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The Optimal School Size for Achieving Economies of Scale in Public Secondary Schools in Kenya

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Abstract

This study examined the optimal school size for achieving economies of scale in public secondary schools in Bungoma County, Kenya. Despite government funding through free day secondary education and increased enrolment, many schools experience financial constraints, including delayed payments to suppliers, teachers, and Board of Management-employed non-teaching staff, as well as challenges in maintaining facilities. The study targeted 376 public secondary school principals and the County Director of Education, from whom 194 principals and the County Director were sampled. An embedded mixed-methods design was adopted. Qualitative data were obtained through interviews with 20 principals and the County Director, while quantitative data were analysed using descriptive and inferential statistics and qualitative data through thematic analysis. The study achieved a response rate of 93.3 per cent, representing 181 principals and the County Director. The optimal enrolment sizes were established at 1,600 students for extra-county schools, 864 for county boarding schools, 841 for county day/boarding schools, and 716 for sub-county schools. These sizes corresponded to unit costs of Ksh. 56,472.80, Ksh. 49,877.939, Ksh. 27,519.039, and Ksh. 21,797.611, respectively. Operating at optimal enrolment would yield per-student savings of Ksh. 4,057.688, Ksh. 4,348.397, Ksh. 1,426.423, and Ksh. 3,934.055, respectively. Qualitative findings indicated that optimal school size varies by school category. Schools should therefore maintain enrolment levels that minimise unit costs without causing congestion or compromising educational quality.

Keywords: Economies of scale, optimal size, public secondary schools, school category, unit cost.

1.0 INTRODUCTION

The school's enrolment is important as it influences the allocation of resources, utilisation of facilities, deployment of teachers, and delivery of educational services. Odebero (2019) defined the optimal size of a school as the scale at which a school operates most efficiently, where the unit cost of education aligns with the marginal cost, resulting in maximum cost effectiveness. Giwa and Sheu (2023) found strong economies of scale in both primary and secondary schools. Their study showed that as student numbers increased, total cost and cost per student decreased sharply, though this trend plateaued at higher enrollment levels. Chakraborty et al. (2000) similarly observed that economies of scale arise when an increase in output leads to a decline in average cost per unit. In Kenya, Masifwa (2018) found that there is a significant relationship between school size and Total Expenditure per student. Moreover, Mbunde (2018) indicated that an increase in a school's enrolment translates to economies of scale due to the optimum use of teachers and school facilities. However, he warns that the expansion and increase in enrolment should be up to an optimal size since beyond the optimal size the school's savings start declining. Kirui et al. (2022) indicated that public secondary schools in Kenya are expected to run at a cost that is cheap and sustainable. However, he indicates that the cost of education was high in the majority of public secondary schools in Bomet County.

Therefore, the unit cost is expected to decrease as the student enrolment in a school increases. However, the relationship between school size and efficiency is not always straightforward. Hence, the benefits associated with expansion may vary depending on the capacity of schools to effectively manage their growing enrolment and resources. Schütz (2007) indicated that there is no specific number of students that can be accepted as the optimal school size worldwide. This is because increased enrolment beyond optimal levels led to stagnation in cost savings and later increased unit costs. This was evident in schools that were congested. Humlum and Smith (2015) argue that school size is highly context-dependent, shaped by student characteristics, neighbourhood dynamics, and the governance structure of school boards. It is against this background that this study uses the case of Bungoma County, Kenya, with a view to understanding how variations in student enrolment affect the efficient utilisation of educational resources.

The government of Kenya introduced policies in education to increase access and equity. These policies include the Free Day Secondary Education (FDSE) in 2008 and the 100 per cent transition policy in 2018. These policies led to an increase in enrolment in secondary schools in Kenya. The Kenya National Bureau of Statistics, KNBS (2024), shows that student enrolment increased from 2,942,700 in 2018 to 4,108,113 in 2023. In particular, Bungoma County experienced the highest enrolment in secondary schools in Kenya. The enrolment increased from 153,688 students in 2019 to 203,195 students in 2023 (KNBS, 2024). This led to variation in student population in schools across the county. Some schools had a large student population while others had very few students. Schools with very many students experienced constraints on school resources. This challenges the assumption that big is always better.

The classrooms and dormitories with very many students were congested because of over-enrolment. Most of the schools were facing financial challenges due to over/under enrolment. Reports indicate that most schools delayed in payment to suppliers, teachers and non-teaching staff employed by the Board of Management (BoM) teachers and support staff. Schools also experienced challenges in maintaining facilities and infrastructure. This raises a key question: is running schools at this scale making them more

efficient, or is it actually leading them into diseconomies of scale? Therefore, this study sought to determine the optimal enrolment of public secondary schools in Bungoma County. At optimal enrolment, they may reduce the unit cost and experience cost savings, which can be used to pay some of the pending bills. The relationship between an increase in the number of students, financial challenges, and school effectiveness has not yet been fully studied, especially at the county level. This is why this study is relevant and timely.

The study was guided by the following research question: What is the optimal school size for achieving maximum economies of scale in secondary schools in Bungoma County? The null hypothesis was: There is no statistically significant relationship between student enrolment and economies of scale in public secondary schools in Bungoma County. This study contributes to the literature by establishing the optimal enrolment for various categories of schools in the county. That is, extra-county, county boarding, county day/boarding and sub-county schools. The study will guide the Ministry of Education and other stakeholders on the placement criteria.

2.0 LITERATURE REVIEW

Studies related to optimal size for achieving economies of scale were reviewed. Schiltz and De Witt (2017) found that merging school districts up to an enrolment of 6500 students led to cost savings. Foreman-Peck and Foreman-Peck (2006) found that a student population of 560 students led to cost-efficiency. Gronberg et al. (2004) found significant cost savings when small districts increased to 1600. They also indicated that an increase in enrolment by 100 per cent led to a 28.3 per cent decrease in per-pupil costs. They concluded that optimal district size was established at an enrolment of 25,000. Similarly, Tirivayi et al. (2014) established the optimal enrolment of 24,954 students in public universities. Tangtipongkul (2016) found that 3200 to 3600 is the optimal size for public vocational schools. The study also indicated that vocational schools with more than 3600 students experienced high unit costs.

In Kenya, studies have been done to determine the optimal size of schools that leads to reduced unit cost. Ndiritu (2012) identified 400 students as the optimal school size and a unit cost of Ksh.29,787.19 per year. Kemboi (2008) identified 174 as the optimal size of a school in Tirap Division. And Kirop (2009) found an optimal size of 320 students and a unit cost of Ksh. 17,503.30 for schools operating at optimal size.

Although insightful, Tirivayi et al. (2014) pertains to universities, while Tangtipongkul (2016) focused on vocational schools whose cost structures, staffing, and program offerings differ significantly from those of secondary schools. Thus, their findings may not be directly useful or even transferable to the Kenyan secondary school environment. Foreman-Peck and Foreman-Peck (2006) carried out their study in a developed country, which may not directly translate to African or other developing countries, due to varying demographic, economic, and policy environments. Gronberg et al. (2004) and Schiltz and De Witt (2017) focused on school districts, which involve combined enrolment of many schools in a district, while this study focused on enrolment in individual secondary schools in Bungoma County. Previous studies done in Kenya by Ndiritu (2012), Kemboi (2008) and Kiprop (2009) reported a single optimal school size, whereas the present study examines optimal enrolment across different categories of public secondary schools in Bungoma County.

3.0 METHODOLOGY

An embedded mixed-methods research design was used in this study. Qualitative data provided a supportive, secondary role in a study based primarily on quantitative data. Quantitative analysis was used to establish data on enrolment and expenditure in schools, while qualitative data was used to establish how school managers experienced and responded to financial challenges in relation to enrolment. The quantitative and qualitative data enabled the study to explain and justify the school processes involving the observed cost patterns.

The research was undertaken among public secondary schools in Bungoma County, Kenya. The target population comprised 376 principals of public secondary schools. Using Yamane's (1967, p. 886) formula, the study established a sample of 194 principals. The formula utilised to determine the sample size is presented below:

$n = \frac{N}{1+NX(e)^2}$, where,

n- Sample Size

N-Population Size

e- Acceptance sampling error at 95 per cent confidence level

$$\text{Number of principals} = \frac{376}{1+376(0.05)^2} = 194$$

Stratified sampling was used to select school principals in each sub-county. This ensured an equal and unbiased chance of selection. In addition to sub-county stratification, the study also considered categories of schools which were treated as important sub-groups within the population. The categories that existed within a sub-county were proportionally represented in the sample. The number of participants selected from each stratum was calculated using stratified sampling formula indicated in Cochran and Cochran (1977), as shown below.

$$\text{Sub group sample size for each stratum} = \left(\frac{Nh}{N}\right) \times n,$$

Where, Nh-Population size of the stratum

N-Total population size

n-Total target sample size

Table 1: Stratification of Public Secondary Schools in Bungoma County

Sub-County	No. of Public secondary Schools	Sample Size	Percentage (%)
Bungoma South	62	32	51.6
Bungoma West	31	16	51.6
Bumula	29	15	51.7
Kimaeti	20	10	50.0
Bungoma Central	44	22	50.0
Bungoma East	27	14	51.9
Tongaren	24	12	50.0
Bungoma North	29	15	51.7
Kopsiro	11	6	54.5
Cheptais	13	7	53.8
Mt. Elgon	19	10	52.6
Kimilili	33	17	51.5
Webuye West	34	18	52.9
Total	**376**	**194**	**51.3**

Source: Field Data (2025)

The quantitative analysis was based on responses from 181 school principals, representing a response rate of 93.3 per cent from the targeted participant sample. Additionally, the study used purposive sampling to select principals from secondary schools and the county director of education for interviews. According to Moser and Kalton (2017), purposive sampling selects participants based on specific information they hold. This means that participants are selected based on the researcher's judgment that they will provide access to the needed information. In this way, it became possible to obtain the required number of participants in each purposive category: 3 principals from extra-county schools, 3 principals from county boarding schools, 6 principals from county day/boarding schools and 8 principals from sub-county schools. It was also used to select the County Director of Education.

All ethical issues were adhered to. The researcher obtained an introduction letter from the University of Eldoret, proceeding to collect data. The research permit was then sought from the National Council for Science and Technology (NACOSTI). A letter of research authorisation was also sought from the county education and the county commissioner's offices. The respondents were assured confidentiality before gathering information from them. This promoted confidentiality among the respondents. Participants were informed of the purpose of the study, and the importance of the study was explained in detail. Respondents were informed that participation was voluntary. To protect respondents' identities, questionnaires did not require names or school names. The study will communicate its benefits, and recommendations will be implemented to benefit participants and other members of the country.

To strengthen qualitative findings, oral data were integrated with quantitative data. The study ensured that all participant voices in this section are coded to ensure confidentiality. Principals were assigned anonymised identifiers based on school category and the sequence of the interview, for example:

- EC-P1, EC-P2… = Extra County Principals
- CB-P1, CB-P2… = County Boarding Principals
- CDB-P1, = County Day/Boarding Principals
- SC-P1, SC-P2… = Sub-County Principals

Quantitative data were subjected to descriptive and regression analyses. The analysis assessed the relationship between student enrolment, the squared enrolment term, and unit costs across the different school categories. Interview responses were analysed thematically to identify explanations related to perceptions of school enrolment and cost efficiency. The qualitative findings were subsequently used to complement and provide deeper interpretation of the quantitative results. The validity of the research instruments was assessed through content validation. Instrument reliability was determined using the test-retest procedure. The reliability assessment produced a Pearson product-moment correlation coefficient of 0.84, indicating that the instrument demonstrated an acceptable level of reliability.

4.0 RESULTS AND DISCUSSION

Unit Cost

Table 2 indicates that extra county schools incurred a higher average cost of KSh. 60,628.38 per student, followed by county boarding schools, which incurred an average cost of Ksh. 57,464.84; county day and boarding schools came third with an average expenditure of Ksh. 31,051.58, and sub-county schools incurred the lowest average cost per student of Ksh. 27,496.34. Sub-county schools incurred a lower unit cost because most schools were day schools, leading to a lower cost. Extra-county and county boarding schools incurred a higher unit cost. This is because of boarding-related expenditures, specialised facilities, and broader academic programs.

Table 2: Unit Cost Incurred in Schools

Category	Unit cost		Mean	Std. Deviation
	Minimum	Maximum		
Extra County	55,960.25	77,455.48	60,628.38	5,920.09
County Boarding	44,998.09	65,967.63	57,464.84	6,474.66
County Day/Boarding	24,640.61	39,647.06	31,051.58	4,199.02
Sub-County	20,072.18	39,518.56	27,496.34	4,596.23

Source: Field Data (2025)

Table 3 shows descriptive statistics for student enrolment and student enrolment squared. It indicates the minimum, maximum, mean, and standard deviation for both variables.

Table 3: Student Enrolment and Student Enrolment Squared

	N	Minimum	Maximum	Mean	Std. Deviation
Student Enrolment	181	105	3,400	660.12	552.63
Student Enrolment squared	181	11,025	11,560,000	739,465.41	1,599,473.599
Valid N (list-wise)	181				

Table 3 shows that the school with the lowest enrolment had 105 students, while the school with the highest enrolment had 3400, averaging an enrolment of 660 students. This indicates unequal student distribution across schools.

The Optimal Enrolment for Achieving Maximum Economies of Scale

The school principals were asked to indicate whether they had experienced cost reductions as enrolment increased in the past five years. The results are shown in Table 4. The majority (72.4%) of secondary school principals indicated that costs do not decrease with enrolment, while only 27.6% agreed that costs reduce as enrolment increases. This is because oral submissions from principals indicated that increased enrolment led to expansion mode, which was costly. Savings only occur after they have stabilised.

Table 4: Does Cost Reduce as Enrolment Increases

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	YES	50	27.6	27.6	27.6
	NO	131	72.4	72.4	100.0
	Total	181	100.0	100.0	

Table 5 shows the student enrolment statistics across school category that is extra-County, county day/boarding, county boarding, and sub-County). It indicates the minimum, maximum, mean, and standard deviation for enrolment within each category.

Table 5: Enrolment in County Secondary Schools in Bungoma County

Category	N	Minimum	Maximum	Mean	Std. Deviation
Extra-County	14	1167	3400	2311.79	565.779
County Day/Boarding	61	300	1255	639.15	241.089
County Boarding	15	446	1000	639.47	202.428
Sub-County	91	105	1060	423.47	195.164
Valid N (listwise)	181				

The Optimal Enrolment in Extra County Schools for Achieving Maximum Economies of Scale

Table 6 represents the regression analysis table showing unstandardized coefficients, standardized coefficients, t and significance values.

Table 6: Linear Cost Function of Extra County Schools in Bungoma County

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
Constant	76948.753	25921.176		8.883	.000
Student Enrolment (X_1)	-25.597	8.090	-2.446	-3.164	.009
Student Enrolment Squared (X_1^2)	.008	.002	3.163	4.091	.002

Dependent Variable: Unit Cost (Y)

At the 95 per cent confidence level, Table 6 shows that there is a negative and statistically significant relationship between student enrolment and unit cost in extra-county (B=-25.597, t=-3.164 and p=0.009). Therefore, a one-unit increase in student enrolment decreases the unit cost by KSh. 25,597. The regression equation was given by;

$Y=76948.753 - 25.597X_1 + 0.008X_1^2$, where Y is the unit cost, X_1 is the student enrolment, and X_1^2 represents student enrolment squared.

To determine the optimal size for extra county schools, the first derivative of the unit cost function above was equated to zero;

$0.016 x_1 = 25.597$

$X_1=1599.81 \approx 1600$ students

Therefore, extra county schools can operate efficiently with an enrolment of 1600 students. On the other hand, 78.57 per cent of schools in the study had an enrolment greater than 1600 students and thus were also operating above the optimum size. This implies that only 7.14 per cent in this study were operating at optimum size.

Optimal Enrolment in County Secondary Schools for Achieving Maximum Economies of Scale

Optimal Enrolment in County Boarding Schools for Achieving Maximum Economies of Scale

As presented in Table 7, student enrolment is negatively and significantly associated with unit cost in county boarding schools at the 95 per cent confidence level (B = −148.610, t = −2.889, p = 0.014). Therefore, a one-unit increase in student enrolment decreases the unit cost by Ksh. 148.610. The regression equation was given as;

$Y=114078.323 – 148.61X_1 + 0.086X_1^2$

$0.172x_1=148.61$

$X_1=864.01 \approx 864$ students

Table 7: Linear Cost Function of County Boarding Secondary Schools in Bungoma County

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
Constant	114078.323	17033.373		6.697	.000
Student Enrolment (X_1)	-148.610	51.438	-4.646	-2.889	.014
Student Enrolment Squared (X_1^2)	.086	.036	3.860	2.400	.033

This indicates that county boarding schools can operate efficiently with an enrolment of 864 students.

Optimal Enrolment in County Day and Boarding Secondary Schools for Achieving Maximum Economies of Scale

Table 8 represents the regression analysis table showing unstandardized coefficients, standardized coefficients, t and significance values.

Table 8: Linear Cost Function of County Day/Boarding Schools in Bungoma County

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
Constant	52,275.556	2,807.924		18.617	.000
Student Enrolment (X_1)	-58.872	7.829	-3.380	-7.519	.000
Student Enrolment Squared (X_1^2)	.035	.005	3.187	7.089	.000

Dependent Variable: Unit Cost (Y)

Table 8 indicates a statistically significant inverse relationship between student enrolment and unit cost in county day/boarding schools at the 95 per cent confidence level (B = −65.864, t = −10.771, p = 0.000). The results imply that an increase of one student in enrolment is associated with a reduction of Ksh. 58.872 in unit cost.

The regression equation was given as;

$Y=52275.556 - 58.872X_1 + 0.035X_1^2$

$0.07x_1=58.872,$

$X_1=841.03 \approx 841$ students

This indicates that county day/boarding schools can operate efficiently with an enrolment of 841 students.

Optimal Enrolment in Sub-County Secondary Schools for Achieving Maximum Economies of Scale

Table 9 indicates that a one-unit increase in student enrolment decreases the unit cost by Ksh. 65.864.

Table 9: Linear Cost Function of Sub-County Secondary Schools in Bungoma County

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
Constant	45374.059	1519.774		29.856	.000
Student Enrolment (X_1)	-65.864	6.115	-2.797	-10.771	.000
Student Enrolment Squared (X_1^2)	.046	.005	2.250	8.666	.000

The regression equation was given by;

$Y=45374.059 – 65.864X_1 + 0.046X_1^2$

$0.092x_1=65.864,$

$X_1=715.91 \approx 716$ students

This shows that Sub-County schools can operate efficiently with an enrollment of 716 students.

At a 95 per cent confidence level, Table 9 shows that there exists a negative and statistically significant relationship between student enrolment and unit cost in sub-county schools (B=-65.864, t=-10.771 and p=0.000). The findings of the study concur with those of Masifwa (2018), who established that an increase in the enrolment of a school leads to a decrease in the total expenditure per student in Bungoma South Sub-County. However, the present study sampled schools in the entire Bungoma County. Tables 6–9 further demonstrate a statistically significant positive association between the squared student enrolment term and unit cost across all school categories. This indicates that the cost curve will eventually bend upward after a certain point. This means that after this point, increasing enrolment will lead to an increase in unit cost, leading to diseconomies of scale.

The mean enrolment in extra county, county boarding, county day/boarding and sub-county schools was 2311, 639.47, 639.15 and 423.47 respectively. The cost of educating a student in extra county, county boarding, county day/boarding and sub-county schools that were operating at optimal size was Ksh.56,472.80, Ksh.49,877.939, Ksh. 27,519.039, and Ksh. 21,797.611 respectively. This translates to cost savings of Ksh.4,057.688, Ksh.4,348.397, Ksh.1,426.423 and Ksh. 3,934.055 per student in extra county, county boarding, county day/boarding and sub-county schools respectively.

Qualitative Analysis on the Optimal Enrolment for Achieving Maximum Economies of Scale

Oral data analysis in this section of the study complements the quantitative findings on optimal enrolment and economies of scale in public secondary schools in Bungoma County. Results generated from regression models were statistically significant; however, the lived experiences of principals explain how these relationships are lived, negotiated, and at times resisted within the daily operation of schools.

The county director of education stated:

"Increased enrolment does not lead to efficiency. Efficiency depends on how well a school is run." (8th Oct 2025)

Oral explanations, however, showed that numerical judgments of a 'moderate' relationship between student enrolment and cost efficiency took up many experiences marked by strong positive and negative feelings. This is largely as a result of disadvantages to the development of the school, in the form of government capitation, and infrastructural challenges.
EC-P1, who found the relationship to be moderate, said:
"Yes, there is a relationship, but it's not linear; as enrolment grows, some of them fall, and others rise concurrently. That's why I can't say it's very strong." (14th Oct 2025)

Principals from large, long-established Extra County schools, by contrast, had more faith in the benefits of enrolment-led efficiency. EC-P2 stated:
"When the numbers are high, you feel the relief, the laboratories are fully loaded, teachers are optimally loaded, and the fixed costs are widely spread." (14th Oct 2025)

Conversely, those principals in small boarding schools highlighted diseconomies of scale deficiency. CB-P2 noted:
"A matron, night guard, and full kitchen staff are still required with 500 children, and that equates to a lot of money for each child." (15th Oct 2026)
Those at closer to optimal sizes were cautiously optimistic:
"When we were under 700 students it was a problem every term. The day we got to 700 it was fine." CDB-P1 (22nd Oct 2026)

CDB-P2 highlighted the inefficiencies in transitions:
"Enrolment growth gets you into expansion mode; expansion is costly, savings only occurs after stabilization." (CDB-P2) (22nd Oct 2026)

Discussion

The results presented in Tables 6–9 reveal significant negative associations between student enrolment and unit cost in extra-county, county boarding, county day/boarding, and sub-county schools at the 95 per cent confidence level. Although insightful, the study only sampled one sub-county; the present study sampled schools in the entire Bungoma County. The mean enrolment in extra county, county boarding, county day/boarding and sub-county schools was 2311, 639.47, 639.15 and 423.47, respectively.

The cost of educating a student in extra county, county boarding, county day/boarding and sub-county schools that were operating at optimal size was Ksh.56,472.80, Ksh.49,877.939, Ksh. 27,519.039, and Ksh. 21,797.611 respectively. This translates to cost savings of Ksh.4,057.688, Ksh.4,348.397, Ksh.1,426.423 and Ksh. 3,934.055 per student in extra county, county boarding, county day/boarding and sub-county schools, respectively. This concurs with studies by Ndiritu (2012), Kiprop (2009), and Ngetich et al. (2014), who established the unit cost as KSh. 29,787.19, Ksh. 17,503.30, and Ksh. 41,768.00 respectively. However, the studies did not give the unit cost of the various categories of schools in those areas.

This study determined the optimal enrolment of public secondary schools in Bungoma County. This study found an optimal school size student population of 1600, 864, 841 and 716 as the optimal school size for extra- county, county boarding, county day/boarding schools, and sub-county schools, respectively. This concurs with Foreman-Peck (2006), who found that a student population of 560 students was cost-efficient. Schiltz and De Witt (2017) found that merging school districts up to an enrolment of 6500

students led to cost savings. However, the studies were carried out in developed countries, which may be less applicable to a developing country like Kenya. Schiltz and De Witt (2017) focused on the optimal size of a district, while this study focused on individual schools in Bungoma County.

In Kenya, Ndiritu (2012) gave a student population of 400 as the optimal school size. Kemboi (2008) identified a student population of 174 as the optimal size of a school in Tirap Division. Kiprop (2009) found an optimal size of 320 students in Marakwet District schools. Masifwa (2018) identified 409 students as the optimal school size. However, the findings reported by Ndiritu (2012), Kemboi (2008), Kiprop (2009), and Masifwa (2018) differed in their estimates of optimal school size. Such variation may be attributed to differences in geographical context, student population size, and the period in which the respective studies were conducted. Nevertheless, the reviewed studies did not establish optimal school sizes for extra-county, county, and sub-county schools.

The oral data in this study indicated noticeable trends that depended on the categories of schools, that is, extra-county, county, and sub-county schools. Similarly, quantitative data give variation in optimal size for various school categories in Bungoma County. This means that not all schools can have a common policy on enrolment, as it may lead to inefficiency. Policies on enrolment should therefore be based on the category of schools. This finding concurs with Schütz (2007), who indicated that there is no specific number of students that can be accepted as the optimal school size worldwide. He found that economies of scale are influenced by the population density, school accessibility and financing conditions.

5.0 CONCLUSION AND RECOMMENDATIONS

Conclusion: The analysis established a statistically significant non-linear relationship between student enrolment and unit cost of education. The quadratic cost function revealed that unit cost initially declines as student enrolment increases, reaches a minimum point, and thereafter begins to rise as enrolment continues to increase. The study also established the optimal enrolment for extra-county schools, county boarding schools, county day/boarding schools, and sub-county schools as 1600, 864,841 and 716, respectively.

The cost of educating a student in an extra- county, county boarding, county day/boarding, and sub-county school that was operating at optimum school size was found to be Ksh. 56,472.80, Ksh. 49,877.939, Ksh. 27,519.039 and Ksh.21,797.611 respectively. This translates to cost savings of Ksh. 4,057.688, Ksh. 4,348.397, Ksh. 1,426.423 and Ksh. 3,934.055 per student in extra-county, county boarding, county day/boarding and sub-county schools, respectively. This is the reason why some large schools in Bungoma County do not have any financial relief even if they are large, while some small schools are racking up high per-capita funding due to their size. The 100 per cent transition policy and the free day secondary education were intended to reduce wastage such as dropout and repetition by maximising enrolment. However, increasing enrolment beyond the optimal size leads to diseconomies of scale by inflating the unit cost. The majority of the extra-county schools are on the rising side of the cost curve due to 100 per cent transition.

Recommendation: The Ministry of Education should review and operationalise evidence-based guidelines on optimal secondary school enrollment to ensure schools operate at sizes that minimise unit cost while avoiding congestion and quality deterioration.

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