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UPE and Social Inequality in Uganda: A Step Backward or a Step in the Right Direction?

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UPE and Social Inequality in Uganda:
A Step Backward or a Step in the Right Direction?

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Abstract

It is widely agreed that studying the relationship between school quality and academic achievement will benefit public investment in education. This is particularly true in Africa where, the 1990 World Conference on 'Education for All' led to renewed commitments to quality basic education. At this time, Uganda implemented a set of public reforms that were designed to increase educational opportunities in poor communities. This paper uses data from the second wave of a cross-national survey of schools in Southern and Eastern Africa to assess some dimensions of these Ugandan reforms. Hierarchical linear models are estimated to investigate which schools most effectively ensure a meaningful educational experience for children who face economic and social hardships. Contrary to earlier studies in developing countries, the positive relationship between socioeconomic status and student performance is striking and significant. In line with the school effectiveness theory, resource availability proves to be consistently related to educational quality and its equitable distribution in Uganda.

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1. Introduction

This study contributes to our understanding of how schools can respond to socioeconomic differences in academic achievement. Like many less developed countries, primary school education in Uganda has undergone numerous reforms over the years. These changes reflect both local and international events. One policy that has had a dramatic effect on educational delivery is the introduction of Universal Primary Education (UPE). UPE was endorsed internationally at the World Conference on Education in Thailand in 1990 and at a follow-up conference in Senegal ten years later (UNESCO 2000). With the removal of fee structures, education has become more accessible to the very poor. Mass education drives have also exerted unprecedented pressure on the education system. Government expenditure on primary school education has increased dramatically. Governments and local communities have also invested in upgrading school facilities, recruiting teachers and upgrading the skills of staff (Alubisia 2005).

Data from Uganda that are used in this study were collected two years after the introduction of UPE in that country. We consider which schools coped most effectively under these conditions. We identify how schools differed in educating a socially diverse population and which schools were more effective for students of low socioeconomic status. We explore this particular issue based on Grade 6 literacy test scores because this is a subject where outside support can significantly influence subject mastery and where the poor are at a distinct disadvantage (van Steensel 2006; Willms 2004). There is mounting evidence that children from impoverished homes have limited access to written material, have little exposure to regular reading habits in the home and are therefore at a higher risk of academic failure in reading (Smith and Dixon 1995; Willms 2004).

A longstanding debate exists about the importance of resources as an influence on education. The emerging consensus is that the strength of association is greater in developing countries where even basic facilities are scarce and where variation in the supply of education resources between schools is known to exist (Fuller 1987; Heyneman et al. 1981; Heyneman and Loxley 1983; Lee et al. 2005; Lockheed 1993; Lockheed and Hanushek 1988). In the same way, because children from poorer homes have limited access to educational resources outside of school, it is more likely that resource benefits will be greater among poorer students within a school.

The literature has also suggested that although the magnitude of resource effects on academic achievement is greatest in areas of scarcity, the marginal gain of expanding resource availability may depend on how resources are classified (Raudenbush and Bhumirat 1992). The

intent of this paper is to understand both direct and indirect resource effects because this carries with it important implications for policy decisions about where to focus resource distribution. What qualifies as an important resource input depends heavily on the context of a school, the structure of the education system and whether resources are identified as a school or a student characteristic.

Although the role of socioeconomic status on educational inequality has been widely reported in high-income countries (Blossfeld and Shavit 1993; Burstein et al. 1980; Hauser 1970), researchers often downplay its importance in widening gaps in academic achievement within developing countries (Heyneman 1976a; Heyneman 1976b). Moreover, whereas previous studies have provided very narrow definitions of educational resources, we use a research model that is more comprehensive. Each type of resource reaches the school through different mechanisms. Our approach underscores the importance of clearly identifying the pathways through which resources affect educational quality, especially in a developing setting where scarcity is the norm rather than the exception.

This paper is not an assessment of whether learning outcomes deteriorated after UPE was introduced in Uganda (although evidence strongly suggests that they did). How resource distribution related to scholastic development in the context of a mass education system remains the central consideration. The guarantee of a quality public education is not an easy undertaking. As Lockheed and Verspoor (1991, p.271) explain, the goal is to "…design a system of allocating central government resources that would favour disadvantaged communities and would complement locally generated resources."

We focus our empirical work on three specific issues. First, we address the question of how student background characteristics relate to academic achievement within the context of free primary education. The second question investigates the relationship between school resources and educational quality. The remaining question investigates whether resource effects differ depending on a student's background. We begin by discussing the condition of primary schooling in Uganda and the social mix of students attending state schools at the time data for this study were collected. We also review related literature on resource effects and educational quality in Uganda and the empirical evidence in the period leading up to educational reforms. The results of data analysis are divided into two sections. The first presents the descriptive evidence on students and schools in Uganda and the second reveals the results of the multilevel modelling.

2. The Condition of Uganda's Primary Schools

2.1 Education in the Colonial Era

Uganda, alongside Kenya and Tanzania, formed part of the British East African protectorate between 1894 and 1962. Uganda's experience under British control is an excellent example of rule by means of inciting divisions among local groups. The British nurtured favourable relations with the Buganda kingdom that were to haunt Uganda for many years (Arnold 2005). In exchange for British support in quashing rival kingdoms, the Baganda offered their services to the British as low-ranking officials. With the aid of Christian missionaries, many schools were built especially in Buganda areas where children of the elite were educated. Perhaps more so than in other parts of East Africa, the missionary influence on education was to remain firmly in place until independence.

2.2 Education after Independence

Uganda became independent in 1962, with Milton Obote as its first president. Opposed to Uganda's monarchies, Obote sought to reverse the dominance of the Baganda and establish a socialist state (Arnold 2005). Obote gradually increased the power of the executive and went as far as suspending the constitution. Uganda's early education reforms placed heavy emphasis on secondary and tertiary level institutions because it was generally believed to be the best way to achieve development (Chesswas 1966; Government of Uganda 1999). Budget allocation to primary schooling tended to fade into the background. A series of internal and external shocks were to rock Uganda to its core and to halt progress in educational development. These disturbances included political strife, fluctuating commodity prices, mounting debt and involvement in regional conflicts. Ethnic tension during the rule of President Obote was replaced by an even worse situation when the violent rule of General Idi Amin began in 1971. Amin remained in power until he was overthrown in 1979. During his rule, Asians were expelled from the country (many of whom ran prosperous businesses), mass murder was carried out and the economy was run into the ground. Many teachers were drawn into the turmoil and some died (Mushemeza 2003). Tensions remained even after Obote was reinstated in 1980. He eventually went into exile in 1985.

The educational infrastructure was severely damaged by two decades of instability. Instructional materials became scarce, teacher morale plummeted and many teachers left the country. Like many developing countries, Uganda was subjected to the World Bank Structural Adjustment Programmes in the 1980s. Unsurprisingly massive cuts in social sector spending

were carried and education was not spared. A dismal 1.2 percent of GDP was spent on education in the 1980s (World Bank 2002). To a large extent, it was community support that prevented the education system from completely collapsing. During this period parental contributions were essential. Parents covered as much as three-quarters of school expenses (Appleton 2001; Heyneman 1983; Nishimura et al. 2007; Policy and Operations Evaluation Department (IOB) 2008)

In 1986 the National Resistance Movement took control of Uganda. This signalled the end of decades of internal turmoil. A Poverty Eradication Action Plan (PEAP) was launched with basic education as a focal area. Uganda's fee-free education system was announced in 1996 and launched in 1997. This triggered massive increases in enrolments[i]. Primary school enrolments doubled in the first year and continued to increase until 2003 (Alubisia 2005). Uganda was one of the first countries to take advantage of the Heavily Indebted Poor Country (HIPC) debt initiative in 2000. Under this scheme, debt burdens of the world's poorest countries were reduced and extra resources were used to target poverty alleviation programmes (Policy and Operations Evaluation Department (IOB) 2008). Uganda's strategy focused on improving primary health care and expanding access to primary education.

Not surprisingly, differences in enrolment levels between students from low-income and high-income groups reduced by nearly two-thirds (Deininger 2003). Because there were no age caps on attendance, older children added to the burgeoning numbers of primary level students. Uganda's 'big bang' style of UPE effectively created a complex combination of students with varying educational needs. Although government abolished school fees, certain private costs remained in place. For example, parents were still expected to provide school uniforms, lunches, stationery and labour for the construction of school facilities (Mushemeza 2003; Nishimura et al. 2007). Schools were encouraged to relax rules regarding uniforms depending on a student's circumstances (Colclough et al. 2003). School management often took a different view. They argued that by strictly enforcing uniform regulations wealth differences among students would be less apparent. According to Alubisia (2005) it was common for students who were unable to purchase uniforms to miss classes or drop out of school entirely.

Government responsibility for primary schools now included paying teacher salaries, purchasing teaching materials and covering the costs of school buildings (Penny et al. 2007). Because the direct costs of schools differed substantially, state funds were channelled to schools based on their specific needs. All government schools were allocated a capitation grant (often referred to as UPE grant). The size of the grant was determined by a school's enrolment.

These grants were intended to cover student tuition costs as well as the operational costs of the school. Strict guidelines governed how capitation grants were to be used. An estimated 50 per cent was to be spent on instructional materials, a further 35 per cent on co-curricular activities, 15 per cent on school maintenance and 5 per cent on administrative costs (Mushemeza 2003).

The second type of funding was the Schools Facilities Grant (SFG). This grant was managed by district education offices and was designed especially for the benefit of very poor schools to help them build and furnish classrooms and sanitation facilities (Penny et al. 2007). School Management Committees (SMCs) were responsible for applying for these grants and for supervising construction. Using local contractors proved to be an efficient approach to maintaining school facilities and the fact that the amount received by any school was made known publicly tended to improve accountability in some areas (Reinikka 2001).

Predictably, public reforms had their unintended consequences. Many schools ignored government directives and simply continued to collect parental contributions (Reinikka 2001). This is hardly surprising given the culture of parental involvement that had preceded these reforms. Pressure on poor parents to make private contributions also came from teachers because additional funds helped to supplement their salaries (Suzuki 2002). According to a number of studies, it was not uncommon for salary disbursements to be delayed by several months (Alubisia 2005; Dauda 2004; Penny et al. 2007). In some instances late payment left schools in debt for extended periods (Policy and Operations Evaluation Department (IOB) 2008). This could only have increased the school's reliance on parental contributions. Administrative leakages also meant that enrolment data grossly underestimated actual student attendance and funding failed to keep up with rising costs. As a result, schools received less than they required for their daily operations. Suzuki (2002, p.250) points out:

> Despite the government ban on mandatory monetary contribution under the UPE policy, many schools collect money from the parents through the PTA. It is plausible that parental contribution to school finance is part of the school culture in Uganda because of its long practice before the introduction of UPE.

These conditions notwithstanding, it is fairly apparent that some important steps had been taken to increase resource distribution and to improve accountability structures. Within the first seven year cycle of UPE, nearly 30,000 classrooms had been built across the country through SFG disbursements (Penny et al. 2007). What these policies failed to counterbalance were the enormous differences in private contributions to schooling that reflected extensive wealth gaps in society. On the one hand, education was more accessible than ever because tuition fees were

waived. On the other, private costs remained and were highly visible in schools. For households who were accustomed to making allowances for schooling costs, the fee waiver represented a monetary gain. For poor households with children attending school for the first time, partially free education meant making critical decisions about how to stretch their limited resources to meet these new financial commitments. It was almost inevitable that in spite of an increase in educational opportunities, social imbalances would be evident in schools. In the next section we give an account of just how stratified the education resource base was for students of different socioeconomic backgrounds before turning to its application to this study.

3. What was the social mix of students in Ugandan primary schools?

That disparities would exist in private resource availability for schooling should be obvious. Yet the differences in monetary contributions made by different households for students attending government primary schools in Uganda are quite startling. In Table 1, we present data on the percentage of households making contributions to different primary schooling activities. Estimates are drawn from a household survey that was conducted at the same time as the SACMEQ[ii] survey used in later analysis (for further details about the Uganda DHS Ed Data Survey see (Uganda Bureau of Statistics 2001)). They provide a useful glimpse of the gaps in a household's capacity to support academic development. The values in Table 1 reflect frequencies within each wealth quintile[iii]. It shows that 10 per cent of all households in the lowest quintile contributed to food compared to 44 per cent of all households in the top quintile.

Several important issues arise from this table. First, all households, ranging from the poorest to the most affluent were responsible for some direct and indirect costs of schooling. It has been reported that students of lower socioeconomic status in Uganda spent more time working and doing chores while at home than their more affluent peers (Colclough et al. 2003). Therefore the economic burden was substantially higher for families sending children to school for the first time, particularly when the indirect private costs of losing an extra source of labour is considered. Second, certain private contributions to schooling led to improvements that could accrue to all students irrespective of the source of funds. For example, PTA payments and building development funds would be used to supplement teacher salaries and maintain buildings, thus benefiting the entire school. Third, although tuition expenses were supposedly covered by UPE, it is quite clear that households continued to make these forms of payment. Finally, students from wealthier households were especially advantaged in having the means to

pay for items that would yield private benefits for their education (such as extra tuition, transport and food). There are even reports of parents insisting on charges for extra-curricular activities; thus ensuring that they remained exclusive (Alubisia 2005). Schools were not obligated to arrange for feeding programmes. This added to the stratified climate created at schools.

Absenteeism was common among Ugandan children especially in remote areas where they were required to walk long distances to school (Alubisia 2005). Better off students spent more on transportation resources, which further increased their selection of schools significantly. Long distances to school also increased the cost of schooling in poor families because children would be away from home for longer periods of time and less able to contribute their labour. Figure 1 further highlights the differences in spending on schooling for students based on their backgrounds. In monetary terms average per-pupil expenditure for students in the wealthiest quintile was four times higher than per-pupil spending for students in the fourth quintile and eight times higher than spending for children living in the poorest households. Obviously the estimates include contributions that would accrue both private and public benefits. Moreover, differences might be less acute if meal expenses were set aside. The important point here is that in spite of being part of the same education system, there is little doubt that the education experience of the rich and poor in government schools was dramatically different.

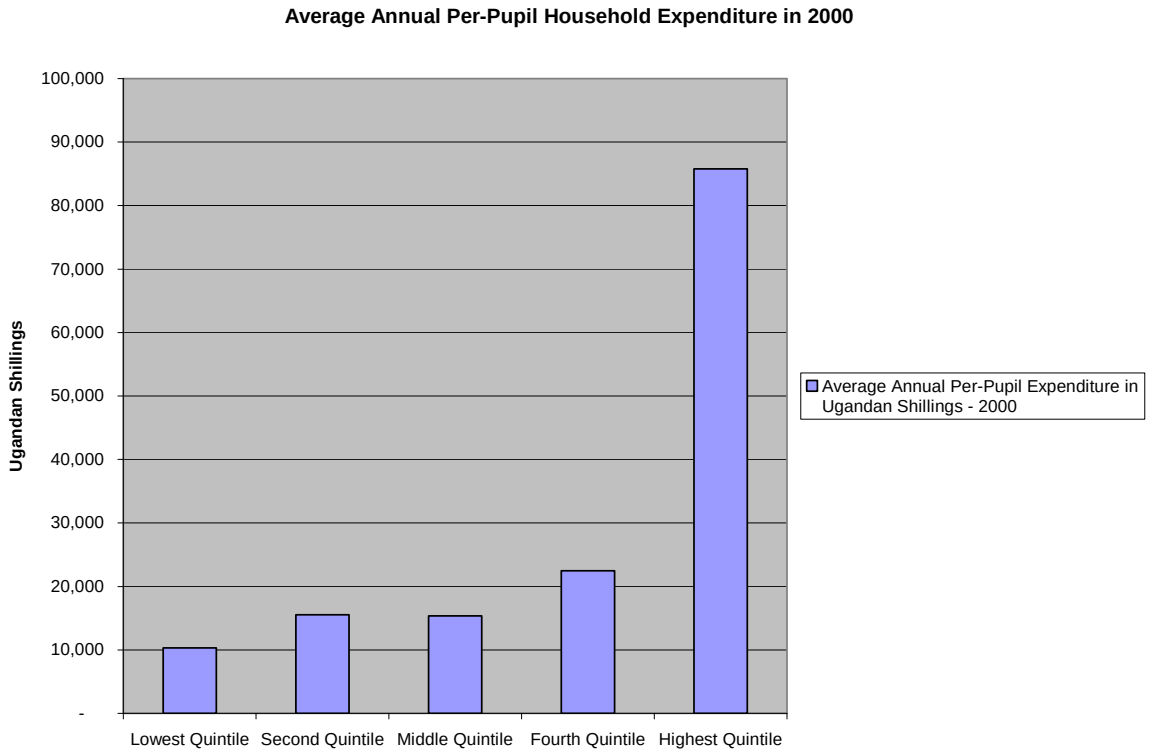
Table 1: Percentage of Households in Different Wealth Quintiles Making Contributions to Primary Schooling Costs in Uganda During 2000

Asset Index	Tuition	Development Fund	PTA	Exam Fees	Uniforms and Clothing	Books and Supplies	Transport	Food
Lowest Quintile	5.4	45.6	12.8	11.8	77.2	97.3	0.5	10.0
Second Quintile	8.2	56.7	11.6	17.9	76.9	96.4	1.6	11.5
Middle Quintile	8.1	60.4	14.0	17.4	76.7	97.4	0.7	16.7
Fourth Quintile	13.2	61.1	15.7	20.1	78.1	98.0	2.9	22.7
Highest Quintile	37.4	57.3	27.8	29.7	85.3	98.3	14.1	44.0

Source: (Uganda Bureau of Statistics 2001, p.66)

a. These estimates reflect the percentage of total households *within* each quintile that contributed to different schooling costs. Therefore columns do not sum up to 100 per cent.

Figure 1: Average Annual Per-Pupil Household Expenditure for Uganda in 2000



Source: Based on estimates from (Uganda Bureau of Statistics 2001, p.70)

4. Previous Ugandan Research

In this section we take a brief look at empirical research into resource effects and primary school education in Uganda. Heyneman's seminal research into the quality of primary schools in Uganda in the 1970s stands out as one of the most ground-breaking studies of its time in a developing country. Using data from students and staff in 67 Ugandan primary schools within different localities, Heyneman isolated the characteristics of schools that influenced student performance on the national assessment at the end of primary school. It has frequently been described as the first Coleman study in a developing country because it provided some of the earliest conclusive evidence about the school's role in the scholastic development of students in poor countries (Buchmann 2000). Though this research can be criticised for many of the methodological and data failings common to that era of research (for example ignoring the multilevel structure of the data, and using an unrepresentative sample), its findings about the influence of the human and physical resources on students' educational careers were still meaningful (Heyneman 1976b; Heyneman et al. 1981; Heyneman and Jamison 1980; Heyneman and Loxley 1983).

Heyneman's studies contradicted the evidence emerging from industrialised countries at the time. It seemed implausible that the mere presence of basic school facilities could influence educational outcomes so significantly. Yet resources mattered and in a very meaningful way. Heyneman argued that in areas of extreme poverty, this finding had as much to do with the academic benefits of basic school facilities as with the underlying process at work to ensure that resources actually reached the schools where they were needed and when they were needed (Heyneman 1977). The strong association between academic achievement and certain school resources spoke volumes about the motivation of staff and communities to ensure necessary resources were available.

Like many developing countries emerging from colonial rule in the 1960s, it was commonly believed that the centralised administration of public education would ensure equal access to resources. Decisions regarding the purchase and distribution of supplies, the placement of teachers, the inspection of facilities and the powers of school administrators were determined by central authorities (Heyneman 1975; Heyneman 1977). In spite of these efforts, inequality in resource allocation persisted and was strongly related to the geographical location and to the social background of the students within the school (Heyneman 1975). Schools in urban settings with richer students seemed to acquire resources with greater ease, in spite of the seemingly equitable method of resource distribution.

The socioeconomic status of students in a school represents an important resource dimension (Barr and Dreeben 1983). Surprisingly, evidence from the literature of this period pointed to very weak linkages between academic achievement and student social background (Heyneman 1976a; Heyneman 1976b; Heyneman 1979). Researchers attributed this partly to widespread poverty in Uganda that limited its explanatory power and partly to a culture that appreciated the value of education for social mobility (Currie 1997; Heyneman 1976b; Heyneman 1979; Heyneman and Loxley 1983). To suggest that SES effects are generally stronger in industrialised countries seems to make intuitive sense, given that a higher percentage of low-income students are enrolled in school, but to argue that educational outcomes are completely independent of student social background in less industrialised countries leads to questions about the statistical and substantive basis of such research. The literature has long argued that socioeconomic status strongly influences student achievement in countries at different stages of economic development and even in education systems that are increasingly merit-based (Blossfeld and Shavit 1993; Entwisle et al. 1997; Mare 1981). Particular attention has been given to how socioeconomic status and education reinforce inequality across generations because children of low socioeconomic status with fewer

educational opportunities tend to be less competitive in the labour market (Bhorat 2004; Darling-Hammond 2007; Hauser 1970).

Claims of negligible SES effects on achievement in Uganda may have been overstated for a number of reasons. First, the sample used in these studies was not entirely representative of the primary school population in general. Because enrolments were still very low in the 1970s (UNESCO 1999), the relationship between socioeconomic status and achievement could have been suppressed. Implying that academic success was only related to the school environment ignored the fact that tuition costs at some state schools prevented the poor from enrolling. Therefore school attendance was still subject to a student's family background. Second, the measure of socioeconomic status was based on a selection of 'modern' items that might not have been contextually relevant predictors of wealth[iv]. Third, and most critically, researchers failed to distinguish between the individual role of socioeconomic status on achievement and the collective effect that the socioeconomic status of the student body played on academic achievement and its equitable distribution. In other words, Heyneman and his colleagues ignored the fact that the collective effect of student social class on student academic achievement could actually reinforce inequality between students in the same school. This is not to say that his findings about the strength of school effects in Uganda were invalid, but rather that these conclusions about the absence of family-SES effects on achievement were quite possibly imprecise (Baker et al. 2005).

In summary, existing literature on Uganda generally supports the view that when resources are defined in terms of material inputs, they are strong predictors of educational quality. There is, however, less conclusive evidence about the relative importance of other dimensions of school resources in that country. Furthermore, there has been little research devoted to the role of resources in improving the social distribution of achievement within schools there. Weaker SES effects have been recorded in low-income countries but in this chapter we challenge previous claims that educational outcomes are unresponsive to student socioeconomic status and by extension, that policies to minimise SES achievement gaps are less imperative.

5. Student and School Characteristics Used in the Uganda Study of Social Inequality

The research questions covered here centre on policy-related issues that were most critically affected by the introduction of free primary education in 1997. We also considered other estimates that would have been impacted by UPE such as teacher quality and class size. However these constructs were unrelated to either school average reading achievement or to the

SES gap and were dropped from the analysis. This is likely because patterns of variation in teacher quality and class size were unrelated to variation in reading achievement (Lee et al. 2005; Zuze 2008). We included three student characteristics: grade repetition, gender and socioeconomic status. The index of socioeconomic status used in this study consisted of information on parental education levels, household possessions and the structural features of the home. We provide a detailed description of how all the variables were constructed in the Appendix. Parental education, parental occupation and family wealth are the most common measures of socioeconomic status used in education surveys. Whereas these measures have demonstrated relative reliability (Case and Deaton 1999; West et al. 1998; Willms and Somers 2001) household income and occupational status are less consistent predictors of student achievement (White 1982).

Recent theoretical contributions have shown the benefit of a thoughtful characterisation of family background. It has become popular to use the presence of certain household possessions or the structural features of the home to represent household wealth (Filmer and Pritchett 1999; Heyneman 1979; Lee et al. 2005; Postlethwaite and Ross 1992). These items provide a more useful representation of a student's home situation. Depending on data availability and the nature of the research questions, a combination of these factors have been used to capture a student's social background (Buchmann 2000). Research suggests a strong relationship between different dimensions of family status so that when they are combined, they represent a comprehensive index of student socioeconomic status (Baker et al. 2002; Nonoyama-Tarumi 2008). In addition to the traditional measures of wealth and family background, the use of culturally specific items has proven to be highly reliable in international surveys (Fuller et al. 1995; Lee et al. 2005; Postlethwaite and Ross 1992). In Tables 2 and 3, we present the characteristics of students in the sample.

Table 2: Grade Repetition and Literacy Achievement of Grade 6 Students in Uganda

	Uganda Reading Achievement		
	Repeaters	**Non-Repeaters**	**Total[a]**
Sample Proportion	1382	1260	2642
Reading Achievement	472	499	485
SES[b]	-.08	0.08	0.00

Source: SACMEQ Data Archive Version 4.0 (own calculations)

a. Estimates for the total sample (repeaters and non-repeaters combined). The sample of students who took the literacy test (2642) is slightly more than the sample for the mathematics tests (2619) because of student absences.
b. The SES variable is in a standardised (z-score) metric, mean (M)=0, standard deviation (SD)=1 within Uganda.

Student test scores for reading are 0.15 standard deviations (SD) below the SACMEQ average of 500 for reading. Predictably, students who have repeated a grade have lower achievement scores. What is also noteworthy is that the socioeconomic status of non-repeaters is 0.16 SD higher than for repeaters. Gender-related achievement differences for the reading test were negligible. The socioeconomic status of girls in Ugandan government schools was 0.25 SD higher than for boys (see Table 3). A greater number of boys than girls are known to have re-enrolled at higher grades after UPE was introduced in Uganda (Appleton 2001), which could partly explain the sizeable socioeconomic gap between boys and girls in this Grade 6 sample.

Table 3: Gender Differences and Literacy Achievement of Grade 6 Students in Uganda

	Uganda Reading Achievement		
	Male	**Female**	**Total[a]**
Sample Proportion[a]	1483	1159	2642
Reading Achievement	484	487	485
SES[b]	-.11	.14	0.00

Source: SACMEQ Data Archive Version 4.0 (own calculations)
a. Estimates for the total sample (male and female combined).
b. The SES variable is in a standardised (z-score) metric, mean (M)=0, standard deviation (SD)=1 within Uganda.

In Table 4, we compare average differences in school characteristics in urban and non-urban areas of Uganda. It is often argued that one of the immediate impacts of UPE is that resource allocation and educational quality favour schools in urban settings that are able to access government offices easily and to ensure timely resource delivery. The majority of schools in the sample are situated outside urban centres. However, average reading achievement is considerably higher in schools that are situated in urban areas. It is interesting that differences in the distribution of teaching resources and in the teacher workloads are negligible. In contrast, the allocation of physical resources and the average socioeconomic status of the school favour urban areas. The model for Uganda also takes cognisance of the age

distribution of Grade 6 students in the school because many of the children entering the education system after the introduction of UPE were older than the official age for the grade. Children in remote rural areas often start school later because of safety issues related to walking long distances to school. The presence of older students who have experienced periodic gaps in their schooling can place immense pressure on schools and teachers. On average, students living outside of urban areas are nearly one year older than children attending schools in urban centres.

Table 4: Descriptive Information on School Location in Ugandan Primary Schools

School Location		Average SES	Average Teaching Hours (Weekly)	Average Age of Students (Years)	Teaching Resources	Physical Resources	Average Reading Ach.
Non-Urban	Mean	-.05	17.1	14.3	.00	-.06	481
	N[a]	152	148	152	148	152	152
	SD	.95	8.6	0.96	1.01	0.96	73
Urban	Mean	0.70	16.5	13.4	-.04	.86	522
	N	11	11	11	11	11	11
	SD	1.43	6.5	.73	.95	1.23	74
Total	Mean	.00	17.1	14.2	.00	.00	.00
	N	163	159	163	159	163	163
	SD	1.00	8.4	0.97	1.00	1.00	74

Source: SACMEQ Data Archive Version 4.0 (own calculations)

a. 'N' represents the number of schools

Because UPE targeted state-owned schools, it is also useful to control for the quality of education in different sectors (Table 5). Unsurprisingly, all resource and achievement indicators are higher in private schools. On average, students in private schools are younger and benefit from superior access to physical and teaching facilities. The average SES in private schools is over 1 SD above the average. Average student performance in private primary institutions is 0.75 of a SD above performance in government schools.

Table 5: Descriptive Information on School Sector in Ugandan Primary Schools

SECTOR		Average SES	Average Teaching Hours (Weekly)	Average Age of Students (Years)	Teaching Resources	Physical Resources	Average Reading Ach
Private	Mean	1.06	13.1	16.4	.12	.82	555
	N[a]	9	9	9	9	9	9
	SD	1.36	.90	7.6	.92	.72	67.96
Government	Mean	-.06	14.3	17.1	-.01	-.05	480
	N	154	154	154	150	154	154

	SD	.94	0.93	8.4	1.01	.99	72.39
Total	Mean	.00	14.2	17.1	.00	.00	483.96
	N	163	163	163	159	163	163
	SD	1.00	0.97	8.4	1.00	1.00	73.97

Source: SACMEQ Data Archive Version 4.0 (own calculations)

a. 'N' represents the number of schools

6. Initial Multivariate Results

The descriptive evidence on students and schools has shown fairly typical patterns, with achievement advantages among students with a better social and academic background and among well resourced schools in urban settings. The next section will show how student and school factors related to achievement within a fully integrated multilevel model. Multilevel analysis is a popular technique increasingly used when data have a nested structure (Bryk and Raudenbush 1992; Hox 2002; Snijders and Bosker 1999). There were two reasons why the use of multilevel modelling was applied here. First, the core research questions focus on how characteristics of schools might influence students' achievement. Second, the data used to address the topics of educational quality and distributional equity are hierarchical.

One distinguishing feature of multilevel analysis is that it incorporates a more precise treatment of the relation between variables. It avoids compositional and ecological fallacies that are present if single-level regression analysis is applied to questions and data of this kind (Keeves and Sellin 1990). These errors occur when researchers draw conclusions about groups by using individual-level data and make inferences about individuals based on group-level data. A variable can have a completely different meaning depending on the level to which it refers. A pertinent example is socioeconomic status. At the individual level it represents the educational resources available to a student at home. At the school level it reflects the resource wealth of the student body as a whole and the social class climate that they generate.

Part of the reason why multilevel modelling is so useful in educational research is that we can model the interaction between school variables that occur at a higher level and student characteristics that are situated at a lower level. This is an important consideration when researchers and policy makers are interested in how the school environment can influence scholastic development. The majority of HLM studies that have been undertaken using developing country data have used school characteristics to explain average achievement differences (Lee et al. 2005; Lockheed and Longford 1989; Nyagura and Riddell 1993; Willms and Somers 2001). Only a handful of researchers have gone further to investigate cross-level effects between school factors and student characteristics (Duthilleul and Allen 2005; Fuller et

al. 1994; Lee et al. 2004; Zuze 2008). This additional step avails an opportunity to address issues of quality and equity simultaneously.

Results of the Fully Unconditional Model

A preliminary step in developing a full multilevel HLM model is to partition the variance in the outcome variable (reading achievement) into its within-school and between-school components. This HLM procedure generates a "fully unconditional model," in that it is not conditioning on any independent variables. We use the information from this model to calculate the intraclass correlation or ICC. The ICC can be best described as a measure of the distribution of inequality between schools. The higher the ICC the larger are the systematic differences in achievement scores between schools. Table 6 displays the results of this analysis. It reveals that 58 per cent of total variation in reading achievement existed between Ugandan schools at the time of the survey and that the remainder (42 per cent) was due to achievement differences between students within the same school. Even compared to a high percentage of other countries in Southern and Eastern Africa, the ICC for Uganda is high (Lee et al. 2005), meaning that inequality was concentrated at the school level rather than at the student level at this time. The estimation also generated a chi-squared statistic for the variance components. It confirms that these differences in average test scores between schools were statistically different and a multilevel approach to explain these differences was indeed appropriate. The outcome variable is reliably estimated (0.95 where perfect reliability is a value of '1'), which increases confidence in the estimation results.

Table 6: Variance Decomposition for Literacy Achievement in Ugandan Primary Schools

	Uganda
Average Reading Achievement	485
Average Within-School Sample Size[a]	16.21
Total Variance Within Schools (sigma-squared)	3679.04
Total Variance Between Schools (tau)	5212.42
Intraclass Correlation (ICC) (a)	0.58
Reliability (lambda)	0.95

a. ICC = tau/(tau + sigma-squared)

Source: SACMEQ Data Archive Version 4.0 (own calculations)

a. The average number of students within each school in the sample.

Results of the Within-Schools Model

In Table 7 we summarise the results of the within-school HLM model. This model addresses questions concerning the influence of student background characteristics on reading achievement. Student socioeconomic status appears as a focus variable because it is at the core of the analysis of the social distribution of learning. It is standardised so that results can be interpreted in terms of standard deviation units. In addition, we included two control variables – one for gender (coded '1' for female students) and one for grade repetition (coded '1' for repeaters). We centred the slope of the focus variable (here socioeconomic status) on its school mean. At the same time, we relaxed the assumption that all schools had an identical estimate of SES by allowing the slope for SES to vary. Grade repetition and gender were centred on the population mean and the slopes were fixed to reflect average values for the population as a whole. The results confirm that student characteristics are important predictors of achievement. In particular, student SES had a positive and significant effect on achievement. A one standard deviation increase in SES was associated with an eight point increase in reading achievement. The results of the chi-square test also confirm that the relationship between SES and reading achievement differed between schools in a manner that is more than just random.

Figure 2 illustrates this relationship more clearly. By plotting the distribution of achievement scores by SES across a random sample of Ugandan schools it is quite clear that the relationship between SES and Grade 6 reading scores differed. Although generally positive, in some schools the slope was very steep (large differences in performance between students based on their socioeconomic backgrounds), whereas in other schools, the slope was fairly flat (a weak SES effect). These differences in the relationship between SES and achievement in each school would drive the final school effects model to identify which characteristics of schools narrowed gaps in performance based on social background. What is also noteworthy is that the length of the line varies but it is not systematically related to achievement levels. The length of the line represents the range of SES within a school. A short line would indicate that most students are quite similar in socioeconomic status. One might have expected a pattern of elite primary schools to be emerging (i.e. short lines with high SES and at high achievement levels) but in general it appears that students of varying backgrounds were enrolled within the same school at this time.

In addition to information on SES, other student background variables provide useful insights into student performance. With other background characteristics controlled for, female students and students who have repeated a grade are expected to have poorer literacy scores.

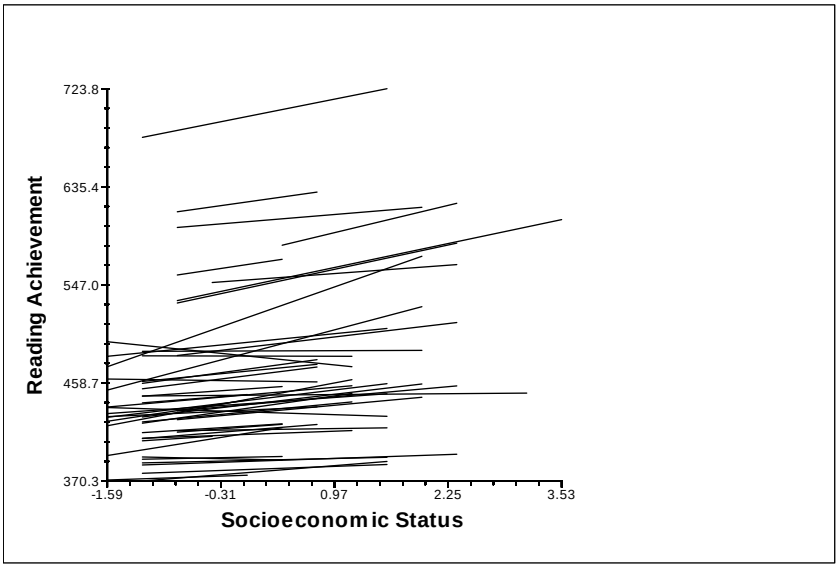
The repetition gap is an important adjustment because it is an indicator of academic preparedness. Students repeat a grade for different reasons related to their home and school environments. Irrespective of the reasons for repetition, the results seem to suggest that student retention is associated with poorer academic outcomes (Brophy 2006).

Table 7: Level-1 HLM Models for Literacy Achievement in Ugandan Primary Schools

	Uganda
Fixed Effect	
Intercept	484.08***
Socioeconomic Status	7.63***
Grade Repetition	-18.49***
Female	-7.58**
Random Effects	
Mean Achievement	5159.92***
Student SES	152.50**
Rij	3465.49
Reliability of OLS Regression-Coefficient Estimates	
Mean Achievement	0.96
Student SES	0.25

Source: SACMEQ Data Archive Version 4.0 (own calculations)

Figure 2: SES and Reading Achievement for a Random Sample of Ugandan Primary Schools



7.Modelling School Resources, Achievement and Social Inequality

In Table 8, we summarise the results of the multilevel model-building routine. We begin by including a set of school-level statistical controls for sector, location and the age composition of students. We then group resource variables into four categories: school social composition, physical resources, teaching resources and weekly teaching hours. The order that variables enter the multilevel model is guided by their potential responsiveness to policy changes. Therefore more fixed factors (social composition) precede more amenable factors (teaching resources and teaching hours). We also discuss indirect effects based on changes to coefficient values as variables representing different resource effects are added to the model. The first five models identify school effects related to educational quality (models of the intercept). The final model includes variables that explain the SES/Achievement gap.

Model1: Statistical Control Variables

The majority of primary school students in Uganda attend government-owned schools situated in rural areas[v]. It was nevertheless necessary to introduce statistical controls for school sector and school location before considering the relationship between resources and achievement. As shown earlier in the descriptive analysis, urban schools and private schools are known to have an advantage over state schools situated in rural areas. Shorter distances to school are thought to shore up attendance among poor children living in urban centres compared to poor children living in remote rural areas (Lockheed and Verspoor 1991). A greater social mix of students will have a negative effect on average test scores in a school.

Owing to the unusually wide age distribution when students flooded into primary schools, we also controlled for the average age of Grade 6 students. Not surprisingly, test scores are age-dependent. Schools with an older cohort of Grade 6 students had lower average achievement scores. This is after allowances have been made for the intake quality by controlling for student repetition history. Unsurprisingly, the average test scores in government schools were nearly 40 points below the score for students in private schools.

Model 2: Social Composition of Schools

The achievement advantage experienced by private schools and schools with a younger cohort of Grade 6 students is partially explained by the average social background of students within a school (Model 2). This implies that low performing government schools with older students also tend to enrol students who are socially disadvantaged. The relationship between

social class composition and educational outcomes has generated much interest in sociological circles. There is no shortage of theories as to why, even in developed settings and in the midst of industrial progress, expanding educational opportunities does not guarantee diminished differences in performance between students with different family backgrounds. Explanations for why social inequality in achievement persists generally point to the central role that private education investments play when it comes to supporting the formal schooling process (Blossfeld and Shavit 1993). For example, some research has found that low-SES students risk serious academic setbacks, especially during school holidays, because they have little exposure to social environments where what is learned at school is reinforced (Entwisle et al. 1997). Of interest to policy is how the school environment can reverse these severe setbacks.

Models 3 and 4: Physical Resources and Teaching Resources

The physical resources available at a school also had a positive and significant relationship with reading achievement, over and above the influence of a school's social composition (Model 3). A similar pattern was evident for teaching resources (Model 4). Interestingly, there was a slight attenuating effect on the coefficient for the social composition of schools when these resource variables were included. It points to an underlying relationship between the level of resources and the social composition of students within the school. The cross-sectional nature of these data bars any discussion of the direction of this relationship. Are wealthier students drawn to better resourced schools or does their presence at a school raise the likelihood that parents will ensure that schools are properly maintained? The literature on Uganda seems to suggest that both scenarios may hold some truth. Historically, the presence of strong and active PTAs seems to have influenced the sustained quality of school facilities. Bray would add that customs of community support for local schools are stronger among certain groups in society. This would lead to high levels of involvement in school maintenance in certain areas. (Bray 1996).

Model 5: Teaching Workloads

The fifth model in the series reveals how, on average, longer teaching hours are related to lower average reading scores for the school. The importance of this result cannot be overstated. Because the projections about enrolment increases grossly underestimated reality (World Bank 2002), government struggled to provide adequate numbers of trained teachers, especially in rural areas. It is interesting that the variable representing teacher workloads appears to be unrelated to other resource effects. It represents an independent resource dimension that

remains important over and above the facilities available in the school or the social composition of the students within the school. It surely underscores a mismatch between the level of expectations imposed on Ugandan teachers and what their actual capacity was. Most were unprepared for the task of teaching large numbers of students with different levels of academic preparation. No doubt, in such an environment, less time was available for individual student attention. It is hardly surprising then that the negative effect of longer teaching hours on average test scores was more serious for socially disadvantaged students as shown in the final model of intercepts and slopes below.

Final Model of Intercepts and Slopes

In the final model, the resource effects for average reading achievement (the intercept) and SES/Achievement differences (the slope) are modelled simultaneously. Our intent was to identify resource characteristics that would produce a positive coefficient on the intercept (more effective) and a negative coefficient on the slope of socioeconomic status (more equitable). The final model explained 23 per cent of variance in reading achievement and 25 per cent of variation in the SES slope.

The results are quite informative. First, although overall achievement was higher in schools with a higher average SES, wealthier students were the main beneficiaries in such an environment. The coefficient of average social background is 27.82 when it is modelled on the intercept and 7.05 when it is modelled on the slope. Second, in the same way that the social composition of schools led to gains for more affluent students, heavier teacher workloads inflicted the most harm on poor students. The two results are related. Because many of the costs of schooling (such as meals and stationery) remained after 1997, this may have led to severe social stratification within schools. One reason why the social composition effect is so strong is because it is linked to the influence of individuals within the community. If this is the case, then the possibility of preferential treatment for students based on their parents' status in the community cannot be ruled out. The measure of social composition probably captures some of this effect. According to one study, influential members of local communities may resort to using their status for their children's benefit at school (Bray 1996). In the same way, overburdened teachers tend to focus their attention on students whose parents may show them favour.

In effect, poor household members find themselves subsidising school systems that are tailored to middle class families because they lack the hidden currency of local status. The influence of the poor on the internal operations of a school is tentative at best. Teachers are

known to read out the names of children who fail to make financial contributions to a school and to send them home (Alubisia 2005; Rajani 2001). Such practices tend to reinforce the notion that only certain students are worthwhile teaching. It is interesting that a significant interaction effect was detected between teaching resources and average social background. The existence of such an interaction strongly suggests that the positive effect of teaching resources on reading achievement is greater in schools where the average social background of students in the school was higher.

Perhaps the most encouraging result of this study is that access to physical resources had a meaningful effect on overall achievement and that gains were concentrated among less privileged students. This is a key finding because it indicates that the physical environment of a school can play a role in reversing the disadvantage faced by students from poor homes. A direct policy implication of this finding is that it endorses strategies such as the School Facilities Grant. As previously stated, this was a policy that was specifically designed to assist poorer schools upgrade their infrastructure but that required the school's input to apply for funding.

Figures 3 and 4 further illustrate these findings. In Figure 3, the average reading scores are represented for different social class climates. As average social background increases, so does the slope in achievement between students based on their socioeconomic status. In contrast, Figure 4 highlights how resource effects not only have a positive effect on average achievement (the intercept) but the slope that corresponds to higher resource levels is flatter, thereby reflecting greater social equity as resource levels increase. It is worth mentioning that the resource effects seem to be particularly strong at the lower levels (see Figure 5); the difference between the 25^{th} and 50^{th} percentile is much greater than the corresponding difference between the 50^{th} and 75^{th} percentile. This makes intuitive sense. The marginal achievement gain will surely be stronger in a situation of scarcity, where even the most basic improvements to the education environment will be a significant step forward than in situations where resources are more readily available. Of course the question of causality arises once again. Students who have fewer available alternatives to supplement their education are likely to suffer the most from resource scarcity in a school. Therefore a sudden increase in enrolment would have the effect of stretching resource levels thinly, leading to declines in school quality that would be more acute among low-income students. Without longitudinal data it is impossible to determine the direct sequence of events. Nonetheless, there is ample evidence to conclude that school facilities were related to educational quality in this context in ways that should not be overlooked.

Table 8: Results for Ugandan Model of Education Quality and Social Inequality

	Model 1	Model2	Model 3	Model 4	Model 5	Final
Intercept [a,b] (Average Achievement)	519.67***	507.43	501.19***	500.55***	500.87***	504.62***
Urban School Location	6.99	3.33	-7.38	-6.68	-5.42	-2.58
Government School Sector	-38.22~	-25.00	-17.66	-17.02	-17.40	-21.58
Average Age	-29.78***	-10.14~	-9.78~	-10.36~	-10.94~	-9.66~
Average Social Background		33.77***	30.22***	29.47***	28.96***	27.82***
Physical Resources			13.55*	13.35*	12.11*	11.61**
Teaching Resources				8.02*	9.24*	10.09*
Teaching Resources x Average Social Background						10.57*
Weekly Teaching Hours					-7.81~	-7.67~
SES/Achievement Slope	7.78***	7.87***	7.87***	7.87***	7.86***	7.05**
Average Social Background						5.04*
Physical Resources						-3.96*
Weekly Teaching Hours						-3.90*
Random Effects						
Intercept, $\mu 0j$	4073.28***	3384.44***	3256.59***	3211.57***	3175.54***	3123.52***
SES slope, $\mu 1j$	155.03**	158.69**	154.92**	154.82**	158.09**	115.62~
Level-1 error, rij ($\sigma 2$)	3464.78	3463.48	3464.80	3464.96	3463.62	3467.75

Source: SACMEQ Data Archive Version 4.0 (own calculations)

~ p < .10; * p < .05; ** p < .01; *** p < .001

a. Only the SES achievement slope was allowed to vary between schools and was centred on each school's respective mean.

a. Because the within-schools models are the same as those shown in Table 5.6, they are not repeated here.

Figure 3: SES/Achievement Gaps for Different Resource Levels

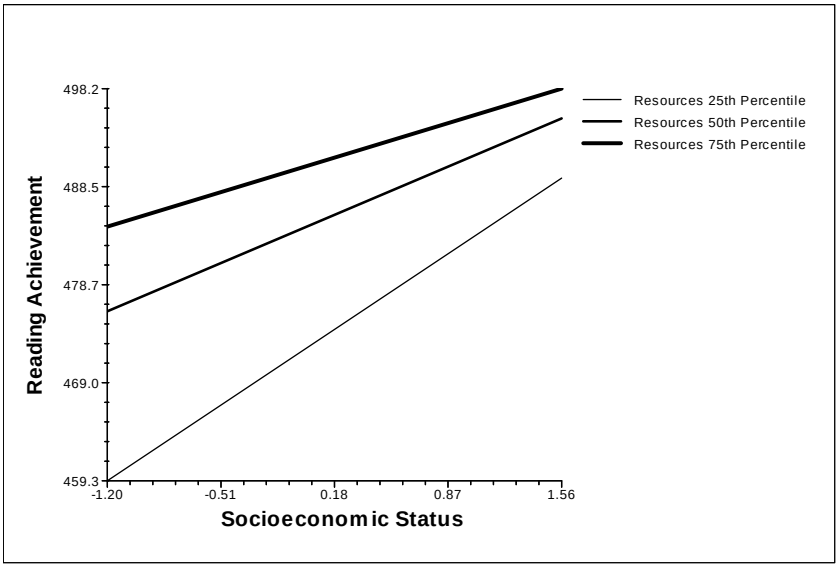
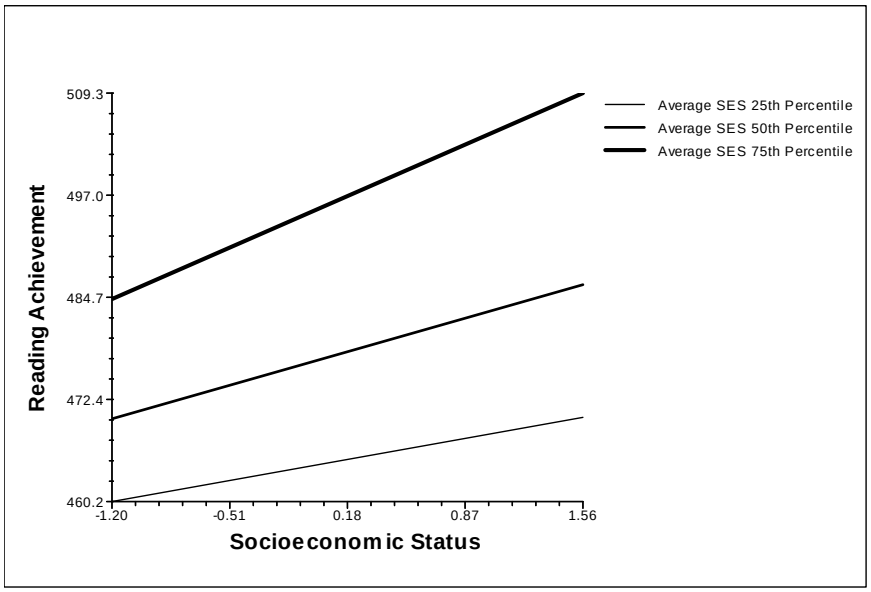


Figure 4: SES/Achievement Gaps for Different Levels of Average SES



8 Conclusion

In this paper we sought to clarify the relationship between resources and educational quality in general and to identify how effective resources could be in reducing social disparities in learning outcomes. Uganda presented a suitable context to pursue the question of how education systems in transition should invest in public schooling because access to primary schools had been increased. These changes led to adjusted decision making depending on whether households were enrolling children in school for the first time or whether households with children already attending school were modifying their conduct to cope with the changing face of education. We began by providing a description of the patterns of achievement among students and schools in Uganda before turning to the statistical analysis.

Results from this paper lend support to the handful of studies that have endeavoured to rethink the relationship between socioeconomic status and achievement in the third world (Baker et al. 2005; Lee et al. 2005; Niles 1981) with a view to creating the most educationally desirably environments for poor students. (Buchmann 2001; Niles 1981). The literature has long suggested that this link is enduring even among economically advanced countries (Blossfeld and Shavit 1993). Nor were social class differences an urban phenomenon because they persisted even after controlling for urbanicity.

Although in relative terms, achievement differences between schools in the sample were more important than differences between students attending the same school, student socioeconomic status had unambiguous positive effects on literacy achievement. Student social background is particularly important in socially mixed learning environments. How a student's SES compares to the norm for the school will influence a student's status among peers and may even affect how responsive teachers are (Burstein et al. 1980). Researchers have often criticised the use of inappropriate SES measures in developing country contexts (Buchmann 2000; Fuller and Clarke 1994). In this analysis we used a highly robust measure of socioeconomic status that incorporated information on parental education, household assets and the structural quality of the home.

This study was a further extension of the school effects theme in a developing country context. The central conclusion of the multilevel analysis was that equality of access to formal primary education did not necessarily translate to equality of outcomes. Because of the narrow definition of free education, households were still required to make substantial contributions to schooling. Administrative weaknesses increased the demand for private contributions and this helped to fuel social inequality in schools. It was not surprising for schools to receive textbooks

after a delay of an entire academic year (Policy and Operations Evaluation Department (IOB) 2008).

Inevitably, the private costs required for education proved to be extremely prohibitive for the poor. Results of the analysis that related to school social composition provided a clear picture of the reality of social stratification in primary education. A school's average socioeconomic status was related to general improvements in educational quality but it was also related to wider gaps between rich and poor students. Because of the scarcity of private resources among poor families, the ratio of private direct costs relative to private resources would be much higher. Added to these difficulties, there were greater indirect costs that stemmed from a higher demand for child labour. It is quite apparent that greater provisions (such as meal subsidies, uniforms and transport) are necessary if poor students attending state schools with more socially advantaged peers are to benefit equally from public education. We have also shown that heavier teaching workloads had the most damaging effect on low-SES students with fewer private resources to devote to academic processes.

A new curriculum was introduced shortly after UPE was launched. It was criticised for being too broad and for not emphasising literacy sufficiently. The curriculum has since been modified but the pressure brought on by overcrowded and under-resourced schools with teachers expected to teach an extended selection of material clearly had its worst effect on the very poor. It would seem that greater support for teachers is an important ingredient in an equitable education system.

These results lend empirical support to the view that material inputs are a positive influence on educational quality in developing countries. We have shown that policies that promote physical resource availability can lead to substantial equity gains. School facilities were important for educational quality over and above the influence of the social composition of the school. It could easily be argued that the greatest beneficiaries of free education were students from middle class homes, children from families who could not yet afford the costs of private schools but who could now channel the savings from fee waivers into private educational gains.

Some researchers have proposed more aggressive strategies to increase local educational revenues such as matching grants. Funds raised through community contributions are matched by government grants using a formula that ensures that poorer communities receive grants at a higher ratio to wealthier ones. Matching grants have been successful in areas where traditions of community participation are strong and active and where institutional arrangements are available to provide technical support for less organised communities. Without this support,

such funding mechanisms tend to be heavily biased against poor communities (Alubisia 2005). Other initiatives need to consider how to reduce the direct costs of schooling for the poor even further. At the very least, allowances for meal subsidies, stationery and uniforms for children from impoverished homes should be considered so that children are fit to benefit from instruction while at school (Fiske and Ladd 2004). Local governments need to co-operate with PTAs to improve service delivery to poor students, especially in terms of feeding programmes. If such direct costs are ignored, then the removal of tuition fees becomes meaningless. In the long run, enrolment gains among poor children will be eroded (Lockheed and Verspoor 1991).

One of the proposals tabled during the planning stage of UPE in Uganda was a phased implementation of the reform. The idea was to introduce free education for the first five grades of primary school by 2000. In fact, initially UPE was restricted to four children per household. Perhaps a more tempered approach would have allowed for better planning and more intensive resource distribution. However political pressure led to grander initiatives. Penny et al (2007, p.4) sum it up perfectly when they write:

> Education reform is a political process rather than a purely technical one. Politics makes a difference. It is not possible to separate technical education reforms from the wider governance environment required to make them work and the political system in which they are embedded.

There are lessons to be learned for other countries embarking on equally bold policy reforms. Most fundamentally this study puts forward a case for a more measured approach towards mass education. If schools are to reverse profound inequalities among students rather than reinforce them, serious attention must be given to a further removal of other prohibitive costs. There is also a comprehensive argument in favour of improving administrative efficiency between national and district officials and between local authorities and schools so that private interests are less likely to dominate the management of school affairs. Ultimately, it is "…the children of the poorest that must endure the inadequacies of the UPE system or else leave school" (Alubisia 2005, p.58).

Appendix: Description of Variables Used in the Multilevel Analysis

In this appendix, we present additional details about the variables that were used in the HLM analysis. In addition to a description of each student and school-level variable, we also indicate the name of the variable as it appears on the original SACMEQ dataset in parentheses [ ].

Student-level Variables

Reading Achievement: A reading test score for Grade 6 students. The test consisted of 83 questions in total of which 32 questions covered narrative ability, 26 questions tested the expository domain and 25 questions were allocated to document domain. It was standardised to a SACMEQ mean of 500 and standard deviation of 100 [ZRALOCP].

Socioeconomic Status: In constructing the ses index, three separate dimensions were created and then combined to represent the parental education level (ZPFAMOED), household assets (ZPTOTP12) and the physical quality of the house (ZPHMQUAL). Parental education was a likert-type item coded from 1 (no school) to 6 (post-secondary and tertiary education). The variable ZPFAMOED was created by adding the individual values for mother's and father's education. ZPTOTP12 was constructed by adding a series of dichotomous items that described the possessions found in a student's home. The items included in this dimension were: newspaper, magazine, radio, tv, vcr, cassette player, telephone, car, running water, electricity and a table. The physical quality of the house was based on four variables. Each variable had four possible responses. The variables were: source of lighting (ranging from fire to electricity), the wall material (ranging from 'not sealed' to 'cut stone or brick'), the floor material (ranging from 'not sealed' to 'carpet or tiles') and the roof material (ranging from 'not sealed' to 'tiles'). The variable ZPHMQUAL was derived by adding the four values together. The final ses measure (ZPSES) was derived by adding and recoding the values for ZPFAMOED ZPTOTP12 and ZPHMQUAL within each country. We standardised the variable within each country, mean (M)=0, standard deviation (SD)=1

Female: A dummy-coded variable for student gender. It was coded '1' for female and '0' for male [ZPSEX].

Grade Repetition: A dummy-coded variable for whether a student had repeated a grade. It was coded '1' if the student had repeated a grade at least once and '0' otherwise [ZPREPEAT].

Weighting variable: The student-level weight was proportional to the reciprocal of the probability of inclusion in the survey sample. The sampling weight adjusted for missing data and for differences in selection probabilities due to the multistage sampling design [PWEIGHT2].

School-level Variables

Average SES: School-level aggregate of Grade 6 student socioeconomic status. We standardised the variable within each country, mean (M)=0, standard deviation (SD)=1.

Percentage Repetition: School-level aggregate of the prevalence of repetition among Grade 6 students. We standardised the variable within Uganda, mean (M)=0, standard deviation (SD)=1.

Urban School Location: A dummy-coded variable coded '1' for large town or city and '0' otherwise [SLOCAT].

School Sector: A dummy-coded variable coded '1' for government schools and '0' for private schools [STYPE].

School Resources: A composite measure of school physical resources consisted of information on the availability of the following school facilities: library, hall, staff room, office for the school head, store room, sports ground, garden, fence and cafeteria. We standardised the variable within Uganda, mean (M)=0, standard deviation (SD)=1 [SRES01 SRES02 SRES03 SRES04 SRES05 SRES07 SRES12 SRES22 SRES23].

Teaching Resources: A composite measure of classroom resources including the following: writing board, chalk, wall chart, cupboard, book shelves, classroom library, teacher table, teacher chair. We standardised the variable within Uganda, mean (M)=0, standard deviation (SD)=1 [ZXCLRES8].

Total Number of Hours of Teaching: This is an aggregated variable that represents the total number of hours spent teaching by reading teacher. [XMINUTES XPERIODS]

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[i] Enrolment figures for the period prior to the introduction of UPE are very inconsistent. The more conservative official estimates indicated that primary enrolments remained stagnant for the decade prior to UPE but independent estimates have suggested that enrolments began to increase slowly in 1991 and then accelerated in 1997 (Reinikka, 2001).

[ii] Data for this paper are sourced from the second wave of a cross-national research project conducted by the Southern and Eastern African Consortium for Monitoring Educational Quality (SACMEQ). The SACMEQ consortium was launched in 1995 and represents fifteen Ministries of Education in Eastern and Southern Africa. Uganda was not part of the first wave of the study. SACMEQ II data were collected in October 2000 in Uganda The main purpose of the SACMEQ studies were to evaluate the quality of primary level education across a selection of African countries. A representative sample of students, teachers and school principals from each country completed questionnaires. In addition, a selection of students and their teachers took part in a literacy and numeracy assessment. These data make it possible to pursue a

research design that considers the influence of the education domain on scholastic achievement, while controlling for students' background characteristics. There is also the potential to explore the interaction between the school environment and the distribution of achievement between different groups of students.

[iii] The DHS Ed Survey Asset Index was based on ownership of the following items: radio, television, refrigerator, telephone, bicycle, motorcycle/scooter, car/truck, boat/canoe, donkey or plot of land. It also used information on source of lighting, water, fuel and type of sanitation facilities. Materials used for the floor, wall and roof a house were also included. Asset scores were normalised, standardised and divided into quintiles.

[iv] Household items included: bed, newspaper, bicycle, radio, clock, motorcar or lorry, camera, and television.

[v] Approximately 90 per cent of primary school students attend government owned schools.

The Southern Africa Labour and Development Research Unit

The Southern Africa Labour and Development Research Unit (SALDRU) conducts research directed at improving the well-being of South Africa's poor. It was established in 1975. Over the next two decades the unit's research played a central role in documenting the human costs of apartheid. Key projects from this period included the Farm Labour Conference (1976), the Economics of Health Care Conference (1978), and the Second Carnegie Enquiry into Poverty and Development in South Africa (1983-86). At the urging of the African National Congress, from 1992-1994 SALDRU and the World Bank coordinated the Project for Statistics on Living Standards and Development (PSLSD). This project provide baseline data for the implementation of post-apartheid socio-economic policies through South Africa's first non-racial national sample survey.

In the post-apartheid period, SALDRU has continued to gather data and conduct research directed at informing and assessing anti-poverty policy. In line with its historical contribution, SALDRU's researchers continue to conduct research detailing changing patterns of well-being in South Africa and assessing the impact of government policy on the poor. Current research work falls into the following research themes: post-apartheid poverty; employment and migration dynamics; family support structures in an era of rapid social change; public works and public infrastructure programmes, financial strategies of the poor; common property resources and the poor. Key survey projects include the Langeberg Integrated Family Survey (1999), the Khayelitsha/Mitchell's Plain Survey (2000), the ongoing Cape Area Panel Study (2001-) and the Financial Diaries Project.

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