

Access and Quality in the Kenyan Education System:

A Review of the Progress, Challenges and Potential Solutions

Prepared for

Office of the Prime Minister of Kenya

By

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1. Executive Summary

1.1 Objectives

Education is widely seen as one of the most promising paths for individuals to realize better, more productive lives and as one of the primary drivers of national economic development. The citizens and the government of Kenya have invested heavily in improving both the access and quality of education, in an effort to realize the promise of education as well as to achieve the education-related Millennium Development Goals and Vision 2030.

The objectives of this review are to help inform the education investment strategy of the Government of Kenya by (1) identifying the key issues facing the education sector, (2) suggesting potential solutions based on lessons learned from rigorous quantitative research, (3) summarizing promising solutions that could be important for education in Kenya but that may not have enough support from rigorous research, and (4) highlighting a subset of proven high-impact and cost-effective policies that could boost the productivity of the education sector.

The potential solutions are based on evidence drawn from rigorous quantitative research, and in particular on randomized evaluations, which provide the most reliable evidence on what works and what does not work in increasing access to quality education.

1.2 Key Issues

This report summarizes the key issues facing primary, secondary, and vocational education in Kenya. While issues pertaining to early childhood education and tertiary education are also important, we do not include these in this review as there is limited rigorous evidence on the effectiveness of various policy options in these sectors.

o Primary Education

While the free primary education (FPE) program has increased access to primary education especially among poorer households, ancillary costs of primary education (such as school uniforms) continue to hinder the educational attainment of many children. In addition, the provision of quality education remains a challenge. This was highlighted by a recent study by Uwezo (2010) which found disappointing levels of learning among primary school children. The continued and consistent dominance of private schools in the KCPE has further raised concerns about the rising disparity in quality between public and private schools. As students from richer households increasingly enroll in private primary schools, designing policies that address the achievement gaps in public primary schools will overwhelmingly benefit students from poorer households that are unable to access private schools.

Evidence from randomized evaluations suggests a number of key cost-effective interventions that could be introduced to address the inequities in access and achievement in primary school. Large-scale deworming programs, for example, have been shown to be extremely cost-effective at increasing schooling and could go a long way in boosting participation, especially among the poor.

The research suggests that programs that provide remedial education to students that are falling behind are very effective. These programs can be even more effective if the remedial educators are accountable to local school committees. For example a program where local school committees are provided with grants to hire remedial education instructors could have even larger effects. Programs that allow teachers to tailor their lessons to better suit the level of preparation of their students are effective at boosting students' academic performance. The existing evidence shows that a merit scholarship program can raise achievement. Since primary school fees have been abolished, providing merit scholarships for students who gain admission to secondary school is a possibility that warrants further exploration. Additional programs that provide teachers or head-teachers with incentives to raise the levels

of learning in their students could also be piloted and evaluated on a small-scale before implementation on national-scale.

o Secondary Education

While the past decade has seen tremendous increases in primary school access, secondary school access remains low. In 2009, the secondary school net enrollment rate was approximately 50% (World Bank, 2009), while the primary-to-secondary school transition rate was equally low at 55% (MOE, 2010). Despite the recent reductions in secondary school fees, these fees still present a major financial obstacle. The 2005 Kenya Integrated Household budget shows that on average secondary school expenditures accounted for approximately 55% of annual per capita household expenditures. While the increased availability of bursaries (e.g. from the CDF) have provided many families with financial assistance, the pressing burden of secondary school fees prevent many students from attending secondary schools. These financial barriers are especially important for females and vulnerable groups such as orphans, and the poor.

The continued poor public school performance in the KCPE can also act as a barrier to secondary school access. Data from the 2004 KCPE examinations shows that 77 percent of private school candidates qualified for secondary school by scoring over 250 points, while only 45 percent of students in public schools qualified. This disparity in the performance between private and public primary schools has also led to the continued overrepresentation of private school graduates in the elite National Secondary schools. While the recently introduced MOE policy implemented a quota on the number of private primary school students that could be admitted to National schools, this policy did not address the root causes of the private-public performance gaps. Moreover, it is possible that unintended consequences of this policy, such as increased social stratification in the secondary school system, where high performing private primary school students attend private secondary schools, could negatively impact the public secondary school system in the long-run.

Overall, student performance in the KCSE was poor. In 2008, only 25% of students scored at least a C+ on the KCSE, with girls being less likely than boys to score at least a C+. The performance was weakest in District schools, where only 11% of students scored at least a C+, compared to 43% in Provincial schools and 90% in National schools. The difference in performance across these types of schools partly reflects differences in facilities, teachers and other resources, but it also reflects the different levels of academic preparation of the students admitted to these schools.

With the increasing demand for secondary school as a result of the FPE program, it is becoming increasingly important to implement programs that address the primary-to-secondary school bottleneck. Introducing programs that reduce the financial barriers to secondary schooling especially for females and students from disadvantaged families could have important implications. For example, a merit scholarship program for students from poor backgrounds who gain admission to a national or provincial school could both alleviate the financial barriers and stimulate student performance in primary schools.

Conditional cash transfers have been used to encourage educational enrollment among the poor in many countries. These programs provide families with a small cash transfer if their children meet certain school attendance targets (for example, an 80% attendance record is often required). These programs have been shown to both promote access to education and to boost test scores. However, these programs are very expensive to implement.

Lack of information has also been identified as a constraint that prevents many individuals from adequately investing in education or from accessing quality schools. With limited information about the quality of schools and the secondary school selection process, children and parents often make many judgment errors in the process leading to unfavorable outcomes. Data from the 2004 KCPE records shows that over 20% of students made judgment errors in selecting their preferred schools that led them to miss opportunities to enroll in higher level schools. In

addition, data from other settings has shown that individuals in developing countries are often misinformed about the economic (or pecuniary) benefits of education. Overall, the research has shown that individuals from poor backgrounds are more likely to be constrained by information. Providing individuals with more information on the benefits of education, the quality of secondary schools and on the school selection process could boost secondary school enrollments and also allow students from poorer backgrounds to access better quality schools. This is a very cost-effective way of improving the outcomes of students from disadvantaged backgrounds. Given the high incidence of judgment errors committed by students in the secondary school selection process, it may be instructive to explore reforms to the secondary school assignment system.

o Vocational Education

There is a growing consensus that youth unemployment in less developed countries is a major economic and social problem, especially in Sub-Saharan Africa. A recent World Bank report states that youth account for approximately 60% of the unemployed in this region, and that 72% of adolescents in Sub-Saharan Africa live below the “\$2 a day” poverty line (World Bank 2009). Data from the 2005 KIHBS shows that approximately 21% of youths aged 15-29 are unemployed and a further 25% are neither in school nor working. Vocational education has been identified as a promising avenue through which young adults can acquire marketable skills that will enable them to obtain employment.

Although government subsidies have reduced the fees in the vocational training sector, the current fee levels are still significant barriers for many. The current fee levels at the cheapest government schools account for approximately 15 percent of annual per capita expenditures. Preliminary evidence from an on-going randomized vocational training project suggests that reductions in fees through scholarships (or vouchers) can significantly increase vocational training enrollments. Evidence from the project also suggests that students were often misinformed about the highest

earning trades. Given the apparent misperceptions, providing more accurate information can enable individuals to make better informed decisions about vocational training.

There is a growing sentiment that the public provision of training produces students with skills that are not relevant on the labor market. The proponents of this view often argue that the private training institutes are more flexible, more adaptable and better able to provide trainees with market-relevant skills. While there is limited evidence on the ability of private institutes to deliver better training, preliminary evidence of an on-going randomized vocational training project suggests that providing students with access to the private sector through a voucher program can improve outcomes such as increased student enrollment and retention. Given the preliminary evidence from the on-going vocational training project, it could be constructive for the government to introduce and carefully evaluate a pilot voucher program that allowed individuals to access both public and private vocational training centers.

o Cross-Cutting Issues

Poor health has been shown to impede educational access, attainment, and achievement for students in developing countries. School-based health initiatives could be introduced across all levels of the education system to boost the educational outcomes of students. School-based deworming programs have been proven to boost the schooling participation of Kenyan primary school students. School based micronutrient supplementation could also positively impact student educational outcomes. Additional programs that focus on HIV prevention, specifically those that warn girls about the HIV risk posed by older men have been shown to be very effective at reducing risky behavior.

The available evidence points to the need to rethink and explore innovative ways to boost learning in the education system. Research has shown that technology, such as computer aided instruction (or mobile phone aided instruction), can boost student

learning. These programs can be especially important for less prepared students as these technologies can provide them with specifically tailored supplementary instruction. Remedial education programs across all levels of education could also benefit those who are falling behind. While there is evidence on the benefits of remedial education at the primary level, there is little evidence of the benefits at higher levels of education. This is an area for further research and exploration. Additional evidence has also identified the potential of using teacher incentives to boost learning. Exploring these possibilities could significantly boost the productivity of the education system.

Vouchers that allow students to access private primary, secondary and vocational schools could also be introduced. As these programs allow students to “vote with their feet”, vouchers have the ability to increase productivity in the education sector by increasing competition among schools. These types of vouchers also allow governments to harness the burgeoning private market for education.

There is also a need for increased emphasis on improved monitoring and evaluation. Improved data collection can allow government to better design policy and identify key constraints in the education system. Making this improved data available to researchers, allows the government to benefit from additional insights generated by external researchers.

1.3 High-Impact and Cost Effective Approaches:

Taking into account the severe budget constraints facing the Ministry, we believe the highest priorities should include:

1. *Deworming*—a renewed implementation of the national school-based deworming program. At less than \$0.50 per child per year, deworming is widely recognized as one of the most cost-effective ways to boost school attendance.

2. *Need-based secondary school bursaries*—a scholarship program for students from poor backgrounds whose KCPE score would qualify them for admission to a national or provincial secondary school.
3. *Grants to finance remedial education*—a program in which school committees are given grants to hire assistants for remedial education in lower standards.
4. *Piloting vouchers for vocational education*—an implementation of rigorously evaluated pilot programs providing vouchers for vocational education, redeemable at either public or private institutions.
5. *Piloting early-childhood development*—a rigorously evaluated pilot program to support local school committees ECD programs.
6. *Piloting teacher incentives*—a program to test several approaches to improving teacher incentives, including enhanced inspections and a contract-based assignment of head teacher positions.
7. *Information campaigns*—a program that provides primary school students with information about the secondary school selection process, including information on the popularity of each secondary school. The program could further provide secondary school students with information about post-secondary options and could also disseminate information on the wages associated with different levels of education to students.
8. *School-based health initiatives*—incorporation of other high-priority school health initiatives, including informing girls about the HIV risk posed by older men.

1.4 How the report is organized

The rest of the report is organized as follows. Section 2 covers Improving Access; Section 3, Improving Quality and Achievement; Section 4, Cross-cutting Issues; and Section 5, concludes. Sections 2 and 3 consist of 3 divisions: (1) Primary Education, (2) Secondary Education, and (3) Vocational Education. Section 4 covers issues and

potential reforms that touch on improving both access and quality in all three sectors.

2. Improving Access

Access increased dramatically in primary school when free primary education was introduced. However, there is scope for improving access to both secondary and tertiary education.

2.1 Primary Education

o Issues

School fees had been a major barrier to education. In 2000, prior to FPE, the gross enrollment rate in primary school was 87%. However, the introduction of FPE led to a surge in enrollment, pushing the gross enrollment rate to just over 100% (World Bank, 2004). Yet despite the FPE related enrollment and access gains, other important barriers to access remain. In particular, while enrollment is now high on average, there are still groups among whom enrollment remains an issue. Additionally, irregular attendance amongst those who are enrolled is a major problem across the country.

Out of pocket costs—with the introduction of FPE, the cost of school uniforms continues to impede education access. In 2003, school uniforms cost about 480Kshs (approximately 2% of per capita GDP), which was excessive for many families. The official policy says that no child can be turned away for not having the school uniform. But uniforms are such an entrenched part of schooling in Kenya that either the schools continue to turn children away or the parents keep the children away because they do not have uniforms. School uniforms and other input expenses incurred by households may be reducing access to schooling.

Physical access to school and other non-monetary costs—while in much of the country distance to the nearest school is good compared to many countries of a

similar income level, this is not the case in all regions. In some areas, distance to the nearest school remains a problem. The problem is most acute in provinces such as Northeastern, which only had 250 public primary schools in 2007, compared to over 4000 public primary schools in Eastern province. While this reflects the low population density of Northeastern, the shortage of schools probably contributes to the low enrollment rates in the region. In 2007, the gross enrollment rate was approximately 35%, compared to about 125% in Eastern province (Ministry of Education, 2009). There is substantial evidence in the economics literature that distance is an important deterrent in the take up of services (e.g. Kremer et al 2010 for water services, Thornton 2009 for health services). Thus, reducing the distance to schools could help boost educational access for students in areas such as Northeastern.

Poor nutrition and poor health—nutrition and health can affect attendance. For example, children with poor nutrition, malaria, and intestinal worms may be too sick to attend school. Data from the Kenyan Demographic and Health Survey shows that 20% of Kenyan children are underweight, indicating poor health status. Micronutrient deficiencies can also hamper children's cognitive development. Micronutrients such as vitamins and minerals are vital to health. Deficiencies affect a third of the global population, especially women and children. Every year across the globe, 2 million children die from lack of vitamin A, zinc, and other nutrients; 18 million babies are born mentally impaired due to lack of iodine deficiency; and 500,000 women die in childbirth due to severe anemia (iron deficiency). In Kenya, according to the Micronutrient Initiative, the Vitamin A deficiency in children 6 to 59 months old is 84.4%, and the iodine deficiency throughout the population is 36.8%. The prevalence of anemia in children 6 to 59 months old is 69%, while the prevalence of anemia in women is 55.5% (Micronutrient Initiative, 2011). These micronutrient deficiencies can retard or reverse gains in the education sector.

Access among vulnerable groups—traditionally, vulnerable groups have included girls and nomadic communities. There is evidence that the gender gap is

not closing. A study by Lucas and Mbiti (2011) find that more boys than girls completed primary school in response to the FPE. The 2007/8 post-election crisis resulted in major internal displacement, with loss of income, community ties, and property, including documents. There is very little known about the plight of the internally displaced with regards to education. Hence, more research is needed to better understand these issues.

o Potential Solutions

Reducing cost of education—distributing vouchers for school uniforms is an effective and reasonably cost effective way to increase access. Distribution of school uniforms has been shown to reduce dropout rates (Evans, Kremer, and Ngatia, 2008 and Duflo, Dupas, Kremer and Sinei, 2006). But given that uniforms vary from school to school, it may be prohibitively expensive for the government to distribute uniforms. A potential solution is to provide vouchers for school uniforms, potentially targeted to poor pupils.

School-based food and micronutrient supplementation—school meals programs have been shown to increase attendance at pre-schools, especially among the poorest children (Kremer and Vermeersch, 2004). These are the children who are likely to have the worst nutrition at home. Micronutrient supplementation could complement gains from school feeding.

School health programs—In 2009, 3.6 million children were dewormed through a partnership between the Ministry of Education, the Ministry of Public Health and Sanitation, and the Kenya Medical Research Institute. Deworming has been shown to significantly increase school attendance (Miguel and Kremer, 2004). In a comparison of alternative ways to promote access to education, deworming was found to be one of the most cost effective approaches of all those rigorously tested. Those children that were dewormed as a part of the study even earned higher wages in later life, suggesting that there are large economic and social returns to investments in deworming programs. Implementation of the national school-based

deworming program has stalled since 2009. Re-establishing this program would be an extremely cost-effective way to increase access to education and improve long-run economic and social outcomes.

Providing information—informing children and their parents about the economic returns to education can increase attendance and reduce dropout rates. This type of policy is discussed in greater detail below.

Conditional cash transfers—conditional cash transfers (CCTs) have been shown to reduce child labor and increase school enrolment and attendance. CCTs have become a common anti-poverty tool, with approximately 29 countries implementing such programs (World Bank 2009). This type of policy is discussed in greater detail below.

2.2 Secondary

Despite the gains in primary school enrollments, Kenya still has low net enrollment rates in secondary schools (estimated at 50% by the World Bank in 2009). This is largely due to the low primary to secondary school transition rate, which is estimated to be approximately 55% (MOE, 2010). Of the 655,000 students who completed the KCPE in 2004, only 230,000 (35%) of these students completed the KCSE four years later in 2008. These figures clearly indicate that the primary to secondary school transition is a major bottleneck in the education system. Using data from Western Kenya, Ozier (2011) suggests that relieving this bottleneck would result in significant human capital and labor market gains (in terms of shifting individuals from informal to formal employment). We systematically discuss the major factors that contribute to the low secondary school enrollments below.

o Issues

Physical access to secondary school—While there are over 26,000 primary schools, there are only approximately 6,500 secondary schools across the country,

with many communities lacking a nearby secondary school. For instance, data from the 2009 FinAccess Survey show that only about 40% of residents in Northeastern Province and Coast Province reported to be in walking distance of a secondary school, compared to almost 80% in Central province. Previous research has shown that distance is an impediment to school enrollment, with some researchers arguing that female schooling may be more sensitive to physical distance to school due to safety concerns (Alderman and King, 1998). Overall the shortage of secondary schools is improving. Data from the Ministry of education does show that the number of secondary schools has increased by over 50% from 2003, with much of this growth driven by CDF and LATF funds (Ministry of Education 2009).

School fees and other monetary costs—There is substantial evidence in the literature that consumers are sensitive to the cost of education (Holla and Kremer, 2008) and that fees remain a major barrier for many families. Data from the 2005 Kenya Integrated Household Budget Survey (KIHBS) show that household's expenditures on a primary school student averaged approximately 3,000Kshs per year, while expenditures on a secondary school student averaged close to 25,000 Kshs (an eightfold increase). These secondary expenditures account for approximately 55% of annual per capita household expenditures. The preponderance of boarding schooling for secondary students is a contributing factor to the higher financial burden of secondary education. Parents, particularly in rural areas, are forced to send their children to boarding schools as there are often no secondary schools in walking distance. These boarding fees, in addition to ancillary expenditures such as uniforms, mattresses, and bedding can impede many households from sending their children to secondary school. Overall, data from the KIHBS shows that non-tuition expenditures average close to 10,000 Kshs, accounting for over 40 percent of the average total secondary school expenditures. The introduction of secondary school subsidies, coupled with the increased availability of bursaries from the CDF have helped ease the financial burden of secondary schools

A large body of research has shown that girls' schooling is particularly sensitive to fees (Alderman and King, 1998). Statistics from the World Bank show that the secondary school net enrollment rate for boys is approximately 51, while the enrollment rate is 48 for girls. However, the gender gaps in secondary school completion are even more pronounced. In 2008, 54 percent of secondary completers (those who took the KCSE) were boys. Data from the 1997 Welfare Monitoring Survey show that fees are the most cited reason for non-school attendance by both girls and boys. Pregnancy and marriage were the second most cited reason for non-school attendance among girls. This is consistent with Lloyd et al (2000) who find that gender gaps in enrollment widen during teenage years. Reducing the fee barriers (including ancillary fees such as uniforms) could boost female enrollment (relative to male enrollment) and possibly reduce the incidence of early marriage and pregnancy among girls (Duflo et al 2010 in Kenya, and Baird et al, 2010 in Malawi).

Poor quality of public primary school—with a limited number of secondary school places, KCPE scores play a major factor in the progression of students to secondary school. The introduction of the free primary education program has led to increased concerns about the quality of public primary schools relative to private schools. Overall, between 2003 and 2007, KCPE scores have been approximately 50 points higher in private schools than public schools on average. Hence, public school quality can act as barrier to secondary school enrollment if students in public schools are less likely to qualify for secondary schools. Data from the 2004 KCPE cohort shows that on average 77 percent of private school students qualified for secondary school by scoring over 250 points on the KCPE, while a mere 45 percent of public schools student qualified for secondary schools. In addition, the same data shows that 56 percent of students in urban schools qualified for secondary school compared to 46 percent in rural schools. Students in urban public schools were 5 percentage points more likely to qualify for secondary schools compared to their counterparts in rural public schools. As KCPE performance is highly correlated with timely secondary school completion, it is crucial to ensure that incoming secondary

school students are adequately prepared for the demands of secondary school. These persistent private versus public and rural versus urban KCPE performance gaps reflect the increased stratification and inequality in the education system.

Disproportionate access in national schools by private primary school graduates—While only approximately 10 to 15 percent of the KCPE candidates are from private schools, private primary school graduates account for approximately 50 percent of the KCSE candidates in National schools. In an effort to reform the system to allow more equitable access to national schools, the Ministry of Education implemented a quota system on the number of private school KCPE candidates who would be granted admission to National schools. Despite the controversy surrounding this policy, little is in fact known about the potential benefits or costs of this policy. While the policy does provide public primary school graduates with increased access to elite National secondary schools it does not address the root causes of the private-public performance gaps in the KCPE.

o Potential Solutions

Reducing cost of secondary education—Fees remain a major barrier, given the low physical access of secondary schools which entails boarding school for many students from certain parts of the country. The recent provision of secondary school subsidies is an important step towards boosting the primary to secondary school transition rate. In addition, the complementary scholarships (or bursaries) provided through the CDF further reduce the financial barriers to secondary school. However, there are some concerns that these mechanisms are not sufficiently or effectively targeted. Potential ways of reducing the costs of education include tuition vouchers and conditional cash transfers.

Tuition Vouchers. A potential solution is the introduction of means-tested tuition vouchers. Vouchers for secondary school have been used in Colombia and are being piloted in Ghana. Targeting of poor students can be done through a means test or other methods, such as the participatory resource appraisal. Evaluations of

Colombia's PACES program, which provided vouchers to students from poor neighborhoods to attend private schools as long as they maintained their grades, showed that the program led to substantial increases in both attendance and test scores for participants (Angrist et al 2002 and 2007). Moreover, the researchers found that these effects were larger for girls than for boys.

Vouchers are transparent, easily understood and relatively easy to implement. Voucher proponents argue that vouchers can lead to better educational outcomes by promoting competition among schools and by providing students with increased access to private sector options, which may lead to a better match between student and school (Ladd 2002). These competitive pressures could arise as vouchers allow students to "vote with their feet", rewarding high performing schools and punishing those whose performance lags. Since the voucher funds are tied to students, vouchers have the potential to unleash market forces in the education sector, thereby increasing the sector's productivity (Friedman, 1962). In this perspective, vouchers will be most effective when they allow students the greatest possible freedom of choice. Thus vouchers that can only be used in public sector institutions would increase competition among public schools, but the beneficial competitive pressures would be even greater with the inclusion of private schools. Further evidence from the Colombian PACES program suggests that the program did lead to an increase in test scores, where this increase was in part driven by an increase in productivity rather than just an increase in peer quality through voucher induced-sorting (Bettinger, Kremer, and Saavedra, 2007)

In addition to the increases in competition, voucher proponents further argue that vouchers can generate a "supply-side response", by encouraging new providers into the sector. This supply-side response is documented by Hsieh and Urquiola (2006), who show that the introduction of a nation-wide voucher program in Chile induced more than 1000 private schools to enter the market and increased the private school enrollment rate by 20 percentage points.

The greatest concern with large scale voucher programs is that they may lead greater stratification and sorting, where the higher ability (or higher income) students benefit at the expense of lower ability students (Epple and Romano, 1998). This pattern was observed in Chile following the introduction of the aforementioned voucher program (Hsieh and Urquiola, 2006).

In his review of voucher programs across developing and developed countries, West (1997) identifies fraud as a frequently cited potential challenge faced by governments keen on introducing voucher programs.

West (1997) identifies the vetting of private schools as an additional voucher implementation challenge. This is a tremendous challenge given the large variance in the size and scope of private institutions in Kenya. A national voucher scheme would need to set minimum standards and requirements for private schools to adhere to. These can range from simple enrollment and attrition thresholds, such as those used in programs in Bangladesh, up to complete inspection and supervision under the purview of the Ministry of Education, such as those used in the UK and Sweden (West, 1997). While there is no theoretical or empirical consensus on the best way to vet private schools, it is clear that the regulations need to balance the need to ensure education standards versus the autonomy of private schools. As West (1997) argues, if these regulations and standards are too far reaching, the private schools may not accept voucher payments, limiting the choices of voucher recipients and thus undoing one of the central benefits of vouchers

Ancillary costs of educations such as uniforms, provisions for boarders, and other school inputs are also important barriers, especially for girls. As discussed previously, the provision of uniforms has been shown to reduce student absence and dropout rates. Vouchers for uniforms and other ancillary secondary school inputs could be used to address this issue, although there may be practical concerns such as ensuring that the vouchers or supplies are not misused.

Conditional cash transfers. Conditional cash transfers (CCTs) provide cash grants to families if they send their children to school or get them immunized. Overall the research on CCTs shows that they increase school enrollment, reduce child labor and increase both post-primary and post-secondary matriculation. The pioneering PROGRESA conditional cash transfer program in Mexico provided up to three years of monthly cash grants equivalent to one-fourth of average family income for poor mothers whose children attended school at least 85 percent of the time. These grants were even higher for older children and girls in junior secondary school. The program significantly increased the transition rate from elementary school to junior secondary school. In addition, girls' enrollment increased significantly more than boys' enrollment (Schultz, 2004). Moreover, school re-entry after dropout increased among older children, while younger children repeated grades less often, suggesting improvements in effort among the treatment group since grade progression typically depends on grades during the school year (Behrman, Sengupta, and Todd, 2005). Interestingly, repetition decreased even for children in grades 1 and 2 who were not yet eligible for program benefits, consistent with spillovers from older siblings, anticipation effects, or a household income effect from the subsidy itself.

While CCTs have become a popular policy in many developing countries, they have significant administrative costs as governments need to determine eligibility, monitor the conditionality (check if students actually attend school) and to administer the transfer and prevent diversion of funds. A World Bank (2009) report found that among the median administrative costs of a CCT were approximately 8 percent of total program costs. As the verification of complying with the CCT attendance conditions is at the program monitor's discretion, there is some evidence that monitors do not accurately record student attendance and may in fact show favoritism towards students from certain backgrounds (Shastry and Linden (2007)). These programs should be designed to include typically disadvantaged groups such as landless, the displaced, and girls and those in extreme poverty. One potential way to reduce the administrative costs of targeting the poor is to

implement the program in locations or areas that are poor, rather than attempting to identify and enroll individuals who meet a predetermined level of poverty.

There is a growing body of research that provides some insights into how to best design conditional cash transfer programs. One crucial element is eligibility and appropriate targeting. Todd and Wolpin (2006) compare the existing PROGRESA subsidy schedule with several alternatives. They argue that eliminating the subsidy in lower grades, where attendance is almost universal, and increasing it in upper grades would leave overall program costs unchanged but increase average completed schooling. An additional important element is setting the benefit levels. Recent research from Malawi by Baird et al (2010) finds that even very small incentives (around US\$5) can have large effects.

Some have argued that cash transfer programs should be free of conditions. These critics argue in part that the administrative burdens of CCTs hinder many developing countries from adopting them. They argue that unconditional cash transfers (UCTs) can deliver many of the benefits of CCTs without the added administrative complexity. A recent research paper by Baird McIntosh and Ozler (2010) compares the effectiveness of a conditional cash transfer program for girls versus an unconditional cash transfers for girls. Overall, they find that CCTs are more effective at improving schooling enrollment, attendance and academic performance than UCTs. However, they find that UCTs are more effective at reducing marriage and early-pregnancy. They argue that an “optimal” design would use CCTs to promote schooling for younger girls (for example, ages 15 and below) and use UCTs for older girls (ages 16 and above)

Barrera-Orsorio et al (2009) examine the efficacy of three different CCT designs in Colombia; a prototypical “PROGRESSA” CCT which provides participants a monthly stipend conditional on school attendance, a “commitment savings” variant where a portion (33%) of the monthly stipend was deferred and paid as a large lump sum close to the start of the school year when re-enrollment decisions are made and a

“tertiary education savings” variant where once again 33 percent of the monthly stipend was withheld but the student would earn the right to a large lump sum if they enrolled in a tertiary institution such as a vocational training center. Surprisingly, all three designs are equally effective in increasing attendance rates. However, the savings and tertiary variants were much more effective at increasing secondary and tertiary school enrollment rates. This suggests that simple design changes that do not affect overall benefit levels, such as conditioning payments on graduation rather than enrollment and helping families circumvent the difficulties of saving money can have large impacts on secondary and tertiary schooling.

Increasing physical access—Examining Indonesia’s schooling construction program, Duflo (2001) shows that the large scale construction of (primary) schools led to increases in educational attainment. This program was designed to place more schools in regions with a relatively low school density. A similar program focusing on underserved regions such as Northeastern province and rural districts could promote increased secondary school enrollment. An alternative approach, discussed above, is to promote the entry of private schools into the market by harnessing the supply-side response induced by vouchers, although it should be noted that in general, private schools are less likely to enter into underserved regions such as rural areas.

Information provision—Providing information to parents and students could be extremely crucial at decision points, such as the transition to secondary school and transition to labor markets.

Information during the transition to secondary school. Under the current secondary school selection process, students are admitted to secondary schools based on their KCPE score, their preferences, and district quotas. KCPE candidates are required to rank 8 choices of schools: 2 national schools, 2 provincial schools, 2 extra provincial schools and 2 district schools. The tiered system of schools leads to enormous pressure and competition for places in national schools and provincial

schools. Indeed, data from the 2008 KCSE cohort shows that the average KCPE score of KCSE candidates in National schools was 414 compared to 323 for those in Provincial schools and 266 for District schools. Given these large differences in the characteristics of these schools it is critical that students and parents are well informed about how to rank schools such that they can maximize their chance to attend a good quality school.

Research by Lai et al (2009) on Beijing's school selection process shows the importance of careful ranking. In this system, parents and students have to rank 7 schools out of a set of 28. Although the selection algorithm is different from the one used in Kenya, there are a number of similarities. Most importantly, there are a select group of elite schools where the competition for a seat is extremely high. The authors argue that selecting one of these schools as a second or later choice dramatically reduces their chances of admission to a preferred school. As the demand for these elite schools is extremely high, they argue that selecting one as the second choice is essentially equivalent to throwing away an opportunity to gain entry into a school. Similarly in Kenya, there are for example certain National schools such as Alliance Boys or Alliance Girls that are in very high demand. Over 40 percent of boys choose either Alliance Boys or Mangu High as their first choice. Thus selecting one of these schools as a second choice significantly reduces the chance of gaining admission to a national school. Data from the 2004 KCPE cohort shows that 25 percent of boys and 21 percent of girls made this judgment error in selecting schools. As Lai et al (2009) show these errors can have adverse effects on academic outcomes, where students are assigned to lower performing schools which in turn can lead to lower academic performance. These errors in judgment could be reduced if parents and students had a clearer understanding of the selection mechanism and were better informed about the academic performance of these schools. As Lai et al (2009) and Ajayi (2010) show this is especially important for poorer students and students from lower performing schools, who are more likely to make judgment errors.

A rigorous study in the U.S. by Hastings and Weinstein (2008), showed that providing students and parents from poor backgrounds with clear, simple and relevant information on the performance of schools (school test scores), improved the school selection of parents and students. A rigorous study by Andrabi, Das and Khwaja (2009) also demonstrated the importance of providing school performance in rural Pakistan. Taken together, these studies suggest that providing Kenyan parents, students and primary school teachers with better information and details on the performance of secondary schools, the choice process, the average number of students choosing each school and the admission probabilities could promote better choices and eliminate errors in judgment. As we would expect the poor to benefit the most, this policy may help poorer students get admission to National schools. Given the high incidence of judgment errors committed by students in the secondary school selection process, it may be worthwhile to explore reforms to the secondary school assignment system.

Information and the transition to labor markets (out of school). Recent research suggests that simply informing students about the extent to which earnings vary with schooling can increase school participation with minimal fiscal expenditure. In his study on the Dominican Republic, Jensen (2010) finds that students in class eight underestimated the earnings difference between primary and secondary school graduates by 75 percent. He argues that residential segregation by income leads children to underestimate returns to education because poor children disproportionately observe relatively low earners among those they know with high education, and rich children will disproportionately observe high earners among the less educated people who they know. Jensen (2010) finds that providing students with information on the earning returns to education led students to update their beliefs about the expected returns to education and subsequently reduced dropout rates and ultimately increased school completion. However, the author does acknowledge that information provision may not be an effective policy if households still face financial barriers.

2.3 Vocational Education

There is growing recognition within Kenya of the importance of the vocational education sector. With data from the 2005 KIHBS showing that approximately 21% of youths aged 15-29 are unemployed, and a further 25% are neither in school nor working, vocational training is seen as a promising avenue to provide youth with marketable skills. The vocational sector includes youth polytechnics under the purview of the Ministry of Youth and the more prestigious technical training colleges under the Ministry of Education as well as a large private sector. Yet despite the recent renewed emphasis on the vocational sector, many challenges remain. The recent curriculum reform which has introduced a modular curriculum is an important step in the right direction as it provides students with greater flexibility. However, more reforms and policies are needed to improve the effectiveness of this sector.

o Issues

Fees—as with primary and secondary education, fees are a barrier to vocational training. Although the provision of subsidies in the vocational sector has reduced the financial burden, the fees are still at least 10,000 Kshs a year accounting for over 15 percent of average per capita household expenditures from the 2005 KIHBS (adjusted to 2009 prices). This is reinforced by evidence from a recent randomized project in Western Kenya where close to 75 percent of students who were randomly awarded a voucher for vocational training (a scholarship) enrolled in a training program, while less than 5 percent of individuals who were not awarded a voucher, but were equally interested in pursuing vocational training, enrolled in a program.

Physical Access—as with secondary schools, vocational schools are not always available nearby. Across the country there are just over 1,600 registered private and public vocational centers, with public institutions accounting for 45 percent of the total number of institutions (Ministry of Education, 2009). The supply of vocational institutions has grown recently, with much of the growth in the private vocational

sector. Ministry of Education statistics show that the number of public institutions grew by 7 percent from 2004 to 2007, while private institutions grew by 16 percent over this period. This growth in part reflects the rapid growth in the demand for vocational training, where enrollments have risen by 11 percent over the same period. Data from the Western Kenya vocational training project shows that on average approximately 23% of individuals in the study were within three kilometers of either a public or private vocational institution at baseline. On average there were 2 public institutions within 10 kilometers of the homes of the over 2,000 individuals in the study (Hicks et al 2011).

Information—It is possible that individuals do not have an accurate view of the true returns to vocational training in Kenya. They may also be mistaken about the distribution of earnings by vocation. Data from the Western Kenya vocational project (Hicks et al, 2011), shows that on average both men and women appear to have had somewhat optimistic perceptions about the increase in earnings associated with vocational training: they believed that the average increase in earnings associated with training was 65% higher than the estimated amount from a Western Kenya survey data. In addition, individuals were also mistaken about the highest earning trades.

Ensuring Access for Women—Data from the 2008 Demographic and Health Survey shows that 26 percent of women aged 20–24 had given birth by the age of 18. Furthermore, approximately a third of women were married by age 18. Marriage and fertility can prevent girls from attending vocational training courses. Indeed, data from the Western Kenya vocational training project (Hicks et al 2011) showed that marriage, maternity and childcare issues were the most important barrier that prevented girls who had won scholarships from enrolling in a course. Girls who had won scholarships were also more likely to cite distance as a barrier to enrolling in a course, compared to boys. This is consistent with previous research that has argued that girls schooling is more sensitive to distance than boys schooling (Alderman and King, 1998).

o Potential Solutions

Vouchers for vocational training—Vouchers that allow students to access both private and public sector vocational training centers are a potentially innovative way to alleviate both the financial barriers to accessing training and the distance barriers. Data from the Vocational Voucher Project in Western Kenya shows that there were on average 6 public and private institutions within 10 km of participants' homes, compared to only 2 public institutions in the same radius (Hicks et al 2011). Thus, providing individuals with access to the growing private sector could significantly reduce the physical access barriers. Further evidence from the Vocational Voucher project shows that the participation (measured by enrollment) of students who were awarded a “government-only” voucher was less compared to the participation of those who were awarded an unrestricted (government or private) voucher. This was in part driven by the increased availability of private centers in the area. While tuition is a major barrier, ancillary costs such as transport costs, lunch and uniforms can also act as impediments. The Jovenes en Accion program in Colombia provided a combination of classroom training and on-the-job training provided by legally registered companies as unpaid internships. Crucially, the program also provided participants with a living stipend, including money for childcare. The provision of these stipends helped generate extremely high program participation rates especially for women (Attanasio et al 2009).

Information provision—Given the apparent misperceptions about returns to vocational training, the provision of accurate information could potentially have had meaningful consequences on individual educational choices. For instance the project found that females who were provided with information on the returns to vocational education were more likely to enroll in a male-dominated course (such as automobile mechanics). The authors find that this effect was stronger for younger and more educated females (Hicks et al 2011). However, it is not clear that measured wage gaps are an accurate signal of returns, as there may be important selection issues and rates of course completion and employment are unclear.

Ensuring Access for girls—As discussed earlier, marriage, fertility and childcare issues are major barriers to female enrollment in vocational training. Evidence from the Jovenes en Accion program in Columbia demonstrates the potential for stipends to promote access for females. The program provided participants with a living stipend, including money for childcare. Trainees without children received stipend of \$2.20 a day for food and transportation while women with children under 7 received an extra 80 cents for childcare (or childcare subsidies) or day care at the schools. This extra stipend contributed to the extremely high program participation rates among women (Attanasio et al, 2009).

3. Improving Quality and Achievement

3.1 Primary Education

o Issues

FPE has increased enrolment, but many students' learning remains inadequate. A recent nationwide survey comprising over a 100,000 students aged between 3 and 16 in over 2,000 schools, found that only 33% of children in class 2 can read a paragraph at their level. The survey further found that a third cannot read a word and 25% of class 5 students cannot read a class 2 paragraph (Uwezo, 2010).

These poor performance and learning indicators may be driven by the following:

Increased pressure on available inputs— With the advent of FPE, enrolment increased in the classes in the lower grades were often are very large, and the children arrived with wide-ranging levels of preparedness. These large and heterogeneous classes can challenge pedagogy. For example, at the beginning of 2005, the average first-grade class in some areas in Western Province was 83 students, and in 28 percent of the classes it was more than 100.

Reduced learning, as indicated by lower test scores—Large and heterogeneous classes, possibly driven by the influx of poorly prepared first-

generation learners, has led to a slight decline in test scores (Lucas and Mbiti, 2010). The low levels of reading proficiency found in the Uwezo survey suggest that learning has been compromised in primary schools.

Increased stratification—Students from richer households increasingly enroll in private school. This stratification becomes all the more important given the continued (perceived) dominance of private schools in the KCPE. Data from the KNEC shows that between 2003 and 2007, private schools have consistently outperformed public schools in the KCPE by about 50 points on average. This has raised concerns about the rising disparity in quality and achievement between private and public schools.

o Potential solutions

Tailoring Teaching to Meet the Needs of Students—A study of a program that provided textbooks in Western Province found that, while the average child did not benefit from textbooks, students who were already proficient did benefit. A possible explanation for this, the authors conclude, could be that many students had fallen behind the level of the textbook (and possibly the curriculum). Support for children who have fallen behind, including remedial education, could provide children who have fallen behind the basic skills that they need to learn effectively (Glewwe et al, 2008).

One possibility is to reorganize the classroom to allow teachers to tailor their lessons to pupils' level of preparation. A study in Western Province suggests that this can allow students to benefit from being taught in more homogenous peer groups. Such groups have greater homogeneity which can allow teachers to tailor their teaching to what the students do not know. The study finds that the group of students who were less prepared seemed to gain the most in the easier competencies and to gain the least in the hardest competencies (Duflo et al, 2009).

Other possibilities include changing the teaching methods. More research is needed however to determine the most effective teaching methods given the large and heterogeneous classes that are common in most developing countries. Another possibility is increasing the flexibility in the way classes are structured. Given the heterogeneous achievement level in the classes, should the grade structures be more flexible so that some children can take different subjects with different peer groups, taking math with one group and reading with another? Some school systems group students into different classrooms for certain subjects depending on their achievement in that subject. Research by Duflo et al (2009) suggests that these approaches can boost performance, although more research is needed to examine the effectiveness of subject specific grouping as described above.

Reforming the Teaching Workforce—The largest share of the national education budget already goes to teacher compensation. There is scope for reforming the teacher workforce to increase learning. Possibilities include:

Teacher Unemployment—The shortage of teachers that leads to overcrowding is not because there are not enough teachers but that there is not enough money to employ teachers graduating from the national system of teacher-training colleges. A possible way to circumvent this is to hire teachers in two steps. Teachers graduating from the teaching colleges get a probationary contract, possibly locally managed, contract. These teachers would be paid less than the civil service teachers. This would put more teachers into schools at a lower cost. These teachers are likely to work hard as these contracts are probationary and will only lead to a TSC contract, if they perform well. See Duflo et al. (2009). Evidence suggests that such a program would be even more effective if these probationary short-term teachers were managed by local school committees. However, this necessitates sufficient training for members of the school committee and community.

Teacher Incentives—On paper the teachers already have all the incentives they need. A great number of teachers are indeed professional. They come to work and

they teach when they are at work and they are dedicated to the success of their students, even if they sometimes endure very difficult working conditions such as large classrooms. But there is still unacceptably high chronic absence, especially in remote areas.

A possible way to address this is to introduce performance/attendance-based pay. A study by Glewwe, Ilias and Kremer (2008) in Western Province found that a program that gave teachers prizes based on student performance increased exam scores while the program was in place. A study by Muralidharan and Sundararaman(2009) found that linking student test performance to teacher pay significantly improves learning outcomes for students in government schools in Andhra Pradesh, India. Other studies in Israel by (2002, 2009) have also shown that student performance-based pay can increase test scores. A study by Duflo, Hanna and Ryan (2010) shows that linking teacher pay to attendance increased both attendance and test scores.

But there are some potential issues. In linking teacher salaries to student test scores, one worry is that teachers may focus on activities which improve exam scores but may not improve learning in the long run or the underlying competencies targeted by the curriculum. Another worry, given the varying level of preparedness among students, is that the pay-for-performance scheme may penalize teachers whose pupils are less prepared at the start. For example, pupils from poorer socioeconomic backgrounds tend to be less prepared than richer students, perhaps because their parents are not educated or because they did not go to preschool or benefit from other early education programs. Teachers assigned to schools with proportionally more of these students, for example teachers in rural areas, may be penalized compared to their counterparts in schools with more advantaged children. For attendance-based pay, the worry is the cost of measuring attendance, which requires adequate monitoring. Some headmasters may feel pressure from teachers that makes monitoring teachers difficult. . The difficulty of monitoring teachers was the reason that the program linking pay to attendance in India that was studied by

Duflo, Hanna, and Ryan (2010) used cameras to record teacher presence. Another approach would be incentivizing headmasters.

Engaging parents— Recent work in France examined a program that encouraged parents to participate more in their child’s school and found very positive results (Avvisati et al 2010). The program emphasized the importance of parents’ involvement in their children’s education. It also provided parents with better information on the school system, including information on the roles and responsibilities of various personnel and school offices. While the results were very encouraging, this approach has not been tested in a context where the average education of parents is lower.

Merit Scholarships—Incentives for students such as cash prizes and bursaries can be effective at increasing performance. Research has shown that merit scholarships can induce more effort from students trying to earn the award. A merit scholarship program for girls in Western Kenya provided Standard 6 girls who scored in the top 15 percent in their district exam a two-year scholarship that covered school fees and school supplies for the remaining two years of primary school. The scholarship program resulted in increases in test scores, not just among the top students who had hope for the scholarship, but even the lower students and the boys. A possible explanation is that the students demanded more time from the teachers and the teachers increased time for all students (Kremer, Miguel, and Thornton (2008)). This program operated at the primary level, but with the advent of FPE it may make sense to try a similar program at the secondary level.

3.2 Secondary Education

o Issues

Kenya has three tiers of government secondary schools. The elite government schools, National Schools are the most prestigious secondary schools in the country. In 2004, these eighteen single sex boarding schools admitted approximately 3000 of

the top primary school candidates from across the nation (Lucas and Mbiti (2011)). Relative to other schools, they have better facilities, offer a larger variety of courses, and provide a higher quality peer group. For instance as of 2007, 80 percent of teachers in National Schools had a degree compared with 68 percent in other public schools. In addition, National School teachers were twice as likely to hold advanced degrees compared to teachers in other schools. Moreover, these schools offered an average of 16 KCSE examinable subjects compared to 11 in subjects in other schools. These extra subjects were often costly or hard to offer such as German and Aviation (Lucas and Mbiti (2011)).

The almost 1,000 Provincial Schools, the second tier, admit the top remaining students from within a province. While the approximately 3,000 District Schools, the bottom tier, draw students from the district who could not gain admission into national or provincial schools. Over 100,000 students graduated from District Schools in 2008. Contrary to the situation in primary school, the quality of private schools varies. Although there are some elite private schools, in general the schools are of lower quality than the National and Provincial Schools. In 2008 only 12 percent of secondary school graduates graduated from the 859 private schools.

Overall performance in KCSE is weak. In 2008, only 25% of students scored at least a C+ on the KCSE, with girls less likely to score at least a C+ compared to boys. There were striking differences across the various school types. In 2008 the average KCSE score of students in National schools was approximately 9.6 (out of 12). In these schools 90 % of students scored at least a C+. Moreover there were no gender gaps in performance in national schools, which is very encouraging. In contrast the average KCSE score in a Provincial School was 6.2 and only 43% of students scored at least a C+. Unlike national schools, there are small (but statistically significant) gender gaps in performance in this tier. The performance in District schools however, was appalling. The average KCSE score was approximately 4 points and merely 11% of students scored at least a C+. There were also significant gender gaps

in the performance for both district and private schools. The proportion of boys achieving at least a C+ was almost twice the proportion of girls.

There were also large regional disparities in the performance of students from Northeastern and Coast province. A mere 16% of students who were from Northeastern province scored at least a C+, and only 19% of students from Coast province achieved at least a C+. This compares very unfavorably to the performance of students from Nairobi and Nyanza, where 32% and 26% of students, respectively, achieved at least a C+.

While the differences in facilities, teachers and other inputs probably contributed to this difference, it is clear that these differences in performance are also driven by the different levels of academic preparation of the students. The average KCPE score of a 2008 KCSE candidate in a National school was 414 points, almost 100 points (1.5 standard deviations) more than the provincial average of 322 and close to 150 (2.25 standard deviations) more than the district average of 266. The gap between national schools and private schools was almost as large as the gap between national schools and district schools, where the average KCPE score of a private school student was approximately 273.

Dropout rates and repetition rates provide an additional way to examine the overall quality of the secondary school system. Data from the MOE show that approximately 92 percent of the Form I class in 2004 reached Form 4 in 2007 (Ministry of Education, 2009). This was a marked improvement over the previous year where the progression rate for that cohort was 87%. As repetition rates were less than 2%, in 2003 (MOE), it is likely that much of the non-progression of students was actually driven by drop out rather than repetition rates.

o **Potential solutions:**

Reorganizing the classroom— Rigorous evidence from randomized trials in an environment similar to Kenya's at the secondary level is scarce. However, it may be worth exploring computer-aided instruction and support.

Merit Scholarships— As discussed above incentives for students such as merit scholarships can boost student performance. While there is evidence on the effectiveness of such programs in Kenyan primary schools, there is no such evidence for Kenyan secondary schools, although a study in Israel by Angrist and Lavy (2008) did show that such providing financial incentives to students based on their academic performance can boost examination performance.

Engaging parents—Getting parents involved and encouraging them to be active participants and partners in the education of their children could have positive impacts as described above.

Conditional cash transfers—As described above, providing conditional cash transfers can improve test scores. As discussed above, Baird, McIntosh and Ozler (2010) find that conditional cash transfers (and unconditional cash transfers) are effective at improving schooling enrollment, attendance and academic performance. These programs could also be used to address gender disparities by reducing pregnancy and marriage among girls.

Vouchers— As discussed above vouchers that provide students access to private secondary schools could be used to boost the productivity of the secondary schools by promoting competition. This policy could be explored through a rigorous pilot program.

3.3 Vocational Education

o Issues

Overall, government run vocational training institutes in developing countries have been criticized in some circles for failing to adequately provide marketable and relevant skills to students and failing to respond and adapt to a rapidly changing labor market driven by technological advances (Johanson and Adams, 2004). Additionally, public provision of vocational training is up to 14 times more expensive than general secondary education in Sub-Saharan Africa (Atchoarena and Delluc, 2001). There is a growing sentiment that the public provision of training produces graduates with obsolete or market-irrelevant skills, even though the cost of training is much greater in public institutions compared to private institutions (Johanson and Adams, 2004). Citing examples from Mali and Senegal, Johanson and Adams (2004) argue that private training institutes are more flexible, better able to adapt, more innovative and better in tune with the labor market. Johanson and Adams (2004) argue that in Kenya, the centralization of the vocational training curriculum has prevented close collaborations between industry and the vocational sector. These issues are also discussed in Bettinger et al (2007).

Johanson and Adams (2004) argue that teachers with sufficient work experience were critical in order to ensure that vocational training provides students with market-relevant skills. Data from the Vocational Voucher Project in Western Kenya shows that on average instructors in vocational training schools had about 4 years of practical experience and over 10 years of teaching experience. The data further shows that public school teachers have 50% more teaching experience than private teachers. With rapid technological change, recent practical experience in industry may be a particularly important dimension of teacher quality, and one which may enhance the labor market relevance of the training program. Thus the longer a teacher is out of the labor market the more likely their labor market experience is depreciated.

However, we do see that public institution courses are more likely to require an internship or attachment as part of the coursework compared to private schools. Similarly, formal private institutions were more likely to offer courses that required internships compared to “Jua-Kali” private institutions. This finding probably reflects the differences in course offerings across the different types of institutions, rather than a systematic difference in policy across them. However, we do find that private, urban schools and formal private institutions were significantly more likely to assist students with job placement compared to their public, rural and informal counterparts. This placement assistance could have significant implications for successful employment outcomes; however the efficacy of such programs is currently unknown.

o Potential Solutions:

Vouchers—The private sector is seen as more dynamic, flexible, better able to adapt, more innovative and better in tune with the labor market (Johanson and Adams (2004)). Bettinger et al (2007) find that students awarded vouchers for private vocational education in Colombia performed much better than their counterparts who did not win a voucher for a private vocational school. While there is little rigorous evidence on the labor market outcomes of individuals who attended private institutions compared to those who attended public schools, the on-going Vocational Voucher project of Western Kenya provides some suggestive evidence. The project was designed to specifically test the differential labor market returns between public and private institutions through an innovative voucher design. As described earlier, a random half of voucher winners were awarded a voucher that was redeemable in both private and public schools, while the other half received a voucher that was only redeemable in a private school.

The preliminary results show that individuals who were awarded an unrestricted (public or private) voucher had higher take up rates, and crucially, higher retention rates, compared to those awarded a restricted (public institution only) voucher

(Hicks et al 2011). There are several possible explanations for this result. First, private institutions may provide more flexible and relevant training. Anecdotal evidence gathered by Hicks et al 2011 shows that in occupations and trades such as auto vehicle mechanics, public institutions were often using outdated engines no longer found on the road, while private institutions were using current car models. Public institutions' tailoring courses dutifully covered the standard course curriculum, which may or may not reflect current market trends or tastes in clothing. In contrast, many private sector tailoring courses used an "apprenticeship" style model where students interact regularly with clients and work on real projects, potentially providing them a better understanding of current market demand. These results could also perhaps reflect the greater density of private institutions in the study area, which resulted in lower average transport costs for students. Alternatively, the results could also reflect differences in the (observed or unobserved) characteristics of these institutions – for example Hicks et al (2011) show that private institutions were more likely to assist their students in the job search process. Finally, this could reflect students' perceptions of the (labor market) returns to private versus public training. Taken together these results demonstrate the potential of engaging the dynamic private vocational training sector through a publicly financed voucher scheme. In addition to providing students access to the private sector, the voucher could also promote school competition and encourage an increase in the supply of training schools. These competitive pressures could further boost the productivity of the vocational training sector.

4. Cross-cutting Issues

There are a number of issues and potential solutions that cut across all levels and sectors of education. It's easy to see when we think less in terms of the sectors and programs but in terms of the child targeted by all those programs. For example, improving a child's health and nutrition can improve their attendance and learning in school. We can think of these issues as cutting across ministerial portfolios. Other issues—for example decentralization—also pertain to multiple sectors in education.

4.1 Complementarities between Health and Education

Health and Education—There are several examples of potential interventions of this type: mass deworming, micronutrient supplementation, and non-infectious diseases, such as short-sightedness.

School-based Mass Deworming. Given the high burden of infectious disease in developing countries, some interventions focus on achieving impact by reducing the high burden of infectious disease on children in Kenya. Hookworm, roundworm, whipworm, and schistosomiasis affect two billion people worldwide (WHO, 2005) and are particularly concentrated among school aged children. As discussed earlier, a randomized evaluation of a program in Western Province showed that school-based mass deworming was one of the most cost-effective ways of increasing attendance at schools in areas with high worm loads. A partnership between the Ministry of Education, the Ministry of Public Health and Sanitation, and the Kenya Medical Research Institute coordinated a national deworming program that treated over 3.6 million children in 2009. Renewed deworming efforts would yield significant health and education benefits.

School-based micronutrient supplementation. School nutrition constitutes another avenue for improving education through health. School-based micronutrient supplementation can be used to combat micronutrient deficiencies. As discussed earlier, these deficiencies can affect the cognitive development of children. For instance, research has shown that iodine deficiency disorders can hinder cognitive development which can affect schooling. A study by Field, Robles, and Torero (2009) showed that providing iodine supplementation to women of child-bearing age in Tanzania increased the educational attainment of children born to these women especially girls.

Currently, the Micronutrient Initiative has been working with the Ministry of Health to develop a strategy to combat micronutrient deficiencies and to develop an action

plan for implementing fortification activity. School-based supplementation led by the MoH and MoE would be an important addition to this very important work.

Non-infectious Diseases. Other interventions focus on addressing barriers arising from non-infectious diseases and personal hygiene. Refractive error affects the eyesight of poor children in developing countries at least as frequently as elsewhere (5 to 15 percent), but it is almost never corrected even though we now have options for prescription and provision of glasses that cost less than \$1 per year. Recent evidence by Glewwe, Park and Zhao (2009) shows that providing eyeglasses led to increases in student performance in examinations in Western China.

4.2 Cross-sector issues in education

Rethinking programs that solely increase educational inputs—While current research suggests that additional resources at the school level, including more teachers per child, often have little or no detectable effect on learning outcomes unless accompanied by changes in teaching, more research is needed to fully understand the complementarities between inputs and the structure of the education system. The evidence at hand shows that programs that simultaneously changed inputs and the structure of the education were more effective than programs that only changed inputs in isolation. For example, a number of studies have found that remedial teaching, focused on lagging children, can significantly improve their test performance at a low cost. More generally, teaching that is focused on the competency level of a particular child may generate gains. Such programs combine both a change in pedagogy and change in inputs.

Curriculum Reform—Kenya may need to adopt specific pedagogical techniques to address problems common in their schools such as large class sizes, varied education levels and family backgrounds, irregular student attendance, and weaker motivated, poorly-trained teachers. Current teaching methods and curricula are failing very large numbers of children who attend school regularly but learn very

little. The curricula may not be adapted to local challenges and needs. Too often, it presumes competencies that many of the first-generation learners do not have. In Western Province, a randomized evaluation found that a program providing standard textbooks benefited only those already performing well, suggesting that standard texts were inappropriate for three quarters of children. In contrast, a randomized evaluation of a remedial education program in India that focused instruction on providing at-risk children with the basic skills they need to learn effectively, improved test scores of those falling behind the standard curriculum. The central questions are therefore how to devise pedagogies adapted to students' needs and how to get teachers to implement them.

Technology could address some of these problems by providing additional instruction time, by allowing lessons to be tailored to the child, and by complementing the teacher's knowledge. A program in Nicaragua that supplemented the teacher with radio lessons in mathematics yielded impressive results in a randomized evaluation. A randomized evaluation of a computer-assisted-learning program in India targeted at reinforcing math skills also found large and persistent effects on learning. Given the costs of computers, a recent randomized evaluation of an adult literacy program found that mobile phones could be effectively used to complement classroom activities (Aker et al. 2010). Finally while many are skeptical about the benefits of teacher training for learning, the evidence on which these opinions are based is entirely from non-randomized studies. More research is needed in this area.

Education system reform— Education systems reforms have commonly included changing accountability systems for teachers, devolving more control to local communities, and allowing for school choice. Evidence in Kenya has shown that locally hired teachers can dramatically raise student performance, perhaps due to their higher attendance rates.

The evidence from randomized evaluations on the effect of rewarding teachers based on the performance of their students is mixed, with evidence from Israel suggesting that test-score based accountability systems may lead to improvements in test scores, but evidence from Western Province suggesting that teachers may seek to game the system in various ways in response to high stakes tests. An alternative approach is to put better systems in place to enforce basic teacher responsibilities. In India, a program that linked teacher pay to attendance, where teacher attendance was measured accurately with the aid of tamper-resistant technology, improved both teacher attendance and test scores in a randomized evaluation.

A number of ongoing randomized evaluations are examining the impact of making teachers accountable to communities by providing communities with information on their rights and on the quality of their local school. This community-driven approach was advocated by the 2004 World Development Report. Another set of evaluations examines school-based management, which gives communities more authority to hire and fire teachers and to monitor school budgets. However, research studies suggest caution in implementing these programs. Nevertheless, a study in Western shows that with adequate training and real power school committees can play an important and positive role in improving learning

A large and growing share of students, including poor ones, are now attending private schools in Kenya. It will be critical to understand how relationships between the public and private sectors can best be managed to expand access to education while improving quality—for example, are there ways to regulate private schools in a way that improves their quality?

Some have argued for allowing more school choice through voucher programs that enable students to attend private schools with public funding. For example, a randomized evaluation of a voucher program in Colombia increased educational achievement among participants.

Improved data collection by ministry— High quality data and information is crucial for designing policy initiatives and programs aimed at improving education. Basic knowledge of the diverse needs, opportunities, and challenges faced by children and parents in all corners of Kenya would go a long way to improving program design and targeting.

Currently, much of the education data is collected through the Education Management Information System (EMIS). The EMIS survey is sent to all public schools and is completed by the principal. However, it is unclear if the principal has incentives to misreport information, especially if the principal believes that such actions could influence the distribution of resources. Random audits could be used to assess the scale of misreporting and possibly reduce the incidence of misreporting. Additional training could also be used to improve the data quality. One of the biggest flaws in the EMIS data is that it does not include data from private schools. This omission has to be corrected as this will provide a comprehensive view of the education sector.

Other improvements to data collection include efforts to ensure data from TSC and KNEC are easily matched to the EMIS data. Currently the EMIS, TSC and KNEC each use their own set of school identification codes. Synchronizing these codes across agencies could enable policymakers to create comprehensive datasets that can be used to plan effectively. It is also critical that such comprehensive data be made readily available to researchers for further analysis.

An interesting approach to collecting up-to-date information on the status of education has been developed by the Indian NGO Pratham and is gaining wide acceptance. Called the Annual Status of Education Report (ASER) this approach surveys the enrollment as well as the reading and arithmetic levels of children aged 6 to 14 years. The survey is carried out using local organizations and volunteers. The first innovation is to create a rapid assessment tool that can be used by non-specialists, thereby empowering citizens to directly assess the performance of the

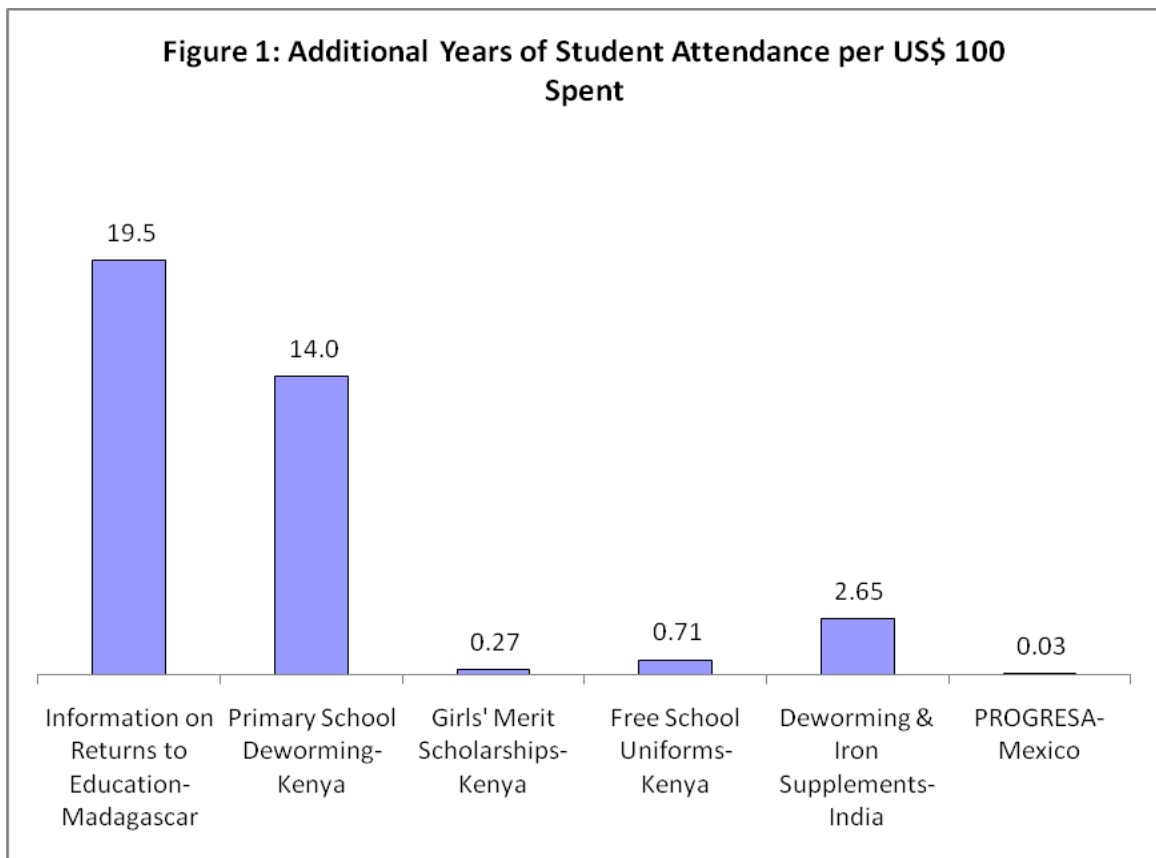
educational system. This tool is then deployed in a large national deployment to obtain a representative random sample of India. Pratham has conducted ASER annually since 2005, and in 2008 ASER tested over seven hundred thousand children in over 16,000 villages in over 500 rural districts in India (essentially all districts and more than 32,000 volunteers from NGOs, colleges and universities, youth and women groups participated in this effort). Pratham releases a report based on the ASER results in January every year; and to encourage additional analysis and extend the findings, the raw data is made available to external researchers. The findings of the report are on the front page of every newspaper and are disseminated widely within the government and outside at the national, state, district and village levels. Several governments explicitly base their annual education planning in part on the ASER results, and the findings played an important role in the approach paper to the 11th Planning Commission. The success and importance of Pratham's ASER in identifying gaps in the Indian education system have not gone unnoticed outside India. The Education For All - Fast Track Initiative (EFA-FTI), a global partnership to help low-income countries meet the education Millennium Development Goals, has adopted two of their indicators of reading skills, emphasizing their contribution towards empowering local education groups to engage in dialogues with their local governments and tracking performance over time. ASER is now being replicated, as UWEZO ("capability"), in the East African nations of Tanzania, Kenya, and Uganda. ASER is not only a one-time survey, but should be viewed as a starting point. Using such data in combination with improved EMIS data would enable better planning and policy formulation in the education sector.

4.3 Using Cost- Effectiveness information to prioritize programs

Given the multiple policy options discussed previously, it is important to consider information on the cost-effectiveness of different policy alternatives. The charts below show the cost effectiveness of a number of different programs aimed at

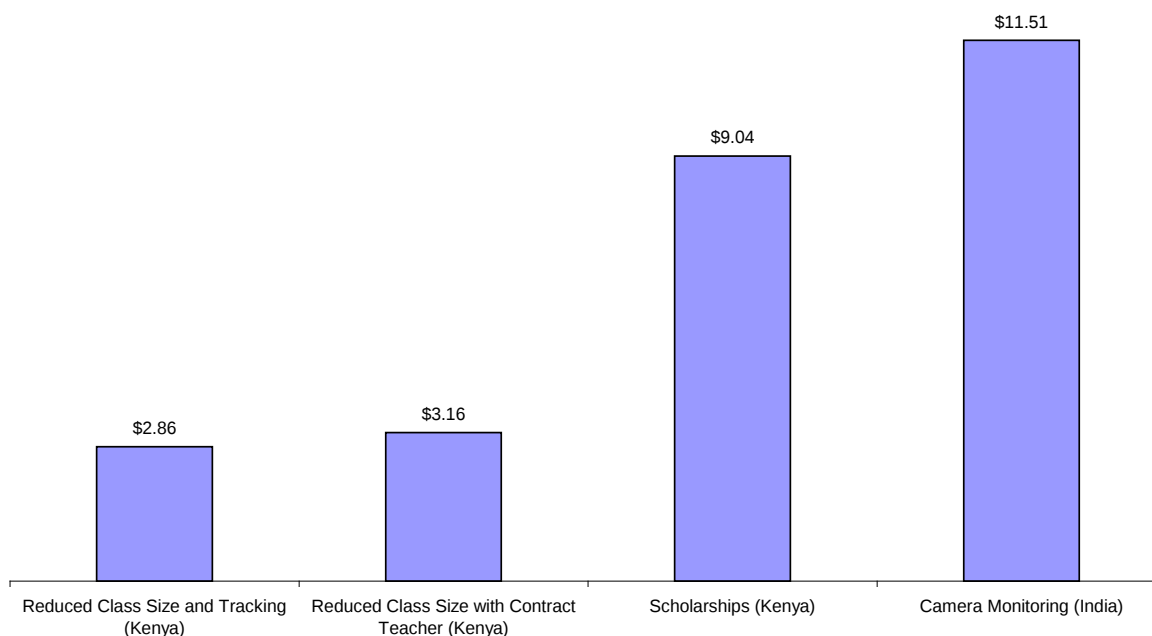
improving educational outcomes. Figure 1 focuses on programs aimed at increasing access. Specifically, it shows the additional years of education (or in some cases enrollment) gained per US\$100 spent. While Figure 2 shows the cost effectiveness of a variety of programs aimed at boosting students' performance.

Figure 1 shows that information campaigns and deworming are very cost effective means of raising schooling attendance. In addition, the positive long-run impacts of deworming on labor markets boost the overall returns on investment in deworming. Figure 2 shows that changes in pedagogy through reductions in class size (for example through the provision of short-term locally managed contract teachers) are cost-effective means of raising test scores. Scholarships and improving teacher attendance through monitoring are also relatively cost effective. Unfortunately, cost effectiveness or cost-benefit information is not readily available for other programs discussed in this review. Moreover, while CCT's, merit scholarships and school uniforms are not as cost effective at raising attendance, these programs may generate important additional benefits beyond their impact on school participation. For example the World Bank (2009) argues that CCT's have led to reductions in poverty and reduced the incidence of child labor. Thus policy makers need to consider the additional benefits generated by these programs and factor in the policy priority of these additional benefits in order to gain a comprehensive outlook of the true costs and benefits of each program. For the cases where the evidence on the costs-benefits ratio is non-existent, evidence in the Kenyan context would be needed to assess the effectiveness of such programs.



Source: Duflo et al 2011.

Figure 2: Cost per Student per 0.1 SD Increase in Test Scores (US\$)



Source: J-PAL. Preliminary Cost-Effectiveness Analysis, 2011."

5. Conclusion

With the introduction of free primary education and the reduction of secondary school and vocational training school fees, Kenya has made tremendous progress in promoting access to education. However, there are still numerous bottlenecks in the system, such as ancillary costs of education (e.g. school uniforms) and distance to schools (especially secondary schools) that prevent many students from investing in education. Moreover, providing high quality education to all parts of the country remains a challenge. For instance, the poor performance of primary school students in the 2010 Uwezo assessment demonstrates some of the quality deficiencies in the education system. Using rigorous evidence from randomized evaluations, many conducted in Kenya, we have provided a number of different options and policy tools that could be used to address the access and quality issues. Moreover, we also discuss the importance of cross-cutting issues such as curriculum reform and

reforming teacher labor markets. These system-wide issues, such as curriculum, can often hinder the effectiveness of education policies enacted to address particular issues (Glewwe et al (2007)). We provided information on the cost-effectiveness of various policy options and also highlighted key policies and pilot projects that we believe have proven high impact and are feasible in Kenya. It is our hope that the information and recommendations outlined in this report can provide some guidance on selecting programs or policies that could be employed to positively impact the education sector given limited resources. As outlined in this report, there are many promising policy options that have not yet been rigorously evaluated in contexts that are similar to Kenya. Moreover, there is very limited rigorous evidence on the most effective policies and programs in early childhood education and tertiary education. Thus, more rigorous evidence is needed in all these areas to ascertain the most effective ways to support education and achieve Vision 2030 in Kenya.

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