The Economic Consequences of School-Consolidations: Paired Sample t-test Analysis

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Abstract:
The objective of this study is twofold. First, this study tried to analyse the meaning of school consolidation and explains the determinants of school-consolidations. Second, the study tried to trace some economic consequences of such school-consolidations in Telangana State, India with the paired sample analysis. The school-closures, school-consolidations and the merger of schools are often termed as synonymous to each other. The closure or merger of low-enrolment registered schools is broadly considered as the school–consolidation. One of the key determinants of school consolidations is the low-enrollment. The study is based on the primary survey conducted in Telangana state. This study has found that the average per-capita expenditure to access the education after school consolidations has increased drastically. The results of the paired sample t-test confirmed that there is a statistically significant difference in average per-capita expenditure concerning pre-and-post school-closures expenditure on education. Ultimately, this school-consolidations creates an occasion to choose private schooling by the parents of pupil.
Keywords: School-consolidations, school-closures, expenditure, economic impact, paired Sample t-test.

INTRODUCTION

Universalization of education is one of the key principles of the Indian constitutional mandates. The Article 45 in the Constitution of India says "The State shall endeavor to provide, within a period of ten years from the commencement of this Constitution, for free and compulsory education for all children until they complete the age of fourteen years". Various policies were adopted in this direction from time to time. The National Commission on Education (1964), Education Policy (1968), the National Policy on Education (1986) propose to provide "access to education of a comparable quality for all irrespective of caste, creed, location or sex". The Right to Education Act (2009) mandates the government to provide for children's access to elementary schools within the defined area or limits of neighborhood. The neighborhood area of the school is defined as "the habitations in a safe walking distance of 1 km for a Primary School, 3 km for an Upper Primary / High School having classes VI to VIII" .

The Right to Education Act (RTE-2009) had set a stage for India to attaining universal elementary education, but still, there are some hurdles in school education. The school consolidations (also referred to as school closures) are one of such bottleneck problem in Indian school education system. The idea of school consolidation through the closure of low-enrolment schools works against the people desires, especially in the rural area.

National Education Policy (2020) also clearly mentions that "although consolidation of schools is an option that is often discussed, it must be carried out very judiciously, and only when it is ensured that there is no impact on access. Such measures are nevertheless likely to result only in limited consolidation, and would not solve the overall structural problem and challenges presented by the large numbers of small schools" .

The research on education is well established and explored on the different aspects like quality, absenteeism, dropouts, enrolment, returns on education, employment opportunities of education, etc. However, there is a lag in research on understanding schools-consolidations and its relationship with expenditure on education.

Therefore, this study tries to fill that gap in modest way. The objective of this study is twofold. First, to analyse the trends of school consolidations/closures and find the reasons for them in Telangana State. Second, to understand the economic consequences of pre-and-post school-closures in Telangana State.

To understand the causes for school consolidation/closure at the grass-root level, this study had conducted a primary survey at two villages (where two primary schools closed) 1. Srirangapur and 2. Mungamandinney in erstwhile Mahabubnagar district of Telangana State, India. One of the key determinants of school consolidations is the low-enrollment. The study found that the average per-capita expenditure to access and continue the education after school consolidations has increased drastically.

RELATED REVIEWS

The school's consolidation means 'it is a technique adapted to combine the low-enrollment schools' and the both terms School-Closures and Consolidation-of-Schools are almost having the same meaning (Howley, Johnson, & Petrie, 2011). Moreover, the 'consolidation of schools' sometimes referred to as 'merger of schools' too (Joe Bard, Clark Gardener, 2005). However, the idea of school closures in the name of consolidation of schools creating big hurdle in accessing education by every child. This goes against the spirit of achieving universalization of education. This school closure not only creating a problem of access to it but it is even causing some economic adverse effects.

There are no consensus views on the reasons for school closure in both rural and urban areas. The low-enrolment rate is one of the prime causes for the closure of schools (Müller, 2011). The low enrolment typically increases the fiscal burden on the responsible authority of the school. To reduce the financial burden of expenditure in low enrolment schools, the government had to go for adopting consolidation of such school. Therefore, the consolidation of school means making a school more viable in the economic situation, for example, the bigger school has more advantage of cost-benefits (Y. L. Jack Lam, 1982). Interestingly such low-enrolment is an outcome of administration failure (G. Bruce Doern and Michael J. Prince, 1989).

According to the DeYoung & Rowley (1990) the motive behind rural school's closure is the poor schooling in some regions of North America. Here the schooling measured in the form of pedagogy, a systematic instruction of predetermined bodies of knowledge, which is

very crucial for every student. The study found that there was a reduction in total school availability from 238000 schools to 61000 schools between 1930 and 1980 in United States of America. On the contrary, Muller (2011) argues that the demographic processes have resulted a decline in some urban areas in the eastern German region during 1992-2002. As a result, there was a decline in enrolment in urban schools and consequently, there were school closures occurred during the period 2002-08.

It is impossible to become a long-run sustainable country without encouraging inclusive education facilities (Hoffmann, UNICEF, and Adams, 2015). Further, the school education acts as a base for nation building from gross-root level to create a healthy educated society but as this idea of school-consolidation may work against such expectations (Campion, 2015).

THE CONSEQUENCES OF SCHOOL CONSOLIDATIONS

The costs and consequences of school consolidations offsets the proposed benefits to a larger extent. This closure of schools will lead to wastage of valuable public resources like school buildings and the workforce of teaching community etc. (Richard Weatherley, 1983). The Consolidations increase the dropouts (Shakeshaft and Gardner, 1983). More importantly, the school consolidations increase the private expenditure on education and also increases the transportation cost of accessing schooling (Krishner, Gaertner and Pozzoboni 2010). A study in the United Kingdom showed that the school consolidations caused a massive wastage of public funds in terms of school infrastructure (Shaw, 1990). The consolidation influences the lives around the school neighborhood. This school-consolidation may also adversely impact the economies of those families living near to closed schools (Billger & Beck, 2012, Howard M. Johnson, 1978). The schools closures may also lead to increased demand for the private school education, there are tendencies of increasing enrolment in private schools and pay more fees in such schools.

Despite those visible adverse outcomes of school consolidations, this can produce some benefits in the form of reduced operating costs and increase administrative efficiency. But, as per the requirement of this study and to address the proposed objectives it won't consider to focus on benefits of school consolidations.

THE SITUATION OF SCHOOL CONSOLIDATION IN INDIA

There are some exclusive reasons for why the schools are being closed in India. The prime cause for the closure of public schools in India is low-attendance and poor-quality of education (Dhankar, 2014). A study estimated that the number of school closures in major states like Rajasthan (17000), Maharashtra (14000) and Odisha (195) schools in 2014

In 2015, the Andhra Pradesh government had a plan to merge nearly 12,998 schools but end-up merging 1,436 schools due to the pressures from the civil society (The Hindu, 2015). This indicates a decline in the government school-education system. If it continues further, the public schools crate a vacuum in the school system which will be gradually occupied by private schools, which operate with profit motive. This will have serious consequences on the education system in India as a whole.

The Telangana State is newly created 29th state in India (Ministry of Law and Justice, 2014). Unlike those conventional causes to school-closures, The Telangana State experiencing a peculiar situation with school consolidation (Miranda, 2013). Some scholars viewed that provisions in the RTE-2009 may implicitly cause for school consolidations. The Right to Education Act (RTE-2009) has made a compulsory provision of 25% seats to the marginalized children's who studying under the private ownership schools in India. Accordingly, all the private schools need to allot their 25% of total available seats to marginalized sections students. This may create situation where students migrate from government schools to private schools (Akula, 2015). Practically, RTE-2009 creating an ambiguous situation of public-school closures (Francis, 2014). Since, the government provides financial assistance to the students joining under the 25% quota in private schools, there may be large migration of students from government schools to private school. This will result in low enrollment in the public schools and which becomes the reason for consolidation of state-run schools. The department of school education of Telangana State has also apprehensive that effective implementation of RTE-2009 norms would also give a chance to mushrooming of private schools in the state as private institutions will get fee reimbursement (Akula, 2015).

According to Telangana assembly discussion on education (2016), the government of Telangana State proposed some reforms regarding the consolidation of schools. It is considered that if a primary school has to function well, it must possess at least not less than 100 students. For upper primary schools, it is around 220 students, and in high schools, it should be around 200 students. If those numbers did not meet, then it will become a financial burden to run such schools.

Therefore, the government is following two criteria to deal with such a situation. The first one is to merge the less enrolled or non-teacher available upper primary schools into nearest (within five k.m, distance) high school, The second option of merging schools is whichever high school has less than 100 enrolments it has to merge the nearest high school (with-in five k.m, distance high school). Therefore, the criteria of minimum "100 student's strength" taken as a determinant boarder line of whether the schools must run or merge with another school under the process of consolidation.

Table-1: District-wise closure of schools from 2012-13 to 2016-17, Telangana State

Total closed schools (2012-13 to 2016-17) In 00's					
Districts / Year	2012-13	2013-14	2014-15	2015-16	2016-17	Total
Adilabad	45	66	88	14	12	225
Hyderabad	12	19	101	11	17	160
Karimnagar	118	137	135	6	28	424
Khammam	38	49	61	3	3	154
Mahbubnagar	28	47	120	16	21	232
Medak	71	75	53	7	59	265
Nalgonda	123	166	102	1	8	400
Nizamabad	89	95	76	5	17	282
Rangareddy	67	59	1	94	42	263
Warangal	61	88	179	2	22	352
Total	652	801	916	159	229	2757

Source: Sarva Shikshya Abhiyan, Telangana State, 2017.

Note

1. the data included all the type of schools. i.e., primary and upper primary and high schools.

2. The Data has been collected and processed based on the profiles of old districts. In 2018, the Telangana has reorganized the districts from 10 to 33 districts.

From the above table-1, it is observed that the total 2757 government schools are being closed with the highest number being 916 schools in the academic year 2014-2015 and least 159 schools closed in the year 2015-2016. When we look at district wise, it is evident that Karimnagar, Nalgonda, and Warangal occupied the top position in total school closures. Khammam and Hyderabad & Adilabad showing least closure of schools. The table-2 provides detailed explanation of annual average closure of different type's Schools.

Table-2: District wise annual average school closures from 2012-13 to 2016-17.

District/average school closures	Primary School	Upper primary schools	High schools	Average closure of total Govt schools
Adilabad	34	3	1	38
Hyderabad	24	1	1	26
Karimnagar	66	2	2	70
Khammam	25	0	1	26
Mahbubnagar	37	1	1	39
Medak	41	1	2	44
Nalgonda	65	1	1	67
Nizamabad	40	3	4	47
Rangareddy	43	1	1	45
Warangal	57	1	1	59
Total	432	14	15	461

Source: Sarva Shikshya Abhiyan – Telangana State, 2017

Note

1. in table-1, Hence the entity of schools is not possible to division into decimal numbers, the actual outcomes of averages are modified from the decimals to nearest absolute numbers.

2. The Data has been collected and processed based on the profiles of old districts. In 2018, the Telangana has reorganized the districts from 10 to 33 districts.

That Primary schools (PS) contains the classes from first to fifth class and Upper Primary schools (UPS) teach from sixth to the seventh standard, finally High schools (HS) covers the classes from eighth to 10th standard. The Primary schools were closed nearly 432 per year (table-2). The districts like Karimnagar, Nalgonda, and Warangal have most primary school closures at the rates of 66 and 65 & 57 per year (table-2). The Upper primary schools closed at 14 per year (table-2). The most UPS closed in the districts Nizamabad, Adilabad, and Karimnagar. Meanwhile, the average high school (HS) closed in State are 15 per year (table-2). The most of the high school are closed districts in the districts Nizamabad (4), Medak (2), Karimnagar (2) schools per year. Relatively, the primary schools are closed in high number compared to UPS and HS schools (Table-2). Therefore, the school closure problem is high in the basic elementary education level.

Table-3: Causes for School Closures, Telangana State in India

Reasons for school closures	Types of schools closed				
	PS	PS+UPS	UPS+HS	PS+UPS+HS	Total
Uneconomical Enrolment	57	2	2	0	61
Children going to Private Schools	3	0	0	0	3
Non availability of sufficient infrastructure facilities	5	1	0	0	6
Migration of children along with parents	2	1	0	0	3
Other reasons	34	4	2	1	41
Total	101	8	4	1	114

Source: Sarva Shikshya Abhiyan-2017, Telangana State, India.

The Government of Telangana State has surveyed on reasons for school closures in some selected closed schools (114) areas (table-3). State Government has collected these above responses from the teachers and village residents in those closed school areas. Broadly, it has found that there are five reasons. Among them, the most selected reason is "uneconomical enrolment" which causes the closure of 61 schools out of a total of 114 schools (table-3). The second is the "Other reasons" with contribution to closure of 41 schools, and next, "non-availability of sufficient infrastructure facilities" (6 schools) and children going to private schools (3 schools). Finally, 3 schools closed due to migration of children along with parents (table-3). It is evident from the data that the primary schools had closed mostly because of uneconomical enrolment reason (table-3).

Wherever there is low-enrolment in primary schools, the government felt that it is economically burdened to continue such less-enrolled school and opt to close them permanently. However, the data in Table-3 is not witnessing all the hidden reasons like parent's views on school and medium of teaching & toilet facilities, etc., which are most influential factors for low-enrolment in this case.

MATERIALS AND METHODS

The study is based on a primary survey conducted at two villages (where two primary schools closed) Srirangapur and Mungamandinney in erstwhile Mahabubnagar district of Telangana State, India. Since, this study is trying to analyse the economic effect of school consolidations on families of children's who studied in those closed-schools, the primary data is collected to study per-capita expenditure on education of each student independently concerning pre- and post-school consolidation. Such Cross-section primary data has been collected from the field survey by using non-probabilistic purposive sampling technique. From the secondary data collected from Sarva Shikshya Abhiyan, Telangana State, It was identified that there are two closed-schools, one is from Srirangapur BC-Colony primary school and another from Mungaman Dinney village Primary School, those both schools belong to the same erstwhile revenue Mandal named Pebbair in the erstwhile Mahabubnagar district in Telangana State. This study noticed that there were 52 students used to go for schooling in those two closed-schools. However, after the closure of such schools, only 48 students out of 52 pupils have continued their education and rest of four students left their education and joined the family works. This survey is concentrated on those 48 children's per-capita expenditure on education concerning pre- and post-school closures. So that we can make an inference, regarding whether there is any impact of the consolidation of schools.

PAIRED SAMPLE T-TEST

To analyse cost/expenditure effects of school consolidation on each pupil, it requires to collect the data from same source of pupil/individual who have been studied in that consolidated school. Statistically, the pre and post school closures and their expenditure effects can be studied and validated with the paired sample t-test. Cooly & Floyed (2013) analysed the school consolidation effects in Texas (USA) with ten years reference period from 1999 to 2009, and that study found that the results of the paired sample t-test did reveal a statistical difference in per-pupil expenditures before and after consolidation. By following Cooly & Floyed (2013), this study adopts the same methodology to study the school consolidation.

The paired sample t-test examines whether the difference in the per-capita expenditure of each student concerning school consolidation is statistically significant or not. two dependent samples are defined as that, two data values—one for each sample—are collected from the same source (or element) and, hence, these are called paired or matched samples (Mann, 2016).

It is notified that x_i is per-capita expenditure on education of ith student before the school being closed and y_i is per-capita expenditure on education of ith student after the closure of the school. Such both samples being collected from the same source of sampling units which is total of 48(n). Before applying t-test, it is necessary to assume that the sampling data is sufficiently large ($n \geq 30$) and it is following the normal distribution.

Under the null hypothesis (H_0) we assume that the increase or decrease in per-capita expenditure is just by chance but not due to closure of schools, i.e., $H_0 : \underline{x} = \underline{y}$, Alternative Hypothesis (H_1) : $\underline{x} \neq \underline{y}$. test statistic is

$$t = \frac{\underline{d}}{s_{\underline{d}}} \text{ , where } d_i = x_i \text{ - } y_i \quad \text{and} \quad \underline{d} = \frac{1}{n}\Sigma \qquad d, \qquad s_{\underline{d}} = \frac{s_d}{\sqrt{n}} \text{ , } \qquad S_d = \sqrt{\frac{\sum_{i=1}^{n} (d-d)^2}{n-1}}$$

t stands for test static, d_i is difference of paired samples x and y at each ith unit. The n is sample size (48), n-1 is degree of freedom. $\underline{d}$ is mean of difference of paired samples x and y. s_d Is standard error of d, and S_d is standard deviation of d. the outcome of this test will be discussed in-detailed in the section of results analysis.

EXPENDITURE ON EDUCATION: PRE AND POST SCHOOL-CONSOLIDATIONS

The table-4 indicates that, in closed schools the average expenditure ($\underline{x}$) on education of per child was Rs 1750 and approximate minimum expenditure was Rs 1000, maximum was Rs 3000 per student per year. After the consolidation of school's 48 students (out of 52 students) are continuing schooling in different managements of schools and paying Rs 16604.17 as an average expenditure($\underline{y}$) to pursuing the same primary education. Therefore, there is a huge escalation in the average expenditure on education due to school closures. On an average this is at the level of Rs 14854.17. Now let us check this result with paired sample t-test whether it is by chance or it following the statistical significance.

Table-4: descriptive statistics of expenditure on education.

Sample	minimum	maximum	mean	Std. Deviation	skewness	Kurtosis
X	1000	3000	1750.00	601.417	.153	-.441
Y	1000	48000	16604.17	11808.291	1.070	.302

Source: Authers Field survey-2016

Note

1) The expenditure incurred in closed-school is purely based on costs of cloths and stationery (X_i).

2) The expenditure on present school is calculated from both the government and private school admitted students together (Y_i).

To test the hypothesis that the pre-closure per-capita expenditure and its standard deviation ($\underline{x}$=1750, SD_x=601.417) and post-closure per-capita expenditure and its standard deviation ($\underline{y}$=16604.17, SD_y=11808.291) were equal, a paired sample t-test was performed. Prior to the conducting the analysis, the assumption of normally distributed samples were satisfied as their estimated skewness values (x=.153, y=1.070) and kurtosis values (x=-.441, y=.302) are less than the maximum allowable values for a t-test (i.e., skew < 2.0, kurtosis < 9.0) (Posten, 1984). Therefore, the above conditions suggest that the depended/paired sample t-test is appropriate to use in this case. The (H_0) null hypothesis of equal per-capita expenditure in pre and post school closure is rejected, t (47) =-8.841, p≤ .05. it confirms that $\underline{y}$ is statistically significantly not equal to $\underline{x}$.

In the field survey, it was also observed some related effects of school consolidation, which are, after the closure of those two schools about 21(43.8%) students had joined in near government schools, and rest of 27(66.2%) students joined in private management schools. Therefore, consolidation of government schools is indirectly promoting mushrooming of private schools. The first adverse effect of school closure is a sharp rise in average school-going distance from zero (before school closure, students had to study in their own village school) to 21.13 K.m. In the post-consolidation, the students studying in the new government schools on an average (per-year) had to spend Rs 7142.85 as transport cost exclusively. When it comes to students who are going to private schools have to bear average school fee and transportation costs approximately Rs 32000 per year (calculated from the field survey).

CONCLUSION AND SUGGESTIONS

The adaptation of school consolidation policy goes against the spirit of the Right to Education Act-2009. However, due to school-consolidations, the government avoiding these norms and justify in the name of efficiency gains. The data suggesting that comparatively there is more closure of primary schools than other two types of schools.

The study found that the average per-capita expenditure to access the education after school consolidations has increased drastically. The government has not focused on why the parents are not interested to send their child's to government schools. The field survey data explaining that non-English medium of teaching and poor infrastructure facilities and problems associated with teachers are majors reasons for low-enrolment in the government schools.

The government has not taken into account all the above factors in analyzing, why students aren't taking admissions in government schools. Instead, it is focusing only on end outcome which is less enrolment indicating the school consolidation policy. Instead of fixing the existing problems in schools, the government is undoubtedly creating further problems with the closure of schools.

There is a urgent need to fix those causes of school closures. If the enrolment rate increases in required areas, there is a chance of growing government education and achievement of universalization of education, and it will create an occasion to the achievement of

inclusive education with all sections of people. This study has found some possible suggestions for the control of the negative effects of school closures. There below are;

1. In the field survey, the parents categorically said that the future benefits are (in terms of higher education and employment opportunities) mostly associated with the English medium learning, and expressed concerns over local telugu- medium as teaching. Therefore, as per the parents' interest, immediately the government has to implement English-medium teaching since the first class. It will reduce the withdrawal of students from government schools.

2. The most common barrier in closed school was poor infrastructure facilities. So, improve the number of classrooms and drinking water & toilets facilities regarding the demand for boys and girls separately.

3. It was also noticed that there was only one teacher used to allot to teach for the classes from first to fifth. Parents have some concerns on such teacher's allocations. So, less number of teachers's in a school also a cause for the decline in the number of students at the primary and elementary class level. here the government must increase the number of teachers or at-least, not violate the rules of RTE-2009 on teacher's availability in primary schools.

4. Improve the methods and ways to make active participation of parents in school development issues.

5. There were poor monitoring authorities such are Mandal education officers and others. Therefore, the government has to improve the smart-technology to monitor absenteeism by teacher and students, control of government officials functions.

6. Most importantly, the government has to stop seeing education in an economic motive. Because the RTE-2009 says clearly, the education should not follow the profit motive in its supply.

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