Consortium for Research on Educational Access, Transitions and Equity

The Role of Maternal Education During Educational Expansion for Children in Sub-Saharan Africa

Ricardo Sabates
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Keith M Lewin

CREATE PATHWAYS TO ACCESS
Research Monograph No. 64

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University of Sussex
Centre for International Education

Consortium for Research on
Educational Access, Transitions & Equity

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The Consortium for Educational Access, Transitions and Equity (CREATE) is a Research Programme Consortium supported by the UK Department for International Development (DFID). Its purpose is to undertake research designed to improve access to basic education in developing countries. It seeks to achieve this through generating new knowledge and encouraging its application through effective communication and dissemination to national and international development agencies, national governments, education and development professionals, non-government organisations and other interested stakeholders.

Access to basic education lies at the heart of development. Lack of educational access, and securely acquired knowledge and skill, is both a part of the definition of poverty, and a means for its diminution. Sustained access to meaningful learning that has value is critical to long term improvements in productivity, the reduction of inter-generational cycles of poverty, demographic transition, preventive health care, the empowerment of women, and reductions in inequality.

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List of Acronyms

CREATE – Consortium for Research on Educational Access, Transitions and Equity

DHS – Demographic Health Surveys

EFA – Education for All

EPDC – Education Policy and Data Centre

GMR – Global Monitoring Reports

IQ – Intelligence Quotient

OECD – Organisation for Economic Co-operation and Development

SSA – Sub-Saharan Africa

UK – United Kingdom

UPE – Universal Primary Education

USA – United States of America

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Preface

Education for All (EFA) seeks to ensure that all children attend and complete a full cycle of basic education. The promise at the Dakar conference in 2000 was that no country with a credible plan to achieve this would fail to achieve the outcome for lack of resources. As a result, and with considerable variation between countries, levels of investment in basic education have increased, infrastructure has improved and many more children are attending school. But some remain never enrolled and many drop out before completion. Those excluded are more and more likely to be from communities and households where the conditions are such that sustained enrolment and progression is difficult, and where national initiatives may have limited impact. For these and other reason it is very important to try to understand more about the dynamics of household decision making and the associations that exist between characteristics of care givers and sustained educational participation.

This paper explores one dimension of the relationship – mother's education – and how this may have changed over time in six African countries at two different points in time. One of the predictions of EFA is that as more mothers have became more educated, and more children participate, the well known and strong association between mothers education and that of their children should weaken. The results are complex and different in each country. However, there is enough evidence to suggest that in too many cases established gradients of access linked to mother's educational level have persisted rather than diminished. This takes no account of differences in the quality of education that may exist between the children of more and less educated mother's which will overlay and reinforce the differences that are associated with additional years of maternal schooling. The paper invites more nuanced analysis of the data and illuminative studies that could unravel why changes that are expected with EFA policy and practice have not been happening as much as was anticipated.

Keith Lewin
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Summary

This paper analyses the gap in educational access according to maternal education over a 10 year period using evidence from the Demographic Health Surveys (DHS) in six African countries (Kenya, Malawi, Nigeria, Tanzania, Uganda, and Zambia). Each country contains two DHS datasets, separated by at least a decade. The study uses the model of Zones of Exclusion developed by the Consortium for Research on Educational Access, Transitions and Equity (Lewin, 2007) to analyse educational access for children. Maternal education is defined according to years of schooling.

To investigate the narrowing or widening in the gap in educational access according to maternal education, two cohorts of children and one cohort of mothers were selected from each of the DHS datasets. The first cohort of children experienced education during the 1980s, the second cohort of children during the 1990s and the cohort of mothers experienced education during the 1960s.

Our results show a gradient in children's educational access according to maternal education which has declined over time for girls in Nigeria, Uganda and Malawi. Hence, higher levels of access with more equality were achieved. A very flat educational gradient remained unchanged in Tanzania, but with greater educational access for all children. In Kenya we found that average access to school declined for girls who experienced education during the 1990s compared with girls who experienced education during the 1980s. It is possible that this decline was the result of a lag effect in policy mechanisms to correct for lack of educational expenditure. Finally, we found very little variation in access to education in Zambia and a constant gradient in educational access for children according to maternal education. These results are consistent with previous CREATE work by Lewin and Sabates (2011) looking at changes in access over time in Anglophone and Francophone African countries.

Cross-country results highlight the importance of maternal education in interaction with household wealth in estimating the gap in educational access according to maternal education. In summary the analysis indicates that associations between mothers' education and children's access to education remain widespread and can be quite strong. More often than not the relationship is more significant amongst the relatively rich than amongst the poorest. It may also be stronger the greater the number of years of education the mother has. Between the samples in the 1980s and 1990s the changes we see are not very great, and nor are they very consistent across countries. This may be because the time period is too short to see changes, and it may be that the causality of the changes that are observed is much more complex than a simple model can capture. Nevertheless the changes that do appear provide an invitation to explore in more detail at country level what the reasons might be.

The Role of Maternal Education During Educational Expansion for Children in Sub-Saharan Africa

1. Introduction

The importance of parental education for children's cognitive development and their overall educational attainment has been well documented in the empirical literature (Wolfe and Haveman, 2002). In most countries, children who are raised by parents with high levels of education are likely to complete compulsory schooling, to be engaged with their school work and to achieve higher levels of education than children whose parents have low levels of education (Bynner and Joshi, 2002; Chevalier et al., 2003). Although this intergenerational transmission of education seems to be fairly universal, it is unclear whether children of parents with low levels of education are able to benefit more from the expansion of educational opportunities, and in particular universal primary education, than children of parents with high levels of education. This issue is particularly important in the context of Sub-Saharan Africa (SSA) where a significant number of children whose parents have no education are not in education either (Lewin, 2007).

Since 1990, with the World Conference on Education for All in Jomtien, Organisation of African Unity Decade of Education (1997-2006; 2006-2015), Poverty Reduction Strategies, the Millennium Declaration, Fast Track Initiatives, Global Action Plan and Debt Relief initiatives, efforts have been made to reverse the limited access to education, inadequate curriculum and poor learning outcomes (Gakusi, 2008). Many countries have made significant progress towards achieving Universal Primary Education (UPE); but although, access to education has improved dramatically, large inequalities in educational access with respect to parental income, household wealth, race, ethnic, and location still remain (UNESCO, 2010; Lewin and Sabates, 2011). There are several important questions that relate to CREATE's work on changing patterns of access to education. During rapid expansion of educational access with the existing inequalities, has the gap in educational access according to parental education changed over time? Have gender differences according to parental education decreased over time? Are children living in poor households whose parents have some education able to benefit from the expansion of educational access more so than children whose parents do not have any education?

This paper focuses on whether the relationship between maternal education and children's educational access has changed between the 1980s and the 1990s in six African countries: Kenya, Malawi, Nigeria, Tanzania, Uganda, and Zambia. During the 1980s the main macroeconomic policies dictated by the World Bank and the International Monetary Fund were to reduce the fiscal deficit of governments. During this decade there were cut backs in many sectors of the economy, including social programmes such as education and health. In 1990, due to the international involvement and particularly requirements of debt relief benefits to be spent on the social sectors, there was a commitment to secure new funds towards education and health (AfDB, 2007). Significant steps were taken to set up new financial arrangements like budget support and SWAPs since the 1990s. Education targets were included in the Poverty Reduction Strategy Papers, Education For All, and the Millennium Development Goals. Nonetheless, data suggests that 28 out of the 43 Sub-Saharan African countries might not be able achieve UPE by 2015 (Gakusi, 2010). What changes can we observe in the relationship between educational access for children and the educational qualifications of their parents between the 1980s and the 1990s in these countries?

Using nationally representative data on Kenya, Malawi, Nigeria, Tanzania, Uganda, and Zambia, we investigate the relevance of parental education for the educational access of boys and girls, both poor and rich. In doing so, we explore whether the role of maternal education has changed as a predictor of access. Various initiatives should have increased equity and reduced educational exclusion. These include in different countries fee-free education, conditional cash transfers, mandatory schooling, school building programmes, investment in teachers' training, among others. Of course we are not able to link any causal impact of policy changes on the role of maternal education for the educational access of their children. Nevertheless, our analysis tracks significant episodes of international commitment to achieve UPE and in doing so our interest relies on whether at the country level the educational gradient on access to schooling has been modified over time.

The contributions of this paper are twofold. First, we apply a re-conceptualisation of educational access that takes into account different zones of exclusion in education. The CREATE model of educational access considers meaningful access to be achieved when children complete a full cycle of primary and lower secondary education and a required level of learning and competence is obtained. The CREATE model also differentiates between different stages in the educational cycle where children may be at risk of dropping out of education. We believe that the CREATE model provides a framework for addressing issues around educational access for children in SSA. Second, we test whether the gap in educational access between children of mothers with low and high levels of education changed between the 1980s and the 1990s. We investigate the gender and wealth dimensions of these changes in six SSA countries. This complements a literature that has focused almost exclusively in developed countries, mainly the USA, Canada, England and Germany (Blanden, Gregg and Machin, 2003; Blanden and Machin, 2004; Piraino and Haveman, 2006) and the few studies that have investigated this issue in Latin American (Berhman, Gaviria and Szekely, 2001; Binder and Woodruff, 2002) and other developing countries (Lillard and Willis, 1994; Thomas, 1996; de Broucker and Underwood, 1998; Alain-Désiré and Vencatachellum, 2007; Sato and Shi, 2007; Hertz et al., 2008).

The rest of the paper is organised as follows: Section 2 describes the role of parental education and how it relates to the intergenerational transmission of education success for their children. Section 3 introduces the CREATE model of educational access and Section 4 discusses the data, variables and estimation methods to be used in the paper. Results are provided in Section 5 and the final section of the paper provides discussion of the findings and implications for policy.

2. The Role of Parental Education

Understanding the possible relationship between parental education and children's academic attainment and the conceptual premises for the different ways in which parental education can result in benefits for their children's education is complex. In order to understand, model and quantify the role of education Feinstein, Duckworth and Sabates (2004, 2008) used Bronfenbrenner's (1979 and 1986) ideas to develop a framework for the impact of parental education on children's educational attainment. The model developed by Feinstein, Duckworth and Sabates (2004, 2008) clarifies two important ways in which parental education impacts on children's developmental outcomes. Firstly, the education of parents enables them to make decisions regarding the provision of a developmentally enhancing environment and the interactions with children that are important for children's physical and psychological well being. In other words, the impact of parental education is channelled by many different factors, which may include income, provision for context, use of language, discipline strategies, among many others.

Secondly, because of education, parents are able to change the way in which different factors impact on child development. Take for instance the impact of income poverty on child's schooling. Families who are income poor may have very few economic resources to send their children to school. So, it is expected that income poverty affects children's access to education. However, poor families where the head of the household or spouse has some education may give a higher weight to the importance of their children's education and as such prioritise education over other needs when allocating household's economic resources. For example, Lloyd and Blanc's (1996) study about the impact of parents and other family members on children's school enrolment in Sub-Saharan African countries suggests that family education plays the deciding role in determining whether children enrol in school, at what age they do, and for how long they stay in education. It is then expected that for the same level of income, children of parents with some education will have higher levels of educational access and attainment than children of parents with no education. This is the moderating effect of parental education.

Chevalier et al., (2005) suggest that there are four types of studies to investigate the role of parental education on children's education. The first two types focus on the direct impact of parental education, ignoring the possible channels for educational effects. These types of analyses are sometimes called a black box, since they focus on the direct causal impact of parental education net of any channels or mediating effects. The third type of studies focuses on the channels for educational effects whereas the final type is about the moderating effect of education. Below we review in more detail research related to these four different types of studies.

The first kind of studies focuses on the impact of parental education net of inherited ability. This nurture versus nature hypothesis aims to investigate whether the education of parents is important for the education of children when controlling for the inherited ability of children (Haveman and Wolfe, 1995; Dearden, et al., 1997; Sacerdote, 2002, 2007; Plug, 2004; Björklund, et al., 2004, 2006; Plug and Vijverberg, 2003; Bowles and Gintis, 2002; Plomin et al., 2001). To do this, researchers have used data on adopted children to measure whether the educational attainment of adopted children is similar to that of natural children for parents of the same levels of education. Plug and Vijverberg (2003), for example, found that both parental education and parental IQ improved the probability that adopted and natural children attend college, but the impact was larger for natural children. They concluded that biological

children enjoy the effect of both genetic and cultural transfers, while adopted children only cultural transfers. Similar conclusion was reached by Dearden et al., (1997) and Sacerdote (2002). From this kind of study, it is expected that in completely equal education systems there will be variation in educational attainment that is the result of inherited ability (Bowles and Gintis, 2002). The question that still remains is how much variation is accounted by genetic transmission and how by inequality of opportunities?

The second kind of approach has to do with the direct effect of parental education on children's education (net of genetics and any other mechanisms). Empirical studies have tried to isolate the impact of parental education from many other possible confounding effects using econometric techniques[1]. Lloyd and Blanc's (1996) study using DHS data of 14 Sub-Saharan countries found that the more educated the head of the household, the more likely the children were to attend school (except of the case of Tanzania and Niger where the results were not statistically significant). Moreover, for some countries (Cameroon, Niger, and Malawi) the probability that children were enrolled was 26 to 39 percent higher in those households where the head had at least 7 years of schooling compared with households where the head had no education. In the United States, Oreopoulos et al. (2006) found that a one year increase in parental education decreases the probability of repeating a schooling year (or grade) among children aged 7 to 15 and significantly lowers the likelihood of dropping out from school for 15 to 16 year old children. In the United Kingdom, Chevalier et al., (2004) found that one additional year of parental education increases by four percent the probability that children stay in education after compulsory schooling, with a considerably larger effect for sons than for daughters. Also in the United Kingdom, Sabates and Duckworth (2010) found that an additional year of maternal education significantly improved mathematical attainment for their sons, but not for their daughters. The research design of these studies has increased confidence that the observed relationships between parental education and children's education may have a causal element. In addition, these studies have highlighted important gender differences between fathers and/or mothers education and their sons' and daughters' education.

The third approach focuses on the main mechanisms for educational effects. Reviewing all the possible mechanisms is a task beyond the scope of this paper, so here we focus on income as an important mechanism for educational effects. Economic returns are related to parental education and these, in turn, may impact on children's educational outcomes. Findings suggest that highly educated parents achieve higher family earnings and their children have better educational outcomes. For example, children of parents with low levels of education are more likely to misbehave at school, have lower performance and drop out of school than children of parents with high levels of education (Brooks-Gunn et al., 1997; Hobcraft and Kiernan, 1999). These associations are reduced, but still statistically significant, when family income is included in the analysis as potential mechanism for educational effects. In SSA countries wealth remains an important predictor of children's school participation. Those children coming from the top 20^{th} percentile of the wealth distribution are six times more likely to reach Grade 9 than those from the poorest 40^{th} percentile of the wealth distribution (Lewin and Akyeampong, 2009). The important argument from these studies is that both parental education and parental income seem to matter for the educational attainment of children. Income may be a mechanism for educational transmission, but certainly it is not the only one. Also, parental education may be an important factor, but it is not the only one that

[1] The most common econometric technique is an instrumental variable, which aims at inducing exogenous variation to parental education and use this variation to estimate its effect on children's education.

affects how parents secure the educational success of their children. Yet, for the task of understanding the intergenerational transmission of education it is important to be able to distinguish and understand the complex interrelations between these different factors.

How education interacts with other factors is commonly known as the moderating effect of education. The final set of studies focuses on the complex interactions between parental education, parental income, parental wealth, institutional contexts, among other factors. In terms of institutional contexts, research has focused on institutional change, for instance whether the expansion of higher education for parents benefits their children (Chevalier, 2005; Piraino, 2007; Heineck and Riphahn, 2009). When this is the case, research has estimated a reduction in the persistent link between parental education and their children's education over time. Chevalier, et al., (2004) found that the expansion of tertiary education in OECD countries was more beneficial for children of highly educated parents. However, he also found that policies geared at less favoured children, for example educational grants, allowed educational mobility for children of poorly educated parents. A particular example of research focusing on the moderating effects of education at household level was provided by Galindo-Rueda and Vignoles (2005). The authors found that educational attainment of children in the UK has increased far more for those with low ability and high parental income than for those with high ability and low parental income. This result highlights the important role of parental income over child ability in the UK educational system.

In this paper we focus on changes in the relationship between parental education and children's educational access over time. Following the logic of the fourth type of studies highlighted above, the paper uses indicators of educational access for children who experienced education during the 1980s and those who experienced education during the 1990s to investigate whether the role of maternal education changed between these decades. The main focuses of the paper are: (i) the possibility of increased access for children of mothers with low levels of education which may have occurred after the EFA policies of 1990; (ii) the gendered differences in the role of maternal education during this time; and finally (iii) the role of maternal education in improving educational access for those with the fewest resources[2].

[2] We cannot estimate or identify causal relationships with this data; hence analyses of the paper are just at the level of associations.

3. Reconceptualising Educational Access

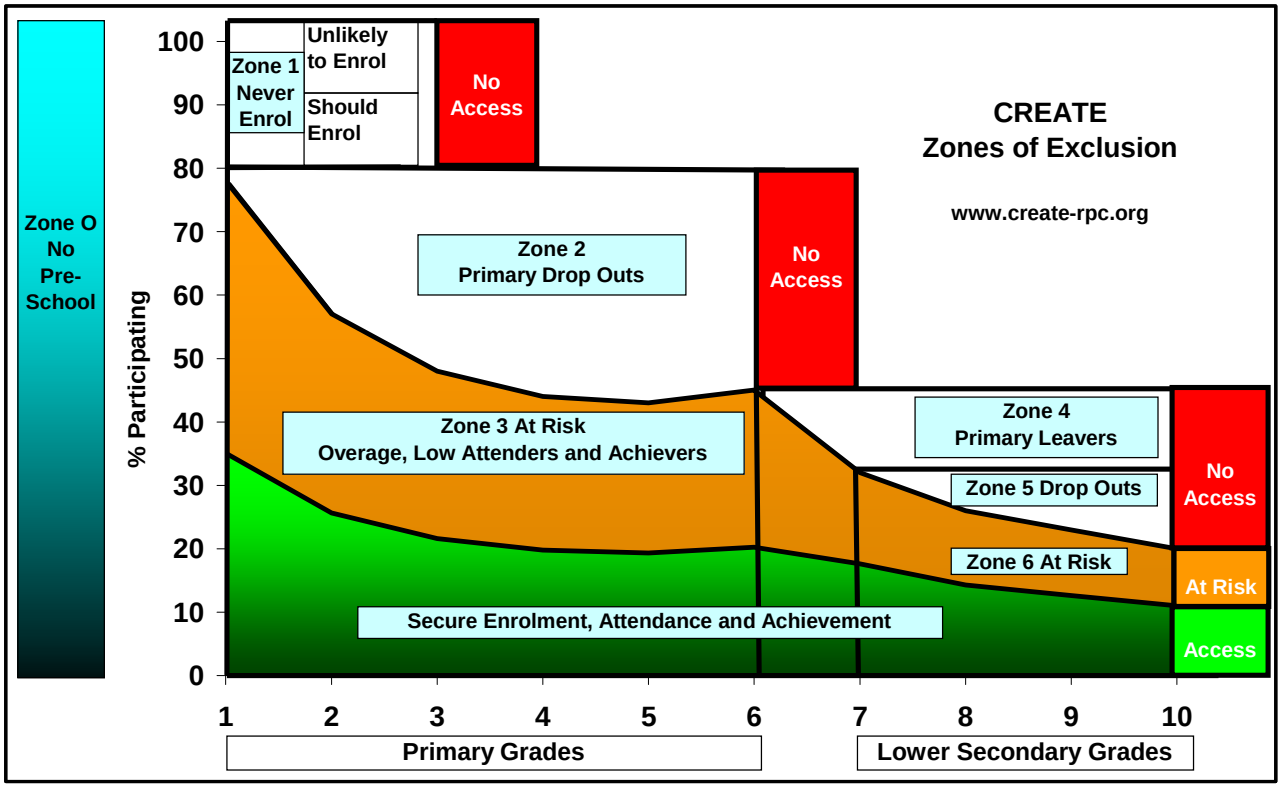
Most studies estimating the relationship between parental education and children's educational outcomes over time have focused on the intergenerational mobility of education. In order to do this, empirical studies have estimated the strength of the relationship between parental years of education and their children's years of education for cohorts of parents and children who have experienced different educational systems. In most developed countries this correlation has declined over time, indicating some degree of educational mobility for children of recent generations (Blanden and Machin, 2004). For developing countries the correlations tend to be higher than in developed countries, but few studies have focused on whether these correlations have changed over time, which in part highlights the lack of data available to undertake such research (Piriano and Haveman, 2007).

Having the same indicator of educational attainment for parents and children is necessary to measure intergenerational educational mobility. However, we suggest that measuring education in years of schooling is problematic in the context of developing countries. Children's access to education measured by the time they spend in schooling has little meaning unless it results in regular attendance, progression through grades at appropriate ages and meaningful learning which has utility (Lewin, 2007). Many children in developing countries spend a few years in primary schooling and leave the educational system without acquiring the most basic skills for reading, writing and numeracy. Therefore, to achieve two or three years of primary education is meaningless for many children in developing countries, especially those living in extreme forms of poverty and marginalisation.

A broad definition of educational access and attainment is required to address the complex problems of children as they transit though the educational system. We adopt the re-conceptualisation of educational access that is based on the model developed by the Consortium for Research on Educational Access, Transitions and Equity (CREATE). We are only able to discuss issues around intergenerational mobility of educational if we can measure educational access in the same way for parents and for children. Unfortunately, this will not be possible with the available data. Since the indicator of educational access for children differs from that of educational attainment for parents, this paper is about the role of parental education for children's educational access, and not about educational mobility across generations.

According to the CREATE model (Lewin, 2007), there are six zones of exclusion from primary and secondary schooling (in addition to zone 0 – exclusion from pre primary education) (Figure 1). Zone 1 contains those denied any access. Expansion of schooling can enrol a proportion of these children, but not all. Zone 2 includes all children who are excluded after initial entry, which means that these children have dropped out. Typically, drop out increases as children grow older due to the high opportunity cost of schooling, in particular for children living in poverty (Cain, 1977; Fentiman, Hall and Bundy, 1999; Boyle et al 2002). Those dropping out usually become permanently excluded, although recent evidence suggests that some drop-out children do actually re-enter education (Ananga, 2011; Sabates, Hossain and Lewin, 2010). Zone 3 includes those in school but at risk of drop out. Children who remain formally enrolled in school may be silently excluded if their attendance is sporadic, their achievement so low that they cannot follow the curriculum, or if they are discriminated against for socio-cultural reasons. Nutritional deficiencies and sickness can compound these problems.

Figure 1: CREATE zones of exclusion (Lewin, 2007)



Zone 4 contains those excluded from lower secondary school as a result of failing to be selected, being unable to afford costs, or dropping out before successful completion of primary school. Access to secondary schooling promotes the social mobility needed to give poor households more access to higher income employment. Zone 5 includes those who have entered lower secondary school but who fail to progress to the end of the cycle. In most countries lower secondary is now considered part of basic education. Many who fail to complete the cycle are likely to be below the legal working age if they are in the appropriate grade for their age. The reasons for drop out include poor performance, affordability, and loss of interest. Finally, zone 6 contains lower secondary children at risk of drop out. As with zone 3, some children in secondary school will be 'silently excluded' although they are enrolled, and at risk as a result of poor attendance and low achievement. Meaningful access is achieved by those who complete a good quality lower secondary schooling and achieve the level of knowledge and competencies to fully participate in society.

To our knowledge, none of the above empirical studies have applied such a broad concept of educational access when looking at the role of parental education. This broad conceptualisation of educational access is particularly important in the context of resource constrained educational systems where a significant number of children are still denied access to the most basic form of education. Research has started to show that children who drop out are different to those who are permanently excluded from education in terms of poverty levels and other social background factors that predict educational status (Sabates, Hossain and Lewin, 2010). CREATE has several studies analysing SSA countries such as Ghana, Kenya, Malawi and South Africa using the model of zones of exclusion. For example, studies on Ghana and Kenya suggest that almost a quarter of children who enrol at school fail to complete the primary cycle and half of them do not complete junior secondary. Hence, the majority of children out of school are those who started schooling but have not persisted

(Rolleston, 2009). A review of educational access in South Africa indicates that achievement remains as an issue of 'silent exclusion', where learners fail to reach minimum and meaningful standards of achievement (Gilmour and Soudien, 2008). Enrolments have increased rapidly in Grade 1 in SSA countries with UPE programmes accelerated by the Education for All commitments made at Jomtien in 1990. However, completion rates have not increased enough and most of those entering Grade 1 fail to graduate successfully from primary school. Hence we continue to operationalise the CREATE model of educational exclusion using secondary sources of data. We explain this in the next section.

4. Methods, Data and Variables

4.1 Data

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), whereas the other in the beginning of this century (2003 for Kenya and Nigeria; 2004 for Malawi; 2006 for Uganda; 2007 for Tanzania and Zambia). All DHS surveys are nationally representative of the population. In all countries, two-stage sample selection procedures are followed and appropriate weights are derived, which we use in our empirical analyses.

The key methodological aspect of these surveys is that we are able to identify a cohort of mothers who experienced the same educational system and two cohorts of children who experienced education at different periods of time. In particular, one cohort of children experienced education during the 1980s, before the EFA conference in Jomtien, and during a time when many SSA countries experienced recession. The other cohort experienced education during the 1990s, after the policy push for the provision of educational opportunities for all children and the commitment by international donors to secure funds for education and health. For these two cohorts of children their mothers experienced education during the 1960s. The flows of resources that were committed at Jomtien were uneven and took several years to gain momentum in different SSA countries so no simple patterns of causality are likely. However it is clear that the goals were to reduce educational exclusion and differences between groups, whatever the precise causality.

In order to identify the cohorts of children and their mothers, the following sample selection strategy was used from each DHS data. First, we selected children aged 15 to 19 as these children should have completed the full cycle of primary and lower secondary school. Hence, we are able to estimate the likelihood that these children have progressed through school without entering any of the different zones of exclusion, or their proxy measures[3]. Secondly, we identified 15 to 19 year olds for whom we were able to identify their mother. DHS data on relationship structure only refers to individuals' relationship to the head of the household. So, 15 to 19 year olds who were not sons or daughters (natural or adopted) of the female head or female spouse of male head were dropped from the sample.

Thirdly, we selected a cohort of mothers who experienced the same educational system. We focus on mothers exclusively for two reasons. First, DHS data target women aged 15 to 49, so sample sizes for pairs of mothers and children are larger than for fathers and children. Second, research has shown the importance of mothers for children's health and education in the context of development (Anderson, Butcher and Levine, 2003). For the first cohort of children, those aged 15 to 19 in the 1990s data, we selected mothers aged 35 to 44 years. For the second cohort of children, those aged 15 to 19 in the 2000s data, we selected mothers aged 45 to 54 years. Since there is at least one decade between the surveys, then mothers of

[3] A seven year old, for instance, can only be located in zones of exclusion 1 (never enrolled), 2 (drop-out) or 3 (enrolled by not attending or not performing academically). Hence age will be a strong determinant of the probability of entering into different zones of exclusion, not because younger children have a higher likelihood of being excluded from zones 4 or 5 but because they have not yet reached the cycle of education that corresponds to zones of exclusion 4 or 5.

the first and second cohorts of children are representative of the same population, i.e. women born between mid-1940s and mid-1950s. These mothers should have experienced the same educational system, around the 1960s. Their children experienced educational systems at different times separated by about a decade, one in the 1980s and the other in the 1990s. This sample strategy enables us to investigate the changing role of maternal education for boys and girls who may have experienced increased educational access due to policies to improve education and to examine the role of maternal education for children's educational access for different wealth groups[4].

4.2 Variables

Outcome Variable Educational Access: Information about current educational status was provided for all 15 to 19 year olds living in the household. We focus here on two particular indicators to identify proxy measures for the CREATE zones of exclusion (see Table 1). The first indicator relates to the highest educational attainment, which could be no education, incomplete primary, complete primary, incomplete secondary and complete secondary. The second indicator is whether the young person is still in school. So, 15 to 19 year olds who have achieved no education and are not in school are considered to be in zone 1, never enrolled. Those who had some primary education but not completed and are not in school are considered to be in zone 2, drop out from primary school. Every 15 to 19 year old still in primary school are considered to be in zone 3, these young people are over age but still in education. Those who completed primary school and are not in education are considered to be in zone 4, completed primary school and not making the transition into secondary education. Zone 5 is identified for those young people who made the transition into secondary school but dropped out whereas those who are still in secondary education are considered to be in zone 6, at risk of dropping out from secondary education. Finally, all 15 to 19 year olds who have completed secondary or higher education are considered not to fall into any of the "zones of exclusion". This departs from the wider definition used by CREATE that would require an assessment of learning outcomes that have utility as well as simply participation through the end of a cycle.

Table 1: Categorisation of Zones of Exclusion in DHS Data for 15 to 19 Year Olds

Highest educational attainment	*Still in school?*	*Zone of exclusion*
No education	No	Zone 1: Never enrolled
Incomplete primary	No	Zone 2: Drop-out primary school
Incomplete primary	Yes	Zone 3: In primary school over age
Complete primary	No	Zone 4: Completed primary & drop-out
Incomplete secondary	No	Zone 5: Transition into secondary school & drop-out
Complete primary	Yes	Zone 6: In secondary school over age
Complete secondary or higher	No or Yes	Meaningful access

Source: DHS data from household roster information on education.

[4] One potential limitation of this sample strategy is that it is not representative of all pairs of 15 to 19 year olds and their mothers, but only those who live at home with their mothers. The sample will be biased towards boys (since there are greater pressures for girls to enter into marriage at earlier age) and wealthier households.

The identification of some of the zones of exclusion is not exactly related to the conceptual definition provided by Lewin (2007). This is particularly the case for zone 3 and zone 6, for which data is needed on school attendance and achievement to identify those children who are at risk of dropping out who are likely to be "silently excluded". We use being over age for the appropriate grade as a proxy measure for the risk of dropping out. Recent studies have shown that being over age is closely linked to drop out. Hunt (2008) highlights the fact that that over age is one of the precursors of the process of dropping out from school. EPDC (2009) findings in 35 developing countries suggest that during the final year of primary school, children who are over age by two or more years have the highest drop out rates in all of the 35 countries. Hence, we believe that 15 and 19 year olds still in primary or junior secondary schooling have a higher risk of dropping out than children who are in their correct age-in-grade.

Main Explanatory Variable Maternal Education: Information was collected on mothers' highest level of school attended and the highest grade at the level. With these two indicators DHS data offers a derived variable for years of education, which we use as our indicator for maternal education. As mentioned above, we only selected mothers who were representative of the same cohort in both datasets. These mothers experienced schooling from the mid 1950s to the end of 1960s, during a time where independence from the UK occurred in all these countries[5]. The distribution of mothers' years of education is very similar in both datasets and there are not statistical differences over time.

Table 2 shows the correlation between mothers' years of education and children's educational access. There is a positive relationship between mothers' education and their children's educational access, indicating that mothers with high levels of education are likely to have children with better access to education than mothers with low levels of education. The range of the correlations is large, from 0.21 in Tanzania to 0.60 in Uganda. There are also gender differences in the correlation between mother's education and children's education. Larger correlations are found in general for mothers and daughters than for mothers and sons, this is particularly the case in Malawi and Uganda.

The most important observation from Table 2 is the persistence of the correlation coefficient for the mothers' education to children's educational access for the most recent cohort of children compared with the previous cohort. Recall that the most recent cohort of children were likely to experience the expansion in educational access at primary school level which have been put in place in all these countries since 1990. The earlier cohort experienced education during the early 1980s, a decade of fiscal restraint in most educational budgets in SSA. Table 2 shows that in Uganda, Malawi, Nigeria and Zambia the correlation coefficients have remained almost unchanged. In Tanzania it has decreased and in Kenya it became stronger. This issue will be explored more in detailed in the empirical section of this paper.

[5] Independence from the UK occurred in all these countries between 1960 and 1962.

Table 2: Spearman Correlation Coefficient, Mothers' Education and Children's Educational Access

	Parent-Child Cohort 1		Parent-Child Cohort 2	
	1990		2000	
	Boys	Girls	Boys	Girls
Kenya	0.241	0.320	0.452	0.448
Malawi	0.468	0.503	0.467	0.544
Nigeria	0.487	0.513	0.364	0.328
Tanzania	0.299	0.306	0.218	0.215
Uganda	0.321	0.606	0.384	0.536
Zambia	0.484	0.495	0.524	0.511

Other control variables: Individual level control variables include the age and gender of the child. Another main control in the analysis is household wealth. Household wealth is derived from information about the characteristics of the household dwelling and ownership of various assets. Filmer and Pritchett (1999) suggest using information from more than twenty of these asset 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[6]. We also use family characteristics and regional controls. Family characteristics are defined by household size, the number of children under the age of five 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 for each country. 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 this 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)[7]. 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).

4.3 Estimation Method

We use linear regression analysis to estimate the relationship between mothers' education and children's educational access (see Wooldridge, 2002 for information on multivariate regression analysis). In modelling educational access we include the average difference in educational access for the two cohorts of 15 to 19 year olds. This is achieved with a dummy variable for year of survey. The main parameters of interest are maternal education interacted with year of survey. The interaction measures whether the association between maternal education and children's access has changed between the two cohorts of children and the

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

[7] 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.

direction of the change. For these estimations we also include the square term for maternal years of education to capture any nonlinearity in these relationships. All estimations control for children's age, household wealth, family characteristics and regional controls. The analysis is undertaken separately for boys and girls to capture the gender dimension.

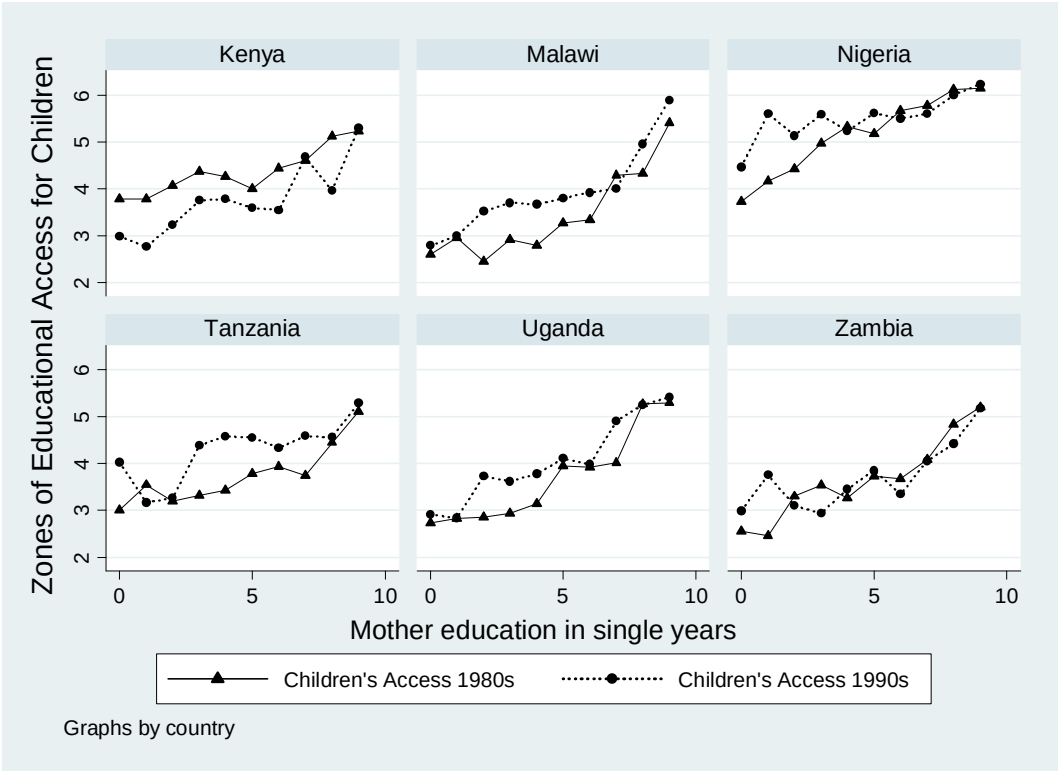
In addition, we use the wealth indicator of the household to generate wealth quintiles. We separated the dataset into the poorest 40^{th} percentile and the richest 40^{th} percentile of the distribution and re-estimated the models by gender. In these analyses, the main aim is to investigate the changes in the role of maternal education for their sons' and daughters' educational access for poor or rich households.

5. Results

Figure 2 shows the association between maternal education and children's educational access over time in the six selected African countries. In the y-axis we measure the seven point scale of educational zones of exclusion (taking into account that a higher value in this axis implies greater access). In the x-axis we measure maternal years of education, truncated at nine or more years. The solid line is the relationship between mother's education and children's educational access during the 1980s whereas the dotted line is for mother's education and children's educational access during the 1990s.

Following the correlation analysis shown in Table 2, we can see a positive relationship between children's educational access and their mother's years of schooling for all countries. A steep relationship is obtained for Malawi, Nigeria, Uganda and Zambia and much flatter for Tanzania. In all countries except in Kenya and Zambia there has been average improvement in educational access, sometimes with greater improvements for children whose mothers have low levels of education. This is the case in Nigeria, Uganda and to some extent Malawi, where the relationship between maternal education and children's educational access is higher at low levels of maternal education for children who experienced education during the 1990s. In Zambia there is almost no change in the average level of educational access of children according to maternal education in the two time periods. In Kenya, the situation seemed to have deteriorated with lower average levels of educational access according to maternal education for children who experienced education after 1990s.

Figure 2: Children's Educational Access Over Time According to Maternal Education in SSA Countries



Disaggregated analyses by gender and wealth are shown in Table 3 for Kenya, Malawi and Nigeria and in Table 4 for Tanzania, Uganda and Zambia. The first two columns of Tables 3 and 4 show results by gender, the next four columns disaggregate these results further by wealth. Wealth is divided according to quintiles, with boys/girls living in the bottom 40th percentile of the wealth distribution defined as poor and those living in the top 40th percentile of the wealth distribution defined as rich. The first row in Table 3 shows the average difference in educational access between children who experienced education during the 1990s compared with children who experienced education in the 1980s. The next row indicates the estimated association of maternal education with children's educational access and the third row is the interaction between maternal education and time, which indicates changes in the role of maternal education as the result of changes in children's educational access. The final row shows the quadratic relationship of maternal education to capture nonlinearity.

In Kenya, results showed that that girls' access to education during the 1990s was lower, on average, than during the 1980s. This was not the case for boys. Hence, the reduction shown in Figure 2 is mainly driven by reduction in average levels of educational access for girls who experienced education in the 1990s compared with girls who experienced education in the 1980s. We also found that maternal education in Kenya was positively associated with boys' educational access. This association was not found for girls. The higher the education of the mother, the more likely that the son progressed through education without entering any of the zones of exclusion. Notice, however, that this situation has become stronger for boys who experienced education during the 1990s. When disaggregating the analysis further by wealth we found that the role of maternal education for children's educational access is mainly associated with boys living in the richest 40th percent of the households. For rich boys,

educational access in the 1990s has increased and this increment has been particularly beneficial for boys whose mothers had high levels of education.

Table 3: Parameter Estimates [Standard Errors] for Access to Education for Children aged 15 to 19 and Association with Mothers' Education in Kenya, Malawi and Nigeria

VARIABLES	Boys	Girls	Poor Boys	Rich Boys	Poor Girls	Rich Girls
KENYA						
Children's access 1990s vs 1980s	-0.493	-0.768**	-0.376	2.144***	0.030	0.130
	[0.382]	[0.384]	[0.598]	[0.527]	[0.596]	[0.860]
Maternal Years Education	0.080**	0.042	0.060	0.098*	0.078	0.056
	[0.033]	[0.040]	[0.081]	[0.054]	[0.096]	[0.062]
Maternal Education 1990s vs 1980s	0.050*	0.025	-0.048	0.079**	-0.054	-0.008
	[0.027]	[0.030]	[0.060]	[0.039]	[0.061]	[0.049]
Maternal Years Education Squared	0.002	0.007*	0.008	0.001	0.002	0.007
	[0.003]	[0.004]	[0.011]	[0.004]	[0.013]	[0.005]
Observations	1071	853	476	354	349	307
MALAWI						
Children's access 1990s vs 1980s	0.867***	0.643*	0.982**	0.301	0.834**	0.010
	[0.318]	[0.332]	[0.539]	[0.624]	[0.391]	[0.551]
Maternal Years Education	0.118***	0.092**	0.086	0.157***	-0.059	0.130**
	[0.042]	[0.040]	[0.136]	[0.059]	[0.130]	[0.056]
Maternal Education 1990s vs 1980s	0.001	0.036	-0.063	0.035	0.113	0.044
	[0.029]	[0.027]	[0.086]	[0.039]	[0.077]	[0.034]
Maternal Years Education Squared	0.003	0.005*	0.024	0.003	0.006	0.004
	[0.003]	[0.003]	[0.019]	[0.005]	[0.021]	[0.004]
Observations	885	619	294	404	157	341
NIGERIA						
Children's access 1990s vs 1980s	0.451	1.180***	0.563	0.385	1.917*	1.399*
	[0.397]	[0.412]	[0.836]	[0.574]	[0.978]	[0.720]
Maternal Years Education	0.159***	0.118***	0.147	0.151***	-0.090	0.058
	[0.042]	[0.045]	[0.227]	[0.046]	[0.203]	[0.046]
Maternal Education 1990s vs 1980s	0.015	-0.057*	0.042	-0.048	0.050	-0.043
	[0.029]	[0.032]	[0.172]	[0.031]	[0.144]	[0.031]
Maternal Years Education Squared	-0.008***	-0.002	-0.008	-0.005*	0.031	0.002
	[0.003]	[0.003]	[0.037]	[0.003]	[0.034]	[0.003]
Observations	988	710	324	474	172	393

Source: DHS. Notes: Asterisks *, **, ***, represents statistical significance at 10, 5 and 1% level, respectively.
Poor/rich defined as those in the bottom/top 40th percentile of wealth distribution.
All estimations include controls. Estimations weighted and adjusted for survey design.

In Malawi, we found a different story. Both boys and girls have, on average, higher levels of educational access during 1990s than they did during 1980s. Maternal education is found to be associated with greater access for boys and for girls. Hence, the initial result shown in Figure 2 for Malawi does not have a gendered dimension. In addition, we found interesting results when disaggregating the analysis further by wealth. We did not find that mothers' years of education are associated with educational access for those children who live in the poorest 40th percent of the households. Maternal education is associated with greater educational access for children at the top 40th percent of the wealth distribution. This result

may suggest that in the absence of wealth the potential benefit of maternal education for children's education is restricted, but in combination with wealth, maternal education is likely to be associated with greater educational access for children. Finally, we found that children living in the poorest households who experienced education during the 1990s had, on average, higher levels of educational access than similar children who experienced education during the 1980s. Over this period the position of the poorest improved.

In Nigeria we found increasing educational access for girls who experienced education during the 1990s compared with girls who experienced education during the 1980s. This was not the case for boys. Differences in educational access according to maternal education were found for boys and for girls. However, we found reductions in inequality in educational access according to maternal education for girls during the 1990s compared with the 1980s. This is mainly shown by the negative and statistically significant coefficient of the interaction between maternal education and time (-0.057). This result suggests that educational access for girls according to maternal education increased significantly more for girls whose mothers have low levels of education relative to those whose mothers have high levels of education. This result is in line with the increasing access found in Figure 2 for Nigerian children according to maternal education. The analysis shown here indicates that the improvements in educational access and equality in Nigeria had a gendered dimension geared towards girls. When disaggregating the analysis further by wealth, we found a positive relationship between maternal education and their sons' educational access for boys living in rich households. This was not the case for boys living in poor households. This result was similar to the one found for Malawi. Both girls living in poor and rich households who experienced education in the 1990s had, on average, greater educational access than poor and rich girls who experienced educational access during the 1980s.

From Table 4 we found that children in Tanzania who experienced education in the 1990s had higher average access than children who experienced education during the 1980s. In addition, there is a gradient in educational access for these children according to maternal education. This gradient has not changed for boys or for girls over the last decade. However, the gradient has become flatter for rich boys and rich girls, indicating perhaps a movement towards equality in educational access according to maternal education for children living in households who have a certain level of wealth. We further found that education of the mother is associated with greater educational access for poor and rich girls (but not for boys).

In Uganda there has been an increase in educational access for children who experienced education in the 1990s compared with children who experienced education in the 1980s (Figure 2). The increase in educational access was mainly for girls (see Table 4). In addition, we found a gradient in educational access for girls according to maternal education, but this gradient has declined over time. Hence, it is possible that girls who experienced education in the 1990s whose mothers had low levels of education had greater access to education than girls whose mothers had high levels of education. In Uganda it is interesting that boys living in rich households experienced an increase in educational access over the last decade. For girls the situation was different as both poor and rich girls experienced an increase in educational access during the 1990s compared with the 1980s. The gradient in educational access according to maternal education is more marked for boys and girls living in richer households. This result was consistent with results for Malawi and Nigeria.

Finally, there have been no average improvements in educational access in Zambia (consistent with information shown in Figure 2). The main result in Zambia is the educational

gradient according to maternal education for both boys and girls and the persistence of this gradient for rich boys and for rich girls. Again, similar to Malawi, Nigeria and Uganda, there is a gradient in educational access according to parental education for children who live in rich households.

Table 4: Parameter Estimates [Standard Errors] for Access to Education for Children aged 15 to 19 and Association with Mothers' Education in Kenya, Malawi and Nigeria

VARIABLES	Boys	Girls	Poor Boys	Rich Boys	Poor Girls	Rich Girls
TANZANIA						
Children's access 1990s vs 1980s	0.870**	1.262***	0.893**	0.901	-0.303	1.013
	[0.411]	[0.412]	[0.451]	[0.695]	[0.617]	[1.177]
Maternal Years Education	0.086***	0.164***	0.102	0.057	0.301***	0.155***
	[0.032]	[0.039]	[0.083]	[0.044]	[0.103]	[0.054]
Maternal Education 1990s vs 1980s	-0.01	-0.027	-0.063	-0.085*	-0.026	-0.102**
	[0.032]	[0.035]	[0.061]	[0.045]	[0.083]	[0.050]
Maternal Years Education Squared	0.002	-0.006	0.004	0.009*	-0.026*	0.001
	[0.004]	[0.004]	[0.012]	[0.004]	[0.015]	[0.006]
Observations	1029	859	347	497	277	416
UGANDA						
Children's access 1990s vs 1980s	0.65	1.655***	-0.161	2.403***	2.770***	2.001***
	[0.419]	[0.478]	[0.535]	[0.567]	[0.976]	[0.614]
Maternal Years Education	0.063	0.224***	0.025	0.149***	0.250*	0.232***
	[0.040]	[0.036]	[0.124]	[0.053]	[0.142]	[0.063]
Maternal Education 1990s vs 1980s	-0.003	-0.077**	-0.068	-0.055	-0.154	-0.052
	[0.034]	[0.039]	[0.081]	[0.045]	[0.103]	[0.054]
Maternal Years Education Squared	0.004	-0.005	0.017	0.001	-0.003	-0.004
	[0.003]	[0.003]	[0.018]	[0.004]	[0.019]	[0.004]
Observations	774	614	298	312	222	279
ZAMBIA						
Children's access 1990s vs 1980s	-0.187	0.115	0.362	0.463	0.686	0.021
	[0.437]	[0.351]	[0.958]	[0.577]	[0.670]	[0.556]
Maternal Years Education	0.138***	0.138***	0.122*	0.124**	0.104	0.188***
	[0.034]	[0.038]	[0.062]	[0.062]	[0.082]	[0.070]
Maternal Education 1990s vs 1980s	-0.009	-0.022	0.001	-0.003	-0.098	0.009
	[0.024]	[0.025]	[0.054]	[0.038]	[0.066]	[0.036]
Maternal Years Education Squared	0.001	-0.001	0.004	0.002	0.008	-0.002
	[0.002]	[0.002]	[0.006]	[0.003]	[0.010]	[0.004]
Observations	843	715	309	367	223	368

Source: DHS. Notes: Asterisks *, **, ***, represents statistical significance at 10, 5 and 1% level, respectively.
Poor/rich defined as those in the bottom/top 40th percentile of wealth distribution.
All estimations include controls. Estimations weighted and adjusted for survey design.

6. Conclusion

This paper has focused on the relationships between mother's education and children's educational access in six SSA countries. Since 1990 there has been a push in all six countries to universalise primary education, supported by international donors and national governments. More children now have access to basic education than did two decades ago. Nevertheless, all these countries still show very large inequalities in educational access, whether associated with household level economic resources, such as wealth or income, or by socio-cultural resources, such as parental education and occupational prestige (Lewin and Sabates, 2011). Inequalities in educational access associated with levels of parental education are often observed in developed high income countries where there is very often a gradient in educational outcomes associated with parents' income and educational levels (Piraino and Haveman, 2006). In this analysis of children in six SSA countries, those who live in poverty are less likely to enter education than rich children. If they do enter into education, they are less likely to complete the cycle of basic education, and even if they do complete the cycle, the quality of the educational provision they receive is generally worse than that for rich children.

Across the six SSA countries sampled it is clear that children who have mothers with higher levels of education are more likely to complete the basic cycle of education successfully than children whose mothers have lower levels of education. The strength of the effect varies between countries, but it is always in the same direction. The research asked whether the relationships between mothers' education and educational access had changed over time between those in school in the 1980s, and those in school in the 1990s. It was predicted that the gradients of educational access according to mothers' education should flatten between the different time periods. We did not find consistent support for this proposition in the data across the countries over time. Only in Uganda and Nigeria, and to some extent in Malawi, did it appear that there were reductions in the educational gradient for children according to their maternal education. In Tanzania the gradient did not change, though it was also true that in Tanzania there was the flattest gradient of educational access in relation to maternal education.

An interesting result relates to the role of maternal education for children who live in households with greater material resources. Although there is a gradient in educational access according to maternal education for all children, the gradient is often steeper for those children living in the wealthiest households. It is therefore possible that there is a threshold effect related to material resources below which maternal education has only weak incremental effects, and above which there is a much stronger positive correlation. This could be an indication of the capability to mobilise forms of cultural and economic capital that are not feasible for those in the lowest quintiles of assets who have little discretionary ability to reallocate resources to invest in education. It may be that the concave rate of return sometimes observed with educational level (Kingdon and Theopold 2008), also resonates with the changing influence of mothers education when this interacts with the material basis on which to act to improve educational access and attainment. As returns to primary schooling fall (Colclough, Kingdon and Patrinos, 2010) because more and more children participate, the differential effect of more educated mothers at this level is also likely to diminish, and become more evident at higher levels.

The analysis in this paper has limitations. First, the time lag between the 1980s and 1990s samples of children may not have been long enough for changing policy commitments to

have had an effect. Thus any impact from EFA post the 1990 World Conference would only have gathered momentum by the end of the 1990s in terms of large scale changes in participation in schooling. It is also true that the reductions in educational expenditure in common in SSA during the 1980s could have had consequences that lingered well into the 1990s. And in any case the impact of recession and debt crises was uneven across countries. Thus a wide range of economic, social and political factors including commodity price fluctuations and social conflict and war could be behind the changes we have observed.

Second the selected sample is not representative of all children aged 15 to 19 and their respective mothers. We were only able to identify children living at home whose mother was the head of the household or the spouse of the head. In our estimations this resulted in greater reductions in sample size for girls than for boys and for poorer households than for richer households so that overall it was not entirely representative of the population. Third, we selected mothers of a particular age group with children aged 15 to 19 who were living at home. This excluded girls and boys in the age group who had left home to seek work and/or who had formed their own independent families. The sample therefore does not capture relationships between maternal education and children's education for those children who do not live with their natural or adoptive mother.

In summary the analysis indicates that the associations between mothers' education and children's access to education remain widespread and can be quite strong. More often than not the relationship is more significant amongst the relatively rich than amongst the poorest. It may also be stronger the greater the number of years of education the mother has. Between the samples in the 1980s and 1990s the changes we see are not very great, and nor are they very consistent across countries. This may be because the time period is too short to see changes, and it may be that the causality of the changes that are observed is much more complex than a simple model can capture. Nevertheless the changes that do appear provide an invitation to explore in more detail at country level what the reasons might be. We can note that EFA should result in a weakening of the relationship between mothers' education and children's access to education at the level of basic education as it becomes universalised. This clearly is yet to happen for these samples of children.

It is not possible to reach singular policy related conclusions across the countries in the data set since the patterns vary. The analysis does give an indication of several areas that invite further enquiry at a country level, and the collection of more evidence to inform, policy dialogue. These include:

- Track the impact of mother's education on educational attainment to establish whether its significance in determining differences in access to basic education is diminishing.

- Establish if there are household wealth related interactions between mother's education and access and if so identify measures which might strengthen the relationships amongst the poorest households.

- Determine whether post school interventions to raise mother's educational levels (adult literacy classes, post school adult basic education and training (ABET) have a positive impact on children's access to education.

- Identify community inputs that can compensate for the disadvantages associated with having mothers' with low levels of education including pre-school provision for poor households.

- Support the development of child seeking schools which are child friendly to complement a possible lack of maternal cultural capital.

References

African Development Bank, AfDB. (2007) Review of bank assistance effectiveness in the education sector (1975-2005). Tunis, Tunisia: African Development Bank Group.

Alain-Désiré, N., and Désiré, V., (2007) Intergenerational education mobility of black and white South Africans. *Journal of Population Economics*, 20(1):149–182.

Ananga, E., (2011) Typologies of School Dropout: the Dimensions and Dynamics of Exclusion from Universal Basic Education in Ghana, paper accepted for a CREATE special issue of the *International Journal of Educational Development.*

Anderson, P. M., Butcher, K. F. and Levine, P. B., (2003) Maternal Employment and Overweight Children. *Journal of Health Economics*, 22: 477-504.

Behrman, J., Gaviria, A., and Székely, M., (2001) Intergenerational mobility in Latin America. *Economia*, 2(1):1-44.

Binder, M., and Woodruff C., (2002) Inequality and intergenerational mobility in schooling: The case of Mexico. *Economic Development and Cultural Change*, 50(2):249-267.

Björklund, A., Jäntti, M., and Solon, G., (2005) Influences of Nature and Nurture on Earnings Variation: A Report on a Study of Various Sibling Types in Sweden. In *Unequal Chances: Family Background and Economic Success*, Samuel Bowles, Herbert Gintis and Melissa Osborne, eds. Princeton University Press.

Björklund, A., Lindahl, M., and Plug, E., (2006) The origins of intergenerational associations: lessons from Swedish adoption data. *Quarterly Journal of Economics*, 121 (3), 999–1028.

Blanden, J., and Machin, S., (2004) Educational Inequality and the Expansion of UK Higher Education. *Scottish Journal of Political Economy* 51(2), 230-249.

Blanden, J., Gregg, P., and Machin, S., (2003) Changes in Educational Inequality. CMPO Working Paper Series No. 03/079, Bristol.

Bowles, S., and Gintis, H., (2002) The Inheritance of Inequality. *Journal of Economic Perspectives* 16(3), 3-30.

Boyle, S., Brock, A., Mace, J. and Sibbons, M., (2002) Reaching the Poor: the 'costs' of sending children to school: a six country study. DFID Educational Papers, No. 47. London: DFID.

Bronfenbrenner, U., (1979) *The Ecology of Human Development*. Cambridge, MA: Harvard University Press.

Bronfenbrenner, U., (1986) Ecology of the family as a context for human development: Research perspectives. *Developmental Psychology*, 22, 723–42.

Bynner, J., and Joshi, H., (2002) Equality and opportunity in education: evidence from the 1958 and 1970 birth cohort studies. *Oxford Review of Education*, 28(4), 405-425.

Cain, M. T., (1977) The Economic Activities of Children in a Village in Bangladesh. *Population and Development Review*, 3(3): 201-227.

Chevalier, A. Halmon, C., O'Sullivan, V., and Walker, I., (2005) The Impact of Parental Income and Education on the Schooling of their Children. Institute for Fiscal Studies and IZA.

Chevalier, A., (2004) Parental Education and Child's Education: A Natural Experiment. IZA discussion paper No. 1153.

Chevalier, A., Denny, K., and McMahon, D., (2003) A Multi-country Study of Inter-generational Educational Mobility. ISSC Discussion Paper 2003/06. Dublin.

Colclough, C., Kingdon, G. and Patrinos, H., (2010) The Changing Pattern of Wage Returns to Education and its Implications. *Development Policy Review*, 28(6):733-747.

de Broucker, P. and Underwood, K., (1998) Intergenerational education mobility: An international comparison with a focus on postsecondary education. *Education Quarterly Review*, 5(2):30-51.

De Graaf, P., and Kalmijn, M., (2001) Trends in the Intergenerational Transmission of Cultural and Economic Status. *Acta Sociologica*, 44(1): 51-66.

Dearden, L., Machin S., and Reed, H., (1997) Intergenerational mobility in Britain. *Economic Journal*, 107: 47–66.

Education Policy and Data Center (EPDC), (2009). Pupil Performance and Age: A Study of Promotion, Repetition, and Dropout Rates among Pupils in Four Age Groups in 35 Developing Countries. Working Paper EDPC-09-02. Washington DC: Education Policy and Data Center.

Feinstein, L., Duckworth, K. and Sabates, R., (2004) *A Model of the Inter-generational Transmission of Educational Success*. Research Report 10. London: Centre for Research on the Wider Benefits of Learning, Institute of Education, University of London.

Feinstein, L., Duckworth, K. and Sabates, R., (2008) Education and the Family: Passing Success Across Generations. In Peter Aggleton and Sally Power (Eds), *Foundations and Futures of Education*, Oxford: Routledge.

Fentiman, A., Hall, A. and Bundy, D., (1999) School Enrolment Patterns in Rural Ghana: a comparative study on the impact of location, gender, age and health on children's access to basic schooling. *Comparative Education*, Vol 35, 3, 331-349.

Filmer, D., and L. Pritchett, L., (1999) The Effect of Household Wealth on Educational Attainment: Evidence from 35 Countries. *Population and Development Review* 25(1): 85-120.

Gakusi, A. E., (2008). African Education Challenges and Policy Responses: Evaluation of the Effectiveness of the African Development Bank. *Third Annual African Economic Conference on "Globalization, Institutions and Economic Development of Africa"*. Tunis 12-14 November 2008.

Gakusi, A. E., (2010). African Education Challenges and Policy Responses: Evaluation of the Effectiveness of the African Development Bank's Assistance. *African Development Review*, 22, 208-264.

Galindo-Rueda, F., and Vignoles, A., (2005) The Heterogeneous Effect of Selection in Secondary Schools: Understanding the Changing Role of Ability. CEE Discussion Papers 0052, Centre for the Economics of Education, LSE.

Gilmour, D. and Soudien, C., (2008). Learning and equitable access in the western Cape, South Africa'. *Comparative Education*, 45.

Gregg, P., and Machin, S., (2000) The Relationship Between Childhood Experiences, Subsequent Educational Attainment and Adult Labour Market Performance. In K. Vleminckx and T. Smeeding (Eds.), *Child Well Being in Modern Nations: What do we know?* Bristol, Policy Press.

Hanson, T. L., McLanahan, S., and Thomson, E., (1997) Economic resources, parental practices, and children's well-being. In G. J. Duncan and J. Brooks-Gunn (Eds.), *Consequences of being poor*. (190-238). New York: Russell Sage Foundation.

Haveman, R. and B. Wolfe, B., (1995) The determinants of children's attainments: a review of methods and findings. *Journal of Economic Literature*, 33, 1829–78.

Heineck, G. and Riphahn, R. T., (2009) Intergenerational Transmission of Educational Attainment in Germany - The Last Five Decades. *Journal of Economics and Statistics (Jahrbücher für Nationalökonomie und Statistik)*, 229(1), 36-60.

Hertz, T., Jayasundera, T., Piraino, P., Selcuk, S., Smith, N., and Verashchagina, A., (2008) The Inheritance of Educational Inequality: International Comparisons and Fifty-Year Trends. *The B.E. Journal of Economic Analysis & Policy*, Berkeley Electronic Press, vol. 7(2).

Hill, M. S., Yeung, W., and Duncan, G. J., (2001) Childhood family structure and young adult behaviours. *Journal of Population Economics*, 14, 271-299.

Hobcraft, J., and Kiernan, K., (1999) Child poverty, early motherhood and adult social exclusion. (CASE paper 28). London: London School of Economics.

Hunt, F., (2008) Dropping out from school: A cross-country review of literature. CREATE Pathways to Access Monograph No 16. Consortium for Research on Educational Access, Transitions and Equity: Brighton, University of Sussex.

Joshi, H. and Verropoulou, G., (2000) Maternal Employment and Child Outcomes: Occasional paper. London: The Smith Institute.

Kingdon, G. and Theopold, N., (2008) Do Returns to Education Matter to Schooling Participation? *Education Economics*, 16(4): 329–350.

Lewin, K. M. and Akyeampong, K., (2009) Education in sub-Saharan Africa: researching access, transitions and equity. *Comparative Education*, 45, 143-150.

Lewin, K. M. and Sabates, R., (2011) Changing patterns of Access to Education in Anglophone and Francophone Countries in Sub-Saharan Africa: Is Education For All Pro-Poor? CREATE Pathways to Access Monograph No. 52, Consortium for Research on Educational Access, Transitions and Equity, Brighton, University of Sussex.

Lewin, K. M., (2007) Improving Access, Equity and Transitions in Education: Creating a Research Agenda. CREATE Pathways to Access Monograph No. 1, Consortium for Research on Educational Access, Transitions and Equity, Brighton, University of Sussex.

Lillard, L., and Willis, R., (1994) Intergenerational educational mobility: Effects of family and state in Malaysia. *Journal of Human Resources*, 29(4):1126-1166.

Little, A. W., (2008) Size matters for EFA. CREATE Pathways to Access Monograph No 26. Consortium for Research on Educational Access, Transitions and Equity: London and Brighton, Institute of Education and University of Sussex.

Oreopoulos, P., Page, M., and Stevens, A., (2006) The Intergenerational Effects of Compulsory Schooling. *Journal of Labor Economics*, 24(4), 729-760.

Pastore, J., and Zylberstajn. H., (1996) Social mobility: The role of education in determining status. In *Opportunity Foregone: Education in Brazil*, Birdsall, N., and Sabot, R, H (eds.). Washington: Inter-American Development Bank.

Piraino, P., and Haveman, R., (2006) Generational Income Mobility. *Review of Income and Wealth*, 52(3): 477-486.

Plug, E. and Vijverberg, W., (2003) Schooling, Family Background, and Adoption: Is It Nature or Is It Nurture? *The Journal of Political Economy*, 111(3): 611-641.

Plug, E., (2004) Estimating the Effect of Mother's Schooling on Children's Schooling Using a Sample of Adoptees. *The American Economic Review*, 94(1), 358–368.

Rolleston, C. (2009). The determination of exclusion: evidence from the Ghana Living Standards Surveys 1991-2006. *Comparative Education*, 45**,** 197 - 218.

Sabates, R. and Duckworth, K., (2010). Maternal schooling and children's relative inequalities in developmental outcomes: Evidence from the 1947 school leaving age reform in Britain. *Oxford Review of Education*, 36(4): 445-461.

Sabates, R., Hossain, A. and Lewin, K. M., (2010) School Drop Out in Bangladesh: New Insights from Longitudinal Evidence. CREATE Pathways to Access Research Monograph No. 49, Brighton: University of Sussex.

Sacerdote, B., (2002) The Nature and Nurture of Economic Outcomes. *American Economic Review (Papers and Proceedings)* 92:2, pp. 344-348.

Sato, H., and Shi. L., (2007) Class origin, family culture, and intergenerational correlation of education in rural China. IZA, Bonn, Germany, Discussion Paper 2642.

Schoon, I., Bynner, J., Joshi, H., Parson, S., Wiggins, R. D., and Sacker, A., (2002) The influence of context, timing, and duration of risk experiences for the passage from childhood to midadulthood. *Child Development*, 73, 1486-1504.

Smith, J. R., Brooks-Gunn, J., and Klebanov, P. K. (1997) The consequences of living in poverty for young children's cognitive and verbal ability and early school achievement. In G. J. Duncan and J. Brooks-Gunn (Eds.), *Consequences of growing up poor*. (132-189). New York: Russell Sage Foundation.

Thomas, D., (1996) Education across generations in South Africa. *American Economic Review*, 86(2):330-334.

UNESCO, (2010) *Reaching the marginalized. EFA Global Monitoring Report.* Oxford University Press, United Kingdom.

Wolfe, B. and Haveman, R., (2002) Social and non-market benefits from education in an advanced economy. Paper presented Conference Series 47, Education in the 21st Century: Meeting the Challenges of a Changing World, Federal Reserve Bank of Boston, June 2002.

Wooldridge, J., (2002) Econometric Analysis of Cross Section and Panel Data. MIT Press, Cambridge, MA.

Consortium for Research on
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Report summary:

This paper analyses the gap in educational access according to maternal education over a 10 year period using evidence from the Demographic Health Surveys (DHS) in six African countries. To investigate the narrowing or widening in the gap in educational access according to maternal education, two cohorts of children and one cohort of mothers were selected from each of the DHS datasets. Our results show a gradient in children's educational access according to maternal education which has declined over time for girls in Nigeria, Uganda and Malawi. A very flat educational gradient remained unchanged in Tanzania. In Kenya we found that average access to school declined for girls who experienced education during the 1990s compared with girls who experienced education during the 1980s, whereas in Zambia we found a constant gradient in educational access for children according to maternal education. In summary the analysis indicates that associations between mothers' education and children's access to education remain widespread and can be quite strong.

Author notes:

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Professor Keith Lewin is Director of the Centre for International Education at the University of Sussex and of CREATE. He has extensive experience in Sub-Saharan Africa, South and South East Asia, and China, has published 18 books and over 100 scholarly articles and chapters, and supervised 40 D Phil students. He has worked extensively with the World Bank, DFID, DSE/GTZ, UNICEF, and UNESCO, and the International Institute of Educational Planning. Keith presented at the world education conferences at Jomtien and Dakar, and has contributed to sector development planning in Uganda, Tanzania, Rwanda, and South Africa, and in India, Mauritius, and Sri Lanka. His research interests include the economics of education, educational financing, educational policy and planning, teacher education, science education policy, assessment, and aid to education.

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