United Nations Economic Commission for Africa

MDGs/Poverty Analysis and Monitoring Section

RESEARCH REPORT

Investing in education as a means and as an end: exploring the microfoundations of the MDGs

Biniam Egu Bedasso

March 2008

Investing in education as a means and as an end: exploring the microfoundations of the MDGs

Abstract

Investing in education is regarded as one of the centerpieces of development. At the height of this recognition, the Millennium Development Goals have set universal primary education as one of the eight goals to be achieved by 2015. However, apart from taking it as end in itself, not much scrutiny was pursued in identifying the role of education as a means to achieve the other goals. In this paper, I have examined the impact of household education on MDG-related indicators constructed out of survey data in pursuit of exploring the microfoundations of the broader goals. Seven African countries representing different cross-sections of economic development and historical background were included in the study. In the results, family education is shown to have a consistently strong impact on household wealth, children's schooling and utilization of delivery assistance. Education appears to have a weaker impact on those indicators where a comprehensive knowledge or information that is not necessarily provided in formal education is required. Higher education might not be necessary to directly influence such basic welfare indicators as child mortality. But it plays an instrumental role in improving the household's economic status which is crucial in determining other welfare variables.

Key words: Education, Millennium Development Goals, Human welfare

1. Introduction

The policy discourses in human development have viewed education more as an end in itself than as a means to achieve other goals. The inclusion of a combined measure of literacy and school enrollment as one of the three components of the Human Development Index (HDI) is a manifestation of the importance that is attached to education in measuring human welfare. Apparently, the HDI calculations give an equal weight of one-third to all the three components (i.e. GDP per capita at PPP, Adult literacy and combined school enrollment, Life expectancy at birth). Nevertheless, the literature suggests that education could be a primary factor that plays a pivotal role in affecting other components of human development. In this respect, the endogenous growth theory lays a good ground for formalizing the impact of education on GDP. The impact of schooling on health and life expectancy is also emphasized in the theoretical and empirical literature. "Good health" being a capital that requires individual investment, education is thought to improve the efficiency with which health capital is produced (Grossman, 1972).

The importance of education has been reinvigorated by the adoption of universal primary education as goal number two in the Millennium Development Goals. The vitality of education is also implied in goal three of the MDGs which has set the target of gender parity in primary, secondary and tertiary education. It is clear that there is some kind of interdependence between the eight goals in the MDGs as all of them are built around human welfare and development. Education is a likely candidate that could be defining the common thread of underlying factors stretching through most of the goals and targets.

The general argument that gives education the leading role in catalyzing development has been propagated by different studies examining the social benefits of education (Stacey, (1998), Maynard and McGrath (1997)). The economics literature also has recognized the extra benefits of education through the calculation of social rates of returns to schooling. This paper has the purpose of taking the discussion from there and extending the analysis to the specific indicators adopted in the Millennium Development Goals. By investigating the impact of schooling on variables that are closely related to the official MDG indicators, the study attempts to provide a micro-foundation to the underlying factors determining progress towards the goals.

Following this introduction, the second section of this article provides a more detailed account of the conceptual motivations driving our empirical research. The third section formalizes the whole discussion with a theoretical model explaining the link between family education and various welfare outcomes in the traditional utility maximizing framework. Section four takes on the task of harmonizing the formal model with our purpose and the data available. Section five is devoted to presenting the descriptive statistics of the major variables. Section six and seven will make the core of this article with the outputs from the empirical research conducted on seven African countries. Section eight concludes and draws policy implications.

2. Theoretical motivations

One of the earliest recognitions for the social benefits of education comes from Gary Becker (1964) in his seminal book where he pointed out the importance of the non-market impact of education. Besides the obvious role of human capital in raising the earning potential of individuals, Becker illuminates those benefits of education which accrue outside the labor market. He used the intuitive example of homemaking capabilities for women who might not join the labor force for various reasons.

The non-market benefits implied above are predominantly personal. However, such benefits of education could also accrue to the society at large. Preston and Green (2003) make important distinction between micro-social and macro-social benefits. According to their review, micro-social benefits include such widely mentioned benefits of education as improvements in health and increases in individual civic participation. The macro-social benefits of education are "those which occur at a societal level as construed separately from the aggregate of micro-social effects. There are three qualities of macro-social benefits – they have *depth*, are strictly *non-attributable* to individuals/communities and are *systemic*."

The lack of sufficient consideration for the non-market benefits of education in the formal rates of return analysis posed a considerable challenge for theoretical and policy analysis. In fact, the literature made a useful distinction between private and social rates of return to education. Accordingly, the social rates of return take account of public expenditure on education - on the cost side - and the potential tax revenue - on the benefit side. Nevertheless, this calculation leaves out the important components of non-market benefits which cannot be monetized and directly traced in either the fiscal sector or the labor market. Particularly, from the point of view of human and social development, the overall impact of education would be underestimated by substantial amount if the analysis sticks to the calculations of social rates of return alone. In order to overcome this problem, the scope of the analysis should extend to include the broad array of welfare indicators that are potentially affected by education. Unlike in the case of conventional microeconomic approaches, the unit of analysis should be the household rather than the individual. This owes to the fact that many of the non-market benefits of education accrue to the family as a whole, especially in the case of mother's education.

In the following section, I will present a model that provides a theoretical foundation for the household level analysis of human welfare and the role of education. The model is adopted from Behrman and Wolfe (1987) and it follows a production function approach to analyze the impact of maternal education on household health, nutrition, medical care and sanitation. I have modified the original model by introducing the schooling of children as one component of the utility function in a way that allows for children's schooling to be explained by their parent's education.

3. The model

The model is specified in a household utility maximization framework. Parents are assumed to be maximizing a utility function which depends on their own health status (H_m^*, H_f^*) and their children's human capital, i.e. health (H_c^*) and education (S_c), in addition to the consumption of goods and services not related to health and education (Z):

$$U = U(H_m^*, H_f^*, H_c^*, S_c, Z) \qquad (1)$$

Health, in general, is affected by several factors that will enter into its production function as inputs. The health status of the family will be determined by consumption of nutrients (N^*), by water and sanitation conditions (W^*), and by heath-related inputs such as medical care utilization (I^*), by mother's schooling (S_m) and age (A_m) and by endowments of the community of residence and of the mother (E_r^*, E_m^*):

$$H_i^* = H^*(N_i^*, I_i^*, W_h^*, S_m, A_m, A_m^2, E_r^*, E_m^*) \quad \text{where } i = m, f, c \qquad (2)$$

Equation (2) includes the important variable of mother's schooling because it is hypothesized that mother's education is an essential determinant of household productivity. Age is entered as a proxy for experience. In order to take account of the physical deterioration that might come with age, the equation is specified to be quadratic in age. Community endowments (E_r^*) are useful to capture common access to medical facilities and health information in the specific locality. Mother's endowments (E_m^*) represent her knowledge and habits pertaining to health production and her prior health status, all as related to her childhood family background. In the whole sets of equations, it should be noted those variables which are usually unobservable in empirical datasets are marked with asterisks (*).

.

Unlike the health production function in equation (2), the function determining children's schooling should have two different components that reflect the joint process of choice and production. The choice part will represent the decision function of parents to enroll their children to school or to keep them in other alternatives such as child labor. Once the choice is made to enroll children to school, the production process comes into play as posited by the theory of educational production function and it determines the subsequent attainment of children. Formally, the choice function of parents will be defined by $E^*(C_c, O_c, B_c^*)$ which is a function of the present value of direct costs (C_c) and the present value of opportunity costs (O_c) of sending a child to school as well as the potential benefits in terms of the child's human capital (B_c^*). The above choice function enters as one component of the overall schooling function along with other family, school and neighborhood characteristics.

$$S_c = S^*(E^*(C_c, O_c, B_c^*), S_m, S_f, K_c^*, R^*) \qquad (3)$$

In equation (3), the education of parents (S_m and S_f) is taken as input to the attainment of their children representing the most important of the family characteristics. In addition, school (K_c^*) and neighborhood (R^*) characteristics are taken in to account, following the common tradition in specifying educational production functions.

The family (parents) maximize their utility function in (1) subject to equations (2) and (3) as well as the following budget constraint,

$$Y \geq P_N^*(N_c^* + N_m^* + N_f^*) + P_I^*(I_c^* + I_m^* + I_f^*) + P_W^* W_h^* + P_S^* S_c + P_Z^* Z \qquad (4)$$

where Y is the household income and the P_j^*'s refer to the respective prices, $j = N, I, W, S, Z$.

Assuming that the above functions are well-behaved, we can maximize equation (1) subject to (2), (3) and (4) which gives us a number of demand functions for health, nutrition, sanitation and children's education. Suppose that community and maternal endowments, mother's and father's schooling, age and household income are exogenous. Then we arrive at the following reduced-form demand functions:

$$V = f(X) \qquad (5)$$

where V is a vector of dependent variables $(N_c^*, N_m^*, N_f^*, H_c^*, H_m^*, H_f^*, I_c^*, I_m^*, I_f^*, W_h^*, S_c, Z)$ and X is a vector of predetermined variables $(E_r^*, E_m^*, S_m, S_f, Y, A_m, A_m^2, K_c^*, R^*)$.

The above general model can be applied to a number of welfare indicators that are related to health, nutrition and education. Although the model does not offer detailed propositions and specific reduced-form functions, it provides a theoretical basis for the selection of the empirical variables. Accordingly, one can follow the same framework to study the micro-level determinants of several MDG indicators. The following section will pursue customization of the above model to the purpose of this study and the empirical methodology.

4. Model implementation and empirical methodology

The MDGs have set clear targets, among others, on child nutrition, primary education, child and maternal health. The official indicators are national-level percentages, ratios and trends that are corresponding to the respective targets. Following the above model of household utility maximization and considering the available datasets, we identified four official indicators that could have micro-level representations in household datasets. The following table shows the list of MDG indicators classified according to their respective goals and targets. We also present the list of corresponding household level indicators that we can construct using Demographic and Health Survey datasets.

Table 1 – List of selected MDG indicators and the corresponding household-level variables[1]

Ser. No	Official classification	Description of the indicator	Corresponding variable from DHS datasets
1	Goal 1, Target 1.A, Indicator 1.1	Proportion of population below $1 (PPP) per day	Dummy variable for a household falling below 40% wealth quantile
2	Goal 1, Target 1.C, Indicator 1.8	Prevalence of underweight children under-five years of age	Dummy variable for a child, aged under five, being moderately underweight
3	Goal 2, Target 2.A, Indicator 2.1	Net enrolment ratio in primary education	Dummy variable for a 10 year old being enrolled in primary school
4	Goal 4, Target 4.A, Indicator 4.2	Infant mortality rate	Count of infant deaths (under one years of age) encountered by a mother during the last 10 years
5	Goal 5, Target 5.A	Proportion of births attended by skilled health personnel	Dummy variable for access to professional delivery assistance at the time of the last birth

Inspecting at the last column of the above table, one can see that the DHS datasets provide us with household level indicators that could support the analysis on micro-foundations of the MDGs. The theoretical model in the previous section could be used to formalize the empirical estimation of the indicators from No. 2 – 5 in the table.

[1] The representation of the poverty indicator with household wealth measurements is obviously controversial. However, studies like Sahn and Stifle (2003) have shown, using DHS data, that we can use asset-based measurement of poverty in cases where consumption/expenditure data is not available and that gives almost similar results as the later one.

Precisely, the reduced-form demand functions could be estimated for the child nutrition results (# 2), child education (# 3), child health (# 4), and maternal health (# 5).

The analysis of poverty, as represented by household wealth quintiles, falls out of the scope of the theoretical model we presented. Nevertheless, with the assumption that earnings are highly correlated with wealth, we can adopt a simple Mincerean[2] framework to explain the wealth status of the household using education and age (a proxy for experience). In addition to the enrollment variable in # 3 which is officially adopted as an MDG indicator, primary completion is also deemed to be an essential indicator of child education that importantly captures the output aspect of efforts to expand primary education. Accordingly, one more indicator is included from DHS data to measure primary completion by a dummy variable indicating if an 18 years old have completed primary education.

Based on the dependent variables we identified in the preceding table, we can specify equation (5) in the form of non-linear regression functions. The dummy dependent variables could be fitted in binary response models with either normal or logistic distribution assumptions.

The binary response models are generally derived from an underlying latent variable model such as:

$$y^* = X\beta + e, \qquad y = l[y^* > 0) \tag{6}$$

where e is a continuously distributed variable independent of X and the distribution of e is symmetric about zero. l[.] is the indicator function. The latent function could

[2] Jacob Mincer (1958, 1970) lays the foundations for the popular framework of estimating earnings as a function of schooling and experience.

represent the unobserved value that households attach to nutrition, health and children's education while the observed values are indexed by 0 or 1.

But, in the above table of indicators, we have identified "the count of infant deaths in the last ten years" as the dependent variable for the analysis on child health. In this case, the values of the dependent variable are non-negative integers without an upper bound. Such count variables are more likely to have a poisson distribution and they could be estimated using count data models. Therefore Poisson regression is chosen to estimate the equation of infant mortality.

We have designed the research process to have two different stages with their own purpose. The first stage will be an exploratory phase where we analyze data from a number of countries and try to depict a broader picture regarding the impact of education on several MDG-related indicators. The broader scope at this stage will be helpful to understand the general pattern of micro-level indicators that are normally believed to be affected by human behavior across countries of different background. In the second stage of the research process, the micro-level results from the exploratory phase will be used to build a macro-level extension in a way that furnishes the microfoundations for the bigger pictures.

It has been noted above that we will be using the Demographic and Health Survey data to conduct the empirical analysis for this study. The surveys have been conducted in 37 African countries in one or more rounds. The widely acknowledged advantage of DHS data is their comparability (with some exceptions) across countries and periods. I have selected seven African countries, which conducted DHS surveys in or after year 2000 and could represent different cross-sections in terms of economic development, culture and historical background. The countries are Cameroon, Egypt, Ethiopia, Morocco, Namibia, Nigeria, and Senegal.

5. Descriptive statistics

Before we proceed to discussing the results of the empirical estimations, we need to first take a brief look at the descriptive statistics. The review of descriptive statistics is important for two major reasons. First of all, it will be used to check if the sample taken in the survey is actually representative. The descriptive statistics produce country-level figures and those are particularly important because the official monitoring process of the MDGs is undertaken using national statistics. Secondly, the national statistics will provide context in defining the general status of that particular country in the issue under question. Setting the context may prove important later in understanding and interpreting the micro-level results.

Table 2 - Descriptive statistics of the selected indicators in the seven countries

	Proportion below 40% quintile*	Proportion moderately underweight	Proportion primary enrolled	Proportion primary completed	Average infant death per mother**	Proportion of mothers with delivery ass.
Cameroon (2004)	0.3671	0.1668	0.8866	0.723	0.1913 (0.4823)	0.6178
Egypt (2005)	0.3757	0.0674	0.9584	0.9203	0.0812 (0.3252)	0.7427
Ethiopia (2005)	0.393	0.3746	0.4982	0.4217	0.195 (0.5028)	0.126
Morocco (2003/4)	0.4157	0.1107	0.9441	0.8097	0.0909 (0.3429)	0.6307
Namibia (2000)	0.4576	0.2368	0.9073	0.9609	0.0743 (0.2834)	0.7661
Nigeria (2003)	0.4858	0.2912	0.7601	0.8664	0.244 (0.5482)	0.3796
Senegal (2005)	0.4942	0.1881	0.6575	0.6156	0.1893 (0.4847)	0.4181
Geometric mean	0.424291	0.1796821	0.783485	0.7355029	0.1378297	0.461127
Standard deviation	0.052302	0.1054964	0.172157	0.18996244		0.229881

* The wealth quintiles are built out of equal division of the households in to 5 groups based on their wealth index. Therefore proportions shown in the table do not have any real meaning related to level of development.

** The figures in parenthesis represent the standard deviation in the respective country

Table 2 above presents the descriptive statistics we generated using DHS datasets. The figures are by and large reflective of the general status of the countries in nutrition, health and education development. The bottom row displays the standard deviations of the indicators across the seven countries. In this respect, women's utilization of delivery assistance comes out with the highest standard deviation giving preliminary indications about the presence of regional inequity between countries in delivering maternal health services.

6. Cross-country results from the exploratory analysis

Six different equations, each representing the indicators in Table 1, were estimated for every one of the seven countries. A succinct discussion of the findings is presented in the flowing subsections.

6.1 Education and economic wellbeing

Following the Mincerean framework proposed in the last section, a logit regression of the probability of a household falling below the 40% wealth quintile is run on explanatory variables such as years of education of the household head, age of the head and type of residence (urban vs. rural). A squared value of years of education is also incorporated to indicate the rate of change in the marginal effect of education. The quadratic specification is particularly important to analyze the strength of the marginal effect at different levels of education such as primary, secondary and tertiary.

The results in Table 3 depict a very clear picture about the strong impact of education on improving the wealth status of households. The squared values of education also come out with positive and statistically significant coefficients implying that the marginal impact of education increases as the level of education steps up. In this regard, higher education will have a greater marginal effect than secondary education whereas the latter performs better than primary education.

Namibia is an exception in this case where education does not have any sort of statistically significant effect.

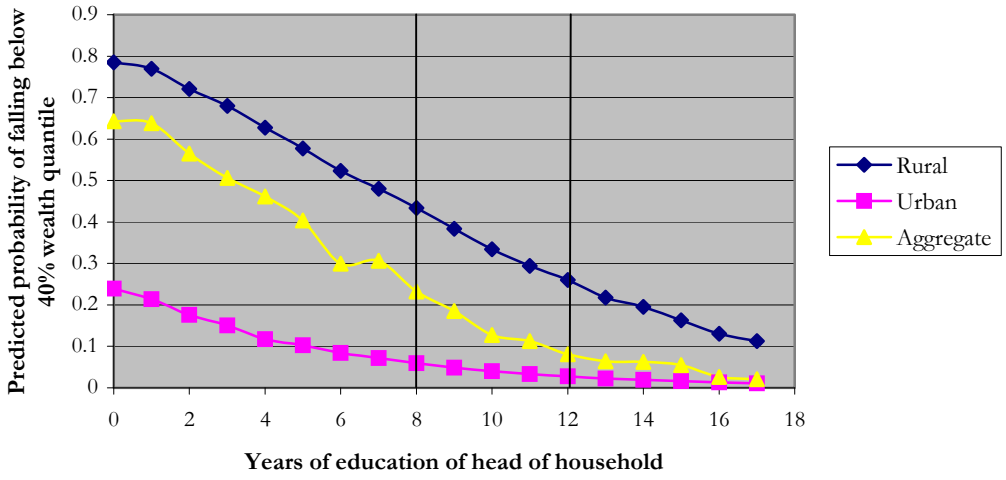
Table 3 - Logit results of household wealth status as a function of years of schooling of the head of the household

Country	Years of education of the head of household		Years of education squared	
	Estimated coefficient	Marginal effect	Estimated coefficient	Marginal effect
Cameroon (2004)	-0.252*** (0.00820)	-0.0500*** (0.00164)	0.0024*** (0.00009)	0.0005*** (0.00002)
Egypt (2005)	-0.2008*** (0.04679)	-0.0420*** (0.0101)	0.0014*** (0.00339)	0.0003*** (0.00071)
Ethiopia (2005)	-0.3077*** (0.02220)	-0.0556*** (0.00424)	0.0097*** (0.00230)	0.0018*** (0.00042)
Morocco (2003/4)	-0.2326*** (0.01066)	-0.0505*** (0.00214)	0.00231*** (0.00011)	0.0005*** (0.00002)
Namibia (2000)	-0.0123 (0.02279)	-0.0020 (0.00366)	-0.0098 (0.00198)	-0.0016*** (0.00031)
Nigeria (2003)	-0.2063*** (0.00742)	-0.0445*** (0.00158)	0.0019*** (0.00011)	0.0004*** (0.00002)
Senegal (2005)	-0.1910*** (0.01273)	-0.0422*** (0.00273)	0.0017*** (0.00014)	0.0004*** (0.00003)

The above findings showing a stronger effect of higher education on the economic status of a household stand in stark contrast with the traditional proposition that primary education has the highest rates of return in developing countries. Of course, the basic variable in the rates of return analysis is labor market earning while it is wealth in the current estimations. However, the pronounced difference in results reveals that the benefits of higher education to economic wellbeing could be highly underestimated when economic returns are narrowly defined merely as wage incomes. This concern is reflected in Appleton (2001) where he found out that, in Uganda, non-wage income is as important as wage income in determining the rates of return to education.

The marginal effect column show that an additional year spent in school by the head of the household will boost the family's chance of escaping the 40% asset-poverty line by 4.7 percentage points. Ethiopia has the highest marginal effect at 5.6 percent whereas Egypt comes out with the lowest at 4.2 percent. Generally, the marginal effects for all the countries fall in a close range.

Fig 1. Wealth and education, Cameroon (2004)



The predicted probability of falling below the 40% line in Cameroon is plotted against years of education of the household head in Fig. 1. There is a huge urban-rural divide evidenced by more than 55 percent premium in the probability of falling under the "poverty line" for rural households compared to urban residents with the same years of education (i.e. no education) and other attributes.

6.2 Intergenerational impact of education

The literature has vividly documented that education holds an intergenerational impact mainly because better-educated parents are more likely to raise better-educated kids (Behrman et al (1982), Ermisch and Francesconi (2000). This argument is also reflected in the household production function outlined in section 3 above. According to equation (3) of the theoretical model, children's enrollment is a function of the present values of the direct and opportunity costs of schooling as well as the potential benefits from the child's human capital. By raising family income, parental education lowers the effective value of the direct and opportunity costs of children's schooling. Additionally, it is argued in the literature that differential levels of education affect the time preference of parents. Accordingly, the children's education function in equation (3) incorporates the years of schooling of the mother and the father as an independent covariate that directly affects children's attainment.

The empirical results from six African countries (Namibia being the exception) confirm the argument that parental education is a strong determinant of the probability of children's enrollment to primary education (see table 4). The educational attainment function is not just about enrollment, however. It also deals with completion, which could be considered as an output if enrollment is an input. The results in table 5 reaffirm the preceding results that in the same way as the enrollment outcomes the probability of completing primary education for 18 years old is highly affected by the years of schooling of the head of the household. These results are evident of the consistently strong impact that parental education bears on children's schooling throughout the course of primary education.

Table 4 – Logit results of primary enrolment as a function of years of schooling of the head of the household

Country	Years of education of the head of household		Years of education squared	
	Estimated coefficient	Marginal effect	Estimated coefficient	Marginal effect
Cameroon (2004)	0.5705***	0.0200***	-0.0226**	-0.0008**
	(0.07898)	(0.00414)	(0.00908)	(0.00035)
Egypt (2005)	0.1884***	0.0018***	-0.00105	0.0000**
	(0.05585)	(0.00083)	(0.00460)	(0.00005)
Ethiopia (2005)	0.0811**	0.0198**	0.0012	0.0003
	(0.03650)	(0.00889)	(0.00343)	(0.00083)
Morocco (2003/4)	0.2018***	0.0101	-0.0013	-0.0001
	(0.07668)	(0.00364)	(0.00090)	(0.00004)
Namibia (2000)	-0.0648	-0.0015	0.0343**	0.0008**
	(0.12353)	(0.00271)	(0.01478)	(0.00034)
Nigeria (2003)	0.2569***	0.0304***	-0.0024***	-0.0003***
	(0.02725)	(0.00252)	(0.00028)	(0.00003)
Senegal (2005)	0.3878***	0.0821***	-0.0151***	-0.0032***
	(0.05150)	(0.01064)	(0.00431)	(0.00091)

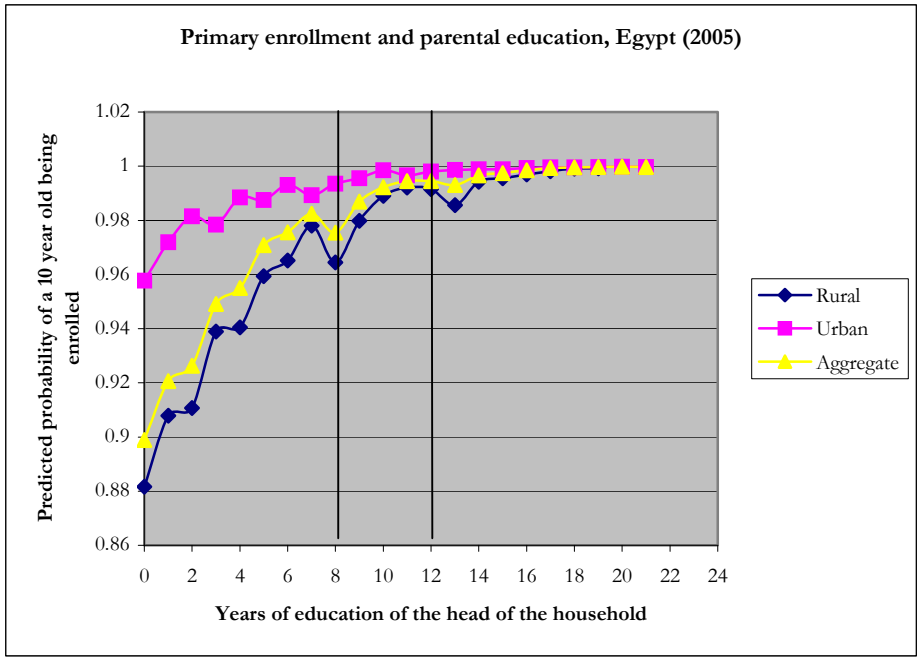
The second level of analysis on the impact of education examines the relative strength of the marginal effect at different levels of education. The figures from the quadratic term indicate that in most of the countries the impact of education on primary enrollment as well as completion declines at the higher levels of schooling of the head of the household. Intuitively, this implies that it is enough for parents to have primary education in order to weigh down the opportunity costs of their children's schooling and realize the non-income benefits of education. The overall results of the estimation reveal that wealth also has a considerable explanatory power in enrollment and completion outcomes (See Appendices 3 and 4). However, Senegal represents a unique case in this regard where enrollment outcomes are not determined by the household wealth status, but rather by the fact that the family is residing in urban or rural area.

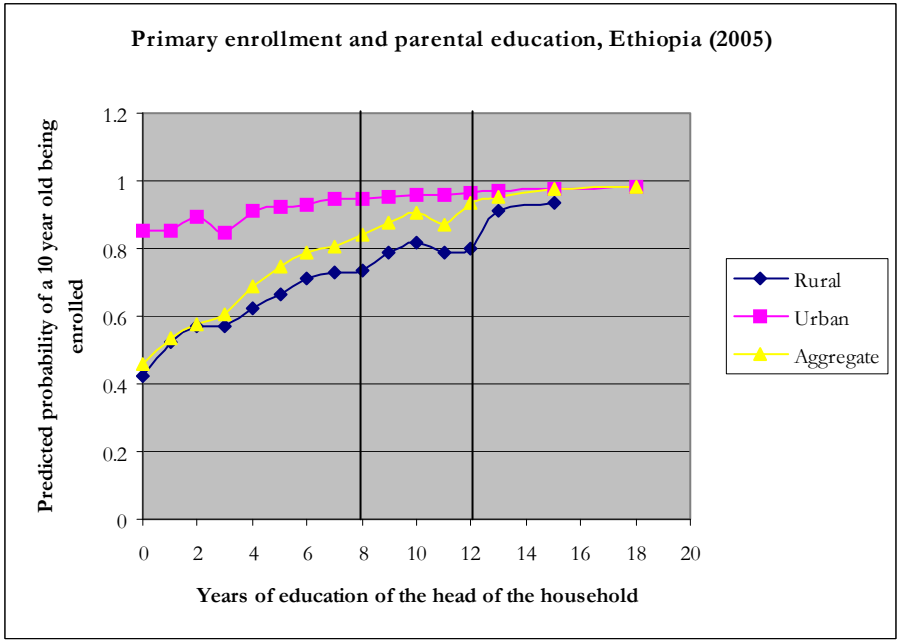
Table 5 – Logit results of primary completion as a function of years of schooling of the head of the household

Country	Years of education of the head of household		Years of education squared	
	Estimated coefficient	Marginal effect	Estimated coefficient	Marginal effect
Cameroon (2004)	0.2810*** (0.05812)	0.0454	-0.0086 (0.00571)	-0.0014
Egypt (2005)	0.3274*** (0.05132)	0.0077	-0.0100** (0.00465)	-0.0002
Ethiopia (2005)	0.2368*** (0.05988)	0.0579	-0.0051 (0.00550)	-0.0012
Morocco (2003/4)	0.2301*** (0.04263)	0.0149	-0.0024*** (0.00043)	-0.0002
Namibia (2000)	0.3487** (0.17462)	0.0107	-0.0111 (0.01355)	-0.0003
Nigeria (2003)	0.4893*** (0.09424)	0.0384	-0.02365*** (0.00697)	-0.0019
Senegal (2005)	0.3245*** (0.04551)	0.0743	-0.0127*** (0.00359)	-0.0029

As far as marginal effects are concerned, the average of six countries (taking Namibia out) shows that parental education has higher marginal effect on primary completion (3.9 percent) as opposed to the effect it has on primary enrollment (2.7 percent). This result could provide an important insight into the fact that enrolment is too rudimentary to require a better-educated parent compared to completion. In other words, it is easier to send one's child to school as far as the educational facility is there and other kids from the neighborhood are also going; however it requires more personal and family specific variables like parental education to make sure that the kid completes the whole course of primary education.

Fig 2: Comparative tables of predicted probabilities of enrollment for Egypt and Ethiopia





The two graphs of predicted probability in fig.2 throw some light on the comparative difference between countries in terms of their status in providing primary education, the rural-urban divide and the pace of change that parental education could bring to educational outcomes. Ethiopia, with its lower level of development compared to Egypt, displays a highly pronounced disparity in the probability of primary enrollment between rural and urban residents who have lower level of family education. Considering the very low initial value for rural households in Ethiopia, primary education of the head of the household doubles the chance of a 10 years old kid in the family for being enrolled in to school. The curves flatten out after secondary education implying that higher education has no marginal effect on the probability of children's enrollment that is different from high school completion.

6.3 Mother's education and child nutrition

Child nutrition is modeled in our theoretical framework as an outcome that is derived from the household utility function. Conventionally, child nutrition outcomes are measured by anthropometric variables like weight-to-age Z-score of the child. The model proposes that parental education is among the determinants of the demand function. The conceptual background behind the inclusion of parental schooling is related to nutritional information and knowledge that could come with formal education (Webb and Block, 2004). Following the commonly held belief that maternal education is more relevant to childcare and nutritional status than paternal education, we have included mother's years of schooling as an explanatory variable.

The logit regressions on the data from the seven African countries come out with mixed results. In three of the seven countries (i.e. Cameroon, Nigeria and Senegal), maternal education has a statistically significant impact in reducing children's probability of being underweight. In three of the remaining countries (i.e. Egypt, Ethiopia, Morocco), the coefficients for education appeared with the right sign but

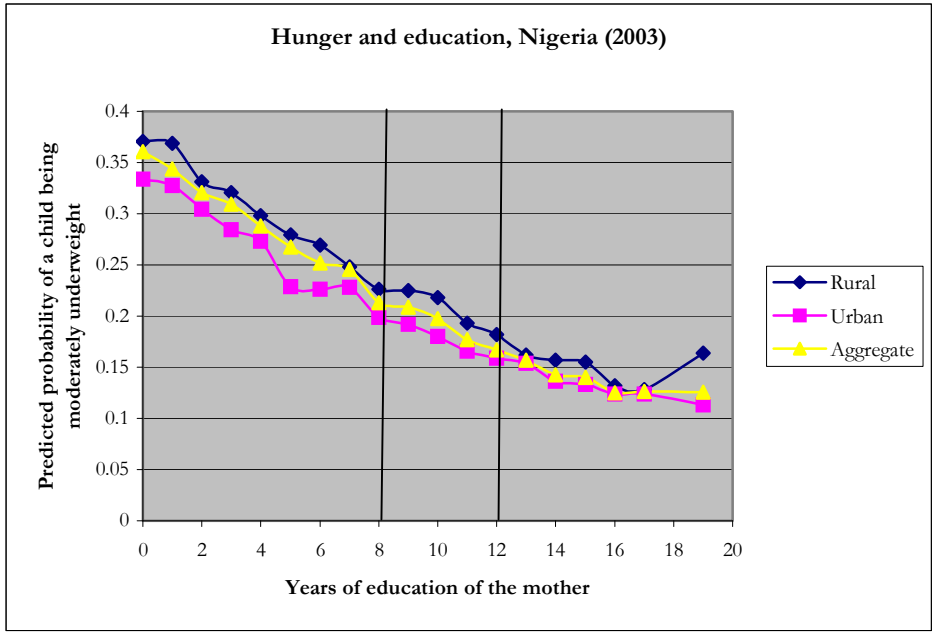
remained statistically insignificant. It is not clear, in any of the countries, whether mother's education has the biggest impact at the higher or the lower levels of schooling. What comes out to be interesting, however, is the fact that in Ethiopia and Morocco, where maternal education is not able to affect nutritional outcomes, urban residence is a strong factor reducing the probability of underweight.

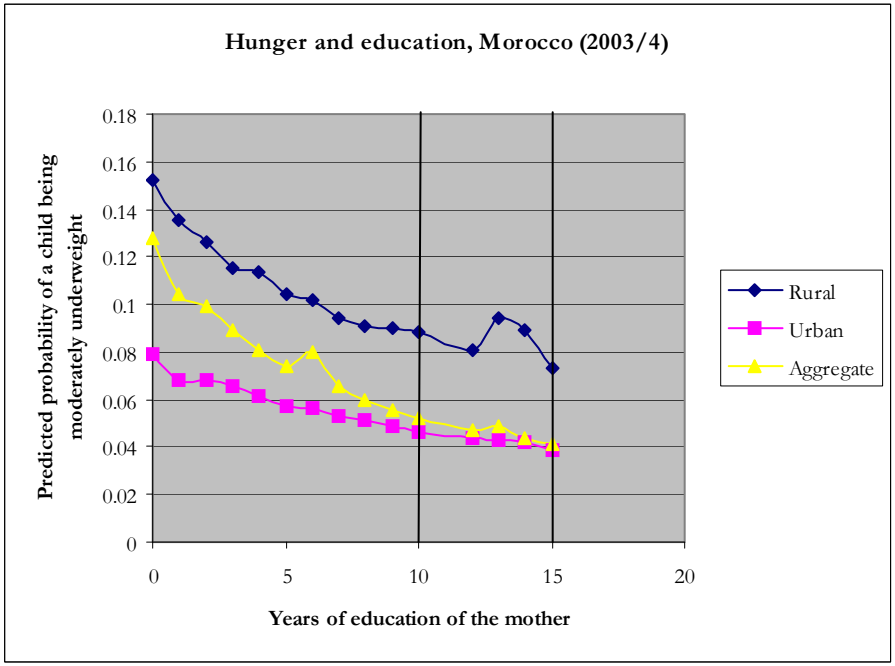
The above trade-off between the influence of education and type of residence manifests that the aforementioned variables might not be important by themselves, but they are instruments to the basic factor of access to nutritional knowledge and information. In cases where mother's schooling is significantly affecting nutrition, formal education is effective in enhancing the personal channel of information about nutrition. On the other hand, the cases where type of residence is stronger in explaining nutritional differences support the argument for the communal dimension of information transfer.

Table 6 – Logit results of likelihood of being underweight as a function of years of schooling of the mother

Country	Years of education of the head of household		Years of education squared	
	Estimated coefficient	Marginal effect	Estimated coefficient	Marginal effect
Cameroon (2004)	-0.1409*** (0.03876)	-0.0173	0.0028 (0.00448)	0.0003
Egypt (2005)	-0.0326 (0.02413)	-0.0020	0.0007 (0.00172)	0.0000
Ethiopia (2005)	-0.0466 (0.04026)	-0.0114	-0.0042 (0.00426)	-0.0013
Morocco (2003/4)	-0.0678 (0.04386)	-0.0062	0.0025 (0.00380)	0.0002
Namibia (2000)	0.0221 (0.02994)	0.0038	-0.0088*** (0.00318)	-0.0015
Nigeria (2003)	-0.0785*** (0.02273)	-0.0159	0.0012 (0.00195)	0.0002
Senegal (2005)	-0.1334*** (0.05178)	-0.0192	0.0059 (0.00550)	0.0009

Fig 3: Comparative tables of predicted probabilities of moderate undernourishment for Nigeria and Morocco





The graphs in fig. 3 are intended to illustrate the preceding argument about the trade-off between personal and communal channels of information about nutrition. It is clearly depicted in the graphs that Nigeria (where education has a statistically significant impact on nutrition) has a narrower urban-rural divide and steeper curves along years of education. On the contrary, Morocco is shown to have a larger urban-rural gap and flatter curves along different levels of education.

6.4 Maternal education and child survival

There is plenty of evidence in the literature that maternal education has favorable impact on the positive outcomes of child survival (Chou et al (2007), LeVine et al (1994)). The results from our empirical estimations show, however, that it is only in two of the seven African countries (i.e. Morocco and Senegal) that mother's education holds a direct and statistically significant impact on the number of infants who died in the last ten years period. Apparently, these results do not offer much of a support to the deterring influence of maternal education on infant mortality.

From methodological point of view, our findings call for a closer look at the nature of the dataset we used. Basically, the DHS datasets provide information on child death retrospectively based on the memory of the mother. In this regard, Brockerhoff and Rose (1994) expressed concern that DHS may have serious shortcomings in measuring the impact of education on child mortality due to a number of reasons. First, there is no clear information in DHS on whether the child who died had been residing with his mother. Second, mothers with low level of education are more likely to face higher chances of maternal death and therefore would systematically miss out of the data. Third, less educated mothers are believed to deliberately omit dead children from the survey roster. Therefore, the coefficients from our regression equations might have underestimated the impact of education on child survival.

The literature draws a distinction between infant mortality, which is confined to the neonatal age of 0-12 months, and child mortality which has a broader age range of 0-60 months. It is argued that neonatal deaths are usually attributed to biological factors rather than socioeconomic reasons (see Brockerhoff and Rose (1994) for empirical results). In this light, some of the results from our estimation provide important evidence to the role of biological factors. Appendix 5 displays that, in four of the seven countries, the number of infant deaths first decreases and then increases with the age of the mother at first birth. In other words, mothers who started giving birth at early age as well as those who started late will have higher chances of facing more infant deaths than those in the middle. Clearly enough, this results confirm that biological factors which are related to the optimal age of the mother and her physical readiness to give birth are more powerful determinants of infant survival.

Table 7 – Poisson regression results of child survival as a function of years of education of the mother

Country	Years of education of the mother	Years of education squared
Cameroon (2004)	-0.0228 (0.03616)	-0.0044 (0.00341)
Egypt (2005)	-0.0214 (0.03242)	-0.0022 (0.00245)
Ethiopia (2005)	-0.0431 (0.04631)	-0.0047 (0.00479)
Morocco (2003/4)	-0.1292*** (0.04795)	0.0061 (0.00375)
Namibia (2000)	0.01854 (0.06302)	-0.0058 (0.00553)
Nigeria (2003)	0.0030 (0.03689)	-0.0018 (0.00301)
Senegal (2005)	-0.0899** (0.03583)	0.0025 (0.00311)

In exploring the underlying mechanisms that could be linking maternal education to child mortality, Basu (1994) examined the role of fertility as an intervening variable. Most of the empirical literature confirms that higher levels of mother's education are associated with low levels of fertility. And lesser number of births will protect maternal health and contribute to low chances of infant death. Our empirical model has incorporated the information on "ideal number of children" suggested by the mother as an instrument for fertility. We opted to use an instrument instead of the direct measure of number of children due to potential endogenity. The coefficients in appendix 5 are well in line with the theoretical prediction that mothers with higher fertility preference face more number of infant deaths in five of the seven countries. This result opens some leeway to argue that mother's education may be working through such factors as low fertility.

6.5 Delivery assistance and maternal education

By examining whether a mother has accessed professional delivery assistance at the time of the last birth, we are effectively talking about revealed preferences. Our theoretical framework proposes that the health care utilization of a family is determined by the schooling of the mother and/or the father. Nevertheless, an important distinction has to be made from the outset between access and utilization and which one of them is the subject of the current analysis.

Access is a predominantly physical phenomenon. But there is also an important economic component of effective access which is related to the cost of healthcare facilities. Utilization could be thought as a second level phenomenon where access is taken as given while other factors determine individual differentials in using the health care facility. The empirical specification for the current analysis focuses on utilization as the dependent variable while it takes access as a control variable. Physical access has a proxy in urban-rural residence whereas effective assess will be

represented by the wealth quintiles. Since we are taking the most recent birth in the last five years, there could be some changes in service availability over the years that should be captured by trend variables.

Table 8 presents logit results from all the seven countries with a strong support for the impact of mother's schooling on her likelihood of utilizing delivery assistance in time of birth. The coefficients for the squared value of years of schooling reveal that in Cameroon and Nigeria the contribution of higher levels of education to the aforementioned general impact is lower while the reverse is true for Namibia.

The intuitive interpretation of this result should, however, be seen in conjunction with the results for the rest of the control variables. Accordingly, a quick look at the results in Appendix 6 provides a clear insight on the overwhelmingly strong and consistent impact that type of residence and wealth status have on delivery assistance. This implies that, as far as delivery assistance is concerned, physical and effective access are automatically translated into utilization. However, the coefficients in table 7 are evident of the independent effect of mother's education apart form the access variables. The possible explanation for the (statistically) weak impact of higher levels of education could emanate from the relatively high correlation between urban residence, better wealth status and higher education. Since urban residence and better wealth status are strong determinants of utilization, they will siphon off the independent effect of higher education.

Table 8 – Logit results of professional delivery assistance as a function of years of schooling of the mother

Country	Years of education of the head of household		Years of education squared	
	Estimated coefficient	Marginal effect	Estimated coefficient	Marginal effect
Cameroon (2004)	0.3461***		-0.0029***	
	(0.01500)	0.0735	(0.00018)	0.0385
Egypt (2005)	0.0781***		0.0011	
	(0.02022)	0.0122	(0.00165)	0.0002
Ethiopia (2005)	0.1052**		0.0060	
	(0.04303)	0.0046	(0.00379)	0.0003
Morocco (2003/4)	0.1174***		0.0042	
	(0.04190)	0.0735	(0.00442)	-0.0006
Namibia (2000)	0.0971**		0.0092**	
	(0.04066)	0.0128	(0.00389)	0.0012
Nigeria (2003)	0.2688***		-0.0064***	
	(0.02895)	0.0605	(0.00236)	-0.0015
Senegal (2005)	0.0546**		-0.0002	
	(0.02408)	0.0132	(0.00222)	-0.0001

7. Inter-country differences and macro-level covariates

The preceding section provided extensive analysis of the micro-level determinants of MDG-related welfare indicators with a focus on testing the viability of family education as the main explanatory variable. The household data results have thrown important light on those indicators which are substantially affected by education. The results were also indicative of whether the marginal impact of education grows as people get more and more years in school or not. The nuance of the micro-level analysis is very useful to understand the foundations of the aggregate figures we see in the official MDGs monitoring process. But we need to also grasp the bigger picture and see the inter-link between the impact of education and other country level economic and social covariates. Such extension is expected to give us more explanation on the inter-country differentials of the impact of education on various indicators.

The marginal effect coefficients from the regression equations in the preceding section convey information about the degree of influence that family education has on various indicators. Apparently, the magnitude of the marginal effect of education varies from one country to another. And, this is usually linked to the socioeconomic and cultural context of the specific country. There could be a number of economic and social factors that determine the effectiveness of education in influencing the status of households in terms of basic welfare aspects. The ideal way to investigate this issue would be running a multiple regression equation of the marginal effect coefficients on a number of economic and social covariates. Unfortunately, we have only seven countries included in our micro-level analysis and would lack a cross-country dataset that provides sufficient number of observations for a regression analysis. Therefore, a brief review of the correlation matrix of the marginal effects and some country level covariates is presented below.

A selection of country-level covariates was made to capture the economic and social development of specific countries. GDP per capita is chosen to represent economic development. With regard to social development, two indicators are selected from the education sector (i.e. public spending on education and pupil-teacher ratio) while three indicators are picked from the health sector (i.e. number of physicians, public health expenditure and private health expenditure). Table 8 displays a correlation matrix showing that the marginal effects of education on primary completion and delivery assistance have statistically significant correlations with specific country level covariates.

The influence of parental education on primary completion has a very strong negative correlation with GDP per capita. This clearly means that in poorer countries the education of parents plays a substantial role in protecting their kids from dropping out of primary school. This result is reinforced by the second statistically

significant result which shows that the same indicator is positively correlated with the pupil-teacher ratio. Intuitively, those countries which have insufficient number of teachers are the countries where the parent should be educated enough to keep the kid in school. There is apparent correlation between low GDP per capita and high pupil-teacher ratio associating the high-influence of parental education to countries with low level of socioeconomic development. Practically, low level of development implies that schools are often far away and child labor is rampant. Under those adverse circumstances, it obviously takes educated parents to pursue the path of education.

Table 8 – Correlation matrix of marginal effect coefficients and country-level covariates

Marginal effect on	GDP per capita	Public spending on education (% of GDP)	Pupil teacher ratio	Physicians (per 1000 people)	Health expenditure, private (% of GDP)	Health expenditure, public (% of GDP)
Wealth effect	.371	-.362	-.422	.499	.268	-.396
Primary enrollment effect	-.516	-.240	.476	-.517	-.114	-.098
Primary completion effect	-.874(***	-.488	.876(***)	-.657	.150	-.285
Delivery assistance	-.089	-.248	.064	-.193	.766(**)	-.660(*)

* Correlation is significant at the 0.1 level (2-tailed).
** Correlation is significant at the 0.05 level (2-tailed).
*** Correlation is significant at the 0.01 level (2-tailed).

The last row of table 8 reveals some interesting facts about the influence of education on the utilization of delivery assistance and the level of public spending on health. According to our results, the intensity of the impact of education has negative and positive correlations with the public spending and private spending on health, respectively. The levels of public and private expenditures (as percentage of GDP) are negatively correlated with each other, implying that there is a clear trade off between the two. The interpretation for our results is that maternal education is a key

factor determining the utilization of delivery services in courtiers where relatively low amount public resources are devoted to the health sector. In more general terms, personal factors like education are important in determining levels of utilization of maternal healthcare where public provisions are comparatively insufficient.

8. Conclusion and policy implications

In the view of many researchers and policy makers, education holds the promise to gear up social and economic development on sustainable basis. The empirical findings of this particular study have made a strong point in favor of the positive impact of education on household wealth outcomes. The results also underscored that higher levels of education put their influence on social development by and large through their effect on the economic status of households. Most of the welfare indicators under investigation represent basic level of wellbeing and may not require a family to be educated at a higher level in order to be cognizant of their benefits or to produce them more efficiently. Rather, higher education affects the budget constraint and that in turn determines welfare status. This link is empirically manifested through the consistently significant results of the wealth coefficient in the regression functions of most of the indicators.

The increasing impact of family education on more sophisticated welfare variables is reaffirmed by the larger impact of schooling of the head of the household on primary completion of children as opposed to its impact on primary enrollment. The influence of parents' education is shown to be lower on such variables as infant mortality which has complex biological dimensions. Among the health indicators under investigation, the utilization of professional delivery assistance is highly affected by mother's education, indicating that schooling can easily influence the input variables of health outcomes. The divergent results on nutritional outcomes demonstrate that in some countries communal channels of information transfer could be more effective than formal education in building the nutritional knowledge of parents.

The macro-level extensions tell a story that household education is a crucial determinant of family wellbeing in countries where there is low level of

socioeconomic development and lower commitment of public resources to the education and health sectors. This particular pattern implies that households relay on their human capital in those situations where the social infrastructures provided by the public sector are not sufficient. Additionally, it also indicates that the "welfare returns" of education decline as the overall level of development rises.

Drawing on the major results of the empirical research in this paper, some broader implications could be identified to a couple of policy areas.

- Rural education – there is evidence of persistent rural-urban divide in the status of households in many of the welfare indicators. This dichotomy is highly pronounced in the case of the probability of escaping asset-poverty. However, education has been shown to have a quick and significant impact in terms of boosting the chance of rural residents to escape poverty. It is obvious that a huge proportion of the population in most of the African countries live in rural areas and lifting a portion of this segment out of poverty would have a compounded effect. Therefore, investment in education in rural areas should get greater attention from policy makers.

- Investment in teachers' education – the larger impact of parent's education on primary completion in countries where the pupil-teacher ratio is higher indicates that investment in education has intergenerational returns. However, at the flip side, this finding implies that parents' education is predetermined in the short-run and could not be responsive to policy changes. Therefore, the quick-fix strategy for policy makers in countries where the over-all level of parental education is lower is to invest heavily on teachers' education.

- More effective formal education in terms of nutritional information – years of schooling of the mother are shown not to directly translate into lower levels of malnutrition. In other words, the effectiveness of formal education in transmitting nutritional information is a key determinant to the impact of education on outcomes of child nutrition. Accordingly, school curriculum should be designed in a way that could deliver the necessary information on home economics in general and child nutrition in particular.

- Non-formal education for mothers – it has been noted above that parental education is predetermined in the short-run and might not be a feasible target of policy actions. However, given the broader impact that this particular variable has on many indicators, policy makers cannot afford to leave it out. Therefore, non-formal education to mothers should be seriously considered in national development strategies. The basic nature of the welfare indicators and the quick improvement that a few years of schooling could bring to those indicators qualify non-formal education as a feasible strategy to supply sufficient knowledge and information.

- Girls' education – the empirical evidences of this study provide support to the stronger impact of age-at-first-birth on infant mortality while maternal education is shown to have an insignificant effect in many of the countries. But there is apparent correlation between age-at-first-birth and maternal education because as girls stay more years in school they would defer marriage and avoid early-age pregnancy. Accordingly, policy makers should consider the investment in girls' education along with its returns to child health and survival.

References

Appleton, S. (2001), Education, Incomes and Poverty in Uganda in the 1990s, CREDIT Research Paper, Nottingham University

Basu, A. M. (1994), Maternal Education, Fertility and Child Mortality: Disentangling Verbal Relationships, Health Transition Review, No. 4, pp. 207 – 215.

Becker, G. (1964), Human capital, New York

Behrman, J. and B. Wolfe (1987), How Does Mother's Schooling Affect Family Health, Nutrition, Medical Care Usage, And Household Sanitation?, Journal of Econometrics, 39 (1987), pp. 185 – 204.

Behrman, J., R. Pollak, P. Taubman (1982), "Parental Preference and Provision for Progeny", Journal of Political Economy, Vol. 90, No. 1, pp. 52 – 73.

Brockerhoff, M. and L. F. De Rose (1994), Parental Education and Child Survival: Can the DHS Tell Us Anything New?, Health Transition Review. No. 4, pp. 192 – 196.

Chou, S. Y., Jin-Tan Liu, Michael Grossman, and Theodore Joyce (2007), Parental Education and Child Health: Evidence From a Natural Experiment in Taiwan, NBER Working Paper Series, No. 13466

Ermisch, J. and M. Francesconi (2000), "Educational Choice, Families, and Young People's Earnings", Journal of Human Resources, Vol. 31, No. 1, pp. 144 – 176.

LeVine, R., E. Dexter, P.Velasco. S. LeVine, A. R. Joshi, K. W. Stuebing, and F. M. Tapia-Uribe (1994), Maternal Literacy and Health Care in Three Countries: a Preliminary Report, Health Transition Review, No. 4, pp. 187 – 191.

Mincer , J. (1958), Investment in Human Capital and Personal Income Distribution", JPE, Vol. 66, pp. 281-302

Mincer, J. (1970), "The Distribution of Labor Incomes: A Survey With Special Reference to Human Capital Approach", JEL, Vol. 8, No. 1, pp. 1- 26

Preston, J. and A. Green (2003), The Macro-social Benefits of Education, Trainings and Skills in Comparative Perspectives, Center for Research on Wider Benefits of Learning, No. 9, August

Sahn D. and D. Stifle (2003), Exploring Alternative Measures of Welfare in the Absence of Expenditure Data", Review of Income and Wealth, Series 49, No. 4

Stacey, Nevzer (1998), Social benefits of education, Annals of the American Academy of Political and Social Sciences, Vol. 559, pp 54 – 63.

Webb, P. and S. Block (2004), Nutritional Information and Formal Schooling as Inputs to Child Nutrition, Economic Development and Cultural Change, 52:4, pp. 801 – 820.

Appendix 1: Full result on Wealth/Percentage in the poorest quantiles

Cameroon				
Dummy for 40% poorest	Coef.	Std. Err.	z	P>z
Years of education (Head)	-0.2518675	0.0082709	-30.45	0
Years of education squared	0.0023853	0.0000936	25.48	0
Dummy for urban	-2.492133	0.0611898	-40.73	0
Dummy for female head	-0.3720136	0.0630747	-5.9	0
Age of household head	-0.0110023	0.0017477	-6.3	0
_cons	2.052306	0.1051461	19.52	0

Egypt				
Dummy for 40% poorest	Coef.	Std. Err.	z	P>z
Years of education (Head)	-0.2008638	0.0467918	-4.29	0
Years of education squared	0.0014244	0.0033912	0.42	0.674
Dummy for urban	-2.281434	0.0388648	-58.7	0
Dummy for female head	-0.2465593	0.0564062	-4.37	0
Age of household head	-0.0177091	0.0016443	-10.77	0
_cons	2.391747	0.1270957	18.82	0

Ethiopia				
Dummy for 40% poorest	Coef.	Std. Err.	z	P>z
Years of education (Head)	-0.3077204	0.0222005	-13.86	0
Years of education squared	0.0097137	0.0023078	4.21	0
Dummy for urban	-3.86254	0.1446501	-26.7	0
Dummy for female head	0.2669339	0.0517005	5.16	0
Age of household head	-0.0054872	0.0013768	-3.99	0
_cons	0.5750779	0.0689097	8.35	0

Morocco				
Dummy for 40% poorest	Coef.	Std. Err.	z	P>z
Years of education (Head)	-0.2326023	0.0106666	-21.81	0
Years of education squared	0.0023168	0.000115	20.14	0
Dummy for urban	-3.648243	0.0600374	-60.77	0
Dummy for female head	-0.173358	0.0803647	-2.16	0.031
Age of household head	-0.019789	0.0020841	-9.5	0
_cons	2.926199	0.121497	24.08	0

Namibia				
Dummy for 40% poorest	Coef.	Std. Err.	z	P>z
Years of education (Head)	-0.0122548	0.022795	-0.54	0.591
Years of education squared	-0.0098027	0.0019855	-4.94	0
Dummy for urban	-2.439579	0.0932392	-26.16	0
Dummy for female head	0.4785698	0.065437	7.31	0
Age of household head	0.0034739	0.0019553	1.78	0.076
_cons	-0.0646357	0.1234487	-0.52	0.601

Nigeria				
Dummy for 40% poorest	Coef.	Std. Err.	z	P>z
Years of education (Head)	-0.2063388	0.0074246	-27.79	0
Years of education squared	0.0019832	0.0001119	17.73	0
Dummy for urban	-2.006423	0.0669676	-29.96	0
Dummy for female head	-0.4012916	0.0787104	-5.1	0
Age of household head	-0.0083224	0.0019736	-4.22	0
_cons	1.477128	0.110968	13.31	0

Senegal				
		Robust		
Dummy for 40% poorest	Coef.	Std. Err.	z	P>z
Years of education (Head)	-0.1910737	0.0127344	-15	0
Years of education squared	0.0017176	0.0001388	12.38	0
Dummy for urban	-2.912736	0.0774646	-37.6	0
Dummy for female head	-1.029047	0.0787038	-13.07	0
Age of household head	-0.0022728	0.0020376	-1.12	0.265
_cons	1.21311	0.114669	10.58	0

Appendix 2: Full results on Hunger/ Children underweight

Cameroon				
Dummy for underweight	Coef.	Std. Err.	z	P>z
Mother's years of education	-0.1409266	0.0387699	-3.63	0
Years of education squared	0.0028367	0.0044841	0.63	0.527
Dummy for poorer	-0.0570737	0.1196034	-0.48	0.633
Dummy for middle	-0.4082849	0.1282829	-3.18	0.001
Dummy for rich	-0.7577889	0.175651	-4.31	0
Dummy for richest	-1.274094	0.2576757	-4.94	0
Dummy for urban	-0.0890498	0.1231388	-0.72	0.47
Dummy for male child	-0.1033822	0.0906338	-1.14	0.254
Dummy for female head	-0.0410396	0.1216971	-0.34	0.736
Household size	0.0106748	0.0095134	1.12	0.262
_cons	-0.8329588	0.1273303	-6.54	0

Egypt				
Dummy for underweight	Coef.	Std. Err.	z	P>z
Mother's years of education	-0.0326667	0.0241322	-1.35	0.176
Years of education squared	0.0007457	0.0017239	0.43	0.665
Dummy for poorer	-0.1211561	0.1001329	-1.21	0.226
Dummy for middle	-0.1762215	0.114391	-1.54	0.123
Dummy for rich	-0.3865675	0.1364442	-2.83	0.005
Dummy for richest	-0.1794134	0.1660051	-1.08	0.28
Dummy for urban	0.0548817	0.0948087	0.58	0.563
Dummy for male child	0.3149108	0.0723136	4.35	0
Dummy for female head	0.3821162	0.1375897	2.78	0.005
Household size	0.0015055	0.0083436	0.18	0.857
_cons	-2.544522	0.1112667	-22.87	0

Ethiopia				
Dummy for underweight	Coef.	Std. Err.	z	P>z
Mother's years of education	-0.0466453	0.0402673	-1.16	0.247
Years of education squared	-0.0041789	0.0042684	-0.98	0.328
Dummy for poorer	-0.1220324	0.0958331	-1.27	0.203
Dummy for middle	-0.1545406	0.0979098	-1.58	0.114
Dummy for rich	-0.3693269	0.1012106	-3.65	0
Dummy for richest	-0.3812877	0.1294867	-2.94	0.003
Dummy for urban	-0.5249803	0.1495839	-3.51	0
Dummy for male child	0.0909028	0.0653755	1.39	0.164
Dummy for female head	0.0891256	0.094248	0.95	0.344
Household size	0.0140792	0.0155815	0.9	0.366
_cons	-0.3331326	0.1225008	-2.72	0.007

Morocco				
Dummy for underweight	Coef.	Std. Err.	z	P>z
Mother's years of education	-0.0678149	0.0438636	-1.55	0.122
Years of education squared	0.0025136	0.0038019	0.66	0.509
Dummy for poorer	-0.4316174	0.1113742	-3.88	0
Dummy for middle	-0.4855364	0.144958	-3.35	0.001
Dummy for rich	-0.4488675	0.1926655	-2.33	0.02
Dummy for richest	-0.9023015	0.2390242	-3.77	0
Dummy for urban	-0.3893828	0.1421147	-2.74	0.006
Dummy for male child	0.0342456	0.086938	0.39	0.694
Dummy for female head	0.0062656	0.1685815	0.04	0.97
Household size	0.0065348	0.0120956	0.54	0.589
_cons	-1.590574	0.1291262	-12.32	0

Namibia				
Dummy for underweight	Coef.	Std. Err.	z	P>z
Mother's years of education	0.0221352	0.029946	0.74	0.46
Years of education squared	-0.0088002	0.003182	-2.77	0.006
Dummy for poorer	-0.1686867	0.112947	-1.49	0.135
Dummy for middle	-0.3405861	0.109623	-3.11	0.002
Dummy for rich	-0.6209163	0.1191595	-5.21	0
Dummy for richest	-1.231648	0.1776627	-6.93	0
Dummy for urban	0.0843791	0.1096011	0.77	0.441
Dummy for male child	0.0414311	0.0764606	0.54	0.588
Dummy for female head	-0.0569936	0.0778801	-0.73	0.464
Household size	0.0190737	0.0101081	1.89	0.059
_cons	-0.7282989	0.1303919	-5.59	0

Nigeria				
Dummy for underweight	Coef.	Std. Err.	z	P>z
Mother's years of education	-0.0784893	0.0227337	-3.45	0.001
Years of education squared	0.0011759	0.0019523	0.6	0.547
Dummy for poorer	0.0906077	0.0958589	0.95	0.345
Dummy for middle	-0.1024462	0.1008012	-1.02	0.309
Dummy for rich	-0.1739711	0.1116746	-1.56	0.119
Dummy for richest	-0.4469554	0.142593	-3.13	0.002
Dummy for urban	-0.0288818	0.0801203	-0.36	0.718
Dummy for male child	0.0824241	0.0657704	1.25	0.21
Dummy for female head	-0.2611149	0.1203203	-2.17	0.03
Household size	0.0001633	0.0091787	0.02	0.986
_cons	-0.5450606	0.1013159	-5.38	0

Senegal				
Dummy for underweight	Coef.	Std. Err.	z	P>z
Mother's years of education	-0.1334528	0.051785	-2.58	0.01
Years of education squared	0.0059126	0.0055043	1.07	0.283
Dummy for poorer	-0.0549873	0.1211551	-0.45	0.65
Dummy for middle	-0.2545766	0.1358181	-1.87	0.061
Dummy for rich	-0.7299221	0.1967941	-3.71	0
Dummy for richest	-1.063624	0.2328524	-4.57	0
Dummy for urban	-0.1709495	0.1325082	-1.29	0.197
Dummy for male child	-0.0299899	0.0927322	-0.32	0.746
Dummy for female head	0.0340926	0.1304212	0.26	0.794
Household size	0.0118295	0.006315	1.87	0.061
_cons	-1.208599	0.1270407	-9.51	0

Appendix 3: Full results on Primary enrollment

Cameroon				
Dummy for primary enrollment	Coef.	Std. Err.	z	P>z
Years of education head	0.5704875	0.0789833	7.22	0
Years of education squared	-0.022655	0.0090867	-2.49	0.013
Dummy for poorer	0.3290516	0.1999487	1.65	0.1
Dummy for middle	0.8884323	0.243188	3.65	0
Dummy for rich	0.7839643	0.3155185	2.48	0.013
Dummy for richest	2.607395	1.145896	2.28	0.023
Dummy for urban	0.2845052	0.2328657	1.22	0.222
Dummy for female head	0.5744467	0.260771	2.2	0.028
Dummy for male child	0.5951124	0.1632548	3.65	0
_cons	0.0035605	0.1488509	0.02	0.981

Egypt				
Dummy for primary enrollment	Coef.	Std. Err.	z	P>z
Years of education head	0.1884382	0.0558569	3.37	0.001
Years of education squared	-0.0010481	0.0046057	-0.23	0.82
Dummy for poorer	1.143398	0.22492	5.08	0
Dummy for middle	2.009389	0.4047444	4.96	0
Dummy for rich	1.622517	0.4615906	3.52	0
Dummy for richest	2.858515	0.9505231	3.01	0.003
Dummy for urban	0.5374337	0.2848088	1.89	0.059
Dummy for female head	-0.1129055	0.3241048	-0.35	0.728
Dummy for male child	1.463883	0.194749	7.52	0
_cons	1.073876	0.1216215	8.83	0

Ethiopia				
Dummy for primary enrollment	Coef.	Std. Err.	z	P>z
Years of education head	0.0811441	0.0365078	2.22	0.026
Years of education squared	0.0012284	0.0034289	0.36	0.72
Dummy for poorer	0.7623376	0.1100782	6.93	0
Dummy for middle	1.161594	0.1163285	9.99	0
Dummy for rich	1.542149	0.1203899	12.81	0
Dummy for richest	2.316357	0.1801293	12.86	0
Dummy for urban	0.9260341	0.2012368	4.6	0
Dummy for female head	0.12601	0.1091758	1.15	0.248
Dummy for male child	0.0702938	0.0791854	0.89	0.375
_cons	-1.113187	0.0894448	-12.45	0

Morocco				
Dummy for primary enrollment	Coef.	Std. Err.	z	P>z
	0.2018427	0.0766892	2.63	0.008
Years of education head	0.2018427	0.0766892	2.63	0.008
Years of education squared	-0.001325	0.0009014	-1.47	0.142
Dummy for poorer	0.3912324	0.2065225	1.89	0.058
Dummy for middle	1.654848	0.346238	4.78	0
Dummy for urban	0.6839231	0.3184757	2.15	0.032
Dummy for female head	0.5101344	0.3839548	1.33	0.184
Dummy for male child	0.604973	0.1882621	3.21	0.001
_cons	1.503949	0.1496413	10.05	0

Namibia				
Dummy for primary enrollment	Coef.	Std. Err.	z	P>z
Years of education head	-0.0648568	0.1235333	-0.53	0.6
Years of education squared	0.0343943	0.0147802	2.33	0.02
Dummy for poorer	0.429225	0.3415346	1.26	0.209
Dummy for middle	0.6483563	0.3582281	1.81	0.07
Dummy for rich	0.8164763	0.4408905	1.85	0.064
Dummy for richest	2.797965	1.137342	2.46	0.014
Dummy for urban	0.0288407	0.4498662	0.06	0.949
Dummy for female head	1.123299	0.2936519	3.83	0
Dummy for male child	0.0179317	0.2554413	0.07	0.944
_cons	0.5810103	0.259633	2.24	0.025

Nigeria				
Dummy for primary enrollment	Coef.	Std. Err.	z	P>z
Years of education head	0.2569319	0.0272537	9.43	0
Years of education squared	-0.0023874	0.0002853	-8.37	0
Dummy for poorer	0.2729051	0.1820282	1.5	0.134
Dummy for middle	0.5022045	0.1935323	2.59	0.009
Dummy for rich	1.398646	0.261528	5.35	0
Dummy for richest	2.088126	0.4116162	5.07	0
Dummy for urban	-0.1600804	0.1797714	-0.89	0.373
Dummy for female head	1.297794	0.3056187	4.25	0
Dummy for male child	0.6348894	0.1419086	4.47	0
_cons	-0.4909568	0.1479958	-3.32	0.001

Senegal				
Dummy for primary enrollment	Coef.	Std. Err.	z	P>z
Years of education head	0.3878495	0.0515099	7.53	0
Years of education squared	-0.0150959	0.0043064	-3.51	0
Dummy for poorer	0.0452739	0.1127228	0.4	0.688
Dummy for middle	0.1978156	0.126056	1.57	0.117
Dummy for rich	0.0783664	0.1742966	0.45	0.653
Dummy for richest	0.0704427	0.2150141	0.33	0.743
Dummy for urban	0.8664268	0.1310622	6.61	0
Dummy for female head	0.2930303	0.1212358	2.42	0.016
Dummy for male child	0.0616467	0.0863452	0.71	0.475
_cons	-0.0233877	0.0934694	-0.25	0.802

Appendix 4: Full results on Primary completion

Cameroon				
		Robust		
Dummy for primary completion	Coef.	Std. Err.	z	P>z
Years of education head	0.2810413	0.0581214	4.84	0
Years of education squared	-0.0086379	0.005709	-1.51	0.13
Dummy for poorer	0.7282669	0.269618	2.7	0.007
Dummy for middle	1.059585	0.2539176	4.17	0
Dummy for rich	1.718732	0.3155411	5.45	0
Dummy for richest	2.639572	0.4359886	6.05	0
Dummy for urban	-0.0609859	0.2132224	-0.29	0.775
Dummy for female head	0.6439898	0.2132561	3.02	0.003
Dummy for male child	-0.4972528	0.176809	-2.81	0.005
_cons	-1.007941	0.2395749	-4.21	0

Egypt				
Dummy for primary completion	Coef.	Std. Err.	z	P>z
Years of education head	0.32746	0.0513274	6.38	0
Years of education squared	-0.0100571	0.004656	-2.16	0.031
Dummy for poorer	1.146434	0.1397764	8.2	0
Dummy for middle	1.750303	0.2036018	8.6	0
Dummy for rich	2.652609	0.3744348	7.08	0
Dummy for richest	2.510036	0.4876985	5.15	0
Dummy for urban	0.1436957	0.1717541	0.84	0.403
Dummy for female head	0.1545968	0.1830135	0.84	0.398
Dummy for male child	1.3075	0.1263263	10.35	0
_cons	0.2578726	0.0985532	2.62	0.009

Ethiopia				
		Robust		
Dummy for primary completion	Coef.	Std. Err.	z	P>z
Years of education head	0.2368924	0.0598846	3.96	0
Years of education squared	-0.0050897	0.0055031	-0.92	0.355
Dummy for poorer	0.8499608	0.2341422	3.63	0
Dummy for middle	0.7144869	0.2405974	2.97	0.003
Dummy for rich	1.370811	0.2220577	6.17	0
Dummy for richest	1.989614	0.2382058	8.35	0
Dummy for urban	1.444702	0.2148098	6.73	0
Dummy for female head	0.2584325	0.1479112	1.75	0.081
Dummy for male child	0.4889498	0.1351981	3.62	0
_cons	-2.557127	0.1993893	-12.82	0

Morocco				
Dummy for primary completion	Coef.	Std. Err.	z	P>z
Years of education head	0.2301047	0.0426364	5.4	0
Years of education squared	-0.0024727	0.0004348	-5.69	0
Dummy for poorer	0.8041604	0.1420453	5.66	0
Dummy for middle	1.786418	0.2065806	8.65	0
Dummy for rich	3.271728	0.3853486	8.49	0
Dummy for richest	4.335212	0.7550712	5.74	0
Dummy for urban	0.2435864	0.1958764	1.24	0.214
Dummy for female head	0.2875993	0.1927398	1.49	0.136
Dummy for male child	1.302262	0.1293151	10.07	0
_cons	-0.54379	0.1105838	-4.92	0

Namibia				
Dummy for primary completion	Coef.	Std. Err.	z	P>z
Years of education head	0.3487101	0.1746244	2	0.046
Years of education squared	-0.0111387	0.0135551	-0.82	0.411
Dummy for poorer	0.4664865	0.5585249	0.84	0.404
Dummy for middle	0.46973	0.6389306	0.74	0.462
Dummy for rich	0.1686405	0.5356596	0.31	0.753
Dummy for urban	0.3289145	0.6615315	0.5	0.619
Dummy for female head	1.09773	0.5154428	2.13	0.033
Dummy for male child	-0.0203289	0.4167621	-0.05	0.961
_cons	1.50297	0.4031864	3.73	0

Nigeria				
Dummy for primary completion	Coef.	Std. Err.	z	P>z
Years of education head	0.4893026	0.094243	5.19	0
Years of education squared	-0.0236573	0.0069716	-3.39	0.001
Dummy for poorer	0.4291744	0.2992669	1.43	0.152
Dummy for middle	0.6475675	0.3070063	2.11	0.035
Dummy for rich	1.453219	0.4105457	3.54	0
Dummy for richest	2.130531	0.7111397	3	0.003
Dummy for urban	-0.1817237	0.2816134	-0.65	0.519
Dummy for male child	-0.2689695	0.2365091	-1.14	0.255
_cons	0.3891687	0.2506622	1.55	0.121

Senegal				
Dummy for primary completion	Coef.	Std. Err.	z	P>z
Years of education head	0.3245319	0.0455155	7.13	0
Years of education squared	-0.0127272	0.0035964	-3.54	0
Dummy for poorer	0.223192	0.1442619	1.55	0.122
Dummy for middle	0.3987418	0.1524378	2.62	0.009
Dummy for rich	0.6584419	0.1798956	3.66	0
Dummy for richest	0.5990814	0.202176	2.96	0.003
Dummy for urban	0.7188335	0.1224366	5.87	0
Dummy for female head	0.0723017	0.1230287	0.59	0.557
Dummy for male child	0.3980281	0.0968712	4.11	0
_cons	-0.7392137	0.1215301	-6.08	0

Appendix 5: Full results on Infant mortality

Cameroon				
Count of infant death	Coef.	Std. Err.	z	P>z
Years of education head	-0.0228	0.036157	-0.63	0.528
Years of education squared	-0.0044	0.003406	-1.29	0.196
Dummy for poorer	-0.17763	0.138238	-1.28	0.199
Dummy for middle	-0.25528	0.135877	-1.88	0.06
Dummy for rich	-0.11904	0.176332	-0.68	0.5
Dummy for richest	-0.17309	0.220701	-0.78	0.433
Dummy for urban	-0.28741	0.133191	-2.16	0.031
Dummy for mother's childhood residence urban	-0.56673	0.206271	-2.75	0.006
Fertility preference	0.024382	0.018477	1.32	0.187
Age at first birth	-0.17448	0.076908	-2.27	0.023
Age at first birth squared	0.004002	0.001823	2.2	0.028
_cons	0.528704	0.809121	0.65	0.513

Egypt				
Count of infant death	Coef.	Std. Err.	z	P>z
Years of education head	-0.0214	0.032417	-0.66	0.509
Years of education squared	-0.00223	0.002451	-0.91	0.363
Dummy for poorer	-0.34186	0.127379	-2.68	0.007
Dummy for middle	-0.29846	0.145834	-2.05	0.041
Dummy for rich	-0.41051	0.181779	-2.26	0.024
Dummy for richest	-0.33479	0.219763	-1.52	0.128
Dummy for urban	-0.02675	0.121163	-0.22	0.825
Dummy for mother's childhood residence urban				
Fertility preference	0.136837	0.031168	4.39	0
Age at first birth	-0.2047	0.064511	-3.17	0.002
Age at first birth squared	0.004085	0.001241	3.29	0.001
_cons	0.104201	0.801819	0.13	0.897

Ethiopia				
Count of infant death	Coef.	Std. Err.	z	P>z
Years of education head	-0.04312	0.04631	-0.93	0.352
Years of education squared	-0.00475	0.004786	-0.99	0.321
Dummy for poorer	0.203153	0.138232	1.47	0.142
Dummy for middle	0.330347	0.129504	2.55	0.011
Dummy for rich	0.289922	0.132294	2.19	0.028
Dummy for richest	0.019604	0.177769	0.11	0.912
Dummy for urban	-0.31758	0.190871	-1.66	0.096
Dummy for mother's childhood residence urban				
Fertility preference	0.011905	0.013451	0.89	0.376
Age at first birth	-0.17021	0.06747	-2.52	0.012
Age at first birth squared	0.003553	0.001512	2.35	0.019
_cons	0.190115	0.746725	0.25	0.799

Morocco				
Count of infant death	Coef.	Std. Err.	z	P>z
Years of education head	-0.12922	0.047946	-2.7	0.007
Years of education squared	0.006136	0.003749	1.64	0.102
Dummy for poorer	-0.30415	0.183163	-1.66	0.097
Dummy for middle	-0.36466	0.212629	-1.71	0.086
Dummy for rich	-0.5721	0.294175	-1.94	0.052
Dummy for richest	-0.75758	0.339189	-2.23	0.026
Dummy for urban	-0.04343	0.189408	-0.23	0.819
Dummy for mother's childhood residence urban	-0.13694	0.310639	-0.44	0.659
Fertility preference	0.087335	0.029957	2.92	0.004
Age at first birth	-0.1188	0.094155	-1.26	0.207
Age at first birth squared	0.002045	0.001779	1.15	0.25
_cons	-0.56339	1.166519	-0.48	0.629

Namibia				
Count of infant death	Coef.	Std. Err.	z	P>z
Years of education head	0.018542	0.063024	0.29	0.769
Years of education squared	-0.00586	0.005533	-1.06	0.29
Dummy for poorer	0.2632	0.267433	0.98	0.325
Dummy for middle	0.522695	0.256191	2.04	0.041
Dummy for rich	0.197106	0.281392	0.7	0.484
Dummy for richest	-0.02969	0.356838	-0.08	0.934
Dummy for urban	-0.154	0.214132	-0.72	0.472
Dummy for mother's childhood residence urban				
Fertility preference	0.087408	0.028135	3.11	0.002
Age at first birth	-0.13596	0.120106	-1.13	0.258
Age at first birth squared	0.0029	0.002441	1.19	0.235
_cons	-1.28301	1.392528	-0.92	0.357

Nigeria				
Count of infant death	Coef.	Std. Err.	z	P>z
Years of education head	0.003002	0.036893	0.08	0.935
Years of education squared	-0.00189	0.003009	-0.63	0.529
Dummy for poorer	-0.13936	0.128248	-1.09	0.277
Dummy for middle	-0.35508	0.145419	-2.44	0.015
Dummy for rich	-0.4945	0.170337	-2.9	0.004
Dummy for richest	-1.04242	0.223534	-4.66	0
Dummy for urban	-0.14228	0.136448	-1.04	0.297
Dummy for mother's childhood residence urban				
Fertility preference	0.045028	0.014509	3.1	0.002
Age at first birth	-0.13358	0.077647	-1.72	0.085
Age at first birth squared	0.002998	0.00171	1.75	0.08
_cons	0.123367	0.837495	0.15	0.883

Senegal				
Count of infant death	Coef.	Std. Err.	z	P>z
Years of education head	-0.08994	0.035834	-2.51	0.012
Years of education squared	0.002461	0.003107	0.79	0.428
Dummy for poorer	-0.01182	0.112564	-0.11	0.916
Dummy for middle	-0.20786	0.126474	-1.64	0.1
Dummy for rich	-0.38275	0.155369	-2.46	0.014
Dummy for richest	-0.63341	0.213344	-2.97	0.003
Dummy for urban	0.056373	0.120674	0.47	0.64
Dummy for mother's childhood residence urban	0.178969	0.106385	1.68	0.093
Fertility preference	0.07257	0.018423	3.94	0
Age at first birth	-0.24076	0.056017	-4.3	0
Age at first birth squared	0.005107	0.001252	4.08	0
_cons	0.72031	0.634308	1.14	0.256

Appendix 6: Full results on Utilization of delivery assistance

Cameroon				
Dummy for delivery assistance	Coef.	Std. Err.	z	P>z
Years of education	0.3460692	0.0150023	23.07	0
Years of education squared	-0.0029393	0.000181	-16.24	0
Dummy for poorer	0.1855084	0.1005044	1.85	0.065
Dummy for middle	0.6977561	0.1022936	6.82	0
Dummy for rich	1.028283	0.13488	7.62	0
Dummy for richest	1.234107	0.1917592	6.44	0
Dummy for urban	0.9198614	0.0949336	9.69	0
Partner's education - primary	0.1969387	0.0901904	2.18	0.029
Partner's education - secondary	0.1628254	0.1042303	1.56	0.118
Partner's education - tertiary	0.8614791	0.408337	2.11	0.035
Age of the respondent	-0.0588415	0.036947	-1.59	0.111
Trend variable - year_01	0.1444364	0.1534881	0.94	0.347
Trend variable - year_02	0.1208503	0.1378397	0.88	0.381
Trend variable - year_03	0.0009453	0.1373663	0.01	0.995
Trend variable - year_04	-0.0954564	0.154998	-0.62	0.538
_cons	-1.316971	0.5503068	-2.39	0.017

Egypt				
Dummy for delivery assistance	Coef.	Std. Err.	z	P>z
Years of education	0.0781125	0.0202197	3.86	0
Years of education squared	0.0010796	0.0016553	0.65	0.514
Dummy for poorer	0.4676321	0.0670675	6.97	0
Dummy for middle	0.8302785	0.0778192	10.67	0
Dummy for rich	1.092755	0.0996998	10.96	0
Dummy for richest	1.876857	0.1677587	11.19	0
Dummy for urban	0.6607041	0.0715278	9.24	0
Partner's education - primary	-0.0551082	0.0338641	-1.63	0.104
Partner's education - secondary	0.1623367	0.0767679	2.11	0.034
Partner's education - tertiary	0.1708698	0.073016	2.34	0.019
Age of the respondent	0.3200773	0.1378892	2.32	0.02
Trend variable - year_01	0.0463662	0.0910129	0.51	0.61
Trend variable - year_02	0.2167221	0.0890572	2.43	0.015
Trend variable - year_03	0.240297	0.0880531	2.73	0.006
Trend variable - year_04	0.2377753	0.1077991	2.21	0.027
_cons	0.1222295	0.5101021	0.24	0.811

Ethiopia				
Dummy for delivery assistance	Coef.	Std. Err.	z	P>z
Years of education	0.1052408	0.0430287	2.45	0.014
Years of education squared	0.0060321	0.0037988	1.59	0.112
Dummy for poorer	-0.1247353	0.2926584	-0.43	0.67
Dummy for middle	0.0907928	0.2741445	0.33	0.741
Dummy for rich	0.911954	0.2374829	3.84	0
Dummy for richest	1.682561	0.2347727	7.17	0
Dummy for urban	1.67261	0.133223	12.55	0
Partner's education - primary	0.4761778	0.1395461	3.41	0.001
Partner's education - secondary	0.8583418	0.1589988	5.4	0
Partner's education - tertiary	1.44295	0.290556	4.97	0
Age of the respondent	-0.1671679	0.0557464	-3	0.003
Trend variable - year_01	-0.2542009	0.2168181	-1.17	0.241
Trend variable - year_02	-0.0809153	0.2033638	-0.4	0.691
Trend variable - year_03	-0.2378402	0.2005877	-1.19	0.236
Trend variable - year_04	-0.0530087	0.1983964	-0.27	0.789
_cons	-1.368298	0.8237396	-1.66	0.097

Morocco				
Dummy for delivery assistance	Coef.	Std. Err.	z	P>z
Years of education	0.1174558	0.0419003	2.8	0.005
Years of education squared	0.0041704	0.0044195	0.94	0.345
Dummy for poorer	0.5467907	0.0956102	5.72	0
Dummy for middle	0.8485146	0.1231013	6.89	0
Dummy for rich	1.291281	0.17921	7.21	0
Dummy for richest	1.662716	0.2470171	6.73	0
Dummy for urban	0.9449735	0.1117831	8.45	0
Partner's education - primary	0.3650281	0.0874429	4.17	0
Partner's education - secondary	0.752311	0.1310854	5.74	0
Partner's education - tertiary	0.7486624	0.3092264	2.42	0.015
Age of the respondent	-0.0120302	0.0058282	-2.06	0.039
Trend variable - year_01	-0.0181289	0.1170094	-0.15	0.877
Trend variable - year_02	0.0769874	0.1151237	0.67	0.504
Trend variable - year_03	0.1863716	0.1152927	1.62	0.106
Trend variable - year_04	-0.3125645	0.5275279	-0.59	0.554
_cons	-0.6604486	0.2194582	-3.01	0.003

Namibia				
Dummy for delivery assistance	Coef.	Std. Err.	z	P>z
Years of education	0.097133	0.0406675	2.39	0.017
Years of education squared	0.0092148	0.0038892	2.37	0.018
Dummy for poorer	0.2590929	0.1402362	1.85	0.065
Dummy for middle	0.6473239	0.1380027	4.69	0
Dummy for rich	0.9447729	0.150049	6.3	0
Dummy for richest	1.409409	0.2649118	5.32	0
Dummy for urban	1.104087	0.1428794	7.73	0
Partner's education - primary	-0.0029098	0.0068669	-0.42	0.672
Partner's education - secondary	-0.0930291	0.1319531	-0.71	0.481
Partner's education - tertiary	0.0666676	0.1360438	0.49	0.624
Age of the respondent	-0.4407769	0.5186733	-0.85	0.395
Trend variable - year_01	-0.125584	0.2081879	-0.6	0.546
Trend variable - year_02	-0.0311561	0.1906338	-0.16	0.87
Trend variable - year_03	-0.0325482	0.1825498	-0.18	0.858
Trend variable - year_04	-0.0595676	0.1864954	-0.32	0.749
_cons	-0.5563749	0.302385	-1.84	0.066

Nigeria				
Dummy for delivery assistance	Coef.	Std. Err.	z	P>z
Years of education	0.2688978	0.0289517	9.29	0
Years of education squared	-0.0064619	0.0023653	-2.73	0.006
Dummy for poorer	0.5235703	0.1354278	3.87	0
Dummy for middle	0.7205661	0.1348008	5.35	0
Dummy for rich	1.023857	0.1464014	6.99	0
Dummy for richest	1.694215	0.1793652	9.45	0
Dummy for urban	0.4139341	0.0993756	4.17	0
Partner's education - primary	0.3771522	0.1112698	3.39	0.001
Partner's education - secondary	0.3869131	0.1210049	3.2	0.001
Partner's education - tertiary	0.5142434	0.1710085	3.01	0.003
Age of the respondent	-0.0927277	0.0427333	-2.17	0.03
Trend variable - year_01	0.1233584	0.1867738	0.66	0.509
Trend variable - year_02	-0.0104011	0.1770995	-0.06	0.953
Trend variable - year_03	0.0123605	0.1738406	0.07	0.943
Trend variable - year_04	-0.1767704	0.1921959	-0.92	0.358
_cons	-1.71899	0.6392865	-2.69	0.007

Senegal				
Dummy for delivery assistance	Coef.	Std. Err.	z	P>z
Years of education	0.0546417	0.0240864	2.27	0.023
Years of education squared	-0.0002465	0.0022183	-0.11	0.912
Dummy for poorer	0.4714257	0.0900506	5.24	0
Dummy for middle	1.052821	0.0905852	11.62	0
Dummy for rich	1.724682	0.1076788	16.02	0
Dummy for richest	2.1521	0.1289894	16.68	0
Dummy for urban	1.242833	0.0682344	18.21	0
Partner's education - primary	-0.0437337	0.0293642	-1.49	0.136
Partner's education - secondary	0.2472169	0.0919539	2.69	0.007
Partner's education - tertiary	0.1896954	0.1131468	1.68	0.094
Age of the respondent	0.3415438	0.2371321	1.44	0.15
Trend variable - year_01	0.4369244	0.1194408	3.66	0
Trend variable - year_02	0.3478154	0.1031433	3.37	0.001
Trend variable - year_03	0.3468263	0.0915311	3.79	0
Trend variable - year_04	0.2807912	0.0880264	3.19	0.001
_cons	-1.153409	0.4339434	-2.66	0.008