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Impact of Unit Cost on Academic Performance of Public Secondary Education in Kenya: A Case Study of Siaya District from 1997 to 2007

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ABSTRACT
The unit cost of secondary education has continued to increase steadily and especially the direct and indirect cost while outcomes are repeatedly unsatisfactory. The consequence of this would be that students in Siaya district lose hope and parents who have clearest interest in a high level of their children's performance become disoriented with secondary schooling. *The study focused on relationship between unit cost and academic performance at secondary level.* The descriptive and causal comparative designs were used in this study. The study sample comprised 85 head teachers', 765 teachers', 3349 students and one DEO. Questionnaires' and interview guides were used. Pearson's correlation between unit cost in day secondary schools and performance index using raw scores reveal a coefficient of relationship of 0.372 while the constant variation shows a correlation of 0.372. In boarding secondary schools, Pearson's correlation between unit cost and performance index using raw score and constant variation shows a correlation of 0.412. The correlation in most cases is low with an implication of very low relationship between unit cost and performance index. The implication of such a relationship is that a rise in unit cost does not necessary mean an increase in performance index and putting more resources as a mean of improving performance should be treated with caution.
Key Terms: Unit Cost, Academic Performance Index, Impact

1.0 Introduction

The human capital stock comprises cognitive and non-cognitive skills and is mainly produced in formal and non-formal educational system (UNDP, 2006). In the formal education system, secondary education is strategically placed in such a way that it connects primary education, tertiary education and the labour market. It plays a key role as a transition level of education that links basic education with skills and professional development without which one cannot achieve them (World Bank, 2005).

The question confronting educators in every society is how to provide quality secondary education when unit cost has continued to rise and resources are scarce. In recent years, stakeholders in education in both industrialized and developing countries increasingly demand effective secondary schooling for their disadvantaged youth (Watkins, Watt & Buston, 2001). Yet providing quality and effective secondary education at lower unit cost is an overwhelming challenge to most governments, particularly those in developing countries (Atcharena &Hite, 2001). Students in many developing countries frequently go through their secondary education system without actually learning valuable basic skills that are crucial for their future survival (Cohen, Raudenbush & Ball, 2003).

Are unit costs vital in contributing to the school performance? Insufficient financial resources are often cited as a root cause for the poor quality of education (CIDA, 2002). Most stakeholders in education readily believe that adding more money to schools will improve the quality of education and thereby, schools' performance. However, production function studies in both industrialized and developing countries have produced findings that are inconsistent and mixed. Hanushek (1999) reported that in 12 studies on per pupil expenditure in developing countries, half were statistically significant, and the other half were found to be statistically insignificant. Whether secondary schools with greater access to more financial resources outperform others is still an issue demanding exploration in developing countries.

Poor parents often find it difficult to make a projection of the payoff of their children's education and cannot capture all the benefits of schooling, since these accrue across a child's lifetime and are difficult to access in the immediate or short term (Herz and Sperling, 2005). According to Ngware *et al*. (2006b), since the late 1980s household's investment to secondary education has risen considerably. Given that household contribution to physical facilities and instructional materials was meant to be optional, a growing proportion of households are making contributions below what is needed or are opting out of secondary education for their children - if they cannot afford the needed levies. In Siaya District, parents were responsible for meeting up to Ksh.9,914 of charges per annum. In addition, 'development fund', 'caution money' and 'lunch fees' were charged to parents

increasing the unit cost annually. Although the unit cost has been high, the performance has been fluctuating and below average in most of the subjects and especially in languages, science and mathematics. By implication, few students are being admitted in competitive courses such as medicine, engineering and architecture. Parents are questioning how the system currently delivers secondary education. The objective of this study among others sought to answer this questions: Are changes in unit cost consistent with changes in performance index and what is the nature of their relationship?

Methodology

This study adopted descriptive (survey) and causal-comparative (ex-post facto) designs. Descriptive (survey) research describe systematically the facts and characteristics of a given population or area of interest, factually and accurately. Causal comparative research design is "ex-post facto" in nature, which means the data is collected after all the events of interest have occurred. The study was carried out in Siaya district, Nyanza province in Kenya. The district lies between latitude 0^0 26' to 0^0 18' North and Latitude 33^0 58' east and 34^0 33' West (Republic of Kenya, 2003e). The population of the study comprised 85 headteachers', 749 teachers', 3210 form 4 students' and one DEO. In this study, stratified, systematic and purposive sampling methods were used. Data pertinent to the study were collected using questionnaire and interview schedules.

Research Findings & Discussion

Table 1 and Figure.1 shows unit cost derived from remuneration of teachers per annum, bursary and grants per student per annum giving overall unit government expenditure per student in Siaya district.

Table 1: Unit Government Expenditure per Student (in Ksh.)

Year	Teacher salary per student	Bursary per student	Grants per student	Unit government expenditure
2007	13,628	1,106	98	14,822
2006	13,183	996	167	14,346
2005	13,460	979	172	14,511
2004	12,494	655	96	13,149
2003	11,314	280	159	11,753
2002	11,029	265	-	11,294
2001	7,829	260	-	8,089
2000	6,459	246	-	6,704
1999	5,420	247	-	5,667
1998	4,900	232	-	5,132
1997	4,328	230	-	4,568

Authors' Derivation

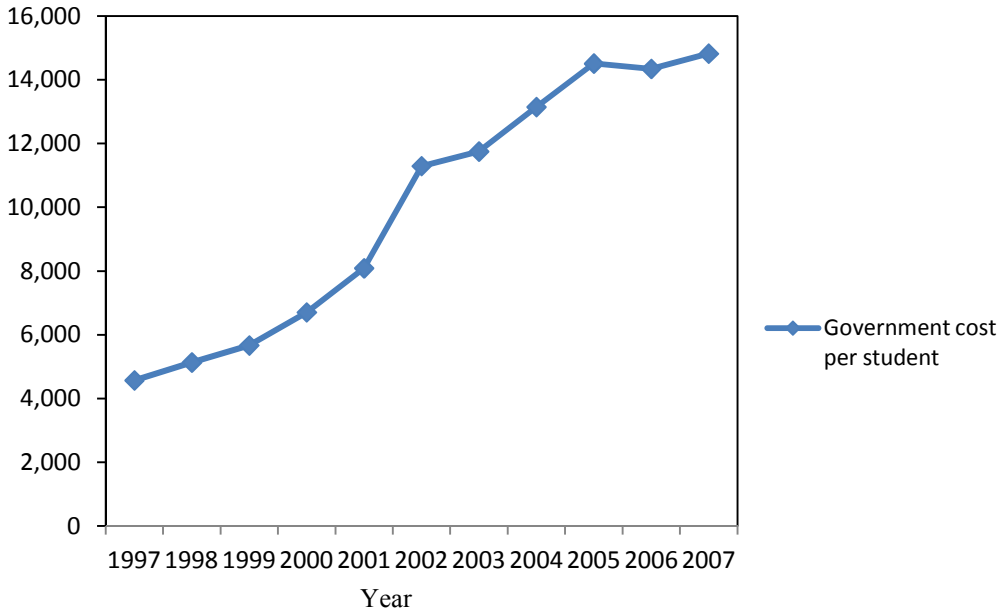

Figure 1: Line Graph of Government Contribution to Cost per Student

Table 2: Actual Fees Paid.

Items	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Board	8200	8500	8900	9000	9200	9500	10500	11600	12500	13400	14500
Tuition	2700	2700	2700	2700	3000	3000	3600	3600	3600	3650	3650
P.E	2400	2400	2700	2700	3000	3200	3300	3500	3600	4000	4565
R.M.I	500	500	500	500	500	500	500	500	500	800	800
Activity	500	500	500	500	800	800	800	800	800	900	900
Medical	200	200	200	200	200	200	200	200	400	400	400
L.T&T	600	600	600	675	675	675	800	800	1000	1000	1000
E.W.C	600	600	600	600	600	600	600	800	800	800	800
Conti.	400	450	450	450	450	500	600	600	600	900	900
PTA	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Dev.	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000
Lunch	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Caution*	500	500	500	500	500	500	500	500	500	500	500
Mock*	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Smasse	-	-	-	-	-	-	200	200	200	200	200
KNEC*	3700	3700	3700	3700	3700	3700	3700	3700	3700	3700	3700

Source: Authors' Derivation

*caution money – only form one and new students

*mock – only form 4 students

*KNEC – only form 4 students

Table 2 shows the actual fees paid by parents in Siaya District from 1997 to 2007. Table 3 shows average unit cost in day and boarding secondary schools. It shows that day secondary schools were cheaper than boarding secondary schools.

Table 3: Unit Cost in Day and Boarding Secondary Schools (in Ksh.)

Year	Household –cost per student in day	Household- cost per student in boarding	Government-Cost per student	Unit cost in day	Unit cost in boarding
2007	14,116	42,437	14,822	28,938	57,259
2006	13,600	40,296	14,346	27,946	54,642
2005	12,643	38,411	14,511	27,154	52,922
2004	12,486	35,649	13,149	25,635	48,798
2003	12,238	32,753	11,753	23,991	44,506
2002	11,486	30,269	11,294	22,770	41,563
2001	11,225	26,414	8,089	19,314	34,503
2000	10,240	24,029	6,704	16,944	30,733
1999	10,353	22,827	5,667	15,921	28,494
1998	10,100	21,582	5,132	15,032	26,714
1997	9,790	20,668	4,568	14,358	25,236

Authors' Derivation

Figure 2 shows both unit cost of day and boarding secondary schools. The elasticity of day secondary school curve was 1536 units while boarding secondary schools was 2177 units. The implication was that boarding cost was rising faster than day secondary schools.

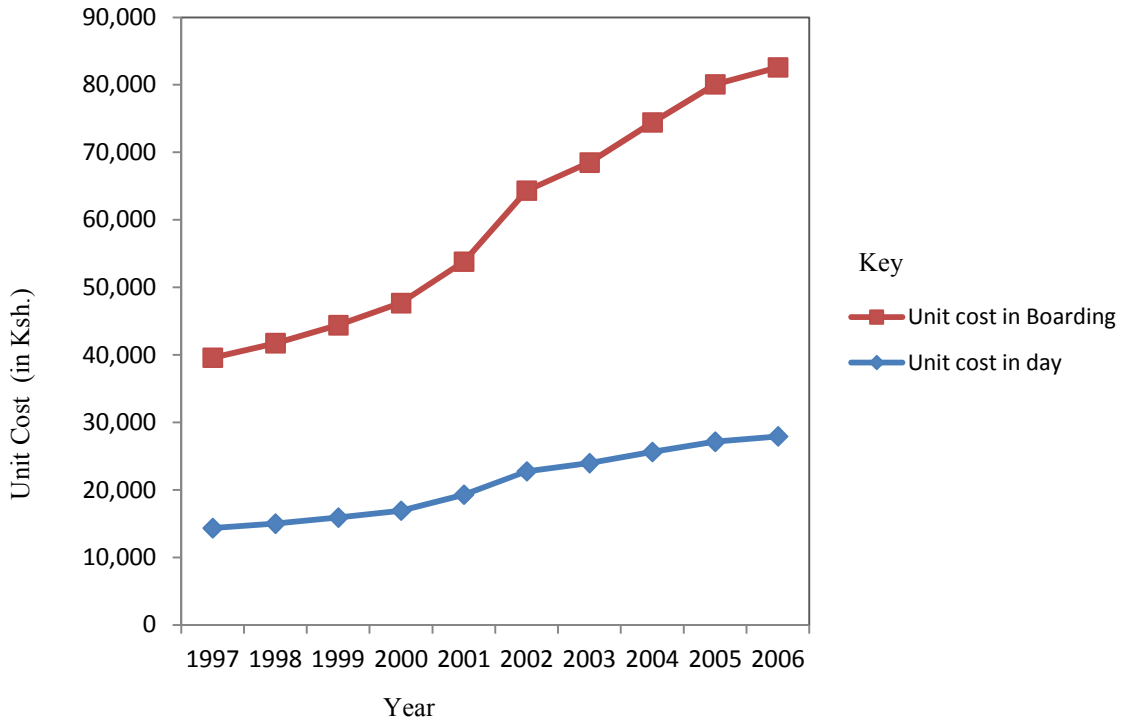

Figure 2: Unit Cost of Day and Boarding Secondary Schools

The trend of academic performance in the district can inform the education stakeholders whether resources being injected in secondary education are yielding much needed results. Table 4 show the mean performance index from 1997 to 2007 in Siaya District.

Table 4: Mean performance index

Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
P.index	5.57	5.58	4.68	5.50	5.46	4.20	5.19	5.87	5.95	5.96	5.92

Table 4 shows that the mean performance index dropped in 1999 to 4.680 from 5.58 in 1998. The performance dropped to 4.20 in 2002 an all time low from 5.460 in 2001. However, it improved in preceding years to an all time high index of 5.96 in 2006.

Deviation analysis

Table 5 shows the deviation analysis of unit cost and performance index in current and constant growth (index) over the time series period 1997/98 to 2006/07.

Table 5: Absolute and Constant Analysis of Unit Cost (in Ksh.) and Performance Index

year	Absolute analysis unit cost (day)	Absolute analysis unit cost (board)	Constant analysis unit cost (day)	Constant analysis unit cost (board)	Absolute analysis performance index	Constant analysis performance index
2007	992	2617	14580	32023	-0.5	0.346
2006	792	1720	13588	29406	+0.0137	0.394
2005	1519	4124	12796	27686	+0.0829	0.371
2004	1644	4292	11277	23562	+0.6801	0.298
2003	1221	2943	9633	19270	+1.0925	0.374
2002	3456	7060	8412	16327	-1.2612	-1.374
2001	2370	3770	4956	9267	-0.381	-0.114
2000	1023	2239	2586	5497	+0.8185	-0.076
1999	889	1780	1563	3258	-0.9009	-0.894
1998	674	1478	674	1478	0.007	0.007
1997	0	0	0	0	0	0

Authors' Derivation

The absolute deviation analysis in Table 6 shows that the unit cost in day secondary schools rose from 674 units

in 1997 to 3456 in 2002 then dropped to 1,221 units in 2003 and dropped further to 992 units in 2007. In boarding secondary schools, the unit costs rose from 1478 in 1997 to 7,060 in 2002 before fluctuating between 2003 and 2007where unit cost fell to 1,720 in 2006 and rose to 2,617 in 2007. The implication of fluctuation (Fig. 3) is that unit cost can rise and fall depending on the prevailing market situation dictated by inflationary rates and therefore parents are faced with unpredictable fee regime dictated by the institutions and prevailing circumstances.

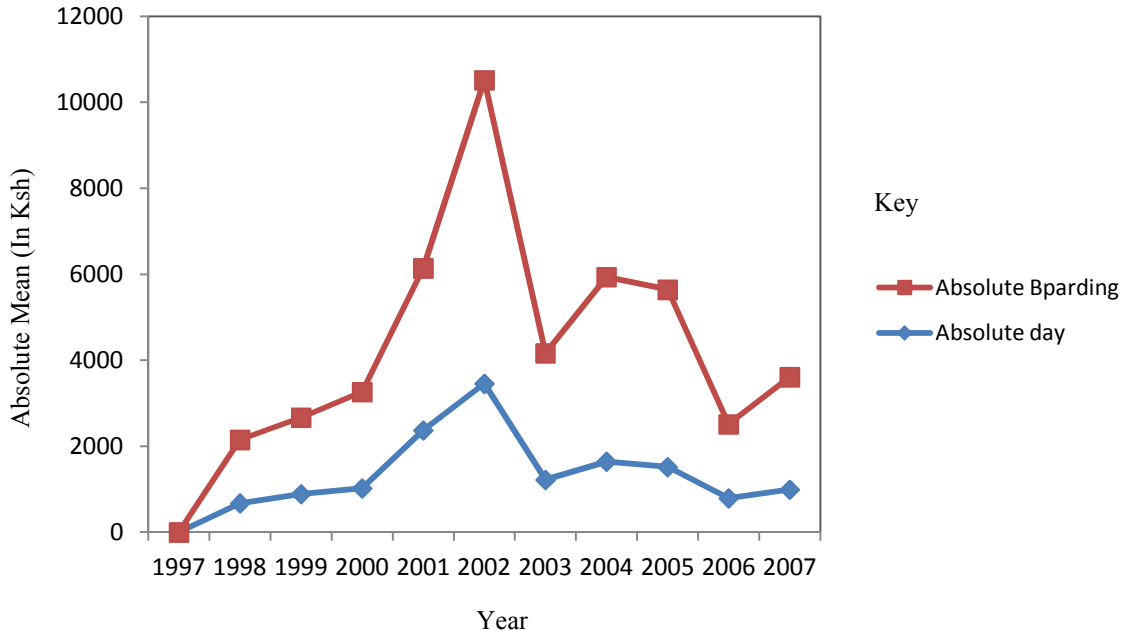

FIG. 3: Absolute Analysis Graph

Under absolute deviation analysis, the performance was fluctuating from 1997 to 2002 with extreme cases of negative deviation reaching -1.26 in 2002 (see Figure 4). If we look at the growth in absolute terms, unit cost has been experiencing above average increase while performance index has been experiencing below average improvement. The implication of Figure 3 and 4 was that parents are faced with unpredictable fee regime and unsatisfactory academic performance therefore there is need for performance index and unit cost to be steadied. To the administrator of the school system allocations to education are seen less as absolute amounts but assessed more from the angle of quantity of inputs that such allocations can purchase. The purchasing power of allocations is therefore, considered more important from a management point of view than the absolute amount allocated and therefore as the purchasing of the school system diminish, they are forced to increase fees levied to parents but when savings are accrued, and then the fees are reduced in line with the government policy of the day.

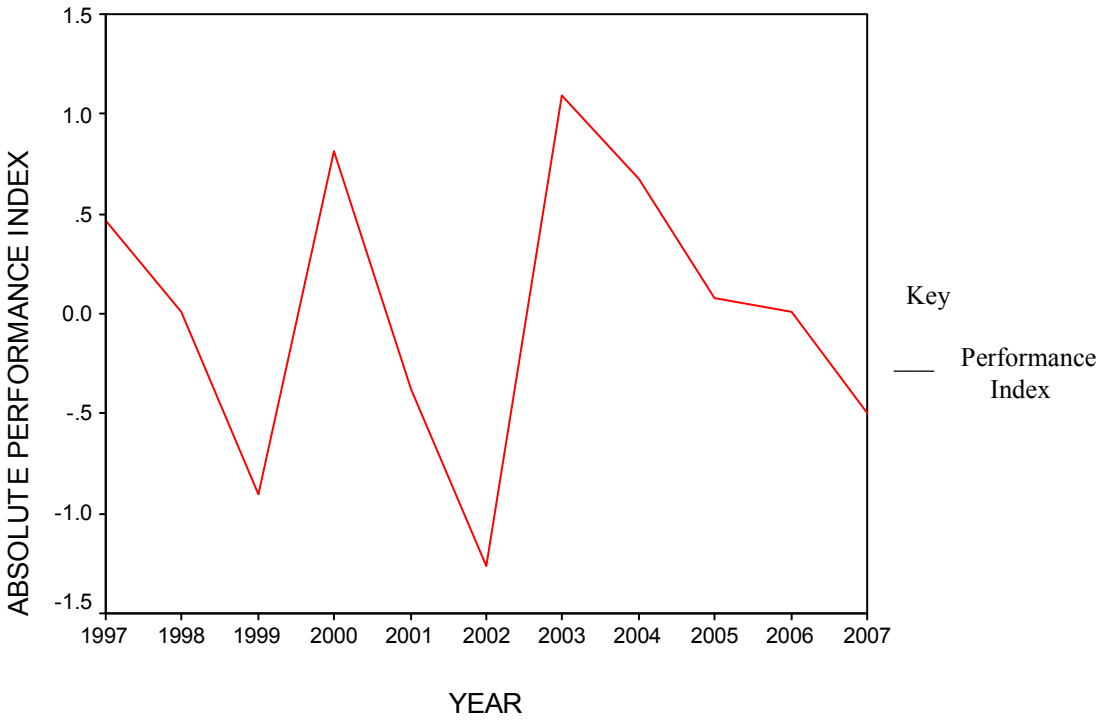

Figure 4: Absolute Deviation Analysis for Performance index

Constant Deviation Analysis

For the constant deviation analysis, the base year was 1997. The performance index reveal a negative and fluctuating trend from 1997 to 2007. However, between 2003 to 2007, it tended to flatten out as shown in Figure 5.The implication of such a curve is that students and parents are faced with unpredictable performance trend. In terms of constant analysis, the unit cost in day secondary show an upward trend from 674 units in 1998 to a maximum of 14,580 units in 2007. In boarding secondary schools the unit cost rose from 1,478 in 1998 to 32,023 in 2007 as shown in Figure 6. The implication of such trends is that parents should be prepared to pay high fees according to agents demand and although, measures are being adopted to control unit cost faced by parents, still some loopholes exist to charge extra levies on parents increasing the cost of education.

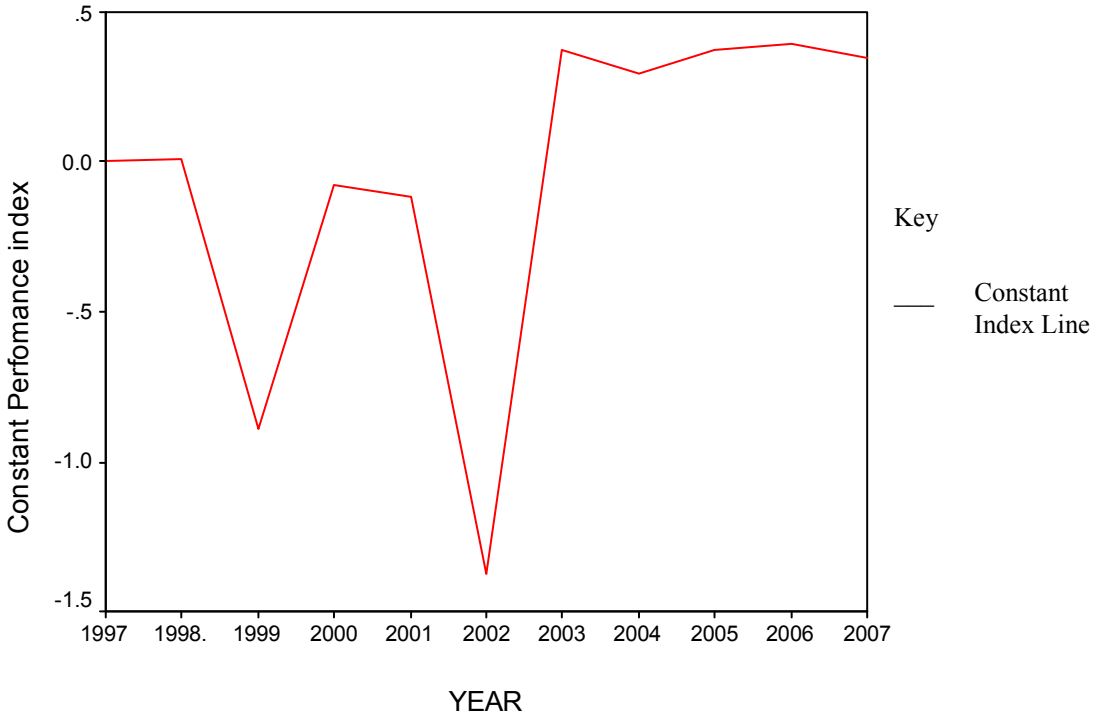

Figure 5: Constant Analysis for Performance index

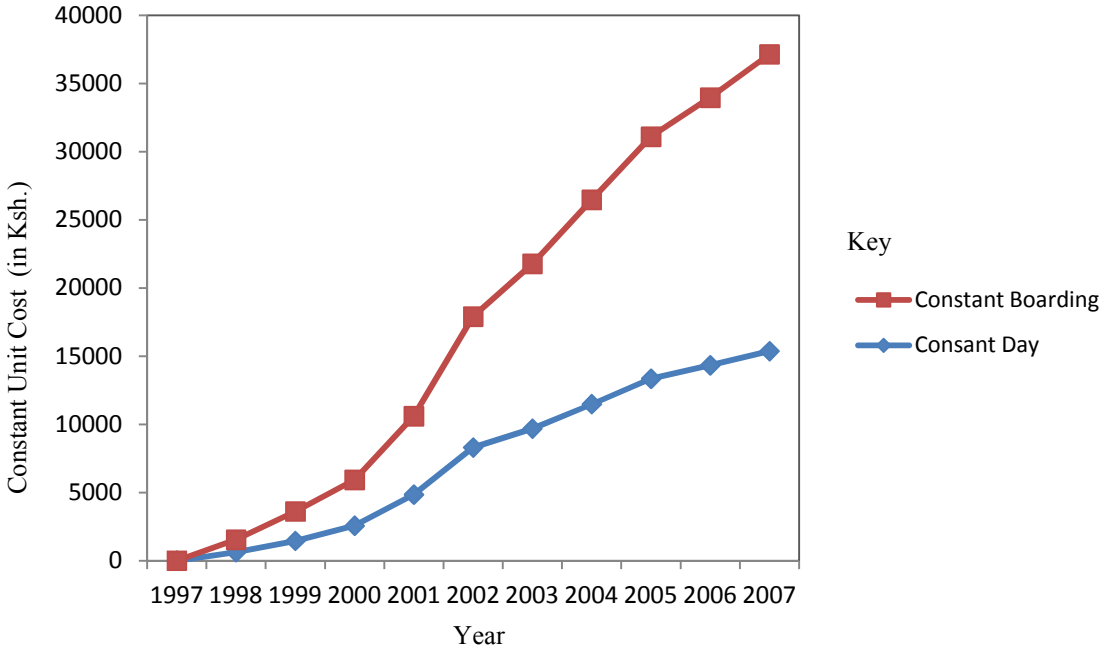

Figure 6: Constant Unit Cost Analysis

Nature and Impact of Relationship Between Unit Cost and Performance Index

This section makes a comparison between unit cost and performance index between 1997 and 2007. The absolute deviation analysis shows that both unit cost and performance index have been fluctuating as shown in the Figures 3 and 4. Closer scrutiny reveals that although the deviation has been fluctuating, unit cost has enjoyed more positive deviation than performance. In absolute terms, the unit cost in day secondary schools grew 5.6 times between 1997 and 2002. In the period between 2003 and 2007, the growth experienced a decline averaging 1.3 times the 2003 units due to government regulations. In boarding secondary schools the unit cost grew 4.2 times between 1997 and 2002. It experienced fluctuations and decline between 2003 and 2007 averaging 1.1 times. On the whole the growth averaged 2.65 times in boarding schools. The government

contribution to unit cost grew by 5.6 units between 1997 and 2002. It also experienced fluctuations between 2003 and 2007 averaging 3 times that of the 2003 units. However under constant analysis, the household contribution to unit cost grew by 26 times in 2007compared to the 1997 figure for both day and boarding secondary schools. The constant analysis of government contribution to unit cost grew by 15 times in the period 1997 to 2007. The constant analysis of performance indicated fluctuations and therefore growth over time could not be measured appropriately.

The administrators of the school system view unit costs differently. Unit cost of education are usually seen as absolute amounts but assessed more from the angle of the quantity of inputs that the unit cost can purchase. The purchasing power of the unit cost is therefore, considered more important from a management point of view than the absolute amounts allocated.

Pearson's correlation between unit cost in day secondary schools and performance index using raw scores reveal a coefficient of relationship of 0.372 while the constant variation shows a correlation of 0.372. In boarding secondary schools, Pearson's correlation between unit cost and performance index using raw score and constant variation shows a correlation of 0.412. The correlation in most cases is low with an implication of very low relationship between unit cost and performance index.

Conclusions

The contribution of parents to funding secondary education outweigh the contribution of the government. Parent's contribution has experience steady increase between 1997 to 2007. However academic performance has been fluctuating over the same time period. It was concluded that a rise in unit cost does not necessary mean an increase in performance index and therefore putting more resources as a means of improving performance should be treated with caution. To the school administrator, the purchasing power is more important than the absolute or constant performance index hitherto demanded by society.

Recommendation

The government should strengthen the audit arm of the Ministry of Education so that it can monitor the efficiency of utilization of financial resources at the disposal of secondary schools. There should be some efforts made towards sharing resources between district secondary schools and provincial secondary schools through structured agreement. For instance, many schools can gain access to resources of tacit knowledge and skills of specialized teachers (i.e markers, examiners, and science teachers) as those resources are contracted out by schools previously advantaged by exclusive access to these resources.

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