Determinants of Average Class Size of a School: A Case Study in West Midnapore District of West Bengal

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ABSTRACT

Student inflow in a school can be treated as an essential schooling output as it reflects the functional capacity of a school. Parents' choice in selecting a school for their children largely depends on a school's functional capacity. This paper aims to measure regional variations regarding the availability of various school inputs and student inflow in a school and determine the essential determinants affecting the student inflow of a school. For this purpose, we have collected the DISE block level & unit level data for 2012-13, West Midnapore district in West Bengal, India. The study only considered the information about rural schools providing elementary education. Main findings from regression exercises are that availability of core facilities, basic facilities, grants and incentives, status and availability of teachers, and monitoring agents' functions positively impact the average class size. Moreover, all the associations, except the relationship between average class size and monitoring agent functions, are statistically significant.

**Keywords:** Student inflow, Average class size, School inputs, Core facilities

Elementary education is considered an effective instrument in economic development in any society. Because of its immense importance, it has become a public policy debate. The status of several schooling outcomes that depend on the availability of various school inputs is the central agenda of this public policy debate. A student's enrollment status or the student inflow in a school can be treated as an essential schooling output as it reflects a school's functional capacity, which in turn depends on various school inputs. Parents' choice in selecting a school for their children largely depends on a school's functional capacity. The variation in the functional capacity of schools is argued to be the prime factor responsible for explaining the differences in student inflow among schools. Schools with students-strength more of their capacity might fail to offer a proper teaching-learning environment. Again, less student strength reflects the inability to use scarce resources available for elementary education effectively. A proper legitimate and justified public education policy is required to achieve the dual objectives of effective utilization of resources and imparting quality of education.

The Government of India has adopted several education policies during the planning period. The National Education for policy (NEP, 1968) was the first official document evidencing the India Government's commitment to school education. The NEP (1968) went through a couple of amendments thereafter. A key milestone in the history of achieving access to education is the 86th constitutional amendments act passed in December 2002. This Act makes free and compulsory education a fundamental right for all children aged 6-14. Article 21-A of the constitution of India and its
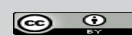
consequent legislation, the right to Children to Free and Compulsory Education (RTE) Act, 2009[1], became operative in the country on 1st April 2010. The RTE aims to improve education in India by focusing primarily on increasing funds for schools, mandating specific infrastructure deliverables, maintaining prescribed student-teacher ratio, attendance of teachers and students and creating a variety of accountability mechanisms. Within RTE, children are treated as right holders rather than duty bearers. The Act specifies that it is the obligation of the Government to ensure admission and enrolment of children in elementary education.

Policy debates on maintaining the adequate student inflow in a school emphasize access to education and the quality of elementary education. In either case, the academic status of teachers, availability of physical facilities, and monitoring mechanism play a crucial role in selecting a school. Moreover, the socio-economic conditions (Dongre & Tewary, 2015) and landscape (Jindal, 2015) of the locality also affect the children's access to elementary education, which in turn determine the enrolment status of a school. Higher student inflow in a school increases the average class size compared to the schools where this inflow is relatively less.

Most of the studies those deal with variation in class size simply examine its association with student achievement (Glass & Smith, (1979); Rivkin, Hanushek & Kain (2005); Woessman and West (2006). Rockoff (2009) argued that student achievement increased when class size rose in the context of the USA prior to World War II. Moreover, most studies explore the effects of school inputs on students' attendance, drop-out and quality of education. How these school inputs affect the student inflow of a school is relatively less explored. However, very few studies in this regard are available in the Indian context. In this context, this paper aims to identify the factors affecting the average class size of the schools providing elementary education.

This paper is divided into five sections. The sources of secondary data and methodology adopted for the study are reported in Section II. Section III describes the regional variations regarding the availability of various school based inputs and the

status of the average class size in the study area. Section IV examines the effects of various factors in determining the average class size of a school. The final Section V provides the main conclusions of this study.

DATA AND METHODOLOGY

In this study, we have used data from secondary sources. It has been collected from DISE statistics (Elementary education) for the year 2012-13, which is based on DISE unit level (school level) data of Paschim Midnapore district of West Bengal. The DISE unit level data gives various school-specific key indicators (enrolment, availability of various infrastructure, the status of the teacher, academic visit, development grant etc.) for primary education.

Based on DISE data and census data, we have developed various school input variables.

In this study, all school-based inputs are categorized into seven dimensions.

We have constructed various individual level indices based on DISE data to study the above-said objectives. Various indices are constructed by using the formula (Actual value-minimum Value)/ (Maximum Value- Minimum Value). Apart from this, some other statistical tools like mean, coefficient of variations, and multi-regression models have been used in this study.

Availability of School Inputs in West Midnapore District and its Regional Variations

Analysis of availability of school inputs and achieved outputs reflect some idea about the status of education in a region. It not only highlights the availability of school resources but it reflects resource deprivation and the utilization capacity of such resources in a school. Moreover, it helps to determine the future investment and other strategies required to fulfil the commitments of the Governments prescribed in RTE 2009.

Availability of Academic Institutions imparting Elementary Education

A good education system always demands the fulfilment of some physical requirements. The success of elementary education depends on the availability of these facilities, i.e., the prevalence

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[1](https://dsel.education.gov.in/rte)

Table 1: School-Based Inputs in Elementary Education

Sl. No.	Dimensions	Components of Dimensions
1	The density of Academic Institutions	Area coverage per School
		Households coverage per school
2	Availability of core inputs	Whether the schools have classrooms
		Whether the schools have blackboards
		Total classrooms in a school
		Percentage of good classrooms in a school
3	Teachers and their Academic Status	Availability of Headmaster
		Total number of teachers
		Percentage of a professionally trained teacher
		Percentage of graduate teachers in a school
4	Monitoring of Academic Institutions	Visit by Block Resource Centre (BRC)
		Visit by Circle Resource Centre (CRC)
		Academic Inspection
5	Availability of Fund	Development Fund
		Teaching Learning Material (TLM) Fund
6	Availability of Basic facilities	Availability of Electricity
		Availability of Drinking Water
		Availability of toilet
		Presence of Boundary Wall
		Presence of Playground
		Presence of all approachable weather road
7	Incentives	Provision of Mid-day meal
		Free medical Check-up

Source: UDISE 2012-13, West Midnapore.

Table 2: Household and Area Coverage per School

Coverage indicators	Maximum	Minimum	Average	CV
Number of households per school	240 (Kharagpur 1)	88 (Sankrail)	138	25.36
Area coverage per School	1.68 km (Jamboni)	0.65 km (Daspur II)	1.07	25.84

Source: DISE (2012-13) and Census 2011.

of more equipped educational centres. More educational centres ensure the easy accessibility of education by the people. In our study, two block level variables, namely, (i) Area Coverage per school and (ii) Households coverage per school, have been used to measure the availability of academic institutions imparting elementary education. These two indicators give some insights into the density of schools in a block.

In the rural West Midnapore district, there are 8785 primary and upper primary schools (DISE 2012-13). Area coverage per school in this district is found to be 1.07 km (Table 2) which is quite satisfactory as the prescribed norm of area coverage is one km per school. The school density is lowest at Jamboni, where each school cover nearly 1.68 km. The density of schools is maximum in Daspur II Block.

Regarding household coverage per school, the study reveals 138 households per school in the West Midnapore District. Per-school household coverage is maximum in Kharagpur I block, whereas the minimum household coverage per school is in Sankrail block. This picture might help make an investment plan in creating educational centers in a particular district area. The above analysis shows a wide inter-block variation regarding the availability of academic institutions.

Availability of Core facilities

Access to elementary education by all cannot be

achieved by only spreading academic institutions. It demands the availability of other core facilities such as the availability of classrooms and their condition, blackboard etc. Analysis of the availability of core facilities may offer an insight into the resource deprivation of the academic institutions.

In our sample district, many schools are deprived of these core facilities. Nearly 2.42 per cent of schools do not have classrooms in the West Midnapore district. In addition, nearly 21.23 per cent of classrooms are in bad condition. Some schools do not have any blackboards (0.77 per cent). Table 3 presents the regional disparities in accessing core facilities by the academic institution imparting elementary education. As regards the availability of classrooms, nearly 12 per cent of schools do not have any classrooms in the Binpur-I block.

Insufficiency of classrooms is a normal phenomenon in almost all blocks in the sample district. In West Bengal, a primary school require four classrooms as it runs four classes (I to IV), and an upper primary school requires at least eight classrooms as it runs eight classes (I to VIII). The average classroom per school in this district is just 3.3, far below the minimum required level in this regard. The worst scenario in this regard has been observed in Binpur I block, where this ratio is 2.5. Daspur II block is appeared to be the best performing block in this regard. The inter-block variation in average classrooms is very high compared to the other indicators measuring core facilities. A comparison regarding condition of classrooms across the blocks shows that the percentage of bad Classrooms ranges from 29 per cent in Gopiballavpur I to 16 per cent in Garbeta III block.

The above analysis helps us to offer an insight into the physical infrastructure available to impart elementary education in the sample district. The provision of core facilities is a necessary pre-condition but not sufficient for the successful implementation of elementary education. In the next section, we have tried to give some idea about the availability of other essential facilities required to impart quality education.

Availability of Basic Facilities

The availability of basic facilities reflects a school's status and plays a major role in parents' school selection for their children. Table 4 presents some information about the variation in the availability of basic facilities in schools across blocks in the West Midnapore district. The basic facilities which we have considered in our study are (i) availability of toilets; (ii) electricity; (iii) drinking water; (iv) playground; (v) boundary wall; (vi) existence of approachable all-weather road to reach school.

While comparing the availability of electricity in the schools across the blocks (measured in terms of percentage of schools having electricity facilities), it is found that 25 per cent of schools in this district avail electricity. The highest number of schools having electricity is in Daspur I block whereas in Binpur I, the corresponding figure is just 11 per cent. Inter-block variations in this regard are found to be nearly 56.64.

The provision of boundary walls and playgrounds in a school not only displays a school's status but also helps to ensure a proper teaching-learning environment by securing students' safety. Our study highlights that nearly 28 per cent of schools have boundary walls in this district. In the keshiary block, nearly 50 per cent of schools have boundary walls, whereas only one-fifth have boundary walls in the Jhargram block.

Table 3: Availability of Core Facilities

Core Facilities Indicators	Minimum	Maximum	For District	CV
Per centage of Schools having Classroom	100 (Dantan I)	87.81 (Binpur 1)	97.58	2.52
Per centage of Schools having Blackboard	100 (Daspur II, Garbeta I & III, Gopiballavpur I & II, Jamboni, Jhargram, Kharagpur I and Mohanpur.	98.06 (Ghatal)	99.33	0.68
Average classroom per school.	2.5 (Binpur II)	4.4 (Daspur II)	3.3	15.82
Per centage of Good Classroom	71.38 (Gopiballavpur I)	83.56 (Garbeta III)	78.77	3.63

Source: UDISE 2012-13, West Midnapore.

Table 4: Availability of Basic Facilities

Indicators of Basic facilities	Maximum Value	Minimum Value	For Districts	CV
(i) Availability of toilet	99.52 (Gopiballavpur II)	70.49 (Binpur II)	92.69	7.56
(ii) Percentage of schools having electricity	65.82 (Daspur I)	9.86 (Binpur II)	25.44	56.64
(iii) Percentage of schools having drinking water	100 (Binpur II & Nayagram)	96.14 (Jhargram)	98.79	0.87
(iv) Percentage of schools having a playground	63.53 (Dantan I)	16.90 (Garbeta II)	35.51	34.87
(v) Percentage of schools having boundary wall	50.18 (Kashiary)	17.55 (Jhargram)	27.73	28.19
(vi) Percentage of schools having the existence of approachable all-weather road to reach school.	99.17 (Garbeta III)	87.43 (Binpur II)	95.65	2.98

Source: UDISE 2012-13, West Midnapore.

Regarding playground availability, the scenario is relatively better compared to the availability of electricity and boundary walls in the elementary schools in the West Midnapore District. On average, in this district, nearly 35 per cent of schools have playgrounds. Dantan I block has appeared to be the best performing block in this regard, where nearly 63 per cent of schools have such facilities. The availability of this facility is recorded as just nearly 17 per cent in the Garbeta II block. The inter-block variations in this regard are also found to be very high.

The scenario regarding the availability of drinking water in the elementary schools is quite satisfactory as nearly 99 per cent of schools in this district have this facility though the sources of drinking water differ in different schools. There are two blocks, namely, Binpur –II and Nayagram, where cent per cent of schools have this facility. Nearly 4 per cent of schools in Kharagpur –II block do not have any drinking water facility.

Student enrollment in a school or the selection of a school depends largely on the availability of all approachable roads to access the school. In our sample district, nearly 4 per cent of schools do not have approachable all-weather roads. The situation is more severe in Binpur –II where this percentage is 13 per cent. The number of schools having approachable all-weather roads is maximum in Garbeta –III block. The inter-block variation in this regard is appeared to be very less, as reflected by the Value of CV (2.98).

In our sample district, many schools are deprived of minimum basic facilities like toilet facilities. Table 4 shows that nearly seven per cent of schools in this district do not have any toilets. In Binpur I block, nearly 30 per cent of schools do not have toilet facilities. The availability of this basic facility is found to be high in Gopiballavpur-II (99.52),

The provision of these basic facilities plays a significant role in students' school enrollment. The next section tries to give some insight into the teachers' status working in different schools in different blocks.

Availability of Teachers and their Status

Another important indicator for selecting a school is the status of teachers in the school. For this purpose, we considered four variables. These are (i) the presence of a Headmaster in a school; (ii) the percentage of graduate teachers in a school; (iii) the percentage of teachers having professional training; and (iv) the availability of the number of teachers. Being a social organization, a school always needs an authority possessing good leadership quality to perform various academic and administrative works. The presence of the head teacher in a school is expected to enjoy more freedom to perform various activities required to impart quality teaching.

The availability of adequate teachers in a school is a prerequisite for selecting a school that imparts a better teaching-learning environment. Moreover, the presence of the more highly educated teacher

Table 5: Availability of Teachers and Their Status

Indicators related to teachers and their status	Maximum	Minimum	For districts	CV
Percentage of schools having Head Teacher	81.48 (Kharagpur II)	46.67 (Gopiballavpur II)	61.36	15.88
Percentage of Graduate teacher to total teacher	64.96 (Pingla)	44.3 (Keshpur)	55.43	8.61
Percentage of the teacher with professional qualification	52.41 (Pingla)	29.81 (Nayagram)	41.26	15.18
Teacher per school	6.3 (Daspur I)	3.72 (Sankrail)	4.78	15.28

Source: UDISE 2012-13, West Midnapore.

is positively correlated with better quality teaching (Hammer et al. 2013). Regarding the availability of a headteacher in a school, nearly 39 per cent of schools in this district do not have a headteacher. The presence of headteachers in a school is maximum in Kharagpur –II block, where nearly 81per cent of schools has headteacher. Nearly 47 per cent of schools have no head teacher in Gopiballavpur II Block. Again, the average number of teachers per school in this district is 4. Teacher availability per school is highest in Daspur I block, which is 6.30. Teacher availability per school is appeared to be least in Sankrail Block, where the corresponding figure is 3.72.

The minimum requisite qualification of the teachers working in primary schools in West Bengal is a senior secondary school certificate and diploma or certificate in basic teachers' teaching of a duration of not less than two years or a bachelor of elementary education (NCTE regulations, 2001). For upper primary schools, a person with a senior secondary school certificate and diploma or certificate in basic teachers' teaching of a duration of not less than two years or a bachelor of elementary education or a person qualified the bachelor of elementary education or a graduate with Bachelor of Education (B.Ed), or its equivalent is eligible to become a teacher.

This study found that out of total teachers, nearly 55 per cent of teachers are graduates. The most satisfactory block in this regard is Pingla, where nearly 65 per cent teachers are graduate. The percentage of Graduate teachers is the lowest in the Kashpur block, where this figure is 44 per cent. As regards professionally trained teachers in elementary schools, 41 per cent of teachers have such professional qualifications in this district. A wide inter-block variation is observed in this regard.

It ranges from nearly 52 per cent in the Pingla block to nearly 30 per cent in the Nayagram block.

Therefore, it is found from the above analysis that there are wide inter-block variations in respect of all variables describing the availability and academic status of the teachers. This variation is highest in the case of headteacher availability in elementary schools compared to the other components considered in this study.

The availability of teachers and head teacher not only helps to impart quality education but it helps to arrange/ implement various programmes designed for the children of the elementary schools. These programmes include the arrangement of mid-day meals and medical check-ups for children. Arrangements of these programmers are expected to enhance student enrolment in a school. In the next section, we tried to give some insights about these incentives availed by the school children.

Availability of Incentives

Students of elementary schools receive various incentives like study materials, uniforms, and mid-day meals. Apart from this, the students have also provided free medical check-ups. Our study considers two variables: the arrangement of mid-day meals and medical check-ups. Table 6 presents some information on incentives availed by the students. This district's performance in arranging mid-day meals in schools is quite satisfactory as children of nearly 92 per cent of schools enjoy this facility. In Nayagram block, this percentage is as high as 97 per cent, whereas in Dantan -II block, nearly 17 per cent of schools, do not have such facilities.

Information on medical check-ups availed by the school children reveals that the children of 37 per cent of schools in this district avail these facilities.

Table 6: Availability of Incentives

Indicators of Incentives	Maximum	Minimum	For District	CV
Per centage of Schools provide Mid-day meal	97.2 (Nayagram)	82.86 (Dantan II)	91.51	3.73
Per centage schools arranging medical check-ups for students	76.08 (Daspur II)	15.05 (Binpur-I)	37.06	36.35

Source: UDISE 2012-13, West Midnapore.

Table 7: Performance of Monitoring mechanisms

Monitoring Indicators	Maximum	Minimum	For all Blocks	CV
Per centage of Schools where academic inspection has been done	85.75 (Nayagram)	32.35 (Chandrakona I)	60.01	22.27
Per centage of schools where BRC visit has been done	79.38 (Garbeta II)	16.67 (Binpur II)	35.89	41.69
Per centage of schools where CRC visit has been done	88.67 (Ghatal)	50 (Dantan I)	67.75	16.8

Source: UDISE 2012-13, West Midnapore.

While comparing the inter-block performance in this regard, it is found that nearly 76 per cent of schools in Daspur –II block avail of these facilities. However, the Binpur-I block appears to be the least performing block in respect of schools arranging medical check-up facilities.

The above analysis found that the variations in the arrangement of medical check-ups for school children across blocks are much higher than that of the arrangement of mid-day meals for school children in different blocks. It is argued that a proper monitoring mechanism helps to ensure the proper arrangement of these incentives and other facilities provided to the school children. In the next section, we discuss the activities of different monitoring agents working to improve the quality of education.

Functions of Monitoring Agents

Various monitoring agencies are working under the school education department in each state to supervise the activities of elementary schools. In West Bengal, a district-level office named as District Primary School Council looks after all the different activities of schools to ensure the quality of education. In addition to this, two other monitoring institutions, namely, the Block Resource Centers (BRC) and the Cluster Resource centres (CRC), have been created under the Sarba Sikhsha Abhijan (SSA) throughout the country to monitor the functions of schools. In the Right to Education Act context, these monitoring institutions are gaining ground for the promotion of quality education to all.

Table 7 presents the information on monitoring conducted by these three agencies. It is found that academic inspections have been done in nearly 60 per cent of schools in the West Midnapore district. A block-wise wide variation (C.V) is recorded as 22.27. The academic inspection has been done in nearly 86 per cent of schools in Nayagram Block. On the other hand, the corresponding figure is just 32 per cent in Chandrakona Block.

Regarding BRC visits, Table 7 reveals that the representatives of BRC have visited 36 per cent of schools in the West Midnapore district. Maximum visits in schools by BRC have been done in Garbeta –II block (79 per cent), Binpur –II block appeared to be the least performing block with a corresponding figure of 17 per cent. A comparison of percentages of schools with CRC visits across the blocks has shown a wide variation from 89 per cent in the Ghatal block to 50 per cent in the Dantan-I block. The corresponding figure for the whole district is 68 per cent. The above analysis reveals the presence of an active monitoring mechanism in the sample district though wide inter-block variation exists in this respect.

Access of Teaching and Development Grant

The availability of core inputs and basic facilities of a school depends on the amount of grants received. Generally, schools receive two types

of grants: development grants and Teaching and Learning Materials (TLM) grants. Table 8 presents the information on the availability of grants by the schools in the West Midnapore district.

It is found in Table 8 that the average size of development grants is just ₹ 8162 per school in this district. Availability of development grant is maximum in Daspur –I block (₹ 32276). Salboni Block is appeared to be the minimum average development grant receiver block in this district. A wide inter-block variation has also been recorded in this regard. Regarding TLM grants, per school availability of grants is ₹ 2669.02 in this district. The Pingla Block receives the maximum average grant and it is ₹ 4193. The lowest performing block in this regard is again Salboni.

SCHOOL OUTPUT

Students' Inflow in a School

Student inflow or enrollment in a school is essential to fulfilling the commitments of RTE. DISE (2012-13) data of West Midnapore district shows a wide variation in student inflow across schools. Student inflow in a school is measured in terms of total student enrolment in a school. Greater student inflow in a school is reflected in the average class size of a school. In this study, we consider the average class size to measure the student inflow in a school. From the DISE data, we have computed the average class size for each school, dividing the total students by total classes. For block, average class size is measured by dividing the total students of the block (Rural) accessing elementary education by the total number of classes of all schools imparting elementary education.

The study reveals that the average class size in rural West Midnapore district is appeared to be 25. The average class size is maximum in Daspur-I and Daspur-II blocks (32); the minimum average class size is recorded in Sankrail and Nayagram blocks (18). The wide variation in average class size across blocks raises some questions regarding its relationship with various school inputs required to access and impart quality education. In the next section, we tried to give some insight into this.

To identify the factors affecting the average class size of a school, several school-level composite indexes of core inputs and the index of average class size are computed.

FACTORS AFFECTING STUDENT INFLOW IN A SCHOOL

The major premise of the RTE is that it makes the Government more responsive to delivering services, especially educational services, in favour of all children in the age group of 6-14 years. This programme's institutional arrangements provide various educational resources (input) in schools. The provision of these resources seems to enhance the children's accessibility to the educational institution and the quality of education. The access to education in a school is reflected through its student enrolment, which is primarily influenced

Table 8: Performance of grants received by the schools

Indicators related to receiving grant	Maximum	Minimum	Average for District	CV
Development Grant Received per school	32276.36 (Daspur I)	2786.70 (Salboni)	8162.73	90.20
TLM Grant Received per school	4193.33 (Pingla)	1110.70 (Salboni)	2669.02	29.34

Source: UDISE 2012-13, West Midnapore.

Table 9: Average Class size of West Midnapore districts

	Maximum	32 (Daspur I and Daspur II)
Average class size	Minimum	18 (Sankrail & Nayagram)
	Average for all Blocks	25
	CV	18.29

Source: UDISE 2012-13, West Midnapore.

by the factors representing the school's academic environment.

Although the block-level secondary data presented in the previous section provided some idea about variations in various school inputs and output (average class size) across blocks, do these variations in school inputs affect the average class size of a school? The unit-level data (school level) have been used to determine the factors affecting the average school size. For this purpose, six composite indices of school inputs, the density of school Index and the index of average class size have been computed by using the unit-level data.

Explanatory Variables and Hypotheses

In this analysis, six school-level inputs and the density of schools at the block level have been selected as possible factors that are likely to determine the average class size of a school. Let us mention the hypotheses relating to the relationships between the explanatory variables considered by us and the dependent variable.

(i) Composite Core Inputs (C_Core_Index): To construct the core input index, we consider four types of information available in DISE, 2012-13, West Midnapore. These are schools having classrooms, blackboards, the percentage of the good classroom in a school and the availability of rooms per class. The first and second variables are dichotomous. Regarding the percentage of good classrooms, we constructed the good classroom index using the formula stated in section II. The availability of rooms per class is calculated by dividing the total rooms available in a school by its total classes, and then we have constructed the index in respect of this variable. We have developed the composite core input index by averaging the four using these four types of information. We hypothesize the positive relationship between the availability of core inputs and the average class size of a school.

(ii) Composite index of availability of basic facility (C_Bfacility_Index): Information on the availability of six basic facilities available in a school has been taken to formulate a composite index of the basic facility. These are the availability of electricity, boundary wall, playground, toilet, drinking water and presence of the approachable all-weather road. All those variables are dichotomous. The composite index of the basic facility is constructed

by averaging all the components. The hypothesized positive relationship between the basic facility's availability and the school's average class size would be positive.

(iii) Composite Teacher Index (C_Teacher_Index): Four information, namely, the presence of a headteacher in a school, the school having more than one teacher, the percentage of graduate teachers, percentage of professionally trained teachers, have been taken into consideration to compute the composite teacher index in a school. The first two types of information, i.e. the presence of head teacher and the schools having more than one teacher, are binary. Regarding the percentage of professionally trained teachers and graduate teachers, we have constructed the trained teacher index and graduate teacher index for each school. The average of these four types of information gives the composite index. The availability of headteachers and other teachers and their academic status is expected to enhance the average class size in a school. Therefore, we hypothesize a positive relationship between the composite teacher index and the average class size index.

(iv) Composite Incentive Index (C_Incentive_Index): Both the components of the Incentive index, namely, the provision of mid-day meals and the arrangement of free medical check-ups for the students, are dichotomous. The composite incentive index is calculated by taking the average of these variables. The availability of such incentives is expected to improve the average class size, and we hypothesize a positive relationship between the composite incentive index and the average class size of a school.

(v) Composite Monitoring Index (C_Monitoring_index): All the three components of monitoring, i.e., academic inspection, visit by Block resource centre (BRC), and Circle Resource Center (CRC), are dichotomous. The average of these three variables gives the composite monitoring index. The hypothesized relationship would be positive between the composite monitoring index and the average class size in a school.

(vi) Composite Grant Index (C_Grant_Index): To construct a composite grant index, we have first constructed the indices of two grant components, namely, the development grant index and TLM

grant index, separately for each school. The composite grant index has been calculated by taking the average of these two indices. Grant availability is expected to associate with a school's average class size positively.

(vii) School Density Index (C_Density_Index): Two variables, namely, area coverage per school and household coverage per school, are considered here to construct the composite coverage index. These two types of information are block-level information. We have constructed an index for each variable for each block. The value of this block level index is assigned to all schools in a block. The average of these two indices gives the composite coverage index. The availability of more educational institutions in a locality is expected to reduce a school's excessive student strength. The negative relationship between the composite coverage index and the average class size of a school is hypothesized in this study.

We have estimated the multi-variables regression model to measure the actual magnitude of all the inputs. In such regression, we have attempted to measure the influences of various school input indices on the average class size index in our study area. The multi-variables regression model expresses a quantitative index (dependent variable) as a function of several explanatory variables, which are also expressed in indices. The multiple regression model involving the depending variables Y_i and explanatory variables $Xj_i s$ is specified as:

$$Y_i = \alpha + \beta_1 X_{1i} + \beta_2 X_{2i} + \ldots\ldots\ldots\ldots\ldots\ldots\ldots + \epsilon_i$$

Where i denote the ith observation, $\beta_i s$ denotes the vector of unknown coefficients, and X_j is a vector of covariates that affect the average class-size index.

The dependent variable in our model is the average class size index. Average class size is calculated by dividing a school's total student strength by the total classes. Using this information, the class size index is measured for each school. Table 10 presents the results of the regression model of average class size on various class inputs.

It is found from the estimation result that, in our sample district, the average class size of a school increases if there is the availability of more core inputs, basic facilities, incentives, and grants. Moreover, it increases with the increase in teacher status in a school. It is also found in Table 10 that the average class size of a school decreases with the availability of more educational institutions. All the estimated coefficients have expected signs (as per hypotheses) and turned out to be statistically significant. The Value of R^2 for the estimated model is nearly 0.31, which implies that the seven factors together explained nearly 31 per cent of the total variation in average class size. The likelihood ratio (LR) statistics reveal the model's overall statistical significance.

The exercise concludes that, among all factors, the availability of basic facilities is most important in enhancing the average class size.

Table 10: Results of Regression of Average Class Size on School Inputs

Variables	Coefficient	Std Error	t' value	P-value	Tolerance	VIF
C_Core Index	0.105	0.007	15.88	0.000	0.925	1.08
C_Teacher_Index	0.105	0.004	26.04	0.000	0.870	1.15
C_Bfacility_Index	0.173	0.005	32.85	0.000	0.810	1.23
C_Incentive_Index	0.012	0.003	4.10	0.000	0.917	1.09
C_ Monitoring_ Index	0.019	0.003	7.17	0.000	o.919	1.09
C_Grant _Index	0.138	0.023	6.02	0.000	0.993	1.01
C_ Density_Index	-0.012	0.004	-3.17	0.002	0.943	1.06
Constant	-0.181	0.005	-34.63	0.000	—	—
Number of observations				8785		
F-Statistics (7, 8777)				558.54		
R-square				0.308		
Adj R-squared				0.308		

Source: Authors Estimation, UDISE, 2012-13, West Midnapore.

SUMMARY AND CONCLUSION

This study tries to explain the variations in average class size across schools in the light of various school inputs like status of teachers, core inputs, availability of basic facilities, monitoring mechanism, incentives, grants, the density of schools etc. The study highlights that all the school inputs significantly affect the average class size. These findings might help the policy makers adopt suitable steps required to optimum utilization of resources and impart quality education in the sample district.

Disparities in average class size might be expected to be significantly influenced by the socio-economic conditions of the local area. Further study is needed to measure the influence of socio-economic variables and other variables in explaining the variability in average class size across schools.

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