PRIMARY SCHOOL UNDER-ENROLLMENT IN MOZAMBIQUE:

EXPLORING THE EFFECTS OF HOUSEHOLD INFLUENCES ON SCHOOL ENROLLMENT DECISIONS

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To my son, Luke, who brings wisdom to our lives each day

and

To my wife, Kristen, infinitely supportive in both strength and grace

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Chapter I

Introduction

Over forty million children in sub-Saharan Africa are currently not enrolled in primary school (Ainsworth & Filmer, 2006; Easterly, 2009). A number of countries have made a tremendous effort to increase their enrollment rates - with some of the poorest countries such as Burkina Faso, the Democratic Republic of Congo, and Mali producing double digit increases in primary school enrollment – but over a third of the countries in the region continue to enroll less than 85% of eligible children (Ainsworth & Filmer, 2006; Lloyd & Hewett, 2009). Mozambique in particular added more than 1200 schools between 2004 and 2008 – a net increase of over 15% - while primary school enrollment rates increased less than 4% during the same period – rising from just 64.1% to 68% (Mozambique National Institute of Statistics, 2010; UNICEF, 2008). When considering the effects on girls in particular, the ratio of girls to boys enrolled in primary schools in sub-Saharan Africa has remained relatively static at 80% since the early 1990s (Ainsworth & Filmer, 2006; Easterly, 2009). While countries are enrolling more children, underlying causes for under-enrollment of girls and other sub-populations has largely gone unchanged. While we are encouraged by progress, review of the literature indicates that observed under-enrollment is potentially attributed to the supply of primary education, characteristics of supply inputs, or unique household characteristics directing enrollment decisions.

Due to the persistent lack of resources that have affected sub-Saharan nations, a meaningful amount of research has been conducted to guide the supply of primary education. Understanding where schools should be built, how many teachers to train and the quantity of

textbooks to provide have been crucial inputs for developing sufficient educational infrastructure. Without the presence of these basic educational inputs, countries are unable to teach literacy, numeracy and other critical subjects necessary for stable economies, social cohesion, and a democratic citizenry (S. Handa, 2005; Lewin, 2009; Motala, Dieltiens, & Sayed, 2009; The World Bank, 2004). Enrollment numbers noted above, however, are indicating there are diminishing returns from simply increasing the supply of primary education in Mozambique and other sub-Saharan countries. These finding do not minimize the importance of supply inputs, but rather point to the importance of exploring other influences that dictate the degree to which communities and governments can increase their enrollment rates.

In order to understand the remaining gaps in enrollment, a significant amount of research has focused on assessing the characteristics of supply provided in the region – specifically in the areas of building infrastructure, teacher training and availability, and type of textbooks and related inputs (Burke & Beegle, 2004; Chimombo, 2009; Dewey, 2000). The characteristics of educational supply are a unique area of research as it serves as an intersection between educational infrastructure and household perceptions. The type of textbook provided is traditionally a supply issue but directly influences a household's perception of the quality of education their child receives (Dewey, 2000; Sudhanshu Handa & Simler, 2005). The supply of teachers can affect class size which may inform a household's perception of how much attention their child receives in school (Case & Deaton, 1999; Chimombo, 2009; Dewey, 2000; Sudhanshu Handa & Simler, 2005). The characteristics of school inputs, however, appear to have their most significant impact on school enrollment when there are other private or public comparisons available (Heyneman, Stern, & Smith, 2011). While statistically significant, so few communities have more than one primary school alternative – as in many provinces of Mozambique, that the characteristics of supply inputs cannot reasonably explain the leveling of

school enrollment in Mozambique or other sub-Saharan nations (Mozambique National Institute of Statistics, 2008).

Given the diminishing returns observed from growing the supply of primary schooling and small observed affects from controlling the characteristics of supply, it is our belief that elucidating the household's complex structure and its effect on school enrollment decisions is the key to understanding the methods and related policies required to increase school enrollment. Cultural factors influencing the educational attainment of women continue to affect the household's decision to send a son or daughter to school (Fleisch & Shindler, 2009; Roby, Lambert, & Lambert, 2009; Sheldon, 1998). Limited income and resources often induce a family to ration educational investments (Akresh, Bagby, Walque, & Kazianga, 2010). Agricultural shocks can increase the demand for child labor and adverse health events of parents or siblings can redistribute an income burden to children and reduce the demand for primary school enrollment (Beegle, Dehejia, & Gatti, 2006; Jensen, 2000; Roby & Eddleman, 2007). While supply-side investments may be a prerequisite to the provision of primary schooling for a given population, the significance of household characteristics and events that affect educational investment choices must be better understood for communities to effectively increase their enrollment rates.

Chapter 2

The Importance of School Attendance

National and Regional Economies

The economic and social effects of school attendance are well documented (Akabayashi & Psacharaopoulos, 1999; Barrett, Reardon, & Webb, 2001; Ellis & Biggs, 2001; Sudhanshu Handa, Simler, & Harrower, 2004; Sen, 1999; Winters et al., 2009). On a national and regional basis, the accumulation of human capital is a primary means to increasing labor productivity and serves as a prerequisite to attracting domestic and international investment capital necessary to stimulate economic growth (Sudhanshu Handa, et al., 2004). As human capital becomes more available and of higher quality, human capital can reduce the poverty level by substituting for physical capital unequally distributed across a country or population. Economies largely dependent on land, finite natural resources or concentrated wealth that is unequally distributed can leverage expanding human capital to develop new products and services that both diversify the economic base and provide new forms of employment and investment (Sudhanshu Handa, et al., 2004; Lanjouw, Quizon, & Sparrow, 2001; Winters, et al., 2009). If countries do not adequately invest in schooling and related vehicles required for the development of human capital, economic gains will not only remain restricted to the returns of their fixed natural resources but also limit the long term growth potential realized from new industry and service sectors dependent upon the supply of human capital in the region.

Social Cohesion and Stable Democratic Norms

Economies which continue to underinvest in human capital and propagate economic inequalities through a dependence on finite resources have been found to slowly erode the level

of social cohesion necessary to develop and operate an effective democracy (Heyneman, 2000, 2002). As the opportunity for social mobility declines and social capital erodes between households and communities – trade, investment, and trust declines throughout the economy. Conversely, as human capital develops and expands throughout an economy, bridging and bonding between and within social groups increases and new sectors of economic growth are developed. Trust levels increase, economic and legal processes gain new efficiencies and economic inequality between social groups declines (Sudhanshu Handa, 2002; Sudhanshu Handa, et al., 2004; Heyneman, 2000, 2002). In turn, democratic participation improves and is incented to ensure key economic norms and regulations are stabilized, maintained and improved over time (Oder, 2005; Oketch, 2005).

Health Status of Regional Populations

As economies realize significant returns on their investment in human capital, improvements in the health status of the population are simultaneously observed. Research throughout sub-Saharan Africa has shown that increased enrollment rates in primary education decrease infant mortality rates and raise rates of immunization (Lindelow, 2008; Streathfield, Singarimbum, & Diamond, 1990). Schooling has been shown to reduce the frequency of risky health behavior, resulting in decreased vulnerability to and incidence of HIV transmission, increased use of birthing assistance and improved spacing between births (Barrera, 1990; Bicego & Boerma, 1993). Maternal literacy has special import when considering the improved health status of a population. Focusing specifically on populations in sub-Saharan Africa, Handa et. al. showed that basic maternal literacy of mothers in Mozambique raised the probability of a child completing all vaccinations by sixteen percent and the probability of a child possessing a health card by eleven percent (Sudhanshu Handa, et al., 2004). The improved health outcomes achieved through schooling further enhances the economic returns initially achieved through

basic investments in human capital. Healthy lives improve the longevity of the most experienced and efficient workers while improving household economic returns by reducing unnecessary health care expenditures and reducing lost wages and decreased productivity due to personal and household member illness (Lindelow, 2008).

Schooling also improves the choices households make in cultivating and developing certain crops and staple foods. Individuals who complete primary schooling have been found to eat more healthily and cultivate a basket of food stuffs that improve the nutritional value of family edibles and meals (Behram & Wolfe, 1987; Wolfe & Behram, 1982). Schooling is an integral component of not only reducing risky health behaviours but also improving the inputs required for long term health and longevity.

Individual and Household Agency

Schooling also remains an integral part of improving the aspirations of individuals and households. Primary schooling cultivates literacy, numeracy and other foundational skills that empower individuals to improve their personal production functions and expand the number of occupations and skill sets one can pursue. As opportunities are defined and realized, individuals believe they can affect their own future and realize hopes and dreams they articulate and espouse. Schooling and education not only improve the capability of an individual, but also the functionings an individual can pursue (Sen, 1999). In its most basic sense, learning to write not only allows an individual the opportunity to function as a writer, but also the capability to communicate asynchronously, articulate new ideas to be shared with others and define agreements between two parties. As Sen expressed in his own review of agency, capabilities and functionings - functionings can in turn create new capabilities which then further empower new functionings to be realized. In the example above, the formation of contracts allows a

system of enforceable rules to be created which govern such contracts – which further develops the capability to trust and anticipate behavior between parties – leading to improved economic efficiency and productivity (Sen, 1997, 1999). Once an individual develops a sense of agency and believes they are capable of achieving new goals and aspirations, they inevitably begin realizing those functions and in turn develop new capabilities that further improve production and output.

Given individuals are a part of a household unit, it's easy to understand why households would make informed investment decisions surrounding school enrollment and attendance. With schooling the primary vehicle for households to improve their collective level of human capital and the means to increasing the capabilities and functionings of the entire family – schooling becomes the fulcrum from which a household can improve economic output, advance the health status of family members, expand its social capital within the community, and impact the likelihood of its ability to respond to unforeseen challenges through the investment in new capabilities (Oya & Sender, 2009; Sen, 1999; Takyi & Broughton, 2006). While the supply of education may be increased by a government ministry for macroeconomic reasons, it is the household investment decision in education that is likely to inspire, determine, and realize whether or not a child enrolls and persists through primary school.

It should be noted, however, that school attendance decisions are composed of interconnected forces spanning individual beliefs, household characteristics, community capabilities, transport access and other meaningful inputs affecting the daily lives of our survey's respondents. While our review of the literature has tried to categorize the significant factors of attendance decisions into simple classifications and has focused on the household dimension for our survey – attendance decisions involve both macro and micro effects that make it difficult to

isolate just one factor in decision making. Review of the entire literature and our findings should therefore be considered holistically and in partnership when considering policy decisions to improve school attendance in low-income countries.

Chapter 3

The Limitations of School Supply

Given the number of children of primary school age that remain out of school and the significant returns households and governments achieve from increasing enrollment and school completion rates – the historical assumption has been that if governments simply build enough schools for children to attend - enrollment rates will dramatically improve (Ellis & Biggs, 2001; Sudhanshu Handa, 2002; Sudhanshu Handa & Simler, 2005). The supply of schooling is no doubt a prerequisite to schooling as an investment opportunity for a household, but its simple presence in the community does not necessarily dictate that households will elect to enroll their children in school (Burke & Beegle, 2004; Lavy, 1996; Younger, 2003). There is therefore a unique intersection between the community's supply of educational inputs and the household demand function for electing to enroll a child in primary school. As supply and demand functions inform one another while exhibiting their own unique characteristics, a brief review of key educational inputs are covered here in order to inform the methodology of our proposal and the long-term importance of understanding household influences on enrollment decisions.

School Building Supply

The first of three essential school inputs is the school building and its related infrastructure. While schools throughout sub-Saharan Africa have been known to meet without building structures, latrines and related constructions – a great deal of research has shown that the physical presence of a school building is essential to developing consistent primary school enrollment levels (Filmer, 2007; Sudhanshu Handa, 2002; Sudhanshu Handa & Simler, 2005;

Lewin, 2009; Lewin & Akyeampong, 2009; Motala, et al., 2009; Somerset, 2009; UNICEF Mozambique, 2009).

Assuming adequate building structures are present, the density of schools present can affect the distance a child may need to travel to school. While a school may be present five miles away and possess a slot for that child, the distance may simply be too great for the child to pursue enrollment (Sudhanshu Handa, 2002; Sudhanshu Handa & Simler, 2005). Incorrect placement of schools can make travel impassable when children are forced to cross rivers or steep inclines when traveling to school – raising issues of safety and lost time. While placement of schools may be a supply-side decision, it should be noted that it can dramatically affect the household demand for education as well. If issues of safety or lost time become too risky or costly, households will invest their efforts in something other than schooling (Case & Deaton, 1999; Sudhanshu Handa, 2002; Sudhanshu Handa & Simler, 2005; Motala, et al., 2009; Porter, 2007).

When the demand for education is high in a community, the number or size of schools can also impact the educational experience. As is the case in Mozambique, most primary schools have been forced to serve two separate groups of students during a given school day (Mozambique National Institute of Statistics, 2007). Because there are not enough schools and the schools are not physically large enough, one group of students are instructed during the morning and another group of students are instructed in the afternoon. Instructional periods are lessened and students must travel the same distance for half the traditional instruction time (Sudhanshu Handa & Simler, 2005; Sudhanshu Handa, et al., 2004; UNICEF Mozambique, 2009). Again, as the perceived quality of schooling declines due to a lack of schooling supply, there is a potential downward pressure on households investing in primary school enrollment.

Quantity of Instructors

In the event adequate school structures are built, teachers must also be present for instruction to take place. Inadequate numbers of teachers can contribute to large class sizes, a lack of instructional expertise in certain subjects, and a larger number of days in which school is cancelled due to teacher illness, disability, or other personal reasons (Case & Deaton, 1999; Lavy, 1996). A number of studies have shown that when a single school teacher is responsible for school-wide instruction – as is often the case in poor rural areas of Mozambique – children can miss weeks and months of schooling due to teachers falling ill from AIDS, delivery and care of a newborn, or caregiving demands at home (Sudhanshu Handa, 2002; Sudhanshu Handa & Simler, 2005).

Textbook Supply

Textbooks have been shown to be the third primary input for ensuring adequate schooling resources (Heyneman, Farrell, & Sepulveda-Stuardo, 1978; Heyneman & Jamison, 1980). Textbooks specifically augment teacher instruction and help students advance their knowledge outside of the school day or make up for deficits that may occur when a teacher is not knowledgeable or familiar with a specific subject area (Goldhaber & Brewer, 1995; Sudhanshu Handa & Simler, 2005). The importance of textbooks and other educational support materials – such as computers – have been controversial as some developed countries have not realized an increase in schooling demand or performance when more textbooks or related inputs are present in the school (Harris, 2007). Heyneman showed, however, that in low-income countries there is a very real and measurable impact on school enrollment and outcomes when a greater investment is made in school materials and textbooks (Goldhaber & Brewer, 1995; Heyneman & Jamison, 1980; Heyneman & Loxley, 1983). While research continues to be done in this area, indications are there are diminishing returns on increasing

the number of textbooks past a given level, but anything below a basic level of school textbooks and materials has a profound and significant effect on school enrollment and educational outcomes (Dewey, 2000; Harris, 2007; Heyneman & Loxley, 1983).

Supply Side Conclusions

Few doubt the supply of schooling inputs is a prerequisite for households having the option to make an investment in education and their children's schooling. Supply side decisions, however, can have a significant effect on the level of investment a household might make in school enrollment. Placement of schools effect safety and lost time that could be spent laboring in fields, caregiving, or earning wages. An inadequate number of schools can shorten school days and limit instruction time and quality. The gender of teachers can make schooling more or less attractive to households while an inadequate supply of teachers can make instruction infrequent and therefore a more costly investment if children are traveling to school without being instructed. We must therefore honor the importance of schooling supply and acknowledge which type and amount of inputs can influence household primary school enrollment decisions. Given an understanding of the ways in which educational inputs influence household enrollment decisions, we can begin to explore the intersection of quality indicators and household perceptions necessary to more fully understanding why families specifically choose to send (or not send) their children to school.

Chapter 4

Mixed Results from Adjusting the Characteristics of Supply Inputs

Characteristics of Instruction

As noted in our discussion of schooling supply, the type of educational inputs can have a significant effect on whether a household decides to enroll their child in primary school. In review of the literature, teacher quality was the most sited supply characteristic involved in primary school enrollment decisions (Burke & Beegle, 2004; Sudhanshu Handa, 2002; Sudhanshu Handa & Simler, 2005; Sudhanshu Handa, et al., 2004; Heyneman, et al., 2011; Lewin, 2009; Somerset, 2009). Teacher quality was not only composed of the quality of instruction, but also degree of absenteeism, fairness, and turnover. If the teacher did not regularly show up for school, was perceived to be unfair to groups of students, "corrupt" by requesting payment for grades, or was regularly replaced by another teacher – families were far less likely to send their child to school (Case & Deaton, 1999; Sudhanshu Handa & Simler, 2005; Sudhanshu Handa, et al., 2004).

Recent studies have also shown that the supply of female teachers can have a dramatic effect on school enrollment or attendance. It appears that female teachers attract more students than male teachers and specifically attract more female students than male students (Sudhanshu Handa, 2002; Sudhanshu Handa & Simler, 2005). Elucidating another unique intersection between the type of teacher supply and the household demand for education – it appears that households are more willing to invest in schooling when a female teacher is directly supplied as an educational input.

In cases where the length of school day was limited by either too few teachers, too small of classrooms (and therefore had a morning or afternoon session rather than a complete school day) or the teacher was unable to be on time due to distance traveled to school – families were again less likely to send their son or daughter to school (Sudhanshu Handa & Simler, 2005; Sudhanshu Handa, et al., 2004). If instruction time is going to be severely limited – families are unlikely to send their child to school (Sudhanshu Handa & Simler, 2005; Sudhanshu Handa, et al., 2004; UNICEF Mozambique, 2009). While these reasons are simple and straightforward, the research reinforces the fact that households make very deliberate enrollment decisions based on the quality of instruction they assume their child will receive.

Characteristics of School Infrastructure

The quality of building infrastructure and its effect on enrollment decisions have also been researched, but in nearly every case they've proven to be a non-factor in family decision making or the least significant factor when evaluating whether or not to enroll a child in primary education (Case & Deaton, 1999; Sudhanshu Handa, 2002; Sudhanshu Handa & Simler, 2005). Studies have specifically reviewed the presence of latrines, chalkboards, and roofing materials. In each case, however, the quality of building infrastructure had, in some cases statistically significant, yet marginal measurable effect on the enrollment decision.

The Relative Importance of Supply Characteristics

While the characteristics of school inputs remains a meaningful intersection between the influence of supply and demand on schooling, it should be noted that policies governing teacher selection, management and oversight appear to be the most important when influencing family enrollment decisions. Furthermore, while the presence of a building, chalkboard, or textbook is certainly important as a function of supplying education to a

community – the characteristic of the physical input itself has not yet shown to widely influence enrollment decisions. It should be noted, however, that few quality studies appeared to have been conducted in environments where there was already an adequate supply of educational inputs. Consequently, it is very possible that when families are presented with two schooling options with an equal supply of inputs (i.e. schools are equidistant, contain textbooks, and similar class size) – quality may have a more significant effect on the schooling decision (Heyneman, et al., 2011). We would argue, however, for the purpose of our review in Mozambique, that the characteristic of available schooling would likely influence where your child attended school rather than whether or not to enroll your child in the first place.

Chapter 5

Dominant Household Themes Affecting Primary School Enrollment Decisions

Given the increase in school supply and educational inputs throughout sub-Saharan Africa during the last four decades, research has begun to explore the effect of household characteristics on enrollment decisions as fewer than expected families have pursued schooling once it's become available in their community (Sudhanshu Handa, 2002; Lewin, 2009; Motala, et al., 2009; Somerset, 2009). We address this issue in a step-wise fashion. In step one, we have focused on reviewing traditional household characteristics known to be highly predictive of school enrollment – specifically gender beliefs, safety, and cost. In step 2, we summarize the literature that has only recently emerged about new household characteristics that may also effect school enrollment decisions – namely health status, child ability and aspiration, agricultural production, household community infrastructure, agency, and presence of non-governmental schools. With a traditional and emerging look at household characteristics, we then look at the ways in which the literature has understood the directional relationship between household characteristics as both a determinant and an outcome of schooling.

Gender Beliefs

Informed by a region's religious influences and demographic density, gender beliefs remain a significant influence on whether or not a household decides to invest in their child's education (Cramer, Oya, & Sender, 2008; Fleisch & Shindler, 2009; Roby, et al., 2009; Sheldon, 1998; Stedham & Yamamura, 2004). In a study of 21 low-income countries, it was found that each country consistently sends more boys to primary school than girls (Filmer, 2007). Specific studies have shown that many families, especially in rural communities, continue to believe

their daughters will marry early in life and quickly become a part of another family's production function (Burke & Beegle, 2004; Roby, et al., 2009; Sheldon, 1998). Investing in a girls education when she is likely to leave the family early and no longer support the family's income prospects – remain frequently cited reasons for electing not to enroll girls in primary schooling.

Studies have also shown that some families believe schooling may actually decrease the marital prospects their daughter will have after completing primary school (Roby, et al., 2009; Sheldon, 1998). Even though clear evidence has shown women completing primary school are more productive, more knowledgeable about preventing disease, and further invest in their own children's education and capabilities – many families' continue to believe educated daughters are perceived to be more independent, less willing to compromise and consequently less desirable to potential grooms.(Le Vine, LeVine, & Schnell, 2001; United Nations Children's Fund (UNICEF), 2005)

Certain religious beliefs have also been found to reinforce a gender bias towards sending boys to school rather than girls (Jejeebhoy, 2000; Jejeebhoy & Sathar, 2001; Le Vine, et al., 2001; Stedham & Yamamura, 2004). Studies have shown that certain religious traditions continue to believe a mother's duty is to work in the home and that she should limit her public interactions to those events where her husband is present and specifically not engage in trade or commerce(Jejeebhoy & Sathar, 2001; Le Vine, et al., 2001; Stedham & Yamamura, 2004). As these beliefs entrench themselves within a given community, men and women both begin to advocate for sending their sons to school and restricting enrollment for girls in the family (Cramer, et al., 2008; Sheldon, 1998; Takyi & Broughton, 2006).

Gender beliefs, while difficult to measure, continue to significantly influence primary school enrollment decisions when it comes to educating both boys and girls. It is anticipated

that further studies will reinforce these findings as well as confirm a higher attendance of girls within families where the mother exhibits a higher degree of personal agency within the family structure.

Safety and Exploitation

The distance between a child's home and school has long been understood as a significant factor affecting school enrollment (Filmer, 2007; Foster & Rosenzweig, 1996). The opportunity cost of a child's lost labour from traveling significant distances has also been well documented (Akabayashi & Psacharaopoulos, 1999; Rovallion & Wodon, 2000). Recent studies, however, have shown that the issue of safety may be a stronger determinant than the actual distance to school. While there is a statistically significant effect of school distance on primary school enrollment decisions, the safety of the travel itself seems to be a much stronger determinant on whether the child enrolls or persists in school (Oxaal, 1997). Studies specifically note that parents are worried about their child being threatened or abused while traveling independently to school. Respondents consequently note they are more likely to send their son to school, rather than their daughter, for the simple reason their son will likely be safer while traveling to school (Malmberg-Calvo, 1994; Porter, 2002, 2007).

Recent studies have also shown that families fear their child may be exploited by teachers at their children's school (Roby, et al., 2009; United Nations Children's Fund (UNICEF), 2005). A survey with heads of households in Mozambique articulated that many believe their daughter will face regular sexual harassment while at school or be expected to perform sexual favors for the teacher or instructor (Roby, et al., 2009). The same survey showed, in the instances of boys, many were expected to either perform chores at their teachers home or pay substantial funds for grades and high marks. While research is currently being done to

determine how widespread these issues are, safety and exploitation continue to be an issue from a number of different perspectives and one in which future studies will continue to focus on.

Cost (and Opportunity Cost)

There is considerable documentation that the direct cost of schooling, such as tuition and fees, has a significant and measurable effect on whether households enroll their children in school (Beegle, et al., 2006; Chimombo, 2009; Edmonds, 2006; Janvry, Finan, Sadoulet, & Vakis, 2006; Rovallion & Wodon, 2000). Countries throughout sub-Saharan Africa have reduced or eliminated school tuition and fees during the last two decades and primary school enrollment has risen dramatically (Kadzamira & Rose, 2003; Lewin, 2009; Lewin & Akyeampong, 2009; Somerset, 2009). The challenge of directly funding tuition and fees while going without the child's labor and support is not surprising given the low earning potential of many households in sub-Saharan Africa – educational fees have consequently proven to be simply too much for some families and the decision is often made not to enroll children in school(Akabayashi & Psacharaopoulos, 1999; Beegle, et al., 2006; Edmonds, 2006).

The most often defined opportunity costs affecting school enrollment decisions are care of siblings, child labor used in agricultural production, and children's lost wages. Numerous studies have shown that families use older siblings, most often girls, to care for younger brothers and sisters in order for parents to focus on income generation for the family (Akabayashi & Psacharaopoulos, 1999; Black, Devereux, & Salvanes, 2005; Edmonds, 2006). Households most often equate the cost of schooling with the loss of *parental* wages foregone in order to care for the family while older children are in school. In the case of child labor, as is the case in Zambezia, Mozambique, a great number of families are subsistence farmers – and

therefore view schooling as a potential loss to agricultural production (Beegle, et al., 2006; Jensen, 2000). Since subsistence farming is dependent on a number of uncontrollable variables, it is unclear how important the child's labor actually is to the overall productivity of the land. For these reasons, most studies have had a difficult time determining the degree to which agricultural productivity affects schooling investments and therefore the opportunity cost of child labor may be a qualitative factor empirically unproven (Edmonds, 2006).

Studies concerning the effects of school tuition and loss of child labor on primary school enrollment should not, however, assume that families are unwilling to directly invest in their child's primary schooling. A great many families throughout sub-Saharan Africa are paying for private education in the expectation that the household's prospects will be improved over the long run in comparison to the public option (Heyneman, et al., 2011). It should therefore be assumed that each of the variables affecting household investment should be taken to be interdependent and likely to influence one another in an interdependent manner. Trying to understand this complexity and embracing new variables affecting household investment will therefore be the focus of our remaining sections and investigation.

Chapter 6

Emerging Household Characteristics Effecting Primary School Enrollment

Outside of the traditional areas of research concerning primary school enrollment decisions, several new areas of inquiry have emerged during the last decade. While enrollment decisions related to gender beliefs, the cost of schooling and quality of education pursued are no doubt foundational to a family's decision on whether or not to enroll their children in school – innovations in the study of agency, agricultural production, child ability and health and infrastructure are providing new insights into the complexity in which schooling decisions are made. In an effort to better reflect the literature on the subject and to inform our ongoing studies of primary school enrollment in sub-Saharan Africa, a brief overview of each category is explored below.

Health Status and Schooling Decisions

A number of studies have shown that health conditions affecting school attendance over long and intermittent periods of time – such as malaria – can significantly influence a family's decision to enroll their child in primary school (Clarke et al., 2008; Thuilliez et al., 2010). While health status has been known to be an impediment to school enrollment – recent studies have begun to explore health status' effect on student absences, achievement, and long-run schooling persistence. As an example, Fernando and Wickremasinghe determined that six malaria infections during primary schooling lowered achievement scores in sampled Sri Lankans by more than 15%. When malaria interventions are put in place and students are presented with bed nets and chloroquine prophylaxis, school absences were found to decrease by as much as 62.5% (Fernando, de Silva, Carter, Mendis, & Wickremasinghe, 2006).

Parents may actually have the desire and means to enroll each child in primary school, but as health status impedes enrollment from taking place, health serves as an impediment – rather than the households intent – in determining enrollment. Interventions to prevent such conditions should therefore result in higher enrollments and an overall increase in human capital achieved through primary schooling (Clarke, et al., 2008; Lindelow, 2008; Thuilliez, et al., 2010). Chronic conditions or illnesses likely to reoccur over time without management or prevention may also affect enrollment decisions as absence rates increase, child achievement declines, and the overall return from schooling decline to a degree the household invests more in a healthy sibling competing for limited resources (Clarke, et al., 2008; Thuilliez, et al., 2010). Understanding both the impact of pending child mortality and chronic disease on school enrollment may therefore be an important factor influencing primary school enrollment and should be studied in greater depth while controlling for more traditional factors covered above.

Child Ability , Aspiration and Expectation

While the household's assessment of child ability and its effect on schooling investments has only recently begun to be studied, it consistently shows up as a statistically significant variable when included in analysis. In its purest form, recent studies have shown that families do have a sense of which siblings are likely to do better in school and which child has a better prospect for persisting through primary and secondary education (Ayalew, 2005; Black, et al., 2005; Butcher & Case, 1994; Glick & Sahn, 2010; Ota & Moffatt, 2007). These perceptions are not always accurate, but they do appear to affect education investment decisions when resources are scarce (Ayalew, 2005). To the degree child ability affects investment decisions more or less than other demand variables is unclear. It is also unclear regarding the degree these perceptions are informed largely by gender bias, birth order, or other confounding factors (Black, et al., 2005; Butcher & Case, 1994). Nevertheless, we feel it important to mention here.

Slightly more researched than child ability is the household's perception of schooling's overall return on investment. While a number of innovative studies have been conducted to assess a family's expected return – the majority of research has shown that a family may possess high educational aspirations for each of their children but those aspirations greatly differ from their expectations (Al-Sammarrai & Peasgood, 1998; Ayalew, 2005; Glick & Sahn, 2010; Sudhanshu Handa, et al., 2004; Taylor & Yunez-Naude, 2000; Winters, et al., 2009). More specifically, studies have indicated that families believe it is possible that successful primary schooling will likely lead to secondary and university completion for many students – but do not necessarily expect it will happen for their children directly (Lewin, 2009; Lewin & Akyeampong, 2009). The question researchers are now grappling with is why aspirations and expectations occasionally vary within families – even for those families who are making great sacrifices to send their children to school. For the purpose of our question, it therefore remains unclear whether households elect not to enroll their children due to a lack of aspiration or an expected rate of return.

Agricultural Production and Use

As noted earlier, when families depend on child labor or children's wages to increase household income levels – there is an opportunity cost associated with enrolling a child in school. Research noted above and elsewhere has confirmed this relationship by showing that land ownership correlates with lower school attendance and long-term persistence. Recent studies, however, have shown that more education leads to a higher incidence of non-agricultural wages and lower economic returns to schooling when household land use is high (Rigg, 2006; Winters, et al., 2009). Children who attend and complete primary schooling are likely to not choose agriculture as their primary source of long-term income. Households that have a large amount of land, and perhaps even better positioned to afford sending their

children to school, still send fewer children of their children to school because they perceive the return from schooling to be low - or perhaps unnecessary given household income comes from agriculture rather than non-agricultural labor – which is often perceived as the outcome of schooling (Lanjouw, et al., 2001; Winters, et al., 2009; Yunez-Naude & Taylor, 2001).

While there may be a higher opportunity cost to child labor for agricultural households in comparison to households dependent on non-agricultural wages that children cannot perform, it may be the very presence of the agricultural income and the belief that education won't improve returns from the land – that ultimately determines the household's decision to enroll their children in school (Winters, et al., 2009). This would explain why some areas of sub-Saharan Africa which remain largely rural or have invested aggressively in expanding land use – have not seen the expansion in primary school enrollments they expected. While the perceived benefits of schooling amongst agricultural income-based households has not yet been widely studied – it is mentioned here in order to present the complexity involved in assessing the opportunity cost decisions households perform in determining their educational investments and primary school enrollment.

Presence of Household and Community Infrastructure

The difference between urban and rural households and their different approaches to school investment decisions has been well documented and studied (Barrett, et al., 2001; Ellis & Biggs, 2001; Reardon, 2000). In most cases the research has focused on the above topics of distance to school, access to quality teachers, direct and indirect costs of schooling, and topics covered earlier. Recent studies, however, have begun to explore the importance of household and community infrastructure in school enrollment decisions. While the definition of infrastructure is widely defined in the literature, we include it here to encompass the presence

of electricity, access to clean water, transportation to and from school, and other items that might ease barriers to both attending school as well as facilitating the ability to study outside the school building. While it is extremely difficult to study infrastructure inputs while controlling for family income, school supply differences between communities, and intrahousehold factors such as child health or ability, it is plausible that infrastructure can significantly decrease direct and indirect costs of education and therefore might affect household investment decisions in education in a meaningful way (Khanam & Ross, 2006; Tansel, 2002). Household infrastructure items may also enable different levels of social connectivity and social cohesion. As households are more connected to their communities they may also be more likely to enroll their children in school. Being able to control for some of these factors in a large enough household survey, however, may allow us to determine if items such as electricity – which allows children to study or learn in the evening – could allow children to substitute education time with child labor during daylight hours while advancing studies during the evening (Barrett, et al., 2001).

Agency

Research regarding school enrollment decisions has also indicated that the sense of personal agency amongst and between parents may also affect educational investment (Jejeebhoy, 2000; Jejeebhoy & Sathar, 2001; Mason, 2005; Pitt, Khandker, & Cartwright, 2006; Samman & Santos, 2009). While agency may be broadly defined as an individual's perceived power or influence over their surroundings or as the capabilities a person believes they possess in pursuit of certain functionings – agency appears to play a crucial role in a parents' perception of how education can influence the long-term prospects or freedom a child might possess (Jejeebhoy, 2000; Samman & Santos, 2009). As an example, a recent study in Mozambique showed that women found to have a significantly higher measurable level of personal agency were significantly more likely to send both their sons, and especially daughters, to school when

compared to women representing lower levels of personal agency (Oya & Sender, 2009). Qualitative reviews performed during the study indicate that the choice to send children to school was largely dependent on (a) the mother's desire to provide their sons, but especially their girls, with the freedom to provide for themselves and (b) access to more markets with non-agricultural wage opportunities – a specific type of economic freedom (Oya & Sender, 2009). While women in the study with higher levels of agency were found to also be divorced and well-educated, it does appear that agency can be a potential determinant of school enrollment decisions. While causality is certainly difficult to determine in all the studies we examined – as agency itself is a multi-dimensional outcome and input in household decision making, we believe understanding the degree of personal agency parents and heads of household possess – could be a significant determinant in defining school enrollment decisions as a household. While understudied, we believe agency to be an area of increasing importance and we will make every effort to study its affects in our Mozambique study.

Presence of non-governmental schools

Recent studies have shown the presence and sustainability of non-governmental schools can also help inform how households make enrollment decisions (Heyneman, et al., 2011; Jimenez, Lockheed, & Paqueo, 1991; Tooley, 2001; Tooley & Dixon, 2003). In areas where there are schooling options (i.e. more than one school to which a household can enroll their children) we can begin to control for certain schooling supply, quality and household characteristics. Issues such as distance to school, household income levels, and other indicators can be controlled while variables such as perceived quality and cost can be more directly measured (Jimenez, et al., 1991; Tooley, 2001). As more and more empirical studies are completed, research has increasingly found that private schooling options provide cost-effective options for parents who desire a higher quality school in comparison to their local public option (Glomm,

1997; Heyneman, et al., 2011; Jimenez, et al., 1991; Tooley, 2001). While the body of research comparing private school decision-making is still growing, the importance of its presence should not be understated in understanding household investment decisions and its potential to validate many of the demand and supply side variables covered in our review.

Chapter 7

Household Characteristics as both Determinants and Outcomes of Schooling

Our review of the societal importance of schooling shows that the experience of school attendance creates unprecedented outcomes in areas of human capital development, community cohesion, health status and agency levels in both households and the community at-large (Barrera, 1990; Sudhanshu Handa, 2002; Sudhanshu Handa, et al., 2004; Heyneman, 2000; Takyi & Broughton, 2006). These outcomes at the household level are consequently found to influence further school attendance decision as viewed through more than 11 household dimensions (Akabayashi & Psacharaopoulos, 1999; Barrett, et al., 2001; Bicego & Boerma, 1993; Butcher & Case, 1994; Sudhanshu Handa, 2002; Jensen, 2000; Malmberg-Calvo, 1994). Our literature review consequently supports the notion of a "flywheel" effect in which school attendance improves household dimensions in a way that further encourages school enrollment decisions within the household and consecutive generations (Al-Sammarrai & Peasgood, 1998; Sen, 1999). It has been shown, however, that the pace of this flywheel has slowed as certain supply side investments in schooling have failed to significantly raise school attendance rates (Mozambique National Institute of Statistics, 2007, 2008; UNICEF, 2008; UNICEF Mozambique, 2009). Our survey of household characteristics therefore intends to inform the way in which household characteristics can increasingly influence school attendance decisions – for if we can support households in new ways that improve school enrollment, the flywheel effect of improving attendance through household characteristics can be re-energized and countries can once again experience continuous rising of school attendance across generations.

Chapter 8

Study Methodology

Our data was obtained from a unique household survey conducted in the Zambezia province of Mozambique from August 8, 2010 through September 25, 2010 and was used as the basis for our exploration into household factors influencing school enrollment. Our interest in the data from this particular survey are threefold: (1) the survey was conducted in Mozambique – one of the poorest countries in sub-Saharan Africa and a country that has observed leveling enrollments in primary school, (2) the survey engaged 3749 households and took a multi-disciplinary approach to assessing household decision-making – allowing us to examine historical *and* emergent causes of school under-enrollment and (3) the data has yet to be examined from an educational perspective and therefore represents an opportunity to define and publish new findings related to factors affecting school enrollment decisions. With these intentions, the following is an overview of the study context and design, as well as description of variables used in the analysis and generation of findings.

Context of the Study

Mozambique is a low-income country with more than 54% of the residents living on less than $1 USD a day (UNICEF Mozambique, 2009; United Nations Children's Fund (UNICEF), 2005). Given more than 10 million of the country's residents live in extreme poverty, the majority of the population is consistently working to manage the competing demands of food, housing,

education and health within and between families each day (UNICEF Mozambique, 2009; United Nations Children's Fund (UNICEF), 2005).

Located in central Mozambique, Zambezia is a remote and rural province with a strong agricultural base for its 3.8 million residents. Two-thousand and eighty (2,080) schools are widely scattered throughout the province educating eight hundred and sixty two thousand (862,000) students (Mozambique National Institute of Statistics, 2007). There are only five private primary schools in Zambezia serving fewer than 2,700 students (Mozambique National Institute of Statistics, 2007).There exists only one provincial hospital for the area and HIV prevalence among pregnant women receiving antenatal services ranges between 14 and 35% (Vergera et al., 2010). Zambezia is therefore analogous to most poor, rural provinces in sub-Saharan Africa. By using this community for our analysis, we are optimistic that our study's findings, analysis and discussion will be applicable to governments and non-profit organizations throughout the region.

Design of the Study

The survey tool was developed by a multi-disciplinary team of researchers from Vanderbilt University and the University Eduardo Mondlane in Maputo, Mozambique. Faculty and students involved were from the schools of Medicine, Nursing, Education, Management, Engineering and Divinity. The first portion of the study collects demographic information about each of the household members and includes household information such as location, ages, language, religious affiliation and ethnicity (Vergera, et al., 2010). The second portion of the study collects a wide range of child health information, including questions regarding vaccinations, malaria, diarrhea and nutrition in children under five. The third portion of the study includes a comprehensive set of questions related to education and educational choices.

The survey tool specifically includes two instruments adapted from the Wide-Range Achievement Test (WRAT-1) to measure literacy and numeracy of the interviewee (Vergera, et al., 2010; Wilkinson, 1993). Questions on education achievement and aspirations were designed based on instruments previously used in Malawi but informed by local contexts (Grant, 2008; Lockheed, Fuller, & Nyirongo, 1989). Educational levels for each household member were obtained, reasons for non-enrollment were coded for each child, as well as distance to school and 10 additional educational indicators suspected to influence primary school enrollment. The fourth portion of the survey instrument focuses on food security, dietary diversity and food coping strategies (Vergera, et al., 2010). These questions were localized based on the Household Food Insecurity and Access Scale (HFAIS) of the Food and Nutrition Technical Assistance Project (Coates, Swindale, & Bilinsky, 2007; Vergera, et al., 2010). The section on social barriers and social participation addresses areas of personal well-being, availability of social support networks, as well as gender differences and decision making within families (Vergera, et al., 2010). Questions in this portion of the survey were based on works from the Oxford Poverty and Human Development Initiative, UNICEF and other previously used instruments for assessing agency levels (Buiya et al., 2007; Oxford Poverty and Human Development Initiative, 2010). The section on material possessions and consumption of goods were "adapted from several sources based primarily on the unsatisfied basic needs approach, where the aim is to estimate use or acquisition of assets presumed critical for well-being" (Vergera, et al., 2010). Questions were specifically adapted from the Demographic and Health Survey and the World Bank's Multiple Indicator Cluster Survey (Pradhan & Ravallion, 2000; The World Bank, 2004). The portion of the survey related to quality of life indicators was based on several WHO quality of life scales and questions surrounding agency and self-determination were adapted from the Social Support Appraisal's Scale (The World Bank, 2004; Vaux, J. Phillips,

& Holly, 1986; Vergera, et al., 2010). The last two portions of the survey focused on income generation and agricultural practice and production. Questions related to income were adapted from the Core Welfare Indicators Questionnaire survey and questions related to agricultural practice were based on surveys previously used by World Vision and other non-profits serving the Zambezia province (Vergera, et al., 2010).

The survey was "designed to collect information about the household from the female head of household, defined as the principal wife of the nuclear (immediate) family." In the instance of polygamous families, the eldest wife was selected, which likely introduced some bias in the event the younger wives and their children receive fewer of the family's resources (Vergera, et al., 2010).

Once the English version of the survey was completed, several revisions were made prior to field testing in order to modify the Portuguese version to the linguistic and social context of the Zambezia province in Mozambique (Vergera, et al., 2010). Field tests were then completed in the districts of Namacurra and Quelimane to further adapt the survey to both rural and urban populations (Vergera, et al., 2010). Once the survey was ready in Portuguese, the instrument was translated into the five principal languages in Zambezia: Nyanja, Elomwe, Emakhwa, Chisena, and Echuabo (Vergera, et al., 2010). Further changes to the instrument were then made as trained staff "back-translated" the survey into Portuguese to verify translation accuracy (Vergera, et al., 2010). The Portuguese version of the survey was then loaded onto mobile phones for survey collection – with the five local language versions available on paper. Interviewers were then trained using the paper instruments to ensure consistency of questioning and answer response and coding (Vergera, et al., 2010).

Survey Implementation

Implementation of the survey was completed between August 2010 and September 2010. Great care was used in implementing the survey in the field as described below by the principal investigators:

"Interviewers and team leaders were recruited from a pool of women with prior experience in survey work, prioritizing geographical areas where the 5 most common languages in Zambezia were spoken. Fourteen teams of 5 women were formed composed of one team leader and four interviewers. The teams were assigned by language abilities to a specific region to work under the supervision of a regional supervisor. The team leaders were responsible for the operational side of the survey, including the following tasks: accompanying interviewers to the enumeration areas (EAs), ensuring that GPS localization was conducted upon arrival to a new EA, supervising the selection of households in all EAs, assigning interviewers to selected households, conducting the random sampling and anthropometric measurement of children aged 0-59 months in selected EAs, backing up data, maintaining registers of data collection for each member of their team, keeping supervisors well-informed, and charging phones"(Vergera, et al., 2010).

Special care was given when training each of the interviewers. Training related to specific and general aspects of each of the following categories was conducted over a four week period of time in various locations throughout the region:

- Ethical behavior and confidentiality,
- Obtaining consent,
- Procedures for locating pre-selected enumeration areas,
- Selecting a random child in the appropriate age groups for anthropometry and child health questions,
- Scenarios requiring termination of the interview,
- Procedure to be used when no eligible head of household was present,
- Procedures to engage local political and traditional authorities to obtain authorization to conduct interviews in a given locality (Vergera, et al., 2010).

Local authorities at multiple levels of government were made aware of the survey and appropriate approvals were gathered to ensure smooth implementation of the survey itself (Vergera, et al., 2010). Prior to entering each enumeration area, surveyors and team leaders met with local officials to ensure they were engaged in the process and to secure any additional governmental and ethical review approvals. These local officials were instrumental in not only ensuring community level participation, but also confirming the team's presence in the appropriate enumeration area and orienting the team to modified maps and infrastructure (Vergera, et al., 2010).

Data Collection and Management of the Survey

In the majority of cases the mobile phone was used to administer the questionnaire and record responses. In the event Portuguese wasn't spoke by the interviewee, a localized paper questionnaire was used by the interviewer (Vergera, et al., 2010). Data aggregated by the mobile phone was submitted wirelessely and paper surveys were submitted routinely as teams returned from the field (Vergera, et al., 2010). In the event mobile phone coverage was unavailable in a given enumeration area, each phone was given enough memory to "store dozens of completed surveys and programmed to submit the data once a signal was achieved. " Once data was received in Maputo, all of the survey data was aggregated on the central server and checked for any errors and inconsistencies (Vergera, et al., 2010).

Selection of Sampling Frame

The population for Zambezia is estimated at 3,794,489 individuals living in 918,025 households – which are divided into 9,073 enumeration areas (EAs) (Vergera, et al., 2010). There are 155,202 households represented in 1,458 urban EAs and 762,823 households

represented in 7,615 rural EAs throughout the Province (Vergera, et al., 2010). There were two representative samples used in collecting the survey data. One sample was conducted throughout Zambezia Province to allow for general estimation. The second sample was concentrated in Alto Molocue, Morrumbala, and Namacurra districts to provide more precise estimates and better precision when calculating differences from baseline that can be utilized over the study's five-year duration (Vergera, et al., 2010). These three districts in which oversampling occurred make up approximately 20% of the provincial population (Vergera, et al., 2010).

Sampling Methodology

According to the principal investigators, "sampling was conducted by the Chief Sampling Statistician from the National Statistics Institute using the Government of Mozambique's sampling frame created for use on all national surveys based on 2007 census results" (Vergera, et al., 2010). This would allow comparison data to be available for other studies as well as comparing results to certain historical data. The randomized sampling itself was divided into four steps. Step one was to divide the sampling frame into two distinct groupings: (1) urban and rural areas throughout the province with (2) a three district group for oversampling and improved estimations (Vergera, et al., 2010). Step two was to select appropriate enumeration areas for each stratum (rural, urban, and the 3 district grouping). These enumeration areas were selected based on probability proportional to size: "EAs with a higher number of households had a proportionally greater probability of selection than those with fewer households" (Vergera, et al., 2010). Step three involved selecting households to be sampled. Aerial satellite images were acquired for the region being sampled and an algorithm was developed to detect rooftops of households using color thresholds from the photos (Vergera, et

al., 2010). Houses were marked and sampled with equal probability within each of the selected EAs. In the event that the building selected was experienced to be uninhabited or non-residential, interviewers were instructed to proceed to the next closest household dwelling (Vergera, et al., 2010). In the event satellite images were inadequate for selection of households, topographic maps from the National Institute of Statistics were used within each selected enumeration area and a convenience approach to household selection was implemented (Vergera, et al., 2010). Using this methodology, (1) the EA is divided into four quadrants, (2) the interviewer selects a central location within each quadrant and (3) "spins" a pen to select a direction in which to proceed. The interviewer then selects the first household in the pen's direction followed by the four nearest households (Vergera, et al., 2010). In step four, where anthropometric measures were used, a random sampling technique (as defined below)was deployed for children ages 0-59 months (Vergera, et al., 2010). Selection for anthropometric measures occurred as follows: prior to setting out into the field, each interviewer was given two numeric tables prepared by the project statistician – "listing randomly generated numbers of households with two to eleven children aged 0-12 or 13-59 months." Using the random number generated based on the *number of children* in the household and the *corresponding birth order* – the interviewer sampled and measured one child between 0-12 months and one child between 13-59 months of age (Vergera, et al., 2010).

Sample Size

A two-stage cluster design was used to determine the sample size and is described as follows. The desired level of accuracy for the Zambezia-wide estimates was set to achieve a 5% precision for the half-length of a confidence interval of 95% for a proportion (Vergera, et al., 2010). The population proportion was set conservatively to p=0.5 in order to maximize the standard error (Vergera, et al., 2010). The number of households interviewed per EA was set at

n=15; this was determined based on the number of enumeration areas to be covered within the time allotted to complete the entire survey. One interview team was therefore expected to complete one enumeration area per day – which ideally translated into 15 households per day. The number of clusters was then determined by the following equation:

$$m = \frac{p(1-p)D}{s^2 n}$$

D is the design effect and quantifies the standard error of the estimate due to the sampling procedure used – which we understand to be the difference between the number of subjects in the cluster study and the number of subjects in an equally reliable randomly sampled unclustered study. (Bennet, Woods, Liyange, & Smith, 1991; Vergera, et al., 2010). In our case, D increases with the number of interviews sampled within a cluster and decreases for small intracluster correlation, D = 1+ICC(n-1). All this being said, the total sample size desired turns out to be 3960 households (Vergera, et al., 2010).

Potential Sources of Error

Authors of the household survey utilized in our study have articulated several potential sources of error that should be noted and managed during our process of analysis. As is the case with any survey translated into numerous languages and dialogues and dialects, certain questions may not have fit within the local context, may have been misunderstood within cultural norms or simply translated incorrectly (Vergera, et al., 2010). Authors of the survey minimized any errors through focus groups and back-translation methods – but the potential for error is present and therefore will be noted when focusing on more nuanced results.

Administration of the questionnaires is also a potential area for errors as interviewers may be unfamiliar with new mobile phone technologies and could have inputted initial data incorrectly (Vergera, et al., 2010). While technology can reduce errors of notation and subjectivity, the lack of hard copies can make it difficult to clean data and note where acute errors may have been made.

We know that satellite images for certain enumeration areas were unavailable or not useful in extremely rural locations and therefore rooftop selection may not have been randomized to the same degree as other enumeration areas (Vergera, et al., 2010). While standard methodology for such events was applied, the difference in household selection is appropriately noted.

Analyses

Our analysis is directly focused on elucidating potential household factors affecting school enrollment decisions in Mozambique. Given the comprehensive nature of the household survey available to us, we chose to pursue a straightforward descriptive and regressive analysis utilizing two dependent variables and over 80 independent household variables shown in the literature to potentially influence enrollment decisions of households in sub-Saharan Africa. Our final set of independent variables was determined based on the primary findings observed in our literature review and questions available to us in the SCIP Survey. There were a number of categories and related variables that were observed in the literature to influence enrollment decisions – such as the household's distance to school, whether the family feels the child is treated fairly at school, private school enrollment, etc. – that we would have liked to inquire about, but the survey wasn't able to capture in its defined set of questions (Lockheed, et al., 1989). There were also a number of questions included in the

survey that were of interest to us, but were not found to be of material importance in the literature. These variables would include – has anyone in your household received vocational training in farming techniques, have you [RESPONDENT] received any education or training about caring for your child, etc.. Consequently, the final selection of independent variables were those that were found to have significance in the literature and were asked within the comprehensive SCIP household survey.

Once our variables were finalized, we conducted a bivariate analysis of the defined independent and dependent variables. A subset of independent variables shown to have a statistically significant relationship to school enrollment was chosen, analyzed and aggregated using logistic regression in an attempt to explain the degree to which statistically significant variables can explain under-enrollment amongst the households surveyed. This particular methodology of defining significance and using logistic regression in order to explain the degree to which the variables may predict enrollment decisions was based on the work of Tansel, Ilon and Moock, and Glick and Sahn (Glick & Sahn, 1998; Ilon & Moock, 1991; Tansel, 2002). In each of these studies a spectrum of household independent variables were tested against a set of school enrollment variables for significance and then further isolated using logistic regressions or ordered probit models. In the case of Tansel, an ordered probit model was used to test the determinants of school attainment of boys and girls in Turkey (Tansel, 2002). In the case of Ilon and Moock, a logistic regression following a test of significance was used assessing the relationship between household characteristics and the demand for schooling in rural Peru (Ilon & Moock, 1991).

By grounding each independent variable within the literature and following a method of analysis previously deployed in testing household characteristics in relation to the demand for

schooling, we believe our findings can be material to informing both future policy and the ways in which household factors in Mozambique may uniquely effect enrollment decisions.

For a detailed review of each category of variables and their grounding in the literature, please see “Addendum A – Dependent and Independent Variable Selection – A Detailed Review.”

Chapter 9

Results

Introduction

Utilizing the sampling and weighting methodology outlined, we have completed a comprehensive analysis in an effort to further inform our two primary research questions:

1) Which household variables appear to have a relationship with the decision whether or not to send children of the household to primary school and,
2) Concerning households that remarked schooling "Does Not Matter" as a reason for non-attendance, which household variables appear to have a relationship with households indicating this particular reason not to attend.

In an effort to answer these two research questions, we focused on two dependent variables and eighty-nine independent household variables divided into eleven distinct household dimensions:

- Household Demographics
- Language
- Education
- Religion
- Safety
- Food Security
- Health
- Income
- Household Infrastructure
- Agency
- Well-being

The two dependent variables were specifically:

1) [Completed for each child within the household] Are you still attending school?
2) What is the most important reason [child's name] is not attending school?

The first dependent variable (pg_fam) solicited a yes or no response. The second dependent variable (ph_fam) solicited responses in the categories "Does not matter," "Illness," "Money," "Work," "Don't Know" and "Didn't Answer." Those households noting schooling "Does not matter" as the reason for non-attendance, were then placed in a sub-population in which comparisons to each independent variable were made.

Percentages related to school attendance incorporate the effects of stratification and clustering using selection weights and are presented in Figure 1. The frequencies observed in relationship to school attendance within our population are commensurate with a number of other studies within Mozambique and government reported figures (Mozambique Institute of Statistics, 2010; UNICEF, 2008). Our population appears to have a slightly higher school attendance rate than the national average (77.4% vs. 68%), but this could be explained by our more expansive use of child ages (6-18)in our sampling or the higher than expected number of girls in attendance within our population(Mozambique National Institute of Statistics, 2008, 2010).

While our study was focused on school attendance of primary school children, a number of surveyors reported that households had difficulty (1) specifying which grade their child was attending (and therefore making it difficult to use household defined primary school aged children) and (2) numerous respondents had noted traditionally older children, ages 15-18, were still attending their local primary school. Given our study is interested in household variables which have a relationship with school attendance decisions, we felt a more inclusive age bracket

would render more accurate findings. Children between the ages of 15 and 18 represented only 12.7% of our child respondents and did not change statistically significant results observed in our findings, but could explain the higher attendance figure observed.

Are you still attending school?	
N=5,185	
No	22.5%
Yes	77.4%

Figure 1 – School Attendance

Frequencies observed with respect to reasons individual children are not attending school are presented in Figure 2. The observed frequencies of money and illness are consistent with other studies in Mozambique (Mozambique National Institute of Statistics, 2007; UNICEF, 2008). Work, however, is measurably lower than expected and Does Not Matter is materially higher than expected. The low work frequencies are supported by cross-tabulations with work related independent variables presented later in the paper, but the high percentage of respondents noting "Does Not Matter" was surprising to our team. The high percentage of "Does Not Matter" responses could be attributed to a unique interpretation of the response by both interviewers and respondents. For these interpretive challenges, which are also noted in the discussion section, findings from Does Not Matter should be considered directional in nature.

What is the most important reason [Name] is not attending school?	
N = 1414	
Does Not Matter	34.2%
Illness	10.5%
Money	28.9%
Work	1.1%
Not Applicable	10.7%
Don't Know	12.2%
Didn't Answer	2.4%

Figure 2 – Reasons for Not Attending School

Understanding the independent household variables that relate to school attendance takes on new importance in light of the high percentage of households that recorded school attendance does not matter.

To inform our findings, we have completed cross-tabulations between each independent and dependent variable. We have summarized our results by each household dimension below. In the event a relationship was statistically significant with a p-value <.01, we completed a logistic regression between the two variables to determine an odds ratio in order to quantify the magnitude of the effect. In the case of cross-tabulations and regression results regarding the dependent variable "reasons for not attending," we specifically used the subpopulation "Does Not Matter" to aggregate results in an attempt to explore the variables of households that have articulated does not matter as a reason for not enrolling their school-aged children.

School Attendance

Household Demographics

Simple demographics of children within the household and each female respondent were included in our analysis. Specifically, age of each household child, gender of each child, and marital status of the female head of household (the respondent) were included.

The only significant relationship that was observed was in relationship to the child's age. Those students attending had a median age of only one year more than those children not attending. Neither gender nor marital status was found to be significantly related to school attendance. As you would expect, a smaller number of girls than boys are currently attending school, but in our weighted sample, gender itself did not appear to have a statistically significant relationship to school attendance overall.

	Is [NAME] still attending school?			
	No	Yes	Total	P-value[1]
Age [NAME], Median (IQR)	9 (6-14)	10 (8-13)	10 (8-13)	<0.001
Gender [NAME], %				0.022
Female (n=2,550)	55.5	47.7	49.4	
Male (n=2,633)	44.5	52.3	50.6	
What is the [RESPONDENT] marital status?, %				0.300
Divorced/Separated (n=163)	3.8	3.5	3.6	
Married/Common Law (n=3,787)	77.3	71.4	72.8	
Single (n=947)	13.2	18.8	17.5	
Widowed (n=285)	5.7	6.3	6.2	

[1]t-test from weighted quantile regression and chi-squared tests for survey-weighted data

Figure 3 – Significance Levels of Demographics

When we take a look at the impact of age on attendance, its overall effect is rather small with an odds ratio of 1.06 per 1 year increase (1.34 higher odds per 5 year increase). This would lead us

to believe that age itself is not a dominant factor in determining whether households in our population elect to send their children to school.

	Odds Ratio (95% CI)	P-value
	Odds Ratio (95% CI)	**P-value**
[NAME] Age (per 1 year)	1.06 (1.02-1.10)	0.002
[NAME] Age (per 5 years)	1.34 (1.10-1.61)	0.002

Figure 4 – Odds Ratios of Demographics

Language

Several language variables were included in our analysis: questionnaire language, the native language of the respondent, the language of the child, "Do you understand Portuguese well?", most spoken language in the household, and "Is there another language spoken in your home?"

In relation to school attendance, the two significant relationships found were with the variables "Do you understand Portuguese well?" and "What is the most spoken language in the household?"

	Is [NAME] still attending school?			
	No	Yes	Total	P-value[1]
Questionnaire language				0.017
Cinyanja (n=247)	14.7	15.1	15.0	
Cisena (n=1,926)	15.7	8.6	10.2	
Echuabo (n=1,169)	23.0	17.4	18.7	
Elomwe (n=1,505)	34.0	33.8	33.9	
Emahkuwa (n=3)	<0.1	<0.1	<0.1	
Portuguese (n=328)	12.7	25.0	22.2	
What is your [RESPONDENT] native language?				0.312
Cinyanja (n=221)	14.9	15.9	15.7	
Cisena (n=1,944)	17.7	10.5	12.1	
Cishona (n=1)	0	<0.1	<0.1	
Ciyao (n=6)	0.6	0.8	0.8	
Echuabo (n=1,237)	25.1	22.5	23.1	
Elomwe (n=1,688)	38.5	45.0	43.5	

Emakhuwa (n=29)	0.5	1.8	1.5	
Kimwani (n=5)	0	1.6	1.2	
Portuguese (n=40)	1.0	0.6	0.7	
Xironga (n=1)	0	<0.1	<0.1	
Xitswa (n=9)	1.8	1.2	1.4	
Do you [RESPONDENT] understand Portuguese well?				0.020
No (n=3,501)	69.6	55.3	58.5	
Yes (n=1,680)	30.4	44.7	41.5	
What is the native language of [NAME]?				0.122
Cinyanja (n=257)	18.1	20.7	20.1	
Cisena (n=1,918)	16.3	10.4	11.7	
Cishona (n=1)	0	<0.1	<0.1	
Don't know (n=2)	0.3	0.1	0.1	
Echuabo (n=1,239)	25.9	21.0	22.1	
Elomwe (n=1,569)	37.8	36.8	37.1	
Emakhuwa (n=11)	0.2	0.6	0.54	
Portuguese (n=172)	1.1	8.8	7.1	
Shimakonde (n=1)	0.2	0	0.05	
Xitswa (n=5)	0	1.55	1.2	
Does [NAME] understand Portuguese well?				<0.001
No (n=3,133)	82.4	48.0	55.7	
Yes (n=2,044)	17.6	52.0	44.3	
What is the most spoken language in the household?				0.002
Cinyanja (n=263)	17.3	17.9	17.8	
Cisena (n=1,907)	16.4	10.0	11.5	
Cisenga (n=2)	0	<0.1	<0.1	
Echuabo (n=1,212)	24.8	19.3	20.5	
Elomwe (n=1,580)	37.5	37.5	37.5	
Emakhuwa (n=14)	0.1	0.5	0.4	
Portuguese (n=191)	4.0	14.6	12.3	
Xitswa (n=2)	0	0.2	0.1	
Is there another language spoken in the household?				0.018
No (n=3,433)	64.8	52.3	55.2	
Yes (n=1,734)	35.2	47.7	44.9	

[1]chi-squared tests for survey-weighted data

Figure 5 – Significance Levels of Language

While many other language variables did not have a statistically significant relationship with school attendance, households where the respondent understood Portuguese had 5.1 times higher odds of sending their child to school.

	Odds Ratio (95% CI)	P-value
[NAME] Understands Portuguese	5.07 (3.09-8.30)	<0.001
Primary household language		<0.001
Cinyanja	1.69 (1.03-2.76)	
Cisena (reference)	1	
Echuabo	1.26 (0.82-1.96)	
Elomwe	1.63 (1.06-2.52)	
Emakhuwa	11.0 (1.42-85.7)	
Portuguese	5.98 (2.33-15.3)	

Figure 6 – Odds Ratios of Language

Further informing this finding were the odds ratios calculated for specific languages (referent group is Cisena). Children from households who speak Emakhuwa (variable 6 and less than .4 percent of sample) and Portuguese (7) are more likely to attend school, and the rest of the native languages had similar odds of attendance.

Education

In the education dimension we evaluated a number of variables that directly relate to the respondents experience, expectations and distance to school, including: (1) the number of years of education completed by the respondent, (2) the level of education you dream for your child, (3) the level of education you expect for your child, (4) the number of reading items in the household, (5) are there adequate resources at school in your community, (6) the importance of educational attainment to your child's future, (7) the perceived quality of education to be at the school, (8) the number of minutes it takes to get from the home to the primary school, (9) and the mode of transportation you take to reach the primary school. Every included education variable had a significant relationship to school attendance.

	Is [NAME] still attending school?			
	No	Yes	Total	P-value[1]
How many years of education have you [RESPONDENT] completed?, Median (IQR)	0 (0-3)	2 (0-5)	2 (0-4)	<0.001
How many years of education has [NAME] completed?, Median (IQR)	0 (0-1)	3 (2-5)	3 (1-5)	<0.001
What level of education would you dream for your children to achieve?				<0.001
No response (n=29)	2.6	0.2	0.7	
Don't know (n=1,105)	21.4	12.6	14.6	
Primary (n=408)	10.1	4.4	5.7	
Secondary (n=1,488)	31.6	34.5	33.9	
Superior (non-university) (n=747)	10.0	15.0	13.9	
University (n=1,396)	24.4	33.3	31.3	
What level of education do you expect [in reality] your children to achieve, at best?				<0.001
No response (n=70)	3.0	1.1	1.5	
Don't know (n=1,139)	22.7	13.2	15.3	
Primary (n=405)	8.8	4.3	5.3	
Secondary (n=1,527)	35.3	36.2	36.0	
Superior (non-university) (n=692)	8.2	14.7	13.2	
University (n=1,348)	22.1	30.6	28.7	
How important is educational attainment to your childs future?				0.003
No response (n=13)	0.1	<0.1	<0.1	
Don't know (n=463)	11.1	5.2	6.6	
Not at all important (n=122)	2.3	2.2	2.2	
Not very important (n=223)	2.6	1.7	1.9	
Rather important (n=718)	10.0	5.3	6.4	
Very important (n=3,636)	74.0	85.6	82.9	
How many reading items (Bible, Koran, Newspaper, Magazine, Comic Books) do you have in your home?, Median (IQR)	1 (0-4)	4 (2-10)	4 (1-9)	<0.001
Do you feel there are adequate resources at school in your community?				<0.001
No response (n=57)	4.4	0.8	1.6	
Don't know (n=222)	10.3	3.6	5.1	
No (n=2,672)	49.0	52.7	51.8	
Yes (n=2,231)	36.3	43.0	41.5	
How do you perceive the quality of education to be at the school in your community?				0.001
No response (n=472)	13.5	5.0	6.9	
Don't know (n=445)	8.7	7.6	7.9	
Bad quality (n=521)	9.1	10.1	9.8	
Fair quality (n=991)	22.5	23.3	23.1	
Good quality (n=1,693)	29.1	38.5	36.3	

Very good quality (n=1,059)	17.2	15.6	16.0	
What mode of transport do you use to get there?				0.001
Bicycle (n=342)	11.4	4.9	6.3	
Bus (n=12)	0.5	1.7	1.5	
Car (n=1)	0	<0.1	<0.1	
On foot (n=4,208)	88.1	93.4	92.2	

[1]t-test from weighted quantile regression and chi-squared tests for survey-weighted data

Figure 7 – Significance Levels of Education

The most significant relationship – as the literature has shown – is that the number of years of education completed by the female head of household significantly increases the likelihood of school attendance (Al-Sammarrai & Peasgood, 1998; Barrera, 1990; Bicego & Boerma, 1993; Burke & Beegle, 2004; Sudhanshu Handa, et al., 2004). In our analysis, the female head of household's education more than doubled the odds of attendance per 5 years.

	Odds Ratio (95% CI)	**P-value**
Female head education (per 1 year)	1.20 (1.12-1.29)	<0.001
Female head education (per 5 years)	2.49 (1.76-3.57)	<0.001

Figure 8 – Odds Ratios of Educational Attainment

The level of education one dreams for their child, the level one expects their child to achieve, and the importance of educational attainment to one's future are associated with the odds of attendance. The child of a mother who desires or expects her child to finish secondary school or higher has over twice the odds of attending school currently than the child of a mother who desires or expects her child to finish primary school (p=0.007). Most (89%) respondents thought that educational achievement is very important to the child's future; those that responded no to some importance had lower odds of school attendance (p=0.033). The odds

ratios are all nearly identical between the level of education one dreams for their child, the level one expects their child to achieve and the importance of educational attainment.

	Odds Ratio (95% CI)	P-value
Dream level of education for [NAME]		<0.001
Primary (reference)	1	
Secondary	2.48 (1.59-3.88)	
Superior (non-university)	3.42 (1.72-6.82)	
University	3.09 (1.68-5.70)	
Expected level of education for [NAME]		0.007
Primary (reference)	1	
Secondary	2.11 (1.29-3.44)	
Superior (non-university)	3.68 (1.62-8.39)	
University	2.83 (1.51-5.29)	
Importance of educational achievement to future		0.033
Not at all important	0.84 (0.31-2.34)	
Not very important	0.56 (0.23-1.38)	
Rather important	0.46 (0.26-0.81)	
Very important (reference)	1	

Figure 9 – Odds Ratios of Expectation and Aspiration

The number of reading items is also shown to have a material relationship to school attendance – with the odds of attendance increasing with each reading items.

	Odds Ratio (95% CI)	P-Value
Number of Reading Items		
1	1.05 (0.57 - 1.94)	0.868
2	1.62 (1.12 - 2.37)	0.01
3	2.55 (1.51 - 4.33)	0.001
4	2.18 (1.29 - 3.69)	0.004
5	3.03 (1.62 - 5.69)	0.001
6	2.97 (1.31 - 6.77)	0.009
7	4.59 (1.45 - 14.5)	0.01
8	6.24 (1.67 - 23.37)	0.007

Figure 10 – Odds Ratios of Reading Items

The perception of the quality of the schools – assessed as whether or not the respondent felt there were adequate resources at the school in their community and what they perceived the quality of the education to be at the school – had minimal effect on the odds of attendance.

	Odds Ratio (95% CI)	P-value
Feels there are adequate resources at school	1.10 (0.76-1.60)	0.601
Perceived quality of education		0.308
Bad quality	1.23 (0.69-2.19)	
Fair quality	1.14 (0.72-1.81)	
Good quality	1.46 (0.98-2.18)	
Very good quality (reference)	1	

Figure 11 – Odds Ratios of Perceived School Quality

The mode of transportation used to reach the primary school is associated with the odds of school attendance ($p<0.001$). Those who reach the primary school by bicycle had 60%

lower odds of school attendance than those who arrive on foot and dramatically less odds of attendance than bus travel (though bus travel accounted for an extremely low percentage of respondents).

	Odds Ratio (95% CI)	P-value
Mode of transportation to primary school		<0.001
On foot (reference)	1	
Bicycle	0.41 (0.26-0.63)	
Bus	3.38 (0.47-24.24)	

Figure 12 – Odds Ratios of Transportation to Primary School

Religion

In the religion dimension, we assessed the respondent's religion and how often they travelled to the location of worship. Our hypothesis was that the more engaged in the community and the frequency of church attendance would both be positive predictors for participation and travel to primary school.

We did find that both religious identification and the frequency of attendance were both significant to school attendance.

	Are you still attending school?			
	No	Yes	Total	P-value[1]
What is your religion?				0.002
Don't know (n=197)	1.6	1.2	1.3	
Agnostic or atheist (n=141)	1.3	0.5	0.6	
Catholic (n=2,117)	34.9	47.2	44.4	
Evangelical and Pentecostal (n=795)	21.0	16.4	17.5	
Islam/Muslim (n=364)	9.6	7.1	7.7	
Jehovah's Witness (n=124)	3.1	7.6	6.6	
LDS/Mormon (n=105)	0.5	1.2	1.1	
Non-Christian Eastern (n=154)	2.2	2.3	2.2	
None, Believes in a Supreme (n=317)	11.4	3.4	5.2	
Protestant/Mainline (n=522)	13.2	12.0	12.3	
Traditional Religions (n=33)	1.3	1.1	1.1	
How often to you go to a location of worship?				0.010
No response (n=7)	<0.1	<0.1	<0.1	
Don't know (n=137)	2.1	1.4	1.6	
More than once per week (n=1,895)	42.9	48.6	47.4	
Once or twice per year (n=37)	1.5	0.5	0.7	
Once per week (n=2,296)	52.9	46.4	47.9	
Once per month (n=149)	0.6	3.0	2.5	

[1]chi-squared tests for survey-weighted data

Figure 13 – Significance Levels of Religion

The odds of school attendance drops about 70% for children from families who attend 1-2 times per year versus more than once per week. Religious designation is also associated with the odds of school attendance (p=0.002). Compared with Catholic believers, spiritual/traditionalists and agnostic/atheist have over 70% lower odds of school attendance. We did not detect a difference in the probability of school attendance between most Christian, Muslim, or non-Christian Eastern religions. Religious communities traditionally observed to be more cohesive and isolated, such as Latter Day Saints and Jehovah's Witness' represented a 70% higher likelihood of school attendance in comparison to their Catholic counterparts.

	Odds Ratio (95% CI)		P-value
Religion			
Catholic (reference)		1	0.002
Protestant/Mainline	0.67 (0.42-1.07)		
Evangelical and Pentecostal	0.58 (0.32-1.04)		
LDS/Mormon	1.70 (0.63-4.63)		
Islam/Muslim	0.55 (0.28-1.07)		
None, Believes in a Supreme	0.22 (0.10-0.51)		
Non-Christian Eastern	0.77 (0.19-3.13)		
Jehovah's Witness	1.78 (0.76-4.17)		
Agnostic or atheist	0.26 (0.12-0.60)		
How often to you go to a location of worship?			<0.001
More than once per week (reference)		1	
Once or twice per year	0.29 (0.13-0.61)		
Once per week	0.78 (0.55-1.08)		
Once per month	4.70 (1.85-11.9)		

Figure 14 – Odds Ratios of Religion

Safety

The literature indicated that household safety might have a material effect on primary school attendance. We asked our respondents if they fear for their physical safety in terms of risk of being hurt as a result of a crime and found that there was not a statistically significant relationship to school attendance.

	Are you still attending school?			
	No	Yes	Total	P-value[1]
Do you fear for your physical safety in terms of risk of being hurt as a result of a crime?				0.260
No response (n=108)	3.1	1.3	1.7	
Don't know (n=472)	11.0	9.7	10.0	
No (n=1,664)	30.0	28.1	28.5	
Yes (n=2,930)	55.9	60.9	59.8	

[1]chi-squared tests for survey-weighted data

Figure 15 – Significance Levels of Safety

Food Security

The literature indicated that food security may affect school attendance from a number of different perspectives – such as the need for child labor or increasing need to move from location to location. Our results, however, showed that there was not a relationship between short term food security and school attendance in our population.

	Are you still attending school?			
	No	Yes	Total	P-value[1]
In the past four weeks, was there ever no food of any kind to eat in your household?				0.367
Don't know (n=46)	0.7	1.2	1.1	
No (n=3,402)	65.8	60.6	61.7	
Yes (n=1,720)	33.4	38.2	37.2	
How often did this happen in the past 4 weeks?				0.742
Don't know (n=21)	0.2	0.7	0.6	
Rarely once or twice (n=534)	33.3	30.1	30.7	
Sometimes, three to ten times (n=713)	48.8	50.6	50.2	
Often, more than ten times (n=439)	17.8	18.7	18.5	

[1]chi-squared tests for survey-weighted data

Figure 16 – Significance Levels of Food Security

Income

We selected seven different variables related to household income in order to assess the dimension's relationship to school attendance: (1) does any member of the household have a bank account, (2) do you consider the income of the family to be adequate, (3) the adequacy of the perceived resources and productive capacities of the family to be more or less than needed, (4) the income category of the family, (5) the number of family members that work outside the house, and (6) the respondent's primary occupation, (7) whether any family members own agricultural land, and (8) what proportion of the field may be used for cash crops.

All of the income dimension variables were significant with the exception of (1) whether the respondent felt the resources and productive capacities of the family were more or less than needed , (2)the primary occupation of the respondent, (3) whether any family members own agricultural land and (4) what proportion of the fields are kept for cash crops.

	Are you still attending school?			
	No	Yes	Total	P-value[1]
Does any member of this household have a bank account?				0.002
No response (n=8)	<0.1	<0.1	<0.1	
Don't know (n=86)	1.6	1.5	1.5	
No (n=4,844)	96.0	81.4	84.7	
Yes (n=241)	2.3	17.1	13.8	
Do you consider that the income of the family in this household is…				0.830
Don't know (n=147)	5.0	4.1	4.3	
Less than what is needed (n=2,191)	48.5	45.5	46.2	
More than what is needed (n=268)	6.5	7.8	7.5	
What is needed (n=2,470)	40.0	42.6	42.0	
You consider the resources and productive capacities of the family in this household are…				0.711
Don't know (n=192)	6.6	4.8	5.2	
Less than what is needed (n=2,150)	47.6	46.2	46.5	
What is needed (n=2,445)	38.9	41.9	41.2	
More than what is needed (n=269)	7.0	7.1	7.1	
Monthly income, Median (IQR)	200 (0-500)	300 (0-900)	300 (0-900)	0.005
How many family members in this household work outside the house?				0.233
Don't know (n=14)	1.4	0.4	0.6	
None (n=4,144)	85.5	79.6	80.9	
Some of them (n=456)	6.7	12.2	11.0	
Half of them (n=335)	4.5	5.1	4.9	
Almost all of them (n=81)	0.7	0.7	0.7	
All of them (n=88)	1.3	2.0	1.8	
What is your primary occupation?				0.017
Don't know (n=3)	<0.1	0	<0.1	
None (n=418)	2.4	3.8	3.5	
Business (n=186)	2.3	2.3	2.3	
My house (n=1,008)	23.3	18.8	19.8	

My land (n=3,355)	71.1	69.5	69.9	
Wage labor (n=132)	0.7	5.3	4.2	
Other (n=35)	0.1	0.4	0.3	
Do you or any family members in this household own agricultural land?				0.066
Don't know (n=7)	<0.1	<0.1	<0.1	
No (n=419)	4.5	7.9	7.1	
Yes (n=4,698)	95.5	92.1	92.9	
What proportion of your field/land do you keep for cash crops?				0.722
Don't know (n=800)	27.3	24.3	25.0	
Less than what is needed (n=1,893)	45.0	47.4	46.8	
What is needed (n=1,175)	19.1	21.2	20.7	
More than what is needed (n=534)	8.6	7.2	7.5	

[1]t-test from weighted quantile regression and chi-squared tests for survey-weighted data

Figure 17 – Significance Levels of Income

Presence of a bank account was associated with 5.5 times higher odds of school attendance.

	Odds Ratio (95% CI)	P-value
Any member of household has a bank account	5.50 (1.41-21.50)	0.014

Figure 18 – Odds Ratios of Bank Account

Detailed regressions of household income levels found that children of households making over a threshold of 1000 metaicais per month showed 3.99 higher odds of school attendance (p=0.001).

	Odds Ratio (95% CI)	P-Value
Household Income Level		
No Income	1	
Up to Mts 200	0.99 (0.67 - 1.44)	0.94
Mts 200 to 400	1.18 (0.78 - 1.79)	0.42
Mts 400 to 600	1.03 (0.63 - 1.7)	0.89
Mts 600 to 800	1.39 (0.60 - 3.24)	0.44
Mts 800 to 1000	1.37 (0.64 - 2.96)	0.42
Mts 1000 to 1500	3.99 (1.56 - 10.23)	0.00
Mts 1500 to 2000	3.78 (1.13 - 12.7)	0.03
Mts 2000 to 4000	6.58 (1.22 - 35.5)	0.03
Mts 4000 to 7000	6.9 (1.37 - 34.7)	0.02

Figure 19 – Odds Ratios of Income Levels

Health

Within health we assessed: (1) whether the household had a vaccination card for each child, (2) whether a child had been ill with a fever at any time in the last 30 days, (3) whether the household sought advice or treatment for the fever, (4) whether a child had diarrhea in the last 30 days, (5) whether the household sought treatment for the diarrhea, (6) whether a child had a cough or difficulty breathing in the last 30 days, (7) whether the household sought treatment for the breathing problem, and (8) whether each child slept under an insecticide treated mosquito net last night.

After a complete analysis, none of the health indicators were found to have a significant relationship with school attendance.

	Are you still attending school?		
	No	Yes	Total
Did you ever have a vaccination card (like this) for (NAME)?			
Don't know (n=2)	0	0.02	0.02
No (n=309)	24.2	13.65	16.23

Yes (n=1,108)	75.8	86.32	83.75
Total (n=1,419)	100	100	100

Pearson: Uncorrected chi2(2) = 21.5175
Design-based F(1.15, 225.16) = 5.8625 Pr = 0.013

Has (NAME) been ill with a fever at any time in the last 30 days?	No	Yes	Total
Don't know (n=22)	0.12	0.15	0.14
No (n=752)	45.6	46.59	46.35
Yes (n=641)	54.28	53.26	53.51
Total (n=1,415)	100	100	100

Pearson: Uncorrected chi2(2) = 0.1234
Design-based F(1.05, 204.89) = 0.0191 Pr = 0.900

Did you seek advice or treatment for the fever?	No	Yes	Total
No (n=135)	25.27	19.29	20.74
Yes (n=505)	74.73	80.71	79.26
Total (n=640)	100	100	100

Pearson: Uncorrected chi2(1) = 2.5622
Design-based F(1.00, 147.00) = 0.8530 Pr = 0.357

Has (NAME) had diarrhea in the last 30 days?	No	Yes	Total
Don't know (n=11)	0.05	0.09	0.08
No (n=961)	65.07	64.66	64.76
Yes (n=456)	34.88	35.25	35.16
Total (n=1,428)	100	100	100

Pearson: Uncorrected chi2(2) = 0.0566
Design-based F(1.13, 221.53) = 0.0178 Pr = 0.917

Did you seek advice or treatment for the diarrhea?	No	Yes	Total
No (n=131)	32.5	19.87	22.91
Yes (n=325)	67.5	80.13	77.09
Total (n=456)	100	100	100

Pearson: Uncorrected chi2(1) = 7.5212
Design-based F(1.00, 129.00) = 3.8823 Pr = 0.051

Has (NAME) had a cough or difficulty in breathing in the last 30 days?	No	Yes	Total
Don't know (n=18)	0.12	0.12	0.12
No (n=991)	73.79	63.45	65.95
Yes (n=417)	26.09	36.43	33.93
Total (n=1,426)	100	100	100

Pearson: Uncorrected chi2(2) = 12.4844
Design-based F(1.17, 228.58) = 5.8334 Pr = 0.013

Did you seek advice or treatment for the breathing problem?	No	Yes	Total
No (n=230)	39.43	34.66	35.57
Yes (n=317)	60.57	65.34	64.43
Total (n=547)	100	100	100

Pearson: Uncorrected chi2(1) = 0.8397
Design-based F(1.00, 135.00) = 0.3827 Pr = 0.537

Did (NAME) sleep under an insecticide treated mosquito net last night?	No	Yes	Total
Don't know (n=18)	0.53	2.71	2.18
No (n=833)	54.95	44.1	46.72
Yes (n=574)	44.52	53.19	51.09
Total (n=1,425)	100	100	100

Figure 20 – Significance Levels of Health

Agricultural Practices

In the dimension of agricultural practices, we assessed whether (1) a household utilizes a chemical product (fertilizer) to improve its crops, and (2) whether the household used irrigation on their field. Neither of the agricultural practices we assessed had a significant relationship to school attendance amongst the households in our study.

	Are you still attending school?			
	No	Yes	Total	P-value[1]
Do you use a chemical product (fertilizer) to improve your crops?				0.843
Don't know (n=160)	4.9	4.2	4.4	
No (n=4,284)	92.1	92.9	92.7	
Yes (n=203)	3.0	2.9	2.9	
Do you use irrigation on your field?				0.256
No (n=4,472)	96.9	95.3	95.7	
Yes (n=234)	3.1	4.7	4.3	

[1]chi-squared tests for survey-weighted data

Figure 21- Significance Levels of Agricultural Practices

Household Infrastructure

A number of new studies have indicated that specific household infrastructure items can significantly increase the likelihood of school attendance, so we took special interest in assessing the following items in this dimension: (1) whether the household has electricity, (2) whether the household has a radio, (3) whether the household has a television, (4) whether a spouse or partner has a mobile phone, (5) whether anyone in the household has a functioning watch, (6) whether the household has a functioning bicycle, (7) how the household normally reaches the nearest town, and (8) the respondent's perception of how easy it is to get where they want to go.

Every variable in the household infrastructure was found to have a significant relationship with school attendance with the exception of the spouse/partner's ownership of a mobile phone and the respondent's perception of how easy it is to get where they want to go.

	Are you still attending school?			
	No	Yes	Total	P-value[1]
Electricity?				<0.001
No response (n=5)	<0.1	0.2	0.1	
Don't know (n=96)	0.6	0.7	0.7	
No (n=4,760)	94.5	80.4	83.6	
Yes (n=324)	4.9	18.8	15.6	
Radio?				0.005
Don't know (n=5)	<0.1	0.15	0.1	
No (n=3,006)	66.3	47.2	51.5	
Yes (n=2,167)	33.7	52.7	48.4	
Television?				0.001
No response (n=5)	<0.1	0.2	0.1	
Don't know (n=50)	0.2	0.2	0.2	
No (n=4,853)	97.0	85.1	87.8	
Yes (n=271)	2.7	14.62	11.94	
Does your spouse/partner have a mobile phone?				0.014
No response (n=2)	<0.1	<0.1	<0.1	
Don't know (n=66)	0.4	0.3	0.3	
No (n=3,248)	90.1	74.3	78.1	

Yes (n=470)	9.5	25.5	21.6	
Does any family member own a functioning watch?				0.007
No response (n=7)	<0.1	<0.1	<0.1	
Don't know (n=63)	0.8	0.7	0.7	
No (n=4,311)	84.3	71.1	74.0	
Yes (n=798)	14.9	28.2	25.2	
Does any family member own a functioning bicycle?				0.001
No response (n=1)	0	<0.1	<0.1	
Don't know (n=6)	<0.1	0.2	0.1	
No (n=2,722)	64.1	50.1	53.2	
Yes (n=2,454)	35.9	49.8	46.6	
How do you normally get to the nearest town?				<0.001
No response (n=7)	<0.1	<0.1	<0.1	
Don't know (n=50)	2.3	1.7	1.8	
On foot (n=1,425)	29.8	27.3	27.8	
Bicycle (n=1,331)	22.1	17.8	18.8	
Bus (n=120)	4.5	8.3	7.4	
Own motor vehicle (n=480)	6.1	11.7	10.5	
Truck (n=1,334)	23.5	28.7	27.5	
Other (n=435)	11.7	4.5	6.1	
How easy is it to get where you want to go?				0.250
No response (n=82)	1.7	2.5	2.4	
Don't know (n=267)	9.5	5.3	6.2	
Not at all (n=644)	10.5	11.7	11.4	
A little (n=1,945)	37.5	34.3	35.1	
Moderate (n=776)	15.5	15.1	15.2	
Very easy (n=1,171)	21.1	24.6	23.8	
Extremely (n=254)	4.2	6.5	6.0	

[1]chi-squared tests for survey-weighted data

Figure 22 – Significance Levels of Household Infrastructure

The presence of electricity, a radio, the television, a functioning watch and a bicycle all had odds ratios higher than 1.7 with electricity at 4.5 and the television at 3.0.

	Odds Ratio (95% CI)	P-value
Assets		
Electricity	4.50 (2.07-9.79)	<0.001
Radio	2.20 (1.26-3.84)	0.006
Television	3.01 (2.43-3.73)	0.005
Functioning watch	2.24 (1.25-4.03)	0.007
Bicycle	1.77 (1.26-2.51)	0.001
Transportation to nearest town		<0.001
On foot (reference)	1	
Bicycle	0.88 (0.59-1.31)	
Bus	2.01 (1.07-3.80)	
Own motor vehicle	2.10 (1.22-3.60)	
Truck	1.33 (0.95-1.86)	
Other	0.42 (0.23-0.75)	

Figure 23 – Odds Ratios of Household Infrastructure

Agency

In order to better explore this area we chose a number of unique variables in which to test a potential relationship with school attendance:

(1) who makes the decisions in the family about the appropriate age to marry,

(2) who makes the decisions in the family about household responsibilities,

(3) who makes the decisions in the family about farm/land chores,

(4) who makes the decisions in the family about administration of finances (money) in the home,

(5) who makes the decisions in the family about decisions on how to raise children,

(6) who makes the decisions in the family about seeking healthcare for a child,

(7) does the respondent believe her friends respect her,

(8) does the respondent feel a strong bond with her friends,

(9) does the respondent feel that her family cares about her very much,

(10) does the respondent feel that her family respects her as much as she would like them to,

(11) does the respondent feel close to her family or friends,

(12) the respondent's assessment of how much freedom of choice they feel they have on what happens in their life,

(13) the extent to which the respondent believes they can assess their own destiny,

(14) whether the respondent believes she can make decisions by herself,

freely, without consulting her husband,

(15) whether the respondent can name a decision they and their family had to make in the last 6 months,

(16) whether the respondent felt they could make the choice they wanted most in the household's more recent important decision,

(17) whether a respondent's recent choice in a major decision turned out to be the best for their family,

(18) whether a respondent can describe how a recent important decision came up in her family, and

(19) whether the respondent can identify an important decision the she and her family have had to make in the last year concerning her health or the health of a child.

With nearly twenty unique variables in the agency dimension, we failed to detect any significant relationships with school attendance.

	Are you still attending school?			
	No	Yes	Total	P-value[1]
Appropriate age to marry				0.319
No response (n=20)	0.6	0.3	0.4	
Don't know (n=212)	4.0	3.8	3.8	
Men (n=1,675)	37.5	30.7	32.2	
Women (n=557)	6.6	7.3	7.2	
Both (n=2,717)	51.3	57.9	56.4	
Household Responsibilities				0.172
No response (n=15)	0.2	0.2	0.2	
Don't know (n=100)	2.3	1.4	1.6	
Men (n=1,652)	38.0	32.4	33.7	
Women (n=837)	10.2	14.6	13.6	
Both (n=2,577)	49.4	51.5	51.0	
Farm/Land Chores				0.159
No response (n=27)	0.8	0.6	0.7	

Don’t know (n=70)	1.8	0.6	0.8	
Men (n=1,000)	24.2	19.1	20.2	
Women (n=910)	14.2	15.9	15.5	
Both (n=3,170)	59.0	63.9	62.8	
Administration of finances (money) in the home				0.035
No response (n=38)	0.9	0.3	0.4	
Don’t know (n=110)	2.4	0.5	0.9	
Men (n=2,254)	50.7	45.9	47.0	
Women (n=746)	9.5	12.0	11.5	
Both (n=2,024)	36.5	41.3	40.2	
Decisions on how to raise children				0.014
No response (n=43)	1.9	0.2	0.6	
Don’t know (n=87)	1.9	1.2	1.34	
Men (n=957)	24.0	16.5	18.2	
Women (n=765)	9.2	13.0	12.1	
Both (n=3,321)	63.1	69.1	67.7	
Seeking health care for a child				0.153
No response (n=53)	0.8	0.6	0.6	
Don’t know (n=66)	1.5	0.7	0.9	
Men (n=828)	16.4	11.8	12.8	
Women (n=1,073)	14.1	19.4	18.2	
Both (n=3,152)	67.3	67.5	67.5	
Do your friends respect you?				0.724
No (n=568)	8.3	9.0	8.9	
Yes (n=4,515)	91.7	91.0	91.1	
Do you feel a strong bond with your friends?				0.714
No response (n=7)	0.5	0.3	0.3	
Don’t know (n=45)	2.0	1.2	1.4	
No (n=545)	8.3	9.7	9.4	
Yes (n=4,529)	89.3	88.8	88.9	
Does your family care about you very much?				0.323
No response (n=15)	0.1	0.1	0.1	
Don’t know (n=36)	0.2	0.7	0.6	
No (n=343)	6.2	5.2	5.4	
Yes (n=4,733)	93.5	94.1	93.9	
Does your family really respect you as much as you would like them to?				0.272
No response (n=13)	0.1	0.4	0.3	
Don’t know (n=38)	1.2	0.6	0.7	
No (n=353)	7.6	5.7	6.1	
Yes (n=4,713)	91.2	93.4	92.9	
Do you feel close to your family members?				0.409
No response (n=27)	0.1	0.4	0.3	
Don’t know (n=22)	0.1	0.2	0.2	
No (n=459)	8.1	6.8	7.1	
Yes (n=4,621)	91.7	92.6	92.4	

Some people feel they have completely free choice and control over their lives, while other people feel that what they do has no real effect on what happens to them day by day. Please, how much freedom of choice do you feel you have on what happens to your life?				0.027
No response (n=81)	0.6	1.7	1.47	
Don't know (n=269)	6.4	4.3	4.8	
No choice (n=1,682)	33.2	24.7	26.6	
Little choice (n=1,826)	36.8	39.0	38.5	
Some choice (n=721)	12.5	17.3	16.2	
A lot of choice (n=502)	10.5	13.0	12.4	
Some people believe they can decide their own destiny, while others think they do not have control over their destiny. Please, to what extent do you believe you can decide your own destiny?				0.399
A little (n=2,183)	47.4	45.7	46.1	
A lot (n=262)	5.3	6.9	6.5	
No response (n=74)	1.2	2.3	2.1	
Don't know (n=211)	4.0	4.6	4.5	
Enough (n=520)	8.5	11.5	10.8	
Nothing (n=1,876)	33.7	29.0	30.0	
In general, do you think you can make decisions by yourself, freely, without consulting your husband. Please, to which extent can you do this?				0.092
No response (n=67)	0.4	2.3	1.9	
Don't know (n=85)	0.7	2.0	1.7	
Never (n=2,163)	44.0	48.2	47.2	
Sometimes (n=2,252)	43.8	40.6	41.3	
Almost always (n=384)	4.8	3.8	4.0	
Always (n=173)	6.3	3.1	3.8	
Can you name a decision?				0.106
No response (n=46)	1.5	0.6	0.8	
Don't know (n=96)	5.1	3.3	3.7	
No (n=2,727)	53.7	48.4	49.6	
Yes (n=2,248)	39.7	47.7	45.9	
Did you feel like you could make the choice you wanted the most?				0.845
No response (n=5)	0.1	0.3	0.3	
Don't know (n=23)	1.2	1.4	1.4	
No (n=229)	8.6	7.7	7.9	
Yes (n=1,971)	90.2	90.6	90.5	
Did the choice you made turn out to be the best for your family?				0.639
No response (n=12)	1.3	0.4	0.6	
Don't know (n=28)	1.9	1.8	1.8	
No (n=209)	8.8	7.6	7.9	
Yes (n=1,981)	88.0	90.2	89.8	
Can you describe how the decision came up?				0.791
No response (n=16)	1.1	0.5	0.6	
Don't know (n=58)	1.0	1.1	1.1	
No (n=570)	25.1	24.2	24.4	

Yes (n=1,589)	72.8	74.2	73.9	
Can you tell me what choice you made?				0.561
No response (n=5)	<0.1	<0.1	<0.1	
Don't know (n=18)	0.6	1.0	0.9	
No (n=211)	5.3	7.1	6.7	
Yes (n=1,351)	94.1	92.0	92.3	
Can you please identify an important decision that you and your family have had to make in the past 1 year regarding your health or the health of your family?				0.327
No response (n=60)	1.4	1.4	1.4	
Don't know (n=239)	4.0	4.2	4.1	
No (n=2,799)	54.8	48.9	50.2	
Yes (n=2,022)	39.8	45.5	44.2	

[1]chi-squared tests for survey-weighted data

Figure 24 – Significance Levels of Agency

Wellbeing

In our final dimension, we took five variables to assess the relationship between the respondent's wellbeing and school attendance of children in the household including: (1) how each respondent rates their quality of life, (2) whether the respondents feel they have enough energy or vitality for everyday life, (3) how satisfied each respondent is with her ability to perform daily living activities, (4) how satisfied each respondent is with her ability to work, and (5) how often does the respondent have negative feelings such as despair, anxiety, or depression.

While a number of the variables were close to exhibiting a relationship with school attendance, none of the variables achieve a significance level $p<.01$.

	Are you still attending school?			
	No	Yes	Total	P-value[1]
How would you rate your quality of life?				0.259
No response (n=35)	1.3	0.7	0.8	
Don't know (n=313)	7.5	6.3	6.6	
Very poor (n=572)	10.1	8.4	8.7	
Poor (n=868)	15.5	13.1	13.7	
Neither poor, nor good (n=1,814)	37.6	34.5	35.2	
Good (n=1,115)	22.4	26.2	25.3	
Very good (n=429)	5.7	10.8	9.7	
Do you have enough energy or vitality for everyday life?				0.198
No response (n=94)	1.2	3.0	2.6	
Don't know (n=269)	6.8	6.4	6.5	
Not at all (n=463)	7.5	10.3	9.6	
A little (n=2,060)	40.6	31.3	33.4	
Moderate amount (n=886)	16.5	17.3	17.1	
Very much (n=1,270)	25.5	29.4	28.5	
Extreme amount (n=106)	1.9	2.4	2.3	
How satisfied are you with your ability to perform your daily living activities?				0.097
No response (n=80)	2.1	2.1	2.1	
Don't know (n=231)	6.3	5.0	5.3	
Not at all satisfied (n=303)	4.9	4.5	4.6	
A little satisfied (n=1,041)	15.6	10.8	11.9	
Moderately satisfied (n=1,219)	20.6	17.7	18.4	
Very satisfied (n=2,029)	46.2	51.4	50.2	
Extremely satisfied (n=238)	4.4	8.6	7.6	
How satisfied are you with your capacity to work?				0.012
No response (n=87)	1.3	2.6	2.3	
Don't know (n=190)	6.1	3.4	4.0	
Not at all satisfied (n=297)	5.2	6.7	6.4	
A little satisfied (n=792)	12.8	9.3	10.1	
Moderately satisfied (n=1,217)	21.4	18.3	19.0	
Very satisfied (n=1,990)	44.2	42.2	42.6	
Extremely satisfied (n=553)	9.0	17.6	15.7	
How often do you have negative feelings such as despair, anxiety, or depression?				0.305
No response (n=89)	1.6	3.3	2.9	
Don't know (n=337)	10.0	10.3	10.2	
Never (n=1,581)	31.9	28.7	29.4	
Seldom (n=1,247)	22.4	18.8	19.6	
Often (n=1,391)	22.3	24.8	24.2	
Very often (n=326)	4.7	8.7	7.8	
Always (n=177)	7.1	5.3	5.7	

[1]chi-squared tests for survey-weighted data

Figure 25 – Significance Levels of Well Being

Reasons for Not Attending – "Does Not Matter"

Our comprehensive review of relationships between household factors and school attendance has produced a number of unique findings indicating key conditions that may influence whether or not households decide to send their children to school. While this gives certain insight into household factors influencing school attendance, we are equally interested in subpopulations of our study that have provided distinct reasons for not attending – specifically those households that have recorded "does not matter" as a primary reason for deciding not to send their children to school. Our hope is that by better understanding household factors that appear to influence these subpopulations, we can further identify unique factors that inhibit school attendance in Mozambique.

To perform this analysis, we took the dependent variable "What is the most important reason [name] is not attending school" (ph_fam) and focused on the 34.23% of the respondents that answered "does not matter" as the primary reason. While we could have selected a number of other subpopulations identified by this variable, we chose to focus on Does Not Matter because of its large number of respondents and all other subpopulations defined specific external barriers to school attendance – such as illness or money – which put them in a different classification than an internal perception that school attendance did not matter.

To analyze this subpopulation, we recoded our data as a "1" for Does Not Matter, "0" for All Other Reasons and removed those subjects that were coded Didn't Answer ("DA") or Didn't Know ("DK"). The last two categories were specifically removed as their inclusion was creating significance between chosen dependent and independent variables. Similar to our School Attendance analysis, we then complete cross-tabulations with each of the independent variables in the eleven household dimensions outlined above. Statistically significant

relationships were recorded and logistic regressions were completed to calculate the odds ratio between the independent and dependent variables.

Independent Variables with Statistically Significant Relationships

Our analysis produced five independent variables with significant relationships to respondents answering "does not matter" as a reason for not sending household children to school: (1) whether children in the household have completed any education, (2) the degree to which the respondent believes the productive capacity of the household is adequate, (3) whether the household uses irrigation on their fields and (4) whether the family owns a television. All other independent variables in each dimension did not record a statistically significant relationship.

	What is the most important reason [name] is not attending school?			
	Other Reasons	Does Not Matter	Total	P-value[1]
How many years of education have you [RESPONDENT] completed?, Median (IQR)	0 (0-3)	0 (0-2)	0 (0-2)	1.00
[RESPONDENT] has completed ANY school				0.536
No (n=1,229)	60.9	56.4	59.1	
Yes (n=3,964)	39.1	43.6	40.9	
How many years of education has [NAME] completed?, Median (IQR)	0 (0-2)	0 (0-0)	0 (0-1)	1.00
[NAME] has completed ANY school				<0.001
No (n=2,518)	64.6	84.3	72.5	
Yes (n=2,675)	35.4	15.7	27.5	
You consider the resources and productive capacities of the family in this house…				<0.001
Don't know (n=54)	8.91	4.14	7	
Less than what is needed (n=565)	56.63	35.77	48.25	
What is needed (n=583)	27.78	54.43	38.49	
More than what is needed (n=62)	6.68	5.65	6.27	
Do you use irrigation on your field?				<0.001
No (n=1,120)	94.89	99.64	96.81	
Yes (n=56)	5.11	0.36	3.19	
Do you own a Television?				0.001
No response (n=1)	0	0.04	0.02	
Don't know (n=11)	0.11	0.49	0.26	
No (n=1,243)	96.64	98.9	97.54	
Yes (n=32)	3.26	0.57	2.18	

[1]t-test from weighted quantile regression and chi-squared tests for survey-weighted data

Figure 26 – Significance Levels Found In "Does Not Matter" Population

Number of Years of Education of Respondent

There were low levels of education for respondents and children in both response categories (other and does not matter). However, the odds of responding that school Does Not Matter were nearly 70% lower for a child that has ANY prior schooling.

	Odds Ratio (95% CI)	P-value
[RESPONDENT] has completed ANY school	1.20 (0.67-2.17)	0.536
[NAME] has completed ANY school	0.34 (0.19-0.60)	<0.001

Figure 27 – Odds Ratios of Educational Attainment in Does Not Matter Population

Productive Capacity of Household

Those households that responded as having the productive capacity of what is needed had 3.1 higher odds of noting that school attendance Does Not Matter – one of the highest odds ratios observed in our sample.

	Odds Ratio (95% CI)	P-value
You consider the resources and productive capacities of the family in this house…		<0.001
Less than what is needed (reference)	1	
What is needed	3.10 (1.81-5.33)	
More than what is needed	1.34 (0.61-2.95)	

Figure 28 – Odds Ratios of Productive Capacity in Does Not Matter Population

Irrigation in the field

Those households with irrigation in the field had 1.5 times the odds of reporting that school Does Not Matter. The confidence interval, however, was extremely large and the percentage of respondents with irrigation so small that it's difficult to assert there is a material relationship between the two variables.

	Odds Ratio (95% CI)	P-value
Do you use irrigation on your field?	1.57 (0.72-3.43)	0.259

Figure 29 – Odds Ratios of Irrigation in Does Not Matter Population

Television

In the case of the household owning a television, the odds of reporting school Does Not Matter drop more than 82 percent. As televisions are often a proxy for high income households, it is not surprising to observe this relationship given the high income households have a higher expectation of noting school importance (Al-Sammarrai & Peasgood, 1998; Burke & Beegle, 2004; Kadzamira & Rose, 2003; Ngware, Oketch, Ezeh, & Mudege, 2009).

	Odds Ratio (95% CI)	**P-value**
Do you own a Television?	0.17 (0.05-0.61)	0.007

Figure 30 – Odds Ratios of Television in Does Not Matter Population

Chapter 10

Discussion

Our study has provided a unique view into the number of household dimensions that can affect primary school attendance in both rural and urban populations of Mozambique. After surveying more than 3700 households and 5100 school aged children, we have been able to reinforce findings found throughout the literature while noting new factors that may materially influence school attendance decisions. While our analysis looked at the household factors that represent a statistical significance and magnitude of relationship to school attendance, we also examined the household factors of respondents that cited "Does Not Matter" as the primary reason for their child's non-enrollment in primary school. Summary of our analyses is therefore presented by dimension for both household factors influencing school attendance and households responding that primary school education does not matter.

Household Demographics

The demographics of the children in our survey reflect other recent education surveys in Mozambique. Our weighted sample showed that 22.5% of school-aged children were not attending school and of those students not attending, the majority were females (55.5%) (Sudhanshu Handa, 2002; Mozambique National Institute of Statistics, 2007). The validity of our results was supported by finding children attending school were only a year older than those children observed not to be attending – ensuring there was no selection bias generated by the age of children surveyed in our sample. Neither gender of the child nor the marital status of the female head of household, however, appeared to have a statistically significant relationship to school attendance. Furthermore, the odds of attendance only increased 1.34 times for every

five year increase in age of the child – rendering child age as a mild impact on school attendance decisions. The results observed from household demographics in our study reflect other published studies in relationship to male attendance, average age of child in attendance and school persistence across age (Sudhanshu Handa, 2002; Mozambique National Institute of Statistics, 2007; UNICEF, 2008). The similarities are encouraging as the methodology of the study and breadth of sample helped ensure our population was both representative of other published literature; allowing our other findings to rest on well understood phenomena affecting school enrollment decisions.

Language

The relationship between language and school attendance was dominated by two primary variables: (1) does the child understand Portuguese well and (2) the most spoken language in the household. Only sixteen percent of households that elected not to send their child to school spoke Portuguese well. We found that households speaking Portuguese have a 5.5 times higher odds of sending their child to school. Unless the household spoke Portuguese or Emakhuwa, the native language of the household exhibited only minor effects on the odds of school attendance. In comparison with other household dimensions, we believe language may represent the degree to which a family is integrated or comfortable engaging with government and community institutions. These assertions are supportive of other findings that have been realized in other parts of sub-Saharan Africa (Kone, 2010; Maclure, 1994). In the case of both Mali and Burkina Faso – sensitivities to local isolation represented by language and institutional participation has appeared to limit the overall levels of school enrollment, and in some cases, may be decreasing enrollment from previous levels (Kone, 2010; Maclure, 1994). Households that do not speak Portuguese may feel more isolated and less trusting of certain institutions –

and consequently have less desire or interest in sending their children to school. Linguistically isolated households may also be less knowledgeable or have fewer experiences in realizing the importance of language in navigating institutions, commerce and social cohesive activities that can greatly increase the prospects of children that attend school and learn the dominant language(Kone, 2010; Maclure, 1994). Future research that specifically gauges households on their use of language at a household and community level would further test these hypotheses and better inform language's functioning in enrollment decisions.

Education

As is represented throughout the literature, nearly every educational variable in our study had a statistically significant relationship to household school attendance (Lewin & Akyeampong, 2009; Mason, 2005; Oxaal, 1997; Roby, et al., 2009; Streathfield, et al., 1990; UNICEF Mozambique, 2009; United Nations Children's Fund (UNICEF), 2005). The number of years of education completed by the female head of household remains a significant factor in school attendance (UNICEF Mozambique, 2009; United Nations Children's Fund (UNICEF), 2005). In our study, the number of years of education completed by the female head of household nearly doubled the odds (2.49) of school attendance per five years of school completed by the mother. The child of a mother who desires or expects her child to finish secondary school or higher has over twice the odds of attending school currently than the child of a mother who desires or expects her child to finish primary school ($p<0.001$ and $p=0.007$). Most (89%) respondents thought that educational achievement is very important to their child's future, and those that responded "no" to some importance had a lower odds of school attendance. Similar to findings of both Handa and Takyi – the experience of some degree of schooling and the belief that education is of value to a child's future - were found to be primary factors in school

attendance decisions within households(Sudhanshu Handa, et al., 2004; Takyi & Broughton, 2006) .

The perception of the quality of schools, as expressed earlier in our results, while exhibiting a statistical relationship to school attendance, showed no statistically significant relationship in our regression analyses. This could be, however, due to the very low percentage of respondents who felt their schools were of bad quality (9.8%) and the relatively high percentage of respondents who felt their schools were of good or very good quality (52.2%). It should be noted, however, that of those households that elected not to send a child to school, over 68% noted that their schools were of fair, good or very good quality. The importance of the perceived quality of schools in relationship to school attendance therefore appears to be relatively low within our sample population. This would reinforce findings articulated by Burke, Golharber and others - indicating that improving the quality of schools beyond a certain level may not significantly improve attendance – and reinforces our underlying thesis that household factors may be the determining factor in improving attendance rates among school aged children once a certain level of perceived quality is achieved at the local school level (Burke & Beegle, 2004; Filmer, 2007; Goldhaber & Brewer, 1995). It could also be that seeking the household's perception of school quality is also an imperfect measure and prone to a wide level of interpretations that skewed its significance in our study. As an example, the range of quality in a given region could be quite small, and on average, quite poor. With the reference points being other low quality schools, however, the household might treat the quality of schooling as "good" or "fair"; and yet not so good to make the investment in schooling. Given the study did not distinguish between government and non-government schools, attendance at non-governmental schools would not have affected our overall enrollment findings in this or other areas. Future studies that connect specific households to individual school catchment areas and

their corresponding quality reporting could be significant in helping determine whether it is the actual quality of the school, the household's perception of the quality level, or both that most determines the odds of enrollment.

The number of reading items in the home was also found to improve the odds of enrollment; and as the quantity of reading items increased – so did the odds of enrollment. In review of the literature as a whole, it may have been more appropriate to place reading items in the household infrastructure dimension. As discussed later, household items that improve access to information were found in the literature and our study to significantly improve the odds of enrollment (Guarcello, Lyon, & Rosati, 2004; Khanam & Ross, 2006). On the other hand, the number of reading items may also be more closely related to educational endowments of the parents as put forth by Ayalew (Ayalew, 2005). It is difficult to make any assertion about the direction of the relationship as we neither know what type of reading items they are or who in the household is reading the defined items. Nevertheless, given the strong improvement of enrollment odds when reading items are present, further questioning around the type of items and who utilizes such items may inform a real determinant to school enrollment decisions.

Religion

Over 95% of the households surveyed go to a location of worship at least once per week. A significant number of respondents (47.4%) attend worship more than once per week. While there were relatively few households in our survey that did not attend a location of worship on a regular basis, households that attended worship only once or twice a year had 70% lower odds of school attendance than those attending at least once a week. Spiritual/traditionalists and agnostic/atheist have over 70% lower odds of school attendance than Catholics; while Christian, Muslim, or non-Christian Eastern religions are not statistically

different in school attendance from one other. Religious groups traditionally found to be more traditionally cohesive and isolating, such as the Latter Day Saints and Jehovah Witness', showed a 70% higher odds of school attendance. This last finding was of most interest to us, as it may be that identification with a specific religious "group" may be a distinguishing factor of households exhibiting elevated school attendance rates. This would support the findings of Hofstede, Stedham and Yamamura in which the degree to which members in a country define themselves in terms of group membership – directly relates to the degree of participation and personal confidence in engaging educational institutions and other government bodies (Hofstede, 2001; Stedham & Yamamura, 2004). If this is the case, connection to a specific group (in terms of both place and affiliation) in the community may be a meaningful household factor in school attendance decision-making and would be worthy of more comprehensive research and analyses. Specific exploration of whether the school is located near the household's place of worship or whether children attend school with other members of their religious body could both inform this finding more directly.

Safety

While more than 59% of our households articulated they feared for their physical safety in terms of the risk of being hurt as a result of a crime, there was not a statistically observable relationship between this variable and school attendance. This was surprising given the work of Porter and others in clearly showing that safety is often a significant factor in school attendance (Oxaal, 1997; Porter, 2002, 2007). When examining households with children attending school, we found 60.8% feared for their safety while only 28.1% did not. The primary hypothesis we can make from our findings is that the lack of physical safety in this region is not a strong enough influencer to prevent school attendance. So while households fear for their safety, they appear not let it deter them from sending their child(ren) to school. Households

may also work to mitigate their safety issue by not letting their child attend school outside of walking distance. This hypothesis is directly support by our own odds ratios observed between school attendance on foot and via a bicycle – as when a bicycle was used to go to school, attendance was 60% less likely. Even though safety was not found to be directly related to school attendance, the prevalence of respondents that fear for their safety warrants more explanation. Specifically understanding how households "mitigate" their risk factors – as in the type of transportation used to travel – may be a direct way to better understand safety's relationship to enrollment decisions.

Food Security

Over a third of the households (37.1%) in our survey indicated that in the past four weeks there was an incidence of no food of any kind to eat. While a large number of households articulated an issue with food security, households with a lack of food did not keep a disproportionate number of children at home. This result was surprising. Jensen had clearly found that adverse agricultural conditions had declined enrollment rates by one-third to one-half (Jensen, 2000). His work also showed that even temporary shocks had lasting effects – limiting the likelihood that our results are simply due to timing effects of our study (Jensen, 2000).

We consequently believe, as we did in the safety dimension, that while food security appears to be a real challenge to many of the households in our study, it does not appear to "overpower" the school enrollment decision to a degree in which we find a statistical difference in enrollment between households enrolling their children in school and those who do not. Related findings in our study were also supportive in that we did not find many agricultural practices affecting school enrollment decisions nor the household's type of land ownership. Our

households may consequently not face the same traditional relationships between agricultural practices and food production that has been found elsewhere in the literature and therefore may not reflect the same relationships to school attendance. This hypothesis would be supported by Rigg's work in which he found that slight changes in types of farming, blending levels between farm and non-farm income, and minor expectation changes in levels of production can all change household investment decisions (Rigg, 2006). Directly asking how households prioritize their investment decisions – such as between food, child labor, transportation and schooling – could greatly help in understanding the degree to which school enrollment is prioritized with other household investments and consequently directly affected by food insecurity.

Income

While the income dimension provided a great deal of information about the households surveyed, there were only two factors that exhibited a statistically significant relationship to school attendance: the household's monthly median income and the presence of a household bank account. The level of monthly income is a well know and defined factor in a household's decision to send children to school (Al-Sammarrai & Peasgood, 1998; Sudhanshu Handa, et al., 2004; Janvry, et al., 2006; Kadzamira & Rose, 2003). The interesting result we observed is that there appears to be a significant inflection point at 1000 Meticals. At this income level, households jump to a 3.9 higher odds of school attendance, with higher levels of income only showing incremental increases to 2000 Metricals. The reason for this finding may be that a certain income threshold may need to be reached to positively affect the household's decision to send a child to school. This is consistent with what we also observed in the literature. Handa et. al. found that household income had a significant relationship to school enrollment in Mozambique in particular (Sudhanshu Handa, 2002; Sudhanshu Handa, et al., 2004). Kim et al.

found that income effects on enrollment were much higher amongst lower income households and had diminishing effects on enrollment odds levels as household income rose (Kim, Alderman, & Orazem, 1999). De Janvry et al. have found that certain subsidies to families at low income levels can significantly improve school enrollment but have a leveling effect at much higher subsidy points (Janvry, et al., 2006). Research that examines interventions focused on helping families reach a certain minimum income level may provide additional insight into the threshold income levels required to influence school enrollment decisions and help further define the critical household income levels required to increase enrollment rates on a state and national level .

The other significant relationship between school enrollment and income was in regard to the presence of a family bank account. While only 13.7% of households noted having a bank account, those same households had a 5.5 higher odds of currently sending a child to school – though significance was not as strong. We believe this finding is likely a reflection of income levels rather than a direct relationship between school enrollment and bank accounts. Given the presence of the bank account has a higher odds ratio than certain income levels, alternative hypotheses could be that households with bank accounts can whether income shocks better than households without a bank account – therefore sustaining enrollment levels when household income declines – a hypothesis supported by Jensen's work on agricultural volatility and investments in children (Jensen, 2000). Another hypothesis could be that as households more directly engage in collective groups and institutional support – they are more likely to be proactive in engaging and supporting other groups and institutions such as schools (Hofstede, 2001). Any assertions regarding these alternative hypotheses would certainly need to control for confounding factors such as income, distance to banking institutions, and others obvious

influencers – but the strength of the observed odds ratio would support looking closer at how banking might support families and their school enrollment decisions.

Health

While a number of households recorded challenges in documenting and receiving vaccinations, as well as experiencing respiratory and febrile ailments, none of the household health variables in our survey proved to have a statistically significant relationship with school attendance. This was surprising to us. A number of studies in the literature had recorded episodic and long-term effects on school enrollment from mild to severe health-related ailments (Clarke, et al., 2008; Lindelow, 2008; Thuilliez, et al., 2010). One reason for this finding could be due to survey design. Most of the health related questions within our survey were focused on children ages 0-59 months and respondents may not have always considered their school aged children for the questions related to children outside the defined age range. We were also unable to compare the incidents of health issues observed in our population with comparative household studies to understand whether the prevalence of health issues is the reason enrollment differences were observed. We continue to believe that the linkages between school enrollment and child health need to be continually understood and examined given the little amount of empirical research found in the literature. Methodologies, however, will need to be more robust than those in our own study and will need to control for overall epidemiological issues that could inadvertently skew results.

Agricultural Practices

The surprising finding in the dimension of agricultural practices was how few households had deployed irrigation and fertilization methods. Less than 3% of the households in our study used fertilizer to improve their crops and less than 5% of the same households used

irrigation on their fields. This was roughly half the number of respondents expected in comparison recent Mozambique estimates (Cunguara & Kelly, 2010). With so few households using irrigation and fertilizer and a lack of detail around the type or degree of irrigation and fertilizer used it is difficult to articulate why no relationship was found to school enrollment. To the extent that this survey is a baseline for future surveys of the same cohort, we would recommend studying how changes in the level of irrigation or fertilization may affect school enrollment decisions. Without a baseline and recorded change in irrigation and fertilization prevalence – no meaningful hypotheses can be proposed.

Household Infrastructure

Nearly every household infrastructure variable had a statistically significant relationship to school attendance in our survey. This was not surprising as the literature has shown the absence of assets such as bicycles, electricity and other household infrastructure items significantly extends the time it takes to perform typical household tasks by both children and female heads of households – sometimes creating a trade-off between schooling and household duties (Khanam & Ross, 2006; Porter, 2002). We found, however, that the presence of electricity, a radio, a bicycle, and a television had some of the highest odds ratios with school attendance. A bicycle increased the odds of attendance by 1.7 times, a watch and radio by 2.2 times, electricity by 4.5 times and a television by 3.0 times.

The relationship between electricity and school attendance has been documented in numerous low-income countries (Durant, 1998; Guarcello, et al., 2004). These studies indicate that electricity reduces the value of children's time in household production and maintenance – allowing more time to spent on schooling (Durant, 1998; Guarcello, et al., 2004). Electricity also appears, in some cases, to be a foundational element to other household items – such as radios

and televisions – which may create further household effects or functionings (Durant, 1998). Much less is understood about the effect of these other functionings – but could begin to explain why we observe a higher odds ratio from some household infrastructure items in comparison to income levels. One hypothesis is that radio and television (and perhaps even reading items as mentioned earlier) enhance access to more information in the community and create more social cohesive effects – enhancing an understanding of the return on education and building more social cohesion between the household and the community. Whether listenership increases the demand for schooling or schooling increases the demand for listenership (as in the case of the radio) could not be discerned in our current survey. But the relationship between radio, television and attendance is not unique and further research might help us better understand how they enhance one another and perhaps serve as a multiplier in improving the odds of school enrollment (Khanam & Ross, 2006).

The odds ratio observed from having a bicycle supports the literature found related to ease of transportation and school enrollment (Oxaal, 1997; Porter, 2002, 2007). It should be noted, however, that the bicycle supports a specific functioning – transportation – which lowers specific barriers to school attendance – such as time as a value of money. In this way, the bicycle itself may explain its unique value in improving school attendance as opposed to being a proxy for income or some other variable in our survey (Porter, 2007).

As to the observed relationship between school attendance and a household timepiece – we could find no supporting results in the available literature. Our hypothesis , however, is that an investment in a watch may be a proxy for the household's "value of time." Such a value of time may represent a more intentional view of allocating time and resources within the household and consequently a more intentional review of education's return on investment.

With this in mind, further understanding the variables attributed to household's time and investment decisions – such as how respondents choose to allocate their time each day - may help us further understand the nuances of household characteristics and investment decisions.

Agency and Wellbeing

We examined over twenty unique variables in the agency and wellbeing dimensions. Our respondents generally answered that both the man and the woman were responsible for jointly deciding most household decisions. The majority of respondents (90%+) felt their family cared about them very much, that they were respected by their family, and felt close to their family members. The majority of respondents (69%), however, felt they have little free choice or control over their lives. While most respondents have close familial ties and appear to make a number of choices with their spouse, there remains a frustration, or lack of empowerment in how much households believe they can control the outcomes in their life. We had not observed this dichotomy in the literature. Most of the literature we had reviewed showed close ties between joint decision-making and individual empowerment (Jejeebhoy & Sathar, 2001; Samman & Santos, 2009).

Also interesting was that no single agency or wellbeing variable exhibited a statistically significant relationship to school attendance. Several studies had shown that agency levels of female heads of households had considerable effect on school enrollment decision and we expected to support those results (Mason, 2005; Oya & Sender, 2009; Pitt, et al., 2006). One hypothesis could be that the language used in the survey did not adequately capture the issues of "power to" and "power from" that are most often used in assessing levels of agency. No issues, however, were raised by the teams conducting the survey and the questions deployed were firmly based in methods used elsewhere in sub-Saharan Africa (Samman & Santos, 2009).

Assuming the methodology was sound, another hypothesis is that this "frustration gap" between feeling empowered to make decisions while also feeling they have little control over the outcomes in their life – could be attributed to not believing education will make an immediate difference in improving their observed "frustration" – and therefore agency would not possess a direct relationship to school enrollment in our particular population. Samman and Santos found that exposure to employment and and family structure (i.e. past and present residence with in-laws) were most closely related to positive investments in children (Samman & Santos, 2009). Oya and Takyi found that marital status (specifically divorce) was a positive determinant in school enrollment levels (Oya & Sender, 2009; Takyi & Broughton, 2006). It could be that a relationship between a respondent's level of agency and school enrollment might therefore depend upon: (1) agency defined as very limited set of variables (e.g. employment exposure, marital status) – which seems both limiting and awkward or (2) respondents may need to feel empowered to make decisions in a particular area before a relationship with school enrollment is observed. Female respondents may need to "choose" employment before their particular sense of agency is reflected in school enrollment decisions. Some may need to choose leaving a certain family structure or spouse before making a decision around their children's schooling. This particular hypothesis would depend on a "sequencing" of agency decisions (e.g. the choice of employment comes prior to the choice of children's schooling) which was not immediately found in our literature but is perhaps plausible. Regardless of which hypothesis may be correct, our results show that certain types or levels of agency do not automatically translate to improving school enrollment decisions in our particular population. We can also show that the relationship between parental agency and school enrollment continues to have many unanswered questions and both advances in methodology and selection of agency variables will be foundational supports to tested interventions.

Digging Deeper: Respondents that Answer School Attendance Does Not Matter

In an effort to further understand the household factors that may significantly influence household school attendance decisions, we examined the subpopulation of respondents that answered "does not matter" when asked why the household's school aged child(ren) were not attending school. Using the same household dimensions and variables within each dimension, we found only four variables with a statistically significant relationship with those respondents answering does not matter as the reason for non-attendance: (1) the number of years of education a child has completed, (2) whether the family owns a television, (3) whether the household uses irrigation, and (4) the degree to which the respondent believes the productive capacity of the household is adequate. While there is some support for these findings in the literature, the small number of significant variables (as compared to our larger sample and analysis) has led us to question the interpretation of respondent's answer of "Does Not Matter". While the percentage of respondents was large, interpretation of Does Not Matter could be different linguistically and culturally for regional sub-populations. For this reason, our conclusions and hypotheses should be considered directional and in need of further study before making any long-term assertions.

In the case of the number of years of education completed by a child, we found that the odds of the respondent answering "Does Not Matter" were 66% lower for a household with a child that has had ANY education versus NO education. It appears that the simple experience of having a child attend school for any amount dramatically changes the view of the household – or at least greatly reduces the odds of a household believing schooling does not matter. This has been supported throughout the literature and is consistent with a number of other studies throughout the region (Sudhanshu Handa & Simler, 2005; Sudhanshu Handa, et al., 2004). Not

surprisingly, when a household experiences the "effects" of education they are inclined to persist for some period of time.

In the case of households owning a television, the odds of reporting school "Does Not Matter" drops more than 82%. While we believe the analysis to be correct, since electricity and other household items were not also shown to have a relationship, "televisions" in this case is likely a proxy for income in this particular subpopulation and likely does not reflect a direct relationship to school enrollment decisions.

More interesting results, however, were found in the case of irrigation and perceived productive capacities and resources of the home. Households with irrigation in the field had 1.5 times the odds of reporting that school Does Not Matter. While the number of respondents with irrigation in the field were very small and the confidence interval was large, the relationship was significant. This potentially unusual result was supported by the finding that households responding as having the productive capacity of "what is needed" had 3.1 higher odds of reporting school attendance "Does Not Matter" than households reporting productive capacity of "less than needed". These last two results are supported by research noting that households with high agriculturally-based income levels (ex. supporting irrigation in the field and exhibiting higher productive capacity), observe a lower need for sending children to school (Lanjouw, et al., 2001; Rigg, 2006; Winters, et al., 2009). This result has been attributed to the household already having what it needs, and therefore doesn't perceive a need to invest in their child's education (Rigg, 2006). This particular hypothesis would lead us to believe that these households would also exhibit a significant relationship between educational aspiration and school attendance – which it did not. Another hypothesis is that wealth in low-income countries does not significantly increase the odds of primary school completion – as compared to wealthy

countries – and therefore may not be perceived as a path to prosperity. This hypothesis could also support the underlying results found by Rigg and Heyneman's showing that income is an imperfect predictor of primary school enrollment (Heyneman & Jamison, 1980; Rigg, 2006). Further research is therefore needed to strongly support a particular hypothesis for our particular findings. We can, however, note that simply increasing the productive capacity of a household does not always translate into higher school attendance.

The aggregate of these results does reflect a growing need to understand the "pockets" of populations that are electing not to enroll their children in school. Households that answer schooling "Does Not Matter" are clearly different that the larger population and likely different from those that answered health or work as a primary reason for non-enrollment. Better methodologies to study these populations are therefore warranted and clearly supported by our own findings.

Chapter 11

Household Characteristics as a Policy Framework for Advancing School Enrollment

The challenge of any study focused on a broad scope of independent variables is its functional transition to applicable action and potential policy implications. While the majority of our findings were supported by the literature and reinforce much of what is known surrounding household characteristics and school enrollment decisions – we did want to make an effort to synthesize the breadth of our results into a supporting framework that could inform policies that use households to advance school enrollment initiatives. It is understood that policy makers have few interventions at their disposal and that that such interventions often lack the ability to target specific households. With this in mind, specific interventions will be unique in each setting and population.

In review of those household findings most greatly influencing the odds of school attendance, we found three dominant characteristics: (1) the household's education experience and educational aspirations, (2) income level, and (3) the household's possession of certain distinct functionings in deciding whether or not to send household child(ren) to school. Whether considering the respondents level of education, the educational experience of the child, or educational aspirations for the child – all were found in our study to improve the odds of school attendance in the household (Sudhanshu Handa, 2002; Mason, 2005; Roby, et al., 2009). Policy initiatives which educate children in the short run should therefore have positive effects when they themselves become parents. Policies that improve the educational expectations and aspirations of parents should also have a material effect on the odds of improving enrollment both now and in the future.

Congruent with the literature, we also found critical levels of income are shown to significantly increase the odds of school attendance amongst households (Al-Sammarrai & Peasgood, 1998; Kim, et al., 1999). We found there are diminishing returns to rising income levels above certain thresholds (Kim, et al., 1999). While rising income levels do raise the odds of enrollment even amongst high income households, the rate at which the odds increase slow dramatically at higher income levels. Policy makers that focus on raising the income levels of the poorest households should observe a higher rate of enrollment as the odds improve most quickly in households below 1000 metricals.

Finally, households that possess certain specific functionings – such as those that speak Portuguese well, possess certain household items that inform them of outside events and make it easy to reach the community – and those that use those capabilities to access groups (such as churches) and institutions (such as banks) – all have high odds of school attendance (Durant, 1998; Guarcello, et al., 2004; Khanam & Ross, 2006). Policy initiatives that improve proficiency in Portuguese, electrify the community, expand transportation, and connect groups of people and people with trusted institutions – should observe some improvement in the odds of households sending their children to school.

These three dominant themes also support Sen's general theory that households and communities which realize certain functionings, realize new capabilities which in turn support the development of new functionings (Sen, 1999). Within this framework, policies that specifically focus on household functions such as language development, accessing the community, and securing basic income levels – will likely support households' growing abilities well beyond school enrollment.

Our findings also indicate that initiatives supporting school enrollment affect households in different ways. Our analysis of populations who elect not to send their children to school because it "does not matter," while perhaps only directionally, reflects wide variations in school enrollment decisions in response to the household's perception of their own resources and productive capacity. Similar to the work of Rigg et al., we find that some households with the highest levels of self-perceived productive capacity and resources are also likely to respond that schooling does not matter (Rigg, 2006). While there are a great number of different reasons why households respond differently to school enrollment initiatives – whether that be initiatives that raise income, improve land use, or expand land ownership – households are a complicated set of interconnected forces that may act directional but not always consistently in improving school enrollment levels.

Chapter 12

Limitations and Considerations

It is important to note that the nomenclature and analysis used in our study has significant limitations which restrain our ability to fully predict the way in which our defined variables can effect school enrollment decisions. The use of logistic regression has given us a directional view of what independent variables might influence school enrollment but it is far from predictive and cannot adequately control for certain confounding factors such as income or region of the country.

As conditional independence of our variables may be an inappropriate assumption in some of our logistic regressions, further use of a latent class analysis would be a better means to understanding the way in which our variables affect household enrollment decisions. As an example, latent class regressions would be necessary to more accurately control for issues of income and geography which may be producing confounding results in each of our named dimensions – such as household infrastructure. Other analysis such as the Cox Proportional Hazard Model would be necessary to manage confounding factors of time and variable intensity – both of which would impact food security and safety dimensions in ways we can not sufficiently explain through simple tests of significance and logistic regression – and in the absence of time series data. These discrete analysis, and others like them, would no doubt improve our understanding of which household variables influence school enrollment decisions. These analyses might also produce different results as they better control for income, geography, and other confounding factors present in our survey. Our own data and analysis should therefore be viewed with the necessary skepticism.

Apart from the types of analysis used in our study, there should also be a critical view of our broad definition of "household." This study has depended on a number of different informants within each household unit. While the requested respondent is the eldest female head of household, these respondents were not always available and surveyors may have interviewed other female heads of household where polygamy is present or when a death has occurred. Respondents may also have relied on information from other household members – such as children themselves - thereby including a unique set of informants that would have been unrecorded in the questionnaire. Additionally, surveyors were requested to make certain observations – whether counting the number of reading items in the home or observing the construction of the domicile. It is therefore not improbable that different informants were simultaneously observing the same household unit – making it difficult to control for objectivity and consistency in the survey itself. It is not unlikely that on a different day the same household unit could have a different surveyor and a different household informant and thereby produce different results. The complex nature of both the household and how it is observed should be another reason to view our results critically and without causation.

Given the number of confounding factors in our study and the complexity of household observations, the need for better identifying and analyzing the sub-populations of households will be crucial to realizing more meaningful findings. Rather than a broad review of the household population, discrete questions must be asked and appropriate stratification must take place. For instance, understanding the unique household informants that record different levels of educational aspiration and expectation would be a household subpopulation that would help us better realize the degree to which aspiration and expectation affect school enrollment – extending far beyond the odds ratios generated in our own study.

While we believe our study has certain merits and contributes to the growing amount of literature regarding school enrollment decisions, the study has real limitations that should be considered and managed when referencing our work. It is with this in mind that our work is respectfully submitted.

Chapter 13

Conclusion

Our work has provided a comprehensive look into the ways household characteristics relate to school enrollment decisions. After analyzing more than 80 different variables across 11 different household dimensions, more than 20 unique characteristics were found to relate to school attendance – the majority of which were found to significantly affect the odds of school enrollment.

In the cases of household income, educational attainment, and educational aspiration and expectation – our results strengthen the existing literature and reinforced their importance in school enrollment decisions (Guarcello, et al., 2004; Kone, 2010; Roby, et al., 2009). When considering household items and functionings such as language, electricity, the radio, and the bicycle, we found distinct household functionings can affect the odds of attendance more greatly than even our traditional markers such as income and educational attainment. The child's understanding of Portuguese alone increased the odds of enrollment 5.1 times whereas the mother's educational attainment only increased the odds of enrolment 2.5 times for every 5 years of schooling completed. This is exciting new ground and supports the development framework espoused by Sen - which by increasing certain functionings of the household we can realize new levels of school attendance that will in-turn produce new capabilities for the community writ large (Sen, 1997, 1999).

Finally, our study reflects the complex forces within the household and the unpredictable nature of certain household-level initiatives. Sub-populations of households that note education "Does Not Matter" as a reason for non-enrollment, respond and behave

differently than households in our wider studied population. Households own perceptions of their productive capacity and resources can lead to different levels of school enrollment and certain measures can be inconclusive in some populations, such as the perception of school quality, which was shown to be an imperfect predictor in our study.

And yet, with the majority of the literature on school attendance focused on school supply and supply characteristics – there is much work left to be done in understanding the importance of household characteristics in school enrollment decisions. Hopefully our study will help others focus more narrowly on areas we found to be significant. By further testing new hypotheses put forth we will be able to accelerate our collective work in this area. Each household dimension, however, continues to have its own internal debates. For this reason, we must also work across disciplines to inform the way we view and explain each household dimension. By narrowing our focus around key household characteristics and working across disciplines we will continue to make great strides in improving school enrollment initiatives across low-income countries.

Addendum A –Dependent and Independent Variable Selection – A Detailed Review

The following is a table and related summary of the variable categories and related questions used in our analysis of household characteristics and their relationship to school enrollment decisions. This list is intended as a "crosswalk" between defined variables and their related significance found in the literature. The summary is intended to provide some explanation as to why some variables were chosen but is not intended as a detailed explanation of each variable and each piece of literature.

Agency	Literature
Who makes the decisions in your family about APPROPRIATE AGE TO MARRY?	Jeejeboy, 2000; Jeejeboy & Sathar, 2006; Samman & Santos, 2009; Oya & Sender, 2009
Who makes the decisions in your family about HOUSEHOLD RESPONSIBILITIES?	Mason, 2005; Samman & Santos, 2009;
Who makes the decisions in your family about FARM/LAND CHORES?	Mason, 2005; Pitt, Khandker, 2006; Samman & Santos, 2009;
Who makes the decisions in your family about ADMINISTRATION OF FINANCES (MONEY) IN THE HOME?	Mason, 2005; Oya & Sender, 2009
Who makes the decisions in your family about DECISIONS ON HOW TO RAISE CHILDREN?	Mason, 2005; Samman & Santos, 2009; Oya & Sender, 2009
Who makes the decisions in your family about SEEKING HEALTHCARE FOR A CHILD?	Mason, 2005; Samman & Santos, 2009;
Do your friends respect you?	Mason, 2005
Do you feel a strong bond with your friends?	Jeejeboy, 2000; Jeejeboy & Sathar, 2006; Samman, 2009;
Does your family care about you very much?	Mason, 2005; Samman & Santos, 2009;
Does your family really respect you as much as you would like them to?	Mason, 2005; Samman & Santos, 2009;
Do you feel close to your family members?	Mason, 2005; Samman & Santos, 2009;
[SHOW CARD R1] Some people feel they have completely free choice and control over their lives, while other people feel that what they do has no real effect on what happens to them day by day. Please, how much freedom of choice do you feel you have on what happens to your life?	Pitt, Khandker, 2006; Samman & Santos, 2009; Oya & Sender, 2009

Some people believe they can decide their own destiny, while others think they do not have control over their destiny. Please, to what extent do you believe you can decide your own destiny?	Pitt, Khandker, 2006; Samman & Santos, 2009; Oya & Sender, 2009
In general, do you think you can make decisions by yourself, freely, without consulting your husband? Please, to which extent can you do this?	Jeejeboy, 2000; Pitt, Khandker, 2006; Samman & Santos, 2009; Oya & Sender, 2009
Please think about an important decision that you and your family have had to make in the last 6 months. CAN YOU NAME A DECISION?	Jeejeboy, 2000; Samman & Santos, 2009;
Please think about an important decision that you and your family have had to make in the last 6 months. DID YOU FEEL YOU COULD MAKE THE CHOICE YOU WANTED THE MOST?	Jeejeboy, 2000; Samman & Santos, 2009;
Please think about an important decision that you and your family have had to make in the last 6 months. DID THE CHOICE YOU MADE TURN OUT TO BE THE BEST FOR YOUR FAMILY?	Jeejeboy, 2000; Samman & Santos, 2009;
Please think about an important decision that you and your family have had to make in the last 6 months. CAN YOU DESCRIBE HOW THE DECISION CAME UP?	Jeejeboy, 2000; Samman & Santos, 2009;
Please think about an important decision that you and your family have had to make in the last 6 months. CAN YOU TELL ME WHAT CHOICE YOU MADE?	Jeejeboy, 2000; Samman & Santos, 2009;
Please think about an important decision that you and your family have had to make in the last 6 months. CAN YOU PLEASE IDENTIFY AN IMPORTANT DECISION THAT YOU AND YOUR FAMILY HAVE HAD TO MAKE IN THE PAST 1 YEAR REGARDING YOUR HEALTH OR THE HEALTH OF YOUR FAMILY?	Jeejeboy, 2000; Samman & Santos, 2009;

Agriculture	**Literature**
Do you use a chemical product (fertilizer) to improve your crops?	Beegle, Dehejia & Gatti, 2006; Edmonds, 2006; Barrett, 2001
Do you use irrigation on your field?	Beegle, Dehejia & Gatti, 2006; Edmonds, 2006; Akabayashi & Psacharaopoulos, 1999; Jensen, 2000;

Demographics	**Literature**
What is your marital status?	Butcher & Case, 1994; Al-Sammarrai & Peasgood, 1998;
Gender of each child	Fleisch & Shindler, 2009; Roby and Lambert, 2009; Stedham & Yamamura, 2004

Age of each child	Black, Devereux & Salvanes, 2005; Lindelow, 2008; Akresh et al., 2010;

Education	Literature
How many years of education have you [RESPONDENT] completed?	Handa, 2002; Handa & Simler, 2005
How many years of education has [NAME] completed?	Handa, 2002; Handa & Simler, 2010
What level of education would you dream for your children to achieve? [READ OPTIONS]	Black, Devereux & Salvanes, 2005; Ayalew, 2005; Glick & Sahn, 2010;
What level of education do you expect [in reality] your children to achieve, at best? [READ OPTIONS]	Ayalew, 2005; Glick & Sahn, 2010; Lewin, 2009;
How many reading items (Bible, Koran, Newspaper, Magazine, Comic Books) do you have in your home?	Case & Deaton, 1999; Harris, 2007; Dewey, 2000
Do you feel there are adequate resources at school in your community?	Handa, 2002; Handa & Simler, 2005
How important is educational attainment to your child's future? [READ OPTIONS]	Ayalew, 2005; Glick & Sahn, 2010; Lewin, 2009;
How do you perceive the quality of education to be at the school in your community? [READ OPTIONS]	Handa, 2002; Handa & Simler, 2005; Heyneman, 1983;
What mode of transportation do you use to get there?	Motala, et al., 2009; Handa, 2002; Handa & Simler, 2005

Food	Literature
In the past four weeks, was there ever no food of any kind to eat in your household because of lack of resources to get food?	Lanjouw et al., 2001; Rigg, 2006; Winters et al., 2009;
In the past four weeks, have you worried that your household would not have enough food?	Lanjouw et al., 2001; Rigg, 2006; Winters et al., 2009;
In the past four weeks, did you or any household member have to eat some foods that you really did not want to eat because of a lack of resources to obtain other food?	Lanjouw et al., 2001; Rigg, 2006; Winters et al., 2009;
In the past four weeks, did you or any household member have to eat a smaller meal than you felt you needed because there was not enough food?	Lanjouw et al., 2001; Rigg, 2006; Winters et al., 2009;

Health	Literature
Did you ever have a vaccination card for [NAME]?	Fernando et al., 2006; Clark et. al., 2008; Thuilliez, 2010;
Has [NAME] been ill with a fever at any time in the last 30 days?	Clark et. al., 2008; Thuilliez, 2010;
Did you seek advice or treatment for the fever?	Clark et. al., 2008; Thuilliez, 2010;

Has [NAME] had diarrhea in the last 30 days?	Clark et. al., 2008; Thuilliez, 2010;
Did you seek advice or treatment for the diarrhea?	Clark et. al., 2008; Thuilliez, 2010;
Has [NAME] had a cough or difficulty in breathing in the last 30 days?	Clark et. al., 2008; Thuilliez, 2010;
Did you seek advice or treatment for the breathing problem?	Clark et. al., 2008; Thuilliez, 2010;
Did [NAME] sleep under an insecticide treated mosquito net last night?	Fernando et al., 2006; Clark et. al., 2008; Thuilliez, 2010;

Income	**Literature**
Does any member of this household have a bank account?	Akabayashi & Psacharaopoulos, 1999; Jensen, 2000;
What is the main source of income for the family household [DO NOT READ OPTIONS]?	Edmonds, 2006; Akabayashi & Psacharaopoulos, 1999; Jensen, 2000;
Do you consider that the income of the family in this household is…	Edmonds, 2006; Akabayashi & Psacharaopoulos, 1999;
You consider the resources and productive capacities of the family in this household are…	Beegle, Dehejia & Gatti, 2006; Edmonds, 2006; Black, Devereux & Salvanes, 2005;
[SHOW CARD Q]Adding the income of all the members of the household, including remittance from people who are abroad or in another place and the salary of all adults and children in the household who work, which of the following categories is the closest to your situation?	Akabayashi & Psacharaopoulos, 1999; Jensen, 2000; Rigg, 2006;
Which family members in the household work outside the house?	Beegle, Dehejia & Gatti, 2006; Edmonds, 2006; Rigg, 2006;
What is your primary occupation [READ OPTIONS]?	Edmonds, 2006; Akabayashi & Psacharaopoulos, 1999; Jensen, 2000; Barrett, 2001
Do you or any family members in this household own agricultural land?	Beegle, Dehejia & Gatti, 2006; Edmonds, 2006; Akabayashi & Psacharaopoulos, 1999; Barrett, 2001
What portion of your field do you keep for cash crops?	Beegle, Dehejia & Gatti, 2006; Edmonds, 2006; Akabayashi & Psacharaopoulos, 1999; Jensen, 2000;

Infrastructure	**Literature**
Does your household have ELECTRICITY?	Al-Sammarrai & Peasgood, 1998;
Does your household have RADIO?	Al-Sammarrai & Peasgood, 1998;
Does your household have TELEVISION?	Al-Sammarrai & Peasgood, 1998;
Does your spouse/partner have a mobile phone?	Al-Sammarrai & Peasgood, 1998;
Does your anyone in your household have a FUNCTIONING WATCH?	Motala, et al., 2009; Porter, 2002;
Does your anyone in your household have a FUNCTIONING BICYCLE?	Motala, et al., 2009; Porter, 2002;
How do you normally get to the nearest town?	Motala, et al., 2009; Porter, 2002;

How easy is it to get where you want to go? [READ OPTIONS]	Motala, et al., 2009; Porter, 2002;

Language	Literature
Questionairre Language	Al-Sammarrai & Peasgood, 1998;
What is your [RESPONDENT] native language?	Al-Sammarrai & Peasgood, 1998;
Do you [RESPONDENT] understand Portuguese well?	Al-Sammarrai & Peasgood, 1998;
What is the native language of [NAME]?	Al-Sammarrai & Peasgood, 1998;
Does [NAME] understand Portuguese well?	Al-Sammarrai & Peasgood, 1998;
What is the most spoken language in the household?	Al-Sammarrai & Peasgood, 1998;
Is there another language spoken in your home?	Al-Sammarrai & Peasgood, 1998;

Religion	Literature
What is your religion? [Do not Read Options]	Butcher & Case, 1994; Jeejeboy, 2000; Jeejeboy & Sathar, 2006; Stedham & Yamamura, 2004
How often do you go to a location of worship?	Jeejeboy, 2000; Jeejeboy & Sathar, 2006; Stedham & Yamamura, 2004

Safety	Literature
Do you fear for your physical safety in terms of risk of being hurt as a result of crime?	Malmberg-Calvo, 2004; Oxaal, 1997; Porter, 2002; Motala, et al., 2009;

Wellbeing	Literature
How would you rate your quality of life? [READ OPTIONS]	Pitt, Khandker, 2006; Samman & Santos, 2009; Oya & Sender, 2009
Do you have enough energy or vitality for everyday life?	Pitt, Khandker, 2006; Samman & Santos, 2009; Oya & Sender, 2009
How satisfied are you with your ability to perform your daily living activities?	Mason, 2005; Pitt, Khandker, 2006; Samman & Santos, 2009; Oya & Sender, 2009
How satisfied are you with your ability to work?	Mason, 2005; Pitt, Khandker, 2006; Samman & Santos, 2009; Oya & Sender, 2009
How often do you have negative feelings such as despair, anxiety or depression?	Pitt, Khandker, 2006; Samman & Santos, 2009; Oya & Sender, 2009

Figure A-1: Variable and Corresponding Literature

Dependent Variables

In order to ensure the complexity of our analysis is manageable and sources of error are minimized, we focused on two basic dependent variables: (1) Whether or not each child in the household was attending school and (2) the households who noted that schooling "Does Not Matter" as the reason why non-enrolled children were not attending school. In the first dependent variable, we focused on children who are enrolled and non-enrolled to identify independent variables that show a statistically significant relationship to enrollment levels. Once certain relationships were defined, we performed specific logistic regressions to model the probability of observing the dependent variable for each statistically significant independent variable. The models are summarized using odds ratios (i.e. one unit change in independent variable x is associated with y higher odds of dependent variable z). The same analysis was then performed for our second dependent variable in concert with each of the independent variables listed below in our study.

While there are a great many more questions to be answered by the rich data present in the survey, we believe analysis of these two dependent variables is foundational to understanding why households may elect to enroll their children in primary school and to recognize specific variables present in households that believe school attendance "Does Not Matter."

Dependent Variables
Are you still attending school? [Respondent and All Other Household Members w age and gender]
What is the most important reason [NAME] is not going to school? [All School Age Children]

Figure A-2: Dependent Variables

Independent Variables

Our initial set of independent variables focused on basic demographic information and other descriptive characteristics of the household. Given studies have found gender and age of children to affect enrollment decisions, we simply want to confirm previous findings or detect nuances in our own household data that might shed new insight into our own survey population. Specific questions related to demographics are presented below.

Demographics
What is your marital status?
Gender of each child
Age of each child

Figure A-3: Demographic Variables

Certain studies have also shown that the language used in the home can affect both educational persistence and performance – and therefore might be relevant to the overall decision of whether or not to enroll children in primary schooling (Al-Sammarrai & Peasgood, 1998). It may also be interesting to note any material enrollment differences between and within any of the indigenous languages and how they compare to homes speaking only Portuguese. Our hypothesis would be that homes using Portuguese would have higher educational aspirations or be more connected to the community and therefore may present a higher enrollment level in primary school.

Language
Questionairre Language
What is your native language [For The Respondent]? What is the the native language of [NAME]?
Do you understand Portuguese well? [For Those Who Are Not Native Portugese Speakers]
What is the most spoken language in the household?
Is there another language spoken in your home?
What other languages are spoken in the household?

Figure A-4: Language Variables

The number of education specific questions are lengthy and, we feel, are material to our analysis. Areas of special import include the educational level of the respondent, perceptions of school quality, differences between educational expectations and aspirations, as well as perceived distance to school and educational resources in the home. We believe each questions provides a unique insight into the household as well as directional support to reasons why a household may not elect to enroll a child in primary school.

Education
How many years of education have you completed? [Respondent and All Other Household Members]
What level of education would you dream for your children to achieve? [READ OPTIONS]
What level of education do you expect [in reality] your children to achieve, at best? [READ OPTIONS]
How many reading items (Bible, Koran, Newspaper, Magazine, Comic Books) do you have in your home?
Do you feel there are adequate resources at school in your community?
How important is educational attainment to your child's future? [READ OPTIONS]
How do you perceive the quality of education to be at the school in your community? [READ OPTIONS]
What mode of transportation do you use to get there?

Figure A-5: Education Variables

Our review of the literature expressed religion's material effect on gender beliefs and enrollment decisions amongst girls in particular (Al-Sammarrai & Peasgood, 1998; Butcher & Case, 1994; Filmer, 2007; Fleisch & Shindler, 2009; Le Vine, et al., 2001). While the number of

religion related questions is limited, we believe religious identification and participation may confirm early findings or show material differences between religious identification in comparison to participation levels when exploring enrollment decisions.

Religion
What is your religion? [Do not Read Options]
How often do you go to a location of worship?

Figure A-6: Religion Variables

Safety was a standard reason for households electing not to send their children, and especially girls, to primary school (Malmberg-Calvo, 1994; Porter, 2007). While a single questions is available regarding safety, we believe analyzing its relationship to primary school enrollment is both informative and potentially confirmatory of earlier findings.

Safety
Do you fear for your physical safety in terms of risk of being hurt as a result of crime?

Figure A-7: Safety Variables

While child field labor has been a well-studied reason for under-enrollment levels in primary education, we felt it important to specifically explore whether households have been experiencing food shortages or less than desirable food levels(Lanjouw, et al., 2001; Rigg, 2006; Winters, et al., 2009). While this does not directly correlate to the demand for child labor within the household, it should be a precursor to the demand for child labor and represent similar

affects to labor questions elsewhere in the survey. In the event we get different enrollment levels between food security and child labor, that itself would be a new finding and important to explore in further studies.

Food
In the past four weeks, was there ever no food of any kind to eat in your household because of lack of resources to get food?
In the past four weeks, have you worried that your household would not have enough food?
In the past four weeks, did you or any household member have to eat some foods that you really did not want to eat because of a lack of resources to obtain other food?
In the past four weeks, did you or any household member have to eat a smaller meal than you felt you needed because there was not enough food?

Figure A-8: Food Security Variables

Income levels, savings behaviors, occupation and agricultural production could all be material relationships to primary school enrollment decisions as supported by the previous literature review (Winters, et al., 2009; Yunez-Naude & Taylor, 2001). The income related questions have therefore been selected to not only confirm earlier findings (i.e. level of income, presence of agricultural land, cash crop production, etc.) but also elucidate new perspectives on the ways in which income related factors might affect household enrollment decisions (i.e. presence of bank account, main source of income, family members work outside the home).

Income
Does any member of this household have a bank account?
What is the main source of income for the family household [DO NOT READ OPTIONS]?
Do you consider that the income of the family in this household is…
You consider the resources and productive capacities of the family in this household are…
[SHOW CARD Q]Adding the income of all the members of the household, including remittance from people who are abroad or in another place and the salary of all adults and children in the household who work, which of the following categories is the closest to your situation?
Which family members in the household work outside the house?
What is your primary occupation [READ OPTIONS]?
Do you or any family members in this household own agricultural land?
What portion of your field do you keep for cash crops?

Figure A-9: Income Variables

Health remains a relatively unexplored area in household enrollment decisions and is therefore a key piece of our analysis. The key questions within the health category are related to immunization levels, presence of recent illness, and presence of bed nets as potentially significant relationships to primary school enrollment. While a number of health related surveys have indicated these relationships to be important, little direct study between health and enrollment at a household level has been completed.

Health
Did you ever have a vaccination card for [NAME]?
Has [NAME] been ill with a fever at any time in the last 30 days?
Did you seek advice or treatment for the fever?
Has [NAME] had diarrhea in the last 30 days?
Did you seek advice or treatment for the diarrhea?
Has [NAME] had a cough or difficulty in breathing in the last 30 days?
Did you seek advice or treatment for the breathing problem?
Did [NAME] sleep under an insecticide treated mosquito net last night?

Figure A-10: Health Variables

While there are a number of other agriculture related questions included in other categories, it is our hypothesis that the use of fertilizer and the presence of irrigation should dramatically lower the need for child labor and therefore show material increases in primary school enrollment where these factors are present. We therefore thought an analysis should be included as well as a separate category created to specifically outline our potential findings.

Agriculture
Do you use a chemical product (fertilizer) to improve your crops?
Do you use irrigation on your field?

Figure A-11: Agriculture Variables

Infrastructure availability remains a largely unstudied factor in primary school enrollment decisions. While we believe that the presence of electricity, refrigeration capability, as well as mobile phone communication may be important to child labor decisions as well as distribution of labor over the day – and therefore a factor in schooling decisions – these inputs have gone largely unstudied. We are uncertain whether any findings will be material in our own household survey, but given their inclusion, felt determining whether there is a statistically significant relationship with the defined questions below – is well worth the effort.

Infrastructure
Does your household have ELECTRICITY?
Does your household have RADIO?
Does your household have TELEVISION?
Does your spouse/partner have a mobile phone?
Does your household have REFRIGERATOR?
Does your anyone in your household have a FUNCTIONING WATCH?
Does your anyone in your household have a FUNCTIONING BICYCLE?
How do you normally get to the nearest town?
How easy is it to get where you want to go? [READ OPTIONS]

Figure A-12: Infrastructure Variables

The next category for inclusion in our analysis is the area of Agency. As we saw in research between married, widowed and divorced households – agency can be a significant influence on how many and which children are enrolled in primary school (Jejeebhoy & Sathar, 2001; Mason, 2005; Oya & Sender, 2009; Pitt, et al., 2006; Samman & Santos, 2009). Given this is a new area of study and our survey included a great many questions in this category – we felt a thorough exploration on agency and primary school enrollment was worth the investment.

Agency
Who makes the decisions in your family about APPROPRIATE AGE TO MARRY?
Who makes the decisions in your family about HOUSEHOLD RESPONSIBILITIES?
Who makes the decisions in your family about FARM/LAND CHORES?
Who makes the decisions in your family about ADMINISTRATION OF FINANCES (MONEY) IN THE HOME?
Who makes the decisions in your family about DECISIONS ON HOW TO RAISE CHILDREN?
Who makes the decisions in your family about SEEKING HEALTHCARE FOR A CHILD?
Do your friends respect you?
Do you feel a strong bond with your friends?
Does your family care about you very much
Does your family really respect you as much as you would like them to?
Do you feel close to your family members?
[SHOW CARD R1] Some people feel they have completely free choice and control over their lives, while other people feel that what they do has no real effect on what happens to them day by day. Please, how much freedom of choice do you feel you have on what happens to your life?
Some people believe they can decide their own destiny, while others think they do not have control over their destiny. Please, to what extent do you believe you can decide your own destiny?
In general, do you think you can make decisions by yourself, freely, without consulting your husband? Please, to which extent can you do this?
Please think about an important decision that you and your family have had to make in the last 6 months. CAN YOU NAME A DECISION?
Please think about an important decision that you and your family have had to make in the last 6 months. DID YOU FEEL YOU COULD MAKE THE CHOICE YOU WANTED THE MOST?
Please think about an important decision that you and your family have had to make in the last 6 months. DID THE CHOICE YOU MADE TURN OUT TO BE THE BEST FOR YOUR FAMILY?
Please think about an important decision that you and your family have had to make in the last 6 months. CAN YOU DESCRIBE HOW THE DECISION CAME UP?
Please think about an important decision that you and your family have had to make in the last 6 months. CAN YOU TELL ME WHAT CHOICE YOU MADE?
Please think about an important decision that you and your family have had to make in the last 6 months. CAN YOU PLEASE IDENTIFY AN IMPORTANT DECISION THAT YOU AND YOUR FAMILY HAVE HAD TO MAKE IN THE PAST 1 YEAR REGARDING YOUR HEALTH OR THE HEALTH OF YOUR FAMILY?

Figure A-13: Agency Variables

The final category for inclusion in our analysis is well-being, or as the survey defines it – quality of life. In the wellbeing category, we explore the overall perspective of the respondent on issues such as anxiety and depression, overall energy levels, and ability to perform daily activities. It seems reasonable that these issues may influence primary school enrollment decisions – so we've included them for preliminary review. While little may be determined from

our brief analysis here, some directional results are expected to be observed and helpful in framing future studies.

Wellbeing
How would you rate your quality of life? [READ OPTIONS]
Do you have enough energy or vitality for everyday life?
How satisfied are you with your ability to perform your daily living activities?
How satisfied are you with your ability to work?
How often do you have negative feelings such as despair, anxiety or depression?

Figure A-14: Wellbeing Variables

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