PRE-PUBLICATION DRAFT
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Who Gets What?
Is Improved Access to Basic Education Pro-Poor in SSA?

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Abstract

This paper explores changing patterns of access to basic education in six SSA (SSA) countries[1]. The initiatives associated with Education for All (EFA) and international commitments to universalise access to basic education in the Millennium Development Goals have resulted in improvements in enrolment rates in many, but not all, low income countries (UNESCO 2009). More especially EFA should have resulted in increased participation in basic education by children from the poorest quintiles of household expenditure both absolutely and relative to those in wealthier households. It should also have led to reductions in the proportion of over age children enrolled in different primary and lower secondary school grades. Over age enrolment is important since it is widely linked to low levels of achievement, premature drop out, and gendered differences in participation, all of which compromise the universalisation of enrolment of children within the appropriate age group.

Our research uses nationally representative data from two points in time approximately ten years apart. We explore whether participation rates in basic education have improved or deteriorated, the extent to which such changes have had a different impact on children in the poorest and richest households, and the extent to which the proportion of over age children in the school population have changed.

In general the analysis confirms that participation of children in schooling has increased over the last decade. However, access to education remains strongly associated with household wealth. In most countries the differences associated with urban and rural residence and sex are smaller than those associated with household wealth. Over time the wealth gradient related to access has deteriorated in as many countries as it has improved though EFA is explicitly pro-poor.

The reduction in the number of children out of school has in most cases been accompanied by an increase in the proportion of children over age for the grade in which they are enrolled. Poorer children are also generally more likely to be over age. Large numbers – between 20% and 45% - are two or more years over age. In most cases the numbers three or more years over age are greater than those only two years over age. The latter group of children are unlikely to complete a lower secondary cycle, especially if they are girls.

The six countries in his data set have very different patterns of enrolment by grade and rates of progress towards universal enrolment and completion. These differences mean that a single set of policy relevant conclusions will not resonate with each national context. However, the paper does identify eight insights and seven policy options that can be used to inform policy dialogue around EFA.

Keywords: Educational Access, Wealth, Inequality, Over age, Basic Education, Participation, SSA.

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Introduction

Most countries in Sub Saharan Africa (SSA) have announced programmes to universalise primary education since the World Conference on Education for All at Jomtien in 1990. An increasing number have now extended the goal to include a complete cycle of basic education up to grade 9 or more. But growth has been uneven, gains have not always been sustained, very rapid expansion has stressed infrastructure and teacher supply, and there are concerns that the number of over age children may have increased and quality may have deteriorated.

It is important to establish how patterns of enrolment and educational access have been changing. The flow of children from grade 1 to the end of primary should be improving with fewer over age children and less repetition. Girls should progress as much as boys with no difference between the two. The chances of the poorest being enrolled at higher grades should have improved as much or more than those of the richest.

This paper explores patterns of growth in participation in six Anglophone countries in SSA. The countries are Kenya, Malawi, Nigeria, Tanzania, Uganda, and Zambia. These cases were chosen since all have had large scale Universal Primary Education programmes supported with external finance, and all have DHS data sets collected at least ten years apart, first in the 1990s and subsequently after 2000. This data set provides the opportunity to explore participation over a period of a decade or more to see how it has been changing.

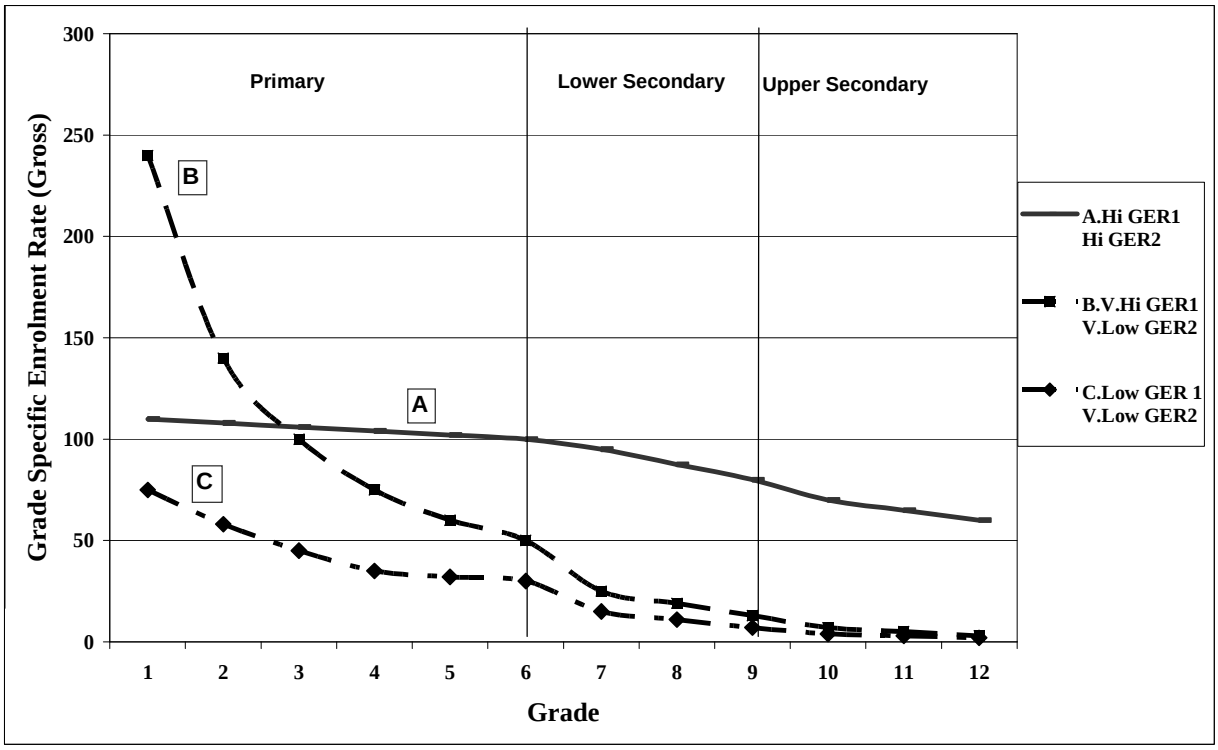
The Evolution of Enrolment Rates

Enrolment patterns in SSA education systems fall into several types (Lewin 2009). A simplified typology is shown in Figure 1 below. In the first case (Type A) the grade specific participation rate – the number enrolled over the number in the nominal age group for the grade - is a little over 100% in grade 1 and falls slowly. These countries mostly have virtually full enrolment with few over age children and little drop out until higher secondary level. In SSA these countries include South Africa, Namibia, Botswana and Mauritius. There are countries with Type A patterns of enrolment that do not have full enrolment. Thus where there are significant numbers of over age children in the system grade specific enrolment rates can be around 100% for each primary grade but substantial numbers remain out of school, at least at higher grade levels. Kenya may be a case in point. Thus, though the grade specific enrolment curve looks the same it is useful to distinguish those cases where there is full enrolment (i.e. little over age and repetition and few drop outs) from those where there is much over age, repetition and drop out. We can label these Type A1 (full enrolment) and Type A2 (over age).

By contrast countries with enrolments like Type B have as many as twice the number of children enrolled in grade 1 as there are in the population. Many are over age and a few are under age. Attrition is sharp and lead to the participation rate falling to around 50% by grade 6 and continuing to fall in higher grades. Many countries with high growth in enrolments after the announcement of universal primary education (UPE) have experienced patterns of enrolment similar to Type B with very high grade specific enrolment rates in grade 1. These countries include Malawi, and Uganda. The third group of countries – Type C - are countries with very low enrolment rates at all levels. In these countries many do not enter grade 1 and most fail to reach grade 6. Many of these countries are in francophone Africa.

It is a reasonable assumption that the investments targeted at universal primary enrolment should result in Type C and Type B systems evolving towards Type A1 systems. It is an open question whether type C systems have to transit through type B.

Figure 1: Simplified typology of enrolment patters in school systems



Source: Based on Lewin 2008

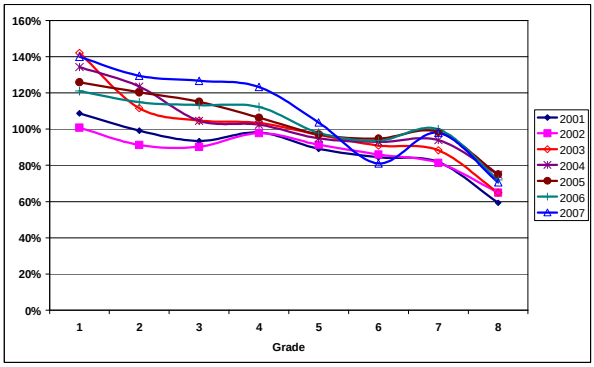
Enrolment data from the six countries can be used to explore how patterns have evolved recently. In the period 2001 to 2007 there are some striking differences. Figure 2 paints a picture of these.

Kenya has an 8:4 school system with eight years of primary and four of secondary. Kenya announced UPE (for at least the third time (Somerset 2007) in 2002. The grade specific gross enrolment rates show several things. First enrolment rates in 2002 in grade 1 to 3 were actually lower than in 2003. This may have been because the anticipation of fee free primary schooling resulted in delayed enrolment by some to benefit from not having to pay fees. Second, in 2003 enrolments in grade 1 rose rapidly to 140% of the age group. This could only occur through a combination of over age enrolment and perhaps some underage enrolment[2]. The over age enrolment is of course consistent with delayed enrolment of some members of the 2002 cohort. The enrolment pattern in 2003 therefore became like type B having previously resembled type A2 (over age). Over the next four year enrolment rates in grades 1-4 stabilised at a new higher level of 100% or more of the school age population. However above grade 5 attrition continued to keep grade specific enrolment rates below 100% with a noticeable dip in grade 8. Grade 8 is the year of the Kenya primary school leaving examination and it may be that some children are retained in grade 7 if schools feel they have little chance of passing (Somerset 2007, Obha 2009).

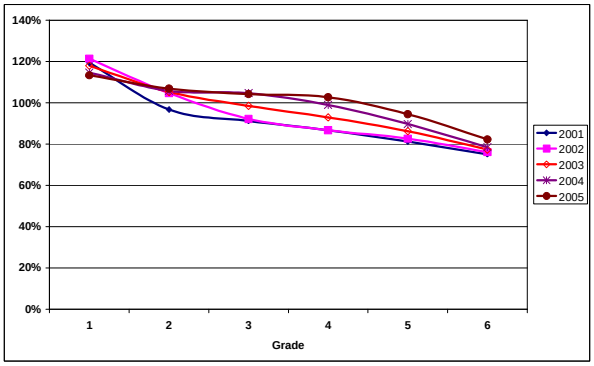
[2] Underage enrolment certainly occurs. Where it does children may spend two or more years in grade 1 and may be placed there as a form of child minding or what some have called warehousing. There is little reliable data on underage enrolment.

Figure 2: Evolution of enrolment rates

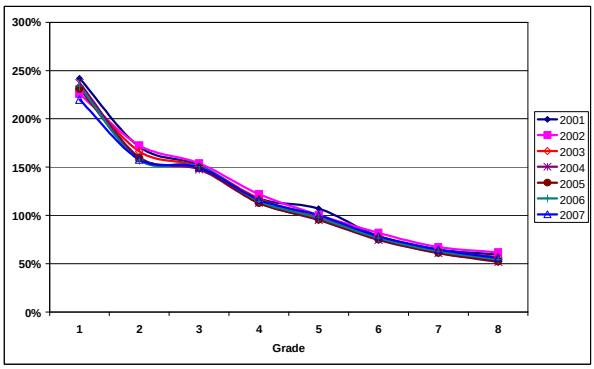
Kenya



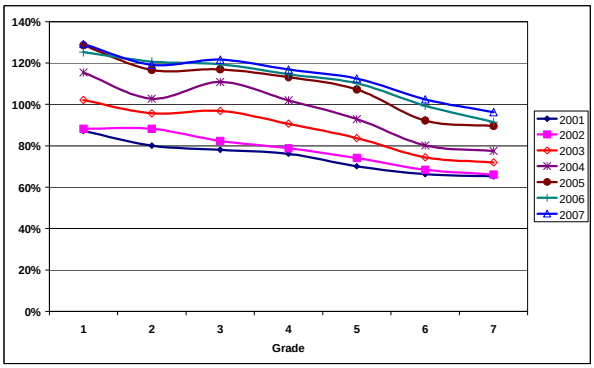
Nigeria



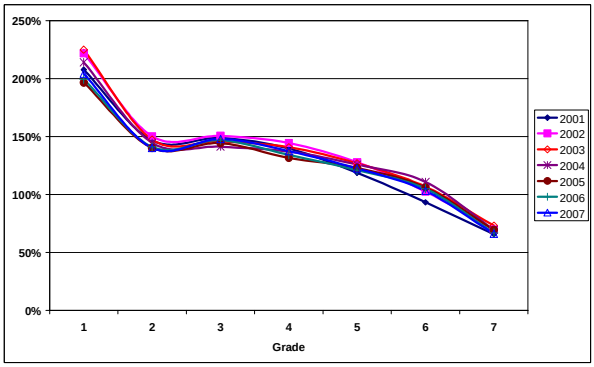
Malawi



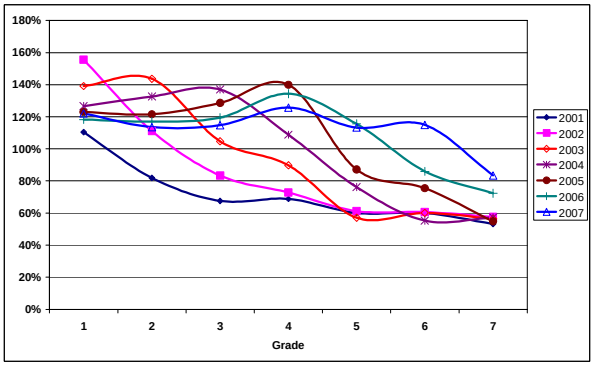
Zambia



Uganda



Tanzania



Malawi has strikingly different patterns of participation. It announced UPE in 1994 after the election of a new government which ended more than three decades of stasis in educational development. In 1995 enrolments in grade 1 increased from about 600,000 to over 1 million and created a typical Type B enrolment pattern. Enrolments in grade 1 at that time were more than six times those in grade 8 at the end of the primary system (Lewin 2009). Figure 2 shows the evolution of enrolment rates since 2001. Strikingly a Type B pattern has persisted. Enrolments in grade 1 have remained year on year about 250% of the number of six year olds. By grade 8 the ratio is below 50% and has not been rising significantly. In 2001 there were 161,000 enrolled in grade 8; in 2007 the number was just 166,000 – a 3% increase over six years which was far less than population growth in the age group. Consistently up to grade 5 there are more children enrolled than there are in the appropriate age group (suggesting that many remain over age). In Malawi EFA programmes have not succeeded in changing the shape of the participation curve, though more are attending in absolute numbers.

Uganda saw UPE announced in 1996. Enrolments in grade 1 increased from about 800,000 to over 2.2 million in one year. This generated a Type B enrolment pattern. In that year grade 1 enrolments were about nine times those in grade 7 at the end of the primary system. Figure 2 shows that the pattern of over age enrolment in grade 1 and high attrition has persisted with little change over the last seven years. There are consistently about twice as many children in grade 1 as there are 6 year olds in the population and participation falls such that by grade 7 enrolments are only 60% of the age group and must still include many who are over age. The output of grade 7 has increased from 2001 to 2007 from about 428,000 to 470,000, an increase of 10% only. Moreover there is clear evidence that queuing is now taking place in grade 6 as schools appear to be holding back children from grade 7, the primary school leaving certificate year, to maximise apparent pass rates. Grade 6 now has more than 90% more children enrolled than take the grade 7 certificate.

Nigeria first introduced its UPE programme in 1976. The Universal Basic Education (UBE) programme was announced in 1999 with nine years of education as the target for full enrolment. Nigeria has a participation pattern which did not change greatly from 2001 to 2005. Enrolment rates in grade 1 are persistently about 120% and in grade 6 about 80%. Some flattening of the enrolment rate curve is noticeable in 2005 suggesting that the numbers over age may be falling and the drop out rate reducing. However, the data for Nigeria is highly aggregated and really needs to be considered at regional and state level since policy on UPE and its implementation differs between states.

Free primary education was announced in Zambia in 2002. Zambia's pattern of enrolment growth is different to the other countries. Enrolments rates in 2001 were about 85% of the age group in grade 1 and 65% in grade 7. From 2003 to 2005 enrolment rates at all grade levels appear to have increased at about the same rate moving the enrolment participation curve upwards without changing its gradient. After 2005 participation rates have reached a plateau. In Zambia the output of the primary system has grown about 58% since 2001, slightly faster than the growth in grade 1 numbers (54%). However the simple ratio of those in grade 6 to those in grade 1 fell from over 70% to 63%.

Enrolments in Tanzania have grown very differently to all the other five cases. Here in 2001 enrolments in grade 1 were a little over 100% of the age group and fell to about 60% in grade 7. The implementation of the latest initiative on UPE (there had been one in the 1970s after the Arusha declaration) commenced from 2002. In 2002 enrolments rose rapidly and consolidated into the Type B pattern. Grade 1 now had 160% of the age group enrolled, whilst grade 7 had the same 60% rate

as the previous year. The striking difference between Tanzania and the other countries in the data set that can be seen in Figure 2 is that the enrolment rate gains in grade 1 were gradually reflected in subsequent grades suggesting that attrition had fallen and that most of those who enrolled persisted to high grade levels. Thus grade 1 enrolments in 2002 can be seen as being sustained into grade 2 in 2003, grade 3 in 2004 and so on.

The evolution of participation rates in Tanzania therefore appears to have followed the pathway that should have been established in the other countries. From a high of grade 1 specific enrolment rate of 140% numbers fell back to stabilise around 120% (suggesting there were still over age children in the system). But the number reaching higher grades began to increase such that in 2007 the grade specific enrolment rates in grades 1 and 7 were both around 120%. Tanzania appears to have succeeded in retaining the expanded UPE cohort that it enrols and evolving towards a Type A2 and then Type A1 system.

Over Age Enrolment

The patterns of enrolment described and analysed above conceal the extent of over age enrolment and the interactions between repetition, promotion and drop out rates that generate the different curves. This paper has a special concern with the evolution of age in grade relationships. There are several reasons for this. First, children who enrol above the normal age of entry will miss learning experiences at a time when they are most receptive to learning basic skills and establishing secure foundations for subsequent cognitive development. Second, those who repeat grade 1 or repeat subsequent grades will become over age for their grade. Several studies suggest that the more over age a child is within a grade the more it is likely that they will underachieve (e.g. SACMEQ, TIMMS). Third, where older children are taught in class groups with younger children there may be psycho-social issues (e.g. of self esteem, bullying, sexual harassment), and problems of matching learning to cognitive capabilities (especially with monograde curricula where all are taught the same things at the same time). Fourth, over age children will be late to arrive at the last grade of primary or junior secondary school. Where the age of initial entry is six or seven, primary school leavers in a six grade system will be 12 or 13. If they are two years over age, they will be 14 or 15. In many societies this approaches the ages of entry to the labour market and/or marriage. Children who are two or more years over age will be in their late teens before reaching the end of junior secondary school making it unlikely most will persist further in formal education.

Data on age in grade enrolment is not widely available and is often not very reliable. Some children and care givers do not know birthdates and registration of births may not be practiced or habitually late. Where there are age limits on participation and repetition children and parents may be economical with the truth to ensure access for older children. Schools may complete school census forms on age in grade with no proper cross checking with children. The issues raised by over age are very important. Data from four of the case study countries is illustrative of some of the issues[3].

Malawi has a pattern of over age enrolment where the spread of ages within a grade increases greatly from grade 1 to grade 8 (see Figure 3). At the same time there is considerable attrition with only a small minority surviving to grade 8. Some children in grade 8 are likely to be 15 or 16 and would thus not complete junior secondary until 19 or 20 years old. Zambia has a similar pattern with less attrition since it has higher grade specific enrolment rates in the higher grades. Children in grade 7 appear to be between 11 and 17 years old.

[3] Age in grade in Nigeria varies widely across the Federal States. A national pattern has levels of aggregation that conceal wide ranges in many places.

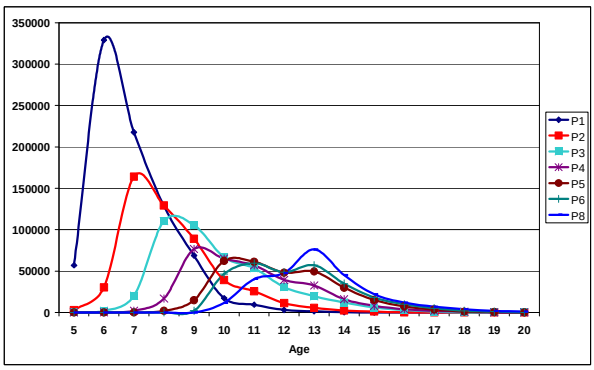
In Kenya a somewhat different pattern prevails with age in grade widening from grade 4 and above. This may be the result of repetition and years lost with school transfers. By grade 8 children are between the ages of 12 and 18 years old.

The pattern in Tanzania shows a dramatic change in the lower grades. In these most children are within a year of the nominal age for their grade. Above grade 3 (2004 data) there is a wider dispersion of ages in grade reflecting a previous pattern similar to that in Zambia. It remains to be seen if the age in grade relationships have now been regularised in Tanzania and will work through to grade 7 and beyond.

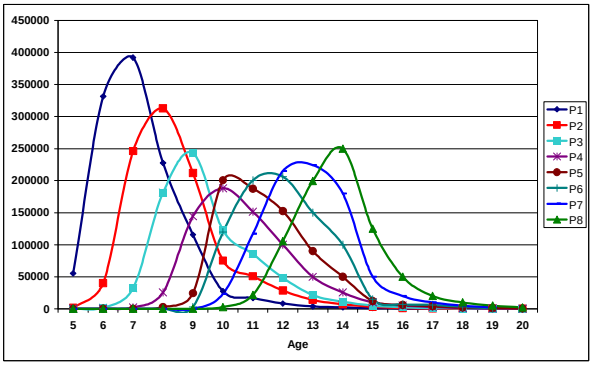
Thus it is important to regularise the age in grade relationships for the reasons given above. If age in grade remains wide it is inevitable that most will not complete primary and junior secondary. All countries which succeed in universalising enrolment and completion of primary and junior secondary have low dispersions of age in grade.

Figure 3: Age-in-grade distributions

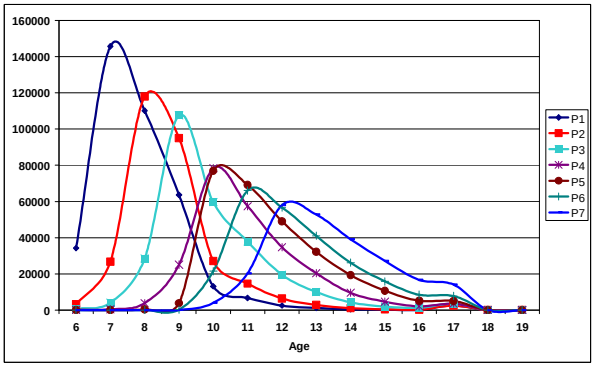
Malawi



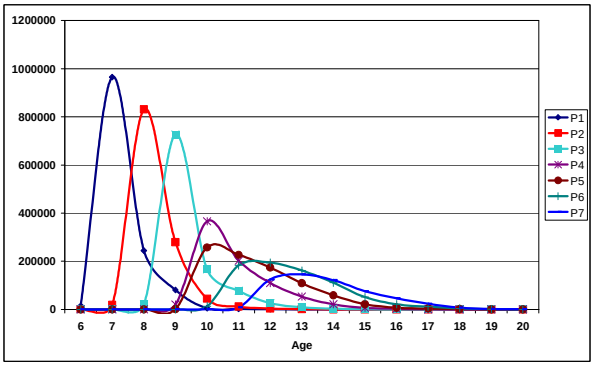
Kenya



Zambia



Tanzania



Data and Samples

Data for this paper come from two rounds of Demographic Health Surveys (DHS) in six African countries (Kenya, Malawi, Nigeria, Tanzania, Uganda, and Zambia). One of the DHS surveys for these countries took place in the early nineties (1990 for Nigeria; 1992 for Malawi; 1993 for Kenya; 1995 for Uganda; 1996 for Tanzania and Zambia). The others took place between 2003 and 2007 (2003 for Kenya and Nigeria; 2004 for Malawi; 2006 for Uganda; 2007 for Tanzania and Zambia). There is therefore at least a 10 year gap between these rounds of data collection allowing for comparison over time.

All these DHS surveys are intended to be nationally representative, with the exception of Kenya. The 1993 Kenya DHS excluded all districts in the North Eastern Province and four districts in other provinces (Samburu and Turkana in Rift Valley Province, and Isiolo, and Marsabit in Eastern Province). In order to make the 1993 sample as comparable as possible to the 2003, we omitted the North Eastern Province from the 2003 survey. However, since the 2003 survey does not contain a variable to identify district of residence, it was impossible to drop individuals from the four districts who were not included in the 1993 survey. In all countries, two-stage sample selection procedures are followed and appropriate weights are derived, which we use in our empirical analyses.

In some countries, we had to make adjustment to the areas selected from the DHS. This is because geographical boundaries changed between surveys, so we adjust the regional variables to make these comparable across time. In Nigeria, for example, we aggregated state level indicators provided in 2004 to obtain regions comparable to the ones in 1990 (Northeast, Northwest, Southeast and Southwest).[4] In Tanzania, homogenous regions were selected according to the 1996 geographical limits (Central, Northern, Eastern, Dar Es Salaam, Southern, Southern Highlands, Western, Lake and Zanzibar). In Uganda, regions in 2006 were aggregated to match geographical regions in 1995 (Central, Eastern, Northern and Western).

For each of the DHS, we selected children from the age of 6 or 7 years, depending on the official age at which compulsory schooling starts, to age 15 (see Table 1). The compulsory schooling age is 6 years for all countries except for Tanzania and Zambia, where the compulsory schooling age is 7 years. The rationale behind our sample selection is as follows: children aged 6/7 to 15 in the early nineties experienced schooling before the initiatives arising from the World Conference on Education for All in 1990 had time to have much effect. For these children, DHS contains information about their schooling, their parents' education, household expenditure and other demographic characteristics. Children of the same age group in the same countries have been selected from DHS samples at least a decade later to explore how access to education has changed. In the mid 2000s the impact of the Education for All initiatives that followed the World Conference at Jomtien (1990) and the Global Forum at Dakar (2000) should be evident. The time lapse between samples varies from 10 years to 13 years with a mean of 11.3 years. The data is cross sectional since the two cohorts of children are different individuals. However, since both are national samples using the same methods the assumption that they are comparable is reasonable.

[4] All regions in 1999 and 2003 can be matched to the 4 main regions in 1990 except for the state of Kogi, which did not exist in 1990. In 1991, parts of the states of Kwara in the northwest and of Benue in the southeast were divided to form Kogi. For this report, all individuals in Kogi are included as part of the northwest region.

Table 1: Sample size from DHS, children aged 6/7 to 15.

Country	Year	Boys	Girls
Kenya	1993	6,047	6,287
	2003	5,323	5,019
Malawi	1992	3,678	3,828
	2004	8,940	9,011
Nigeria	1990	7,359	7,139
	2003	4,744	4,625
Tanzania(*)	1996	5,000	4,849
	2007	5,626	5,660
Uganda	1995	5,054	5,283
	2006	7,268	7,343
Zambia(*)	1996	4,962	4,982
	2007	4,619	4,786

(*) Compulsory age for starting schooling is 7 years.

Variables

Access to education: Our outcome variable is a proxy for access to education. The DHS data allows us to classify children in four categories: (i) children who have never been to school and children who have dropped out from school at the time of the survey; (ii) children in school but who were over age for the grade they were enrolled by three or more years; (iii) children in school but over age for the grade they were enrolled by two years; and finally (iv) children who were in school at the appropriate age-in-grade.[5]

To identify children who have never been to school or have dropped out we used the questions "*has the child ever been to school?*" and "*is the child still in school?*". Since there are large differences in normal development through stages of cognition during childhood, over age was defined by children who were two years older than their appropriate age-in-grade as well as children who were 3 years older or more than their appropriate age-in-grade[6]. For example, in Kenya, where the official age of entry into school is 6, children aged 8 enrolled in primary 1 were considered over age. Children aged 9 and above were also considered over age, but we treat them as a separate group for analytical purposes as being three or more (3+) years over age. In Tanzania, where the official age of entry into school is 7, children aged 9 enrolled in primary 1 were considered over age by two years and children aged 10 and above were considered over age by three or more years.

Table 2 shows the proportion of 6/7 to 15 year old children not in education, over age enrolment by three or more years, over age enrolment by two years and appropriate age-in-grade in each of the countries, by gender, over the 10 year period. The proportion of children not in education decreased over this period in all countries. However, this reduction was accompanied by an increase of over

[5] Unfortunately, it was impossible to separate children who dropped out from those who have never attended school for some datasets. Although a question on whether the person has ever attended school is available from the questionnaires, it is not always available in the datasets provided by the DHS archive. If we were able to access this information, we could generate a more meaningful indicator of access to schooling, where we differentiate between children who have never been to school, those who have been to school but dropped out, those in school but not in age-in-grade, and those in school at appropriate age-in-grade.

[6] The data set only yields age in terms of whole years. Depending on the time of the year the survey was conducted some who enter at e.g. age 6 years, will turn 7 years old. It is therefore better to think of the category two years over age as "between 1.5 and 2.5 years over age", and for those over age by three years as "by 2.5 years".

age enrolment in schools in most countries, except in Tanzania and, on the margin, in Zambia. In Tanzania it appears that the numbers out of school fell dramatically as did the numbers who were over age. Here the announcement of free universal primary education in 2001 and its implementation in 2002, is likely to be the main reason. With a rapid rise in enrolment rates, and automatic promotion, over age enrolment had to fall as the system expanded. In Zambia enrolment rate growth has been slower and the proportion over age has not changed much.

Table 2: Proportion of 6/7 to 15 year old childrenby educational status, by country, gender and year.

		Early 1990		Early 2000	
		Male	Female	Male	Female
Kenya	Not in school	21%	22%	13%	16%
	Over age 3+	26%	21%	30%	23%
	Over age 2	18%	18%	19%	18%
	In school	34%	39%	37%	43%
Malawi	Not in school	32%	34%	20%	18%
	Over age 3+	26%	23%	30%	28%
	Over age 2	11%	12%	15%	15%
	In school	30%	31%	35%	39%
Nigeria	Not in school	37%	44%	26%	33%
	Over age 3+	12%	10%	17%	15%
	Over age 2	8%	7%	11%	10%
	In school	42%	39%	45%	42%
Tanzania(*)	Not in school	46%	44%	22%	17%
	Over age 3+	25%	21%	12%	8%
	Over age 2	12%	14%	15%	13%
	In school	16%	21%	51%	61%
Uganda	Not in school	27%	32%	13%	14%
	Over age 3+	31%	23%	36%	33%
	Over age 2	14%	13%	18%	18%
	In school	29%	31%	32%	34%
Zambia(*)	Not in school	34%	35%	19%	19%
	Over age 3+	15%	10%	14%	12%
	Over age 2	13%	13%	14%	13%
	In school	38%	42%	53%	56%

Source: DHS. Notes: (*) In Tanzania and Zambia children aged 7 to 15 were selected.

Household Wealth: A major concern of this paper is to explore relationships between indicators of access to basic education and equity in terms of household wealth. To address this issue, we focus on progress made by children living in poor households compared with children living in rich households. In order to generate an indicator of poverty we use household wealth as derived from information about the characteristics of the household dwelling and ownership of various assets.

Filmer and Pritchett (1999, 2001) suggest using information from more than twenty of these assets variables and principal component analysis to obtain a total score which represents the wealth index for each household. Filmer and Pritchett have shown that the index is a good proxy for long-run wealth and it can be compared both over time and across countries.[7]

Other variables: We use several variables in the analysis among which we include family characteristics and regional controls. Family characteristics are defined by the gender, age and education of the head of the household. The latter uses information about the highest educational grade achieved which is translated into years of schooling. Other household level controls included are household size, the number of children under the age of 5 living in the household, and the structure of the household, which is defined by the number of adults living in the household. Regional controls include indicators for urban and rural areas as well as specific regional indicators from each country, which were explained above.

Estimation Method

In order to investigate changing patterns of access to education we use a multinomial probit model. This estimation technique is useful for understanding which factors increase (or decrease) the probability of being in one specific category of access to schooling. The multinomial probit model is the generalization of the probit model when there are more than two alternatives for the outcome variable and when this variable has an unordered structure (see Greene, 2008, for a detailed description of this estimation method). In particular, we estimate the likelihood of being in one of the four categories for access to education. When using multinomial probit regression, one category of the dependent variable is chosen as the comparison category. In our case, we omit the category in school at an appropriate age-in-grade. Therefore, all estimated coefficients are interpreted as the association of the explanatory variable on the likelihood that the individuals are in a given category for access to education (not in school, over age by three or more years, over age by two years) instead of in the reference category (age-in-grade appropriate).

The multinomial probit model is derived by assuming that the errors in the discrete choice model are normally distributed. A significant advantage of the multinomial probit model is that the errors can be correlated across choices, which eliminates the assumption of the independence of irrelevant alternatives that imposes the multinomial logit model (Long, 1997). Although the estimation of parameters for the multinomial probit model is computationally complex, it is feasible in our case as we only have four possible alternatives for educational access (Wooldridge, 2002). As in other non-linear models, estimation of the parameters is enough to know the direction of the association between our explanatory variables and access to schooling. But in order to estimate the magnitude of the impact, we had to compute marginal effects, partial changes or predicted probabilities.

The marginal effect for continuous explanatory variables is computed by taking the partial derivative of the probability that the child is in a particular outcome for educational access with respect to each of the explanatory variables, holding other variables constant. For discrete variables, the alternative to the marginal effect is to compute the change in the probability for a discrete change in the explanatory variable. It is important to highlight that the partial change does not equal the marginal effect and only under certain assumptions will these measures be close. Similarly, the derivation of the marginal effect and partial change depends on the value of the other variables, so for example if we are estimating the change in the probability of access to education for boys relative to girls, we need to hold all other variables constant.

[7] All wealth indices were available in the data.

Another way to interpret our results is to estimate the predicted probabilities. The predicted probability is obtained by evaluating the probability that each child will have of falling into each of the categories using the estimated parameters of the model. In our case, predicted probabilities are useful as we can estimate the predicted probability for a combination of variables, in particular wealth, gender and region and the changes of these variables over time, and hold the rest of the variables constant.

Hypothesis

The changes in educational access over time can be linked to some of the key variables, in particular household wealth, gender of children and location. The estimated parameter for time captures the average change in access over the time period. The estimated parameter for the variable household wealth (gender and location), captures average differences in access between households of different wealth groups (or between boys and girls or rural and urban locations). The interaction between time and each of these variables captures progress in educational access for different wealth groups, boys and girls, and in rural and urban areas.

Using an hypothesis of proportional changes in access to education, we expect that the coefficients for these interactions will be statistically insignificant. In other words, access to education for all groups is assumed to change at the same rate over the time period. If there are increasing inequalities in access to education, the sign of the coefficient for the interactions will be the same as the sign of the initial gap and it will be statistically significant. For example, girls could have worse access to schooling than boys initially and in 10 years their access could deteriorate further. Conversely, if there are decreasing inequalities, the sign of the coefficients for the interactions will be opposite to the sign of the coefficient for initial gap and it will be statistically significant. In the example above, girls could have worse access to education than boys initially, but over time they would have been closing the gap.

Results

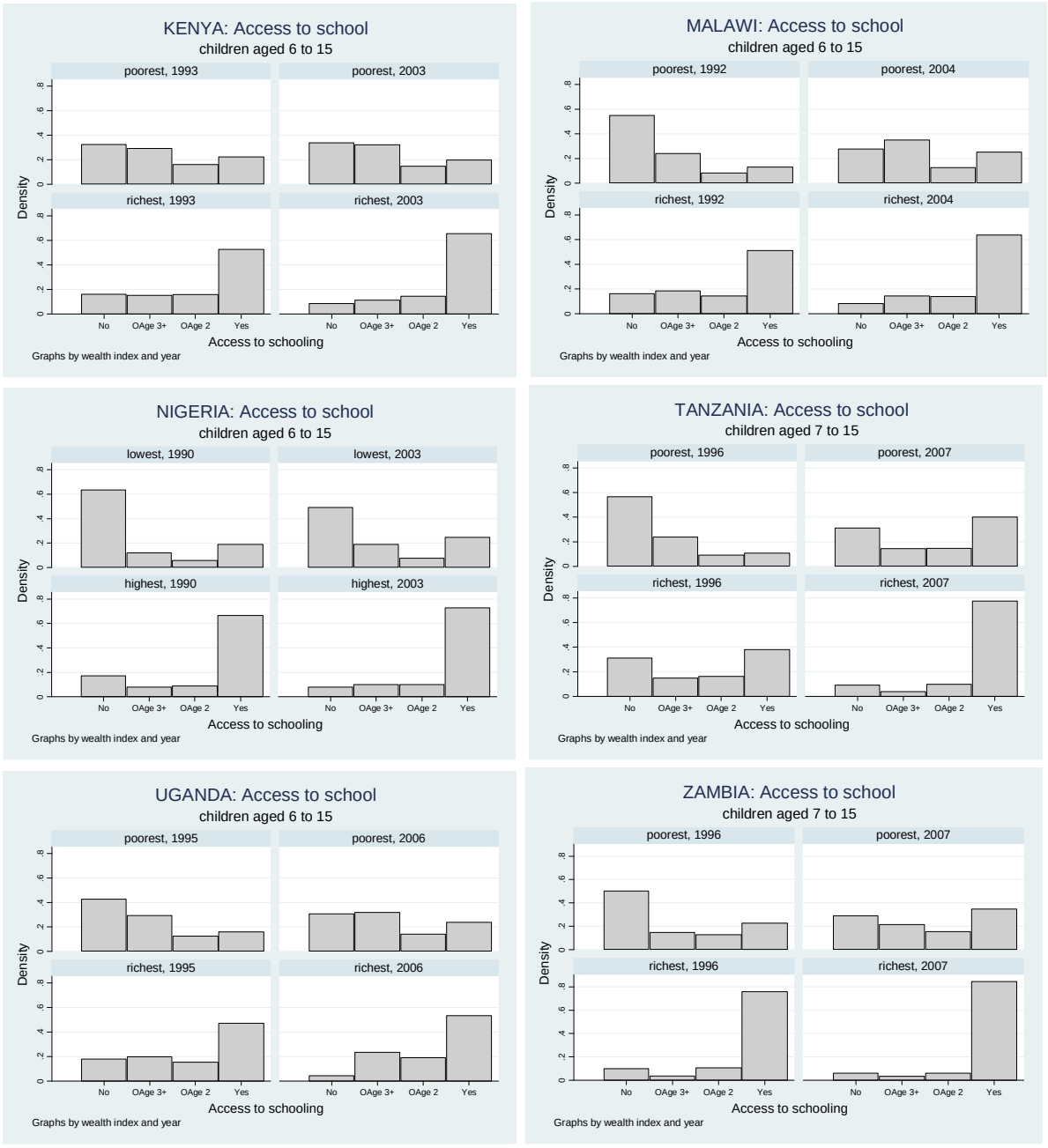
Unconditional differences in access to schooling over time between richest and poorest children

Figure 4 shows the unconditional average differences in access to education in six African countries. These estimations are based on children from the lowest 20^{th} and top 20^{th} percentiles of the wealth distribution and access is calculated as the proportion of children, poorest and richest, in each of the four categories for enrolment status for each of the two years. Conditional averages, based on estimates from the multinominal probit model, which takes other variables into account, are presented later.

In each year, a higher proportion of children living in the poorest households do not have access to school compared with children living in the richest households. This comes as no surprise as this result has been previously shown by other empirical research (Behrman, 1987; Filmer and Pritchett, 1999). Over time, there appear to be an important downward shift in the proportion of children from the poorest households not in schooling in Malawi, Nigeria, Tanzania, Uganda and Zambia. For example, in Malawi, the proportion of children from the poorest households not in schooling dropped from 54 per cent in 1992 to 27 per cent in 2004.

In contrast, the proportion of children from the poorest households out of schooling has remained almost unchanged in Kenya, although this country had higher enrolment rates for these children in the early 1990s. For instance, the proportion of children from the poorest households out of school in Kenya was 32 per cent in 1993 and 34 per cent in 2003.

Figure 4: Access to education over time, children living in richest 20th percentile and poorest 20th percentile of the wealth distribution only.



Countries differ in the overall level of their enrolment rates. The higher these are the less scope there is likely to be for improved access and conversely the lower these are the greater the scope for gains in access. This analysis is concerned with relative changes in access to schooling. These relative changes are measured in terms of wealth, and whether the gap between the rich and the poor has widened or narrowed over time within a country. In Uganda, for instance, 43 per cent of children from the poorest households were not in school in 1995 and only 18 per cent of children

from the richest households were not in school. Therefore, children from the poorest households had more than twice the probability of being out of school relative to children from the richest households in 1995. By 2006, the situation had improved in different magnitudes, as the proportion of children from the poorest households not in school decreased to 30 per cent and the proportion of children from the richest households decreased to 4 percent (as shown in Figure 4). The likelihood of children from the poorest households being out of school relative to children from the richest households was more than 7 times higher in 2006. The statistical significance of this pattern for Uganda, and for the rest of the countries, is tested below.

Conditional differences in access to schooling by wealth, gender and place of residence

We decided to divide these results into changes in access to education according to wealth, gender and region due to the complex nature of describing results obtained by the multinomial probit model. Country specific results for each of these main factors are described below. All estimations control for all confounding variables described above.

Progress in access to schooling over a decade by wealth groups

Table 3 shows results from the estimated parameters using the multinomial probit model on the four different outcomes of access to education. This table shows estimated parameters and results are interpreted against the base category, which is in school at age-in-grade appropriate. The first four variables indicate wealth quintiles for households, from the poorest 20^{th} percentile of the wealth distribution to the richest 20^{th} percentile. The richest quintile is used as comparison group. The parameter associated with these variables measures the relative difference in the likelihood of accessing school between the children of the richest households and poorer children. The next variable is time, which captures average changes in the likelihood of accessing school over time. Finally, the next set of variables are the interactions between time and wealth, which capture average differences in the likelihood of accessing schooling over time by wealth groups. Estimated parameters for these last set of variables are the main focus of this analysis.

For each country, the first column reports the association of the explanatory variable and the probability of not accessing schooling relative to the probability of accessing schooling (age appropriate). The second column reports the association of the explanatory variable and the probability of being in school, over age by three of more years, relative to the probability of accessing school (age appropriate). Finally, the last column reports the association of the explanatory variable and the probability of being in school, over age by two years, relative to the probability of accessing school (age appropriate).

These results are interpreted as follows: In Kenya, those living in the poorest households have a higher probability of being out of school relative to being in school at age-in-grade appropriate compared to children living in the richest households (first estimated parameter 0.98). Also compared to the richest children, children in the poorest households are more likely to be over age by three or more years or by two years relative to being in school at age-in-grade appropriate (estimated parameters 0.87 and 0.60 for over age by three or more years or by two years, respectively). All these results are statistically significant at 1 per cent level.

Table 3: Parameter estimates [standard errors] for access to education by wealth, over time, in six SSA countries

	Kenya			Malawi			Nigeria			Tanzania			Uganda			Zambia		
	Out Sch.	OAge3+	OAge2	Out Sch.	OAge3+	OAge2	Out Sch.	OAge3+	OAge2	Out Sch.	OAge3+	OAge2	Out Sch.	OAge3+	OAge2	Out Sch.	OAge3+	OAge2
Comparison category (richest group)																		
Poorest quintile	0.985***	0.868***	0.597***	1.391***	0.621***	0.226**	1.109***	0.700***	0.392***	1.070***	0.953***	0.329***	1.037***	0.725***	0.398***	1.655***	1.181***	0.882***
0-20th pctile	[0.081]	[0.081]	[0.082]	[0.129]	[0.115]	[0.112]	[0.145]	[0.125]	[0.132]	[0.126]	[0.139]	[0.126]	[0.089]	[0.088]	[0.097]	[0.145]	[0.158]	[0.131]
Poorer	0.550***	0.603***	0.417***	1.058***	0.507***	0.113	0.935***	0.552***	0.315***	0.922***	0.960***	0.466***	0.920***	0.630***	0.242***	1.416***	1.164***	0.848***
20-40th pctile	[0.079]	[0.078]	[0.079]	[0.122]	[0.129]	[0.112]	[0.125]	[0.111]	[0.115]	[0.116]	[0.132]	[0.120]	[0.082]	[0.081]	[0.089]	[0.135]	[0.151]	[0.119]
Middle	0.392***	0.542***	0.454***	0.886***	0.551***	0.277**	0.758***	0.591***	0.316***	0.887***	0.975***	0.498***	0.706***	0.577***	0.334***	1.205***	0.979***	0.666***
40-60th pctile	[0.077]	[0.076]	[0.074]	[0.117]	[0.109]	[0.117]	[0.114]	[0.109]	[0.103]	[0.119]	[0.127]	[0.112]	[0.080]	[0.078]	[0.086]	[0.129]	[0.144]	[0.110]
Richer	0.103	0.285***	0.340***	0.536***	0.401***	0.08	0.384***	0.298***	0.187**	0.625***	0.698***	0.396***	0.442***	0.395***	0.142*	0.811***	0.579***	0.386***
60-80th pctile	[0.078]	[0.078]	[0.075]	[0.094]	[0.108]	[0.096]	[0.101]	[0.088]	[0.093]	[0.099]	[0.123]	[0.105]	[0.077]	[0.075]	[0.084]	[0.104]	[0.130]	[0.097]
Year	-0.782***	-0.084	-0.127	-0.660***	-0.485***	-0.221**	-1.390***	0.018	-0.09	-1.551***	-1.793***	-1.173***	-1.435***	-0.387***	-0.158*	-0.477***	-0.282*	-0.454***
	[0.110]	[0.105]	[0.102]	[0.155]	[0.125]	[0.104]	[0.177]	[0.149]	[0.130]	[0.123]	[0.139]	[0.111]	[0.107]	[0.087]	[0.091]	[0.127]	[0.157]	[0.125]
Poorest*Year	0.136	0.240*	0.024	-0.304*	0.463***	0.294**	0.506**	0.392**	0.222	0.19	0.526***	0.614***	0.080	-0.066	-0.113	-0.429**	0.316	0.365**
	[0.145]	[0.137]	[0.130]	[0.164]	[0.136]	[0.129]	[0.240]	[0.191]	[0.188]	[0.171]	[0.198]	[0.166]	[0.128]	[0.113]	[0.124]	[0.204]	[0.217]	[0.183]
Poorer*Year	-0.096	0.225*	0.128	-0.144	0.430***	0.405***	0.529***	0.455**	0.354**	-0.004	0.14	0.297*	-0.219*	-0.043	0.025	-0.351*	0.012	0.286
	[0.147]	[0.134]	[0.125]	[0.157]	[0.147]	[0.131]	[0.201]	[0.181]	[0.165]	[0.164]	[0.188]	[0.151]	[0.122]	[0.104]	[0.114]	[0.194]	[0.206]	[0.178]
Middle*Year	0.017	0.266**	0.096	-0.177	0.254**	0.243*	0.268	0.013	0.134	-0.257	-0.002	0.203	-0.053	0.078	-0.023	-0.338*	0.085	0.395**
	[0.146]	[0.132]	[0.122]	[0.151]	[0.126]	[0.132]	[0.208]	[0.156]	[0.158]	[0.165]	[0.184]	[0.145]	[0.120]	[0.100]	[0.110]	[0.178]	[0.195]	[0.166]
Richer*Year	0.048	0.208	0.021	-0.017	0.256**	0.339***	0.185	0.284*	0.373**	-0.341**	-0.015	-0.057	-0.111	-0.006	0.083	-0.123	0.156	0.392**
	[0.143]	[0.130]	[0.119]	[0.137]	[0.127]	[0.117]	[0.175]	[0.146]	[0.146]	[0.145]	[0.180]	[0.139]	[0.118]	[0.096]	[0.105]	[0.155]	[0.180]	[0.162]

Source: DHS. Notes: Asterisks *, **, ***, represents statistical significance at 10, 5 and 1% level, respectively. All estimations control for region, gender, rural areas and household characteristics. Estimations weighted and adjusted for survey design. Comparison outcome: In school at appropriate age-in-grade.

In all countries, children living in the poorest households continue to experience a greater likelihood of not being in school relative to children from the richest households. In addition, in all countries except in Kenya, we found that the poorer the family, the higher the value for the estimated parameter measuring the likelihood that the child would not be in school. These parameters are statistically significant for all wealth quintiles. In Kenya, children living in families whose wealth falls into the 60^{th} to the 80^{th} percentile of the wealth distribution do not differ in their likelihood of not accessing school from children from the top 20^{th} percentile richest households (estimated parameter 0.103, not statistically significant). The kind of school they are enrolled in undoubtedly does differ but that is a subject others have explored (Somerset (forthcoming). But poorer children do differ in their likelihood of not accessing schooling relative to children living in the richest households.

Turning now to the likelihood of being over age and in school by three or more years, we found, again, that in all countries the poorest children are more likely to fall into this category than the richest children. This result holds across the whole wealth distribution, since we found that, compared with the richest children, children living in households with less wealth are more likely to experience over age in schooling by three or more years. To a lesser extent, we also found that children from the poorest households are more likely to be over age in school by two years relative to the wealthiest children. This result holds for most wealth groups when compared with children living in the richest families. However, children from the richer households (that is from the 60^{th} to the 80^{th} percentile of the wealth distribution) are not more likely to be in school over age by two years relative to children from the richest households in Malawi.

The interesting parameters to analyse are the interactions between wealth and time, which indicate whether there have been changes over time in access to schooling according to household wealth. In Nigeria, access to school has deteriorated for children of the poorest families compared to children of the richest families over the 10 year period of analysis. We found that children living in the poorest households had lower likelihood of access to school (estimated parameter 1.09), but this situation worsened over time (estimated parameter of interaction poorest-year 0.51). This result holds also for children in the lowest two quintiles (20^{th} to 40^{th} percentiles), where we found the likelihood of not having access to schooling relative to the richest children (estimated parameter 0.93) is increasing over time (estimated parameter of interaction poorer-year 0.53).

In contrast, children of the poorest households in Malawi and Zambia have seen an improvement with respect to their access to schooling relative to children of the richest households. In Malawi, the average difference between the poorest and the richest children in their likelihood of not accessing school (estimated parameter 1.39) decreased from 1992 to 2004 (estimated parameter of interaction poorest-time -0.30). In Zambia, the likelihood of not accessing schooling for the poorest children relative to the richest children (estimated parameter 1.65) decreased from 1996 to 2007 (estimated parameter of interaction poorest-time (-0.43). The wealth gap was also reduced for children in the 20^{th} to 40^{th} percentile and in the 40^{th} to 60^{th} percentile relative to children living in the richest households. For children in the 20^{th} to 40^{th} percentile of the wealth distribution, the initial difference in the likelihood of not accessing school (estimated parameter 1.42) decreased from 1996 to 2007 (estimated parameter of interaction poorer-time -0.35). And for children in the 40^{th} to 60^{th} percentile, the initial estimated difference in their likelihood of not accessing school relative to the richest children (estimate parameter 1.20) decreased over the decade (estimated interaction between middle-time -0.34).

The improvement in Malawi and Zambia for the poorest children was, however, accompanied by an increase in the likelihood of being over age in school. In Malawi, compared with children living in the richest households, the rest of the children were more likely to be over age in school by three or more years or by two years in 2004 than in 1992. In other words, all the interactions between the variable wealth and time were statistically significant and with the same sign as the initial difference in the likelihood of being over age in school. Interestingly, this was not the case in Zambia, were the main finding is with respect to a higher likelihood of over age by two years. Here, we found that three out of the four interactions between wealth and time to be statistically significant and the sign of these interactions indicated that the situation has worsened over time.

Additionally, we found increasing differences in over age by three or more years according to wealth in Kenya, but not by being over age by two or more years. Relative to children living in the richest households, children from the poorest to the 60^{th} percentile of the wealth distribution were more likely to be over age by three or more years in 2003 than they were in 1993. In Nigeria, we found that the problem of over age also increased over time. However, not all wealth groups were affected. The poorest children had an increasing likelihood of being over age by three or more years relative to the richest children over one decade (estimated interaction poorest-year 0.39) but the situation with respect to over age by two years had not changed over time (estimated interaction was not statistically different than zero). In Tanzania, only the poorest children were affected in their likelihood of being over age in schooling, either by three or more years or by two years, relative to the richest children (estimated parameter of interaction poorest-year 0.53 for over age by three or more years and 0.61 for over age by two years). Finally, in Uganda, the only interaction that was found to be statistically significant at 10 per cent level was for children in the 20^{th} to 40^{th} percentile relative to children living in the richest households. For children in the 20^{th} to 40^{th} percentile of the wealth distribution, the initial difference in the likelihood of not accessing school (estimated parameter 0.92) decreased from 1995 to 2006 (estimated parameter of interaction poorer-time -0.22).

Progress in access to schooling over a decade by gender and in rural areas

We now turn to progress in access to schooling for boys and girls and in urban and rural areas. Table 4 shows results for girls (compared with boys) and for rural areas (compared with urban areas). Interpretation of the estimated parameters in this table is the same as for wealth groups explained above.

Our first key result is that we found a decreasing gap in access to schooling for girls over time in Malawi and Uganda. In these countries, the interaction between gender and time, for the likelihood of not having access to education, has decreased. In particular, in Uganda, in 1995 girls were more likely to be out of school relative to boys (estimated parameter 0.14). By 2006 however, the gap had reduced (estimated interaction girls-year -0.13). In Malawi, the gender gap in lack of access to schooling has also decreased and by 2004, girls were less likely than boy to be out of school.

We further found that girls are, on average, less likely to be over age by three or more years in all countries except for Nigeria. In Nigeria, boys and girls are equally likely to be over age by three or more years in schooling. In Zambia, girls were less likely to be over age by three or more years in the 1990s but this difference decreased over time (estimated parameter for

interaction gender-year 0.15). In the other countries the changes over time with respect to likelihood of being over age by three or more years in school by gender were not significant.

In Kenya, Tanzania and to a lesser extent in Zambia, the data indicate that girls are less likely to be over age by two years in school than boys. It is only in Tanzania this situation has changed over time with girls being even less likely than boys to be over age in school by two years (estimated interaction between girls-year -0.18). In the other countries, girls and boys were equally likely to be over age by two years. This situation has not changed during the last decade.

Children living in rural areas continue to have a higher likelihood of being over age in school by three or more years than those in urban areas. We found this in all countries except in Kenya, where children living in rural areas are no different than children living in urban areas according to their likelihood of being over age in school by three or more years. Over time, this situation has improved in Nigeria (the estimated parameter for interaction rural-year is -0.36). In contrast, the situation of over age children in school who live in rural areas has deteriorated in Uganda (estimated parameter for interaction rural-year 0.27).

In Malawi and Uganda, children living in rural areas were more likely to be over age in school by two years. In Uganda, this situation has also deteriorated in the last decade, with the estimated interaction between rural areas and time being statistically significant (0.22). In the rest of the countries, we did not find area differences in the likelihood of being over age in school by two years, nor did we found that there are changes over time with respect to this issue.

Finally, we did not find that children living in rural areas are less likely to be out of school compared with children living in urban areas in Nigeria, Tanzania or Zambia. In Uganda and Kenya, we found that children living in rural areas were less likely to be out of school (estimated parameter -0.18 for Uganda and -0.18 for Kenya) but only in Uganda, this situation has deteriorated over time (estimated parameter for interaction rural-year 0.54). In Malawi, children living in rural areas were more likely not to be in school compared with children living in urban areas. This situation has remained unchanged over time.

Table 4: Parameter estimates [standard errors] for access to education by gender and area, over time, in six SSA countries

	Kenya			Malawi			Nigeria			Tanzania			Uganda			Zambia		
	Out Sch.	OAge3+	OAge2	Out Sch.	OAge3+	OAge2	Out Sch.	OAge3+	OAge2	Out Sch.	OAge3+	OAge2	Out Sch.	OAge3+	OAge2	Out Sch.	OAge3+	OAge2
Girls	-0.052	-0.270***	-0.118***	-0.004	-0.101*	-0.022	0.332***	0.018	-0.059	-0.228***	-0.341***	-0.116**	0.145***	-0.171***	-0.045	-0.038	-0.312***	-0.093*
	[0.042]	[0.041]	[0.043]	[0.054]	[0.056]	[0.062]	[0.051]	[0.051]	[0.055]	[0.048]	[0.050]	[0.056]	[0.046]	[0.046]	[0.051]	[0.042]	[0.050]	[0.049]
Girls*Year	0.019	-0.020	-0.050	-0.171***	-0.031	-0.037	0.059	0.080	0.074	-0.070	-0.017	-0.185**	-0.132**	0.068	0.004	0.024	0.155**	-0.004
	[0.069]	[0.061]	[0.063]	[0.066]	[0.066]	[0.072]	[0.075]	[0.081]	[0.080]	[0.070]	[0.075]	[0.077]	[0.063]	[0.058]	[0.064]	[0.068]	[0.074]	[0.070]
Rural	-0.182**	0.045	-0.126	0.251**	0.508***	0.302***	0.115	0.241**	0.070	0.162	0.245**	0.077	-0.185***	0.317***	0.264***	-0.042	0.314***	0.046
	[0.091]	[0.090]	[0.091]	[0.110]	[0.101]	[0.084]	[0.112]	[0.109]	[0.088]	[0.109]	[0.107]	[0.101]	[0.066]	[0.065]	[0.071]	[0.105]	[0.114]	[0.086]
Rural*Year	0.039	-0.010	0.108	-0.067	-0.082	-0.160	0.170	-0.358**	-0.138	-0.110	0.002	-0.026	0.543***	0.271***	0.225**	0.081	-0.136	-0.100
	[0.127]	[0.123]	[0.117]	[0.166]	[0.139]	[0.109]	[0.171]	[0.147]	[0.126]	[0.156]	[0.163]	[0.137]	[0.115]	[0.097]	[0.103]	[0.151]	[0.155]	[0.128]
Year	-0.782***	-0.084	-0.127	-0.660***	-0.485***	-0.221**	-1.390***	0.018	-0.090	-1.551***	-1.793***	-1.173***	-1.435***	-0.387***	-0.158*	-0.477***	-0.282*	-0.454***
	[0.110]	[0.105]	[0.102]	[0.155]	[0.125]	[0.104]	[0.177]	[0.149]	[0.130]	[0.123]	[0.139]	[0.111]	[0.107]	[0.087]	[0.091]	[0.127]	[0.157]	[0.125]

Source: DHS. Notes: Asterisks *, **, ***, represents statistical significance at 10, 5 and 1% level, respectively. All estimations control for region, gender, rural areas and household characteristics. Estimations weighted and adjusted for survey design. Comparison outcome: In school at appropriate age-in-grade.

Discussion

In most countries included in this study more children have gained access to education over the last 10 years. The proportion of children out of school has decreased. However, the gains that have been made have not been spread equally. There continues to be a large gap in access to education by wealth, whereby poor children are much more likely not to have access to education than rich children. In Nigeria this situation has worsened in the last 10 years, whereas in Kenya and Uganda, the situation has not changed significantly. In Tanzania, which has high enrolment rates, richer groups seem to have improved their advantage over poorer groups, whereas in Zambia and Malawi there has been a reduction in the gap of educational access over the time period between poor and rich children.

In order to show the magnitude of the changes in the wealth gap in access to education, we use the estimated parameters to compute the predicted probabilities for educational access for the richest children (
Table ***5***) and the change in the probability of access according to wealth in the two time periods. The predicted probabilities serve as baseline to which we add or subtract the change in the predicted probability for each other wealth quintile with respect to the richest group. We do this for the two time periods using information from the estimated parameters and the estimated interactions.

In all countries, the predicted probability of being out of school for children living in the richest households has decreased (see
Table ***5***). In Kenya, the probability has changed from 16 per cent in 1993 to around 9 per cent in 2003. The greatest reduction is for Tanzania, where the predicted probability for children living in the richest households decreased by 22 percentage points, from 31 per cent in 1996 to 9 per cent in 2007. Similarly, children living in the richest households have seen a decrease in their probability to be over age at school in all countries except in Nigeria and Uganda. The probability of being in school over age by three or more years increased from 7.7 per cent in 1990 to 9.9 per cent in 2000 in Nigeria and from 20 percent in 1995 to 23 per cent in 2006 in Uganda. Tanzania shows the greatest reductions in the probability of being over age in school for children living in the richest households.

Table 5: Predicted probabilities for school access for children living in richest households

	Out School			Overage 3+ years			Overage 2 year		
	1990's	2000's	% Change	1990's	2000's	% Change	1990's	2000's	% Change
Kenya	16.3	8.7	-7.6	15.0	11.4	-3.6	16.0	14.4	-1.6
Malawi	16.2	8.0	-8.2	18.5	14.4	-4.1	14.3	13.8	-0.5
Nigeria	17.1	7.7	-9.3	7.7	9.9	2.2	8.7	9.7	1.0
Tanzania	31.1	9.0	-22.2	14.9	3.8	-11.1	16.1	9.8	-6.3
Uganda	17.9	4.2	-13.7	19.6	23.3	3.7	15.5	19.0	3.5
Zambia	9.7	6.0	-3.8	3.8	3.5	-0.2	10.7	6.0	-4.7

Source: DHS. Notes: Predicted probabilities calculated for children living in the richest households using estimated parameter from the multinomial probit model.

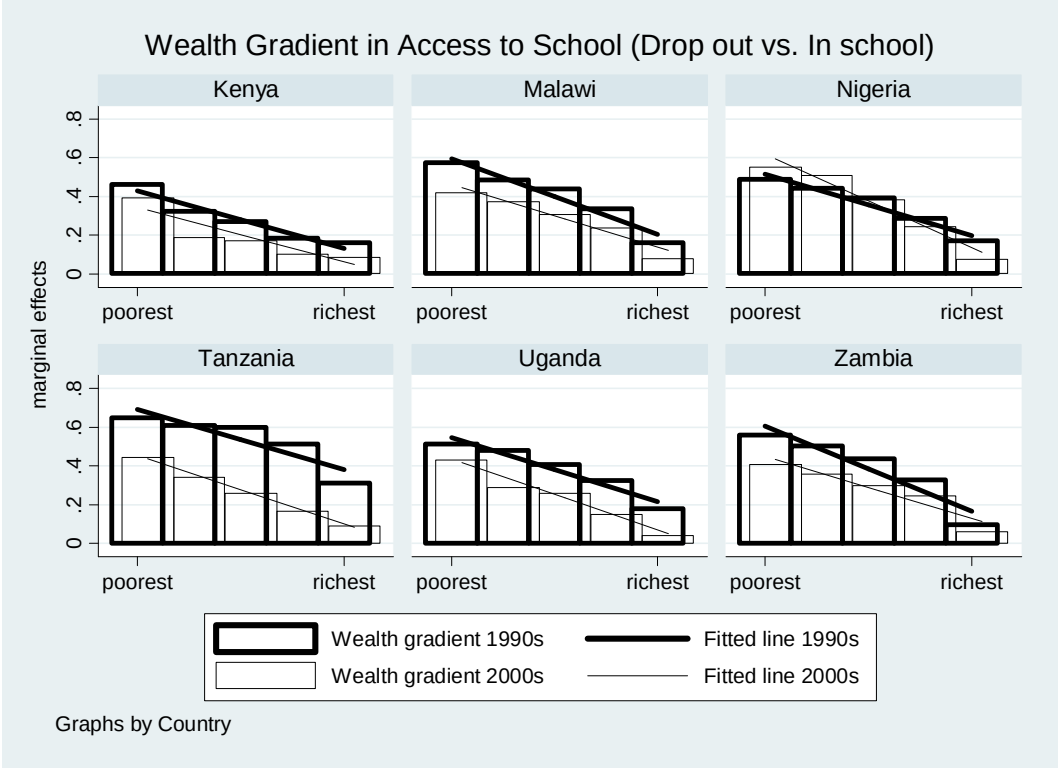
The estimated gradient for the probability of being out of school by wealth groups is shown in Figure 5. This figure is interpreted as follows. The height of the bars is the estimated probability for each group to be out of school. Thick bars estimate for the early 1990's and

thin bars one decade later. The five bars indicate the five wealth quintiles including the richest reference category (results which were shown in
Table ***5***). In Kenya, in 1993, children living in the poorest households had 46 per cent probability of not being in school (that is 30 percentage points higher probability than children from the richest households, who in 1993 had 16 per cent probability of being out of school). The higher the wealth of the family in 1993, the smaller the probability of being out of school, estimated to be 32 per cent for children living in the 20th to 40th percentile of the wealth distribution; 27 per cent for children in the 40th to 60th percentile; and 18 per cent for children in the 60th to 80th percentile. The slope of the gradient is shown by the black thick line.

By 2003, children living in the poorest households in Kenya had 39 per cent probability of being out of school (that is 30 percentage points higher probability than children from the richest households, who in 2003 had 9 per cent probability of being out of school). We also estimated that the higher the wealth of the family, the lower the probability of being out of school in 2003. The slope of the gradient is shown with the black thin line.

The key issue to highlight here is the change in the wealth gradient in access to education. Two lines are fitted to the predicted probabilities, indicating the steepness of the gradient. In Kenya, the wealth gradient in access to education did not change between 1993 and 2003 (this is also in accordance with our estimated parameters for the interactions between wealth and time, which were found not to be statistically significant).

Figure 5: Marginal effect of wealth on likelihood of not being at school over time



In Malawi and Zambia, not only did children have a lower probability of being out of school during the 2000's, the wealth gradient became flatter. Thus between 1992 and 2004 for Malawi and between 1996 and 2007 for Zambia there was a reduction in the wealth gap that was estimated using our empirical model. In Nigeria, the wealth gradient in access to

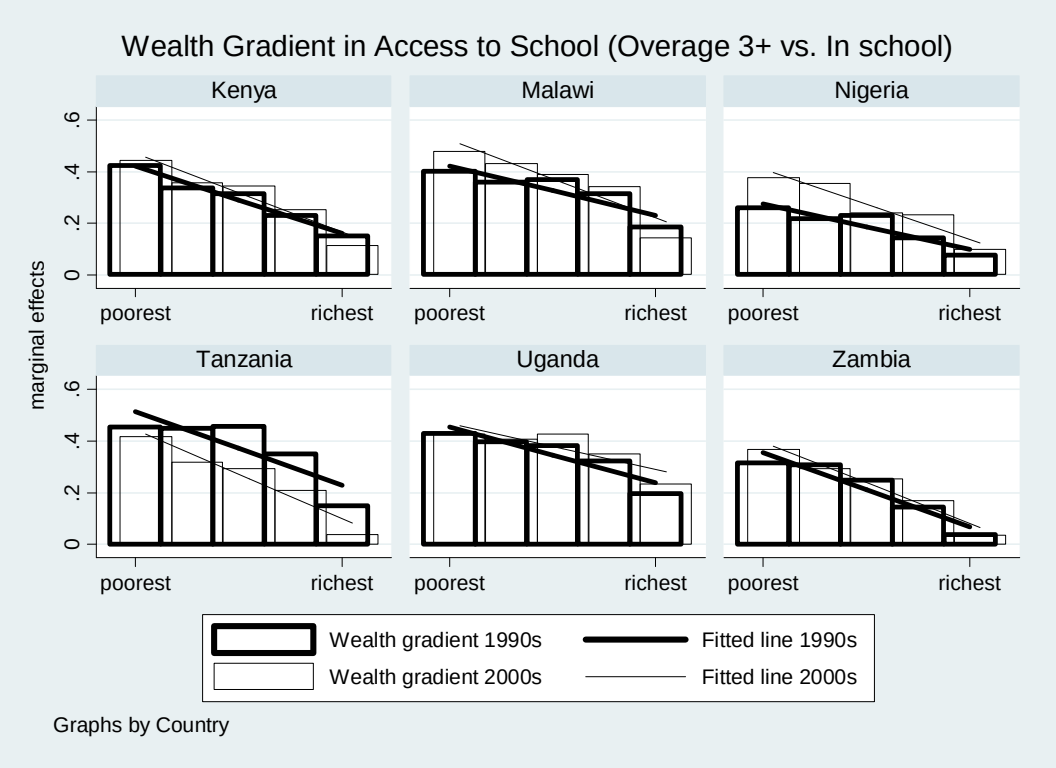
schooling became steeper, indicating that poorest children in 2003 had greater differences in access to schooling than they had in 1990. In Tanzania, the wealth gradient also became steeper in 2007 compared to 1996 because children living in richer households narrowed their difference in not accessing schooling with respect to children living in the richest families. Finally, in Uganda, the wealth gradient did not change between 1995 and 2006, although children in 2006 had a lower probability of being out of school than in 1995.

The data analysis has indicated that the proportion of children over age by two years or more has increased in most of the countries in the sample. It also shows that over age children are disproportionately from poor households. It is probable that children who are in school but who are over their appropriate age-in-grade are significantly more at risk of dropping out from school than others. If these children are also from the poorer households they may be doubly disadvantaged. The data show that there is a large gap in the likelihood of being over age in school by household wealth, with the problem being greater for those over age by three or more years than for those over age by two years.

The probability of being over age by three or more years while in school by wealth quintiles and year is shown in Figure 6. In Malawi and Nigeria, the probability of being over age in school by three or more years has increased over time. That is, children in these countries have a higher probability of being over age by three or more years than a decade or so ago. In Tanzania the situation is different, as children have a lower probability of being over age by three or more years in 2007 compared with 1996. In Kenya, Uganda and Zambia the situation remained almost unchanged.

The wealth gradient for over age by three or more years has become steeper in Malawi, Nigeria and Tanzania. In Malawi and Nigeria, the proportion of children over age by three or more years became worse for the poorest children than for richer children over the last decade. In Tanzania, all children became less likely to be over age by three or more years in school, but the gains for richer children were greater than for poorer children, making the gradient in 2007 steeper than in 1996. In Kenya, there was a slight increase in the likelihood of being over age by three or more years, but this was not large enough to have a significant impact on the wealth gradient (our results showed that the increase is only statistically significant at 10 per cent level and it affected most wealth groups). Finally, we found that the gradient did not change in Uganda between 1995 and 2006 or in Zambia between 1996 and 2007.

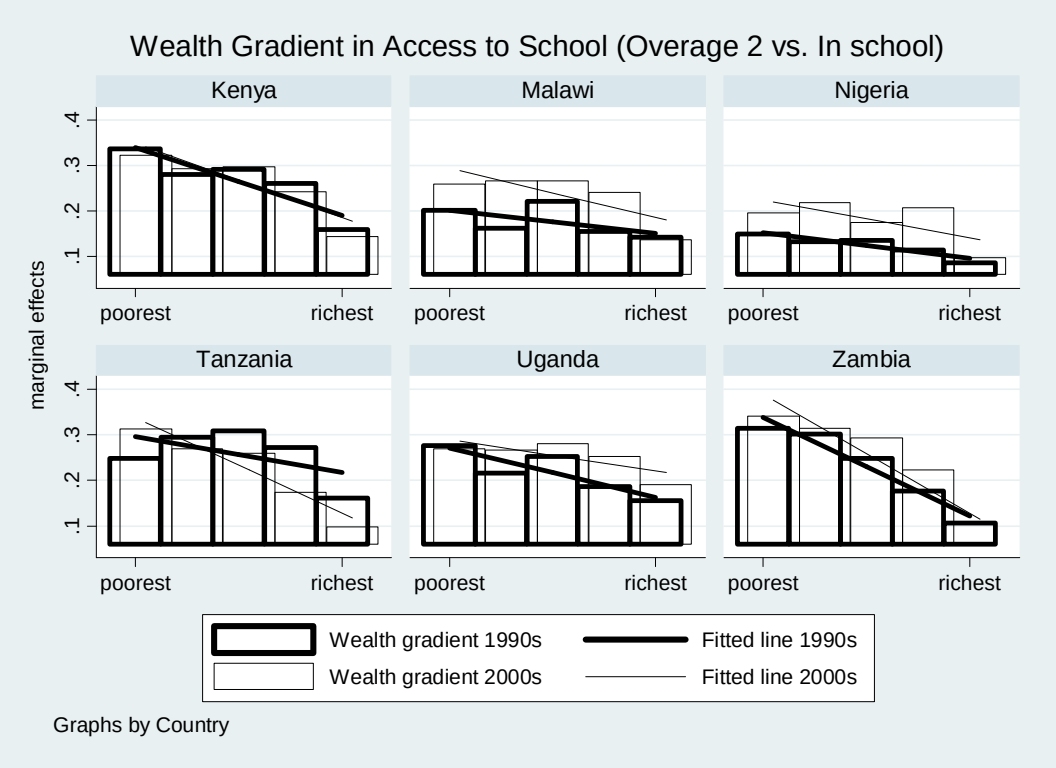
Figure 6: Marginal effect of wealth on likelihood of over age by three or more years at school over time



We now turn to the gradient in over age by two years in school by wealth of the household (Figure 7). In Kenya we estimated no change over time. In Malawi, children were more likely to be over age in school by two years in 2004 than in 1992, whereas in Nigeria, children were also more likely to be over age in school in 2003 than in 1990. In Malawi, the slope of the gradient was affected by children from all wealth groups (as shown by all statistically significant interactions between wealth and year), whereas in Nigeria, the slope of the gradient was affected by the second and fourth wealth quintile. In both cases, the slope of the gradient did not change over time.

In Uganda and Zambia we also find that the predicted probability of over age by two years in school increased during the last decade. There is an indication that the gradient increased in Zambia, as we found significant interactions of wealth over time. In Uganda, the steepness of the gradient comes from the estimated parameters in Table 3 (-0.11 for the interaction between poorest and year and 0.09 for the interaction between richer and year). However, these parameters are not statistically significant. Finally, Tanzania shows a radical change in the wealth gradient according to over age in school by two years. The gradient in 2007 is steeper than in 1996, with children from the poorest families in 2007 being more likely to be over age by two years than they were in 1996, and children from middle and higher wealth groups showing the opposite result. Overall however over age in grade declined between the two time periods.

Figure 7: Marginal effect of wealth on likelihood of over age by two years at school over time



There has been some improvements in terms of access to education by gender.

Table 6 shows an estimate of the magnitude for these changes. In Malawi and Uganda, the likelihood of girls not being in school has reduced over time. In Malawi, we estimate that girls were 4.6 percentage points less likely not to be in school in 2004 than they were in 1992 compared to boys. In Uganda, girls were 2.4 percentage points less likely not to be in school in in 2006 than they were in 1995 relative to boys. In Nigeria and Uganda girls continue to have higer likelihood of not being in school relative to boys, with a 9.8 and 3.9 percentage points higher likelihood not being in school in Nigeria and Uganda, respectively. In Tanzania, on the other hand, girls were, on average, 7.6 percentage points less likely not to be in school than boys.

In terms of over age schooling there have not been significant changes over time with respect to gender. Only in Tanzania we found that girls were 3.4 percentage points less likely to be over age by two years in 2007 than in 1996, whereas in Zambia, girls were 3.2 percentage points more likely to be over age by three or more years in 2007 than in 1996. Girls have, on average, a lower likelihood of being over age in school than boys. In Kenya, girls were 8.7 and 3.3 percentage points less likely to be over age by three or more or by two years in school than boys, respectively. In Malawi girls were 3.6 percentage points less likely to be over age by three or more years than boys; in Tanzania girls were 9.6 and 3.5 percentage points less likely to be over age by three or more years or by two years than boys. In Uganda, girls were 4.9 percentage points less likely to be over age by three or more years whereas in Zambia girls were 6.5 and 1.9 percentage points less likely to be over age by three or more years or by two years than boys.

Table 6: Estimated partial change for gender and region

	Kenya			Malawi			Nigeria		
	Out Sch.	OAge3+	OAge2	Out Sch.	OAge3+	OAge2	Out Sch.	OAge3+	OAge2
Girls	-0.016	-0.087***	-0.033***	-0.007	-0.036*	-0.009	0.098***	0.003	-0.020
Girls*Year	0.020	0.001	-0.018	-0.046***	-0.006	-0.008	0.019	0.020	0.018
Rural	-0.054**	0.031	-0.036	0.079**	0.162***	0.076***	0.018	0.063**	0.014
Rural*Year	0.010	-0.012	0.030	-0.044	-0.041	-0.045	0.065	-0.087**	-0.032
	Tanzania			Uganda			Zambia		
	Out Sch.	OAge3+	OAge2	Out Sch.	OAge3+	OAge2	Out Sch.	OAge3+	OAge2
Girls	-0.076***	-0.096***	-0.035**	0.039***	-0.049***	-0.013	-0.012	-0.065***	-0.019*
Girls*Year	-0.011	0.013	-0.034**	-0.024**	0.017	0.001	0.009	0.032**	-0.003
Rural	0.040	0.064**	0.024	-0.071***	0.109***	0.080***	-0.007	0.063***	0.010
Rural*Year	-0.028	0.001	-0.012	0.161***	0.074***	0.059**	0.021	-0.027	-0.023

Source: DHS. Notes: Estimated partial change.

Asterisks *, **, ***, represents statistical significance at 10, 5 and 1% level, respectively.

Finally, we only found a significant difference in the likelihood of not having access to schooling in rural areas relative to urban areas in Uganda, where children living in rural areas were, on average, 7.1 percentage points less likely not to have access to schooling relative to children in urban areas. However, between 1995 and 2006, there was a deterioration in the likelihood of access to school in rural areas, estimated to be 16.1 percentage points.

Children living in rural areas of Kenya had, on average, 9.1 percentage points higher probability of being in school but over age relative to children living in urban areas. Similarly in Nigeria, where children from rural areas had, on average, 5.5 percentage points higher probability of over age schooling relative to children living in urban areas. In both of these countries, the situtation has improved over time, by 8.1 and 7.2 percentage points in Kenya and Nigeria, respectively. In Uganda, the average difference of 10.9 percentage points higher probability of over age by three or more years in schooling for children living in rural areas relative to children living in urban areas has deteriorated over time (by further 7.4 percentage points). Similarly, the situation of over age by two years has deteriorated over time in Uganda (by 5.9 percentage points).

Conclusions and Policy Implications

The data we have described and the analyses we have undertaken inevitably produce a range of conclusions that apply differently to different country data sets. We can distil some general observations that lead to some tentative conclusions that can be introduced into policy dialogue in these and similar countries. However, in every case the general analysis we have undertaken needs to be supplemented by more robust national data validated in country. It is also of considerable interest to explore data sets which allow regions, and district analysis of key parameters that is beyond the scope of this paper. These could point the way to interventions that could be tailored to local circumstances and actions at the community and school level.

First, grade specific participation rates illustrate how widely differentiated the starting points and recent progress are for universalising primary schooling across just six SSA countries. We have discussed just three main types. As we extend the analysis it will become clear that there are other patterns which also need to be taken into account in other groups of countries.

Second, clearly there are lessons to be learned from the lack of obvious progress in some systems where the profile of age specific enrolment rates has changed little over time and the numbers exiting the system at the end of primary have remained almost constant despite being a fraction of the age group. This is unacceptable especially with the resources that have been made available. Some of the reasons may be clearer when the experience of those countries is compared to that of Tanzania which appears to have had much more success in transforming access to basic education measured by grade specific enrolment rates. Of course many things will be specific to Tanzania and it historic, political, and socio-economic context but nevertheless other things may have common resonances.

Third, age in grade issues are often invisible in policy dialogue yet are central to the sustained achievement of universal access. Not only is it striking that wide age ranges in grades persist, it is also curious that such dispersion is often not linked to discussions thaat surround curriulum, pedgagogy, learning and cognition. It is even more curious that an obvious implication – that monograde pedagogy is ill suited to mixed age classrooms and that multigrade might be – is so little discussed. As noted above no high participation system with good completion rates and high level of achievement on international achievement tests on which there is data has high age in grade dispersion. Either dispersion is reduced or multi-grade is mainstreamed.

Fourth, the analysis of age in grade repeatedly shows that age in grade has been increasing much more often than decreasing and that the poorest groups have experienced greater increases in age in grade. It goes almost without saying that this was not supposed to happen. This almost certainly would be mirrored in completion rates by wealth if they were available.

Fifth, girls in particular seem especially vulnerable to the adverse affects of over age progression. In some systems on which there is data, girls out enrol boys age for age in grade until they are between 14 and 16 years old. Beyond this in SSA boys almost invariably show more persistence and drop out less. If all girls reached the end of primary and lower secondary on age in grade much of the difference in enrolments currently seen in low enrolment countries would disappear. It is also the case that enrolment differences related to sex in secondary schools in SSA are highly correlated with overall levels of enrolment – most SSA countries with Gross Enrolment Rates over 50% at secondary enrol more girls than boys and most below 50% enrol more boys (Lewin 2008). Fixing age in grade could have a major impact on equity.

Sixth, the analysis of age in grade by country is suggestive the growth in participation has been accompanied by increased ranges of ages in grade. This is worrying for the reasons already given. Though it might be expected that high rates of expansion were necessarily accompanied by increased dispersion of age in grade, this should of course be a transient effect. If at a appoint in time – say 1996 a commitment is made to UPE whereby all children are encouraged to enter school at 6 years old and repetition is minimised, then by ten years later almost all over age children should have exited the system one way or another, This does not seem to have happened, though the signs in Tanzania are promising.

Seventh, the programmes of Education for All should have had more impact on the children from the poorest households who are disproportionately excluded from basic education. The data indicates that this is not always the case. It should of course never be the case that EFA, which is explicitly pro-poor, fails to improve the chances of participation of those in the

lowest quintiles more than those in the highest. Where there has been a failure of this kind hard questions need to be asked.

Eighth, progress on gender gaps has also been mixed as it has been on urban rural differences. In general neither is as important as household income as a determinant of participation. However within particular national systems there may be structural features that influence participation that are invisible in national level data. Thus school boarding places are sometimes skewed in favour of boys, distance to school is generally of more significance for female enrolment, rural schools may receive the least motivated and efficient teachers unless there are effective incentives, absenteeism (which results in the loss of very substantial amounts of learning time may be very unevenly spread across children, teachers and schools, with consequential effects on achievement and progression).

Some policy implications are suggested by the analysis in this paper. In short they include:

- Encourage age of entry policy at six years (or below where pre-school facilities exist) and offer incentives to enrol children at the correct age

- Make sure that "every child has a birthday" which is publicly known and perhaps celebrated in an appropriate way in classes. This should help sensitise schools and communities to the importance of age in grade.

- Set normative expectations for repetition rates and for on age progression. If repetition rises above a maxima (say 5%) then expect a curricula and pedagogic response to keep children on track to achieve learning norms for their grade. Where more than, for example 5% are over age by two years or more act to reduce age in grade slippage.

- Track grade specific enrolment rates and abandon targets linked to cycle GERs and NERs which often mislead and can fall as well as rise when systems are improving.

- For similar reasons abandon the Gender Parity Index as a measure of unequal participation in favour of grade specific enrolments by sex coupled with demographic data.

- Where grade specific participation is not improving undertake reviews and identify reforms that would improve the impact of EFA policy and related investment of resources.

- Discuss and agree objectives and measurable outcomes that would reduce the gaps in participation and attainment of children from different quintiles of household expenditure; gaps in urban and rural participation, and participation linked to sex.

This paper raises important questions about how growth in educational access has been evolving in six countries in SSA. EFA should have resulted in high completion rates with most who start grade 1 reaching grade 6 (or in some cases grade 7 or 8); lower proportions of over age children in every grade; reductions in gaps in particpation by those from poor and richer households; and the diminution of differences correlateed with gender and location.

Too often it appears these expectations have yet to be met as time runs out in the approach to the MDG target dates of 2015.

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