How do living conditions influence the effect of parental education on primary school enrollment? Evidence from 46 African countries

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1. INTRODUCTION

The positive relation between parental and children's education has been well-established and is continuously found (Coleman, 1966; Blau and Duncan, 1967, Bourdieu and Passeron, 1977, Ramirez, 2006, Huisman & Smits, 2009, forthcoming, EFA, 2009). Children of higher educated parents in developed countries have lower drop-out rates, stay in school longer and achieve higher academic levels. In developing countries they are also more likely to enter school in the first place, whereas children who have never been to school are much more likely to have lower-educated parents.

Whereas the positive effects of both father's and mother's education on their children's educational attainment have been continuously found, about the circumstances that influence this relation much less is known. In this paper we aim to find out how the situation in which a child grows up influences the effect of the educational level of its parents on its chances to go to primary school in developing countries. Since variation in environmental circumstances is especially large in Africa, we therefore focus on that part of the world. Consequently, the research question we want to answer in this paper is under which circumstances parental education is more or less important for primary school enrollment in African countries.

For this study we use data from the Database Developing World on 350,000 children aged 8-11 from 46 countries in Africa. The household level data are supplemented with context information at the community, district and national level. We use advanced multi-level logistic regression analyses that make it possible to estimate the effect of variables at these four levels simultaneously. To determine the effect of the demographic, economic, educational and cultural circumstances on the relation between parent's and children's education, we include interactions between characteristics of these contextual circumstances and parental education.

The paper is organized as follows. In the next section we will discuss the theoretical framework underpinning this paper. In the subsequent section the data and method used to study this framework are discussed. In section 4 the results of our analyses are presented. This paper ends with a conclusion.

2. THEORETICAL BACKGROUND

2.1 Parental education

It is a well-established fact that children from higher educated parents are more likely to do better in school (*Coleman, 1966; Blau and Duncan, 1967, Bourdieu and Passeron, 1977, Ramirez, 2006;* UNESCO, 2005, 2009; Campbell, 2009; Huisman & Smits, 2009, forthcoming; Tansel, 2002; Buchmann & Brakewood,

2000; Colclough *et al.*, 2000; Smits & Gündüz-Hoşgör, 2005, 2006; Ersado, 2005; Shavit & Blossfeld, 1993). This seems to be a general effect, which has been found both in developed as well as in developing countries. Higher educated parents have higher expectations about their children's educational attainment, are more actively involved in school activities, have more contact with teachers, know more about their child's school performance and are more likely to actively manage their child's achievement (Breen & Goldthorpe, 1997; *Muller and Kerbow, 1993; Baker and Stevenson, 1986; Lareau, 2000*).

In this respect mother's education might be more important than father's education. There is substantial empirical evidence that mother's education has a stronger positive effect on her children's educational attainment than education of the father *(see Schultz, 2002 for an overview).* Moreover, education of the mother might be especially important for educational enrollment of girls *(Fuller, Singer, and Keiley 1995; Shu 2004; Emerson and Portela Souza 2007;* Kambhampati & Pal, 2001*).* Women who have gone to school, have experienced the value of education and know that it is within the reach of girls to complete that level.

Whereas direct, positive effects of both father's and mother's education have been continuously found in all regions of the globe (Fehrler and Michaelowa, 2009), much less is known about how the strength and possibly also the direction of these effects is influenced by characteristics of the context in which the family lives. In this paper we want to shed more light on this. More specifically, we want to find out how the effect of parental education on young children's educational participation varies across more or less difficult circumstances. Disadvantageous living conditions include living in a less-developed region, in an area characterized by low availability and quality of educational facilities, competition from household members over scarce resources, the necessity to help out in the household or earn additional income. For girls, living in a traditional or patriarchal culture might prove to be disadvantageous.

A well-known hypothesis from the social stratification literature in this respect is the so-called social reproduction hypothesis. Parents with a higher educational status will try to make sure that their children achieve a comparable high status, independent of the living conditions they face. Consequently, this hypothesis predicts that the influence of modernization, individualization or educational policy on the effect of parental education will be minor (Collins, 1971; Bourdieu & Passeron [1977] 1990; Goldthorpe, 1996; Breen & Goldthorpe, 1997). If there is much variation in material circumstances and availability of resources as is the case in many developing countries, the assumption underlying the social reproduction hypothesis that the effects of parental education does not differ among circumstances might not be very realistic. In this paper we would therefore like to test two hypotheses regarding the influence of the circumstances on the effect of education of the father and the mother.

The first of these hypotheses is what we call the *compensation hypothesis*. This hypothesis predicts that higher educated parents are in a better position to compensate their children for disadvantageous living

conditions. Higher educated parents might be more motivated, or use their better communication skills and their better knowledge to overcome the disadvantages due to a more difficult household situation or contextual circumstances. The effect of parental education is stronger under more difficult conditions.

Yet another hypothesis might predict the opposite effect: children from higher educated parents are in a better position to profit more from advantageous circumstances. According to this *accumulation hypothesis* parents with a higher level of education will be better able to ensure that their children benefit from more and better educational facilities, living in a higher developed region, etc. Consequently, following from this hypothesis we would expect that the influence of having higher educated parents is stronger under better conditions.

2.2 Other factors

Besides by parental education, educational enrollment of African children is influenced by many other factors, both at the level of the household and at the level of the context in which the household lives. Our model therefore contains a number of other factors that are known or expected to be related to educational enrollment. Most of them are discussed in detail by Huisman and Smits (2009).

2.2.1 Socio-economic factors

At the household level, father's occupation, whether or not the mother is working and household wealth have been known for long to be important determinants of educational participation in both developed and developing world countries (Coleman et al., 1966; Jencks, 1972; Shavit & Blossfeld, 1993; Tansel, 2002; Glewwe & Jacoby, 2004; Mingat, 2007; Evangelista de Carvalho Filho, 2008). Fathers with a higher status occupation might be more motivated to keep their children in school, assuming they want their children to obtain at least the same occupational status they have. Consequently, such fathers provide the home environment which generates the expectation and motivation for children to perform well in school in order to achieve such a cognitively demanding occupation. The effect of a working mother might go two ways. Children of such mothers, especially girls, might be counted on to do the household chores. On the other hand, employment of the mother might increase her power within the household and there are reasons to expect this to increase the chances of her children to get an education. According to the resource theory of conjugal power (Blood & Wolfe, 1960; Rodman, 1972) the degree to which partners can influence important household decisions depends on the extent to which they bring in valued resources into the marriage. Direct costs associated with education, such as fees, books, and uniforms, are less likely to be an obstacle to wealthier families. Opportunity costs of children not being able to help at home, at the family farm or by earning additional income through child labour are also likely to be less important to them (Evangelista de Carvalho Filho, 2008; Basu, 1999). Moreover, wealthier families are less affected by credit

constraints. Imperfect credit markets have been found to be a major obstacle for the education of children from poor families (Edmonds, 2006; Ersado, 2005; Thorbecke & Charumilind, 2002).

Several studies have shown that the neighborhood in which a family lives influences the effect of social origin on educational attainment through socialization of children and limiting agency of parents (Small & Newman, 2001; Leventhal & Brooks-Bunn, 2000; Huston and Bentley, 2010). Although a major issue with these studies is endogeneity, since people are not randomly distributed across neighborhoods, even studies that have attempted to solve this problem, conclude that the socio-economic context affects children's educational achievement (Small & Newman, 2001; Breen & Jonsson, 2005).

Occupations in the formal sector often require a higher level of education. Children cannot learn the skills for such a profession by working alongside their parents, as is possible in agriculture and artisan shops. When there are better opportunities to find a white collar job, the expected value of going to school increases and the chances increase that children will go to school (Treiman, Ganzeboom & Rijken, 2003).

The degree of modernization (as indicated by the level of development or degree of urbanization) might also influence educational attainment. In more modern areas, there generally is more impact of globalization, including the diffusion of value patterns that stress the importance of education and equality among the sexes. In urban areas, the road and transport infrastructure is generally better, the state influence is generally stronger and there may be more pressure on parents to send their children to school. Besides, families living in cities may have moved there because of the better educational opportunities for the children there (Buchmann & Brakewood, 2000). Indeed, Fafchamps & Wahba (2006) find for Nepal that children living near towns and cities are more likely to attend school. Both educational participation in general and participation of girls compared to boys are thus expected to be higher in more developed and urban areas.

2.2.2 Demographic factors

Starting school at a higher age than the starting age for compulsory education is a major problem in all developing countries, including Africa. For the age group we are looking at, 8-11, older children might therefore be more likely to be in school. Competition for the scarce educational resources among sons and daughters and older and younger siblings may reduce the chance of individual children to go to school. There is evidence that in developing countries the cost of high fertility is borne by older siblings, rather than by the parents (Buchmann & Hannum, 2001; Emerson & Portela Souza, forthcoming). The younger children in such families have more opportunities to go to school, because the older children do the household chores or contribute to the household income by earning some extra money. A more favorable pattern might be found in extended families, where relatives may help out in the household and add to the household income, making it easier for children to go to school.

The number of siblings a child has might be important. In Western societies and some developing countries, family size tends to be negatively correlated with educational attendance, probably because the available resources have to be divided among more children (Pong, 1997; Buchmann & Hannum, 2001). However this is not the case in all situations. For example, in rural Botswana, the number of 7-14 year old children in the household was found to be positively related to participation (Chernichovsky, 1985). The reason for this may be that with more children, there are more helping hands at home, which increase the chance that at least some children can go to school. Children whose father or mother is missing from the household are more inclined not to be in school, because they might have to (partly) replace the work done by the missing parent. In situations where children are required to do household chores or to contribute to the household income, it is possible that if there are adopted or foster children, parents may put those duties more on the shoulders of these children instead of their own children (Fafchamps & Wahba, 2006). Consequently, biological children are expected to have bigger chances of being in school.

2.2.3 Cultural factors

In patriarchal societies, where sons are expected to look after their parents when they are old, parents tend to invest more in their son, while daughters often are seen as a liability (Colclough et al, 2000), likely to be married off at a young age, often significantly younger than the man they marry (Kandiyoti, 1988). Being born to a mother under 18 involves a higher likelihood of delayed cognitive development, and consequently has negative implications for educational attainment (EFA, 2009). A larger age difference between partners often means women have less bargaining power. When women have more bargaining power, more household resources are spent on schooling of children (Glitter and Barham, 2008). Apart from a direct effect of a mother's education on her own children's schooling, this might also show in a more indirect effect in which educating children is more encouraged in societies where women have a better position and more say in public matters.

Other cultural characteristics might be the degree to which society is ethnically fractionalized. It has been found that in such societies less resources are spend on education (xxxxxxxxxxx). Lastly, the level of corruption might influence the degree to which children are able to benefit from educational resources made available. It seems likely that in more corrupt societies fewer resources earmarked for education actually reach the proposed beneficiaries (xxxxxxxxxxxx).

2.2.4 Educational factors

Better educational facilities increase the likelihood that children benefit from attending school (EFA, 2004) and consequently improve the chance of success in school. For girls, the presence of female teachers has been found important (Colclough et al., 2000; Michaelowa, 2001; Dee, 2005; Leach, 2006). Male teachers

might not provide girls with enough support, or might even be sexually threatening to them. One particular education characteristic might be the costs associated with education. The effect of educational resources might be especially important in developing countries were school resources are often seriously inadequate (see for instance Montagnes (2001) for a discussion of lack of textbooks in developing countries).

Apart from availability and quality of educational facilities, school participation might also be influenced by acceptance of education. We expect that in communities where the average level of education is higher, children are more likely to go to school. In those communities the benefits of education are obvious to most people since the more schooling someone becomes, the better their life chances (Treiman, Ganzeboom and Rijken, 2003).

3. DATA AND METHOD

To test our hypotheses, we use large representative household datasets for 46 African countries from the Demographic and Health Surveys (DHS) and the Pan Arab Project for Family Health (PAPFAM) of the League of Arab States. All these surveys use nationally representative samples of households and collect information on all household members, including information on the educational enrollment of children.

Besides household-level data, we also use context information at the cluster, district and national level. The cluster and district-level information is in part derived by aggregating from the household surveys. Because the samples are large and the surveys include variables indicating the cluster and district, we could create indicators for level of development, culture and educational participation by taking the cluster and district average of characteristics of households and individuals. For several educational facilities we have information at the district level for a large number of countries which were derived from other sources (statistical offices, Ministries of Education, reports). Our combined dataset contains information on 251,178 children (127,449 boys and 123,729 girls) aged 8-11, living in 441 districts in 46 countries.

(a) Method and variables

The effect of the context characteristics on the relation between parental education and a child's school enrollment are studied using bivariate and multivariate logistic regression analysis. Because we use explanatory variables at four levels of aggregation (household, cluster, district, and country), we apply multilevel versions of the logistic regression models. With multilevel analysis it is possible to include explanatory variables at different levels simultaneously and to study interactions among levels (Snijders & Bosker, 1999; Hox, 2002). Interactions with sex are performed to determine which effects differ significantly between boys and girls.

To determine the effect of the demographic, economic, educational and cultural circumstances on the relation between parent's and children's education, we included interactions. To compute the interaction

terms, centered versions of the involved variables are used. The main effects therefore can be interpreted as average effects. Given the large number of possible interactions, only significant interactions are included. In the analyses, case weights present in the data sets were used to make the data representative of the respective country's populations. In all analyses robust standard errors (sandwich estimators) are used.

Our dependent variable is a dummy indicating whether (1) or not (0) children aged 8 to 11 are enrolled in school at the time of the interview. The lower age-limit was put at 8, because compulsory entry ages differ per country and not all children start schooling at the compulsory age. The upper age-limit of 11 was chosen to restrict our analysis to primary education and because in many African countries children already start to drop out at that age.

Father's and mother's education is measured in years. The same goes for age of the child. Sex of the child is measured with (0) for boys and (1) for girls. Presence of the parents is measured with two dummies indicating whether (1) or not (0) the mother or father is missing from the household. Family structure is measured with a dummy indicating whether the child is living in a nuclear family (1) or an extended household (0).

Father's occupation is measured with three categories: (1) farm, (2) lower non-farm, and (3) upper non-farm. Employment of the mother is measured with a dummy indicating whether (1) or not (0) the mother is gainfully employed. Because income is lacking in most surveys, household wealth is used as an alternative. Household wealth is measured with an index constructed on the basis of household assets (such as radios, cars, telephones), the possession of land, and housing characteristics (such as floor material, roofing, toilet facilities, source of drinking water). Using a method developed by Filmer and Pritchett (1999), all households within a country are ranked based on the available assets and divided into wealth deciles.

Neighborhood poverty is measured by the average wealth decile households from the cluster belong to. This is a good indication of the relative poverty of the child's direct environment. District-level of development is measured with an index constructed on the basis of four variables aggregated from our household datasets: the percentages of households in the district with a fridge, car, television, or running water. Of these characteristics the mean was taken of the standardized values. Country-level of development is measured with Gross Domestic Product per capita in constant 2000 US$ from the World Development Indicators. To account for job opportunities in the formal sector we included a variable indicating the percentage of men aged 30-49 with a white collar (professional, technical, managerial or clerical) occupation in the district.

To get a rough indication of the degree of family control over the mother, we use the age she got her first child, measured by a dummy showing whether (1) or not (0) the mother had her first child under age 18 and a variable indicating the number of years of age difference between the mother and her partner. To account for the effect of living in a patriarchal society, we included a variable measuring the average age

difference between husband and wife at the cluster level, and the percentage of women in the cluster which had their first child below age 18. In societies where women have a better position we expect the difference in formal labor market participation between men and women to be smaller and the percentage of parliamentary seats held by women to be higher. The relative labor market position of women was measured by subtracting the percentage of women with a white collar occupation from the percentage of men with such a job and dividing it by both percentages added to each other. Ethnic fractionalization is measured with a variable on a scale from 0 (no fracionalisation) to 1 from La Porta. Corruption is measured with a variable from Transparency International on a scale from 1 (low corruption) to 9 (high level of corruption).

As a measure of the degree to which education is accepted in the child's direct environment, we include a variable indicating the average number of years of schooling of adults age 20-29 in the cluster. To establish the effect of school resources we included the following four variables. First, Pupil Teacher Rates from UNESCO, which are available at the district level for xxxx countries, at the national level for xxx countries, and missing for xxx countries. Second, female teachers as percentage of total number of teachers at the national level from EFA. Third, total public expenditure on education as percentage of GNP from EFA. Fourth, a dummy indicating whether (1) or not (0) the country has a legal guarantee of free education from EFA.

Besides these variables we also added several control variables. Whether the child is a biological child is measured with a dummy with categories (0) for foster, adopted or unrelated children and (1) for biological children. Birth order and number of sisters and brothers are measured with interval variables. For living in a rural area, a dummy is used indicating whether (1) or not (0) the area where the household lives is defined 'rural' in the surveys. To account for the level of urbanization we also added a variable indicating the percentage of people in the district which lives in a rural area. Time of the survey might influence whether the child is reported as being in school, since children from households who are interviewed later in the school year or during the break in between two school years are more likely to report being out of school. Therefore, a dummy was included indicating whether (1) or not (0) the interview was held in between two school years, and for children from households interviewed during the school year, the number of months after the beginning of the school year the interview was held. As an indication of the effect of AIDS-related deaths and sickness, we added a variable indicating the HIV prevalence among adults age 15-49.

Children with a missing parent were given the mean score of the other children in the database on the variables indicating characteristics of the parents. Because there are dummies for missing mother or father in the model, this procedure leads to unbiased estimates of these variables (Allison, 2001, p. 87). For children with mothers younger than 16 or older than 49, information on occupation of the father,

employment of the mother and the age at which the mother had her first child are not available in the DHS-surveys. To be able to include those children in the analyses, we gave them on these variables the average of the children for which information was available and we included a dummy indicating whether (1) or not (0) the respective variable was missing from the database. To find out whether the coefficients of the other variables would be biased by this procedure, two robustness tests were performed. In the first test, the models were estimated again after (separately) removing the variables for father's occupation, mother's employment and age first child of the mother. In the second test, the models were estimated after removing the children with missings on these variables. Both tests showed that the way we handled these missings hardly influenced our results.

For part of the countries, the year of the household survey differed from the year for which data from other sources were available. To test whether this might influence our results, we added a variable indicating the difference between the survey year and the year of the other characteristics to our models. This variable proved to be non-significant in all our analyses.

4. RESULTS

Table 1 clearly shows that fathers and mothers of children who are in school have more years of education than those of children who are not in school. This is the case for all countries in our study. The difference in duration of education of the father between children who are and are not in school varies from less than one year (Equatorial Guinea, Guinea Bissau, Lesotho, Sao Tome and Principe and Zimbabwe) to more than three years in Egypt, Kenya, Madagascar, and Nigeria. The difference in duration of mother's education also varies from less than one year (Benin, Burkina Faso, Burundi, Djibouti, Equatorial Guinea, Guinea, Mali, Niger and Senegal) to more than three years (Egypt, Kenya and Madagascar), roughly indicating that especially in Egypt, Kenya and Madagascar parent's education and in Nigeria father's education is important. For most countries in our study, children who are in school have fathers with more years of education than their mothers have. Exceptions are Sao Tome and Principe, Burundi, Rwanda, Kenya, Tanzania, where the difference is less than one year, and Lesotho, Namibia, South Africa, Swaziland and Zimbabwe where the difference is more than one year.

Table 2 shows the results from the multivariate analysis. Interactions with sex were performed to check whether the effect of a specific variable differed significantly between boys and girls. If this interaction was significant, coefficients are presented for boys and girls separately. Model 1 contains only coefficients of the main effects. Model 2 is similar to Model 1, but with the significant interaction effects with education of the parents. To keep the table readable, the interaction coefficients are presented separately in Table 3.

As can be seen in Table 2 most coefficients have the expected sign. Parental education is significantly positive, whereby the effect of both a father and a mother who went to school longer is stronger for girls. Older children have a higher likelihood to be in school, but this positive effect of age diminishes as children get older, indicating that dropping out is a problem in Africa. Girls are less likely to be in school, as are children whose mother or father is missing from the household. Living in a nuclear family is insignificant, except for boys, for whom it becomes negative, when we add the interactions with parental education to the model.

Being from a household with more socio-economic resources increases the chances to be in school, both for boys and girls. Having a father with a non-farm job, a working mother, or being from a wealthier household all increase the likelihood a child is in school. The effect of a father with a lower non-farm job is stronger for boys. The positive effect of wealth becomes even stronger for children from the higher wealth deciles.

Having a mother who had her first child at a young age has negative implications for children's school chances, as was expected. Having parents or caretakers who differ more in age, is significantly positive, but becomes insignificant once we add the interactions with parental education.

Living in a relatively wealthy neighborhood, in a district which is more developed and in a country with a higher GDP, all have a positive effect on enrolment. A better chance of finding a white collar job, is not significantly related to being in school.

Living in a neighborhood where education is more readily accepted, as indicated by the average number of years of schooling of adults in a country with more female teachers, and higher governmental spending on education all have a positive effect on educational participation of children, especially girls. A legal guarantee of free education is significantly positive for girls' enrolment, and insignificant for boys. Class size, as indicated by the Pupil Teacher Rate, is insignificant.

A puzzling finding is that living in a neighborhood where more women have their first child at a young age is significantly positive for girls. Ethnic fractionalization and corruption both have the expected negative effects on school participation, effects which are stronger for boys than girls. A relatively worse labor market position for women, as indicated by the district ratio of men versus women with a white collar job, is insignificant, as is living in a neighborhood with a higher average age difference between the parents or caretakers, and the percentage of seats in parliament held by women.

(a) Interactions

When we include interactions with the number of years of education of the father and the mother we find that the effect of being older, having a mother who is missing from the household, or living in an area with a higher Pupil Teacher Rate become less negative for children whose father went more years to school.

Having a father with an upper non-farm job, being a girl from a better developed district, living in a country with a legal guarantee of free education, having parents who differ more in age, and being from a district where women have an inferior labor market position all become even more positive for children whose father is higher educated. For children from wealthier households the effect of father's education becomes less important, while the effect of living in a more ethnically fractionalized country or being from a nuclear family becomes even more negative.

The effect of a missing father becomes less negative for boys whose mother went to school longer. Being from a wealthier household, a relatively wealthier neighborhood, or a wealthier country becomes less important for children with a higher educated mother. The effect of a mother who had her first child at a young age, becomes even more negative when she also went to school longer. When there are more female teachers, or in countries where there is a legal guarantee of free education, having a mother with more years of education becomes even more important. In a country where more seats in parliament are held by women, the effect of mother's education is less important, while in areas with higher Pupil Teacher Rates the effect of mother's education is more important.

5. CONCLUSIONS

In this paper we focus on the circumstances that influence the effect of father's and mother's education on school enrollment. We use data from 251,178 children age 8 to 11 in 46 African countries. Our descriptive data show that in all countries in our study children who are in school have fathers and mothers who on average have more years of education than parents of children who are not in school. This finding illustrates results found in numerous studies that parental education is one of the most important determinants of children's success in school.

The positive effect of mother's and father's education is also shown in our multivariate analysis. The number of years a father or mother has been to school has a significant positive effect on the chance their children are in school. An effect which is somewhat stronger for girls than boys. The multivariate analysis further shows that children are more likely to be in school when they are older, but that this effect diminishes and becomes even negative the older they get. Since age in our study runs from 8 to 11 this indicates that children in Africa in general start school late, and that dropping out is a serious problem. Girls and children whose mother or father is missing from the household have a smaller chance to be in school. Living in a nuclear family is insignificant, except for boys for whom the effect becomes negative when we add the interactions with parental education to the model. This implies that in extended households there is more support which is predominantly available for boys.

Our economic variables all have the expected positive effect. Living in a household with more socio-economic resources increases the likelihood children go to school. Having a father with a lower or upper

non-farm job, a mother who is working, or being from a wealthier household all increase the likelihood of school participation. The effect of a father with a lower non-farm job is stronger for boys. The fact that a working mother has a positive effect in Africa, unlike for instance in India (Huisman, Smits, Rani, forthcoming), indicates that in Africa women improve their bargaining position by working. The positive effect of wealth becomes stronger when the household is wealthier. Living in relatively prosperous neighborhoods, in more developed districts and in countries with a higher GDP, all have a positive effect on enrolment. A higher likelihood to find a white collar job is also positive, but insignificant.

Having a mother who had her first child at a young age is negative for a child's chances to be in school. Living in a neighborhood where this is more prevalent, as indicated by a higher percentage of women who had their first child below age 18, is positive for girls. This is a somewhat puzzling finding. But it might be explained by the fact that this variable only becomes significantly positive once GDP and average level of education among adults in the cluster are added to the model. This indicates that living in a neighborhood where women on average become mother young is positive in itself, possibly because parents in those districts, given the circumstances, deliberately choose to have children young and are more willing to invest in them compared to clusters in which parents are less willing to invest in their children and choose to have them later. The only reason this variable is associated with being negative for children's enrollment chances is that it is more prevalent in poorer countries and areas where adults are lower educated, factors which have a negative impact on children's enrollment chances.

Having parents or caretakers who differ more in age, is significantly positive. This was not as we expected, but could be explained by the fact that having such parents, means that the older one, which most often will be the man, has had more time to improve his economic situation. Living in a cluster where age difference between partners on average is larger is non-significant, as is living in a district where women have a relatively inferior position on the labor market (as indicated by the ratio of men versus women with a white collar job). Living in a country where a higher percentage of seats in parliament is held by women is not significantly related to school participation. Living in a more ethnically fractionalized and more corrupt country has a negative effect on school participation, which is more strongly for boys, as has been found before (xxxxxxxxxxxxxxxxxxxx).

The educational variables almost all have the expected effect, which in all cases is stronger for girls. When there are more female teachers, in neighborhoods where education is more accepted, in countries where free education is legally guaranteed, and in countries which spend more on education, children have a better chance to be in school.

To determine the circumstances under which the effect of paternal and maternal education is more or less important we included interactions between all independent variables in our model and duration of father's and mother's education. Parental education seems to compensate for most of the negative effects of

disadvantageous demographic and economic circumstances. Older children have a better chance to be in school when their father went to school longer and that the effect of a missing mother or father is less severe when the other parent, who is still present in the household, is better educated. The effect of living in a poorer household is less negative for children with a higher educated father or mother. Mother's education compensates for living in a less prosperous neighborhood or a less developed country. In contrast to this compensating influence of parental education on the effects of demographic and economic factors, we also find some accumulating effects of father's education on these factors. The effect of living in an extended family, having a father with a higher-status occupation, and, for girls, living in a more developed district, become even more positive for children whose father is higher educated. A possible explanation for the first effect might be that better educated fathers probably have relatives who are better educated too. Living in an extended family in which several adults are better educated then clearly has a stronger effect than living in a household in which only the father went to school longer.

With respect to the effect of educational and cultural factors, we find that, with the exception of class size, children from higher educated parents profit more from better educational and cultural circumstances. The positive impact of a guarantee of free education is stronger for children whose father or mother went to school longer, and the effect of more female teachers is stronger for children whose mother is higher educated. The effect of a bigger age difference between the parents or caretakers, which proved to be positive contrary to our expectations, becomes even more positive for children whose father has more years of education. The same applies when men have a relatively better labor market position than women and for children living in a less ethnically fractionalized country. Children with a less traditional mother, indicated by her having her first child at a higher age, profit more from their mother's education.

NOTES

1. The words used to refer to this sub-national level differ per country. Some countries have provinces, others districts, counties, states, governorates or walayas. In this paper we will use the word "district" to refer to the sub-national units within the 30 countries.

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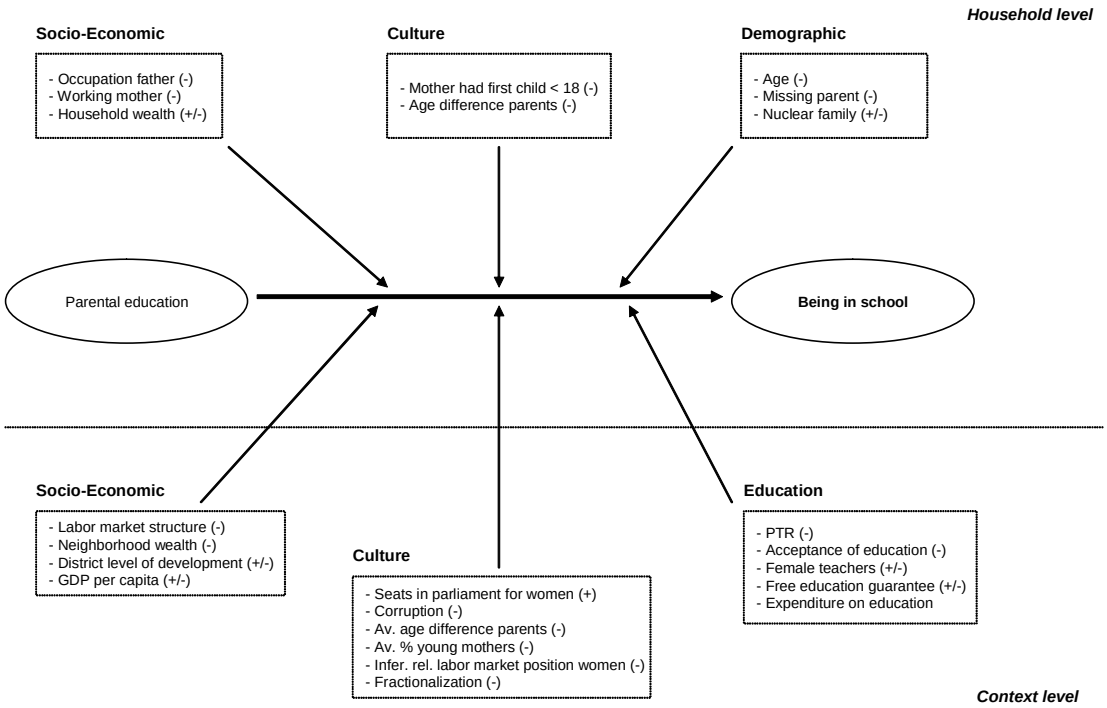

Figure 1: Model for educational participation

Table 1: Average number of years of education of father and mother of children age 8-11 dependent on whether or not child is in school

	Years education father			Years education mother		
	Child not in school	Child in school	Difference	Child not in school	Child in school	Difference
Country						
Algeria	0.94	3.84	2.90	0.89	3.03	2.14
Angola	1.81	3.55	1.75	0.96	2.65	1.69
Benin	0.48	2.23	1.76	0.12	0.96	0.83
Burkina Faso	0.17	1.35	1.18	0.10	0.92	0.82
Burundi	1.98	3.05	1.07	2.56	3.45	0.90
Cameroon	0.88	3.61	2.73	0.46	3.31	2.86
Central African Republic	2.03	4.20	2.17	0.72	2.18	1.46
Chad	0.51	3.10	2.58	0.17	1.47	1.29
Congo Brazzaville	2.75	5.37	2.61	2.57	4.86	2.28
Congo Democratic Republic	3.55	5.95	2.40	2.03	4.35	2.32
Cote d'Ivoire	0.58	2.49	1.91	0.38	1.51	1.13
Djibouti	0.51	2.28	1.77	0.12	0.90	0.78
Egypt	1.82	6.94	5.11	1.00	5.39	4.38
Equatorial Guinea	2.04	3.00	0.96	2.22	2.98	0.76
Eritrea	0.40	2.03	1.64	0.12	1.34	1.22
Ethiopia	0.75	2.31	1.56	0.25	1.58	1.33
Gambia	1.23	2.71	1.48	0.86	2.32	1.46
Ghana	1.21	3.57	2.36	0.81	3.27	2.46
Guinea	0.48	2.13	1.65	0.12	0.91	0.78
Guinea Bissau	1.15	2.14	0.99	0.62	1.74	1.12
Kenya	0.31	4.00	3.69	0.41	4.80	4.39
Lesotho	0.53	1.18	0.66	2.21	3.94	1.73
Liberia	3.30	5.20	1.90	1.38	3.01	1.63
Madagascar	0.99	4.79	3.79	1.07	4.77	3.70
Malawi	1.55	3.00	1.44	0.79	2.42	1.64
Mali	0.32	1.95	1.63	0.17	1.04	0.87
Morocco	0.55	2.46	1.90	0.17	1.74	1.57
Mozambique	1.18	2.52	1.35	0.52	1.80	1.28
Namibia	0.92	2.27	1.34	1.68	4.20	2.52
Niger	0.21	1.70	1.49	0.19	1.12	0.94
Nigeria	1.18	4.40	3.21	0.57	3.34	2.77
Rwanda	1.10	2.27	1.16	1.44	2.84	1.40
Sao Tome & Principe	1.69	2.38	0.69	1.88	2.98	1.10
Senegal	0.20	1.32	1.12	0.20	1.07	0.87
Sierra Leone	0.49	1.84	1.35	0.50	1.81	1.31
Somalia	1.14	2.35	1.21	0.64	1.91	1.27
South Africa	2.08	3.35	1.27	3.46	5.21	1.74
Sudan	0.83	3.21	2.38	0.45	2.80	2.35
Swaziland	0.85	2.00	1.15	2.48	3.88	1.40
Tanzania	2.26	3.71	1.44	2.13	3.73	1.60
Togo	0.70	2.84	2.14	0.56	2.02	1.46
Uganda	1.09	3.33	2.24	0.53	2.49	1.96
Zambia	3.04	4.82	1.78	2.31	4.15	1.84
Zimbabwe	2.32	2.98	0.66	2.57	4.15	1.57
All countries	1.04	3.22	2.18	0.63	2.94	2.31

Table 2: Logistic coefficients of multi-level logistic regression analysis including interactions for children aged 8-11 with being in school as dependent variable

	Model 1			Model 2		
	Girls	All	Boys	Girls	All	Boys
Household-level variables						
Parental education						
Number of years of education father	0,09 **		0,07 **	0,10 **		0,08 **
Number of years of education mother	0,09 **		0,07 **	0,08 **		0,05 **
Demographic characteristics						
Age	1,01 **		1,04 **	1,03 **		1,06 **
Age square		-0,05 **			-0,05 **	
Sex is girl		-0,29 **			-0,30 **	
Mother missing		-0,21 **			-0,23 **	
Father missing		-0,22 **			-0,20 **	
Nuclear family	0,03		-0,02	0,01		-0,04 *
Economic characteristics						
Occupation father; ref. is farm						
Lower non-farm	0,17 **		0,26 **	0,17 **		0,26 **
Upper non-farm		0,25 **			0,27 **	
Mother employed		0,10 **			0,10 **	
Household wealth		0,06 **			0,04 **	
Household wealth square		0,01 **			0,01 **	
Cultural characteristics						
Mother had 1st child under age 18		-0,06 **			-0,10 **	
Age difference parents/caretakers		0,00 **			0,00	
Contextual variables						
Economic indicators						
Average wealth index of the neighborhood		0,24 **			0,23 **	
Perc. of adults in district with a white collar job		0,05			0,05	
District development index		0,33 **		0,34 **		0,40 **
GDP per capita (constant 2000 US$)	2,23 **		2,47 **	2,06 **		2,26 **
GDP square		0,00 **			0,00 **	
Educational indicators						
Av. no. of years of ed. for adults in the neighborhood	0,12 **		0,06 **	0,12 **		0,06 **
Pupil Teacher Rate	-0,06		-0,02	-0,03		0,02
Female teachers	0,37 **		0,30 **	0,39 **		0,33 **
Legal guarantee of free education	0,28 **		0,14	0,33 **		0,18
Total public expenditure on education as % of GNP	0,38 **		0,28 **	0,38 **		0,28 **
Cultural indicators						
Av. age diff. between caretakers in neighborhood		0,00			0,00	
Perc. of mothers in neighborhood with 1st child < 18	0,08 **		0,01	0,08 **		0,01
District ratio men versus women white collar job	-0,01		0,03	0,02		0,04
Seats held by women in national parliament (%)	0,05		-0,02	0,01		-0,03
Ethnic fractionalization	-0,15 *		-0,18 **	-0,17 *		-0,19 **
Corruption index	-0,18 *		-0,22 **	-0,17 *		-0,23 **
N						

**P<0.01; *P<0.05

Control variables: biological child, birth order, number of siblings, living in rural area, percentage of people in district living in rural area, HIV prevalence, survey held during holiday and number of months after beginning school year survey was held

Table 3: Logistic interaction coefficients of multi-level logistic regression analyses for children aged 8-11 with being in school as dependent variable (Model 2 of Table 1 continued)

	Girls		All		Boys	
Number of years of education father						
Demographics						
Age	0,04	**			0,03	**
Mother missing			0,20	**		
Nuclear family			-0,05	**		
Economics						
Occupation father						
Upper non-farm			0,12	**		
Household wealth			-0,01	**		
District development index	0,09	**			0,01	
Education						
Pupil Teacher Rate			0,03	*		
Legal guarantee of free education			0,08	**		
Culture						
Age difference parents/caretakers			0,00	*		
District ratio men versus women white collar job			0,06	**		
Ethnic fractionalization			-0,05	**		
Number of years of education mother						
Demographics						
Father missing	-0,01				0,20	**
Economics						
Household wealth			-0,01	**		
Average wealth index of the neighborhood			-0,03	*		
GDP per capita (constant 2000 US$)			-0,15	**		
Education						
Pupil Teacher Rate			0,06	**		
Female teachers			0,05	**		
Legal guarantee of free education			0,06	*		
Culture						
Mother had 1st child under age 18			-0,07	**		
Seats held by women in national parliament (%)	-0,07	**			-0,04	**

**P<0.01; *P<0.05