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An Efficiency Analysis of Public and Private Elementary Schools in Dera Ghazi Khan

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Abstract
The study aims to compute the efficiency scores of the public and private elementary schools and to find out the differences in the efficiency scores, in Dera Ghazi Khan Tehsil, a junction of four provinces of Pakistan. The Data Envelopment Analysis (DEA) technique has been used in this study. The CCR results for the public and private schools have been found as 0.73 and 0.74 while the BCC efficiency scores for the public and private schools are recorded as 0.89 and 0.92. The scores calculated via both the models used for the study have given the same results. Private schools are more efficient than their public counterparts. The study, therefore, upholds the dominant paradigm that private schools are more efficient than public schools.
Keywords: Technical efficiency, Scale efficiency, Data Envelopment Analysis, Public and Private Elementary Schools

1. Introduction

Education is a source of escaping from destitution and poverty. It bears significant importance in human life, as it is a basic need along with being a right of all and sundry. It is also imperative for a country in excelling towards socio-economic development and economic growth. Education accelerates development and leads to social capital formation. Human capabilities heavily rely on education and these capabilities support economic growth (Malik, 2011). It wouldn't be inappropriate to assume that economic capabilities are often increased and improved through education (Schlutz, 1971). Individuals need education for self-development. According to Hanushek (1986), "Education is a service that transforms fixed quantities of inputs into individuals with different qualities". The reflection of educational reformations is not only observed in labour productivity but in instilling responsibility among citizens of the country. Thus, leadership roles are played by nations with sound academic systems (American Federation of Teachers, 2000). The fact tested through time is that education plays an important role in the rise and fall of nations, and it is education that develops and channels the human resource of a country in the right direction. It is education that aids in the sustainable development of a nation. The provision of education is one of the priorities of all nations due to its socio-economic, social, and cultural benefits. The stature of a nation among other nations is determined by how good the education system of that nation has (Khalid & Khan, 2006). The roadmap to the poverty alleviation and development process is expedited by productive and skilled labour accompanied by income-generating opportunities.

The significance of educational institutions is evident, as these institutions bear the onus of the production process of education. Usually, these institutions are further divided into private and public educational institutions. Most countries have private educational institutions to push government educational institutions into competitor environments and work parallel with public educational institutions. In recent years, a range of policy actions has created a space for the promotion of the private educational system throughout the world. Privatization has become a dominant model in economic-based educational research. As far as the performance of each formation is concerned, the World Bank gives private schools a slight advantage over government-run schools. The developed world depends heavily on its educational system in the context of important issues like maintaining the living standard, alleviation of poverty by equitable distribution of resources, bringing improvement to international competitiveness and propagating harmony among different races. No different from the rest of the world, Pakistan's education system is broken down into public education institutions and privately managed education institutions. The history of competition between government and privately managed educational institutions in Pakistan goes back to the time of independence of Pakistan and beyond. Many governments, in Pakistan, had proposed the privatization of public schools in line with classical and neo-classical theories of the free-market economy that advocate the services to the customers should be provided most efficiently, ensuring the effective utilization of the available resources. Here the term services refer to the provision of education and the term customers refers to students and other stakeholders (Rutkowshi & Rutkowshi, 2009).

Friedman (1955) is attributed to being the first economist to have advocated superior quality education by bringing the privatization of educational institutions. The author continued speaking loud and clear, in favour of the privatization of education, ascribing it to be the only way for a major improvement in the educational system. Since

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public schools alone cannot meet the ever-increasing population, the contribution of privately managed schools is as important as public schools. On one hand, privately managed education institutions have shown significant growth and are considered better for reasons including but not limited to better management and parents' involvement etc. On the other hand, public schools in Pakistan face multidimensional problems including poor management, political interference, unskilled teaching staff and shortage of funds for education and lack of professional competencies (Batool, 2015).

It is well-known fact that privately managed schools stimulate competitiveness which in return enhances the quality of education. Coleman (1997) put to the conclusion that educational markets would improve if parents are given a choice. The promotion of privately managed institutions would give the parents a choice to choose between two available options (Chub and Moe, 1990).

The study is designed to assess the efficiency of two formations, the public and the private elementary educational institutions in tehsil Dera Ghazi Khan. The current study is significant in terms of finding efficiency scores of public and private elementary educational institutions in the district of Dera Ghazi Khan which is at the junction of the four provinces of Pakistan, using DEA. The efficiency of the underlying study holds importance for all the stakeholders ranging from students to teachers, from parents to management and from economists to educationists for decision-making and policy recommendations. The study is significant for less developed countries like Pakistan, where the governments have to make multidimensional decisions such as improvements in the quality of education as well as the provision of basic facilities to the students. So, educational systems such as Pakistan need to attend to both the factors of improvement in quality of education and provision of basic facilities such as furniture, drinking water and boundary walls etc.

The analysis of efficiency scores will provide an opportunity for the management of the concerned institutes in comparing their efficiency to compete with their competitors. The Institutions with better efficiency scores can further make strategies to maintain their level of efficiency. Institutions with low-efficiency scores will be able to devise strategies to uplift their level of performance and try to work on their weaknesses. The research will be a helping hand for the parents of students and the students themselves in terms of the selection of the educational institution. This research will be a handful for policymakers for different managerial and administrative roles and will prove to be helpful for the researchers as well for conducting more extensive research in the field. In the light of current research, results of the policies can be visualized and modifications can be made in the larger interest of the district of Dera Ghazi Khan and alike.

2. Review of Assorted Studies

Table 1 gives the summary of the literature review on public and private educational institutions.

Table 1: Summary of Studies on Public and Private Educational Institutions

Reference(s)	Time Period	Country	Methodology	Variables	Results
Kao (1994)	1993	Taiwan	DEA	Instructors degree, instructors publication, instructors position, Instructor-student ratio, expenditures, workshops and past score	The results from the research coincided with those evaluated by the government. According to the study, the department head was not capable and could be considered for replacement. The teachers were pushing students too hard and the practice was not considered appropriate. There was a need for instructors' offices. The study also helped to know that the equipment was not being used sufficiently.

Kingdon (1996)	1995	UP, India	Ravens Progress Matrices test	Students' Total Cognitive Achievement Score, Students Score on Literacy Test	Privately managed schools were more efficient than public schools
Avkiran (2001)	1995	Australia	DEA	Students Score on Numeracy Test, Child's Age in Months, Private Tuition, Study Hours at Home, No of Siblings	The finding of the research showed that the universities were efficient on technical and scale efficiency but performance on fee-paying enrollment could be improved. There was a potential to downsize due to slacks in input utilization and decreasing return to scale.
Mancebon & Muniz (2008)	2001-2002	Spain	DEA	Percentage of Passes in Universities, Grade, Record, Income, Father's Education, Parents' Attitude and Father's Occupation	State-aided Privately managed schools were found to be more efficient when compared with public schools in absolute terms because of parents' rationale
Awan & Zia (2015)	2014	Vehari, Pakistan	OLS	Family's Income, Education of Parents, Students Teachers ratio, Syllabus Used, Discipline and Regularity, the result of 9th Board Examination	socio-economic status of the family, the accessibility of schools, the cost of education, parents' perception of school quality and their perception of available employment opportunities
Batool *et al* (2015)	2014	Multan, Pakistan	DEA	No of Teachers, Number of Classrooms, Average Teaching Experience of Teachers, Total Expenditures, No of Students, Percentage Result, Weighted Average of Passing Students Percentage Marks, Score of Extra-Curricular Activities	Declined the paradigm that privately managed schools were better than public schools
Batool *et al* (2016)	2014	Multan, Pakistan	DEA	No of Teachers, Number of Classrooms, Average Teaching Experience of Teachers, Total Expenditures, No of Students, Percentage Result, Weighted Average of Passing Students Percentage Marks, Score of Extra-Curricular Activities	Privately managed colleges got the better of public colleges in terms of technical and scale efficiency

Duan and Deng (2016)	2001-2005	Australia	DEA		The Australian universities generally were highly efficient concerning operations and research efficiency. However, the teaching efficiency was not fully optimized. ATN and NGU group of universities which were reckoned as teaching-intensive universities relatively outperformed the others.
Hu *et al* (2016)		Beijing, China	DEA	Student-teacher ratio, non-personal educational expenditures, teachers' average teaching experience, no of books per student and average hours spent by students at school, excellence rate in Chinese, English, and Mathematics, articles published in the formal journals per teacher and teachers' rewards from districts	According to the 58 schools in six districts of Beijing, sampled for this research, schools are generally efficient.
Nauzeer *et al* (2018)	2016	Mauritius	DEA and OLS	Total specialist rooms, Total number of laboratories, Total Number of classrooms in schools, Total other rooms, Total recreational facilities, Total number of subject reading books, Total number of academic staff, Total number of students in school and Total number of administrative staff, overall percentage pass at higher school certificate and overall percentage pass at school certificate examination	The results showed that the efficiency via CRS and VRS lies between 0 and 1, with an average of 0.87 when CRS was applied and 0.90 when VRS was applied. The location, teacher-student ratio, student-class ratio, zone and types of the institute had a significant impact on the school's performance
Johnes & Virmani (2020)	2002, 2006, 2009 & 2014	India, Ethiopia, Peru & Vietnam	DEA	Score, Wealth Index, Class Hours Per Day, Home Study Hours Per Day, Highest Grade Completed, Age, Private School and Household Expenditures	No country was consistent as far as efficiency is concerned. However female schools were more efficient than male schools

DeAngelis (2020)	2018-19	USA	OLS	Accountability Report Card Score, Per Pupil Revenue, Pupli per$1000 funded	The results showed that the independent chartered schools were more cost-efficient as compared to traditional public schools by a margin of almost 30%
Delptrato & Antequera (2021)	PISA 2018	Ecuador, Guatemala, Honduras & Paraguay	DEA	School Resources, STR, Average School SES, Mean school value of Math, Reading and Science scores	The Private schools efficiency scores were 0.88 whereas efficiency scores for the public schools were 0.82. The study upheld the dominant paradigm that the private schools were more efficient than the public schools

3. Data and Methodology

Data envelopment analysis is the most used technique along with its advantage over the other methods that persuaded us to use it for our study. We have employed a stratified sampling technique and taken a sample size through proportional allocation. We have divided the population for each type of elementary educational institution into L = 2 strata that is "1. Public" and "2. Private (Pvt.)". The study uses the following notations:

N_h = the size of the population in stratum h;h = 1, 2;

N = N1 + N2 = the total size of population;

n_h = the sample size in stratum h; h = 1, 2;

n = $n_1 + n_2$ = the total sample size.

The proportional allocation gives the sample size as under:

n_h = ; h = 1, 2.

Further details can be found in Chocran (1977).

3.1. Variables of the Study

Since economic efficiency can be defined as the ratio of weighted inputs to weighted outputs, our study uses two types of variables: input and output variables. Details of input and output variables are given in Table 2.

The current study used 6 inputs expanding over 28 questions and 4 outputs spreading into 10 questions. All the input variables including teachers' attendance, Students' attendance, availability of boundary wall, availability of drinking water, availability of furniture and school hygiene were used for the first time. Since Pakistan is a developing country, all the above-mentioned variables were important in the context of Punjab as in Government of Punjab has worked on the roadmap of the school education department.

Out of the above-mentioned variables, six have been used in several previous studies. AMSPPECE is the Average marks of passing students. This variable is constructed based on the marks of the passing students of the institutes. The variable was developed to capture the percentage marks of all students in an institute.

3.2. Area Profile

Dera Ghazi Khan, the city on the borders of Punjab and Balochistan is one of the important cities of Southern Punjab and holds a large population and is reckoned as the 19th largest city in Pakistan and a business corridor across all the provinces of Pakistan. It is located at 30°1'59" N and 70°38'24" E, approximately in the middle of Pakistan geographically and has an elevation of 410 feet from sea level. Dera Ghazi Khan district, with an area of 1,457 square kilometres, is surrounded by the district Rajanpur on the South and Layyah on the North East side and Muzaffargarh district on the East while the Indus River passes on the East side. Dera Ghazi Khan is a city district and has three tehsils including Dera Ghazi Khan, Kot Chutta and Taunsa Sharif and 98 union councils. According to the 2017 census, Dera Ghazi Khan District's population was 2,872,201 with 23% urban population and the population of tehsil Dera Ghazi Khan is 1,226,612 with rural and urban populations to be 399,064 and 827,548 respectively. Saraiki is the main language of the district along with Punjabi, Urdu and Rohtaki.

Table 2: Input and Output Variables

Abbreviation	Variable
Input Variables	
TA	Teachers' Attendance
SA	Students' Attendance
AVDW	Availability of Drinking Water
AVBW	Availability of Boundary Wall
AVF	Availability of Furniture
SH	School Hygiene
AOS	Area of School
PSE	Provision of Security Equipment
TPS	Teachers' pedagogical skills
Output Variables	
TS	Number of Students/Total Enrollment
NA	New admissions
TSPPECE5	Total Students participated in PEC Exams 5
PSPPECE5	Percentage of Students Passed the PEC Exams 5
TSPPECE8	Total Students participated in PEC Exams 8
PSPPECE8	Percentage of Students Passed the PEC Exams 5
AMSPPECE5	Average Marks of Passing Students in PEC Exams 5
AMSPPECE8	Average Marks of Passing Students in PEC Exams 8
AMSO5	Average Marks of Overall Students Partaking PEC Exams 5
AMSO8	Average Marks of Overall Students Partaking PEC Exams 8

4. Results and Discussions

Our research plan only encompasses those elementary educational institutions in tehsil Dera Ghazi Khan which are registered with Punjab Schools Education Department, Dera Ghazi Khan. It is because of the status of students. Punjab Examination Commission only allows participation of those institutions in examinations which are associated with the Punjab Schools Education department.

4.1. CCR Based Efficiency Scores of Public Elementary Schools

This section discusses the efficiency scores obtained from DEAP analysis for technical and scale efficiency. The efficiency scores using BCC and CCR have been obtained and the scores obtained for the public and private schools have been compared. The results have also been seen to find out the best and worst performing schools based on efficiency scores obtained for a given set of variables.

Table 3 shows the efficiency scores of public schools of tehsil Dera Ghazi Khan, obtained by using the CCR model of DEAP analysis. The results show that out of a sample of 20 schools, seven schools were found to be efficient and 13 schools were identified as inefficient, for a given set of variables used for the study with a maximum score of one and a minimum score of 0.36. The mean score remained 0.76 and the standard deviation was 0.25. There were 5 schools ranging from 0 to 0.5 and 15 schools were found between the range of 0.5 to 1.

4.2. BCC Based Efficiency Scores of Public Schools

Table 4 shows the efficiency scores of public schools, using the model BCC of DEAP analysis. From the drawn sample of 20 public schools, 8 were found to be efficient and 12 schools were found as inefficient. The mean score of public schools remained at 0.89. The standard deviation was 0.2. The minimum and maximum scores were 0.38 to 1 respectively.

Table 3: CCR Efficiency Scores of Public Schools

DMU	Score	Rank
GES GAGGU (M)	1	1
GGES GAGGU SHARIF (F)	0.42	17
GES BASTI RUSTOMANI EAST	0.30	20
GES WAHI KINGRANI (M)	0.41	18
GES CHABRI ZAREEN (M)	1	1
GES MAMOORI (M)	0.85	10
GES JAMNA CHANDIA (M)	1	1
GES BAHADUR GARH (M)	1	1
GES SULTAN MEHMOOD WALA (M)	0.49	14
GES MOHSIN ABAD (M)	0.47	16
GES LADUN (M)	0.57	12
GES CHAK DALAIL (M)	1	1
GES MUMDANI (M)	1	1
GES GABOOL WALA (M)	0.84	11
GES SINDH KALERI JANUBI (KOT HAIBAT) (M)	0.55	13
GGES CHAH MASOORI WALA (F)	0.32	19
GGES GUJJAR WALA NO 1 (F)	1	1
GGES GADI WALA NO 2 (F)	0.90	9
GGES KOT DAUD (F)	0.48	15
GGES CHURHATTA NO 3 (F)	1	1

Total DMUs		20	No. of efficient DMUs	8
Average	0.73			
Standard Deviation				
Maximum	1		No. of inefficient	
Minimum	0.30		DMUs	12

Table 4: BCC-Based Efficiency Scores of Public Schools

DMU	Score	Rank
GES GAGGU (M)	1	1
GGES GAGGU SHARIF (F)	1	1
GES BASTI RUSTOMANI EAST	0.38	20
GES WAHI KINGRANI (M)	0.50	19
GES CHABRI ZAREEN (M)	1	1
GES MAMOORI (M)	1	1
GES JAMNA CHANDIA (M)	1	1
GES BAHADUR GARH (M)	1	1
GES SULTAN MEHMOOD WALA (M)	1	1
GES MOHSIN ABAD (M)	1	1
GES LADUN (M)	1	1
GES CHAK DALAIL (M)	1	1
GES MUMDANI (M)	1	1
GES GABOOL WALA (M)	1	1
GES SINDH KALERI JANUBI (KOT HAIBAT) (M)	0.75	16
GGES CHAH MASOORI WALA (F)	0.59	18
GGES GUJJAR WALA NO 1 (F)	1	1
GGES GADI WALA NO 2 (F)	1	1
GGES KOT DAUD (F)	0.59	17
GGES CHURHATTA NO 3 (F)	1	1

Total DMUs	20			
Average	0.89			
Standard Deviation	0.20			
Maximum	1		No. of efficient	
Minimum	0.38		DMUs	15

4.3. CCR Based Efficiency Scores of Private Elementary Schools

Table 5 shows the efficiency scores of private elementary educational institutions in tehsil Dera Ghazi Khan. A sample of 21 private schools was drawn from the population of 47 schools registered with PSED via District Education Authority Dera Ghazi Khan, using a stratified sampling technique. There were 6 schools found as efficient and 15 schools were found as inefficient. The range of efficiency scores remained between a minimum of 0.19 and a maximum of 1. The mean score was recorded as 0.65 with a standard deviation of 0.31. Out of 21 schools, the scores of 8 schools remained between 0.19 and 0.4. Three schools' efficiency scores remained between 0.5 and 0.6. There were 2 schools with scores ranging from 0.7 to 0.9. The efficiency scores of the 2 schools were range-bound between 0.92 and 0.96.

Table 5: CCR Based Efficiency Scores of Private Schools

Private Schools		Score	Rank
ALI PUBLIC SCHOOL		0.79	11
AL-FAISAL PUBLIC SCOOL		0.65	13
ASIM PUBLIC SCHOOL		1	1
HAMDARD PUBLIC SCHOOL		1	1
MY SCHOOL AND ACADEMY		0.29	21
KAZIM GRAMMAR SCHOOL		0.36	19
PRIMARY SCHOOL DARAHMA		0.89	9
PRIMARY SCHOOL MOHALAY WALA		1	1
HOPE PUBLIC SCHOOL		1	1
LEARNERS LAND SCHOOL		1	1
BRIGHT STAR PUBLIC SCHOOL (KOT HAIBAT)		0.92	8
GROOMERS PUBLIC SCHOOL		0.35	20
ARSLAN PUBLIC MODEL MIDDLE SCHOOL		0.59	16
ADAM GALAXY OF EDUCATION		0.67	12
BRIGHT EDUCATION MIDDLE SCHOOL		0.64	14
ALIYA PUBLIC MIDDLE SCHOOL (PAIGAH)		0.55	17
JAN MUHAMMAD KHOSA PUBLIC HIGH SCHOOL		0.80	10
SIR SYED MODEL SCHOOL (BLOCK 18)		1	1
THE MASTER PUBLIC MIDDLE SCHOOL (PAIGAH)		0.6	15
HAMDARD PUBLIC SCHOOL		1	1
PAEC MODEL MIDDLE SCHOOL		0.52	18
Total DMUs	21	No. of efficient DMUs	7
Average	0.74		
Standard Deviation			
Maximum	1	No. of inefficient	14
Minimum	0.29	DMUs	

4.4. BCC Based Efficiency Scores of Private Elementary Schools

The mean BCC score of private elementary schools remained 0.92, using the BCC model. From a sample of 21 private schools, 9 schools were efficient and 12 schools were found as inefficient. Table 6 reflects the results obtained by the BCC model of DEA. The minimum and maximum range of efficiency scores remained at 0.51 and 1. The mean score was 0.92 with a standard deviation of 0.17.

Table 6: BCC-Based Efficiency Scores of Private Schools

Private Schools		Score	Rank
ALI PUBLIC SCHOOL		0.78	18
AL-FAISAL PUBLIC SCOOL		1	1
ASIM PUBLIC SCHOOL		1	1
HAMDARD PUBLIC SCHOOL		1	1
MY SCHOOL AND ACADEMY		1	1
KAZIM GRAMMAR SCHOOL		0.51	21
PRIMARY SCHOOL DARAHMA		1	1
PRIMARY SCHOOL MOHALAY WALA		1	1
HOPE PUBLIC SCHOOL		1	1
LEARNERS LAND SCHOOL		1	1
BRIGHT STAR PUBLIC SCHOOL (KOT HAIBAT)		1	1
GROOMERS PUBLIC SCHOOL		1	1
ARSLAN PUBLIC MODEL MIDDLE SCHOOL		1	1
ADAM GALAXY OF EDUCATION		1	1
BRIGHT EDUCATION MIDDLE SCHOOL		1	1
ALIYA PUBLIC MIDDLE SCHOOL (PAIGAH)		0.53	19
JAN MUHAMMAD KHOSA PUBLIC HIGH SCHOOL		1	1
SIR SYED MODEL SCHOOL (BLOCK 18)		1	1
THE MASTER PUBLIC MIDDLE SCHOOL (PAIGAH)		0.53	20
HAMDARD PUBLIC SCHOOL		1	1
PAEC MODEL MIDDLE SCHOOL		1	1
Total DMUs	21	No. of efficient DMUs	17
Average	0.92		
Standard Deviation	0.17	No. of	
Maximum	1	inefficient	
Minimum	0.51	DMUs	4

4.5. CCR Based Efficiency Scores of Public and Private Elementary Schools

Table 7 reflects the efficiency of scores of a sample of 41 public and private elementary schools in tehsil Dera Ghazi Khan. The results suggested that only 11 from a sample of 41 schools were efficient. The remaining schools were found as inefficient. The lower and upper range of efficiency scores was 0.19 and 1 respectively. The mean score recorded for the study was 0.62 with a standard deviation of 0.30.

Table 7: CCR Efficiency Scores of Public and Private Elementary Schools

Public and Private Schools	Score	Rank
GES GAGGU (M)	1	1
GGES GAGGU SHARIF (F)	0.42	34
GES BASTI RUSTOMANI EAST	0.30	39
GES WAHI KINGRANI (M)	0.41	35
GES CHABRI ZAREEN (M)	1	1
GES MAMOORI (M)	0.85	19
GES JAMNA CHANDIA (M)	1	1
GES BAHADUR GARH (M)	1	1
GES SULTAN MEHMOOD WALA (M)	0.49	31
GES MOHSIN ABAD (M)	0.47	33
GES LADUN (M)	0.57	27
GES CHAK DALAIL (M)	1	1
GES MUMDANI (M)	1	1
GES GABOOL WALA (M)	0.84	20
GES SINDH KALERI JANUBI (KOT HAIBAT) (M)	0.55	28
GGES CHAH MASOORI WALA (F)	0.32	38
GGES GUJJAR WALA NO 1 (F)	1	1
GGES GADI WALA NO 2 (F)	0.90	17
GGES KOT DAUD (F)	0.48	32
GGES CHURHATTA NO 3 (F)	1	1
ALI PUBLIC SCHOOL	0.79	22
AL-FAISAL PUBLIC SCOOL	0.65	23
ASIM PUBLIC SCHOOL	1	1
HAMDARD PUBLIC SCHOOL	1	1
MY SCHOOL AND ACADEMY	0.29	40
KAZIM GRAMMAR SCHOOL	0.36	36
PRIMARY SCHOOL DARAHMA	0.89	16
PRIMARY SCHOOL MOHALAY WALA	1	1
HOPE PUBLIC SCHOOL	1	1
LEARNERS LAND SCHOOL	1	1
BRIGHT STAR PUBLIC SCHOOL (KOT HAIBAT)	0.92	16
GROOMERS PUBLIC SCHOOL	0.35	37
ARSLAN PUBLIC MODEL MIDDLE SCHOOL	0.59	26
ADAM GALAXY OF EDUCATION	0.67	23
BRIGHT EDUCATION MIDDLE SCHOOL	0.64	24
ALIYA PUBLIC MIDDLE SCHOOL (PAIGAH)	0.55	28
JAN MUHAMMAD KHOSA PUBLIC HIGH SCHOOL	0.80	21
SIR SYED MODEL SCHOOL (BLOCK 18)	1	1
THE MASTER PUBLIC MIDDLE SCHOOL (PAIGAH)	0.6	25
HAMDARD PUBLIC SCHOOL	1	1
PAEC MODEL MIDDLE SCHOOL	0.52	30
Total DMUs 41	No. of efficient DMUs	15
Average 0.62		
Standard Deviation 0.30	No. of	
Maximum 1	inefficient	
Minimum 0.29	DMUs	26

4.6. BCC Based Efficiency Scores of Private and Private Schools

The BCC efficiency scores of both public and private schools of tehsil Dera Ghazi Khan show that from a sample of 41 schools, 12 schools were found as efficient and the remaining 29 schools were found inefficient. The mean score was 0.77 with a standard deviation of 0.26. The responses were evaluated between efficiency scores of 0.26 to 1.

Table 8: BCC-Based Efficiency Scores of Public and Private Schools

Public and Private Schools	Score	Rank
GES GAGGU (M)	1	1
GGES GAGGU SHARIF (F)	0.97	20
GES BASTI RUSTOMANI EAST	0.38	37
GES WAHI KINGRANI (M)	0.49	32
GES CHABRI ZAREEN (M)	1	1
GES MAMOORI (M)	0.99	14
GES JAMNA CHANDIA (M)	1	1
GES BAHADUR GARH (M)	1	1
GES SULTAN MEHMOOD WALA (M)	0.98	19
GES MOHSIN ABAD (M)	0.97	21
GES LADUN (M)	0.98	18
GES CHAK DALAIL (M)	1	1
GES MUMDANI (M)	1	1
GES GABOOL WALA (M)	0.99	15
GES SINDH KALERI JANUBI (KOT HAIBAT) (M)	0.75	26
GGES CHAH MASOORI WALA (F)	0.59	30
GGES GUJJAR WALA NO 1 (F)	0.98	17
GGES GADI WALA NO 2 (F)	0.99	16
GGES KOT DAUD (F)	0.59	29
GGES CHURHATTA NO 3 (F)	1	1
ALI PUBLIC SCHOOL	0.46	33
AL-FAISAL PUBLIC SCOOL	0.44	36
ASIM PUBLIC SCHOOL	1	1
HAMDARD PUBLIC SCHOOL	1	1
MY SCHOOL AND ACADEMY	1	1
KAZIM GRAMMAR SCHOOL	1	1
PRIMARY SCHOOL DARAHMA	0.30	40
PRIMARY SCHOOL MOHALAY WALA	0.32	39
HOPE PUBLIC SCHOOL	0.26	41
LEARNERS LAND SCHOOL	0.32	38
BRIGHT STAR PUBLIC SCHOOL (KOT HAIBAT)	0.63	27
GROOMERS PUBLIC SCHOOL	0.91	22
ARSLAN PUBLIC MODEL MIDDLE SCHOOL	0.61	28
ADAM GALAXY OF EDUCATION	1	1
BRIGHT EDUCATION MIDDLE SCHOOL	1	1
ALIYA PUBLIC MIDDLE SCHOOL (PAIGAH)	0.78	24
JAN MUHAMMAD KHOSA PUBLIC HIGH SCHOOL	0.91	23
SIR SYED MODEL SCHOOL (BLOCK 18)	0.45	34
THE MASTER PUBLIC MIDDLE SCHOOL (PAIGAH)	0.45	35
HAMDARD PUBLIC SCHOOL	0.5	31
PAEC MODEL MIDDLE SCHOOL	0.76	25
Total DMUs 41	No. of efficient DMUs	12
Average 0.77		
Standard Deviation 0.26	No. of	
Maximum 1	inefficient	
Minimum 0.26	DMUs	29

Table 9 shows the scale efficiency scores of the public schools. These scores are calculated by taking ratio of the technical efficiency under CRS of the public schools to the technical efficiency under VRS of the private schools.

Table 9: Scale Efficiency Scores of the Public Educational institutions

PUBLIC SCHOOLS	CRS	Rank	VRS	Rank	Scale Efficiency
GES GAGGU (M)	1	1	1	1	1
GGES GAGGU SHARIF (F)	0.42	17	1	1	0.42
GES BASTI RUSTOMANI EAST	0.30	20	0.38	20	0.78947
GES WAHI KINGRANI (M)	0.41	18	0.50	19	0.82
GES CHABRI ZAREEN (M)	1	1	1	1	1
GES MAMOORI (M)	0.85	10	1	1	0.85
GES JAMNA CHANDIA (M)	1	1	1	1	1
GES BAHADUR GARH (M)	1	1	1	1	1
GES SULTAN MEHMOOD WALA (M)	0.49	14	1	1	0.49
GES MOHSIN ABAD (M)	0.47	16	1	1	0.47
GES LADUN (M)	0.57	12	1	1	0.57
GES CHAK DALAIL (M)	1	1	1	1	1
GES MUMDANI (M)	1	1	1	1	1
GES GABOOL WALA (M)	0.84	11	1	1	0.84
GES SINDH KALERI JANUBI (KOT HAIBAT) (M)	0.55	13	0.75	16	0.73
GGES CHAH MASOORI WALA (F)	0.32	19	0.59	18	0.54
GGES GUJJAR WALA NO 1 (F)	1	1	1	1	1
GGES GADI WALA NO 2 (F)	0.90	9	1	1	0.9
GGES KOT DAUD (F)	0.48	15	0.59	17	0.81
GGES CHURHATTA NO 3 (F)	1	1	1	1	1

Table 10 shows the scale efficiency scores of the private elementary educational institutions.

Table 10: Scale Efficiency Scores of the Private Elementary Educational Institutions

Private Schools	Score	Rank	Score	Rank	Scale Efficiency
ALI PUBLIC SCHOOL	0.78	18	0.78	18	1.01
AL-FAISAL PUBLIC SCOOL	1	1	1	1	0.65
ASIM PUBLIC SCHOOL	1	1	1	1	1
HAMDARD PUBLIC SCHOOL	1	1	1	1	1
MY SCHOOL AND ACADEMY	1	1	1	1	0.29
KAZIM GRAMMAR SCHOOL	0.51	21	0.51	21	0.70
PRIMARY SCHOOL DARAHMA	1	1	1	1	0.89
PRIMARY SCHOOL MOHALAY WALA	1	1	1	1	1
HOPE PUBLIC SCHOOL	1	1	1	1	1
LEARNERS LAND SCHOOL	1	1	1	1	1
BRIGHT STAR PUBLIC SCHOOL (KOT HAIBAT)	1	1	1	1	0.92
GROOMERS PUBLIC SCHOOL	1	1	1	1	0.35
ARSLAN PUBLIC MODEL MIDDLE SCHOOL	1	1	1	1	0.59
ADAM GALAXY OF EDUCATION	1	1	1	1	0.67
BRIGHT EDUCATION MIDDLE SCHOOL	1	1	1	1	0.64
ALIYA PUBLIC MIDDLE SCHOOL (PAIGAH)	0.53	19	0.53	19	1.03
JAN MUHAMMAD KHOSA PUBLIC HIGH SCHOOL	1	1	1	1	0.8
SIR SYED MODEL SCHOOL (BLOCK 18)	1	1	1	1	1
THE MASTER PUBLIC MIDDLE SCHOOL (PAIGAH)	0.53	20	0.53	20	1.13
HAMDARD PUBLIC SCHOOL	1	1	1	1	1
PAEC MODEL MIDDLE SCHOOL	1	1	1	1	0.52

5. Conclusions and Policy Implications

The study has computed the efficiency scores of public and private elementary educational institutions in tehsil Dera Ghazi Khan. Having calculated the efficiency scores using the DEA model on both the types, the public and the private schools are inefficient in tehsil Dera Ghazi Khan under a given set of variables. There is a significant difference

between the efficiency of public and private schools. Private schools are more efficient than public schools. The results can be observed and interpreted in output variables as the efficiency is determined by the ratio of the sum of weighted outputs to the sum of weighted inputs. The more the values of the output, the more efficient are the schools.

The average efficiency scores, for the public schools using CCR, are 73% whereas the average efficiency, scores for the private schools, are 74% which shows that the private schools are more efficient as compared to the public schools. The efficiency scores of the public and private schools, using BCC model, are also calculated. The efficiency scores of the public and private schools, using BCC model, are 89% and 92% respectively. It also upholds the dominant paradigm that private elementary educational institutions are more efficient than their public counterparts.

As far as the output variables are concerned, the mean number of students is recorded as 218 and 235 for the public and private schools respectively. The standard deviations remain 86 and 180, for the public schools and private schools respectively. New admission for the public and private schools are 8% and 24% respectively, which shows that the private schools are performing better and the public schools need to develop public trust and build a perception in order to attract more students. The number of students who participated in the PEC class 5 examinations for the public and private schools on average is 22 and 20. The minimum and maximum values for public schools remain 5 and 50 with a standard deviation of 12. The minimum and maximum values for the private schools remain 0 and 82 with a standard deviation of 21. Similarly, the average number of students who participated in PEC class 8 examinations, for public schools, is 9 when compared to the average number of students who participated in PEC class 8 examinations, for private schools 10. The standard deviation values are 12.5 and 13.4 for the public and private schools respectively.

The variables regarding the average marks obtained by the students in PEC examinations for both classes 5 and 8 are probably important output variables. These variables show the efficiency of the schools, reflecting the quality of education provided by these schools. The average marks, obtained by the students, in PEC class 5 examinations who have passed the examinations, are noted as 324 and 332 for the public and private schools respectively. The minimum marks obtained by a student, are 307 for public schools and 310 marks for private schools. The maximum marks are recorded as 346 for the public schools and 369 for the private schools. These results show why private schools are more efficient than their public counterparts. The average marks, obtained by the students who passed the examinations, in PEC class 8 examinations, are noted as 328 and 333, for the public and private schools respectively, with standard deviation values of 31 for the public and 28 for the private schools.

While the study aimed to evaluate the efficiency scores of public and private elementary educational institutions of tehsil Dera Ghazi Khan, it can be utilized in the provision of guidelines to the policy-makers. With the help of the following policy recommendations, the efficiency of public and private elementary educational institutions can be made better.

- The monthly average teachers' attendance is another reason for the downfall of the public schools that need to be addressed. To compete with the private schools, the public schools need to ensure 100% teachers' attendance.
- The monthly average students' attendance also needs to improve as the more the students spend their time at school, the more they will learn at school.
- The government should take a notice of the schools where drinking water is not available and ensure the availability of drinking water as it is a basic human need.
- The responsible authorities should take steps regarding the availability of boundary walls, as students' attention does not get diverted from the teaching-learning process due to outside activities.
- Although the government is trying hard to meet the requirements of furniture at the public schools still there are some schools where there is room for improvement in terms of 100% availability of furniture.
- School hygiene is another factor that is the cause of parents' concern for their kids as many as 80% of the school buildings and classrooms are not found to be clean. Even though most public schools have playgrounds available, they are not able to increase their enrollment when compared to private schools. The cleanliness issue needs to be addressed by the government needs to recruit cleaners and sweepers.
- Public schools are required to increase their security with the help of security equipment and security guards.
- Frequent training sessions are required to improve and update the teaching skills of the teachers.

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