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DETERMINANTS OF EDUCATIONAL ACHIEVEMENT IN KENYA

SINCE THE INTRODUCTION OF FPE

1. Overview

In 2003 Kenya introduced free primary education (FPE) nationwide. While FPE has succeeded in increasing the quantity of children enrolled in school, there is widespread concern that school quality has suffered – particularly in a subset of districts. We assess three common explanations for this alleged decline: (i) the failure of school budgets and staffing levels to keep pace with enrolment in some areas; (ii) changes in the composition of students; and (iii) the loss of local accountability as school management and funding has become centralized in the Ministry of Education.

Briefly, we find that FPE has led to a 22% increase in enrolment with no appreciable decline of KCPE scores at the national level, although there is substantial variation at the district level. Overall, FPE has been a successful pro-poor policy. Poorer districts have seen larger increases in enrolment compared with richer districts and are also to some extent catching up in terms of achievement. However, staffing levels have not kept pace and increases in enrolment are associated with larger class sizes and concomitantly lower KCPE scores. Moreover, both the potential decline in parental support as the composition of students changes as well as the crowding out of local accountability in the wake of FPE are cause for concern as both these factors are found to be important determinants of educational achievement.

2. Motivation and Hypotheses

Understanding the effects of free primary education on educational attainment is important because educational attainment and human capital accumulation are linked to economic well-being via two important avenues. First, higher levels of enrolment and education are linked to higher per capita income and economic growth. According to Psacharopolous (2004), an additional year of schooling increases wages by an average of 7.3 percentage points in Sub-Saharan Africa. Moreover, while traditional wisdom has held that returns to education are concave (Psacharopolous, 2000), more recent evidence indicates that the returns to education

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are convex with most of the benefits accruing at secondary and tertiary level (Schultz, 2000, Sandefur and Teal, 2006). This is certainly confirmed in Kenya where Manda, Mwabu and Kimenyi have found rates of return of 7.7% at primary level, 23.4% at secondary and 25.1% at tertiary level. The evidence of the impact of education on growth is more mixed, however, with something of a micro-macro paradox, meaning that high effects from schooling on individual wages are not necessarily mirrored when regressing incomes on aggregate enrolment in cross-country regressions. However, there is some evidence that the aggregate enrolment does positively impact upon the growth rate (albeit not the level) of per-capita income. Second, higher levels of educational attainment are linked to increased civic participation. However, if education is not free, then the poor may be prevented from participating in education. Abolishing fees under FPE is therefore an important step towards increasing enrolment rates and educational achievement.

In this report we identify and investigate three channels linking free primary education to student performance:

(a) Sources and total amount of funding in the education sector are affected:

- Government funding is increased.
- The effect of increased government funding may have an ambiguous effect at the school level because local fundraising may be reduced.

(b) Changes in the pool of students:

- Fees are abolished, so more children can access education.
- These children may differ from existing students in terms of socio-economic background, age and ability.

(c) Increased centralization may equate to a loss of accountability:

- School Management Committees no longer raise funds for the school and as a result their governance power is undermined.
- Equally, parents no longer pay for the school, so they may lose sense of ownership.
- Finally, the authority over hiring of teachers is held by the central government leaving little authority to local school management.

3. Data

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We examine the determinants of educational achievement in Kenya since the introduction of free primary education in 2003 using a panel data set based on a census of Kenyan primary schools, spanning all provinces and districts of the country. The dataset combines a variety of administrative data sources collected by the Ministry of Education, the Teacher Service Commission (TSC) and the Kenya National Examination Council (KNEC). The data covers the population of primary schools in Kenya – roughly eighteen-thousand public and private schools in total – on an annual basis, both before and after implementation of FPE. Basic school characteristics such as enrolment and staffing are drawn from the Education Management Information System (EMIS), while our primary performance measure is the school-average score on the Kenya Certificate of Primary Education (KCPE) exam, administered to all students completing grade eight. In addition, we use detailed school level information on parental and community involvement prior to the introduction of FPE from a nationally representative sample of 200 primary schools surveyed by the Southern African Consortium for Monitoring Educational Quality (SACMEQ) in 2000. Finally, school level data has been linked to poverty indicators from the 2006 Kenyan Integrated Household Budget Survey (KIHBS).

4. Enrolment and Achievement under FPE

The most obvious anticipated effect of FPE is a surge in enrolment. The EMIS database allows us to look at nationwide enrolment and KCPE score patterns and determine how enrolment patterns and KCPE scores have changed in the wake of FPE.

[Figure 1 about here: Enrolment Trends by Province]

Since the introduction of free primary education, there has been a clear upward trend in enrolment. Figure 1, which is based on enrolment data from the EMIS data base, presents the average gross enrolment rate before and after FPE. The data are at the school level, but have been summarized in province-level averages in the figure. To compare before and after FPE, the data are collapsed into just two periods: before FPE spans 2000 to 2002, while after FPE spans the period 2003 to 2005. Total enrolment in public primary schools in Kenya increased by 22.4% from 2000-02 to 2003-05, while private primary enrolment rose by 37.0%. Despite growing more rapidly, private enrolment accounted for just 3.6% of the nationwide total in the period after the introduction of FPE.

While FPE has succeeded in increasing the quantity of children enrolled in school, there is widespread concern that school quality has suffered. However, there is little evidence that these concerns are well-founded at least in terms of performance in the Kenyan Certificate of Primary Education. Figure 2 presents the averages by province of school level KCPE scores before and after FPE. Across the country, the average score has remained more or less constant – in fact even showing a small increase of 0.3% on these exams – between 2000-2002 and 2003-2005,

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though there is some concern that scores are normalized and so between district and school comparisons are likely to be informative.

[Figure 2 about here: KCPE Trends by Province]

Increases in enrolment have not been uniform across all districts. The left-hand panel of Figure 3 shows a map of Kenyan districts colour coded by changes in enrolment. Dark blue colours denote the largest increases in enrolment, while dark red indicates that enrolment has fallen. Although enrolment has increased across the board, districts in the North East and along the western border have seen the largest increases, while increases in the central districts have been more modest.

A common concern is that performance in KCPE examinations has suffered because of the influx of marginal students. However, inspection of the right-hand panel of Figure 3, which shows a map of Kenyan districts colour coded by changes in KCPE scores, indicates that there is little evidence for this. Comparing the two panels of Figure 3, we find no clear correlation between increases in enrolment and a deterioration in KCPE performance. If anything, districts that have experienced the largest increases in enrolment are also seeing bigger improvements in their KCPE scores.

4.1 Funding and Resources

A necessary precondition for free primary education to have a positive impact is that central budgets are large enough to fund the influx of new students. Education spending in Kenya since the introduction of primary education has certainly been impressive. Table 2 shows public expenditure official public expenditure from 2000/01 to 2003/04, spanning the period before and after the implementation of FPE in 2003. As seen in the table, in absolute terms the primary education budget rose roughly nine-fold over this period, and increased roughly seven-fold as a share of public expenditure.

While these increases have been impressive, it is important to ascertain how these funds have been distributed among the general populace. Overall, we find that the introduction of free primary education has been an impressive pro-poor policy. Poorer districts have seen larger increases in enrolment compared with richer districts as students who could previously not afford schooling enter the education system. Poorer districts are also to some extent catching up in terms of achievement. However, increases in enrolment are associated with larger class sizes and concomitantly lower KCPE scores.

These findings are based on combining EMIS, KIHBS and KNEC data. Figure 4 plots increases in standard 8 enrolment against the district wide poverty head count. There is a clear positive relationship indicating that poorer districts have been catching up in terms of participation since the introduction of FPE. The relationship between changes in enrolment rates and the poverty

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head count is statistically significant at the 5% level: a district with one standard deviation higher poverty (16.8 percentage points) will on average have experienced an increase in enrolment that was greater by 4.8% percentage points.

Figure 5 shows that poorer districts have also caught up in terms of KCPE scores, but less so. While this increase is not significant, there is in any case no evidence that poorer districts are falling behind in terms of achievement despite influxes in student numbers.

[Figure 5 about here: Growth in KCPE Scores by Poverty Rate]

However, there is evidence that staffing levels have not quite kept up with the increases in enrolment. On average, pupil teacher ratios have increased from 30:1 in 2001 to 44:1 in 2008. Class sizes have increased more in poorer districts where enrolment has been high as can be seen in Figure 6, which plots changes in standard 8 enrolment against district level poverty rates. Moreover, higher class sizes for those taking KCPE exams are associated with lower performance as seen in Figure 7, although the effect is relatively small.

[Figure 6 about here: Growth in Class Size by Poverty Rate]

[Figure 7 about here: Growth in KCPE Scores by Growth in Class Size]

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Figure 3. Maps Before and After FPE. Note: Data is based on averages from 2000-02 and 2003-05; changes refer to the difference between these three-year averages.

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4.2 Composition of Students

Our results show that the composition of students entering education has indeed changed since the introduction of FPE. In particular, the age profile of students has been affected by the introduction of FPE with older students entering or returning to school. For example, the proportion of students who are at least one year older than the regular age in grade 8 has increased from 28% to 48% between 2002 and 2004 and there is at least anecdotal evidence from teachers that this leads to disciplinary problems.

We cannot say how the parental background of students has changed as previously not enrolled students enter the education system. However, Sandefur et al. (2009) find that the introduction of FPE has led wealthier parents to move their children into the private sector. Their study finds that the size of the private sector has tripled with a concomitant doubling of the price of private education. If these are the parents who previously gave a lot of external support to schools – which is certainly plausible given that their decision to move to the pricier private sector reveals a strong preference for their children's education – then the introduction of FPE may well have drained schools of parental support and supervision. Moreover this is of concern if parental support is an important input to educational achievement and we do indeed find evidence that this is the case. Based on a nationally representative sample of 200 schools that were included in the SACMEQ survey in 2000, we have created an index of parental support in a school prior to the introduction of FPE. We find that high levels of initial parental support prior to FPE are associated with persistently higher KCPE scores between 2001 and 2005 in the 200 sample schools. This is seen in Figure 8, where we graph the average KCPE score by initial level of parental support. Schools where parents were on average more involved and supportive prior to the introduction of FPE are achieving KCPE exam scores, which are 15 points higher on average.

[Figure 8 about here: parental support is an important input]

4.3 Accountability, Incentives and Monitoring

Following the introduction of FPE, there has been some concern that centralized funding and monitoring has undermined local accountability and ownership. Based on combining EMIS, KIHBS, SACMEQ and KNEC data, we find that high levels community fund-raising and local monitoring and incentive provision prior to the introduction of FPE are indeed associated with persistently better performance in KCPE exams.

Based on the SACMEQ sample of 200 schools surveyed in 2000, we have created indices of community fund-raising and monitoring. These include involvement in building and maintaining school facilities, and providing text books and stationery. As seen in Figure 9, we find a moderate relationship between initial levels of community fund raising and KCPE scores in the 200 sample schools. Communal fund-raising activities are associated with a 5 point increase in KCPE scores.

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These include activities such as organizing local harambees and providing bonus payments to teachers. We find a moderate relationship between levels of community fund-raising prior to FPE and KCPE scores in the 200 sample schools.

[Figure 9 about here: KCPE Scores by Community Fundraising]

More importantly, schools in communities that provided bonus payments to teachers prior to the introduction of FPE do persistently better than communities that did not engage in this activity. As can be seen from Figure 6, communities which provide some bonus payments to teachers who performed well have KCPE scores which are on average 17 points higher.

[Figure 10 about here: KCPE scores by Community Bonus Pay for Teacher]

Finally, in Figure 11, we explore the impact of communities being involved in extra-curricular activities based on the SACMEQ data. Schools situated in communities which are active in this regard achieve KCPE scores that are 30 points higher in 2001 and 2002. However, this difference has decreased markedly since the introduction of FPE.

[Figure 11 about here: KCPE scores by Community Extra-curricular involvement]

Of course, these findings could be driven by differences in poverty levels in the sense that richer districts can afford to be more active in fund-raising. We find no significant relationship between district poverty levels and the propensity to engage in fund-raising activities, however. Taken together, this suggests that the impact on test scores is not just driven by socio-economic variables, but that local accountability and incentive provision in themselves may increase academic achievement.

Given the potential crowding-out of bottom-up monitoring in the wake of FPE, centralized, top-down monitoring and supervision by the Ministry of Education and its subsidiaries becomes more important. Combining the EMIS and KNEC database, we find evidence that school inspections are effective in improving educational quality. First, the likelihood of an inspection is sensitive to the performance of the school. As shown in Figure 12, districts with below average test scores have almost 10% more inspections than districts with above average test scores. Second, following an inspection, schools tend to improve. Districts with a high percentage of inspections see their test scores increase by an average of 3 points compared with districts with a low percentage of inspections.

[Figure 12 about here: Percentage of schools inspected by past KCPE scores.]

5. Conclusion and Looking Ahead

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FPE has been an impressive pro-poor policy. There have been immediate gains in enrolment especially in poorer districts. But challenges remain: high pupil teacher ratios have only begun to be addressed. However, while there is some association between class sizes and exam performance, the correlations are not strong enough to explain all of the variation in test scores. The effective use of inputs to achieve educational gains seems to require something else. The evidence presented in this report suggests that systems of accountability and monitoring – both internal and external – and the interaction and cooperation between schools, parents and communities are the core drivers of educational achievement.

As this volume is entitled Policies for Prosperity, this of course begs the question, which policies the government of Kenya can use to address these issues. It is of course difficult to 'engineer' community involvement and support. However, evidence by the authors suggests that the drop in communal and parental support may be largely due to a change in the composition of students in the private sector rather than those parents who have always remained in the private sector changing their behaviour in the wake of FPE. From this we can deduce a clear policy prescription: the government of Kenya should aim to make the public sector as attractive as the private sector to entice back those parents who have abandoned public primary schools. In order to do this of course the questions of high pupil teacher ratios and lack of monitoring and teacher discipline need to be addressed. Currently, two government initiatives are planned that may have some success in doing so. According to newspaper reports, the government of Kenya is planning to hire an additional 16000 relief teachers to address the high pupil teacher ratios (Standard, March 2009). It is also planning to move to a system of performance contracts, in which teacher promotions are at least in some part dependent on past performance. Moreover, there is a feeling within the Ministry of Education (Minutes meeting 20th of March 2009), that school management committees were not sufficiently integrated into the process of making primary education freely available and that central administration needs to devolve more responsibilities to them. These are all steps in the right direction, which should directly improve the quality of education for those currently in the public sector as well as bringing back some of those who are currently in the private sector. These two effects may well reinforce each other in bringing about improvements. In any case, the lessons learned from introducing free primary education may well prove useful as the government moves to do the same for secondary education.

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6. Appendix: Figures and Tables

Figure 1: Enrolment increased in all 8 provinces.

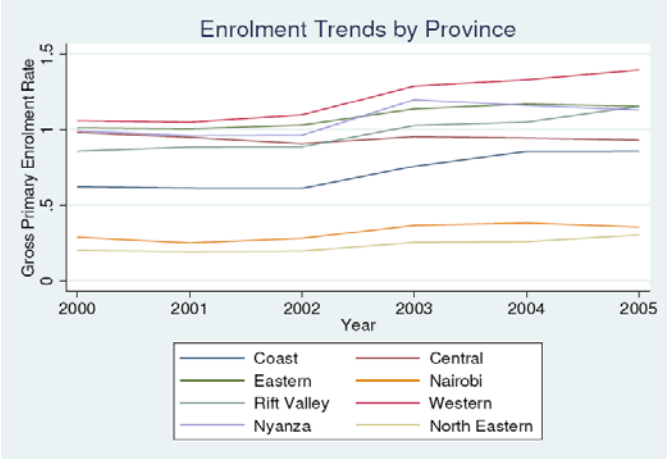

Figure 2: KCPE scores have remained relatively stable – perhaps due to normalization.

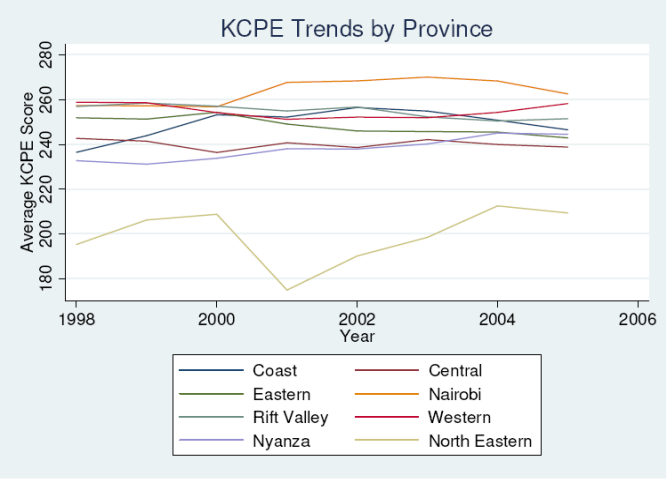

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Figure 4: FPE is a pro-poor policy.

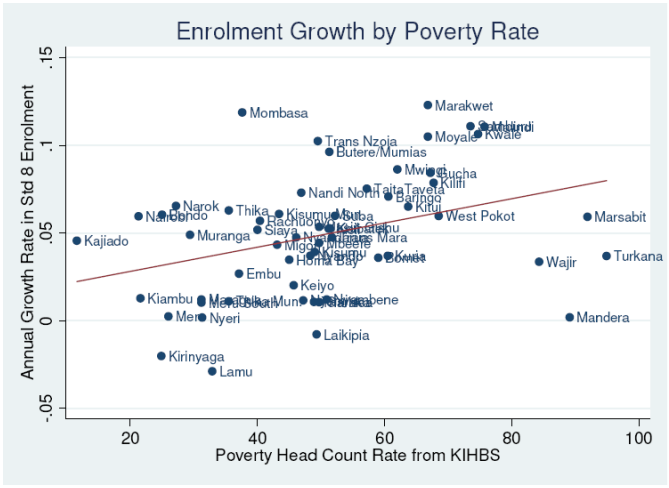

Figure 5: KCPE scores increase faster in poorer districts.

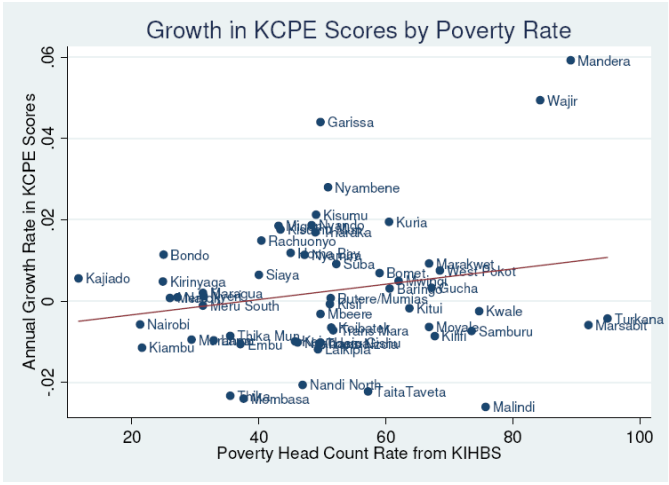

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Figure 6: Class sizes grow faster in poorer areas.

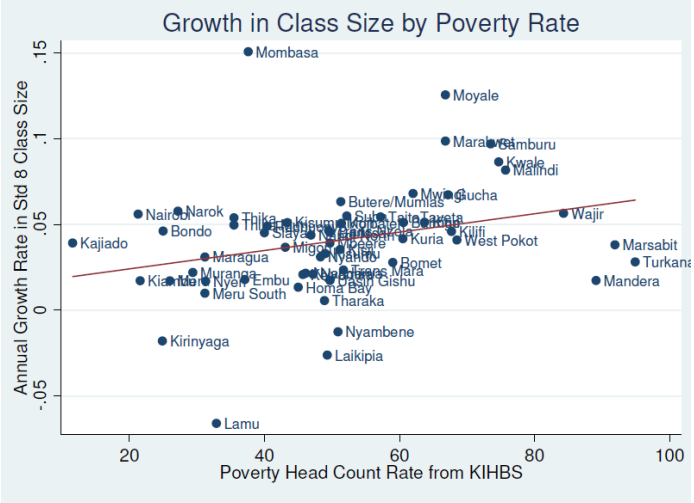

Figure 7: Higher class sizes are associated with lower growth in KCPE scores.

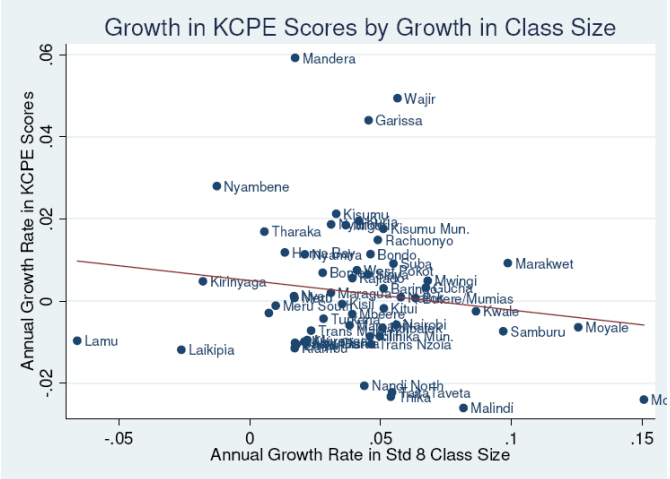

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Figure 8: Parental support is an important input.

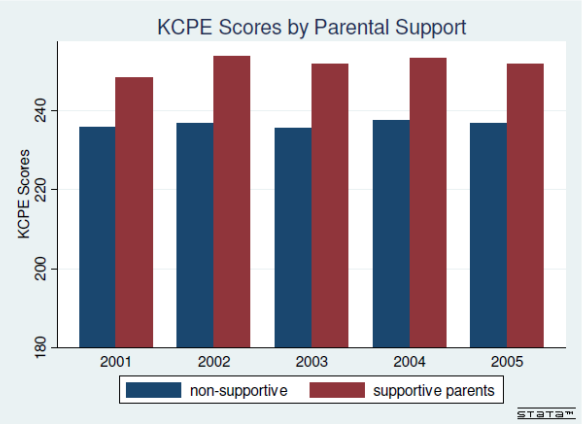

Figure 9: Community fund-raising is associated with higher KCPE scores.

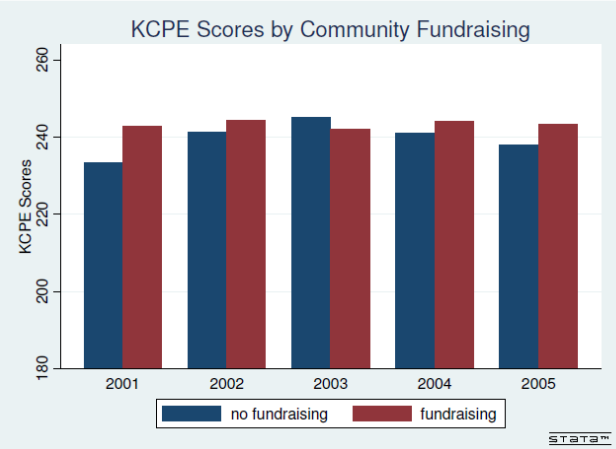

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Figure 10: Teacher bonus pay is associated with higher KCPE scores.

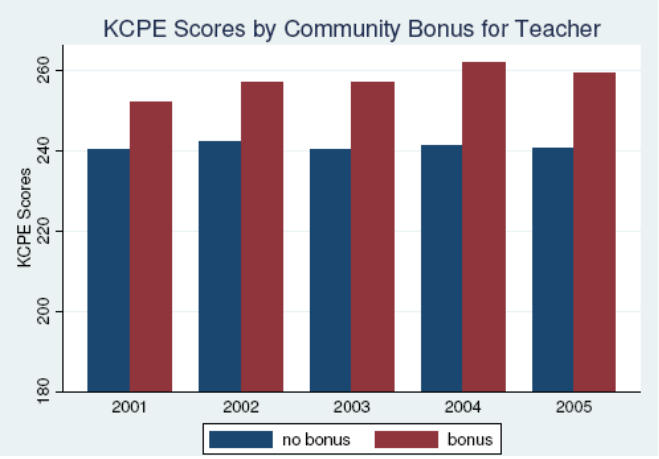

Figure 11: Extra curricular activities are associated with higher KCPE scores.

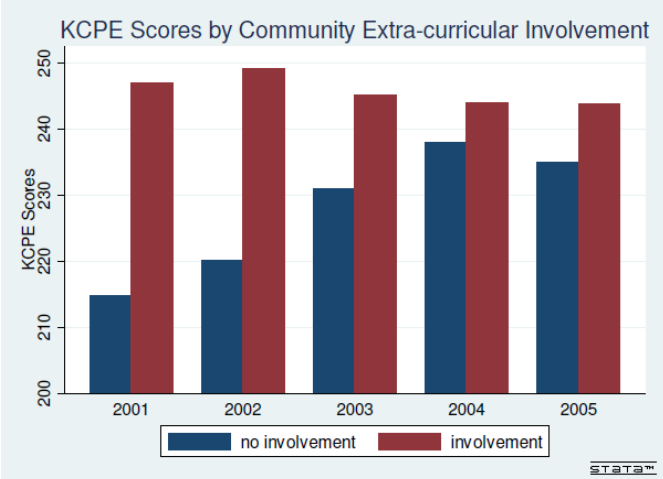

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Figure 12: Inspections are responsive to past KCPE scores.

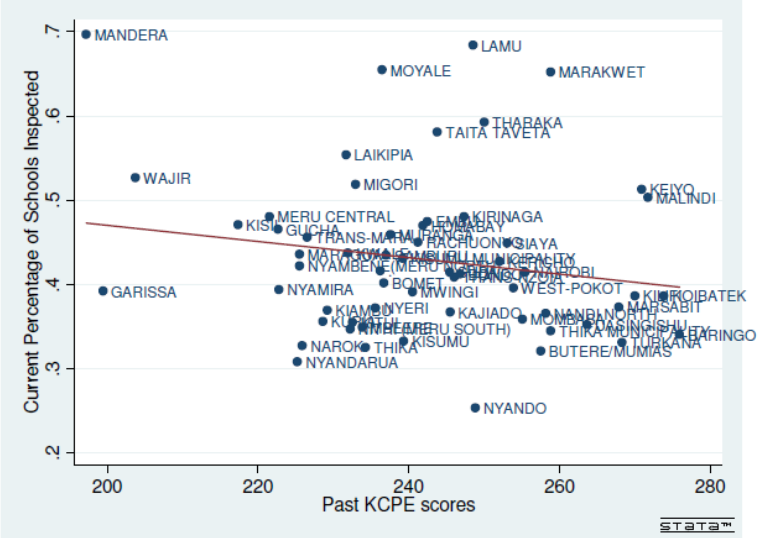

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Table 1:

Table 1. Public Spending and Aid for Primary Education

(Millions of Kenyan Shillings)

	2000/01	2001/02	2002/03	2003/04
Primary Education				
Actual Expenditure	941	933	3,423	8,661
Aid Receipts	207	319	231	1,262
Total Ministry of Education				
Actual Expenditure	48,499	53,992	63,715	74,066
Aid Receipts	288	559	272	1,529
Total National Budget				
Actual Expenditure	181,667	186,845	203,635	229,392
Aid Receipts	34,116	35,072	32,658	33,244

Source: Republic of Kenya, *Report of the Controller and Auditor-General*. Figures in the table represent the sum of the recurrent expenditure and development accounts, i.e., the sum of Votes D31 and R31 for the Ministry of Education, and within these, the sum of Votes D311 and R311 related to primary education.

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