studies that were reviewed above, under “the importance of unexpected/adverse economic shocks”, utilize longitudinal data sets and thus are positioned nicely to investigate the household determinants of dropping out but less well positioned for an investigation of the role of school and teacher characteristics, because of the absence of linked school data.

Panel Data

Data for Wave 1 of the panel were collected as part of a study titled “Investments in Children’s Education and Family-Building Behavior”.³ The original sample was drawn strategically to cover the range of schooling conditions prevalent at the time in both provinces. The 12 rural communities were selected from 6 districts, three each in NWFP and Punjab. 722 married women aged 20-45 (about 60 from each community) and their husbands were included in the sample. They were interviewed in detail about the schooling of all their children (regardless of their child’s age), and their household economic circumstances, using a shorter version of the consumption modules used by the World Bank’s Living Standards Measurement Surveys. Data were collected for each child (whether currently alive or dead) who had ever attended school on the name of the specific primary school attended, the type of school attended (private or public and single-sex or mixed), the age of entry, age of exit, current school status or grade attained, grades repeated, reasons for non-entry or school exit. They were also interviewed about their own experiences with family building.

In addition to the household data, Wave 1 involved the direct collection of data on 50 primary schools attended by the children in the sample (not only all primary schools within the community but any schools that were located nearby if 2-3 children from the community attended them) and on key features of each of the 12 communities. The school data included information on the conditions of the buildings and classrooms, the availability of amenities such as running water, toilet and electricity, the medium of education and the medium of instruction, the presence of middle school grades within the same school compound, the availability of textbooks, the total fees, the duration of daily sessions and number of days in session, official enrollment, student and teacher attendance on the day of the visit, and information on teacher training, workload, and the date the school was established.

In Wave 2 of the panel, households previously visited in Wave 1 were re-contacted (with appropriate protections for confidentiality and informed consent) and all ever married women aged 20-55 in those households were interviewed. Women from the previous sample who had left their former household but remained in the community were also followed and re-interviewed. As a result, eighty two percent of women previously interviewed in Wave 1 were

³ See Sathar et al (2000) for a full description.

successfully re-interviewed.⁴ It is clear from Table 1 that women re-interviewed at Wave 2 do not differ significantly with respect to key characteristics from all women in the original sample nor did their children, so we are confident that the women in our panel are representative of all women interviewed in Wave 1.

In Wave 2, all the 50 primary schools visited in Wave 1 were visited again and comparable data were collected on school characteristics. In addition, all primary schools (including religious and non-formal NGO schools) that has been established within each community during the past 6 years were visited for the first time as were schools outside the community which were not previously visited if we determined that some children from the community were attending those schools. In addition, a qualitative component was added to the school survey in Wave 2 after the structured part of the school inventory questionnaire was completed in the form of in-depth interviews with teachers in each school organized around the following topics: job selection and security, teacher training and refresher courses and the curriculum and medium of instruction. The material derived from these in-depth interviews provide some additional insights into differences in conditions between public and private schools which were not adequately captured with the quantitative indicators.

The Changing School Environment in rural Pakistan

The guidelines provided to the field teams, which were similar in both surveys, were to visit all primary schools located within each community (primary sampling unit) and those outside the communities attended by 2-3 children in our sample. Following these parameters, our sample of primary schools expanded from 50 in Wave 1 to 104 in Wave 2.⁵ Fourteen of the newly attended schools were public and 40 were private.

It is not unreasonable to conclude based on these data that, over the past 6 years, the number of schools attended by primary school students in our 12 villages has more than doubled (Table 2). There are two reasons for the dramatic increase in the numbers of primary schools visited by our field teams. First, there has been a sizeable number of new schools established since 1997, particularly private schools. Of the newly established private schools, 21 were

⁴ Of the 133 women who were not re-interviewed, 24 were absent from the home, 28 refused to be interviewed, 3 could not be located, 63 had moved out of the community, 6 had died and 9 were unavailable for other reasons.

⁵ This does not include religious schools which were not visited in the previous wave and which were attended by very few students – only 1-2 percent of children in the sample.

located inside the community and 9 outside the community. In contrast, only two new girls' government schools were established since 1997, one inside and one outside the community; no new government schools for boys opened since 1997. Second, village children are choosing to attend a wider range of schools, some of which had existed at the time of the first wave but had not been previously included in the sample because few if any students attended them. An additional 22 schools that were not attended by community children at Wave 1 were being utilized at Wave 2, the majority located outside community boundaries. Roughly half of these schools were government primary schools.

School access has also expanded in another way. An increasing percentage of primary schools include post-primary grades within the same facility, easing the transition to middle school for those who chose to continue. In 1997, only 18 percent of the primary schools visited had a middle section. By 2004, the overall percentage with a middle school section had risen to over 50 percent. However, while there is an increasing percentage of government and private schools offering middle sections, the overall availability of middle school sections and the growth in such facilities has been most dramatic in the private sector. In Table 3, we can see that the number of government schools with middle sections has increased from 3 to 12 while for private schools the number has increased from 6 to 41. As a result, as of Wave 2, roughly a quarter of government primary schools had a middle section but over three-quarters of private primary schools had a middle section. The growth of private schools has been particularly dramatic in Punjab where the number has increased almost 5-fold in just 6 years from 7 to 33 in our sample communities.

In the meanwhile, we can also see from data in Table 4, that there have been some noticeable upgrading of government primary schools in the last 6 years, particularly for girls, reducing the gap between boys' and girls' government schools in a variety of characteristics typically associated with school quality as well as the gap between government and private schools. For example, the percent of teachers absent on the day of the visit and the percent of teachers residing in the village have improved substantially in government schools and differences between government and private schools are no longer sizeable. While it is still true that a higher percent of private school teachers reside in the community than public school teachers, the percentage of teachers residing in the community has increased for both boys' and girls' government schools. At Wave 2 the gap between public and private schools was only 15-

17 percentage points, down from a gap of 43 to 46 percentage points between public and private schools six years ago. The availability of basic amenities in government schools has also improved noticeably, in particular the availability of toilets in government girls' schools.

Recent trends in primary school attendance and attainment among 15-19 year olds can be obtained by comparing the overall results for wave 1 and 2 according to three indicators: (1) the percent ever attended, (2) the percent completing primary and (3) the percent of those who ever attended who completed primary or the primary retention rate (see Table 5). The only striking change in ever attendance rates is for girls in NWFP where the percent who have ever attended has risen to levels only slightly below attendance rates in Punjab (from 50 to 59 percent). Primary completion rates tell a different story. There have been no changes in primary completion rates for boys in NWFP, where completion rates were already high. However, there have been notable improvements in completion rates for girls in both provinces and for boys in Punjab, which can be largely explained by similar trends in primary retention rates. The gender gap in completion rates remains substantial in both provinces by international standards— 49 percentage points in NWFP and 17 percentage points in Punjab – but unusually extreme in the case of rural NWFP. Retention rates which are now about the same for boys and girls in Punjab (81 to 84 percent), still diverge substantially in NWFP (69 percent of girls who have ever attended primary school versus 93 percent of boys who have ever attended school complete primary).

Despite limited changes in ever attendance rates, there has been a substantial shift in the composition of primary school enrollment, with a growing percentage of both boys and girls attending private schools (see Table 6).⁶ While 90 percent of 15-19 year old boys (who ever attended school) in Wave 1 reported having attended a government school, only 57 percent of 5-9 year olds students reported attending a government school in Wave 2. For girls, the shift in enrollment has been similarly dramatic, with 93 percent of 15-19 year old girls reporting having attended a government primary school in Wave 1 but only 61 percent of 5-9 year old girls (who ever attended school) in Wave 2 reporting attending a government school. NGO schools represent a very small percent of overall primary school enrollment. The overwhelming majority of children attending private schools attend private-for-profit schools.

⁶ In the remainder of the paper, schools operated by non-governmental organizations and private-for-profit schools are grouped together (as private schools) since only one NGO school was attended by surveyed children in 1997 and only two NGO schools were attended by surveyed children in 2004.

Multivariate Analysis

The focus of this paper will be on primary school retention (grades 1-5) and progress through middle school (grade 6-8) since Wave 1. Thus, our sample of interest will be all the children in the sample who were ages 6-12 at wave 1 and who had ever attended school by Wave 2. Of the 1203 living children who were reported by their mothers to be ages 6 to 12 at Wave 1, 968, or 80 percent, were matched successfully at Wave 2, so that we have data on their participation and progress through school from both waves of the panel.⁷ Of the 745 children who began primary school by Wave 2 in the matched sample, we have data on the characteristics of the primary schools that they attended for 704 of them (94 percent).⁸

We modeled the probability of school dropout since wave 1 measured by the highest grade completed using a discrete time hazard model, allowing dropout probabilities to vary by grade. Figure 1 shows a cross-section of retention by grade for those aged 10-14 at each wave and we can see that while grade retention has improved for both boys and girls, there is a sharp discontinuity in grade continuation beyond grade 5 for girls. This is allowed for in the model by introducing a series of dummy variables representing each grade individually.

The explanatory variables reflecting household characteristics and community characteristics at wave 1 included monthly household consumption, mother's schooling (whether or not she had ever attended school), father's occupation (whether or not he was in agriculture or other blue collar work), an index of community characteristics⁹ and a dummy variable for distinguishing those living in NWFP. The provincial dummy could capture both differences in

⁷ Detailed data on school histories were collected on all children reported by women in Wave 2 who were ages 5 to 20.

⁸ Of the 654 matched children ages 6-12 at wave 1 who had ever attended school by the date of the wave 1 survey, 579 can be linked to a school visited in wave 1, 43 to a school visited in wave 2 but not visited in wave 1 and 32 could not be matched to a school visited in either wave. Of the 84 matched children ages 6-12 at wave 1 who had not attended school by the date of the wave 1 survey but enrolled in primary school for the first time between the two waves of the panel, 63 could be linked to a wave 1 school and 12 to a school visited in wave 2 but not in wave 1. For the present analysis, those not matched to a Wave 1 primary school were assigned the community means of the school quality variables by school type. Alternate models excluded children that were not matched to a Wave 1 primary school (results not shown). In these regressions the size of the effect and the significance were often reduced, although the effect was always in the same direction. However, due to the decrease in sample size, these models were less robust than those presented in Tables 8-10.

⁹ The index of community characteristics was a count of whether or not the community contained the following seven elements: a metalled road, public transportation within the community, sewerage, electricity, telephones, natural gas, and paved streets.

gender norms as well as differences in the management of government primary schools at the provincial level among many other factors.

Unexpected shocks to the household between wave 1 and wave 2 included measures a loss of remittance income, the arrival of an “unwanted” child, and the presence of any other negative shock. In most respects, the household and school questionnaires used in Wave 2 replicated those used in Wave 1 in order to assure comparability across rounds. However, a sequence of questions were added to the household survey in order to measure whether or not the household had experienced any negative shocks in the past 6 years. These included a loss of remittances, loss of a job, a serious illness or death in the family, a crop or business failure, or the loss of property due to theft, fire or destruction.¹⁰ Furthermore, because a complete birth history was collected at both survey rounds, the presence of an “unwanted birth” in the past 6 years was also captured.¹¹

We estimated three models for each of six samples; all children, boys, and girls in grades one to five (primary) and all children, boys, and girls in grades one to eight (primary plus middle). In all three models, the full set of household, community and unexpected shock variables enumerated above are included. The three models are distinguished from each other by the mix of school and teacher variables included. In the first model, we include a dummy variable to represent whether or not the student was enrolled in a government primary school at wave 1 (or entered school between Waves 1 and 2 and attended a government primary school at the time of Wave 2) versus a private school.¹² In the second model, we introduce several

¹⁰ Of the household shocks listed, only the loss of remittances was ever significantly associated with school dropout. Therefore, in the regressions only the loss of remittances will be controlled independently; the presence of any other household shock is controlled in a single dummy variable.

¹¹ At Wave 1, women were asked if they would like to have any additional children. If a woman responded that she was ready to end childbearing at the time of Wave 1, but then proceeded to give birth to an additional child between the two survey rounds, it was considered to be an unwanted birth for the household. One shortcoming of the data was the failure to collect the actual year of birth for each child in the birth history; the data only list the current age or the child's age at death. We make the assumption that all children not previously listed at Wave 1 but mentioned by the mother at Wave 2 were born during this interval between the two waves of data collection. For infants listed for the first time at Wave 2 who were not living at the time of the survey, it is possible that the child was born and died prior to the Wave 1 survey but was not reported by the mother at Wave 1. To take account of this possibility, we constructed an alternate measure of unwanted births which was restricted to new births between the two survey rounds that survived to the time of the Wave 2 survey (results not shown). Although the odds ratio was estimated to be slightly lower when using this alternative measure, the association was still significant for girls at grades 1 through 8, supporting the inclusion of the unwanted births variable in its current form.

¹² Roughly 9 percent of sample were attending a primary school which was different than the one that they had first entered. For these students, as for all other students, we are attributing all the effects of schooling to the characteristics of the school which they currently attend rather than the school they first entered. Unfortunately we

measures of school quality that characterize the school attended, including the amenities score, the mean grades of schooling for teachers in the school, and the percent of teachers that reside in the community, in order to see whether or not we can explain some of the differences in retention rates observed between government and private schools based on these characteristics. In the third model, we add a dummy variable for whether or not post-primary grades were available in the community at the time that the child was ten years old.¹³

Mean values for these independent variables are shown in Table 7 for the total sample and for boys and girls separately. On average, mean monthly household income was about 7700 rupees. No more than a quarter of the children's mothers have ever attended school. Given that these children live in rural areas, a majority have fathers who work in agricultural or blue collar occupations. Over 40 percent of these children have mothers who have experienced the arrival of a "unwanted" child in the household since Wave 1. This is based on the mother's expressed desire for no more children in Wave 1. Girls are slightly less likely to have an "unwanted" sibling because of the strong preference for male children in Pakistan. Only 3 percent of household have experienced a shock in the form of a loss of remittances in the past 6 years, but over 50 percent had experienced at least one other shock including job loss, serious illness or death, crop or business failure or the loss of property.

Roughly 80 percent of children were attending a government primary school at the time of Wave 1. On average the primary schools the children attended at Wave 1 had less than 2 of the four amenities measured (electricity, water, toilet, classroom furnishings). Roughly 40 percent of the teachers of children attending primary school at Wave 1 were residing in the community. On average teachers had attained slightly less than 11 grades of schooling. Slightly more than half of children lived in communities that offered post-primary grades at the time that they were 10 years old.

The results of our multivariate analysis are presented in Tables 8-10 for all primary students, and for boys and girls separately. While we typically prefer to present all of our data

do not know how much time they spent at the previous school before they switched to the school where they were observed.

¹³ Information from the community survey at Wave 2 was used to determine the year that each post-primary school (middle or secondary) was established. Primary schools that also offered post-primary grades were also included in this variable; the Wave 2 school survey collected information on the year in which a school expanded to offer post-primary grades. The variable reflects the opportunities for post-primary education inside each community at the time that the child was ten years old.

separately by sex, our relative small sample sizes led us to want to see if some of the measured effects might show up more clearly for a larger sample.

Results for household and community variables: In Table 8 we can see that for all children who have ever attended primary, higher levels of monthly household consumption reduce the chance of drop out and are always statistically significant. These effects persist when boys and girls are treated separately and remain statistically significant for boys when the sample is restricted to those in grade 1-5 while for girls they remain statistically significant when the sample includes those in grades 1-8. Having a mother who attended school reduces the probability of dropping out substantially in all models and for all samples but the size of the effect is substantially higher and statistically significant for girls. Having a father working in agriculture or another blue collar occupation also increases the likelihood of dropout, but to a much smaller extent and the effects are never statistically significant. This is an interesting finding in that Lloyd, Mete and Sathar (2005) show the large (negative) relationship between fathers' occupation and girls' school enrollments, but once children are enrolled in school then fathers' occupation no longer emerges as an important determinant of duration of schooling.

With respect to community variables, living in a more developed community is an important and statistically significant factor in reducing the chance of drop out; however, community development is not significant for girls when the presence of post-primary grades is included in the model. Provincial differences are not significant when results for boys and girls are combined but become significant when boys and girls are treated separately. This finding is consistent with the results of the descriptive data presented in Table 5 showing that primary completion rates for boys are much lower for boys in Punjab and much lower for girls in NWFP.

Results for unexpected (adverse) household shocks: When all children are combined, we can see in Table 8 that having experienced the birth of an "unwanted" sibling in the past 6 years or living in a household that had experienced a sudden loss in remittances in the last 6 years were both factors increasing the likelihood of dropout, significantly so if one considers post-primary dropout. When boys are considered separately, we see that it is the loss of remittances that is the more important factor, particularly in the post-primary grades. This makes sense as it is when boys are in the early teens that they are in a position to assist the family in replacing cash income

if they drop out of school. Indeed child labor rates at these ages in Pakistan are not trivial for boys (see Lloyd and Grant 2005). When results for girls are estimated separately, we see that for them experiencing the birth of an "unwanted" sibling during their primary school years is the significant factor increasing the odds of drop out at any point during primary or post-primary schooling. Here we can see a clear division of labor between boys and girls. While boys are expected to contribute to cash income when a family experiences economic difficulty, a girl is expected to help out at home when there are extra domestic duties to perform. As a significant proportion of mothers in the sample had experienced an unwanted birth between the two waves of data collections in 1997 and 2004, the elimination of unwanted births would have a major impact on grade progression rates particularly for girls.

By utilizing first-wave survey questions (that collect information on fertility desires) to explain events that took place after wave 1, we hope to avoid the common ex-post justification problem associated with the measurement of births that are unwanted. Even then, there are some assumptions that need to be made to consider births that occurred between the two waves as unexpected events. One possibility is that some women may have decided to have a child at some point after the first wave survey. In order to tackle this issue, we have experimented with a more restrictive definition of not wanting another child, by taking into account both the reply to the survey question on wanting another child but also by considering whether or not the respondents used contraceptives at the time of the first-wave survey (in other words, is the desire to stop childbearing strong enough to lead to a change in behavior?). The signs and magnitudes of the estimated coefficients from this alternative definition are very similar to those that are reported by Table 8-10, although the estimates are much less precise.¹⁴ Ideally one should also take into account husbands' preferences for more children as well. Unfortunately our sample size is too small to this aspect of inter-household decision making process take into account because only 60 percent of husbands were interviewed.

Results for school and teacher characteristics: Attending a government school is associated with increased dropout rates as compared to attending a private school and the size of the effects

¹⁴ The estimated coefficients are statistically significant at 10 percent level only for the models that focus on progression from grades 1 to 8; and not for grades 1 to 5. Note that 62 percent of women who reported that they did not want another child at wave 1 were using family planning as opposed to 50 percent of those who either reported wanting another child later or not having made a decision.

are much greater for girls than boys. Indeed, when the results for girls and boys are presented separately in Tables 9 and 10, we see that being enrolled in a government school does not alter the dropping out probability of boys when other school/teacher characteristics are taken into account. But for girls, being enrolled in a private school increases the duration of schooling significantly even when other school/teacher characteristics are taken into account.

A higher school amenities score is never a significant factor reducing the probability of dropout. For boys, the sign of the amenities score is perverse but never statistically significant. Higher mean grades of schooling for teachers reduces the probability of dropout in the combined sample and for girls, although it is significant only when the presence of post-primary grades is not included. In other cases effects are sometimes perverse but usually not statistically significant. An increased percent of teachers residing in the community reduces the probability of dropout for the combined sample and for boys but is statistically significant only when the presence of post-primary grades are not included.

The presence of post-primary grades at the time each child was ten years old reduces the probability of dropping out of school in all models and is significant in all cases, except for the model that includes boys' post-primary schooling. This effect is found even when controlling for school/teacher characteristics and whether or not a child attends a government school. However, for girls, the community development variable becomes non-significant, suggesting a correlation between the level of development in the community and the presence of post-primary educational opportunities for girls.

Unfortunately, our school variables do not capture all aspects of schooling that may be relevant to school dropout. Even when school characteristics are controlled, we find that being in a government school is associated with a greater likelihood of school dropout, particularly for girls. This might in some ways seem surprising given parents' strongly expressed preferences for single sex education, which is typically only available in government schools (Sathar et al 2000). This finding suggests that either there are other features of government schools that we have not captured in our survey that are important determinants of dropping out; or children who are likely to stay in school longer are also those who are more likely to enroll in private schools in the first place (in the absence of an exogenous shock to the education system, it seems impossible to find variables that would belong in an enrollment equation but not in a duration-of-schooling equation and vice versa, thus we are not in a position to shed more light into this issue

by formulating a model that involves the joint estimation of enrollment and duration-of-schooling equations). Information gathered from our in-depth focus group discussions with teachers may give us some hint as to what some of those issues might be.

Certain themes stood out in the in-depth focus group discussion which can provide additional insights into some of the less easily measured distinctions between government and private primary schools. Most teachers in both public and private schools talk about the fact that private school teachers have no job security whereas government school teachers have certain employment guarantees in terms of longer term contracts. While private school teachers are paid much less than public school teachers, they cannot keep their jobs if they do not perform well, which means that employment is closely tied to performance. Private school teachers are also more closely supervised because the owner/headmaster is on site whereas in most public primary schools, there is no daily supervision of teachers' attendance and performance. Over a quarter of our conversations with teachers included some mention of the tendency that the appointment and transfer of teachers in the public schools was often based on favoritism, political influence and bribes rather than merit. Furthermore, these concerns were more likely to be mentioned in Punjabi schools. For example, in a government boy's primary school in D.G. Khan, Punjab, the following quote was taken:

“We have a complaint for the Ministry that our superiors irrelevantly have teachers transferred and halt their salaries and then, after taking something again, resume their salaries but keep taking cuts from their salaries. In my sixteen ministry years, I have not seen such a poor situation, which has been prevalent for the past two years. The teacher only has his/her salary. If this is taken through cuts and bribery, then how will he manage? Selection is done upon the basis of bribery. The person who comes on merit is not hired until and unless he gives something.”

Surveys conducted by Transparency International (2002) suggest that a major reason for corruption in the education sector in Pakistan is the lack of accountability.

Another factor that may make private schools appealing to parents, particularly the parents of girls, is that a substantial majority of teachers in mixed private schools are female (85 percent, see Table 4). Parents in rural Pakistan express a strong preference for having their children studying with a same sex teacher particularly in the case of girls (Sathar et al 2000).¹⁵ While there is no consistent evidence in the literature that girls perform better with female than

¹⁵ 85 percent of mothers in Wave 1 and 80 percent of fathers expressed a preference for their girls having a same sex teachers. The percentages for boys were 79 and 68 percent respectively.

with male teachers (see review of the literature in Lloyd and Mensch 1999), it may be the parents' preferences for same sex teachers that are more important, particularly if girls are going to progress beyond primary at an age when they are likely to have reached puberty.

Unfortunately, it is difficult to test this hypothesis in a multivariate analysis using our data because all government girls' schools have exclusively female teachers and all but 2 percent of teachers in boys' government schools are male so it is only in the case of private schools that there is any variation to explore.

Conclusions

The results of this study show clearly the complimentary nature of both supply and demand factors in determining grade progression in rural Pakistan, particularly for girls. The results suggest that there is much to improve about the schooling environment in rural Pakistan if universal primary completion is to be achieved by 2015, in particular the quality of government primary schools. However, school improvements alone will not assure success as long as households remain poor and continue to face substantial economic and demographic risks, in particular the relatively persistent risk for families in rural Pakistan of "unwanted" births. While fertility is beginning to decline in Pakistan, levels of unwanted fertility remain high thus reducing the capacity of many families to support their girls' primary school completion. At the same time, boys' primary completion rates are very dependent on household economic circumstances. Child labor rates in Pakistan remain high and primary school completion rates for boys, particularly in Punjab, remain surprisingly low by international standards.

It is likely that a conditional cash transfer scheme targeted towards poor parents to encourage them to enroll their children in school, possibly with some additional incentive for girls will be required in the short run to boost enrollment and completion rates adequately to achieve universal primary school. These policy measures will need to be complemented by substantial reforms in provision of public primary schooling so that government schools become more accountable to parents and to the community for the quality of the education that they provide as well as better access as well as improved quality of care in the delivery of family planning services to the rural poor.

In the absence of these changes, we would predict that primary enrollment will increasingly shift towards the private sector, with attendant benefits for primary completion

rates. However, an increase in the supply of private-for-profit schools at the primary levels has been shown to benefit overall enrollment rates only marginally (Lloyd, Mete and Sathar 2005). Thus, an increased supply of private schools in the absence of other changes is unlikely to be sufficient to achieve universal primary enrollment.

References

- Alderman, Harold, Orazem, Peter F., and Paterno, Elizabeth M. 2001. "School quality, school cost and the public/private school choices of low-income households in Pakistan." *Journal of Human Resources* 36(2): 304-326.
- Behrman, Jere R., Deolalikar, Anil B., Tinakorn, Pranee, and Chandoevrit, Worawan. 2000. *The Effects of the Thai Economic Crisis and of Thai Labor Market Policies on Labor Market Outcomes*. Bangkok: Thailand Development Research Institute.
- Duryea, Suzanne, Lam, David, and Levison, Deborah. 2003. "Effects of economic shocks on children's employment and schooling in Brazil." Population Studies Center Research Report No. 03-541. Ann Arbor: PSC Publications.
- Frankenberg, Elizabeth, Beegle, Kathleen, Thomas, Duncan, and Suriastini, Wayan. 1999. Health, Education and the Economic Crisis in Indonesia. Unpublished manuscript.
- Frankenberg, Elizabeth, Smith, James P., and Thomas, Duncan. 2003. "Economic shocks, wealth and welfare." *Journal of Human Resources* 38(280-320).
- Gertler, Paul J. and Gruber, J. 2002. "Insuring consumption against illness." *American Economic Review* 92(1): 51-70.
- Hanushek, Eric A. and Lavy, Victor. 1994. "School quality, achievement bias, and dropout behavior in Egypt." Living Standards Measurement Study Working Paper No. 107. Washington, DC: World Bank.
- Jacoby, Hanan and Skoufias, Emmanuel. 1997. "Risk, financial markets, and human capital in a developing country." *Review of Economic Studies* 64(3): 311-335.
- Khandker, Shahidur R., Lavy, Victor, and Filmer, Deon. 1994. "Schooling and cognitive achievements in Morocco: Can the government improve outcomes?" Discussion Paper No. 264. Washington, DC: World Bank.
- Lavy, Victor. 1996. "School supply constraints and children's educational outcomes in rural Ghana." *Journal of Development Economics* 51(291-314).
- Lloyd, Cynthia B., El-Tawila, Sahar, Clark, Wesley H., and Mensch, Barbara S. 2003. "The impact of educational quality on school exit in Egypt." *Comparative Education Review* 47(4): 444-467.
- Lloyd, Cynthia B. and Grant, Monica J. 2005. "Growing up in contemporary Pakistan: The separate experiences of males and females." In C. B. Lloyd, J. R. Behrman, N. P. Stromquist, and B. Cohen (Eds.), *The Changing Transitions to Adulthood in Developing Countries: Selected Studies*. Washington, D.C.: National Academies Press (Forthcoming).
- Lloyd, Cynthia B. and Mensch, Barbara. 1999. "Implications of formal schooling for girls'

- transitions to adulthood in developing countries." Pp. 80-104 in In C. H. Bledsoe, J. B. Casterline, J. A. Johnson-Kuhn, and J. G. Haaga (eds.), *Critical Perspectives on Schooling and Fertility in the Developing World*. Washington, D.C.: National Academy Press.
- Lloyd, Cynthia B., Mensch, Barbara S., and Clark, Wesley H. 2000. "The effects of primary school quality on school dropout among Kenyan girls and boys." *Comparative Education Review* 44(2): 113-47.
- Lloyd, Cynthia B., Mete, Cem, and Sathar, Zeba A. 2005. "The effect of gender differences in primary school access, type, and quality on the decision to enroll in rural Pakistan." *Economic Development and Cultural Change* 53(3): (In Press).
- Mete, Cem. 2004. "The inequality implications of highly selective promotion practices." *Economics of Education Review* 23(3): 301-314.
- National Research Council and Institute of Medicine. 2005. *Growing Up Global: The Changing Transitions to Adulthood in Developing Countries*. Cynthia B. Lloyd, Editor. Washington, DC: National Academies Press.
- Sathar, Zeba A., Lloyd, Cynthia B., and ul Haque, Minhaj. 2000. *Investments in Children's Education and Family-Building Behavior in Pakistan: Findings From Rural NWFP and Punjab*. Islamabad: Population Council.
- Sathar, Zeba A., Lloyd, Cynthia B., ul Haque, Minhaj, Diers, Judith A., Faizunnissa, Azeema, Grant, Monica, and Sultana, Munawar. 2003. *Adolescents and Youth in Pakistan 2001-02: A Nationally Representative Survey*. Islamabad: Population Council.
- Skoufias, Emmanuel and Parker, Susan W. 2005. "Job loss and family adjustments in work and schooling during the Mexican Peso Crisis." *Journal of Population Economics* Forthcoming.
- Thomas, Duncan, Beegle, Kathleen, Frankenberg, Elizabeth, Sikoki, Bondan, Strauss, John, and Teruel, Graciela. 2004. "Education in a crisis." *Journal of Development Economics* 74(1): 53-85.
- Townsend, Robert. 1994. "Risk and insurance in village India." *Econometrica* 62(3): 539-591.
- Transparency International. 2002. "Corruption in South Asia: Insights and Benchmarks from Citizen Feedback Surveys in Five Countries." Available: http://www.transparency.org/pressreleases_archive/2002/dnld/south_asia_report.pdf Accessed March, 2005.
- United Nations Millennium Project. 2005. *Taking Action: Achieving Gender Equality and Empowering Women*. New York: Task Force on Education and Gender Equality.

Table 1 Selectivity of panel women and children according to Wave 1 characteristics.

	Married women 20-45		Children 6-12	
	All	Panel	All	Panel
Age (mean)	31.3	31.3	8.8	8.8
Education-mean grades	1.4	1.4	1.4	1.5
Education-mean grades, amongst those who ever attended school	5.4	5.2	1.9	2.0
Household consumption (mean)	7561	7463	7628	7577
Total children ever born	5.07	5.10	n.a.	n.a.
Male (%)	n.a.	n.a.	50.41	51.21
Female (%)	n.a.	n.a.	49.59	48.79

Table 2 Distribution of Wave 1 and Wave 2 schools, by date of establishment and location inside or outside primary sampling unit (school count)

	Inside			Outside		
	Wave 1	Wave 2		Wave 1	Wave 2	
	<1997	<1997	>=1997	<1997	<1997	>=1997
<u>Punjab</u>						
Mixed Government	0	0	0	0	1	0
Boys' Government	11	11	0	2	3	0
Girls' Government	6	7	0	1	4	1
Private	7	7	13	0	7	6
<u>NWFP</u>						
Mixed Government	0	1	0	0	0	0
Boys' Government	8	8	0	2	7	0
Girls' Government	5	5	1	1	1	0
Private	4	5	8	3	5	3
<i>Total</i>						
Mixed Government	0	1	0	0	1	0
Boys' Government	19	19	0	4	10	0
Girls' Government	11	12	1	2	5	1
Private	11	12	21	3	12	9

Table 3 Distribution of Wave 1 and Wave 2 schools, by grades taught (school count)

			Preprimary and primary	Preprimary, primary, and postprimary	Incomplete primary	Total
<u>Government</u>						
Punjab	1997	17	3	0	20	
	2004	18	8	1	27	
NWFP	1997	16	0	0	16	
	2004	18	4	1	23	
<u>Private</u>						
Punjab	1997	6	1	0	7	
	2004	8	23	2	33	
NWFP	1997	2	5	0	7	
	2004	1	18	2	21	
<u>Total</u>						
Government	1997	33	3	0	36	
	2004	36	12	2	50	
Private	1997	8	6	0	14	
	2004	9	41	4	54	

Table 4 Comparison of school characteristics, Wave 1 versus Wave 2

	Government*				Private*	
	De Jure Boys		De Jure Girls		Mixed	
	1997	2004	1997	2004	1997	2004
Amenities Index (0-4)	1.5	2.4	1.3	2.2	3.8	3.8
Water (%)	69.6	81.5	69.2	66.7	91.7	97.9
Toilet (%)	18.2	33.3	8.3	66.7	91.7	95.7
Electricity (%)	31.8	55.6	15.4	44.4	100.0	95.7
Furnished (%)	40.9	74.1	41.7	38.9	91.7	89.4
Textbook in Urdu (%)	91.3	79.3	84.6	88.9	58.3	48.9
Textbook in English (%)	4.3	0.0	0.0	0.0	41.7	48.9
Teaching in local language (%)	87.0	69.0	69.2	26.3	8.3	16.7
Teachers' years of schooling	11.5	12.2	11.5	11.9	11.3	12.6
Teacher absent on day of visit (%)	20.8	9.6	31.0	15.7	9.0	8.7
Teacher resides in community (%)	29.7	35.8	35.0	38.6	81.0	56.4
Student to teacher ratio	26.3	29.9	27.1	26.4	22.6	19.0
Teachers per school	4.5	4.8	4.2	4.1	5.3	5.4
Teacher female (%)	2.7	1.7	100	100	85.4	69.1

*Note: At Wave 1, two boys' private schools are omitted from the analysis; at Wave 2, four boys' private schools, two girls' private schools, and two mixed government schools are omitted.

Table 5 Recent trends in primary school attendance and attainment among 15–19 year olds, Wave 1 versus Wave 2

	Boys		Girls	
	Wave 1	Wave 2	Wave 1	Wave 2
<u>Ever attended (%)</u>				
Punjab	83.8	86.9	63.7	62.5
NWFP	97.1	97.0	50.0	59.2
Total	90.5	92.7	56.3	60.8
<u>Primary completion (%)</u>				
Punjab	61.6	70.3	41.7	52.5
NWFP	92.2	90.4	29.2	40.8
Total	77.1	81.8	35.0	46.4
<u>Primary completion among ever attended (%)</u>				
Punjab	73.5	81.4	65.5	84.0
NWFP	94.9	93.1	58.5	68.8
Total	85.2	88.5	62.2	76.3

Table 6 Type of primary school last attended, of those who ever attended class one or higher

	5-9 year olds		10-14 year olds		15-19 year olds	
	Male	Female	Male	Female	Male	Female
<u>1997</u>						
Government	72	81	83	86	90	93
Private (For profit)	27	19	16	14	10	7
Private (NGO)	0	0	1	0	0	0
<u>2004</u>						
Government	57	61	65	73	76	84
Private (For profit)	41	38	34	25	24	16
Private (NGO)	1	1	0	2	0	0

Table 7 Means of independent variables used in multivariate analysis,
6–12 year olds who ever attended school at Wave 1

	Female	Male	All
N	314	425	739
NWFP (%)	50.0	62.6	57.2
Monthly household consumption (Rs/1000)	7.4	7.9	7.7
Mother attended school (%)	27.4	24.2	25.6
Father works agriculture/blue collar (%)	58.2	59.8	59.1
Community development index (0-7)	4.2	4.2	4.2
Unwanted birth in past 6 years (%)	37.3	45.2	41.8
Loss of remittances in past 6 years (%)	2.5	3.8	3.2
Any other shock in past 6 years (%)	58.0	51.3	54.1
Attended a government primary school (%)	81.5	77.3	79.1
School amenities (0-4)	1.7	1.5	1.6
Teacher resides in community (%)	39.8	39.9	39.9
Teachers' years of education (mean)	10.2	11.3	10.8
Post-primary grades available in community at age 10 (%)	38.85	63.29	52.91

Table 8. All respondents. Discrete time hazard model, odds ratio of dropping out of school.

	Grades 1 through 5									Grades 1 through 8								
	Model 1			Model 2			Model 3			Model 1			Model 2			Model 3		
	Odds Ratio	Z Value		Odds Ratio	Z Value		Odds Ratio	Z Value		Odds Ratio	Z Value		Odds Ratio	Z Value		Odds Ratio	Z Value	
Grade 2 (versus Grade 1)	3.949	2.69		3.963	2.69		3.965	2.69		3.905	2.67		3.908	2.66		3.914	2.67	
Grade 3 (versus Grade 1)	7.622	4.18		7.804	4.20		7.754	4.19		7.381	4.11		7.494	4.12		7.478	4.12	
Grade 4 (versus Grade 1)	7.534	4.06		7.707	4.08		7.686	4.09		7.192	3.97		7.301	3.99		7.320	4.00	
Grade 5 (versus Grade 1)	29.808	7.24		30.965	7.25		31.421	7.29		27.918	7.11		28.809	7.14		29.178	7.17	
Grade 6 (versus Grade 1)										12.938	5.07		13.401	5.11		13.499	5.12	
Grade 7 (versus Grade 1)										11.166	4.55		11.650	4.62		11.676	4.62	
Grade 8 (versus Grade 1)										30.124	6.70		32.023	6.77		31.662	6.74	
Male (versus Female)	0.223	-6.99		0.262	-6.09		0.306	-5.13		0.281	-7.18		0.325	-6.29		0.360	-5.52	
NWFP (versus Punjab)	1.183	0.82		1.052	0.19		1.042	0.16		1.054	0.31		0.896	-0.54		0.925	-0.41	
Household consumption	0.954	-2.10		0.935	-2.83		0.937	-2.67		0.956	-2.25		0.939	-2.85		0.941	-2.69	
Mother attended school	0.489	-2.67		0.509	-2.47		0.553	-2.13		0.523	-2.95		0.541	-2.73		0.575	-2.42	
Father's occupation	1.143	0.69		1.192	0.89		1.223	1.00		1.123	0.71		1.194	1.07		1.227	1.22	
Community Development	0.791	-3.69		0.776	-3.40		0.843	-2.31		0.862	-2.83		0.860	-2.61		0.902	-1.76	
Unwanted birth in last 6 yrs	1.180	0.82		1.214	0.97		1.210	0.95		1.391	1.95		1.417	2.05		1.416	2.05	
Loss of remittances	1.923	1.57		1.672	1.15		1.470	0.90		3.227	3.44		2.828	2.84		2.637	2.69	
Any other household shock	1.222	1.04		1.267	1.19		1.264	1.16		1.054	0.32		1.073	0.42		1.062	0.36	
Government primary (versus Private)	2.297	2.31		2.493	2.36		2.178	2.01		3.134	3.64		3.100	3.27		2.818	3.00	
School amenities				1.086	0.69		1.091	0.71					1.046	0.48		1.053	0.53	
Teachers' years of education				0.927	-2.45		0.948	-1.68					0.938	-2.42		0.953	-1.78	
Teacher resides in community				0.589	-1.51		0.667	-1.22					0.509	-2.46		0.538	-2.34	
Post-primary grades present in community at age 10							0.487	-3.03								0.641	-2.30	
Number of person-years	3098			3098			3098			3923			3923			3923		
Wald chi2(15)	172.75			174.49			180.84			201.83			202.64			206.04		
Prob > chi2	0.000			0.000			0.000			0.000			0.000			0.000		
Pseudo R2	0.1934			0.2028			0.2102			0.1648			0.1747			0.1779		
Log pseudolikelihood	-464.94			-459.51			-455.26			-657.46			-649.62			-647.08		

Table 9. Boys. Discrete time hazard model, odds ratio of dropping out of school.

	Grades 1 through 5									Grades 1 through 8								
	Model 1			Model 2			Model 3			Model 1			Model 2			Model 3		
	Odds Ratio	Z	Value	Odds Ratio	Z	Value	Odds Ratio	Z	Value	Odds Ratio	Z	Value	Odds Ratio	Z	Value	Odds Ratio	Z	Value
Grade 2 (versus Grade 1)	7.537		1.90	7.522	1.89	7.533	1.89		1.87	7.406	1.87	7.400	1.87		7.406	1.87		1.87
Grade 3 (versus Grade 1)	6.025		1.65	6.026	1.64	5.982	1.63		1.60	5.762	1.60	5.760	1.59		5.753	1.59		1.59
Grade 4 (versus Grade 1)	20.484		2.94	20.714	2.94	20.649	2.94		2.83	18.783	2.83	18.940	2.84		18.957	2.84		2.84
Grade 5 (versus Grade 1)	32.366		3.41	33.481	3.41	33.958	3.43		3.26	28.446	3.26	28.772	3.25		28.910	3.25		3.25
Grade 6 (versus Grade 1)									3.33	31.296	3.33	31.475	3.32		31.541	3.32		3.32
Grade 7 (versus Grade 1)									2.99	23.512	2.99	23.645	2.98		23.710	2.98		2.98
Grade 8 (versus Grade 1)									3.84	55.371	3.84	56.397	3.85		56.012	3.84		3.84
NWFP (versus Punjab)	0.378		-2.71	0.333	-2.19	0.376	-1.95		-3.49	0.421	-3.49	0.354	-3.45		0.374	-3.22		-3.22
Household consumption	0.906		-2.71	0.901	-2.40	0.903	-2.22		-1.49	0.948	-1.49	0.945	-1.46		0.946	-1.41		-1.41
Mother attended school	0.990		-0.02	0.894	-0.22	0.924	-0.15		-0.34	0.890	-0.34	0.813	-0.58		0.825	-0.53		-0.53
Father's occupation	1.459		0.85	1.673	1.15	1.858	1.33		1.12	1.397	1.12	1.595	1.55		1.645	1.63		1.63
Community Development	0.757		-2.61	0.652	-3.50	0.712	-3.11		-1.89	0.865	-1.89	0.782	-2.85		0.795	-2.75		-2.75
Unwanted birth in last 6 yrs	0.844		-0.48	0.756	-0.81	0.708	-1.01		0.68	1.194	0.68	1.111	0.41		1.088	0.33		0.33
Loss of remittances	2.078		1.23	2.920	1.69	2.366	1.47		3.15	3.927	3.15	4.838	3.49		4.630	3.45		3.45
Any other household shock	1.427		1.02	1.391	0.92	1.265	0.65		0.08	1.021	0.08	1.035	0.13		1.010	0.04		0.04
Government primary (versus Private)	1.231		0.44	0.649	-0.59	0.582	-0.71		1.93	2.156	1.93	0.902	-0.17		0.860	-0.24		-0.24
School amenities				1.150	0.69	1.151	0.64					1.032	0.25		1.033	0.24		
Teachers' years of education				1.189	1.38	1.184	1.36					1.172	1.75		1.175	1.76		
Teacher resides in community				0.386	-1.61	0.351	-1.74					0.336	-2.40		0.319	-2.43		
Post-primary grades present in community at age 10						0.511	-2.03								0.834	-0.66		
Number of person-years	1843			1843		1843				2401		2401			2401			
Wald chi2(15)	78.16			88.45		90.04				98.43		102.59			106.35			
Prob > chi2	0.000			0.000		0.000				0.000		0.000			0.000			
Pseudo R2	0.1725			0.1878		0.1935				0.1427		0.154			0.1545			
Log pseudolikelihood	-168.89			-165.76		-164.59				-289.08		-285.28			-285.11			

Table 10. Girls. Discrete time hazard model, odds ratio of dropping out of school.

	Grades 1 through 5						Grades 1 through 8					
	Model 1		Model 2		Model 3		Model 1		Model 2		Model 3	
	Odds Ratio	Z Value	Odds Ratio	Z Value	Odds Ratio	Z Value	Odds Ratio	Z Value	Odds Ratio	Z Value	Odds Ratio	Z Value
Grade 2 (versus Grade 1)	3.038	1.87	3.046	1.87	3.067	1.88	3.021	1.86	3.027	1.86	3.048	1.87
Grade 3 (versus Grade 1)	8.290	3.88	8.532	3.92	8.601	3.93	8.156	3.84	8.419	3.89	8.494	3.90
Grade 4 (versus Grade 1)	4.118	2.37	4.213	2.41	4.256	2.42	4.027	2.32	4.112	2.36	4.167	2.38
Grade 5 (versus Grade 1)	35.744	6.68	36.701	6.70	37.651	6.75	34.958	6.66	35.954	6.69	37.112	6.74
Grade 6 (versus Grade 1)							7.989	3.31	8.336	3.37	8.574	3.40
Grade 7 (versus Grade 1)							8.596	3.23	8.790	3.27	8.853	3.27
Grade 8 (versus Grade 1)							31.358	5.42	33.427	5.49	33.303	5.51
NWFP (versus Punjab)	2.179	3.05	2.058	2.08	2.195	2.26	2.026	3.30	1.843	2.14	2.011	2.41
Household consumption	0.970	-0.91	0.957	-1.28	0.954	-1.37	0.962	-1.31	0.944	-1.86	0.941	-1.93
Mother attended school	0.368	-2.87	0.379	-2.74	0.410	-2.48	0.390	-3.18	0.408	-2.96	0.444	-2.65
Father's occupation	1.096	0.38	1.174	0.64	1.164	0.59	1.105	0.46	1.178	0.73	1.174	0.70
Community Development	0.824	-2.44	0.798	-2.30	0.864	-1.36	0.868	-2.05	0.829	-2.28	0.889	-1.36
Unwanted birth in last 6 yrs	1.568	1.85	1.636	1.98	1.648	1.99	1.674	2.29	1.764	2.46	1.810	2.54
Loss of remittances	1.575	0.79	1.309	0.46	0.999	0.00	2.178	1.46	1.689	0.97	1.338	0.53
Any other household shock	1.360	1.21	1.358	1.19	1.381	1.25	1.193	0.80	1.204	0.80	1.229	0.89
Government primary (versus Private)	4.078	2.40	3.475	2.04	3.009	1.83	5.020	3.09	4.331	2.71	3.719	2.43
School amenities			0.867	-0.88	0.825	-1.13			0.892	-0.77	0.852	-1.03
Teachers' years of education			0.956	-1.14	0.978	-0.49			0.942	-1.71	0.962	-1.00
Teacher resides in community			1.347	0.54	2.129	1.20			1.240	0.45	1.919	1.20
Post-primary grades present in community at age 10					0.491	-1.85					0.504	-2.04
Number of person-years	1255		1255		1255		1522		1522		1522	
Wald chi2(15)	103.16		104.41		109.19		124.29		124.95		128.75	
Prob > chi2	0.000		0.000		0.000		0.000		0.000		0.000	
Pseudo R2	0.22		0.2257		0.2313		0.2044		0.2116		0.2172	
Log pseudolikelihood	-270.21		-268.25		-266.3		-339.98		-336.9		-334.5	

Figure 1 Grade Retention (10-14 year olds)

