Why Children Aren't Attending School: The Case of Northwestern Tanzania[1]

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Policies designed to increase education in low-income settings require an understanding of why children do not attend school. Drawing on longitudinal data of primary-school age children in Tanzania, our analysis evaluates the role various dimensions in determining children's attendance. Our results indicate that policies directed towards increasing a child's attendance need to be focused on the demand for schooling within the context of the household. Policies that affect demand for child labour within the household, especially those that promote substitutes for child labour, should be considered. Furthermore, programmes aimed at secondary schools (including improving access) can have an indirect affect on hours of primary-school attendance, particularly for girls.

1. Introduction

Investment in education is a crucial component of both economic and social development. Moreover, it is an important strategy for alleviating poverty in poor economies. Raising schooling levels is typically a focal point of development efforts in low-income settings by both the public sector and non-governmental organisations. Increased education is associated with, *inter alia*, higher worker productivity, improved health outcomes and generally higher

productivity in nonmarket production activities (e.g., Psacharopoulos and Woodhall, 1985; Strauss and Thomas, 1995).

Despite efforts to increase schooling, a large share of children in developing economies are not enrolled in school. Moreover, even when children enrol, many may not actually be attending school since enrolment is a decision that occurs only at the beginning of the school year. With this consideration in mind, this research focuses on a child's school attendance. More specifically, we examine a child's hours of attendance in the last week. Using a rich household data set from the Kagera region of northwest Tanzania, we explore the factors that influence school attendance among a sample of predominantly rural children. We simultaneously account for several determinants of attendance: family and household characteristics, opportunity costs of attendance, and measures of school quality.

Since independence in 1961, education policy in Tanzania has emphasised a unified, centralised system of education with equality for all pupils, resulting in increases in enrolment and improvements in gender equity (Roy-Campbell, 1992). Filmer (2000) does find a slight advantage for girls in the gender gap among 6- to 11-year-olds and a small gap in favour of boys for 12- to 14-year-olds. Tanzania is of particular interest as government policies emphasising social sector investments initially led to large increases in levels of education through the universal primary education movement of the 1970s. However, in the 1980s and 1990s these trends reversed and primary enrolment rates fell or remained stagnant. Although primary school is compulsory for 7- to 15-year-old children, enrolment rates have been well below 100%. As noted, this study will specifically focus on the Kagera region of Tanzania. Within this region the net primary enrolment rate fell from 58 to 44% from the 1970s to the 1980s, with essentially no difference by gender (Tanzania Development Research Group (TADREG), 1993).

The objective of this study is to explore the factors that determine a child's attendance both from the perspective of a household's demand for schooling and the supply of education services in the community. Using data from the Kagera region of Tanzania, we find that the direct costs of schooling were fairly low at the time of data collection. However, parental and household characteristics do play an important role in affecting the number of hours in attendance. Moreover, while the primary school's quality has little influence on attendance, the

location of the nearest secondary school does factor significantly in determining attendance, especially for girls.

The remainder of this paper is organised as follows. The following section discusses the background for this setting. Section 3 presents the conceptual framework for the estimation of attendance. The dataset and some descriptive statistics are presented in Section 4. The results of our estimation are detailed in Section 5. The paper concludes in Section 6 with a discussion of policy implications.

2. Background

The reasons why children do not attend school are complicated and varied. The first, most obvious reason for non-attendance is that the child is not enrolled. Thus, we start by considering the determinants of enrolment. Enrolment can be viewed as both an investment and consumption good. From an investment perspective, the household compares the costs of schooling to the expected benefits from schooling. These costs include direct costs such as school fees and indirect costs such as the opportunity costs of time. One expected benefit of schooling is a higher future wage. However, analyses of the returns to schooling find lower wages in Tanzania relative to other countries in the region (Knight and Sabot, 1990; Mason and Khandker, 1997). Another potential benefit of schooling is improved agricultural techniques. However, Mason and Khandker (1997) suggest that these returns will be low, since traditional production methods are practised and it is modern agriculture systems that are associated with higher returns to schooling in agriculture. From a consumption perspective, households may have preferences for educating children beyond those motivated by future pecuniary benefits of schooling. Parents may place an intrinsic value on education. Thus, parents may prefer different levels of education for their children.

From the perspective of the supply of schooling, both the quality of schooling and the educational infrastructure in Tanzania have been deteriorating over the past two decades (Omari and Mosha, 1987; Roy-Campbell, 1992; TADREG, 1993). The system suffers from 'low quality, inefficiency, and inadequate access' (World Bank, 2002). Aging schools are in dilapidated condition and suffer from years of neglect. Increasingly, there is evidence that parents are reluctant to send their children to school given the low expected returns coupled with the

cost of schooling and the opportunity cost of children's time, as discussed above (TADREG, 1993).

There are several empirical studies that discuss the reasons for non-enrolment in Tanzania. They generally find, among other results, that enrolment is a function of the child's age as well as household characteristics and reported fiscal constraints. Burke (1998) found that a large fraction of parents of non-enrolled children aged seven to nine considered their child to be too young to be enrolled. Even 65% of children age 10–12 years old were viewed as too young. This study is corroborated by the World Bank (1995), which documented a significant amount of delayed enrolment into primary school. They found that the average age of enrolment in primary school was nine for girls and nearly ten for boys. As the child ages, monetary constraints begin to become a factor in the parent's decision to enrol a child. For children age 13–15, 46% of parent's reported that the household could not afford the expenditures for fees, uniforms or text books (Burke, 1998).

In a study on the relationship between household characteristics and primary enrolment in Tanzania, Al-Samarrai and Peasgood (1998) find substantial intra-household differences in how mothers' and fathers' characteristics correlate with boys' and girls' enrolment probabilities. Their study analyses the primary enrolment of a sample of offspring as old as 60, covering a large span of time in terms of the nature and the characteristics of the schooling system, as well as the decisions to enrol children. In addition, this study does not evaluate any measures of school availability or quality nor measures of community characteristics. In a similar study, Mason and Khandker (1997) draw on the Human Resource and Development Study data (HRDS) covering a sample of households from all regions in mainland Tanzania. They include some measures of access to schooling, but not measures of school quality. When they control for household characteristics, they find modest effects of the distance to the school and the number of schools per capita on girls' enrolment. They conclude that data on school quality are 'critical to evaluating just how large an impact quality improvements would make on primary and secondary school participation'.

Enrolment does not fully capture school participation since even when children are officially enrolled, they may not actually be attending school. Enrolment is typically done at the start of the school year, whereas the decision to participate in school is made throughout

the school year. Moreover, even among children who attend on a fairly regular basis, hours of attendance can vary greatly. While enrolment is a prerequisite for school participation, it is not a sufficient condition. Factors that vary throughout the school year as well as fixed family characteristics can influence the intensity of schooling. For children who are enrolled in school, one study of rural Tanzania finds that the most frequently reported reasons for non-attendance were farm work, sickness and the absence of teachers. The inability to pay fees is also reported (TADREG, 1993). Again, the reasons for non-attendance for these children seem to vary with the age of the child. In HRDS, the two most prevalent reasons for non-attendance in children aged 10–15 were that the child had to care for someone who fell ill in the household or there was a death in the family (Burke, 1998).

The opportunity cost of sending a child to school, often considered to be the lost value of the child's labour, is often cited as another obstacle to attendance. Many Sub-Saharan Africa countries have a persistently high incidence of child labour (Basu, 1999). Child labour is postulated to displace schooling, although some research has shown that school and work are not necessarily substitutes (e.g., Ravallion and Wodon, 2000). Children in rural Tanzania often participate in income generating activities, particularly in the non-wage sector on household farms, working on a variety of tasks.[2] Akabayashi and Psacharopoulos (1999) find that children's hours of study decrease as their labour increases, although the causal relationship is hard to identify.

Within the context of these studies, this study extends our understanding of why primary-aged children are not attending school by focusing on multiple determinants. In particular, family and parental background, measures of school quality, and school access are included in the analysis.[3]

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[2] It is important to note that child labour can encompass activities beyond wage-employment. These activities include labour related to the household farm (such as working in the fields or tending to livestock) or time spent on non-farm self-employment activities (such as food stalls). Furthermore, sometimes child labour is defined as including time spent in household activities not directly related to income earning tasks. These include collecting water, fetching firewood, cleaning the house and preparing meals, as well as time spent caring for other children or ill household members.

[3] Because many of the same factors have the potential to influence both the health of individuals in the household and a child's school attendance, illness may be an

3. Estimation Framework

In order to determine the number of hours a child will spend in school we estimate a reduced form equation:

(1) $$Y_{it} = \alpha + C_{it}\beta_C + H_{it}\beta_H + R_{it}\beta_R + u_i + \varepsilon_{it}$$

where i indexes children and t indexes time. The dependent variable (Y) is the number of hours in attendance in the last week. The set of covariates in C are the child's characteristics, H are the characteristics of the household and R are the community characteristics. These characteristics are discussed in further detail below. This specification of an error-components model allows for a time invariant as well as a time-varying disturbance term. The component u_i, the time invariant portion of the disturbance term, can be seen as encompassing factors that are specific to the individual, i, that are not captured by the covariates in the regression and will not change over time. The component ε_{it}, the time varying portion of the disturbance term, captures the time varying factors that are not captured by the covariates.

Hours in attendance is the total number of hours in school in the last week, and as such as are left-censored at zero.[4] In order to account for censoring we employ a random effects Tobit model. Both estimations incorporate the non-continuous form of the left-hand-side variable, as well as the panel aspect of the data in the estimation.

A complete list of all variables included in our estimation, including their definition, mean, and standard deviation are included in the appendix (Table A1). Below we discuss these variables in more detail.

3.1 Child Characteristics

In Tanzania, like other Sub-Saharan African countries, the probability that a child is enrolled in school significantly increases, peaks, and begins to decrease as he or she ages. In order to avoid the confounding effect of delayed enrolment, we only include children aged 10 and older in our sample, rather than focusing on the official starting age of

endogenous determinant of attendance. It is difficult to identify valid instrumental variables, thus, the health of individual household members has been omitted from the analysis. We do include the community's health infrastructure, that is the distance to the nearest health facility as a proxy for the overall of the household.
[4] Four observations with greater than 50 hours are also excluded from analysis.

7 years for primary school. Further, given that gender patterns prove to be different in the empirical estimation, we estimate our model separately for boys and girls.

Familial relationship within in the household is posited to influence outcomes. For example, the relationship to the household head can affect the decision to enrol the child if it captures control over resources that dictates priority in educating one's own children before other children in the household. Children who reside with their parents may face different outcomes than foster children. Children living in a fostering situation are potentially disadvantaged in many ways. They have been found to lack proper nutrition, have less access to health care, work longer hours and receive less schooling than the family's own children (Ainsworth, 1996; Bledsoe *et al.*, 1988). In addition to controlling for foster status, we also control for orphan status. Children who have lost one or both their parents are often hypothesised to be particularly disadvantaged, although the evidence for this varies across countries (Ainsworth and Filmer, 2002; Ainsworth *et al.*, 2002).

Parental education status is included and potentially captures an income effect of greater earning potential. Furthermore, parental education captures a general preference for education which can vary by education level.

3.2 Household Characteristics

Within the set of household characteristics, we include a set of variables describing the head of the household: age, gender, and religion. Of particular interest are households headed by females since they are more likely to have lower economic status. Moreover, previous research has shown that women tend to use their resources in more child-oriented ways. In a study of Sub-Saharan Africa, Lloyd and Blanc (1996) find that children's enrolment increased when a female was the head of the household. Thus it would be interesting to see if the gender of the household head has a similar affect on a child's hours of attendace.

Economic shocks can affect attendance, especially shocks associated with changes in labour demand within the household and expenditure patterns than inhibit the household's ability to pay school costs (fees and other costs). Of particular salience in this setting is recent adult mortality in the household (mainly associated with HIV/AIDS), which

may influence the decision to send a child to school. A recent death in the household could cause a reallocation of the household's resources to pay for funeral expenses. Furthermore, the death of a household member may place demands on a child's time. For example, the child may be employed in the labour force either inside or outside the household, in order to increase the household's resources causing the child's attendance to decline, although evidence of this impact is weak (Beegle, 2002). Sudden shocks like the death of household members underscore the need to measure attendance, rather than enrolment. Enrolment, decided at the beginning of a school year, would have been established *before* the shock occurred.

Finally, we control for household resources through household wealth. Wealth is computed as the total value of all household assets owned at the time of the survey.

3.3 Community Characteristics

In order to control for the high degree of within-region variation, we use a set of community-level information collected in conjunction with the household survey data. To capture the general characteristics of the communities, we identify the district of the village and the urban or rural status of the community.

We also have information about the characteristics of the labour markets in each community. Thus, we include an indicator for whether a child wage was reported in the community survey to attempt to identify the existence of a functioning child labour market in the community. However, this will only capture the formal child labour market in which children earn wages outside the household. Children may have labour market opportunities by working within the household in productive non-wage activities. Therefore, we use information from the household survey to calculate the proportion of children working on household farms as a second measure of the extent to which a labour market exists for children. This excludes daily chores such as cooking, fetching water/firewood and cleaning the house. Measures of the level of health services and infrastructure in the community are also included. To capture the seasonality within the agricultural labour market, we also include seasonal covariates. A price index, developed from the set of market prices collected in the community data set, is included to capture temporal price changes across the districts over time.

Turning to the primary school data, we include an array of availability and quality measures of school supply. For availability, we include the number of primary schools in the community. Likewise, since decisions to invest in primary schooling may be influenced by the access to post-primary schooling, we also include information on the presence of a secondary school and the distance to the nearest secondary school outside the community. Our measures of primary school quality include the teacher-to-class ratio, presence of one blackboard per classroom, and textbooks per pupil. In addition, we include controls for the presence of organisations in the community providing assistance to schools in that community.

4. Data and Descriptive Statistics

4.1 Data

To examine the competing influences on the determinants of attendance we use a rich dataset that affords us the opportunity to incorporate these various factors previously discussed into our analysis. The data for this study are drawn from a research project conducted by the World Bank and the University of Dar es Salaam in the Kagera region of Northwest Tanzania. The Kagera Health and Development Survey (KHDS) surveyed over 800 households in the Kagera region up to four times from 1991 to 1994, with an average interval between surveys of 6–7 months.[5] Households are drawn from 51 communities in the six administrative districts of Kagera (Karagwe, Bukoba Urban, Bukoba Rural, Muleba, Biharamulo and Ngara).

This dataset has several features that make it particularly appropriate for the analysis. First, the KHDS is a detailed household survey with a wide array of individual and household characteristics. Among them, the survey contains information on time use of all household members aged seven and older. This includes time spent last week in school as well as in household businesses (farm and non-farm) and wage labour activities. By emphasising hours of attendance, we account for students who attend less than full-time as well as those not attending despite their enrolment status.

[5] The explicit objectives of the KHDS were to measure the economic impact of fatal illness (primarily due to HIV/AIDS) in the region and to propose cost-effective strategies to help survivors. For more information about this project, see Ainsworth *et al*. (1992) and World Bank (1993).

Secondly, the KHDS fielded a survey of all primary schools located in and serving the communities where household interviews were conducted. This allows us to link measures of availability and quality of schooling to the children in the household survey. Villages in this study each had at least one primary school. These facilities are public and children rarely attend primary schools outside their village, as compared to settings where there are numerous public and private schools and, thus, school choice becomes a confounding factor in evaluating the impact of school quality on the decision to attend (Glewwe, 2002).

Thirdly, the data are longitudinal which can be advantageous in the statistical analysis. Since the household attrition rate is low, we believe that differences in outcomes over time will reflect real changes rather than differences in household characteristics. Furthermore, the panel data allow us to test and control for time-variant, unobservable variables that may bias cross-sectional results.

Our sample consists of 628 households in the KHDS panel that includes at least one child 10–15 years of age.[6] In this sample of households, an average of approximately two children are aged 10–15 years and nearly two children are under 10 years of age per household.

Table A1 presents the definitions, means and standard deviations for all of the variables that are included in the estimation. In the following subsections, we present some further descriptive statistics for three main areas of concern in this paper. These areas include school participation, the direct and indirect costs of schooling, and school characteristics.

4.2 School Participation

Of the sample of children age 10–15, 75% were reported to be currently in school at the time of the survey, while 78% of children age 10–15 had attended in the past 12 months.[7] Thus, 3% of all children had either permanently or temporarily dropped out of school in the previous 12 months. Between girls and boys, we find no significant difference in

[6] The following statistics draw on the first round of data collection.
[7] Net enrolment rates as proxied by attendance in last week in the KHDS are higher than in the 1988 Tanzanian Census for the same six districts of Kagera (45%). In part due to the higher ages used here, it may also be due to the sampling design of the KHDS and the years that the KHDS spans.

attendance rates. Although, as we will discuss later, the determinants of attendance differ significantly between boys and girls**.**

Among children reported to be currently in school at the time of the survey, 17% did not attend in the last week. In the follow-up question for children who reported attending for 0 hours in the previous week, the most common reason cited was 'holiday or school break/vacation' (68%), followed by 'own-illness' (7%) and 'other' (20%). For the sample of children who had attended at least 1 hour in the past week, the average student spent 31 hours in school in the last week and an average of 4.5 days in school. Still, the majority of the children (78%) spent 5 days in school in the past week.[8]

4.3 Direct and Indirect Costs of Schooling

Turning to the direct costs of schooling, the KHDS collects information on the breakdown of expenditures for schooling across several categories of expenditure over the last 12 months. Although it was the general government policy that 'no school fees should be charged' for primary education, different school governing boards did regulate a number of other fees prior to the change in policy in 2002 (Therkildsen, 1998). In fact, an official enrolment fee was introduced in 1995; this enrolment fee was subsequently eliminated in 2002. Direct costs of schooling at the time of the KHDS data collection are broken down into five categories: school fees (annual), registration and parent association fees, cost of uniforms, cost of school equipment (stationery, exercise books, textbooks) and cost of transport/lodging. For students in the Kagera region the largest component of school expenditures are uniforms (48%), followed by books/supplies (23%) and UPE fund fees (16%). The other costs of schooling were a small share of the total school expenditures (3%).[9] Because all villages have at least one primary school, almost no children had any transportation or lodging expenditures. About 12% of children had a 'sponsorship' to cover their schooling costs. That is, someone or some organisation contributed funds to assist the household in paying for school. In almost all cases,

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[8] Double-shifts in schools where there are limited school buildings are common in some low-income settings. We do not have information on this in the community school questionnaire, but can infer from the household questionnaire that this is not the case for Kagera. The evidence suggests that primary schools are not using double-shifts that would limit the number of hours to about four per day.

[9] These results are consistent with Mason and Khandker's (1997) finding for primary schooling using national survey data.

this was a close relative, such as a non-resident parent, sibling, or aunt/uncle. In any case, this outside assistance constitutes a small share of total school expenditures (just 6%). Overall, total school expenditures were less than one% of total household expenditures.

Given that the direct costs of schooling are rather low, we consider the opportunity costs of schooling as the more relevant 'cost' of schooling. In particular, we focus on the hours students spend in school compared to hours in other activities. Since very few children report any time in wage-employment or non-farm self-employment activities, we emphasise three broad areas of time use for children for children aged 10–15. These include farming on the household farm, chores (including fetching firewood, collecting water, cooking, cleaning and caring for sick household members) and school hours in the classroom. Girls and boys spend, on average, the same number of hours in school and in farming activities (where not participating is zero hours). On average, they spend 9 hours in farming in the last week and 19 hours in school. In chores, we do see a significant difference between girls and boys, with a mean of 15 hours for girls and 11 hours for boys. With all activities there is an age gradient, with hours increasing as children get older. For young girls and boys (10 or younger), we do not see differences in hours in chores. Total hours across these three very broad activities is approximately 40 hours per week or nearly 6 hours per day, which leaves roughly 18 hours a day for sleeping, homework/study and leisure activities. In this sense, on average, there seems to be a margin to increase school hours without necessarily reducing time in other economic activities.

4.4 School Characteristics

The level of quality within schools can impact the overall effectiveness of the school system and the long-run returns to schooling for children and society. Shortages of basic equipment such as classrooms, desks and books, not to mention other materials like charts and maps, could be a cause of poor enrolment, low attendance and under-development of cognitive skills.

From Table 1, we can draw two broad conclusions about the state of primary schools in the region. First, there is significant heterogeneity in the quality of schools across the six districts in the region. For example, the primary schools interviewed in Muleba and Biharamulo are disadvantaged with respect to classrooms, with three classes of

Table 1: *Quality of the School Environment in Kagera, by District*

| Characteristic | District | | | | | | |
	Bihar. (n = 6)	Ngara (n = 7)	Karag. (n = 8)	Muleba (n = 12)	Bukoba rural (n = 19)	Bukoba urban (n = 11)	Total (n = 63)
Classes per classroom[a]**	1.50	1.08	1.13	1.32	1.07	1.18	1.19
Blackboards per classroom[a]	0.71	0.82	0.66	0.71	0.81	0.82	0.76
Student/teacher ratio*	45.2	31.9	38.6	32.0	37.2	26.6	34.8
Classrooms[a]**	4.8	5.9	7.1	7.2	6.9	6.5	6.6
Teacher/class ratio*	0.89	1.49	1.27	1.17	1.14	1.72	1.28
Pupils per textbook:							
Kiswahili	3.4	4.7	2.6	2.3	3.2	7.1	3.9
Mathematics	2.1	3.3	2.3	2.0	3.5	8.5	3.8
Other	2.0	3.3	1.1	3.1	2.8	5.0	3.0

Bihar., Biharamulo; Karag., Karagwe.
[a]This excludes one school in Muleba with zero classrooms, recently blown away by a windstorm.
*The difference across districts is statistically significant at 1%.
**The difference across districts is statistically significant at 5%.

students for every two classrooms in Biharamulo. Secondly, quality within all districts is quite low. At least some schools in every district had the problem of crowding in classrooms. None of the districts contain one blackboard per classroom. This situation was the worst in Karagwe, where one in three classrooms had no blackboard. The student/teacher ratio was high everywhere except in the schools in the Bukoba Urban district, although schools in Bukoba Urban district had the largest average class size. These schools also had the highest teacher/class ratio, which is nearly double the ratio in the primary schools interviewed in Biharamulo, where class size was, on average the smallest.

Another indicator of low quality is the shortage of textbooks. We draw two main lessons from the textbook data profile. First, there is generally an inadequate supply of even the most basic and crucial textbooks (Kiswahili and mathematics), which are essential inputs for the development of primary skills. The lack of equipment was reported as one of the four main schooling problems by 84% of

community informants. Secondly, there is large variation in the number of pupils per textbook. On average, nearly four children must share a single Kiswahili textbook and a single mathematics book. This is close to the 1990 national average of just over three and a half pupils per book from the Ministry of Education and Culture, but is *lower* than overall averages for all schools in Kagera in that year (TADREG, 1993).[10] The scarcity of textbooks is the worst in Bukoba Urban, where seven children share one Kiswahili book and more than eight children share a mathematics textbook. In addition, several schools interviewed had no texts whatsoever for particular grades.

When examining school fees in Table 2, 16% of the schools exempted students living in poverty from paying the fees. Moreover, 26% of orphans were exempt from the fees. Overall, the percentage of schools exempting students from paying the fees is surprisingly low. However, compared with other school costs, such as uniforms, these fees themselves are relatively low.

To alleviate the problems of poor infrastructure and inadequate teaching materials, a number of organisations provide assistance to schools. However, the level of assistance is insufficient as is indicated by the poor state of primary schools.[11] Sixteen per cent of all schools received some form of assistance in the 6–7 months between

Table 2: *Percentage of Schools Exempting School Fees, by Criterion and District*

District	Exemption for poverty	Exemption for orphans	Any exemption	Number of schools
Biharamulo	0	0	0	6
Ngara	27	27	29	7
Karagwe	25	50	50	8
Muleba	16	25	27	11
Bukoba rural	11	21	21	19
Bukoba urban	18	27	27	11
Total	16	26	26	62

[10] These averages ranged from four and a half in Bukoba Rural to nearly five in Muleba.
[11] As noted above, it is not the case that direct assistance from an NGO to the student is a substitute for direct assistance to the schools.

interviews of the KHDS. Receipt of assistance varies across districts; none of the schools in Ngara or Biharamulo districts received any outside assistance. Furthermore, schools interviewed in the Bukoba Urban district received funding from the greatest number of sources. However, only one school in Bukoba Rural reported receiving textbooks in the past 6 months. This finding is consistent with the very high student per book ratio for this region.

5. Multivariate Analysis

To estimate the determinants of a child's hours of attendance in the last week, we use a random effects Tobit model (Table 3). As noted earlier,

Table 3: *Random Effects Tobit Estimation of Hours of Schooling of children Aged 10–15 Years in the Last 7 Days*

Covariate	Boys		Girls	
	Coef.	SE	Coef.	SE
Child				
Age in years	21.91***	(5.45)	31.61***	(5.53)
Age squared	–0.78***	(0.22)	–1.20***	(0.22)
Child of household head	–1.57	(3.24)	–6.36**	(3.38)
Mother in household	5.29**	(2.38)	7.52***	(2.64)
Father in household	3.68	(3.80)	5.82	(4.19)
Mother is deceased	2.71	(2.78)	0.47	(2.72)
Father is deceased	–2.26	(2.89)	1.58	(2.90)
Both parents deceased	0.03	(3.79)	–10.10***	(3.71)
Father: 1–6 years of education	7.33***	(2.62)	–1.90	(2.78)
Father: 7 years of education	6.12**	(2.77)	1.05	(2.83)
Father: 8+ years of education	9.96***	(3.44)	3.62	(3.51)
Mother: 1–6 years of education	3.20	(2.02)	8.83***	(1.99)
Mother: 7 years of education	6.04**	(2.34)	11.10***	(2.45)
Mother: 8+ years of education	3.99	(8.85)	10.50**	(5.94)
Household				
Age of household head	0.06	(0.05)	0.18***	(0.06)
Female household head	2.20	(2.44)	2.40	(2.77)
Catholic household head	2.49	(1.92)	–0.82	(2.58)
Other religion (non-Catholic, non-Muslim) of head	1.78	(2.23)	–0.61	(2.81)
Adult female died in last 6 months	–4.07*	(2.36)	–2.33	(2.56)
Adult male died in last 6 months	–0.26	(4.05)	–2.12	(3.10)
Household asset value per person (log)	1.20**	(0.47)	2.18***	(0.54)

Table 3: *Continued*

Covariate	Boys		Girls	
	Coef.	SE	Coef.	SE
Community				
Urban community	2.05	(4.52)	12.39**	(4.80)
Child wage reported in community	0.08	(1.10)	1.03	(1.10)
Per cent of children farming in community	–3.43	(3.33)	–10.78***	(3.28)
Any health facility within 1 km	2.60	(1.94)	–2.33	(2.09)
2–3 Primary schools in community	–0.003	(2.40)	1.07	(2.43)
Secondary school within 5 km	3.38	(2.34)	9.66***	(2.29)
School				
Teachers per class	–3.18	(2.18)	–1.07	(2.18)
1+ Blackboards in each classroom	–0.44	(1.19)	1.75	(1.19)
Students per Kiswahili text	–0.17	(0.10)	–0.15	(0.12)
Students per math text	0.13	(0.15)	–0.04	(0.12)
1+ school receiving assistance	1.06	(1.36)	1.77	(1.43)
Rho	0.8067	0.0358	0.6165	0.0284
Number of observations	1521		1423	

Coef., coefficient; SE, standard error.
*Significant at 10%, ** at 5% and *** at 1%. Estimations also include dummy variables for district, season of interview, and price index based on community-level prices; missing values of father's education and mother's education; and a constant term.

we are using a panel data set that allows us to control for variation across time. Before presenting the specific results, we should note that controlling for this variation is important; the likelihood ratio test comparing the pooled estimator with the panel estimator indicates the significance of the panel component. We estimate the determinants separately by gender in order to explore differences in the determinants for boys and girls, focusing on the effects on hours of attendance of the child's own characteristics, the characteristics of the household and then the characteristics of the community in which the household is located.

5.1 Child Characteristics

As would be expected, hours in attendance increase, level off and then decrease as he or she ages. This holds true for both boys and girls and follows the delayed primary enrolment that characterises Tanzania (World Bank, 1995; Bommier and Lambert, 2000). The effect is larger for girls.

Children of the household head, controlling for other characteristics, do not attend for more hours. When examining parental presence in the household, we find that a mother's presence in the household benefits her children. If a child's mother is in the household, the hours that a child will spend in school will significantly increase. A father's presence in the household does not significantly affect hours in attendance of boys or girls. Orphanhood impacts hours of attendance for girls. Girls who are two-parent orphans have fewer hours in school, but one-parent orphans (in a fostering situation) do not have significantly different hours in school.

Parental schooling also plays a role in determining hours of attendance but differently by gender. This finding is consistent with other results from Tanzania (Mason and Khandker, 1997; Al-Samarrai and Peasgood, 1998) and other parts of Africa (Tansel, 1997; Glick and Sahn, 2000). Mother's schooling is more strongly associated with a daughter's attendance hours than those of her son. In contrast, a father's schooling significantly increases a boy's hours of attendance, but does not significantly affect girls' attendance. Moreover, the size of the coefficients of maternal schooling are larger than father's education, suggesting a higher rate of return on investments in education of girls.

5.2 Household Characteristics

When considering the characteristics of the household head, the household head's age influences attendance for girls. A girl's hours of attendance are significantly increased as the age of the household head is increased. However, the gender of the household head does not play a role in determining hours of attendance. Recent mortality of adult female in the household are associated with fewer hours among boys. There is no significant mortality influence on a girl's hours of attendance. The fewer school hours for boys could indicate substitution into farming activities. Furthermore, we find that our

measure of economic status, household wealth, is associated with increased hours in school for both boys and girls.

5.3 Community Characteristics

Turning to the community-level covariates, we examine those that describe the community in general, and those pertaining to quality and availability of schools. Girls in urban communities spent significantly more hours in school in the last week. A child wage reported in a community survey does not significantly influence hours of attendance. In contrast, an increase in the percentage of children in the community participating in farm labour decreases the hours in attendance, significantly so for girls.

While the number of primary schools in the community does not affect hours of attendance, girls hours of attendance are significantly increased if there is a secondary school within 5 km of the community. These results suggest that raising primary school attendance involves more than investments in access to primary schools. Investing in secondary school access could result in an increase in the number of hours of school participation for girls. Given that secondary school enrolment is conditional on satisfactory completion of primary school, the results indicate that parents consider the education path beyond primary level when investing in the primary schooling of children.

Surprisingly, our indicators for quality at the local primary school were not associated with higher hours of attendance among boys or girls. This result may be driven by the overall low level of quality and/or a lack of sufficient variation in these indicators within the data for this region.

6. Conclusions

The analysis in this study focuses on understanding why some children do not attend school. This is of particular concern in Tanzania, where schooling outcomes in recent years indicate serious problems with declining enrolment and increasing illiteracy rates. Drawing on data from the Kagera region of Tanzania, we focus on the correlates of school attendance for children. We focus on various factors associated with the number of hours of school attendance in the week preceding the survey interview. Panel-estimation techniques are used to directly compare factors that influence school attendance including family and

household characteristics, measures of the indirect costs of attendance, and measures of school quality.

Generally, the direct costs of schooling are not very high, suggesting that these costs may not be a major deterrent to a child's attendance, although this proposition is not explicitly tested here since these costs have already been paid by the children attending. As expected, family factors play an important role in determining whether a child will attend school, although not always in ways one would expect. The presence of the mother in the household is significantly associated with greater hours of attendance. Likewise, mother's schooling raises attendance for all children, whereas father's schooling is associated with an attendance probability that is higher for boys but lower for girls. Two-parent orphanhood is only associated with fewer hours in school for girls. Opportunity costs also factors into the attendance decision; girls attend for fewer hours in school in communities with a higher percentage of children participating in farm labour. School quality is not associated with increased attendance. However, school availability in terms of the distance to a secondary school is associated with significantly greater hours in attendance for girls.

These results indicate that policies directed towards increasing a child's attendance need to be focused on the demand for schooling within the context of the household, as well as the supply of schooling beyond the primary level. Given that the opportunity cost of the child's time, specifically a girl's time, affects attendance, policies that affect demand for child labour within the household, especially those that promote substitutes for child labour, should be considered. Secondly, programmes aimed at secondary schools (including improving access) can have an indirect affect on hours of primary-school attendance for girls.

What remains to be investigated are the channels through which greater access to secondary school motivates primary school attendance for girls. For example, does access alleviate opportunity costs, or are social and cultural norms related to sending girls far from home (and possible to board at the secondary school) important considerations? More generally, this study highlights that the research agenda in this area needs to focus on school outcomes beyond the enrolment measures in order to capture schooling processes of children, this includes current hours of attendance but also extends to numerous other dimensions such as evaluating the determinants of cognitive development and skills outcomes. This could include

collecting information on performance of children upon completion of primary school (such as exam scores or grades).

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Table A1: *Means and Standard Deviations (SD) for Children Aged 10–15 Years*

| | Boys | | Girls | |
Covariate	Mean	SD	Mean	SD
Child				
Attended school in last 7 days:	0.70	(0.46)	0.68	(0.47)
1 if yes, else 0				
Hours in school in last 7 days	21.52	(16.47)	22.09	(17.29)
Age in years	12.50	(1.64)	12.62	(1.69)
Child of household head:	0.66	(0.47)	0.67	(0.47)
1 if yes, else 0				
Mother in household: 1 if yes, else 0	0.57	(0.50)	0.57	(0.50)
Father in household: 1 if yes, else 0	0.53	(0.50)	0.54	(0.50)
Mother is dead: 1 if yes, else 0	0.23	(0.42)	0.22	(0.41)
Father is dead: 1 if yes, else 0	0.29	(0.45)	0.30	(0.46)
Both parents dead: 1 if yes, else 0	0.10	(0.30)	0.10	(0.31)
Father: 1–6 years of education:	0.42	(0.49)	0.46	(0.50)
1 if yes, else 0				
Father: 7 years of education:	0.31	(0.46)	0.28	(0.45)
1 if yes, else 0				
Father: 8+ years of education:	0.10	(0.31)	0.12	(0.33)
1 if yes, else 0				
Mother: 1–6 years of education:	0.36	(0.48)	0.36	(0.48)
1 if yes, else 0				
Mother: 7 years of education:	0.28	(0.45)	0.28	(0.45)
1 if yes, else 0				
Mother: 8+ years of education:	0.01	(0.11)	0.02	(0.14)
1 if yes, else 0				
Household				
Age of household head	51.16	(15.10)	50.41	(14.99)
Female household head: 1 if yes, else 0	0.27	(0.45)	0.26	(0.44)
Catholic household head: 1 if yes, else 0	0.58	(0.49)	0.62	(0.49)
Other religion (non-Catholic,	0.24	(0.43)	0.24	(0.43)
non-Muslim) of head: 1 if yes, else 0				

Table A1: *Continued*

Covariate	Boys		Girls	
	Mean	SD	Mean	SD
Adult female died in last 6 months: 1 if yes, else 0	0.04	(0.20)	0.03	(0.18)
Adult male died in last 6 months: 1 if yes, else 0	0.01	(0.11)	0.02	(0.15)
Household asset value per person (log)	11.25	(1.40)	11.23	(1.25)
Community				
Urban community: 1 if yes, else 0	0.20	(0.40)	0.26	(0.44)
Child wage reported in community: 1 if yes, else 0	0.47	(0.50)	0.46	(0.50)
Per cent of children farming in community	0.62	(0.21)	0.63	(0.21)
Any health facility within 1 km: 1 if yes, else 0	0.36	(0.48)	0.35	(0.48)
2–3 Primary schools in community: 1 if yes, else 0	0.25	(0.43)	0.28	(0.45)
Secondary school within 5 kilometers: 1 if yes, else 0	0.33	(0.47)	0.36	(0.48)
School				
Teachers per class	1.30	(0.45)	1.36	(0.46)
1+ Blackboards in each classroom: 1 if yes, else 0	0.43	(0.49)	0.40	(0.49)
Students per Kiswahili text	4.47	(5.71)	4.39	(5.05)
Students per math text	3.36	(3.83)	3.81	(4.83)
1+ school receiving assistance: 1 if yes, else 0	0.17	(0.37)	0.16	(0.37)
Number of observations	1521		1423	