ADDIS ABABA UNIVERSITY
SCHOOL OF GRADUATE STUDIES

AN ECLECTIC APPROACH TO ESTIMATING THE DETERMINANTS OF ACHIEVEMENTS IN KENYAN PRIMARY SCHOOLS

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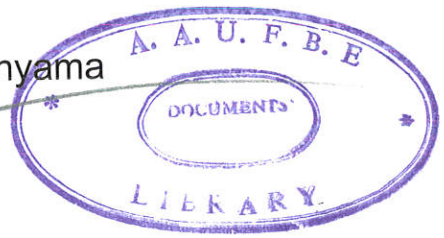

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Dedication

I dedicate this work to my wife and children let the sky be the limit in their pursuit for knowledge.

"He who goes out in search for knowledge is in the hands of God till he returns – the pen of a scholar is mightier than the sword of a martyr"

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Abstract

This paper estimates the determinants of achievement in Kenyan Primary Education by making use of a specially designed reading comprehension test in English for standard six as a proxy of achievement. Reading comprehension is chosen on the presumption that the ability of the pupil to read and comprehend the language of instruction is a sure way to better performance. The Kenyan education system has a cycle of eight years and therefore, the level of comprehension of the pupils at standard six is a fair enough reflection of the quality of the entire education system.

We make use of the data collected by the Southern African Consortium for Monitoring Education Quality (SACMEQ) under the National Primary Education Baseline survey in 1998. The data includes not only scores on the achievement tests stated above, but also detailed information on each child's household and the primary school he or she attends.

In our analyses, we integrate the production function framework favored by economists with the concerns of educators about pedagogical processes and those of socialists regarding school organization and management. We also correct for selectivity biases induced by school choice between private and public schools bearing in mind that parents in Kenya have considerable freedom in choosing which school their children attend. Our results indicate that there is indeed a positive selection into the private schools implying that given the opportunity, parents are more willing to send their children to private schools than public schools. Our findings show that all the three components in an education system classified into: - both physical and pedagogical inputs; teaching process; and school organization and climate influence pupil achievement.

Based on these results we conclude that beside heavy investments in education involving physical and pedagogical inputs alone, school reforms that concentrate on just a few pedagogical practices could lead to substantial improvements in pupil achievements.

CHAPTER ONE

1 INTRODUCTION

1.1 OVERVIEW

Kenya has registered broad and impressive achievements in the growth of education in general since independence in 1963. At independence there were 6,058 primary schools enrolling 891,553 pupils, by 1994, there were 15,906 schools enrolling 5,557,008 pupils (Mitha *et al.* 1995). The present high enrolment rates are consequence of the Governments abolition of tuition fees in 1974 for the first four classes and the rest of the classes in the Primary schools cycle in 1979.

Access to education is equated with vertical socioeconomic mobility, therefore many a parent in Kenya regard primary education as the avenue for the much coveted secondary education and eventual entry into university. This has seen the influx of pupils in primary schools with the continued need to ensure good performance at the end of this cycle to guarantee continuation. However an issue of great concern is the high wastage and low efficiency in the sector demonstrated by the late enrolments, high repetition and dropout rates as well as low completion rates.

The high costs borne by the parents are another major constraint in the sector, especially in the poor rural and disadvantaged communities. Increased poverty and cost sharing has resulted in erosion of access, equity and quality gains. The Ministry of Education (MoE) statistics show that the Governments recurrent expenditure per child at the primary level are the lowest compared to

similar recurrent expenditure at the secondary and tertiary levels and thus raise serious equity concerns. Where resources exist, they are not well managed and effective mechanisms do not exist to channel and utilize both government and parents contribution to this education sector.

The quality and performance of primary schools is low and inefficient. This is disturbing because quality variables have a direct impact on the completion and output rates in this cycle. The Government has repeatedly stated in her policy documents the need and strategies to improve the effectiveness and relevance of education. However the deteriorating trend in the level of financial, human, technical and material resources are imparting negatively on the quality leading to a decline in educational performance, poor learning conditions, low achievements and hence low transition to secondary cycle and overall inefficiency in the system.

This research estimates the determinants of cognitive skills in this very important education sub sector in Kenya with special focus on reading comprehension for standard six. The study not only makes use of the production function framework favored by economists, but integrates it with the concerns of educators about pedagogical processes and those of socialists regarding school organization and management. Use will be made of an unusually rich data set, the 1998 Ministry of Education Baseline Survey under the auspices of Strengthening Primary Education (SPRED II), a project funded by the Overseas Development Association (ODA) of the United Kingdom (UK). The data not only include information on the scores on cognitive achievement tests but also detailed information on each child's household and the primary school he or she attends.

1.2 BACKGROUND

The building of modern nations depends upon the development of people and the organization of human activity. Capital, natural resources, foreign aid, and international trade, of course, play important roles in economic growth, but none is more important than human-power. Human resources are just as much the basis of the wealth of poor nations as of rich. Recognizing this, developing countries spend heavily on education. Kenya is no exception and indeed spends almost 1/3 of her budget allocation on education.

The strategies to expand the coverage and improve the quality of education/schooling typically emphasize, in developing countries no less than elsewhere, the provision of school inputs. The strategies concentrate on school buildings, furniture and equipment, teachers and their training, new curricula and syllabi, textbooks and other instructional materials that assist in delivering the curriculum and administrative services at all levels. The presumption is that increased abundance and quality of such things improve educational performance as measured by how many children enter school, how long they stay there, how fast they move through the grades, what they actually learn, and the social and private utility of what they learn.

Primary education is the cornerstone of social development and a principal means of improving the welfare of individuals. It promotes economic growth thereby reducing poverty and enhances political economic and scientific institutions. Primary education also ameliorates the health and nutritional consequences of poverty (World Bank 1990, 1993). The benefits of primary education for development stem largely from the improved cognitive skills it

imparts: literacy, numeracy, and problem-solving ability. Yet, a large body of evidence suggests that primary education in developing countries is inefficiently organized and that school-level implementation of effective strategies is particularly weak (Lockheed *et al.* 1991). Thus, a key issue in education and development policy is how primary schools can more cost-effectively promote the acquisition of cognitive skills.

1.3 STATEMENT OF THE PROBLEM

The motivation behind this research is the fact that as much as the Government may not have the financial ability and resources to expand primary education, there is still a lot that can be achieved by using the available resources more efficiently. Many pupils have been locked out of the school system basically due to the inability of the parents and the family in general to afford school fees. This is a policy-induced problem following the introduction of cost sharing. Inasmuch as cost sharing is not bad *perse*, its implementation has had a negative impact to vulnerable groups in the society. Our view is that cost-sharing policies should be implemented with very special targeting in mind in order not to have adverse effects on sections of the community. On paper, no pupil should be denied education due to inability to pay fees, but on the ground many pupils are out of school because of the same reason.

1.4 OBJECTIVES OF THE STUDY

Given the problems outlined above, we set out to determine the crucial variables that go into enhancing the performance of pupils in the Kenyan primary schools in general. This study will broadly look into the following two areas of interest with a view to identifying the most significant investments as pertains pupil performance.

i. The safest investment in educational quality in most countries is to make sure that there are enough books and supplies. These materials are effective in raising test scores and, almost invariably, are under-funded currently relative to the teachers' salaries. External aid might be used to address this problem in the short run but not in the long run. Other possibilities for improving quality are found in school feeding and health programs, in-service education for teachers in subject matter, and stronger systems of inspection and supervision and of course a conducive learning environment.

ii. Some investments are not likely to have a noticeable effect on primary school quality despite their potentially high costs. These investments include reducing class size (within the range of 25 to 50), providing primary teachers with more than a general secondary education, providing teachers with more than minimal exposure to pedagogical theory, constructing high quality buildings and introducing televisions or computers into classrooms.

More specifically, the study aims to: -

1. Give an indication of what resources have the greatest impact on learning achievement thus enabling the proper targeting of inputs with greater emphasis on those that are found to have the greatest impact.
2. Provide performance indicators to allow relationships between educational inputs and outcomes in terms of pupil performance, which are likely to inform the national debate on educational standards and provide impetus for necessary reforms.
3. Provide a clear understanding of the teaching and learning processes that are actually going on in the classrooms and pupils', teachers' and parents attitudes towards these processes.
4. Assist the Ministry of Education in establishing what intervention measures to take in order to improve the quality of education in general and learning achievement in particular.

1.5 HYPOTHESIS OF THE STUDY

In view of the foregoing, this study sets out to test the hypothesis that more emphasis has been placed on physical inputs (some that are essentially very expensive) than other social and environmental inputs that are non-quantifiable but still have a direct impact on the achievement of the pupils. These factors can be exploited to enhance the performance of the pupils in the face of other constraints.

1.6 SCOPE OF THE STUDY

The study involves a detailed effort to expand our knowledge of what works in education and educational policies that should follow from this knowledge. Given the data set used in this study, the findings are bound to be a realistic representation of the primary education in Kenya. The sample was drawn from virtually all the districts of the country. Doing a preliminary analysis after the initial random sample was drawn to ascertain that all districts were represented ensured this. When it was clear that some areas had not been covered in the sample, schools from the identified districts were further selected through random sampling. No selected school was left out of the study due to inaccessibility or any other reason for that matter.

1.7 SIGNIFICANCE OF THE STUDY

This study hopes to contribute to the information base by highlighting areas that directly and indirectly affect the performance of the pupils thereby providing timely information about what is happening at the school classroom levels and, through aggregation, what is happening at the national level. Such information will be of enormous value in guiding strategic decisions relating to the achievement of national educational objectives.

Besides, it will contribute to the literature in three dimensions. First, it extends the empirical evidence for developing countries by analyzing data from the SACMEQ survey carried out during the 1998 academic year. The other rigorous comparison of achievement in private and public schools in developing countries have been conducted on secondary education in Kenya (Armitage and

Sabot 1987), Colombia (Psacharopoulos 1987), and Tanzania (Jimenez and Cox 1990).

Second, the study also confronts the difficult methodological questions that have arisen in other studies. An individual's status as a public or private school pupil is a choice made by pupil and parent. If this choice is systematically correlated with personal characteristics, there may be sample selection bias. We use some recent methodological advances to model the effect of pupil and school characteristics on value added and to control statistically for the possibility of selection bias.

Third, we make further inquiries into the nature and consequences of public/private differentials in school achievement. In particular, we shall document differences in the availability and use of school inputs for public and private schools.

CHAPTER TWO

2. REVIEW OF RELATED LITERATURE

2.1 EDUCATION: - A GENERAL COMMENT

Economists have long been aware of the importance of human resource development. For example (Adam Smith 1937) stressed the importance of education at various points in *The Wealth of Nations,* and he specifically included "the acquired and useful abilities of all the inhabitants or members of society" in his concept of "fixed capital"[1].

> *The acquisition of such talents, by the maintenance of the acquirer during his education, study, or apprenticeship, always costs a real expense, which is a capital fixed and realized, as it were, in his person. These talents, as they make a part of his fortune, so do they likewise of that of the society to which he belongs.* (Adam Smith 1937 pp. 265-266)

Alfred Marshall (1930)[2]equally emphasized the importance of education "as a national investment" and in his view "the most valuable of all capital is that invested in human beings.

[1] Adam Smith, *An Inquiry into the Nature and causes of The Wealth of Nations* Cannan ed. (reissued by modern Library) Random House, Inc., 1937 boo II, pp. 265-266.
[2] cited by Harbison *et al.* (1964)

Modern economists of the 1940s and 1950s did not pay as much explicit attention to human resources in economic growth as did some of the great classical economists like Smith and Marshall. Perhaps because physical capital was measurable, and a capital-output relationship was given an apparent quantitative respectability, some modern economists virtually ignored the human resource factor in economic development. This trend has since changed following Theodore W. Shultz presidential address to the American Economic Association in 1960. Theodore W. Shultz said:[3]

> *The failure to treat human resources explicitly as a form of capital, as a produced means of production, as the product of investment, has fostered the retention of the classical notion of labor as a capacity to do manual work requiring little knowledge and skills, a capacity with which, according to this notion laborers are endowed about equally. This notion of labor was wrong in the classical period and it is patently wrong now. Counting individuals who can work and treating such count as a measure of the quantity of an economic factor is no more meaningful than it would be to count the number of machines to determine their economic importance either as a stock of capital or a flow of productive services.* (Harbison *et al.* 1964 pp. 4).

[3] As cited by Harbison. F and Myers C.A 1964, in '*Education Manpower and Economic Growth*". McGraw – Hill, Inc.

Education is more important than ever for developed as well as developing countries. In his 1997 State of the Union address, the President of the United States of America made clear that his number one priority for the next four years was to ensure that Americans have the best education in the world. He issued a ten-point call to action for American education in the 21st Century to enlist parents, teachers, pupils, business leaders, and the local and state officials in this effort. He describes education as the "fault line" dividing those who are able to compete successfully and achieve the middle class dream from those who are falling behind.

In contrast, both poor quality and quantity characterize primary education in developing countries. However according to Nehru *et al.* (1995) Africa has had a faster rate of growth of education than other regions even though it has a lower stock of education. Despite the growth in enrolments, there is evidence of serious deficiencies in the implementation of education policies. There is a wide gap between plans and schools. Less than 10 percent of education policies have been implemented (Graig, 1990), and even when money is allotted for a specific purpose, much of it does not reach its intended destination. For example, less than 30 percent of the money allocated by the Uganda Ministry of Finance on the Primary School non-salary vote in 1991-1995 actually reached primary schools (Ablo *et al.* 1998).

A major debate in the literature on school effectiveness (see Purkey and Smith 1983) concerns which school-level factors _ inputs, teaching, and management best promote cognitive skill formation, and which do not cost effectively. This question has implications for education budget allocations. Specifically, for whether the Governments should provide schools with

particularly effective set of inputs (for example, school facilities and instructional materials); concentrate resources on improving pedagogical processes (for example, through teacher training and performance evaluation); or reform the management of the entire school (for example, through decentralization administration, training and school supervision).

However recent research has shown that providing more resources will not reliably lead to improvements in pupil performance[4]. If that be the case, what alternatives do policy makers have? Further efforts so far made in research have not provided the information needed to refine traditionally input-centered policies. Nor, is the extension of existing studies likely to improve our knowledge in a timely and satisfactory way. At the same time, generalizations in education are difficult because the factors that are considered are quite idiosyncratic. Individual studies, because of peculiarities in the available data and the varying perspectives of the researcher tend to pursue different measures of school and teacher factors. Each generally highlights its "new findings". It would, of course, be foolhardy to think of making policy on the basis of these individual factors.

Evidence available point to the fact that schools differ in important ways, but we cannot describe what causes these differences very well (Hanushek and Lavy 1994). These differences are not captured by the simple measures commonly used. Neither, it appears, are they captured by more detailed measures of classroom organization or pedagogical approach. These findings lead to the conclusion that the educational process is very complicated and that we do not understand it very well. We cannot describe what makes a good or bad teacher or a good or bad school. Nor are we likely to be able to describe the

educational process very well in the near future. We should learn to live with that fact. This implies finding policies that acknowledge and work within this fundamental ignorance. This study recognizes this limitation and pursues the issue given the peculiar situation of the Kenyan education system.

The documented evidence from Kenya points to very low schooling quality. This is true both for educational inputs (such as non-existent or very poor teaching materials and facilities) and educational outputs (such as low cognitive achievement levels of Kenyan pupils in international comparisons and low levels of literacy among those who have acquired some schooling)[5]. Given the importance of cognitive skills for individual productivity, Kenya may be forgoing economic growth because of its poor quality of educational investment. Yet in Kenya, as in most developing countries, there is little research on the determinants of educational quality especially at the primary level. The next section makes an overview of the primary education system in Kenya.

2.2 *THE STATE OF PRIMARY EDUCATION IN KENYA-AN OVERVIEW*

2.2.1 *Education for Manpower Development Model and Its Costs to Primary Education in Kenya*

Kenya has made rapid expansion of its education system at the secondary and higher levels since independence. This has been achieved as a result of the policy derived from the manpower utilization model of development (see Ominde Report, 1964). Although stress on education to produce the needed manpower for independence could to some extent be justified,

[4] For instance Kingdon (1994) ;Glewwe et al. (1995). Harbison et al. (1992) among others.

considering the socio-economic and political system inherited from colonialism, it was over emphasized.

Despite the governments desire to expand educational opportunities for Kenyans, the main objective was to meet national manpower needs. In primary education for example, efforts were made to avoid its rapid expansion to meet general popular demand. Although enrolments did rise, the rate of increase over the period 1964/69 was only 20% from 1,010,889 in 1964 to 1,209,670 in 1969.[6] As much as the manpower utilization model was appropriate, its overemphasis led to curtailing of expansion in primary education in the face of popular demand.

According to Jimenez (1986), rich people tend to benefit more from social services. He gives four reasons for this. First, the private costs associated with the consumption of the service e.g. transportation costs, opportunity costs among others may be too high for the poor. Secondly, differential costs and benefits arising from the fact that the absolute costs to consume are higher to the poor than the rich and the benefits are higher for the rich than the poor due to lack of awareness on the part of the poor. Thirdly, a government expenditure pattern which target services whose access is severely limited. Fourthly, rationing especially so in education using the exam score precludes the participation of the poor given that exam scores and income are not only related but also highly and positively correlated as evidenced by Knight and Sabot (1990) among other studies.

As stated elsewhere, the social returns to primary education are more than returns to higher education. At the same time, education is viewed by both

[5] Nkinyangi *et al.* 1994
[6] Statistical abstract 1971

the poor and the rich as the only avenue through which they can attain and maintain economic power. After independence, the privileged few were able to pursue education at the expense of the majority who were both ignorant and also lacked the opportunity to attend school. This has contributed to the widening gap between the rich and the poor in the post independent Kenya. Had the government placed equal emphasis on all the education sectors, we envisage an independent Kenya with very high literacy levels. This was not to be the case. The benefits that come with a literate society cannot be gainsaid. Even though the gross enrolment rates in Kenya are relatively high by regional levels, these have been achieved in the recent past when the negative impact of the manpower model had taken its toll. This is just a reflection of the curtailed demand for primary education under the manpower utilization model.

The overemphasis of the model has resulted in a situation in which the estimated-trained manpower cannot be said to represent the priority needs of the country. Many can no longer be accommodated in the existing labor market. Inasmuch as the manpower utilization model was well intended, unfortunately, it was overemphasized. The pre-occupation by planners with this model prevented meaningful efforts to universalize education and to integrate the formal school with socio- economic development since much of the resources were directed towards education for manpower development.

The Ominde Commission of 1964 however endorsed as a valid educational policy objective, the provision of free primary education. It was argued that primary education contributed indirectly to economic progress both by providing a reservoir of candidates for secondary and higher education and by offering a basic education required for effective participation in the modern

sector of the economy. However, investment in primary education levels was not to be allowed to hinder growth in other educational levels. It was observed by the report that:[7]

> *Although we recognized a measure of economic importance, for the reasons stated in primary education, we must concede a prior claim to secondary, technical, commercial and higher education. The key posts in our national life require such preparation.. (Sifuna 1990 pp. 3).*

The independent government therefore chose to place the main emphasis on the expansion of higher levels of education and trying to gear them to the manpower needs of the modern sector of economic life. At the same time it provided facilities for a slower but steady increase in primary school enrolments. The growth of higher levels of education therefore happened at the expense of the primary education, which claimed the least on government resources.

2.2.2 *The Return to Primary Education in Kenya*

In Kenya like elsewhere and in developing countries in particular, returns to education are measured by the gaps in wages, and presumably productivity, between workers with different levels of education. It is often assumed that the average wage of labor with a given level of education measures the wage received by the marginal worker with that level of schooling. However, the

[7] Cited by Sifuna D. N. 1990

average may not always indicate the marginal wage. This approach follows the standard Mincerian (1974) framework for analyzing the returns to school investments.

Returns to education in Kenya in general cannot therefore be fully documented since the quality of schooling has not been incorporated formally into the Mincerian framework. Nor have the implication for public investment decisions in including quality been explored. In particular, there is no knowledge of an effort to estimate the social returns to investment in school quality, permitting a comparison of the returns to improving rather than expanding the system.

Given the rapid expansion in the education system the labor market conditions faced by those just leaving the primary school now are very different from the conditions faced by earlier cohorts when primary school leavers were in short supply. For those entering the labor market a generation ago, a primary school certificate was a passport to a white-collar job, and typically those who obtained jobs at that time remain in them today. But because the education system has expanded, today's primary school graduate is fortunate to get even a menial blue-collar job in the wage sector, and his chance of obtaining a white-collar position is virtually nil. Nonetheless the informal sector is expanding and the primary school leavers can readily be absorbed in this sector given the practical orientation of the curriculum.

The filtering down process by which successive corhots of workers at a particular education level enter less skilled jobs has effectively led to a lower marginal return to primary education. At primary level there are a substantial filtering as the educational services expand. However, primary education has

much more social returns than does higher education. This emanates from the fact that primary education imparts numeracy and literacy skills that easily diffuse to enhance the livelihood of the majority in the population in comparison to higher education which is limited to the very few. At the same time, the unit cost of providing primary education as compared to higher education is relatively lower. A simple cost-benefit analysis can support this argument. It is therefore inequitable and inefficient to subsidize higher education at the expense of primary education, since the former has relatively lower social returns than does the latter, and that the latter is relatively more beneficial to the poor. It is important that we concentrate our effort and resource in primary education.

2.2.3 The Enrolment Rates

The Gross Enrolment Rates (GERs) for Primary Education have declined from 105.4 percent in 1989 to 88 percent in 1998. Though the rates are on the decline, they are comparatively high by regional figures[8]. The boys to girls ratio at the national level is one to one, which indicates a great success in eliminating gender disparities at the national level. At the same time marked regional variations still remain. According to the National Primary Education Baseline Report (1998), the mean age for the children in standard three was ten years, whereas it ought to be 8 years and at standard six it was 14 years in comparison to the norm of 11 years[9]. Other specific studies in the nomadic regions of the country show that girls drop out early due to marriage and boys due to entry into *moranhood*. Another aspect in these areas is that there is delayed onset of

[8] See appendix 2 for data on GERs across African Countries.
[9] However, our sample puts the average age at standard six at 13.69 years.

education which drastically reduce the overall period spent in school and indeed have serious effects on completion rates.

Table 1 **Primary School Gross Enrolment Rates by Region/Province**

Province	1989	1990	1991	1992	1993	1994	1995	1996	1997
Coast	78.6	78.2	75.8	74.3	69.4	64.5	64.7	65.2	63.3
Central	105.4	99.3	96.4	95.2	92.3	88.5	89.7	83.1	80.9
Eastern	94.9	93.6	92.7	90.1	84.8	82.5	79	77.9	76.6
Nairobi	86.4	68	67.1	66	51.3	62.1	61.4	58.5	56
Rift Valley	89.5	87.9	86.5	84.4	76.7	77.4	75.8	75.6	75.9
Western	103.5	101.3	98.8	98.1	93.2	92.4	89.8	87.8	86.8
Nyanza	101.6	97.7	94.5	98.1	94.3	93.7	83.4	81	83.3
North Eastern	30	32.4	30.8	29.4	22.1	28.6	19.7	27.2	31.7

Source: Ministry of Education Statistics[10].

Table 1 above shows the GERs by province. Western, Central and Nyanza provinces appear to have the highest enrolment rates with North Eastern trailing closely followed by Nairobi. The general trend is a decline in the enrolments in all the regions save for North Eastern, which shows an upward trend as from 1995. This province in particular has been targeted with a view to improving enrolment by increased provision of food through the school feeding programs.

The completion rates are another area of great concern in the primary education sector. The rates have ranged between 43 percent and 46 percent

[10] The Ministry's Statistics are stored in a single database for all the years.

over the last 10 years. This is an indication of substantial wastage in the form of repetition and dropouts. Such wastage could be attributed to factors such as the inability of households to meet the cost of education, girls' pregnancies and limited opportunities for access to secondary education, among other factors. A closely linked indicator of wastage is the transition rates. *Table 2* below gives the grade transition rates for the pupils who enrolled in standard one in 1990 and completed standard eight in 1997.

Table 2. **Transitional Rates for the 1990 primary school corhot, Kenya.**

	Class							
	1	2	3	4	5	6	7	8
Boys %		-18.5	-4.1	-6.3	-12	-13	1.4	-34.2
Girls %		-18.8	-2.7	-2.7	-8	-12.2	-0.2	-44.8
Total %		-18.6	-3.5	-4.5	-10	-12.6	0.6	-39.4
M:F Ratio	51:49	52:48	51:49	50:50	49:51	49:51	50:50	52:48

Source: Economic Survey, 1995 – 1998.

The figures point to the fact that there is marked dropout after the 1st grade of education represented by the negative transition rate of 18.6 to standard two. A similar observation is made for the transition from standard seven to standard eight, where the gender disparity is very wide. The very low transition at this level can easily be explained. First, by the fact that there is a lot of wastage at standard seven due to repetition. Schools that promote only the very best pupils to standard eight in their endeavor to enhance the ranking of

their school in the national examination occasion this[11]. Secondly the girls dropout due to pregnancies and early marriage. The low transitional rates at standard two are not easy to account for. Dropouts at the very beginning of the education cycle show a grave picture of the entire education system. One would expect the transition rates to decline with the level of education and not vise versa. The Kenyan case indeed needs much investigation to establish this alarming trend. As depicted in *Table 2* above, the gender issue has not been a major problem in Kenya at least at the primary school level especially so from a national perspective. At the district level however, disparities are observed in certain districts. The worst hit districts are those falling in the Arid and Semi Arid Lands (ASAL), where girls are married off early or dropout due to pregnancies.

According to the findings by Nkinyangi *et al.* (1995), amongst other pitfalls to learning, Kenya primary school pupils suffer from severe mal-nourishment and overcrowding classrooms that are stark and bleak. They presented original data on classroom learning conditions, particularly emphasizing the aspect of lighting and its influence on learning. Appropriate classroom lighting is an important dimension of school quality, and a proxy for the quality of school construction. They argue that classroom lighting strikes at the very heart of schooling – providing, or ameliorating, a central element under which the very process of learning is shaped.

[11] See. GOK/UNICEF, 1994.

2.2.4 Declining quality of Education

The cognitive achievement of African students is very low by world standards, and the evidence points to a decline in recent years (World Bank 1993). Much of this evidence is indirect, however, and focuses on quantities of particular inputs (especially books and other learning materials, management, and maintenance of capital assets) and their decline relative to other inputs (especially teachers).

The economic realities of the late 1980s and 1990s manifested in the low economic growth and the effect of the SAPs have necessitated reduction of Government spending on education. The consequence has been an increase in cost – sharing on the part of beneficiaries with the rising cost of living and the fact that nearly half of Kenyans live below poverty line, at the household level education competes with the basic needs.

On the other hand, the impact of rapid population growth and the economic stagnation on the quantity of educational services in Kenya is relatively easy to document. Another probable effect of the recent economic and demographic trends in Kenya is the erosion in the quality of education, but this effect is more difficult to measure.

The quality of a school or education system is properly defined by the performance of its pupils and graduates - the so-called output. In practice, however, because inputs into the teaching process are generally easier to measure than output, quality is often gauged by the inputs. Although information on the availability of inputs is important, caution is required in drawing conclusions about quality from this information.

When either academic or post-school performance is used to measure school quality, it is necessary to control for the effect of non school factors, such as innate ability, family background, and the early childhood education. The impact of school inputs on the performance is the gain attributable to these inputs after controlling for the effects of non-school factors. This study shall focus on both school and non-school factors in estimating the determinants of achievement in Kenyan primary schools.

2.2.5 The Policy Process

Although Kenya together with the World Community at the 1990 World Conference on Education For All (EFA) at Jomtien, rededicated herself to achieving the goal of universal primary education and providing basic education for all, the country's education and training system is currently at crossroads. There is concern over declining participation rates in some sub sectors and especially so in the primary sub sector. For instance enrolments in this sector are on the decline as pointed out earlier. The rates of grade repetition and poor transition rates in general are a major cause of inefficiency (MPET, GoK, 1998).

By being a signatory to the World Conference on Education for All, and by consistently devoting a large share of the national budget to education, Kenya has shown its commitment to Universal Primary Education. It is the quality of the Universal Primary Education that is to be provided which is problematic. The Ministry of Education has done every effort to upgrade the quality in the education system. Strenuous efforts continue to be made by the Ministry to revise the primary school curriculum in order to enhance its relevance. Currently,

there is a Commission that has been appointed (Koech Commission) to review the education system in the country. We are very optimistic that this commission will come up with recommendations from a cross-section of Kenyans that will go a long way in improving education in the country.

Issues of quality, relevance and equity are best addressed on the basis of research findings, particularly survey research involving probability samples of schools in the system. The data collected through routine censuses facilitate the generation of global indicators, but in the established census-based approach the only form of information disaggregation is by region, thus limiting the usefulness of the data. As a result it is difficult to determine the exact situation in the schools.

From a policy perspective, the central reason for pursuing research on educational performance has been to develop a list of inputs, curricular elements, or other factors affecting pupil achievement that could be instituted through central policy. If there were a clear understanding of what determined pupil performance, individual schools could be told what to do. Indeed central authorities could insist that schools follow their directives – by linking funding to specific actions, regulating certain approaches, or implementing specific decisions. However we do not know what determines educational achievement and therefore such prescriptive policies are the wrong approach which in essence necessitates such research.

The key to building an effective strategy of human resource development is the achievement of balance in the constituent programs. The nature of this balance, of course, depends upon the goals of the particular country, its level of economic growth, and the stage of modernization it has attained. In some

countries, primary education may be pursued too rapidly at the expense of secondary and higher education and vise-versa. In higher education too much emphasis may be placed on the arts and humanities as opposed to science, engineering and agriculture. As already indicated, Kenya fell to this trap in her development of the education sub sector after independence. Besides, the concern for which level of education requires much emphasis, the issue of quantity and quality also arises.

Therefore, the proper balance between quality and quantity of education at all levels poses a dilemma for most developing countries because they cannot increase both at the same time. And perhaps the most difficult problem is to decide how much to rely on pre employment formal training as opposed to on-the-job training for craft skill development. For example in Uganda, investment in vocational schools at the secondary level brought very poor returns (Robert, 1965)

An analysis of alternative policies of human resource development is an indispensable part of any good economic development plan. Planners recognize the importance of training and education in development. However most fail to incorporate a systematic analysis of human resource development in the plans they propose (Harbison 1965).

It is clear therefore, that designing and implementing strategies to improve education in Kenya is not easy. The preponderance on effectiveness – that is, on what level and quality and mix of inputs best serve performance objectives – has not served Kenya well because this mix refers to environments that are profoundly different from those in Kenya. Furthermore, the reliability of that evidence is questionable. Conclusions from different studies are sometimes

ambiguous, often inconsistent, and nearly always subject to methodological challenge. More important, evidence on the efficiency of alternative development strategies – that is, on effectiveness of input mixes relative to their costs – is even scarcer and less reliable. Thus, the basic information on which to build educational policies is lacking.

Yet policy decisions must be made, and the only alternative in such circumstances is to plow ahead. The best that appears generally possible is to apply liberal doses of common sense, professional judgment, and knowledge of the local scene to whatever lessons can be distilled from documented experience and conventional wisdom elsewhere. Indeed educational planners and managers in Kenya and the international development agencies most often than not operate on just such a "best guess, make do" basis. It should come as little surprise then that the results often fall short of expectation and desires.

In Kenya, things are changing for the better. Currently the Ministry of Education has developed a national education plan to guide the future directions for its education programs. Before then, these programs were determined by:

(a) the provisions of the Education Act as amended from time to time, Sessional Papers, Policy Framework Papers and the successive five year National Development Plans,

(b) a variety of guidelines and pronouncements, such as the policy circulars issued from time to time which have not been put together into a coherent document, and

(c) updates, situation analyses, comprehensive education analyses, sector reviews, etc., produced by bilateral, multilateral and other

donor agencies in order to provide the decision-makers in the Ministry of Education with information that can assist them in their efforts to guide decisions on the future of education.

The Government has clearly indicated its intention to effect the Master Plan reforms designed to upgrade quality and relevance, and to achieve equity in the provision of educational services. While the broad educational context is fairly well understood, little information is available about the conditions of schooling out in the field. This condition limits the government's and indeed the Ministry of Education in particular, to perform effectively on the education front. This study comes in handy and hopes to provide information that will be of enormous value in guiding strategic decisions relating to the achievement of national educational objectives pertaining to quality.

2.3 THE PRODUCTION FUNCTION APPROACH

Until very recently much of the research in the economics of education has focused on the economic consequences of quantity (years) of education and ignored the role of quality of education. A prominent example of this is the Mincerian earnings function. Yet years of education may be a very imperfect indicator of human capital acquired if schooling quality varies greatly, as within many countries.

Initially the production function approach was limited to physical inputs into education, perhaps because it was pioneered by economists or equally the supply of inputs was seen as the critical determinant of achievement (for example Hanushek, 1986). However most recent studies (including the present

study) are making use of an enhanced production function that examines many more characteristics of schools and teachers than are usually considered in the standard function approach. The overall framework of this approach is as discussed under section 3.2.2 where the dependent variable is the test score on a specially designed exam and the independent variables are a vector of pupil, family, and school characteristics that affect the pupils' performance.

The production function approach has been employed broadly to investigate the effect on school performance of the core factors that determine expenditure on education. Instructional expenditure makes up two-thirds of total school expenditures. Instructional expenditures are in turn determined mostly by teacher salaries and class sizes. Most studies regardless of what other school characteristics might be included analyze the effect of these factors on outcomes. These are also the factors most likely to be found in any given data set especially if the data come from standard administrative records.

The production function analyses have also investigated a wide variety of other school and non-school factors. Although it is difficult to be specific in any summary of other factors because the specifications are quite idiosyncratic, three generalizations are possible.

First, family background is clearly very important in explaining differences in achievements. Virtually regardless of how measured, more educated and more wealthy parents have children who perform better on average, even after taking into account the effect of other factors. The studies however have seldom gone into any detail about the mechanisms by which families influence education. Generally they have stopped with the introduction of proxies of family differences in education. From a policy perspective, it is essential to understand

whether or not a change in inputs that can be identified and manipulated will lead to improved performance, in either the short run or the long run. This requires understanding the underlying causal structure.

Other studies have examined many additional measures of the effects of schools, teachers, curricula, and especially instructional materials on achievement. Various studies have included indicators of schools' organizational aspects, including specific curricula of educational process choices and of time spent by pupils working at different subject matter. Others have complied detailed information on teachers cognitive abilities, their family backgrounds, and such educational factors as where they went to school, what their majors were, what their attitudes are about education of different kinds of pupils and so forth. Similarly detailed information has been gathered about school facilities, school administrators and other personnel.

Input-output studies in developing countries allow insights into aspects of the educational process that are difficult to observe in the developed world. The restricted range of inputs and school organization found in the developed countries inhibits estimating the importance of many factors. For example, virtually all United States teachers have a degree, and variations in their education relate essentially to differences in the amount of graduate school instruction individual teachers have (Harbison R.W and Hanushek E.A. 1992). Similarly, textbooks and a wealth of supplementary instructional materials are universally available in developed country classrooms, but not in the developing countries. Finally, the near universal use of standard classroom instruction does not permit analysis of how for example radio instruction or other means of distance-education affect pupil performance. In developing countries where

variations in schooling inputs are much larger, estimating the effects of such factors is feasible and more likely to yield reliable results.

It is on this premise that most studies on the quality of education in developing countries have focused on the conventional input-output model. This model emphasizes the provision of learning materials and almost neglects other crucial factors that go into improving the quality of education such as school organization and administration, peer influence, learning climate in the school, home background among others.

Evidence from a number of recent econometric studies calls into question the conventional emphasis on quantity for example (see Card and Krueger, 1990). These studies, which examine the association between different indicators of quality of schooling received and labor market performance, share the common conclusion that school quality (defined differently) is statistically important in explaining variations in the productivity of individuals[12]. The evidence on the link between quality of schooling and productivity indicates that, from an economic efficiency perspective, quality aspect of education deserves attention.

Behrman *et al.* (1983) by using the Mincerian (1974) framework for analyzing the returns to school investment in Brazil, incorporate the quality aspects of schooling. They show that the inclusion of quality resolves or reduces the paradox of varying returns to schooling over space and among individuals. They find that the standard approach overstates regional and urban-rural differentials in the impact of schooling; and that most of the apparent different

returns to schooling in the standard estimates for migrants versus non-migrants, often attributed to migrant selectivity on personal characteristics is due to variation in school quality. However to arrive at these findings, they make three key assumptions.

1. That quality varies across geographical areas;
2. Individuals do not move across areas in response to quality differentials;
3. Quality is determined by public resource allocation to schooling out of general overall revenues so there is no direct relation between quality in a particular area and the tax burden of a particular household in that area.

Well, the above assumptions may hold in the case of Brazil, but they may not necessarily hold in the Kenyan scenario, especially so assumptions 2 and 3. The Kenyan education scene is characterized by many boarding schools fairly spread across the country. Generally, these schools tend to perform (on average) better than day schools. Parents may find it more cost effective to send their children to a boarding school that is far than a nearby day school for the same reason. This however, is subject to empirical research. Secondly assumption three implies that there is no direct private cost for whatever quality of education an individual receives. This assumption is flawed in the case of Kenya where individual parents contribute to the education of their children in the

[12] Earnings are used as proxy for productivity in these studies. This is very conventional following the usual assumption that earnings are a good indicator of productivity. However this may not apply in

form of 'fees' notwithstanding the type of school. Furthermore there is a whole spectrum of private schools that are 'believed' to perform better than public schools, at least at the primary level. Some of these schools in fact charge very high fees, which an ordinary Kenyan would consider exorbitant.

A recent and particularly rich example of research that reviews a wide range of inputs (Glewwe *et al.* 1995) suggests that student achievement responds to various pedagogical factors, such as the amount of time devoted to instruction or the use of written assignment. By looking at both "resource" and "process" factors, the authors suggest that a broader view is preferable to the more narrow concentration on resources that has typically been pursued. Fuller and Clarke (1994) share this conclusion on their review of school performance in developing countries.

Different researchers have attempted to summarize key aspects of these studies, frequently providing qualitative discussions of the analyses, their results, and their interpretations[13]. One such summary is that by Harbison R.W and Hanushek E.A (1992). A total of ninety-six studies formed the basis for their analyses. The table below gives a summary of the statistics. It divides the available studies into statistically significant (by sign) and statistically insignificant. (The insignificant findings, unfortunately, cannot be divided by direction of effect). The table begins with the characteristics directly related to instructional expenditure per student and then goes to other attributes of schools.

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situations where we have wage guidelines, as it is often the case in many developing countries.

Table 3. **Summary of Estimated Expenditure Parameter Coefficients from ninety-six Studies of Educational Production Functions: Developing Countries.**

Input	Number of Studies	Statistically Significant		Statistically Insignificant
		Positive	Negative	
Teacher/pupil ratio	30	8	8	14
Teacher education	63	35	2	26
Teacher experience	46	16	2	28
Teacher Salary	13	4	2	7
Expenditure per pupil	12	6	0	6
Facilities	34	22	3	9

Source: Harbison et al. (1992) Educational Performance of the Poor: Lessons from Rural Northeast Brazil [14]

The central conclusion from a review of this literature is both simple and startling: in the last quarter century, work on the relationships between educational inputs and outputs has indicated that schools all over the world pursue very inefficient policies. The simplest notion is; do the resources purchased and used by the schools systematically improve pupil performance? The reported correlations in the table above are those that hold after allowing for differences in the family backgrounds of pupils and other educational inputs.

This evidence provides no support for policies to reduce class size for example. Of the 30 studies investigating teacher – pupil ratios, only eight find statistically significant results supporting smaller classes; an equal number are significant but have an opposite sign; and almost half are statistically

[13] Avalos and Haddad (1979), Fuller (1985), Lockheed and Hanushek (1988), Lockheed and Verspoor (1991).

insignificant. In general little evidence suggests that smaller classes are better than large classes. Additionally, things that affect teacher salaries particularly education and experience are not systematically related to student performance. Neither are teachers' salaries or aggregate differences in per pupil expenditures. Schools in both developing and industrial countries continue to pay for things that have little consistent or systematic payoff in terms of pupil performance. Essentially policies that are expensive but that have no return are obviously in efficient.

The analysis by Card and Krueger (1992) of the effects of historical resource usage in the United States, with its observations of schools during the 1920s and 1930s, may capture some differences in organization or level of resources that would be appropriate for developing countries. Intense controversy surrounds the interpretation of their results, however, making it difficult to apply the work to investment policies in developing countries. (For a discussion of Card and Krueger (1992), see Betts (1994); Heckman, Layne – Farrar, and Todd (1994); Hanushek, Rivkin, and Taylor (1995); and Speakman and Welch (1995). These results suggest that the measurable factors, factors that often determine central policy, are not consistently related. Some evidence suggest that minimal levels of basic school resources, such as the availability of textbooks, the provision of minimal facilities, and so on, are important in student achievement (Lockheed and Verspoor 1991); (Harbison and Hanushek 1992). These findings are not uniform in the statistical analyses, but they are common enough to receive more attention than most of the other findings. The question

[14] Main sources: Avalos and Haddad 1979; Birdsall 1985; Carny 1971; Fuller 1985; Jimenez and Lockheed 1989; Jimenez, Lockheed, and Wattanawaha 1987; Lee and Lockheed 1990; Lockheed 1987; Lockheed

therefore is; why then do we not see policies instituted to provide these minimal resources, particularly if there is strong evidence about their importance? Especially so in Kenya, cost sharing policies have been instituted that do not seem to archer well with improvement in education.

2.4 PRIVATE VERSUS PUBLIC PROVISION OF EDUCATION

Another important aspect of the debate on the quality of schooling is the private versus public provision of education. Traditionally most Governments have preferred to keep all or most of educational 'production' in the public domain for equity reasons. However, budgetary resource shortage in the face of growing school – age populations and economic hardships, have recently encouraged many governments to re-examine the role of the private sector in the provision of education. This re-examination is, in part, a recognition that universal free provision of education does not necessarily best serve equity goals and, in part, a recognition of the limitations of the public sector's own administrative capacity to deliver an efficient services.

The efficiency of schools both private and public has been the subject of a recent lively exchange in the literature. The issue is important because it has implications for the way that the public sector should finance education: whether it should provide only free public education or whether it should also subsidize private schools. In the United States, the debate was sparked off by the Coleman, Hoffer, and Kilgore (1982) report, which concluded that private (Catholic) schools are more effective than public schools in helping pupils

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and Komenan 1987; Ngay 1984; Schiefebein and Farrell 1982.

acquire cognitive skills. In developing countries, where tightening fiscal constraints have limited ability of the public sector to expand its provision of free education, research on this topic began in the late 1980s (Psacharopoulos 1987); (Jimenez and Cox 1990). Further research in this area has been carried out thereafter (Glewwe *et al.* 1994); (Glewwe *et al.* 1995); (Harbison. R.W, *et al.* 1992), among others.

The debate arises due to controversy over methodology, interpretation, and data. The most important methodological issue is the difficulty in attributing differences in the cognitive abilities of pupils in public and private schools to school inputs alone, because a variety of non-school factors also affect achievement.

When examining whether substantial differences exist in the quality of private and public schools, it is clear that one cannot compare the raw achievement scores of pupils and claim that the type whose pupils had the highest average score was the most effective. If for example, pupils with more ability or pupils from more privileged home backgrounds systematically chose to attend private schools, then such superior achievement as they reveal cannot be attributed wholly to the type of school attended. The approach, therefore, must be to measure school effectiveness on the basis of any achievement differences that remain after home background and sample selection has been taken into account.

Various reasons have been postulated for private schools' superior efficiency. Since they are accountable to parents who pay their fees and tuition, private schools may have to exert themselves harder to provide good instruction to pupils. Competition among providers can be good for quality services.

Decentralized management, which is a hallmark of private operators, is conducive to greater efficiency. By contrast, on the other hand, 'X-efficiency' factors can result in poor management and staff motivation in state schools. Although these arguments have some force *a priori,* until recently they had little empirical support.

Jimenez *et al.* (1988) carried out a study on the relative efficiency of Private and Public schools in Thailand. They employ the value-added model. This is achieved by using the pre-eighth grade and post-eighth grade test scores. Notwithstanding the value-added model that mitigates sample selection bias, selection bias was found to be significant in this study. That is, there was a positive selection to the public schools than private schools. Individuals, who are more likely to score higher due to background and pupil characteristics, go into public schools rather than private schools. In this particular study, private schools tended to thrive even when they were relatively less endowed with measurable inputs, such as the proportion of faculty certified to teach.

Based on case studies that compared private and public secondary education in Columbia, the Dominican Republic, the Philippines, Tanzania and Thailand, Jimenez *et al.* (1991b) found out that private school pupils generally outperform public school pupils on standardized tests. In addition, they show that unit costs of private schools are lower than public schools. These results point to the fact that governments should reconsider policies that restrain private sector participation in education.

Kingdon (1994) studied the quality and efficiency of Private and Public schools in India and found out that the popularity of the fee-paying Private Unaided schools in India is explained by their superior quality. Government and

Private aided schools (which are not as autonomous as Private Unaided schools) are similar in their cost-efficiency but compared unfavorably with Private Unaided schools. The findings suggested (as a policy recommendation) a great improvement in the quality and cost - effectiveness of Public schools.

To be able to analyze the effectiveness of either of the school types two broad methodological approaches come out clearly in the related literature. One is where a single achievement function is fitted for both school types and a private school dummy is used as a regressor (Psacharopoulos 1987), ; (Govinda and Varghese 1993) among others. The coefficient on the private school dummy is interpreted as a measure of the standardized achievement advantage of private schools over the public schools. However this approach suffers from two important shortcomings. Firstly, estimating a single equation for the sample of all schools imposes the restriction that the values of the coefficients on variables other than school-type are equal in all school type. If the educational production function varied substantially between the school types, this restriction would introduce serious miss-specification biases. Secondly, a school type dummy is likely to be endogenous since choice of school type may itself be determined by individuals partly on the basis of expected achievement in private and public schools.

The second, more satisfactory, approach is where two separate achievement production functions are fitted: one for the private and one for the public sector. This avoids endogeneity and the restriction of a similar production function across school sectors. The private school quality advantage (or disadvantage) over public schools is calculated using Oaxaca's (1973) method, that is, by predicting a score for a person who has the average characteristics of

a public school pupil if she or he were to attend private school. This predicated score is then compared with the actual public school average achievement score. However this approach has been criticized for failing to control for an important unmeasured pupil characteristic, namely innate ability (see Murnane *et al.* (1985) for a review of the criticisms and issues).

Recent econometric studies of non-random sampling have analyzed the bias introduced by non-random sample selection on conventional estimators such as least squares, and have produced a variety of consistent estimation techniques and empirical models. The most commonly used are econometric models, which correct for sample selection effects by unifying censored regression models and discrete choice models. The Heckman Lee two-step procedure of selectivity bias correction has come to dominate the applied literature using sample selection models because of its relative simplicity (Heckman 1979). The econometric solution to the problem of endogenous sample selection and in comparison of private and public schools using Heckman's two-step correction procedure was pioneered by Jimenez *et al.* (1988, 1990, 1991a, 1991b).

CHAPTER THREE

3 RESEARCH PROCEDURE AND METHODOLOGY

3.1 SOURCES OF DATA AND SAMPLE DESIGN

The study uses data collected by the Ministry of Education, Kenya under the auspices of SACMEQ. The data is collected using sample survey. Before the actual sample survey was carried out, a pilot survey was conducted to evaluate the validity of the instruments prepared for the pupils, teachers and the school administrators. In general the instruments were designed to elicit general information from teachers, school heads, and a specially designed questionnaire to test the standard six pupils in English.

The main survey instruments are described in *Table 4* below. The aim of collecting these data was to generate data that was rich enough to ensure informed policy making, planning and implementation practices.

Table 4. **Main Survey Instruments.**

Questionnaire	Description
Std Six Pupil	The questionnaire asked questions about the pupils' possessions at home and in school. The questions gathered information on the school and home environment. Part two was a reading test literacy test of 60 multiple-choice items.
School Head	The questionnaire gathered information about the general organization of the school including enrolment, facilities, and number of teachers.

Questionnaire	Description
Standard Six English teacher	This questionnaire gathered the characteristics of std six English teachers including level of education and training and teaching conditions and perceptions of teaching methods.
Pupil Name form	This form listed pupils' names, ages, sex, stream (class). It could be used to countercheck information given by pupils in case of any doubt.
School Form	This form was completed by the head teachers and gave details of Std Six English teachers as well as on school enrolment. The forms could be used to cross check information given by teachers and head teachers in their respective questionnaires.

In addition, a '*Manual for Data Collectors*' explaining the data collectors' role and giving detailed instructions on how the data would be collected was prepared. All the questionnaires were pilot-tested in eight schools and after the analysis, revisions were made to the questionnaires as appropriate. However this study in particular makes use of the pupil, the English teacher and the school head questionnaires.

3.1.2 Sampling Procedures

The target population was all pupils in standard six in 1998 who were attending mainstream schools in the country. For sampling purposes it was necessary to have computerized data on the latest school enrolments by class, where each school had a unique identification number. The only source of such data was the Kenya Certificate of Primary Education (KCPE) examination entry data. This data is stratified according to the eight administrative provinces, which are referred to as regions for the sake of uniformity given that the data was

collected for a comparative study between the participating countries of SACMEQ.

Schools were selected using SACMEQ procedures in which the pupils are used as the sampling unit. Schools, which the selected pupils attend, are then included in the sample. These sampling techniques are in line with the standards set down by the IAEEA (Ross 1991). A total of 185 schools were selected for the survey. However the major shortcoming of using the KCPE examination entry data was that the population was effectively reduced by the number of schools that had not reached the examination class and had either reached standard six, seven or presenting KCPE candidates for the first time in 1998.

3.1.3 Data Collection

It was imperative that every step possible is taken to ensure that the data collected was accurate. It was therefore necessary to carry out a pilot study. Schools of various categories were represented, including schools in slum areas, those in affluent areas and a rural - urban mix. These schools were however excluded from the main survey.

Secondly, there was a thorough training of data collectors at two levels:

1. A two-day training workshop for provincial co-ordinators during which the data collectors' manual was improved and the instruments administered to four schools.
2. A five-day training workshop for all data collectors was held two weeks before the main survey in two provincial centers, with the data collectors being trained in the venue closest to them. The

proximity of training to the actual exercise ensured that whatever was learnt was still fresh in the collectors' minds. As part of the training the research instruments were administered by the data collectors in 20 schools which were not in the sample.

3.1.4 Sample Description and Characteristics

About 20% of the schools were in large urban centers whereas 4% and 52% were in the isolated and the rural areas respectively. The categorization was arrived at using the distances from the schools to services and other amenities as proxies. Schools that were found to be very far from these amenities were categorized as rural/isolated whereas those that were close were categorized as urban.

The community within which a school is located is to a large extent likely to influence the characteristics of the school. The provision of resources and management of these resources are greatly influenced by the location of the school and the community within the catchment area of that particular school. There appears to be a balance between the rural and urban schools as per the sample. This in effect shows that the majority of Kenyans live in the rural areas notwithstanding the many large urban centers.

The total enrolment in the sample schools was 104,698 the highest enrolment being in a Nairobi School (1,350) and the lowest being in the Coast Province with an enrolment of 87 pupils. The mean enrolment stood at 566 pupils. The Pupil/Teacher ratio in the sample was 32:1, which is slightly higher than the overall national Pupil/Teacher ratio of 31:1 MoEHRD Statistics, (1998)

The total enrolment for standard six pupils in the sample schools was 11,699 pupils. The highest enrolment being 202 pupils in a Nairobi school and the lowest being 8 pupils in a Coast Province school. Of the total number of pupils taking the test, 28% were enrolled in private schools and 72% were in public schools.

Out of the targeted sample size of 3740 pupils arrived at by taking 20 pupils from each of the 187 sampled schools, a sample of 3233 pupils was achieved. This was because the random sampling technique employed did not allow for replacements for pupils sampled but were absent on the date the instruments were administered. The number of observation for which there was no full information reduces the sample further in this particular study. Given the degrees of freedom available we believe this issue cannot affect the results significantly.

3.2 MODEL SPECIFICATION

3.2.1 Specification and Measurement of Education Output

Clearly, to analyze school production it is essential to employ adequate measures of outcomes. But measuring outputs is not simple. While economic theory concentrates on varying quantities of homogeneous output, this is not easily translated into an education equivalent. Education is a service that transforms fixed quantities of inputs (that is, individuals) into individuals with different qualities. Educational studies concentrate –, as they should – on "quality" differences.

A majority of studies into educational production relationships measure output by standardized achievement test scores, although significant numbers have employed other quantitative measures such as student attitudes, school attendance rates, and college continuation or dropout rates. The measures used, however, are generally proxies (with varying degrees of validation) for more fundamental outcomes. Some people, including many school practitioners, simply reject this line of research entirely because they believe that educational outcomes are not or cannot be adequately quantified.

Interest in and concern about the performance of schools relates directly to the perceived importance of schooling in affecting the ability of students to perform in and cope with society after they leave school. While seldom fully articulated, the theory is that more schooling makes people better able to participate in the labor market, better able to participate in democracy, better consumers, and so forth – in other words, healthy, wealthy, and wise. Economists, Sociologists and Political Scientists have conducted a broad range of investigations into post schooling outcomes. In general empirical studies confirm the correlation between higher levels of schooling and positive attributes after schooling. Indeed it is common place for individual level investigations of behavior to include schooling more or less automatically as a conditioning variable regardless of the topic under investigation.

The analytic problem is that post-schooling outcomes cannot be contemporaneously observed with the schooling. Of course, this kind of problem arises elsewhere – for example, in the analysis of environmental effects on health or of changes in social security law on retirement behavior, and a variety of approaches are employed for gleaning information from existing data. By far

the most common approach in education is to analyze cross-sectional variations in measures that can serve as proxies for future performance. A natural starting point, thus, is an investigation of how schooling affects labor market performance and other post-schooling activities. However the scope of this paper is limited to the available data on test scores.

The central focus of this entire study is the improvement of the educational performance. The ability to analyze the situation and suggest improvements depends, of course, on the ability to measure performance accurately and reliably. The fundamental measuring sticks to be employed in this study are a series of specially designed tests of achievement in English. Ultimate success of the schools is properly better defined by other things e.g. the ability of educated people to compete in the labor market, to increase the productivity of their farms, to participate in democratic society, to care for and nurture children among others as stated earlier.

The ultimate goal of schooling are however virtually impossible to measure at the time of schooling and can be observed only after a substantial period of time has passed. Therefore, when assessing the character and determinants of successful schooling, proxies for these true goals must be employed. This then necessitates the use of standardized tests of the subject matter contained in the school curriculum. This assumes that mastering the school curriculum leads to success in the more fundamental dimensions of societal performance.

3.2.2 *Specification of the Achievement Models*

Somewhat ironically, even though educational studies have attempted to provide much more detail about input differences, they have still been faced with extensive criticism about the specification of the inputs. Part of this criticism arises because the choice of the inputs is guided, sometimes quite explicitly, by the availability of data more than by any notions of how the study is best conceived. But most of the criticism undoubtedly stems from the desire to apply findings to actual policy decisions _ sometimes not found in more academic investigations of production functions.

The general conceptual model depicts the achievement of a given pupil at a particular point in time as a function of the cumulative inputs of family, peers or other pupils, and schools and teachers (Harbison *et el.* 1992). These inputs also interact with each other and with the innate abilities, or "learning potential" of the pupil. Two points deserve emphasis: The inputs should be relevant to the pupil being analyzed; and the education process should be viewed as cumulative _.past inputs have some lasting effect, although their value in explaining output diminish over time. Failure to recognize these points has probably caused the greatest problems in interpreting individual studies.

Empirical specifications have varied widely in detail, but they have also had much in common. Family inputs tend to be measured by socio-demographic characteristics of the families, such as parental education, income and family size. Peer inputs when included, are typically aggregate summaries of the socio-demographic characteristics of the other pupils in the school. School inputs include measures of teachers (education level, experience, sex, race, and so

forth),of the school organization (class sizes, facilities, administrative expenditures, and so forth), and of district or community factors (for example, average expenditure levels). Except for the original Coleman Report, (which approach we adopt in this study) most empirical work has relied on data constructed for other purposes.

The overall framework for analysis follows a standard input-output specification for the educational process. The achievement of a given pupil at time *t* (A_t) is assumed to be related to current and past educational inputs from a variety of sources. This could be from the home, the school, and the community. A general conceptual model could be stated as follows:

$$A_t = f(F(t), S(t), O(t), \in_t)$$

Where

F(t) = a vector of pupils family background and family educational inputs cumulated to time *t*;

S(t) = a vector of the pupil's teacher and school inputs cumulative to time *t*;

O(t) = a vector of other relevant inputs such as community factors, friends, and so forth cumulative to time *t*; and

$\in_t$ = unmeasured factors that contribute to achievement at time *t*

This model follows the approach adopted in the Coleman Report Coleman *et al.* (1966)[15] and most follow-on studies in the United States Hanushek (1986)

[15] As used by Harbison (1992)

and developing countries (Fuller 1985, 1987). This model explicitly incorporates a stochastic error term (ϵ_t) to reflect the fact that it is not possible to observe all the factors affecting achievement. To the extent that the vector of various school factors, denoted by S(t), includes the pertinent instruments of policy, the relative effectiveness of possible educational strategies can be compared both with each other and potentially, with the costs.

The most serious drawback of this approach is the likelihood of obtaining biased statistical estimates of the effectiveness of the school system. The source of such bias is centered on the error term, ϵ_t, which includes all unmeasured influences on achievement. It is natural to expect many things to be unmeasured in the case of individual pupil data. The key issue is whether the collection of these factors is unrelated to the observed family, school, and other influences on achievement that are measured and included in the analysis. If unrelated standard regression analysis provides unbiased estimate of the achievement relationships. If they are systematically related, however, the parameter estimates will be biased, and their use for valuation or policy analysis will tend to be misleading.

In a wide range of educational settings, it is difficult to accept that the error terms are uncorrelated with the measured inputs to achievement. These error terms are likely to contain a variety of unmeasured factors that are, nonetheless, systematic.

First, since education is a cumulative process, the entire past history of inputs is needed to characterize achievement at any one point in time. This implies an enormous data collection requirement one that is seldom if ever accomplished. In fact, for practical reasons, measurements are usually limited to

a single point, neglecting any variations in previous educational inputs. Second, most survey designs limit the range and character of the observed data. Even with the specially designed survey instruments we make use of in this study, for example, it is difficult to record all qualitative differences in teacher's behavior. Thus many contemporaneous factors escaped measurement.

Third, some factors nearly defy measurement. For example, most people believe that differences in innate abilities of pupils are important in determining achievement differences. But there is little consensus on how innate ability might be measured, and available instruments are not easy to administer efficiently to large numbers of children even if they are considered reliable. Similarly the motivation and the aspirations of pupils are extraordinarily difficult to measure even though there are very apt to be important.

Fourth, parents in Kenya have considerable freedom in choosing which school their children attend. Consequently, standard regression estimates, for example, ordinary least squares (OLS), of the determinants of pupil achievements may give biased estimates of the importance of school characteristics. If better schools tend to attract better pupils, these estimates would confound the direct effects on cognitive skills of changing school characteristics with the indirect effect of differences in the composition of student body. Another potential selectivity arises when some pupils are not tested because they are absent on the day the test is administered. This section will try and address both types of selectivity bias. Apparently, it is easy to model for the school choice problem but the problem of absenteeism defies an econometric solution.

All these unmeasured factors are likely to be correlated with observed family and school variables. Past school situations tend to be related both to family characteristics and the contemporaneous school inputs; qualitative differences in inputs often correspond to quantity and the family choices; innate abilities, motivation, and aspirations tend to be correlated with observed family characteristics. The risk of biased parameter estimates and unreliable policy conclusions is thus substantial.

3.2.2.1 Correcting for selectivity bias

To understand the statistical effects of school choice, consider the two regression equations for the test scores of child *i*, one for pupils attending public schools (equation 1) and one for pupils in private schools (equation 2).

(1) $$At_{i1} = \alpha_I + f'_i \beta_1 + s'_{i1} \gamma_1 + \varepsilon_{i1}$$

(2) $$At_{i2} = \alpha_2 + f'_i \beta_2 + s'_{i2} \gamma_2 + \varepsilon_{i2.}$$

where the f'_i and s'_i are vectors of pupil and school characteristics, respectively, and ε_{i1} and ε_{i2} are random disturbances.

The disturbance terms represent unobserved factors influencing performance on the test scores, such as the ability and motivation of the child and are assumed to be uncorrelated with f'_i and s'_i. We assume the observed pupil and school characteristics have the same influence in each type of school, so we constrain the β_s and γ_s to be equal across school types, though we allow the intercepts α_1 and α_2 to differ. We can therefore rewrite our model as

(3) $$At_i = \alpha_1 D_{i1} + \alpha_2(1-D_{i1}) + f'_i \beta + s'_i \gamma + D_{i1} \varepsilon_{i1} + (1-D_{i1}) \varepsilon_{i2.}$$

where D_{i1} is an indicator variable taking on the value of one if the pupils attend private school and zero otherwise.

A more plausible model of school choice is one in which more able or motivated children are sent to the better primary schools. In this case we need to correct for estimates of the effects of school characteristics in equation 3 by taking account of the school selection decision. We model the decision rule for which type of school to attend as follows:

(4) $$D_{i1} = 1 \quad \text{if } w'_i\theta + u_i > 0$$

$$D_{i1} = 0 \quad \text{otherwise,}$$

where w'_i is another vector of observable characteristics. The error term represents the unobserved preference for private over public schools. This error term is likely to be correlated with the ε_s in equation 3, because both may reflect the importance the household places on education. If ε_{i1}, ε_{i2} and u_i are jointly normal with a restricted covariance matrix, then we can write the conditional expectation of equation 3 as

(5) $$E[At_i \mid f_i, s_i] = \alpha D_{i1} + f'_i\beta + s'_i\gamma + D_{i1}E[\varepsilon_{i1}|D_{i1}=1] + (1-D_{i1})E[\varepsilon_{i2}|D_{i1}=0].$$

$$= \alpha D_{i1} + f'_i\beta + s'_i\gamma + \delta_1 D_{i1}\lambda_{i1} + \delta_2(1-D_{i1})\lambda_{i2}.$$

where: $\delta_1 = -\sigma_{1u}/\sigma_{1,}$; $\delta_2 = -\sigma_{2u}/\sigma_{2,}$; $\lambda_{i1} = \phi(w'_i\theta)/\Phi(w'_i\theta)$ and $\lambda_{i2} = \phi(w'_i\theta)/ [1-\Phi(w'_i\theta)]$

In the latter two expressions, ϕ and Φ denote the normal and cumulative density functions respectively. Equation 5 shows that, in general, the composite error in equation 3 has non-zero mean. Omitting the terms involving λ_{i1} and λ_{i2} could lead to biased OLS estimates of equation 3, the determinants of achievement. In particular, not taking into account the correlation between the dummy variable D_{i1} and the composite error term in equation 3 could give us a misleading assessment of the efficiency of public compared to private schools. To correct this potential bias use shall be made of the now standard two step method of Heckman (Maddala 1983, ch.8), first estimating equation 4 as a probit and then, in the second step, inserting estimates of the conditional mean correction terms (the λ_s) into equation 3 as additional regressors.

3.2.3 Choice of Variables

In addition to pupil characteristics (sex and age) and home background information (parental education and household per capita expenditure) a wide range of school variables, divided into three categories: school physical and pedagogical inputs, school pedagogical processes, and school organization and climate are considered. The inclusion of variables such as household income (per capita expenditure) is warranted because the achievement regression specified above is not a structural education production function. The underlying structural production function includes school attendance, an endogenous variable that depends on household income. This variable shall be substituted in

the reduced form equation. It is apparent that some of these variables are subject to measurement problems. A detailed discussion of the variables and how they are measured is provided in the appendix

Among the variables used under the pedagogical process and even on the school organization, climate and control are attitudinal variables. To be able to undertake the econometric analysis applying these variables, one needs to quantify the responses to the attitude questions used in collecting the data. There are several ways by which this can be achieved. The method preferred by Vella (1994) and also Weir (2000) in a study of parental attitudes to education and enrolment choice in rural Ethiopia, is to create an attitudinal index by summing up numerically ordered responses to individual questions. Following this approach, responses to the attitude questions were coded numerically and summed to give the total score on attitude towards certain aspects of the teaching process.

However Vella (1994) cautions that there are potential problems with summing responses to individual attitude questions because for one, the responses to particular questions may have different meanings for different people and secondly, summing scores artificially assigns equal weight to each question. On the other hand respondents may provide answers which do not accurately represent their attitudes, perhaps owing to insufficient self-awareness or perhaps because they strive to present what they feel are appropriate answers. Attitudes conveyed equally may be biased because of respondents' ex post rationalization of their behavioral choices. Therefore before proceeding with econometric analysis of the determinants of achievement based on these

attitudinal variables, it is necessary to ensure that the index accurately represents responses on the individual questions.

Given that we are making use of a processed data set, it is not practically possible to carry out the Spearman Rank Order Correlation test on the Attitude Index and Individual Attitude Questions.[16] Equally, it is not possible to construct indices that capture the attitudes by checking for consistency of responses. Since the questions consider various aspects of attitudes towards enhanced learning, some inconsistency in responses could be expected. We proceed with the analysis with this limitation at the back of our minds.

[16] See Weir (2000).

CHAPTER FOUR

4. ANALYSIS AND PRESENTATION OF RESULTS

This chapter presents the estimates of the determinants of school choice and the determinants of pupil achievements. The estimates of primary interest are of course the estimates of the determinants of achievement. Nonetheless the school choice estimates give some insights on the education in Kenya. These estimates shall therefore be briefly discussed below.

4.1. SCHOOL CHOICE AND SELECTION BIAS

We ran the estimates of the school choice decision between the two types of schools and achievement in Kenya using the Heckman model. These estimates were made in the face of limited information on the characteristics of all schools a child may potentially attend. As an empirical matter, it is almost impossible to have such information. Nonetheless Kenyan parents, face a wide variety of schooling choices be it within the same province of residence or beyond. We therefore use the distance variable as the identifying characteristic in the school choice model. Secondly, Kenya is divided into eight administrative provinces, we use seven province dummy variables to control for the differences in school quality (province averages) between private schools and public schools. Other variables that are included in the selection estimates are the home background variables that are considered to directly influence the choice

of a school. These are the education level of the parents both the mother and the father and the level of household possessions.

Table 5. **Estimates of School Choice, Kenya, 1998.**

Variable	Coefficient
Intercept	0.7326**
	(2.388)
Distance to nearest School (proxy - average time taken to the school)	-0.0035
	(-1.421
Provincial Dummies	
Western.	-0.0894
	(-0.778)
Nyanza,	-0.2536**
	(-2.245)
Rift Valley	0.4033***
	(3.769)
Central.	0.1547
	(1.456)
Eastern.	0.1347
	(1.357
North Eastern.	0.2143
	(1.774)
Nairobi.	0.5834***
	(5.277)
Other Variables	
Fathers' schooling (years)	0.0335**
	(2.181)
Mothers' schooling (years)	0.0133
	(0.774)
Household expenditure	0.0375***
	(3.315)
Age of the pupil (years)	-0.1225***
	(-6.550)
Female pupil	-0.0977*
	(-1.828)

Notes to table 5

* *Significant at the 10 % level.*
** *Significant at the 5 % level.*
*** *Significant at the 1 % level.*
t – statistic in parentheses
Source: Authors' calculations.

Table 5 above presents the results for the school choice model on 2803 observations[17]. The distance variable though not significant, has the expected sign. The farther away the nearest private school is in relation to the nearest public school, the less likely that the child is sent to a private school. The private schools equally appear to compare unfavorably in the Coast province (the omitted dummy variable), Western, and Nyanza provinces but compare very favorably in Rift Valley and Nairobi. Eastern, Central and North Eastern provinces though positive, they are not significant. Other household variables are included that may influence school choice namely parental education, household per capita expenditure, a female dummy variable, and the age of the pupil. Better-educated fathers appear more likely to send their children to a private school, rather than a public school. The education of the mother on the other side has a very dismal impact on the school choice decision of the child. In a society where men hold key positions and are economically more independent, this is expected. The household expenditure and the age parameters are significant at 1 percent. The more household items the family has (indicating a high income) the more likely those children from these households shall be send to private schools.

Older children are more likely to be found in public schools than private schools. The significant and negative coefficient on the age variable indicates that the issue of wastage through repetition and late enrolments is a phenomenon characteristic of public schools and not private schools. This is

[17] The observations used in this analysis are less than the sample size by the number of observations for which there was no full information.

indisputable bearing in mind that, whereas private schools charge fees – in fact exorbitant in certain cases – public schools charge very dismal amounts if anything. It is therefore inconceivable to observe the luxury of repetition and late enrolments in the private schools. On the other hand private schools have a name and image to protect, they cannot therefore afford to perform poorly thereby putting in place very stringent conditions for admission.

4.2 PUPIL CHARACTERISTICS AND ACHIEVEMENTS

The pupil characteristics examined are the basic pupil characteristics and the home background. The age of the pupil has a negative influence on the performance of the pupil just as it had in the school choice equation. This may seem surprising since one would expect the performance to improve with age. In Kenya, where the primary school age bracket is (6-13 years) the mean age of 13.7 years is particularly very high for standard six pupils bearing in mind that they have an extra two years to complete primary school. This implies that on average the pupils complete primary school at the age of 15 years! However this should not come as a surprise in an education system where there is a lot of wastage in terms of grade repetitions and late enrolments. In such a scenario you expect the performance to decline with age thereby being very consistent with theory.

It is quite impressive that gender does not have an influence on the performance. Though in favor of the boys, the coefficient is not significant. This is consistent with the findings by Mioko (1998) based on a similar set of data for five countries participating in the SACMEQ survey. These were Zimbabwe,

Tanzania (Zanzibar), Mauritius, Namibia and Zambia. She found out no differences between boys and girls in terms of mean reading scores. There has been an affirmative action in the education sector to encourage the participation of girls at all levels of education starting with primary education. Previously, the participation of the girls in education, leave alone their performance has been very dismal. However in the recent past and indeed as evidenced by this result, the gap between the boy child and the girl child in performance has reduced dramatically. Given this result one can safely conclude that much has been done towards improving both the participation and performance of the girls.

Table 6. **Descriptive statistics and Estimates of the Determinants of Reading Comprehension Scores in Kenyan Primary Schools 1998.**

Variable	Mean	Standard Deviation	Reading Comprehension Estimate
Achievement			
Reading Comprehension	32.87	9.68	
Basic Pupil Characteristics			
Age of Pupils	13.69	1.61	-0.4910***
			(-2.675)
Sex	0.477	0.499	-0.1701
			(-0.411)
Home Background			
Household expenditure	5.48	2.71	-0.1950**
			(-2.000)
Fathers' education	3.94	2.04	0.1485
			(1.263)
Mothers' education	3.44	1.94	0.0230
			(0.181)
Selectivity Correction term	n.a	n.a	9.9790***
			(3.120)
School Level Physical inputs			
School Facility.			
Condition of the buildings	2.80	1.12	0.6152***
			(3.047)
Availability of school library	2.48	0.72	-0.6563**
			(-2.192)

Variable	Mean	Standard Deviation	Reading Comprehension Estimate
Pupil has a seat.	2.84	0.39	1.6757***
			(3.061)
Pupil has a desk	2.82	0.48	0.3033
			(0.680)
Index of school resources	8.90	4.13	0.4369***
			(5.179)
Number of books in school library.	794.95	2561.07	-0.0000
			(-0.368)
Health.			
Distance to the nearest clinic	3.46	3.55	-0.1204*
			(-1.956)
Meal Index	10.69	2.28	0.3579***
			(3.976)
Classroom Level Pedagogical inputs			
Pupil/Teacher ratio.	36.82	11.12	-0.0425**
			(-2.202)
Sex of the teacher	0.47	0.49	1.0781**
			(2.290)
Teachers years of schooling	12.24	1.72	-0.1153
			(-0.847)
Teachers years of professional training.	3.98	0.66	0.7231**
			(2.170)
Teachers teaching experience (years).	12.50	7.77	0.0876***
			(2.627)
Number of in service courses attended by teacher.	3.43	5.28	-0.1216***
			(-2.623)
Number of books on the classroom library	11.26	22.36	0.0153
			(1.606)
Pedagogical Processes			
Total number of minutes taught by the teacher per week	1234.9	339.81	-0.0015**
			(-2.407)
Hours spent working on lesson preparation	10.39	6.73	-0.0218
			(-0.694)
Attitude of the teacher towards factors that improve learning	5.26	1.58	-0.0147
			(-0.106)
Attitude of the teacher towards encouraging pupils to learn	4.32	1.06	0.6098***
			(2.909)
Parents sign for completed home reading assignment	0.311	0.46	0.0747
			(0.150)
Teachers approach to teaching	3.09	1.11	0.0240***
			(4.173)
School level Organization, Climate & Control			
Work Centered Environment			
Where the pupil stay	1.56	1.03	-0.4865***
			(-2.514)

Variable	Mean	Standard Deviation	Reading Comprehension Estimate
Number of books available where pupil stays	2.70	1.27	0.1753
			(1.063)
Pupil reads at home	0.87	0.33	3.6390***
			(5.944)
Help pupil gets on reading outside school	1.02	1.58	0.2218*
			(1.745)
Number of days pupil absent in the last one month	1.98	3.63	-0.2126***
			(-3.862)
Number of school days lost in the last school year.	12.67	9.46	-0.0002
			(-0.013)
Community involvement			
Frequency with which teachers meet parents	2.64	0.88	0.2304
			(0.967)
Open door policy where parents visit school without appointments.	0.96	0.20	1.2287 (1.212)
Location of the school	2.62	0.87	0.0385
			(0.115)
Adjusted R^2	n.a	n.a	0.32

Notes to table 6.

n.a not applicable
** Significant at the 10 % level.*
*** Significant at the 5 % level.*
**** Significant at the 1 % level.*
t – statistic in parentheses
Source: Authors' calculations.

However, these findings differ from other studies elsewhere, for example, in 1983 international study of math achievement in nineteen education systems, boys outperformed girls in ten systems, whereas girls outperformed boys in nine systems (Robitaille and Garden 1989). Girls outperformed boys in all systems following a study in 1991 of reading performance achievement in twenty-seven systems (Elley 1992). One can only explain the anomaly by the fact that in Kenya, till very recently, the girl child was not accorded similar education preferences like the boy child at least from the socio-cultural perspective. It is however important to note that this is not an official stand but cultural practices

that seems hard to die. Some communities do not give equal opportunities to both boys and girls to this day.

If the girls are performing as well as the boys at the primary level, it could be hypothesized that there might be a vast amount of girls talent that would not be capitalized if their participation in the higher level is not comparable to that of boys. In fact, the National Welfare Monitoring Survey carried out in November/December 1992 by the Central Bureau of Statistics reported a national gross enrolment rate at primary school to be 81 percent, encompassing 81% males and 83% female[18]. At the secondary school level however, the national rate declines to 76% out of which 80% are male and 72% are female. This is evidence enough to show that the transitional rates to secondary schools in particular and higher levels of education in general are relatively lower for girls as compared to that of the boys.

Pupils from "good" homes may perform better in school for a number of reasons: more resources that promote cognitive learning at home, a higher value placed on school performance, or a generally calm, stable environment. Several variables are included in the estimation to measure these effects. The variables included to capture this effect are the household level of possessions, the number of years of education of the father and the number of years of the education of the mother. These variables inasmuch as they measure the economic welfare of the pupil, they also measure the "goodness" of the home from which the pupil comes from. Having controlled for selectivity, all the three variables are insignificant. In fact the household expenditure variable turns out to be negative. It may be worth noting at this point that the level of education of the

father and the level of possessions at home are significant at 5 percent level in the school choice model. The selectivity correction term is significant at 1 percent, which farther confirms the fact that there are marked differences between the two types of schools.

Comparatively, educational levels in Kenya are generally high in Sub-Saharan Africa given a cross enrolment rate of 88 percent at the primary school and relatively low level of illiteracy of 22 percent (see appendix 2 through 5)[19]. Relatively less educated parents may place importance on their children's education notwithstanding some cultural values in some communities that still does not place much emphasis on the education of the girl child.

4.3 SCHOOL CHARACTERISTICS AND ACHIEVEMENT

School characteristics are broadly divided into the school level physical inputs, the classroom pedagogical inputs and the pedagogical processes. A preliminary analysis of the results seems to negate the hypothesis of this study in the sense that both physical and pedagogical inputs have a positive impact on the achievement of the pupil in Kenyan primary schools. More specifically, the level of resource possession in the school has a very positive and significant impact on the levels of achievement. This variable is in fact significant at the 1-percent level. In addition the general condition of the school building impacts positively on the pupil performance. This is significant at 1-percent level. An interesting aspect of these results though is that whereas the level of

[18] See African Development Indicators (1997)

possessions at school is significant, that of possessions at home is not significant and in fact it is negative. One is tempted to draw the conclusion that Kenyan children are more motivated to read at school than at home.

A possible research question would be why should we observe such a puzzling situation when we expect that the households with high income are headed by "more enlightened" individuals who should necessarily foster the education of their children. Among the school facilities, we find that the performance of the pupil is enhanced by where he sits.

Schools may have classroom and school libraries but the pupils may not be allowed to borrow books to take them home to read. According to a study using a similar data set for Zimbabwe it was found that out of 58.2% of the pupils who were in schools with libraries, only 36.7% of the pupils were allowed to borrow books. A similar scenario would be the case in Kenyan primary schools where we find that availability of school library does not have a positive impact on performance. Indeed the impact is negative and significant at 5 percent level.

After controlling for the school physical input variables, we embark on the pedagogical processes. The most interesting variable is the female dummy that is significant at 1 percent level and at the same time impacts positively on the performance. A pupil who is taught by a female teacher is bound to perform better than one taught by a male teacher. This is a very important observation considering that only about 43 percent of the teachers in the sample were female. The teacher-pupil ratio is equally significant with the expected sign. The pupil teacher-ratio used in this analysis is limited to the standard six pupils in the

[19] A closer scrutiny brings into question the authenticity and reliability of the World Bank data.(the figures quoted in the text are from the MoE Statistics).

sense that the number of pupils in the standard six grades is directly taken as the teacher-pupil ratio. The findings indicate that the more the pupils in the class, the poor the performance. This is expected since more pupils in the class come with more workload for the teacher and less pupil-teacher conduct, which affects the teachers' ability to attend to personal problems of the pupils. As much as these findings are consistent with general knowledge, the Kenyan scenario needs much explanation and investigation. At 31 pupils per teacher MoE statistics (1998)[20], this ratio is relatively low by regional levels yet it still affects the performance of pupils negatively.

The number of years of schooling of the teacher has a negative impact on the performance of the pupil though the parameter is not statistically significant. To a less extend (5 percent level), the number of years spent on professional training do affect the performance positively. It is only the experience of the teacher, the approach to teaching and the attitude towards encouraging pupils to learn that seems to matter most amongst the teacher related variables. Whereas the experience of the teacher is significant at 5 percent, the attitude and the approach are significant at 1 percent.

Lately, due to lack of employment opportunities in other sectors of the economy and few prospects for further training, many young high school graduates who qualify to join the university but cannot be selected due to limited places end up in the teacher training colleges. They join the teacher training colleges as a last resort. This we believe has a negative impact on the

[20] Our sample gives a pupil: teacher ratio of 36:1. It is important to note the different approaches employed in calculating this ratio. The MoE ratio is arrived at by taking the total enrolment divided by the number of teachers in post, whereas our ratio is simply the number of pupils in standard six divided by the number of standard six English teachers.

motivation of the teacher to be. This appears to be the reason why the years of schooling in general for the teacher have a dismal impact on the pupil performance. It is unfortunate that the data set does not have information on the age of the teachers. Otherwise it would be interesting to assess the impact of the teacher's age on the performance of the pupils they teach. At this stage, we would strongly hypothesize that the competence and hence the performance of the teacher is directly related to the age of the particular teacher. The older a teacher is, the more experience he has and the more he comes to accept the fact that he is a career teacher and has to do the best out of it. Similarly, given that all teachers have almost equal number of years of schooling, there is no much variation in this variable to explain performance[21].

The health of the pupil as expected has a direct and significant impact on the performance of the pupil. This aspect is captured under the school physical inputs as the distance to the nearest clinic and an index of meals received by the pupil. Even though the meals variable is best captured under the home background it is deliberately included in the school facility for explanation purposes since the results are not affected either way. The further away the clinic is from the school the poor the performance of the pupils in the respective school. This is very consistent with reality. The fact that the clinic is near and possibly is the school, in some cases, reduces the cost in lost time and transportation to the pupil. Similarly, a health facility nearby implies that the

[21] In regression analysis, the precision with which any relationship can be estimated is directly related to the variation of the variable in the sample. The reason for this is intuitively clear: If a variable takes on widely different values, its effect on the dependent variable will be large, or at least larger than if little variation in the factor is observed.

health of the pupil is well taken care of and there are no days lost, if any, when the pupil does not attend school due to sickness.

Pollitt (1990) has pointed it out that poor nutrition results in lack of concentration and perseverance in school for pupils. This implies that a well-fed child is bound to be healthy and therefore can be exemplary in performance holding other factors constant. This is the single most variable, besides the school choice parameter, that explains the positive performance of the pupils. The parameter is significant at 1- percent level. After controlling for school choice, the number of meals received by the pupil significantly affect performance as it were.

Work Centered Environment

This category of variables was included to capture other factors that enhance learning and reading in particular but are not classroom centered. The environment within which the pupil stays when not in school and that to which he is exposed while in school. Pupils who stay with their parents are observed to perform better on the test scores than those who stay away from their parents. Similarly pupils who read at home were seen to outperform those who do not. Elley (1992) showed that the more that children were able to read books and the more that they had books available for them to read the higher was their achievement in reading literacy. This is the single most variable amongst the work-centered variables that best explains the performance of the pupils. Absenteeism is another crucial factor that has a negative influence on the performance and hence the quality of education. Pupils who reported having

been absent in the last one month on most of the days did perform poorly on the test scores. On the same note, the coefficient of the number of official school days lost (by the school in general) in the last school year though negative is insignificant.

The community involvement variables are all insignificant but positive. This shows the limited role played by parents and the community at large in the day to day learning process of their children.

CHAPTER FIVE

CONCLUSION AND POLICY IMPLICATION

Physical and pedagogical inputs, pedagogical practices, and school organization and climate variables all appear to influence achievement among primary school pupils in Kenya. Indeed it appears that not only are physical and pedagogical inputs, usually the focus of the production function approach studies, but also pedagogical process variables are equally significant in contributing to the performance of the pupils. The result suggest that concentration on just a few aspects of pedagogical process and school climate and organization may lead to substantial improvement in pupil achievement.

Therefore, there is much room for school improvement in Kenya. Before taking on certain reforms, it is important to collect and analyze micro level data and conduct cost-benefit analysis whenever possible. Further research is called for to exploit this issue. Though difficult, analyzing costs for the pedagogical practice and school management factors that we have found to be important can produce a meaningful and realistic cost-benefit analysis. This will help to design strategies and policies that will enhance both the expansion and quality of the primary and education in general in Kenya.

POLICY RECOMMENDATIONS

Following these results, one is tempted to give far reaching recommendations. However given the scope of the study and its global nature, caution should be exercised in making such recommendations. The findings documented here are indicative of areas for further more specific research that can come up with more conclusive results to be able to reach meaningful recommendations.

As observed from the findings, one area that needs re-examing in the Kenya education system in general is the issue of the transition of the girl child from the primary school to secondary school and off to higher learning. Given that the performance of both girls and boys at the primary school is fifty - fifty, the poor continuation rates of the girls to higher institution must be costing Kenya a lot in lost productivity of the girls who drop out. Further research is called for to assess the severity of the dismal transition of the girl child to higher learning and in fact an attempt can be made to establish the cost to the economy so that the policy makers can fully appreciate this issue.

On the other hand recommending that policy makers should experiment with new incentive systems for schools and teachers would be foolhardy. Hanushek (1995) points out that there is, as yet, little evidence that these incentives will improve education. Moreover, it may be difficult to design incentive systems that do not lead schools to switch from teaching unmeasured objectives to teaching objectives that are measured to the detriment of the pupils. An example of an incentive system is given of Kenya where schools are charged by the results achieved on the 8th grade exam. Many schools have

responded to this system by promoting only their very best pupils to the 8th grade and forcing the others to repeat the 7th grade (Michael 1995). The schools are responding to incentives but the incentives are too narrow.

It appears from the findings that the level of schooling of the teachers is unnecessarily high in comparison to their remuneration. Interested researchers and even the government can explore this issue further to establish the motivation of the teachers in respect to the training and remuneration alike.

On the same note, one finding that has defied a proper explanation following this study is the issue of the pupil - teacher ratio. The findings suggest that the current pupil-teacher ratio of 31-1 should further be reduced if it should have any positive impact on the performance. Following several studies (see table 3) there is very little support for policies to reduce class size. Of the 30 studies investigating pupil-teacher ratios, only eight find statistically significant results supporting smaller classes. This shows that in the case of Kenya there must be other factors at play, which need further investigation.

The Government should therefore carry out a study to establish the factors that can explain this scenario. Reducing the ratio further will imply more expenditure, which according to our view is unwarranted. Given that the ratio in use is national, one avenue to sorting out this problem is computing regional ratios, which will provide information on regional differences. The problem may essentially lie in the Teachers Service Commission (TSC) staffing practices where some areas may be more staffed than others. If that be the case, then the government should look into the staffing issue and ensure that the national teacher – pupil ratio is a reflection of all the regions by transferring teachers from overstaffed areas to understaffed areas to achieve a national balance.

The nutrition of the pupils is a central issue not only to the performance, but also the general health of the pupil. This means that, notwithstanding the findings from this study, the nutrition of the pupils is necessarily important. The government should therefore device methods and schemes that can address this issue effectively.

The importance of basic learning materials in the form of textbooks, pens, exercise books among others to the achievement of the pupils has been (to an extend) documented in the findings above. This is an area that requires discerning attention by the government. Initially the government provided such supplies through the Kenya School Equipment Scheme (KSES) but it has since stopped. Further research is called for to establish the conditions on the ground concerning the supply of these basic materials to give the policymakers proper targeting.

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APPENDICES

APPENDIX 1 Definitions of Variables

Here below, we give brief definitions and descriptions for some of the variables used in the analysis that we consider not very clear for effective understanding of the results.

Books at home

The pupils were asked to indicate the approximate number of books in their homes according to six categories: 1= no books in the home; 2 = 1=10 books; 3= 11=50 books; 4= 51-100 books; 5= 101-200 books and 6= more than 200 books.

Possessions at home.

The pupils were asked which of the following 14 items were present at their homes: daily newspaper, weekly magazine, radio, TV set, Video Cassette Recorder (VCR), Cassette Player, Telephone, refrigerator, car motorcycle, bicycle, piped water, electricity and table to write on. For each item pupils were given a score of 1 if the item existed in the home and a zero score if the item did not. These values were then summed up to produce an "Index of Possession" which reflected the material wealth of the home. Pupil with none of the items received a score of zero and a pupil with all the items received a score of 14.

Index of Regular Meals.

The index of regular meals was a measure on a 12-point scale that assessed the number of meals that pupils reported they ate in a day. These were breakfast, lunch and dinner. If a pupil ate no meals at all the score was 3, whereas if he/she had all meals, the value was 12.

Parents Education.

The pupil was asked to provide information on the education of the parent as follows:

Did not go to school =1

Completed some primary school =2

Completed all primary school =3

Completed some secondary school =4

Completed all secondary school =5

Completed some education and/ or training after secondary school =6

Attitude Variables.

These variables asked respondents questions that required either of the following three answers

1. Never ——— disagree
2. Sometimes——— indifferent.
3. Always——— Agree

1 was coded –1; 2 was coded 0; and 3 was coded 1. The resulting codes were summed across the questions to produce an index of attitude.

APPENDIX 2. Primary School Gross Enrolment Ratios across African Countries

	Total			Males			Females		
	1980	1989	1992-93	1980	1989	1992-93	1980	1989	1992-93
SUB SAHARAN AFRICA	**79**	**71**	**73**	**95**	**79**	**80**	**64**	**62**	**66**
Excluding South Africa	78	71	69	85	79	76	64	62	61
Exc. S. Africa and Nigeria	71	64	62	76	..	69	57	..	56
Angola	175	99	..	0	103	..	0	95	..
Benin	64	55	72	87	73	..	41	37	..
Botswana	91	114	115	83	110	113	100	118	118
Burkina Faso	18	35	39	23	44	48	14	27	31
Burundi	26	71	69	32	79	76	21	63	62
Cameroon	98	103	91	107	111	95	89	95	86
Cape Verde	114	122	131	119	125	132	110	119	130
Central African Republic	71	71	..	92	88	..	51	55	..
Chad	..	57	56	..	79	76	..	35	36
Comoros	88	73	75	100	85	81	75	61	69
Congo	..	..	..	..	..	..	..	..	..
Cote d'Ivoire	79	73	69	95	85	80	63	61	58
Djibouti	37	..	36	..	..	41	.	..	31
Equatorial Guinea	135	..	..	..	..	..	..	..	..
Eritrea	..	25	47	..	26	52	..	24	41
Ethiopia	34	34	27	44	40	33	23	28	21
Gabon	..	..	..	..	..	..	..	..	..
Gambia	51	64	67	67	74	79	35	53	56
Ghana	80	74	..	89	82	..	71	67	..
Guinea	36	34	46	48	47	61	25	21	30
Guinea Bissau	68	..	..	94	..	..	43	..	..
Kenya	115	..	91	120	..	92	110	..	91
Lesotho	102	..	98	85	..	90	120	..	105
Liberia	48	..	..	61	..	..	34	..	..
Madagascar	136	101	73	139	103	75	133	99	72
Malawi	60	68	82	72	74	84	48	61	80
Mali	26	23	30	33	29	37	18	17	23
Mauritania	37	49	69	47	57	76	26	40	62
Mauritius	93	..	106	94	..	107	91	..	106
Mozambique	99	65	60	114	74	69	84	56	51
Namibia	..	129	134	..	123	133	..	136	136
Niger	25	28	28	33	36	35	18	20	21
Nigeria	105	88	90	118	100	101	92	76	79
Rwanda	63	69	..	66	70	..	60	68	..
Sao Tome and Principe	..	..	..	..	..	..	..	..	..
Senegal	46	58	60	55	68	67	37	49	53
Seychelles	..	..	..	..	..	..	..	..	..
Sierra Leone	52	56	..	61	66	..	43	45	..
Somalia	19	..	..	24	..	..	14	..	..
South Africa	85	..	115	..	..	116	..	..	115
Sudan	50	..	55	59	..	61	41	..	48
Swaziland	103	0	120	104	0	123	102	0	116
Tanzania	93	69	70	99	69	71	86	68	69
Togo	118	105	102	146	127	122	91	82	81
Uganda	50	..	67	56	..	74	43	..	59
Zaire	92	..	68	108	..	78	77	..	58
Zambia	90	94	..	97	..	..	83	..	..
Zimbabwe	85	126	115	..	128	119	..	124	111
NORTH AFRICA	**84**	**46**	**96**	**97**	**51**	**104**	**70**	**40**	**88**
Algeria	94	98	104	108	106	111	81	89	97
Egypt	73	0	97	84	0	105	61	0	89
Libya	125	..	110	129	..	110	120	..	110
Morocco	83	69	77	102	82	89	63	55	64
Tunisia	103	115	118	118	122	123	88	107	113
ALL AFRICA.	**80**	**65**	**78**	**87**	**72**	**85**	**65**	**57**	**70**

Source: African Development Indicators 1997

APPENDIX 3. Percentage of Population 15 years of age and above that is illiterate

	1985			1990			1995		
	Total	Male	Female	Total	Male	Female	Total	Male	Female
SUB SAHARAN AFRICA	**57**	**45**	**68**	**..**	**..**	**64**	**43**	**33**	**52**
Excluding South Africa	57	45	68	53	41	64	46	35	56
Exc. S. Africa and Nigeria	56	45	68	..	..	..	47	35	56
Angola	64	50	77	58	44	72	..	..	..
Benin	81	74	88	77	68	84	63	51	74
Botswana	30	19	40	26	16	35	30	20	40
Burkina Faso	86	77	94	82	72	91	81	71	91
Burundi	58	47	68	50	39	60	65	51	78
Cameroon	52	39	64	46	34	57	37	25	48
Cape Verde	..	..	..	..	..	..	28	19	36
Central African Republic	69	55	81	62	48	75	40	32	48
Chad	77	66	88	70	58	82	52	38	65
Comoros	..	..	..	..	..	..	43	36	50
Congo	48	34	62	43	30	56	25	17	33
Cote d'Ivoire	51	38	66	46	33	60	60	50	70
Djibouti	..	..	..	..	..	..	54	40	67
Equatorial Guinea	55	41	69	50	36	63	..	10	32
Eritrea	..	..	..	..	..	..	..	..	..
Ethiopia	..	..	..	..	..	..	65	55	75
Gabon	44	30	57	39	27	52	37	26	47
Gambia	80	70	90	73	61	84	61	47	75
Ghana	47	36	58	40	30	49	..	24	47
Guinea	83	75	92	76	65	87	..	50	78
Guinea Bissau	70	57	82	64	50	76	45	32	58
Kenya	35	23	47	31	20	42	22	14	30
Lesotho	26	28	16	..	..	..	29	19	38
Liberia	68	57	79	61	50	71	..	46	78
Madagascar	23	14	32	20	12	27	..	..	..
Malawi	59	48	69	..	..	..	44	28	58
Mali	77	69	85	68	59	76	69	61	77
Mauritania	73	60	84	66	53	79	..	50	74
Mauritius	17	11	23	..	..	..	17	13	21
Mozambique	72	61	84	67	55	79	60	42	77
Namibia	..	..	..	..	..	..	..	..	..
Niger	79	68	89	72	60	83	86	79	93
Nigeria	57	45	69	49	38	61	43	33	53
Rwanda	55	41	68	50	36	63	40	30	48
Sao Tome and Principe	..	..	..	..	..	..	..	..	..
Senegal	68	55	81	62	48	75	67	57	77
Seychelles	..	..	..	..	..	..	21	..	..
Sierra Leone	87	79	94	79	69	89	..	55	82
Somalia	83	73	91	76	64	86	..	..	..
South Africa	..	..	..	..	..	..	18	18	18
Sudan	76	61	90	73	57	88	54	42	65
Swaziland	32	30	34	..	..	..	23	22	24
Tanzania	..	..	..	..	..	..	32	21	43
Togo	62	49	75	57	44	69	48	33	63
Uganda	57	43	71	52	38	65	38	26	50
Zaire	34	21	47	..	..	..	33	13	32
Zambia	33	23	41	27	19	35	22	14	29
Zimbabwe	38	30	45	33	26	40	15	10	20
NORTH AFRICA	**54**	**40**	**68**	**47**	**35**	**61**	**47**	**34**	**59**
Algeria	51	37	65	43	30	55	38	26	51
Egypt	55	40	71	52	37	66	49	36	61
Libya	44	30	60	36	25	50	..	12	37
Morocco	58	46	71	51	39	62	56	43	69
Tunisia	42	32	53	32	26	44	33	21	45
ALL AFRICA.	**56**	**44**	**68**	**51**	**39**	**63**	**44**	**33**	**54**

Source: African Development Indicators 1997

APPENDIX 4 Primary School Gross Enrolment Ratios across African Countries

	Total			Males			Females		
	1980	1990	1994-96	1980	1990	1994-96	1980	1990	1994-96
SUB SAHARAN AFRICA	**78**	**76**	**77**	**97**	**93**	**84**	**66**	**68**	**69**
Excluding South Africa	77	72	72	87	80	80	66	64	64
Exc. S. Africa and Nigeria	68	67	63	77	73	70	58	59	57
Angola	..	92	..	..	96	..	..	88	..
Benin	67	58	78	91	78	98	43	39	57
Botswana	91	113	108	83	109	107	100	117	108
Burkina Faso	18	33	40	22	41	48	13	26	31
Burundi	26	73	51	32	79	55	21	66	46
Cameroon	98	101	89	107	109	93	90	93	84
Cape Verde	114	121	..	119	..	..	110	..	..
Central African Republic	71	65	..	92	80	..	51	51	..
Chad	..	54	58	..	75	76	..	34	39
Comoros	86	75	75	100	87	..	72	63	..
Congo, Democratic Rep. Of	92	70	72	108	81	86	77	60	59
Congo, Republic of	141	133	114	148	141	120	135	124	109
Cote d'Ivoire	75	67	71	90	79	82	60	56	61
Djibouti	37	38	39	..	45	45	..	32	33
Equatorial Guinea	135	..	..	..	..	..	..	..	..
Eritrea	..	..	53	..	..	59	..	..	48
Ethiopia	37	33	38	48	39	48	27	26	27
Gabon	..	..	..	..	..	..	..	..	..
Gambia	53	64	77	70	76	87	36	52	67
Ghana	79	75	..	88	82	..	71	68	..
Guinea	36	37	48	48	50	62	25	24	33
Guinea Bissau	68	..	62	94	..	79	43	..	45
Kenya	115	95	85	120	97	85	110	93	85
Lesotho	104	112	108	85	100	102	122	123	114
Liberia	48	..	..	61	..	..	35	..	..
Madagascar	130	103	92	131	103	92	129	103	91
Malawi	60	68	89	72	74	..	49	62	..
Mali	26	26	45	34	33	55	19	19	35
Mauritania	37	49	79	48	56	84	26	41	75
Mauritius	93	109	107	94	109	107	91	110	106
Mozambique	..	67	60	..	77	70	..	57	50
Namibia	..	129	131	..	123	130	..	135	132
Niger	25	29	29	33	37	36	18	21	22
Nigeria	109	91	98	123	104	109	95	79	87
Rwanda	63	70	..	66	70	..	60	69	..
Sao Tome and Principe	..	..	..	..	..	..	..	..	..
Senegal	46	59	68	56	68	75	37	50	61
Seychelles	..	..	..	..	..	..	..	..	..
Sierra Leone	52	50	..	61	60	..	43	41	..
Somalia	22	..	..	28	..	..	15	..	..
South Africa	90	122	131	..	123	133	..	121	129
Sudan	50	53	51	59	60	55	41	45	47
Swaziland	103	111	118	104	114	122	102	109	115
Tanzania	93	70	66	99	70	67	86	69	66
Togo	118	109	120	144	132	140	93	87	99
Uganda	50	75	74	56	83	81	43	66	68
Zambia	90	99	89	98	..	91	83	..	86
Zimbabwe	85	116	119	..	117	115	..	115	111
NORTH AFRICA	**84**	**91**	**100**	**97**	**100**	**107**	**69**	**83**	**93**
Algeria	95	100	108	108	108	113	81	92	102
Egypt	73	94	101	84	101	107	61	86	94
Libya	125	105	..	129	109	..	121	102	..
Morocco	83	67	86	102	79	97	63	54	74
Tunisia	102	113	117	117	120	120	87	107	113
ALL AFRICA.	**79**	**79**	**78**	**89**	**86**	**85**	**67**	**71**	**72**

Source: African Development Indicators 2000

APPENDIX 5. Percentage of Population 15 years of age and above that is illiterate

	1985			1990			1997		
	Total	Male	Female	Total	Male	Female	Total	Male	Female
SUB SAHARAN AFRICA	**56**	**45**	**65**	**50**	**40**	**59**	**42**	**34**	**50**
Excluding South Africa	59	48	70	53	43	63	44	35	53
Exc. S. Africa and Nigeria	59	48	70	54	43	64	46	37	55
Angola	..	..	..	..	..	..	..	..	..
Benin	78	68	87	74	62	85	66	52	79
Botswana	37	39	35	32	34	30	26	28	23
Burkina Faso	87	79	94	84	75	92	79	70	89
Burundi	68	56	79	62	52	72	55	46	64
Cameroon	45	34	56	38	28	47	28	21	35
Cape Verde	43	28	53	38	25	47	29	18	38
Central African Republic	72	58	84	67	53	79	58	44	70
Chad	..	..	..	..	..	..	..	..	..
Comoros	48	40	55	46	39	54	45	37	52
Congo, Democratic Rep. of	..	..	..	..	..	..	..	..	..
Congo Republic of	41	29	52	33	23	42	23	15	30
Cote d'Ivoire	72	63	82	67	57	77	57	49	66
Djibouti	..	..	..	..	..	..	..	..	..
Equatorial Guinea	34	19	48	27	15	39	20	9	30
Eritrea	..	..	..	..	..	..	..	..	..
Ethiopia	76	68	85	72	64	80	65	59	71
Gabon	..	..	..	..	..	..	..	..	..
Gambia	80	74	85	75	68	80	67	60	74
Ghana	50	37	63	43	31	55	34	23	43
Guinea	..	..	..	..	..	..	..	..	..
Guinea Bissau	78	63	91	73	58	88	66	50	82
Kenya	36	24	48	29	19	39	21	13	28
Lesotho	25	38	13	22	34	11	18	29	7
Liberia	67	51	82	61	45	77	52	35	68
Madagascar	..	..	..	..	..	..	..	..	..
Malawi	52	34	68	48	31	64	42	27	57
Mali	81	75	87	75	68	82	65	57	72
Mauritania	68	56	79	65	54	76	62	51	72
Mauritius	23	17	29	20	15	25	17	13	21
Mozambique	71	56	86	67	51	82	60	43	75
Namibia	30	26	33	25	23	28	20	19	22
Niger	90	84	96	89	82	95	86	78	93
Nigeria	59	48	70	51	41	62	40	31	49
Rwanda	53	43	64	47	37	56	37	29	44
Sao Tome and Principe	..	..	..	..	..	..	..	..	..
Senegal	75	66	85	72	62	81	65	55	75
Seychelles	..	..	..	..	..	..	..	..	..
Sierra Leone	..	..	..	..	..	..	..	..	..
Somalia	..	..	..	..	..	..	..	..	..
South Africa	21	20	22	19	18	20	16	15	17
Sudan	61	47	76	55	42	69	47	35	59
Swaziland	34	32	36	29	26	30	23	21	24
Tanzania	44	29	57	37	24	49	28	18	38
Togo	62	46	77	56	40	71	47	31	62
Uganda	49	35	63	44	31	57	36	25	47
Zambia	37	25	47	32	22	41	25	17	33
Zimbabwe	17	11	22	13	9	18	9	6	12
NORTH AFRICA	**57**	**43**	**71**	**52**	**38**	**66**	**45**	**33**	**58**
Algeria	53	39	67	47	34	61	40	27	52
Egypt	57	43	71	53	40	67	47	35	60
Libya	39	22	59	32	17	49	24	11	37
Morocco	67	53	80	61	47	75	54	41	67
Tunisia	47	34	61	41	28	54	33	22	44
ALL AFRICA.	**56**	**45**	**67**	**50**	**40**	**61**	**43**	**33**	**51**

Source: African Development Indicators 2000

LIST OF ACRONYMS AND DEFINITIONS

ASAL	Arid and Semi Arid Lands.
CSAE	Centre for the Study of African Economies.
DfID	Department for International Development.
EFA	Education For All.
GER	Gross Enrolment Rates.
GHC	Geography, History and Civics.
GoK	Government of Kenya.
IAEEA	International Association for the Valuation of Educational Achievement.
IBRD	International Bank for Reconstruction and Development.
IDA	International Development Association.
IEA	International Education Assessment.
IIEP	International Institute for Educational Planning.
KCPE	Kenya Certificate of Primary Education.
KSES	Kenya Schools Equipment Scheme.
MoE	Ministry of Education.
MoEHRD	Ministry of Education and Human Resource Development.
MPET	Master Plan on Education and Training.
NIEPA	National Institute of Educational Planning and Administration.
NPEB	National Primary Education Baseline.
ODA	Overseas Development Association.
OLS	Ordinary Least Squares.
SACMEQ	Southern Africa Consortium for Monitoring Education Quality.
SAPs	Structural Adjustment Programs.
SPRED II	Strengthening Primary Education (Project II).
TSC	Teachers Service Commission.
UK	United Kingdom.
UNDP	United Nations Development Program.
UNESCO	United Nations Educational, Scientific and Cultural Organization.
UNICEF	United Nations Children Fund.
UPE	Universal Primary Education.

WORKING DEFINITIONS OF KEY TERMS

Curriculum: A set of courses in a field of study, often constituting an area of specialization at the higher levels of education.

Enrolment Ratio: School enrolment, both public and private, as a percentage of a given age group in the population. The gross enrolment ratio is the total number of pupils enrolled at a given education level divided by the population of the age group for that level. This ratio may include pupils who are both younger and older than the age expected at that level. The net enrolment ratio is calculated by using only that part of the total number of pupils enrolled that corresponds to the specific age groups defined for that level.

External Examination:. An examination set by an independent organization and administered to a large number of pupils from different schools to allow comparison of results across schools.

Instituteurs-adjoints: A category of the teacher work force in Burkina Faso (level B2 in the civil service salary scale). They are recruited from the graduates of the lower secondary schools and trained for two years.

Moranhood: A stage in the life of some of the nomadic communities in Kenya including the Masaai, Samburu, Turkana when the teenage boys are initiated into adulthood. The rituals involve going to the forests for a long time during which period the initiates are circumcised. During this period the initiates effectively dropout of school.

Post - secondary, tertiary, or higher-level education: Education that requires, as a minimum condition of entry, the successful completion of education at the secondary level or proof of equivalent knowledge or experience. Instruction is given in various types of institutions, including universities, vocational and technical training institutes, and teacher training institutes.

Primary or basic education: The first level of education, in which pupils follow a common curriculum. Primary education offers pupils instruction in primary or elementary schools that are part of the formal education system. These schools span grades/class 1-8 and teach communication/language, mathematics, GHC, and science. Basic education generally refers to instruction in literacy and numeracy skills for out-of-school youth and adults.

DECLARATION

I, the undersigned, declare that this thesis is my original work and has not been presented for a degree in any other university. All references used for the thesis have been duly acknowledged.

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