Social Sector
Performance Surveys

Secondary Education in Bangladesh

Assessing Service Delivery

Final Report
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For further information:

simon.hunt@opml.co.uk
Team leader
Social Sector Performance Surveys
Financial Management Reform Programme
Bangladesh

Contents

Tables and Figures

Preface

This report presents the results of the Secondary Education Social Sector Performance Survey. This was one of three surveys undertaken with the purpose of increasing the effectiveness and equity of public spending on priority services. They were undertaken as part of the Financial Management Reform Programme (FMRP), which has as its goal 'to improve the efficiency and effectiveness of the allocation of public resources and to achieve a more equitable and improved public service delivery'.

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Mitra and Associates undertook the fieldwork between July and October 2004 and data processing activities in the following months and assisted with design, piloting and analysis. The sector leaders were Jahangir Sharif and Sajidul Islam; the overall survey manager was Fuad Pasha and Mohammed Alamgir was responsible for data processing. Md Abdul Hannan and Rashid uz-Zaman provided invaluable assistance with the collection of data from central sources. Sakaimex Ltd undertook the scanning of the student tests.

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Abbreviations

ADB	Asian Development Bank
BANBEIS	Bangladesh Bureau of Educational Information and Statistics
CGA	Controller General of Accounts
DFID	Department for International Development
DIA	Directorate of Inspection and Audit
DM	Dakhil madrasahs
DSHE	Directorate of Secondary and Higher Education
EED	Education Engineering Department
ESTEEM	Effective Schools Through Enhanced Education Management (DFID)
FESP	Female Education Stipend Project (NORAD)
FMRP	Financial Management Reform Programme (DFID)
FMU	Financial Management Unit
FREPD	Foundation for Research on Educational Planning and Development
FSSAP	Female Secondary School Assistance Project (IDA)
FSSP	Female Secondary Stipend Project (Government of Bangladesh)
FY	Financial year
GSS	Government secondary schools
HIES	Household Income and Expenditure Survey
HSC	Higher Secondary Certificate
IDA	International Development Association
MPO	Monthly Pay Order
NAEM	National Academy of Educational Management
NCTB	National Curriculum and Textbook Board
NGSS	Non-government secondary schools
NORAD	Norwegian Agency for Development Cooperation
NTRAMS	National Training and Research Academy for Multilingual Shorthand
PROMOTE	Programme to Motivate, Train, and Employ Female Teachers in Rural Secondary Schools (European Commission)
SESIP	Secondary Education Sector Improvement Project (ADB)
SMC	School Managing Committee

SSC	Secondary School Certificate
SSPS	Social Sector Performance Surveys
Tk	Taka
TTC	Teacher Training Colleges
UPO	Upazila Project Offices

Executive summary

The Secondary Education Social Sector Performance Survey is based on a nationally representative random sample of 223 educational institutions of three types: government secondary schools (GSS), non-government secondary schools (NGSS) and dakhil madrasahs (DM). This is the first such survey of secondary education in Bangladesh. It was undertaken as part of the Financial Management Reform Programme (FMRP), which aims 'to improve the efficiency and effectiveness of the allocation of public resources and to achieve a more equitable and improved public service delivery'. It provides reliable, standardised information to answer two principal questions. First, do public resources reach secondary education facilities as intended? Second, what are the quantity and quality of services that these resources are able to deliver? These are the issues with which Bangladeshi policy makers are currently grappling, as evidenced by those raised in the recently drafted Poverty Reduction Strategy Paper.

The survey methodology is explained in **Chapter 3**. A series of consultations with Ministry of Education officials, and consecutive pilot trials, were used to improve the focus and accuracy of the survey. A random sample of schools was drawn from the list of secondary education institutions that receive public funding. Within each school, a sample of teachers, students and their households was selected in order to assess the quantity and quality of services provided. Various quality control measures were applied to ensure that the data can be relied upon.

Chapter 4 presents the core results on the performance of schools. Two types of performance measures were collected. First, measures of output were obtained, such as enrolment, attendance, repetition of a year's schooling and instruction time. Although it is known that very few poor households send their children to secondary school, a key finding of the survey is that access for poorer households remains very low. The share of Class 9 students who come from the poorest 40% of population is just 12%. There are differences within each school type. The share of Class 9 students in GSS who belong to the wealthiest 40% of population is 96%. DM tend to serve relatively poor students, but even in these about 60% of Class 9 students come from the wealthiest 40% of the population.

Student attendance is very low. A headcount organised by the survey on the first day of the visit, which was not announced, showed that attendance is 41% and falls by a further four percentage points after the tiffin (lunch) break. A comparison with registers showed that school records overstate attendance: according to the registers, attendance is 59% on average during the year and 55% during the period when the survey took place, as attendance tends to fall during the second half of the year. A headcount on the second day of the visit for Class 9 students found that their attendance had increased by four percentage points, but this estimate was probably affected by the presence of the survey team and is still five percentage points lower than the most recent estimate based on the register.

Second, outcome measures were obtained that relate to one of the key objectives of education—the acquisition of cognitive skills. The survey developed and applied a learning test in Bangla and Mathematics that has two advantages. First, the results are comparable across the country; the Secondary School Certificate (SSC) examination results, which are the most commonly referred indicator of school quality, are not comparable as different boards set different examinations in different parts of Bangladesh each year. Second, the results are comparable across schools and madrasahs, as the tests were designed on the basis of the common areas of the curriculum. There were large differences in results across types of schools, although the difference in scores between males and females was not so extensive (three and five percentage points in Bangla and Mathematics respectively). The results also quantify by how much madrasahs lag in terms of performance (nine and seven percentage points in Bangla and Mathematics respectively), which is an important variable as the government tries to mainstream madrasah education.

The last section of Chapter 4 reviews the relationship between these test-based outcome measures and the standard indicators of performance used by the Ministry of Education to grant and renew recognition status to NGSS and DM, which is a key precondition for public financial support. A notable finding is that a majority of NGSS and DM fail at least one of the key conditions for recognition, which suggests that these are either not monitored sufficiently or that there is little will to sanction poor performance. It is also shown that the test-based outcome measures introduced by the survey are not correlated with performance measures used by the Ministry of Education, such as the SSC participation and pass rates, especially after controlling for the quality of the student intake in individual schools.

Chapter 5 provides an overview of the annual resources for secondary education, both public and private, which amount to over Tk 40.2 billion in total. A table accounting for the source and use of financing was compiled, which shows that the proportion of the total cost borne by private households is 49%.

This chapter presents the distribution of available resources by type of school. Average resources per student amount to Tk 4,900 in GSS and Tk 2,400 in NGSS and DM. A stark message is the extremely low level of non-salary resources available in a large proportion of non-government educational institutions. GSS students receive four times more resources of this type than NGSS students and nine times more than DM students. It is also noteworthy that DM are more dependent on government funding than are GSS. Although total resources are spread equally across students from different socioeconomic backgrounds, students from better-off households benefit more from non-salary resources.

Chapter 6 touches upon issues of public expenditure management. First, the survey assessed whether particular inputs were present on the ground, for example whether teachers on the payroll were present at the school. Second, it compared expenditure data at the school level with expenditure data from the Controller General of Accounts (CGA) for a range of functional units where direct comparisons were possible. Third, it compared weighted estimates of expenditure collected at schools with national level data.

The analysis of GSS allotments and statements of expenditure suggests that resources were not diverted to uses unrelated to education. In the case of 28 upazilas (sub-districts), where records were compared for each line item, no substantial discrepancies were identified. However, there was evidence of mismanagement in the authorisation of spending. Almost 40% of teachers heading GSS stated that they had to make speed payments in order to get their bills passed.

In the case of NGSS and DM, it was not possible to compare the survey evidence with proofs of payment. A comparison between the survey data and the Monthly Pay Order (MPO) showed there were 6% more teachers listed than those found at NGSS, although no evidence was found that these teachers had actually been paid. The difference is more likely to be the result of errors in updating the payroll, but in the absence of expenditure records at the central level it is not possible to draw any definite conclusions. Only 0.1% of teachers were found to be receiving a salary even though they were no longer employed by the school. However, it is clear that there is scope for abuse in the system that calls for greater transparency in accounting for these resources.

Chapter 7 deals with stipend projects. The information collected records some drastic adjustments that have been taking place since 2003 to improve the management of the three main projects. Yet, the survey shows that at least 17% of Class 7 and 34% of Class 8 students who were eligible for a stipend had failed to meet one of the two principal eligibility criteria; in these cases, schools had deliberately reported the relevant information incorrectly in order that the students would receive a stipend. Nevertheless, the proportion of recipients that had failed to meet the necessary conditions is lower than that reported in previous audits. The results also show that poorer students do not benefit more in relative terms from the stipend projects. Informal payments of up to Tk 30 by students to schools continue to take place, but on a much

smaller scale than observed in previous assessments. The evidence on whether students were paid the correct amount is not conclusive.

Chapter 8 examines private expenditure. Households spend an average of Tk 4,200 per Class 9 student on secondary education. *Per capita* expenditure on male students was found to be 35% higher than for female students with much of the difference being due to higher payments for private tuition. The evidence presented shows that GSS charge higher fees and achieve higher compliance in payment of fees than non-government institutions. There is wide variation in the types of fees charged by different schools. The market for private tuition is so large that about 60% of students took private lessons. Almost all of them took supporting lessons in Mathematics. Teachers appear, on average, to be earning an additional 37% on top of their salary and allowance income through private tutoring.

Chapter 9 gives a profile of the human resources available at schools. There are significant issues about vacancies in GSS both for teaching and non-teaching posts. One in six NGSS and DM do not pay the stipulated supplement to the government salary. One-third of head teachers and almost half of all assistant teachers claimed that it is necessary to make an informal payment to ensure appointment. About 40% of GSS teachers believe that the transfer system is unfair, while more than two-thirds believe it is necessary to make an informal payment to receive their pension. Teacher absenteeism, estimated at 10% on the day of the visit, is eight percentage points lower than another alternative recent estimate and low when compared with other countries.

The educational level and professional development of GSS teachers is extremely high – 57% have masters, 94% have a professional qualification, and two-thirds have had in-service training. In contrast, only 17% of DM teachers and none of their superintendents have a professional qualification. The survey observed teachers giving lessons, in order to obtain first-hand evidence of the quality of the teaching process. Teaching methods are very traditional, even in GSS where teachers have been extensively trained in classroom techniques. Overall, 90% of lesson time was spent on material taken directly from the textbook and 91% of the time consisted of limited recall and closed questions.

Chapter 10 reports on the learning environment from the point of view of the facilities' physical infrastructure. The majority of DM have severe problems. For example, 81% of their classrooms suffered from noise coming from adjacent classrooms as a result of poor partitioning. One-fifth of sampled NGSS are also in poor state of repair. Only 15% of NGSS and 5% of DM receive a revenue budget maintenance grant every year. On the contrary, a third of NGSS and DM had benefited from a development budget construction project in the four years preceding the survey. However, the distribution of works across upazilas is unequal. Moreover, the effectiveness of one of the construction projects was questioned.

After the separate review of the full set of inputs, outputs and outcomes, **Chapter 11** brings together all the information to assess the determinants of school performance in two key respects, the Bangla and Mathematics SSPS test scores and attendance rates of students in the first six months of 2004. The statistical model draws primarily on the sample of Class 9 students whose households were interviewed. The results show that much of the difference in performance between school types is due to their student intake, as measured by a test of innate ability and by the scores in Bangla and Mathematics tests taken by current Class 6 students. Adjusting for these factors, the advantage enjoyed by GSS over NGSS and DM largely disappears; it is even reversed in the case of the Mathematics test score. Gender differences also disappear when these factors are controlled, except for in the Mathematics test score among NGSS students. These findings emphasise the importance of family background and of improving primary and pre-primary education to students' performance at secondary level.

Student attendance in class and teacher characteristics do not show a significant correlation with student performance, which implies that substantial improvements need to be introduced in the quality of teaching. The analysis does not show a strong relationship between school

characteristics and performance. It suggests that a shift of expenditure from salary to non-salary items might improve performance. Active parent–teacher associations are also often associated with better results. Good school management, including home visits to follow up on absent students, has a substantial effect on raising attendance rates.

Chapter 12 provides the conclusions to the main questions of this survey. Do public resources reach secondary education facilities as intended? What are the quantity and quality of services that these resources are able to deliver? Overall, on the first question, our finding is that the public financial resources reach schools as intended. However, there are some caveats to our finding, such as the evidence of mismanagement in the authorisation of spending, the lack of transparency in accounting for salary subvention expenditure in NGSS, and the poor monitoring of recognition conditions by the central authorities.

On the second question, the survey has shown that the general support for secondary education is not contributing directly to the reduction of poverty. Student attendance rates are very low. There is large variability in test results, availability of equipment, non-salary resources, state of repair of classrooms, distribution of construction works, and student–teacher ratios across NGSS and DM, which the government should aim to minimise. The impact on student performance of school salary expenditure was found to be negative and significant, whereas the impact of non-salary expenditure was found to be positive and significant in some cases. This suggests that there is scope for re-allocation of resources to improve learning outcomes. Finally, the average school score in a test taken by the Class 6 students, which measures both the characteristics of the school's student intake and the school's value added, explains a substantial proportion of the differences in performance between schools. This suggests that the government may need to give priority to interventions in early childhood and primary education.

1 Introduction

The findings of this survey are intended to stimulate policy debate and support the public sector in becoming more performance-orientated and accountable, with the ultimate objective of increasing the effectiveness and equity of public spending on priority services.

The survey combines two kinds of inquiry. First, it tracks public expenditure on secondary education sector through financial year (FY) 2003/04 revenue and development budgets of the Ministry of Education and assesses whether it reached the intended educational institutions. Second, it measures whether these resources resulted in the delivery of education services of the desired quantity and quality.

The survey provides reliable, standardised information from a representative sample of government secondary schools (GSS), non-government secondary schools (NGSS) and dakhil madrasahs (DM). The information collected covers: the flow of financial resources to schools, including pay and stipends; the operation of control systems for these resources; the presence of essential inputs in the schools; the capacity of teachers, the quality of teaching and students' learning achievements; and the way in which school and individual characteristics affect learning. The findings increase the information available on the provision and effectiveness of secondary education, on its beneficiaries, and on the management and financing of the services.

This is the first comprehensive survey of the secondary education sector in Bangladesh. There has been remarkably little research into the state of secondary schools in the country apart from a limited number of individual studies that have grappled with specific issues, such as the stipend programmes, teacher absenteeism, and class size. A standard source of information about secondary schools and madrasahs is the Post-Primary Educational Institutions Survey of the Bangladesh Bureau of Educational Information and Statistics, which is conducted every five years. However, this source is limited in the sense that it does not provide information on performance and it cannot connect schools with the characteristics of their students.

This report brings together the results of the survey and combines the findings with an analysis of public expenditure data from administrative sources, in order to link spending with outcomes. In doing so, the survey applies the principles of a recently developed methodological tool, the public expenditure tracking and service delivery survey, which focuses on issues of public expenditure management in the provision of social services.

The report is divided into 12 chapters. Chapters 2 and 3 provide brief overviews of the secondary education system and the survey methodology. Chapter 4 presents the main measures of school performance and discusses the differences across types of schools. Chapter 5 summarises the financial resources that flow into the secondary education system. Chapter 6 analyses aspects of public expenditure management. Chapter 7 focuses on the stipend projects. Chapter 8 presents the evidence on private household expenditure. Chapter 9 discusses issues related to teachers and Chapter 10 deals with infrastructure. Chapter 11 draws together the evidence from the previous seven chapters, and models two key student performance indicators—test scores and attendance—to identify what drives good performance in schools. Finally, Chapter 12 presents the report's conclusions.

2 Secondary education system and resource flows

2.1 SCHOOLING SYSTEM

There are two main streams of secondary education in Bangladesh—general secondary education and madrasah secondary education.

General secondary education comprises seven years of schooling: the first three years (Classes 6-8) are referred to as junior secondary, the next two years (Classes 9-10) are referred to as secondary and the last two years (Classes 11-12) are referred to as higher secondary (see Table 2.1). From Class 9 onwards, students may choose one of three streams: humanities, science or business. After completing Class 10 in December, students sit for the Secondary School Certificate (SSC) public examination in March. This is organised by seven regional Boards of Intermediate and Secondary Education.

Table 2.1 Secondary education system of Bangladesh

Age (years)	Class	General education	Madrasah education
		HIGHER SECONDARY CERTIFICATE EXAMINATION	ALIM EXAMINATION
17+	12	Higher secondary	Alim madrasah
16+	11		
		SECONDARY SCHOOL CERTIFICATE EXAMINATION	DAKHIL EXAMINATION
15+	10	Secondary	Dakhil madrasah
14+	9		
13+	8	Junior secondary	
12+	7		
11 +	6		

GSS are usually located in metropolitan areas or district capitals, tend to be older institutions, are better endowed on average, are in high demand and attract better than average students. All GSS operate Classes 6-10 and some have primary classes attached to them.

NGSS are a more disparate group. According to current rules, following an initial three-year probationary period, new schools may be given temporary recognition for a period of five years, subject to their satisfying conditions related to student participation and performance in examinations under the relevant Board. Proper recognition may then be accorded, which in practice is followed by a government financial grant to cover 90% of teacher pay and allowances. NGSS have to apply repeatedly for an extension of their recognition. Recognition allows the school to operate at a particular level: some schools may be allowed to offer only Classes 6-8 (junior secondary), some may operate Classes 6-10 (secondary), while others may operate Classes 6-12 (higher secondary) or even offer degrees.

It should be stressed that there is also a number of non-government schools that are not recognised and do not receive any assistance from the public budget. These schools reputedly cater for the wealthiest households, are located almost exclusively in metropolitan areas and tend to teach through the medium of English. However, there is very limited evidence regarding

the number of students enrolled in this sector. The 2000 Household Income and Expenditure Survey, which included questions on the type of school attended by household members, is unfortunately not a good source because the classification of schools is unclear. Nevertheless, it does suggest that enrolment in English-medium schools is well below 1% of the total. These schools are not covered by this survey.

Madrasah secondary education also comprises seven years: the first five years are referred to as the dakhil stage, while the latter two years are referred to as the alim stage. Dakhil education is imparted either in exclusively DM or in the dakhil sections of alim, fazil or kamil madrasahs. At the end of Class 10 students sit for the dakhil examination, which is administered by the Bangladesh Madrasah Education Board. All DM have attached ebtedayee (primary) classes. All DM are non-government and they follow the same rules as NGSS in order to receive a grant for teacher pay and allowances.

Table 2.2 lists the numbers of secondary education institutions and their share of the student population.

Table 2.2 Secondary education institutions, 2002

	Number of institutions		Number of students	Share of students (%)
	Junior secondary	Secondary / dakhil		
General education				
Government schools	0	317	222,125	2.3
Non-government schools	3287	12958	7,940,009	80.9
Madrasah education				
Dakhil madrasahs	0	5536	1,619,486	16.8

Source: BANBEIS Educational Statistics 2003. The number of students in DM includes those students attending Classes 6-10 in 2284 alim, fazil and kamil madrasahs.

2.2 PUBLIC RESOURCES

There is no single budget for public spending in Bangladesh. Recurrent spending on secondary education goes through the revenue budget and capital spending goes mainly through the development budget.

Revenue budget

The Ministry of Education revenue budget was Tk 28.4 billion in 2003/04, which includes higher education. The financial year begins in July and ends in June and so cuts across the school year, which runs from January to December.

Once parliament passes the budget, department heads (e.g. Director General DSHE) are authorised to send allotment letters to Upazila Accounts Offices and Drawing and Disbursement Officers (e.g. GSS head teachers) for all items except those singled out with asterisks (e.g. repairs grants managed through the Education Engineering Department, EED). The Ministry of Finance does not get involved in budget releases, although it monitors closely certain items, such as utility bills, and will not allow virement away from them. The department head can vire

across most other budget line items within certain limits. Above this limit, the department head would need permission from the Principal Accounting Officer of the Ministry (i.e. the Secretary). These changes are made at the discretion of the department head using the original budget allotment.

GSS are fully supported by the revenue budget: this includes salaries as well as expenses related to material supplies and maintenance. NGSS and DM are eligible to receive a government subsidy that pays the largest part of their salary bill. Table 2.3 shows how the Ministry of Education revenue budget expenditure in 2003/04 was structured by receiving institution. Two-thirds of the revenue budget is made up of grants to NGSS and colleges.

Table 2.3 Ministry of Education revised revenue budget allocations, 2003/04

Institutions receiving Ministry of Education revenue resources	Budget allocations	
	Tk, millions	%
Non-government schools and madrasahs (grants)	14,385	50.6
Non-government colleges (grants)	4,207	14.8
University Grants Commission	3,858	13.6
Government colleges	2,018	7.1
Government secondary schools	1,100	3.9
Education Engineering Department	873	3.1
Secretariat (= central administration)	619	2.2
Department of Secondary and Higher Education	508	1.8
Polytechnic institutes	224	0.8
National Curriculum and Textbook Board	185	0.7
Vocational training centres	117	0.4
Other autonomous bodies and institutions	100	0.4
Teachers Training Colleges	59	0.2
Department of Technical Education	45	0.2
Other Technical Institutes	31	0.1
National Academy for Education Management	26	0.1
Commercial institutes	26	0.1
Government madrasahs	17	0.1
Directorate of Inspection and Audit	15	0.1
Bangladesh Bureau of Educational Information and Statistics	13	0.0
Technical Teachers Training College	10	0.0
International organisations	5	0.0
Total	*28,441*	*100.0*

The main government representative in the 64 districts is the District Education Officer whose tasks include the supervision of GSS (if any), some limited monitoring of the non-government sector, as well as participation in various education committees for appointments and construction. There are no permanent government employees dealing with secondary education at the 493 upazilas (or sub-districts). Some small supervisory tasks are taken up by the Upazila

Project Officers, who are responsible for the administration of the female stipend projects. The head of the upazila is the Upazila Nirbahi Officer, the government's representative at this level, who heads education committees that decide on construction projects and may distribute upazila resources to schools. Apart from that, all school funding decisions are taken centrally.

Development budget

The development budget was Tk 13 billion in 2003/04. It follows the Annual Development Programme, is project-based and combines allocations from local resources and external aid. The main projects ongoing in FY 2003/04 are listed in Table 2.4. Almost two-thirds of development budget resources to secondary education go to the female stipend projects, which were introduced in the mid-1990s in order to encourage female enrolments in secondary education. Donors' funding is concentrated in these projects. The Ministry of Finance is involved in development budget releases and this means that when the development budget is approved the project director cannot immediately allocate the entire year's budget.

Table 2.4 Ministry of Education development budget allocations, FY 2003/04

Name of project Objectives	**Key objective** Main source Period	**Budget allocations** (Tk, millions)
Female Secondary Stipend Project (FSSP) Attract and retain female students in secondary school; postpone marriage; increase women's involvement in development; strengthen DSHE through capacity building at upazila level	**Stipends** Government Jul 1994 – Jun 2005	1,657
Female Secondary School Assistance Project (FSSAP) Improve quality of secondary education; increase access and retain girls; strengthen management, accountability and monitoring; stipends	**Stipends** World Bank Jul 2001 – Jun 2007	1,362
Secondary Education Sector Improvement Project (SESIP) Strengthen planning and management capacity of the DSHE through establishment of Policy Support and Planning Unit and Project Management Unit; expand and develop management and monitoring systems; strengthen curriculum development; privatise textbook production; reform examinations; improve teacher education; strengthen school management and supervision; establish school improvement fund for schools in underserved areas; establish new secondary schools and new classrooms; continue stipend and free tuition programme of female secondary students	**Stipends** ADB Jul 1999 – Dec 2005	1,306
Expansion of existing buildings of selected educational institutions Increase physical facilities for secondary especially in rural areas; provide furniture to selected institutions; ensure quality education through maintenance and extension of facilities	**Construction** Government Jul 1999 – Jun 2004	876
Reconstruction of very old (40+ years) educational buildings Sustain architectural heritage of old buildings; provide required furniture and proper maintenance of existing physical facilities	**Construction** Government Jul 1998 – Jun 2004	789
Development of government and non-government secondary schools Expand physical facilities of secondary schools; develop village level secondary schools on priority basis	**Construction** Government Jul 1997 – Jun 2005	789
Recruitment of female teachers in rural non-government secondary schools (PROMOTE) Promote more girl friendly secondary schools and high quality and gender sensitive teaching in rural areas	**Training** European Commission Jul 1995 – Jun 2004	437
Development of government and non-government madrasahs Expand physical facilities of madrasahs	**Construction** Government Jul 1997 – Jun 2004	347

Name of project Objectives	**Key objective** Main source Period	**Budget allocations** (Tk, millions)
Total		*7,522*

2.3 POLICY

Secondary education experienced rapid expansion during the 1990s, as enrolment more than doubled and gender parity was achieved. However, the gross enrolment rate still stands at 43% and completion rates are very low particularly in Classes 9 and 10. Government policy is outlined in the National Plan of Action (2002) (which replaced the 2000 National Education Policy document) and in the report of the National Education Commission (April 2004). The goal is to increase enrolment in secondary education to meet both social and economic objectives. More recently, some of the key issues in the sector that came out of the work of the Poverty Reduction Strategy Paper Education Thematic Group and were included in the draft of the Poverty Reduction Strategy Paper (December 2004) were the following:

- inequality is endemic;
- the curriculum does not relate to 'prospects of employment, entrepreneurship and practical skills' and is not uniform across different types of institutions;
- examinations 'mostly test ability to recall information and do not test abilities to reason, or apply, analyse and synthesise information';
- the system of teacher recruitment and professional upgrading is weak; and
- academic supervision of schools is poor and operational decisions are concentrated excessively in Dhaka.

The draft Paper also notes that some weaknesses are not specific to secondary education but are related to public service delivery and public sector management in general. These include the breakdown of oversight functions, the competition between administrators and politicians, and gaps in the management of the development project cycle.

The government has expressed its determination to tackle these key issues. In particular, it intends to devolve administrative functions, upgrade teacher training, take steps to guarantee appointment of competent teachers, improve the efficiency of infrastructure management, develop professionalism in curriculum design and consider the re-design of stipend allocations to increase their effect on the enrolment of poor groups.

Most importantly, the draft Paper recognises that subventions to non-government educational institutions, which form the majority of public allocations, do not promote minimum quality and performance standards. The government does not fully exercise its regulatory powers and the draft argues that 'funds to educational institutions must be linked to their performance'. It is recommended that educational institutions be 'rewarded with larger grants for satisfactory performance and penalised for dismal outcomes by stopping funds' (p.159).

The survey provides insights into these key challenges, such as the potential trade-offs between the coverage of the population, the input levels per student, the quality of teaching, the equity of opportunity and outcomes, and the need to increase the value for money of public education expenditure, especially with respect to subsidies paid to NGSS. These could be followed up in attempts to introduce a medium-term budget framework in the Ministry of Education and in policy discussions at the Budget Monitoring Committee.

3 Methodology

This chapter covers the survey's objectives and design. It gives a summary of the sampling strategy used, an overview of questionnaires and details of fieldwork and data processing.

3.1 SURVEY DESIGN

The design of the survey began with an initial agreement on its purpose and scope with the Ministry of Finance. This was followed by extensive dialogue with the Ministry of Education on priorities, defining the detailed content of the survey. Key policy and programme documents were also reviewed. A survey analysis plan, outlining the areas to be covered and some of the main estimates to be produced, was then agreed with the two ministries.

Interviews and field visits were undertaken to develop an in-depth understanding of the operation of the different types of secondary schools and the organisations that support them. This provided a basis for the development of draft questionnaires. These were piloted a number of times between March and May 2004 to improve their capacity to measure what was required and to deal with the considerable heterogeneity of systems that was encountered on the ground.

3.2 SAMPLE

A stratified, clustered sample was designed in which the primary sampling units were districts. In total, 20 out of 64 districts were sampled, selecting Dhaka and Chittagong with certainty and all other districts with probability proportional to population. Four upazilas were selected within each sampled district, the sadar upazila being selected with certainty and others with equal probability. In this way, a total of 79 upazilas were selected, although the survey was not conducted in one, a cantonment, due to difficulties of access.[1]

In the selected upazilas, one non-government secondary school (NGSS) and one dakhil madrasah (DM) were selected randomly from a listing of institutions receiving subventions, provided by the Bangladesh Bureau of Educational Information and Statistics (BANBEIS). A sample of up to four government secondary schools (GSS) was randomly selected in each district. Since some districts have fewer than four GSS, 68 GSS were selected in total. Information about the school was collected from the upazila Education Engineering Department offices (on maintenance) and the Upazila Project Offices (on stipends).

In all institutions, the head teacher / superintendent and a representative of the school management committee were interviewed. A sample of other teachers was also selected and interviewed: all teachers of Bangla and Mathematics in Class 9 were selected automatically. If there were fewer than three teachers of this type in the school, additional teachers were sampled randomly from a list of all other teachers whose salaries were government-subsidised, to give a total of three. However, in tables analysing sampled teacher characteristics, only the teachers of Bangla and Mathematics are included. These teachers also took a short test and a standardised instrument was used to record details of their teaching practices.

All Class 6 and Class 9 students who were present on the day of the visit, some 25,000 in total, took a test in Bangla and Mathematics. Because of high rates of student absenteeism, only about 61% and 53%, respectively, of all students on the registers took the tests. It should be remembered that the characteristics of students who were absent differ from those present;

[1] These 79 sampled upazilas are the same upazilas as those selected in the Health and Family Planning SSPS undertaken at the same time.

therefore the test results represent only the latter. Details on tests are found in Annex 2. Tests were retrieved from almost every student present on the day; some very minor losses were due to technical difficulties in matching the examination paper with the tested students.

A sample of Class 9 students was selected for a household interview. This sample included students who were not present on the day of the test. Students were stratified by their presence or absence on the day of the test, their gender and, for females, whether they were eligible to receive a stipend. The number sampled in each of these categories depended on the type of school (if it was co-educational or not) and whether the school was in an area where the stipend projects operate (stipends are not awarded in metropolitan areas). Depending on these factors, a sample of between seven and nine students per school was selected for household interviews.

Additional information was also collected on the ebtedayee section of DM. This will be analysed as part of the Primary Education SSPS.

Table 3.1 Sample units selected and interviewed

Unit	Original intended sample	Actual number selected	Number interviewed	Proportion interviewed (%)
Districts	20	20	20	100
Upazilas	79	79	78	99
Schools of all types	226	223	219	98
School Managing Committees (NGSS and DM only)	154	151	144	95
Head teachers	226	214	212	99
Teachers				
Interviewed	~900	893	880	99
Profiled			883	99
Observed teaching			823	92
Class 9 students		20,012 (Enrolled)	10,622 (Present)	53
Class 6 students		23,558 (Enrolled)	14,282 (Present)	61
Student households				
Total	~2,000	1,764	1,611	91
Present on test		1,090	1,079	99
Not present on test		674	532	79

Table 3.1 shows the sample selected and achieved for each unit. In general, sample losses were low; over 97% of sampled units were interviewed[2]. Of the four sampled schools that were not interviewed, three were found to be of an ineligible type, while one had closed three years before the survey. This should not have occurred, as the facilities were sampled from the list of recognised schools receiving salary subventions. The lowest fraction of interviewed sampled units was for the student households (91%). This proportion was lowest for students who were

[2] The teaching observation schedule was completed for a lower proportion of teachers than were interviewed—around 92 percent.

not present on the day of the test—79% of these sampled households were interviewed. This is partly because students were not available to give information on the location of their households. However, the main reason was that many of these students no longer considered themselves enrolled and were therefore not eligible for an interview.

Analytical weights, the inverse of the selection probability of each unit, were used to ensure that the estimates are nationally representative. They were adjusted for non-response where necessary. More details on the sampling and the calculation of the weights, as well as on losses, are given in Annex 1.

To increase the clarity of tables, information on the number of observations analysed in each table is not reported. Estimates presented for lower level units—teachers, students and households—are generally based on well over 100 observations, while estimates for school-level variables are based on at least 68 observations.

3.3 QUESTIONNAIRES

A summary of the content of the different survey instruments is presented in Table 3.2.

Table 3.2 SSPS instruments

Unit	Sections	Description
Upazila Project Offices	• Upazila-wide information on stipend disbursements • Information on students eligible for stipends in sampled schools	The records of the UPO were consulted to select a sample of students who were eligible for stipends. These were followed up in the sampled schools to check whether they satisfied the eligibility criteria set out in the project documents.
Upazila Education Engineering Department Office		The allotment letters, work orders and progress reports were consulted to record whether the sampled schools had benefited from revenue and development budget projects for repair and construction over the last three years.
School	• School programme • Teacher absenteeism • Classroom observation • Repetition • Selection of student sample • Resources • Examination results • School employees • School finance	This questionnaire recorded information from the student attendance registers for the entire school focusing on Class 9 students. In addition, it used other official documents, such as the salary bills, personnel records, cash books, audit reports and examination registers to estimate the resources available at the facility and other school characteristics.
School Managing Committee	• Operation • Financial support • Community information	The interview covered aspects of support to the school that may not be covered with the head teacher. It was also used to obtain background information about the community that the schools served.
Head teacher	• Career and qualifications • Income • School management • Relations with the SMC	Among other things, the survey collected information on indicators of the effectiveness of school management to assess the role it plays in school quality.

Unit	Sections	Description
Teacher	• Career and qualifications • Income • Support by the school • Literacy / numeracy profile • Lesson observation	All teachers who taught Bangla and Mathematics in Class 9 were interviewed and observed teaching a class. They also completed a short test of numeracy and literacy.
Student	• Bangla • Mathematics • Socioeconomic information	See Annex 2
Household	• Consumption • Living conditions • Education	Sample households of Class 9 students were interviewed about living conditions, consumption and the education of the child. The consumption information conformed to the standards of the Bangladesh Household Income and Expenditure Survey and helped estimate the socioeconomic status of students across schools.

3.4 FIELDWORK AND DATA PROCESSING

Interviewers were trained during a four-week period, using lectures, copies of key documents and records, and classroom and field-based practice. A total of 14 field teams undertook the survey, each with five members. Most of the team members had previous experience in data collection. Fieldwork began in July and ended in October 2004. It was undertaken in three phases. The first phase of fieldwork was conducted in a small number of districts in order to concentrate the field teams together so that they could be closely supervised. Most doubts and problems were identified and resolved at this stage. Respondents were generally very cooperative once the endorsement of the Ministry of Education was understood. Where there were problems, ministry officers assisted in ensuring cooperation.

Field team leaders were responsible for data quality. They checked questionnaires, observed interviews and verified that the sampled units were interviewed. In addition, three roving quality control officers checked the work of the field teams. They reviewed completed questionnaires, cross-checked questionnaires against original data and resolved any problems. A list of all personnel who took part in the fieldwork is in Annex 7. The survey managers and sector specialists also reviewed the quality of the fieldwork, and helped to answer queries at various stages.

Some periods of fieldwork corresponded with floods that affected Bangladesh in 2004. The survey managers sent out scouts to collect information on the degree to which each of the sampled districts was affected by the floods. This information was used to plan the fieldwork around the floods to minimise their impact. Since different districts were affected at different times, this strategy was reasonably successful. In addition, further data on the effects of the floods was collected in each district during fieldwork. This was used to assess any possible impact on the survey findings, and suggested that the impact was small (see Annex 4).

The data were entered in Microsoft Access and a detailed process to check the consistency and accuracy of the data was undertaken. In the large majority of cases where inconsistencies were found these were resolved. In a small number of cases this was not possible and the data have been excluded from the relevant analysis.

4 School performance

Key findings

- The distribution of the benefits of secondary education is highly unequal. The share of Class 9 students who belong to the poorest 40% of the population is 12%. GSS are particularly selective: 96% of Class 9 students belong to the wealthiest 40% of households. DM serve poor households more effectively, although even in DM wealthier households are over-represented.
- The survey shows that student attendance levels are very low. School registers show 55% of enrolled students attending schools on an average day during the period of the survey. A headcount on the first day of the visit suggests that the real attendance rate is 41%, and this falls further after the tiffin break.
- A headcount on the second day of the visit for Class 9 students found their attendance higher by four percentage points, but this estimate was probably affected by the presence of the survey team and is still five percentage points lower than the most recent estimate based on the register.
- The results of tests administered to Class 9 students by the survey show that students in GSS outperform their counterparts in NGSS by 16 percentage points in Bangla and 22 percentage points in Mathematics.
- The test results also quantify the learning achievements of DM students for the first time: they scored nine and seven percentage points below average in the Bangla and Mathematics tests respectively.
- Females' recorded attendance is somewhat higher than that of males, but their observed attendance in the headcount was similar and their learning achievements are somewhat lower. However, differences by gender are much smaller than by school type.
- The majority of NGSS and DM fail at least one of three key recognition conditions: total enrolment, SSC participation rate and SSC pass rate.
- Irrespective of their enforcement, the survey casts doubt on whether these measures adequately reflect individual schools' performance.

School performance is assessed in two ways. The first section presents information on the volume of educational services provided. These output measures are relatively easy to measure with precision. They refer to such aspects of school operation as enrolment, attendance, repetition and instruction time.

The second section asks whether the educational services provided yield the desired outcome, which is a satisfactory level of learning. An objective measure of school quality is impossible to obtain. This survey has gone to great lengths to ensure that the outcome measure is an accurate index of a key aspect of school performance. It should be stressed that the main objective is not to rank schools in an absolute scale relative to a desirable standard but to compare schools so that it is possible to identify the factors that explain good school performance.

The third section compares the test-based performance measures developed by the survey with measures of performance that the education authorities apply in the case of granting or extending the recognition status of non-government educational institutions.

4.1 OUTPUTS

Enrolment

National data show that the gross enrolment rate in secondary education, defined as the total enrolment divided by the population of 11-15 year olds, is approximately 43%. This is an appreciable achievement in the face of limited resources. Among different secondary educational institutions, GSS have the largest enrolment per school according to Table 4.1. This is mainly the result of the fact that a quarter of GSS (all in urban areas[3]) operate on a shift basis. In other words, there are practically two separate schools using the same building, one operating in the morning and the other in the afternoon. DM admit the lowest numbers of students, although this is partly due to the fact that they tend to be situated in the remotest rural areas, as Table 4.2 suggests.

Table 4.1 Mean number of students enrolled per school, by school type

	GSS			NGSS	DM	Total
	Single shift	Double shift	Total			
Total	586	1354	769	460	163	386
Urban	636	1354	850	564	146	569
Rural	445	–	445	443	164	361

Table 4.2 Distance of schools from District Education Office, by school type

Schools located within a particular distance from the District Education Office (%)	GSS	NGSS	DM
0-1 km	36	1	0
2-5 km	15	7	3
6-20 km	22	29	33
21-50 km	17	52	52
50+ km	10	10	13

The above figures refer to the 2004 school year. The survey also collected enrolment information for the 2003 school year in order to compare its estimates with those of the Education Management Information System managed by BANBEIS. The comparison showed that the average enrolment estimates were almost identical for DM (372 students according to the survey as against 378 students according to BANBEIS, including the ebtedayee section students). However, the BANBEIS estimate of average enrolment in NGSS was 11% higher than the survey estimate (562 and 498 students, respectively).

Approximately 60% of schools are co-educational; 10% offer single-gender teaching in at least some classes (usually the three lower classes). While 25% of schools are for females only, just 3% are exclusively for males.

[3] The definition of urban and rural areas used in the survey was obtained by BANBEIS.

Table 4.3 Schools offering primary classes, by school type (%)

	GSS	NGSS	DM
Class 1	5	7	100
Class 2	7	7	100
Class 3	23	7	100
Class 4	29	7	100
Class 5	31	7	100

Table 4.3 reminds us that a large number of GSS and some NGSS also offer primary classes. All DM have attached ebtedayee sections.

The survey collected information on the consumption level of the sampled Class 9 students' households as a measure of socioeconomic status. Detailed information on the construction of the index is provided in Annex 2. Households were ranked by the level of their consumption expenditure in order to assess whether students come from poor or wealthy strata of the population. Table 4.4 looks at the distribution of Class 9 students across different levels of socioeconomic status. On the left panel of Table 4.4, students are classified according to how their households are positioned relative to the national distribution of consumption expenditure, utilising information from the 2000 Household Income and Expenditure Survey. Households of Class 9 students are disproportionately represented at the top half of the distribution: 43% come from households in the highest consumption quintile (highest 20%) of the population in Bangladesh, while only 12% of Class 9 students belong to the poorest 40% of the population. GSS are particularly selective: 96% of Class 9 students belong to the wealthiest 40% of households. On the right panel of Table 4.4, students are classified relative to those households that have members who are enrolled in Class 9. It is clear that GSS are predominantly serving the relatively better-off students, while DM mostly serve the relatively less well off.

Table 4.4 Socioeconomic status of Class 9 students, by school type

	Enrolled students across quintiles of the consumption expenditure distribution (%)							
	Distribution of all households				Distribution of households with Class 9 students			
Consumption quintiles	**GSS**	**NGSS**	**DM**	**Total**	**GSS**	**NGSS**	**DM**	**Total**
Bottom quintile	0	5	10	5	2	19	31	20
Lower middle quintile	1	6	15	7	7	21	25	20
Middle quintile	4	18	16	17	10	21	19	20
Upper middle quintile	13	27	32	28	19	19	17	20
Top quintile	83	43	28	43	62	21	8	20
Total	100	100	100	100	100	100	100	100

Admission processes may be playing a role. Table 4.5 shows that 90% of GSS have a formal admission procedure and all of them charge a participation fee. Explicit admission processes are far less common in non-government institutions.

Table 4.5 Admission procedures by school type (%)

	GSS	NGSS	DM
No admission procedure for school	10	84	93
Admission procedure			
Oral examination only	1	11	71
Written examination only	75	70	16
Interview only	2	1	13
Oral examination and interview	18	8	0
Written examination and interview	2	10	0
Oral and written examination and interview	2	0	0
Total	100	100	100
Schools with an admission procedure that charge a participation fee	99	48	64

Attendance

Enrolment is one indicator of service delivery and provides a basic measure of the number of children the school is educating. However, it does not measure regular attendance and how it varies among different groups attending secondary school. The survey analysed patterns of attendance for male and female students across classes and across the school year. In order to do this, the survey calculated four different measures of attendance:

- Information on the number of absentees in each school was collected from student attendance registers for eight specific days equally spread across the 2003 and 2004 school years in order to calculate average attendance rates[4]. A limited number of dates had to be selected because counting attendance over every day would have been very time-consuming for the interviewers. These dates were common for all schools and were determined in advance of the visits.

- The attendance registers were also used to collect more extensive information on attendance for all Class 9 students. The entire school attendance record of each student was collected for the 2004 school year from January up until the time the school was visited for the purposes of the survey (i.e. between July and October).

- During the school visit the survey teams went to classrooms and counted the number of children who were present in each section and class. This observation was conducted twice: at the beginning of the school day and after tiffin (lunch). The visits were unannounced.

- In order to verify that data collected from the school attendance registers were correct, sampled households were also asked about their child's attendance over the course of the week preceding the survey.

[4] As the school survey was undertaken during the middle of the 2004 school year, it was necessary to look at class attendance registers for both 2003 and 2004 in order to get a picture of how enrolment varied across the school year for each class.

Attendance registers—average annual school attendance

Based on information obtained from the school registers for all classes, Table 4.6 reports average attendance rates for the three different types of school. Average recorded attendance rates for secondary schools in Bangladesh are approximately 60%[5]. Attendance rates are higher in urban areas. The difference is greatest for GSS, where average attendance rates are 10% higher in schools located in urban areas. Female students tend to attend more regularly than their male counterparts, although this difference narrows over the years, so that the gender gap in attendance is 12 percentage points in Class 6 but only one percentage point in Class 10.

Table 4.6 Average annual school attendance according to registers (%)

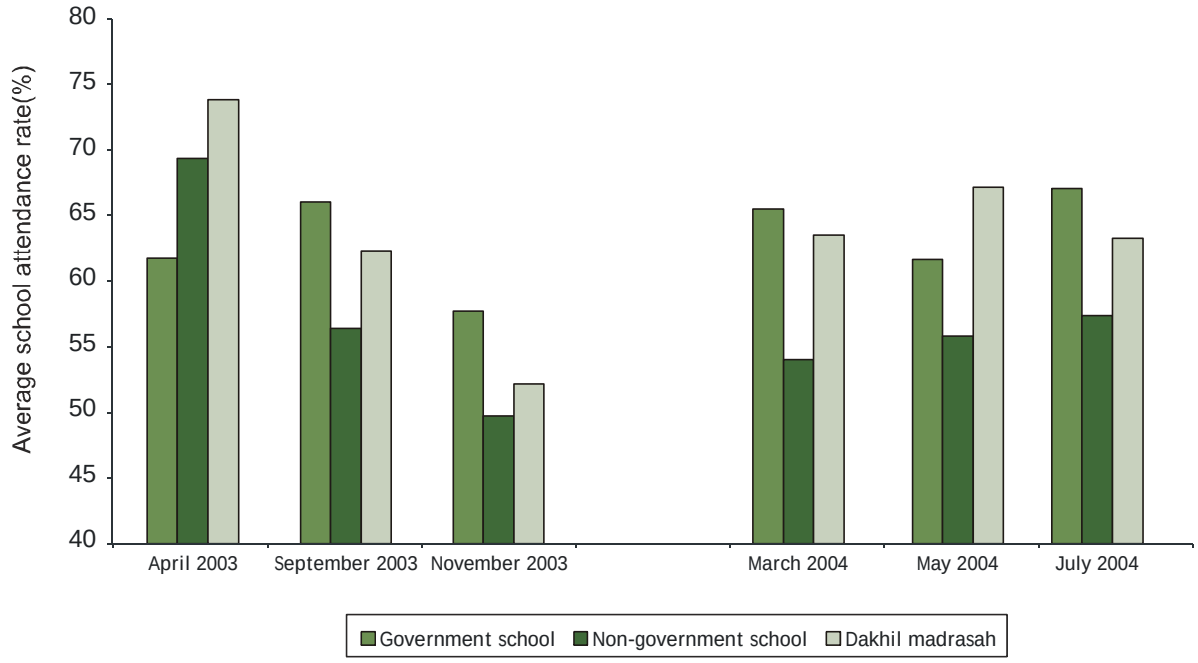
	School type			Gender		Total
	GSS	NGSS	DM	Male	Female	
Total	64	57	63	55	61	59
Urban	66	60	67	62	64	61
Rural	56	57	63	54	61	59
Class 6	68	62	64	55	67	63
Class 7	65	58	63	55	62	59
Class 8	62	57	65	55	62	59
Class 9	62	54	64	54	59	57
Class 10	59	57	65	59	60	59

Note: The average attendance rate is calculated as the average of attendance rates on each selected day over the total number of selected days. A class was classified as being in session if at least one student attended on that day.

Figure 4.1 shows attendance rate variation at specific points in 2003 and 2004 to assess whether they are affected by seasonal differences in the demands on students' time and constraints in the accessibility of schools (e.g. because of weather conditions). In general, attendance rates appear to be stable in the first half of the year, but then to fall as we move closer to the end of the year. This may at least partly have to do with the fact that November coincided with Ramadan, when attendance is known to be poor. Patterns of school attendance do not appear to be affected by gender.

[5] See Annex 4 on the impact of floods on attendance. In general, although the effect was very large for specific schools during July (and to a lesser extent August), the total impact on attendance rates at a national level over the course of the school year would not exceed half a percentage point.

Figure 4.1 Average school attendance rates across the school year



Note: Average school attendance rates are calculated using all available attendance information for classes and sections in each school for the specified month. Each month includes the same sampled schools.

Attendance registers—Class 9 attendance

The survey collected complete attendance records for all Class 9 students in 2004 up to the time of the survey. Table 4.7 calculates attendance using individual information for every single day the school was open between January and June, and therefore differs slightly from estimates reported in Table 4.6, which was based on a selected number of dates.

Table 4.7 Class 9 attendance rates, Jan–Jun 2004 (%)

	School type			Gender		Total
	GSS	NGSS	DM	Male	Female	
Attendance rate	62	52	63	51	56	54
Quintiles of attendance						
Bottom quintile	26	19	19	20	19	19
Lower middle quintile	47	46	47	46	46	46
Middle quintile	61	61	61	61	61	61
Upper middle quintile	74	75	75	75	75	75
Top quintile	90	90	90	89	90	90

Note: The reported data are for all Class 9 students in each sampled school and quintiles of attendance were calculated using the first six months' attendance record in 2004.

Table 4.7 also shows how attendance rates vary across the student population: it orders students into quintiles according to their attendance rates, and reports average attendance rates for each quintile. It shows that the 20% of students with the lowest attendance records had an average

attendance rate of 19%, compared with an average attendance rate of 90% among the 20% of students with the highest attendance records. This shows that attendance in secondary schools is particularly low for a significant proportion of students. Table 4.7 shows, for example, that a significant proportion of secondary school students attend only once or twice a week.

Headcount

In order to evaluate the reliability of school attendance registers, interviewers performed a headcount on the day of the visit. As a measure of comparison, the attendance rate in the school seven days before the day of the visit was selected. This was done because it would not be possible to use the register on the day of the visit as this may have been affected by the presence of the survey team. In addition, one would not want to take the attendance of the day preceding the visit as representative because local conditions, such as market days, may mean that attendance varies across days in the week.

Table 4.8 Comparison of attendance (%) between school registers and headcount

	School type			Gender		Total
	GSS	NGSS	DM	Male	Female	
Attendance according to the register seven days before the survey	65	53	60	53	57	55
Attendance according to headcount before tiffin	54	41	40	41	42	41
Attendance according to headcount after tiffin	42	36	37	36	38	37

The results from the headcount, reported in Table 4.8, suggest that attendance rates are 11-20 percentage points lower than those calculated from school registers. The average for the register-based measure (55%) is slightly lower than the average measure in Table 4.6, given that the survey took place in the second half of the year when attendance is generally lower. The discrepancy between the morning headcount and the school attendance register rates is higher for DM (20 percentage points), followed by NGSS (12 percentage points) and GSS (11 percentage points). It is higher for female students (15 percentage points) than male students (12 percentage points).

In addition, registers are usually completed at the beginning of the school day and if students are present at this time they are classified as present for the whole day, regardless of whether they attend all classes or are present at the end of the school day. The survey team conducted a second headcount after the tiffin break to assess whether children generally attend the full day or not and found that 11% of students left school early.

Approximately one-third of all classes observed had fewer children present after tiffin than before, as Table 4.9 shows.[6] This suggests it is relatively common for students to leave school during tiffin time and not to return for the second session. There are marked variations in this dropout across school types, with NGSS schools registering the largest proportion of classes with dropout. Table 4.9 also shows the percentage decline in the number of students attending after the tiffin break, for classes in which a drop in attendance has been reported.

A smaller proportion of classes were reported as having dropout during the day in GSS, but the drop in student attendance was highest, at 32%. Dropout rates during the day also seem to be highest in Class 10, with nearly half of GSS Class 10 students absent after tiffin in schools that

[6] In one percent of observed classes more students were present after than before tiffin.

report a dropout. Interestingly, male dropout during the day tends to be higher than female dropout, perhaps reflecting student attendance at private tuition during the afternoon. It seems that male students are less likely to attend on a daily basis than female students, and when they do attend they are more likely to leave before classes end.

Table 4.9 Class dropout (%) during the school day

	School type			Gender	
	GSS	NGSS	DM	Male	Female
Classes reporting dropout during the day	12	39	17	–	–
Fall in class attendance in classes reporting dropout during the day	32	19	21	33	21
Fall in attendance by class in classes reporting dropout during the day					
Class 6	32	21	17	29	21
Class 7	30	27	26	34	31
Class 8	38	22	28	34	25
Class 9	39	20	28	30	26
Class 10	48	28	35	45	37

Note: The fall in attendance by class is defined as the drop in attendance (after tiffin) for both males and females as a percentage of overall attendance before tiffin. These falls are averaged by school to give the total figures. The gender disaggregated figures are calculated as the total drop in attendance for male (female) students as a percentage of total male (female) attendance before tiffin.

At this point, it is important to discuss the apparent discrepancy between the evidence in this section so far and the attendance of Class 9 students at the SSPS tests. Recall from Table 3.1 that the proportion of Class 9 students who turned up for the tests on the second day of the visit was 53%; when weighted to account for the large share of GSS students, the attendance rate of Class 9 students is 45.7%. Table 4.10 shows that this is more than four percentage points higher than the corresponding estimate that was based on the headcount on the first day of the visit. However, it is also more than five percentage points lower than the corresponding estimate that was based on the registers a week before the first day of the visit. It is possible to argue that attendance on the second day was increased at least to some extent by the fact that the school was aware of the presence of the survey team and mobilised its students. This was one of the main reasons that the visits were not announced and the school sample was kept secret.

Table 4.10 Class 9 attendance (%) on first and second day of the visit

	School type			Total
	GSS	NGSS	DM	
Class 9 attendance according to headcount on the first day of the visit	55.7	42.1	37.4	41.1
Class 9 attendance according to number of students tested on the second day of the visit	58.1	46.6	42.4	45.7
Class 9 attendance according to attendance register entry seven days before the visit	60.3	49.0	55.4	50.9

Households

Data on the incidence and reasons for absenteeism were collected from households of sampled Class 9 students. Table 4.11 shows some interesting differences across schools and between male and female students in reasons for absenteeism. Sickness was the most common reason students were absent from school in the previous six days. Visiting relatives accounted for a surprisingly high 14%. Weather also featured prominently as an explanation, as the survey was undertaken in the rainy season. Working for the household is another common reason given, although it varies widely by gender and school type: students attending DM (NGSS) were almost three (two) times as likely to cite this as the reason for absenteeism than students attending GSS, reflecting the much higher reliance on family labour in poorer households, and the higher concentration of poorer households in DM and NGSS. Private tuition and examination preparation were cited almost exclusively by GSS students as reasons for non-attendance, again highlighting their higher socioeconomic status.

Table 4.11 Absenteeism in the six days before the survey among sampled students

Reason for absence as proportion of those absent (%)	School type			Gender		Total
	GSS	NGSS	DM	Male	Female	
Sick	39	43	36	37	46	42
Work for the household	5	19	32	29	15	20
Visit relatives	16	14	11	12	15	14
Bad weather	14	12	12	11	12	12
Examination preparation	11	2	0	4	2	2
Paid work	0	1	1	1	1	1
Private tuition	5	0	0	1	0	0
Other / don't know	12	10	7	10	10	10

Repetition

Information on class repetition was collected directly from class teachers, as few schools have a systematic record of the number of students that stay in the same class. According to these data, reported in Table 4.12, the class repetition rate was approximately 4.5%. However, far more students repeated Class 10. DM have an average repetition rate of less than 2%, which may imply lower pressure for performance. Urban students tend to have higher repetition rates for probably the opposite reason. GSS are more likely to make the child repeat lower secondary classes and have a lower proportion of students repeating Class 10. There is little difference between females' and males' repetition rates.

An alternative source of information on repetition is the household itself, as a specific question was included in the questionnaire to households of Class 9 students. The most reliable comparison refers to repetition at Class 9, as the recall error is minimised. This was estimated at 6.2%. To a certain extent, it is not surprising that this estimate is two percentage points higher than that obtained at the school. Teachers may not be keen to identify repeating students. They may also only have had in mind attending students at the time of the visit, while the survey also visited the households of non-attending students. Finally, repeating students may have transferred from another school without the teacher knowing.

Table 4.12 Repetition (%)

	School type			Location		Gender		Total
	GSS	NGSS	DM	Urban	Rural	Male	Female	
Mean repetition (all classes)	6.3	5.5	1.9	7.8	4.1	4.7	4.7	4.6
Class 6	8.4	4.7	2.2	8.8	3.0	3.4	3.7	3.8
Class 7	6.3	3.3	0.8	4.3	2.3	2.6	2.6	2.6
Class 8	6.1	4.9	1.9	4.9	3.2	4.0	3.2	3.4
Class 9	4.8	5.5	0.5	8.7	3.6	4.0	4.5	4.2
Class 10	3.0	12.9	6.6	12.1	10.2	10.9	11.1	10.5

Instruction time

The average instruction time is just under five hours per day. There is little variation between types of school or by urban–rural division. Instruction periods are slightly shorter in GSS, reflecting the fact that in double shift schools each shift is shorter than in single shift schools.

Over the course of one year, the number of days that schools were open varied considerably, as Table 4.13 shows. Based on the 2004 calendar, schools should be open for 208 days in the year. However, the average number of days a school was found to be open was 196 and 61% of schools were open for fewer than 208 days. Most DM were open for longer, probably reflecting the fact that they do not take non-Islamic religious holidays. GSS were actually open for fewer than 14 days a month on average but in the worst 10% of cases, some GSS were open only for 11 days a month. GSS are found predominantly in urban areas. This explains why only 7% of schools in urban areas were open for 208 days. This is partly driven by the fact that many of these schools serve as SSC examination centres in March, but it may also reflect the fact that these buildings are often used for non-educational purposes and are more likely to be affected by hartals (strikes).

Table 4.13 Number of days that the school is open

	School type			Location		Total
	GSS	NGSS	DM	Urban	Rural	
Mean number of days school open in the year prior to the survey (Aug 2003 - Jul 2004)	166	189	217	182	198	196
Schools that were open (%):						
More than 208 days	7	24	82	7	43	39
Less than 208 days	93	76	18	93	57	61

4.2 OUTCOMES

Having examined quality variables, which are indirectly related to achievement, this section examines school performance on the basis of more direct measures of learning.

Secondary School Certificate and scholarship examinations

The standard method to rank secondary schools in terms of quality in Bangladesh is by the pass rate in the SSC examination. Table 4.14 and Table 4.15 list the SSC and dakhil examination pass rates across sampled schools.

Table 4.14 SSC / Dakhil examination pass rates in sampled schools (%)

Year	School type			Location		Total
	GSS	NGSS	DM	Urban	Rural	
2002	75	39	48	81	41	60
2003	68	32	35	77	30	54
2004	74	46	54	80	46	65

Table 4.15 SSC / Dakhil examination pass rates in sampled schools by gender (%)

Year	School gender mix			Gender		Total
	Males only	Females only	Mixed	Male	Female	
2002	78	65	43	63	57	60
2003	72	61	33	57	52	54
2004	74	69	53	67	63	65

GSS achieved a substantially higher pass rate than other types of school. Their proportion of successful candidates in 2003, for instance, was more than double that of NGSS. Similarly, urban schools in the sample have a considerably higher pass rate than rural schools. Differences between the results for males and females were less stark; nonetheless they displayed a consistent pattern: males' pass rates exceeded females' pass rates each year. It is notable that both males and females achieved much better pass rates in single-gender schools than in mixed schools, although this result largely reflects the fact that GSS constitute two-thirds of all single-gender schools surveyed.

One of the conditions for continuing government support of NGSS and DM is the successful participation in the SSC and dakhil examinations. Table 4.16 presents the distribution of sampled schools in terms of the proportion of candidates in the Class 10 student population. The participation rate is an indicator that is less vulnerable to annual variations compared with the pass rate. Note that a participation rate above 100% is possible as students may sit for the SSC examination more than once without repeating the class. There are wide variations in the proportion of students sitting the examination, with NGSS and DM having much lower participation rates.

Table 4.16 SSC / Dakhil examination participation in 2004, by school type

	GSS	NGSS	DM	Total
Average SSC / Dakhil participation (%)	146	82	69	79
Schools (%) where the proportion of Class 10 students sitting the SSC / dakhil examination is:				
<50%	0	27	29	27
50-75%	0	26	32	28
75-100%	7	22	25	22
>100%	93	25	14	23
Total	100	100	100	100

Table 4.17 School level participation in SSC / dakhil examination 2003/04

Non-government secondary schools

2004 \ 2003	<50%	50-75%	75-100%	>100%
<50%	10	12	4	1
50-75%	1	4	9	12
75-100%	0	2	14	6
>100%	0	1	1	23

Dakhil madrasahs

2004 \ 2003	<50%	50-75%	75-100%	>100%
<50%	25	3	1	0
50-75%	9	13	6	4
75-100%	9	4	4	8
>100%	2	0	9	2

Table 4.17 presents the information over two years in the form of a transition matrix. Each cell reports the proportion of schools that fall in particular performance categories in each of the years 2003 and 2004. Cells add up to 100. Schools in the diagonal cells have had the same performance in terms of the proportion of candidates across the two years. For example the top left cell in the left panel says that 10% of NGSS had a participation rate below 50% in both years. The table shows that it is relatively easy to isolate schools and madrasahs with low participation rates.

Finally, passing the Grade 8 scholarship examination is another measure of school performance. By far the highest success rates are achieved by GSS candidates. Pass rates in Table 4.18 appear high, although it should be kept in mind that the number of candidates is usually limited to those more likely to succeed. The participation rates are presented in Table 4.19 and Table 4.20.

Table 4.18 Junior scholarship examination pass rate, 2003 (%)

Year	School type			Gender		Total
	GSS	NGSS	DM	Male	Female	
2001	21	4	0	16	15	15
2002	20	3	0	13	16	14
2003	18	3	0	12	14	13

Table 4.19 Junior scholarship examination participation in 2003

	GSS	NGSS	DM	Total
Average junior scholarship examination participation (%)	30	18	8	16
Schools (%) where the proportion of Class 8 students sitting the scholarship examination is:				
0	0	0	26	7
0-25%	18	59	52	57
25-50%	55	31	11	26
>50%	27	10	11	10
Total	100	100	100	100

Table 4.20 School level participation in junior scholarship examination 2002-03

Non-government secondary schools

2003 \ 2002	None	0-25%	25-50%	>50%
None	0	0	0	0
0-25%	0	49	10	1
25-50%	0	15	16	0
>50%	0	3	4	3

Dakhil madrasah

2003 \ 2002	None	0-25%	25-50%	>50%
None	23	2	1	0
0-25%	18	26	4	3
25-50%	0	2	8	1
>50%	0	4	3	5

Cognitive achievement—the SSPS tests

As part of the survey, all Class 9 students who were present in the school at the time of the visit were given a test to complete. The Class 9 test was designed to provide a measure of student performance based on the extent to which students had understood and achieved proficiency in the secondary school curriculum. Testing consisted of two components:

- Mathematics
- Bangla

The test lasted for 40 minutes and students had 20 minutes for each subject. The test was not pre-announced and in addition there were specific arrangements to prevent cheating. After the test was completed the students were also asked to complete:

- Raven's Progressive Matrices—a test measuring non-verbal ability or general intelligence, which is designed to be as independent as possible of what is learnt at school (Annex 2)
- Questions on their family background

Rather than using the schools' own term examinations, specific tests were conducted for two reasons. First, school-based examinations differ across schools and are not comparable. For example, a student in school A scoring 80% cannot be said to have performed better than a student in school B who scored 60% on a different examination. The same SSPS test was administered to all Class 9 students across schools, making direct comparisons of students across different schools possible. Second, unlike the SSPS test, school-based examinations are likely to test only what has been learnt during the previous term, and not the student's competence in relation to the secondary school curriculum up to Class 9.

The use of SSC examination results to analyse student performance was precluded because pass rates vary widely between each of the seven regional examination boards and the Madrasah Board, and these differences are partly reflected in the pass rates for the sampled schools. In 2002, for example, the pass rate for the Dhaka Board was nearly 50% higher than that for the Comilla Board, for which a different examination was set.

For the reasons given above, it is not possible directly to compare school-based examination results with the SSPS test. However, as a rough measure, Table 4.21 reports correlation coefficients between a student's school rank in the SSPS tests and a student's school rank in the Class 9 first term school examination in Bangla and Mathematics. A correlation coefficient of zero signifies that there is no linear relationship between the two tests, whereas a correlation coefficient close to one signifies a strong positive linear relationship between the two tests. The table shows that the correlation coefficients are relatively high and a statistical test of the correlation between first term examinations and the SSPS test suggests that there is a significant relationship between the student ranking in the two tests, even though this relationship is not very strong.

Table 4.21 Correlation of student ranks in SSPS test and first term examinations

	GSS	NGSS	DM	Total
Bangla first term school based examination result and SSPS Bangla test result	0.48	0.54	0.41	0.58
Mathematics first term school based examination result and SSPS Mathematics test result	0.53	0.58	0.45	0.62

Note: All reported correlation coefficients are significant at the 1% level. The closer the value of the coefficient is to one, the higher the correlation.

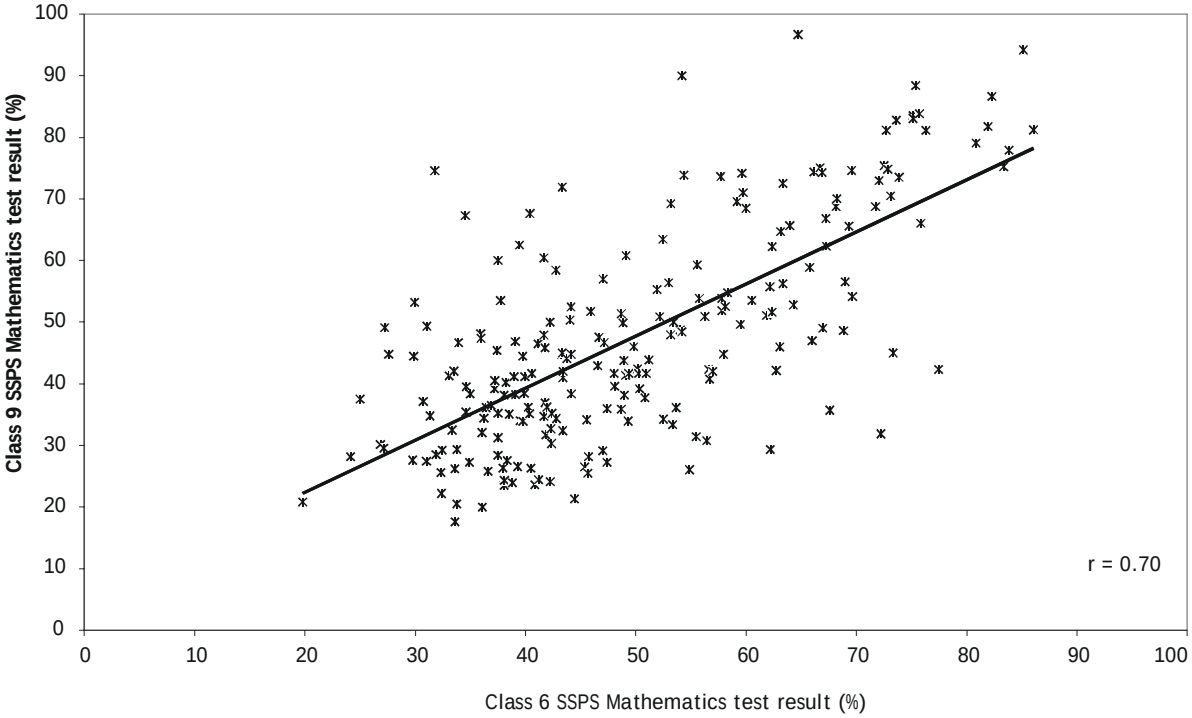
Class 6 students were also tested to give an indication of achievement levels of the student intake of schools. A measure of this kind is important when looking at the determinants of Class 9 achievement, as it controls for improvements in cognitive skills from previous schooling[7]. The structure of the Class 6 test was the same as for Class 9, but Class 6 students were tested using Mathematics and Bangla questions developed for Class 5 students as part of the primary school surveys conducted under SSPS.

Figure 4.2 illustrates the relationship between the Class 6 and Class 9 SSPS tests for Mathematics in sampled schools. It is clear that there is a positive relationship between a school's Class 6 and Class 9 SSPS test result. To the extent that the Class 6 results act as a proxy for the quality of student intake for each school, the figure shows that schools with a better quality intake at

[7] An important determinant of performance is the level of cognitive skill of each Class 9 student before they enter secondary school. For example, it is likely that students who perform well in primary school go to better secondary schools. It is not possible to collect information on previous levels of achievement of Class 9 students so the survey collected information on levels of cognitive skills of current Class 6 students to proxy for this.

Class 6 (i.e. those schools with higher Class 6 test results) tend to have better results at Class 9. Controlling for the quality of student intake will be very important when looking at the determinants of achievement in schools.

Figure 4.2 Relationship between Class 6 and Class 9 SSPS Mathematics test results



Note: The unweighted correlation coefficient is reported at the bottom of the graph.

Table 4.22 summarises the SSPS Bangla and Mathematics test results by school type and gender. The mean scores of GSS class 9 students were more than 25 percentage points higher in Bangla and Mathematics than the scores of those in DM. On average, NGSS school students did better than DM students, although they lagged behind their GSS counterparts. These differences are far wider for the Mathematics than for the Bangla test.

Table 4.22 SSPS Class 9 Bangla and Mathematics test scores (%)

	School type			Gender		Total
	GSS	NGSS	DM	Male	Female	
Bangla test score						
Mean	75	59	50	61	58	59
Urban	79	67	54	68	67	68
Rural	64	57	49	57	56	56
Mathematics test score						
Mean	67	45	38	48	43	45
Urban	73	49	45	55	49	52
Rural	50	44	36	45	42	43

Despite the higher attendance rates of female students in all types of secondary schools, their performance in the SSPS tests was slightly poorer than that of male students. The largest gender gaps in test performance were recorded in GSS, even though these schools also had the highest performing female students. The gender gap was larger in Mathematics than in Bangla, and differed considerably across school type (not shown in the table below). For example, there was an 11 percentage point gender gap in Mathematics in GSS, but gender gaps in Bangla were small in NGSS schools and non-existent in DM.

Perhaps unsurprisingly, students attending schools in urban areas did better in SSPS tests than students in rural schools. These gaps are widest amongst GSS where the average test scores in urban schools were 15 and 23 percentage points higher than in rural schools in Bangla and Mathematics respectively. These differences between test scores in part pick up differences in socioeconomic status in these areas.

Table 4.23 SSPS Class 9 test scores (%) by level of student attendance

		School type			Gender		Total
		GSS	NGSS	DM	Male	Female	
Bangla test score							
By quintile of attendance	Bottom	71	52	42	54	51	52
	Lower middle	73	54	49	58	52	55
	Middle	75	58	46	61	55	58
	Upper middle	79	60	50	63	57	59
	Top	78	62	51	67	59	60
Mathematics test score							
By quintile of attendance	Bottom	60	38	45	43	37	39
	Lower middle	65	41	38	44	40	42
	Middle	66	43	41	48	42	44
	Upper middle	71	46	37	52	42	46
	Top	68	49	38	54	46	48

It is interesting to see how the two key performance measures estimated by the survey, namely attendance and the Class 9 Bangla and Mathematics test scores, relate to each other. As in Table 4.7, students were classified into five equal groups according to their level of attendance, with the bottom 20% including the students with the lowest attendance rate in the sample.

Table 4.23 shows that student performance is positively related to school attendance in NGSS and, to a lesser extent, in GSS, but not in DM, especially in Mathematics. In addition, significant increases in attendance seem to have a relatively small effect on test scores in NGSS. A student who goes to school every day scores ten percentage points more in Bangla and Mathematics compared with a student who goes to school one or two days a week on average.

Finally, Table 4.24 shows the relationship between student socioeconomic status and achievement in the SSPS test scores. With the exception of GSS, there is no monotonic relationship between welfare and performance. However, in almost all cases the students from the wealthiest households scored higher in both subjects.

Table 4.24 SSPS Class 9 test scores by (%) socioeconomic status of students

	School type			Gender		Total
	GSS	NGSS	DM	Male	Female	
Bangla test score						
Bottom quintile		55	45	67	48	54
Lower middle quintile		51	48	60	47	51
Middle quintile	59	56	47	55	55	55
Upper middle quintile	70	53	48	56	49	52
Top quintile	78	61	51	66	59	61
Mathematics test score						
Bottom quintile		43	35	48	39	42
Lower middle quintile		37	33	51	31	37
Middle quintile	53	42	35	41	41	41
Upper middle quintile	54	40	38	47	34	40
Top quintile	72	46	41	53	45	48

Note: There are no students from the two bottom quintile attending GSS. For several other cells, especially in the bottom three quintiles, the number of observations is lower than 100.

4.3 RELATIONSHIP BETWEEN SSPS AND OTHER PERFORMANCE MEASURES

The two previous sections have examined output and outcome measures in the sampled schools. It is of interest to see how the school performance measures based on the SSPS tests relate to other observable measures of performance, especially those that are used by the government as conditions for awarding recognition status to non-government educational institutions and renewing this status every three years.

Compliance with performance measures used as conditions to recognise NGSS and DM

As mentioned in Section 2.1, there exist well-defined guidelines for the allocation of salary subventions to NGSS and DM. These cover very diverse aspects of school operation: use of the government approved curriculum, recruitment of teachers according to rules, presence of a School Managing Committee, minimum distance from neighbouring schools, minimum level of deposits in the school bank account, acceptance of government audit rules, ownership of land and the buildings, and the condition of classrooms.

In this section, we focus on three more immediate measures of performance:

- a minimum number of students must be enrolled (see Table 4.25);
- at least 75% of Class 10 students must participate in the SSC / dakhil examination; and
- at least 50% of participants must obtain a pass in the SSC / dakhil examination.

Table 4.25 Minimum number of students in NGSS and DM

	NGSS		DM	
	Urban	Rural	Urban	Rural
Co-educational / Males only	330	250	300	250
Females only	300	200	250	250

Source: Administrative and Management Manual for Non-Government Educational Institutions, 1997

Table 4.26 examines to what extent the sampled schools satisfy these three conditions. The condition of minimum enrolment is not satisfied by the vast majority of DM and about one in six NGSS. With respect to the SSC-related conditions, more than half of the NGSS and DM sent fewer than the required number of students to participate in the SSC in 2004. Of those students who took part, the pass rate was 32% for the sampled NGSS and 61% for the sampled DM. The interrelationship of these two latter conditions is an issue of concern: according to the 2003 National Policy Forum, schools which believe that their subvention depends on their SSC pass rate may withhold students with limited probability of success from registering for the examination. Plotting the SSC participation and pass rates against each other did not show evidence of any relationship between the two, let alone an inverse relationship. However, it is possible that a screening of applicants takes place between Class 9 and Class 10, as revealed by the high dropout rates; if this is the case, then it is not surprising that no relationship between participation and pass rates is manifested here.

Table 4.26 Selected recognition conditions for NGSS and DM

	NGSS	DM
Schools that do not meet the minimum enrolment condition (%)	17	92
Schools that do not meet the SSC participation rate condition (%)	52	59
Schools that do not meet the SSC pass rate condition (%)	68	39

A majority of NGSS and DM appear therefore not to satisfy these conditions for their recognition and it is clear that the authorities do not apply these rules strictly. One quarter of NGSS had SSC participation rates below 50%, whereas one quarter of DM had SSC participation rates below 40%, which means that they fail to achieve the targets by a considerable margin.

Value of performance measures used as conditions to recognise NGSS and DM

Although the administration does not enforce compliance with existing school performance targets, it is important to ask whether these conditions are good indicators of school performance in the first place. The performance measures based on the results of the Bangla and Mathematics tests administered by this survey can act as a benchmark for such comparisons.

Table 4.27 Correlation between SSPS Class 9 test scores and SSC performance

	Bangla		Mathematics	
	NGSS	DM	NGSS	DM
SSC pass rate, 2004	0.37*	0.36*	0.21	0.19
SSC pass rate, 2002-2004 (average)	0.63*	0.12	0.38*	0.01
SSC participation rate, 2004	0.56*	0.26	0.26	0.23
SSC participation rate, 2002-2004 (average)	0.54*	0.29	0.20	0.15

Note: The reported correlation coefficients marked with an asterisk are significant at the 1% level

Table 4.27 assesses whether there is a linear relationship between the SSPS test scores and the two main SSC-related performance measures, the participation rate and the pass rate. Two versions of the SSC indicators are used: the values for 2004 and the three-year average over the period 2002-2004. The relationship is measured by the correlation coefficient, which takes values from minus one to one. When the coefficient is close to zero there is no linear relationship between the two indicators, whereas a correlation coefficient close to one (minus one) signifies the existence of a strong positive (negative) linear relationship. The results show that the correlation coefficients are significant in the case of the Bangla score in the NGSS. Another observation is that both the Bangla and the Mathematics test scores in the NGSS are more highly correlated with the three-year average SSC pass rate rather than with the 2004 pass rate. However, these relationships do not seem to hold at all in the case of DM.

Even though the SSPS tests have several advantages as indicators of school performance over the SSC examination results, it is possible to argue that the school-level mean score at Class 9 is not the best school performance indicator. Schools differ in many aspects, but a defining characteristic is their student intake, in other words the quality of the students that enter the school at Class 6. As Table 4.5 showed, some schools assess their candidates and only admit those with the best performance in the selection procedure. It would therefore be incorrect to focus on the average test score as a measure of school performance, ignoring these differences.

A more accurate indicator of performance should be the extent to which a school manages to increase the performance of students between Class 6 and Class 9, what is known as the school's value added. This calls for testing the same students both upon entering the school and upon graduating from it five years later but this was not possible in the context of this survey. Under the assumption that the quality of the school intake does not change dramatically for a particular school over a period of years, an alternative solution would be to test the current cohort of Class 6 students and compare their average scores with those of the Class 9 cohort.

When the value added measure is used as an indicator of performance, the picture that emerges with respect to differences across types of schools changes. Table 4.28 shows that average test scores in both Bangla and Mathematics improved relatively more in NGSS than in GSS, whereas DM were ranked once more as the type of school with the lowest performance. It is important to stress that the figures in this table may only be used to rank performance between the three types of schools; they do not suggest in any way whether performance was improving relative to an absolute standard.

Table 4.28 Value added (Class 9 vs. Class 6 SSPS test score) (%) by type of school

	GSS	NGSS	DM
Bangla	-0.0	4.0	-2.1
Mathematics	2.8	8.7	-0.1

Table 4.29 shows how the correlation coefficients change once the mean score is replaced by the mean value added. There appears to be no positive relationship between the two groups of measures at all.

Table 4.29 Correlation between SSPS value added scores and SSC performance

	Bangla		Mathematics	
	NGSS	DM	NGSS	DM
SSC pass rate, 2004	0.08	0.30*	0.03	-0.02
SSC pass rate, 2002-2004 (average)	0.10	0.12	0.14	-0.14
SSC participation rate, 2004	0.04	0.01	0.16	0.09
SSC participation rate, 2002-2004 (average)	0.09	0.13	0.16	-0.04

Note: The value added score has been calculated as the proportional change between the Class 6 and Class 9 SSPS test scores. The Class 6 test score has been normalised by the difference in the mean scores for both tests.

This finding highlights that the quest for a reliable school performance measure needs careful thought. As the value added argument suggests, there are several underlying factors that contribute to school performance and it is important to isolate the contribution that a school is making given its inputs, whether these are the capacities of its students or the financial resources available. The following six chapters examine different inputs to the educational process that are likely to affect performance. Chapter 11 looks in detail at the determinants of school performance using a multivariate model, which allow analysis of one factor while all the other factors are controlled for.

5 Finance

Key findings

- The total annual resource flow into the secondary education sector is estimated at Tk 40.2 billion. The share of the total provided by the government is 47.5%. Private households fund 49% and the remainder is provided by external assistance.
- GSS are much better resourced than other schools. Around Tk 4,900 are allocated for the average student in GSS, compared with Tk 2,300 in NGSS and Tk 2,800 in DM.
- GSS students receive four times more non-salary resources *per capita* than NGSS and nine times more than DM. Differences are larger still when the comparison is limited to the least well-resourced schools.
- Since GSS serve so few students, these differences do not greatly skew resources towards the better-off. Although students from better off households do benefit from higher levels of resources than the poorest, these differences are not large, although they are more appreciable for the non-salary component.

This survey focuses on public expenditure in secondary education. However, it is important to understand the framework in which public resources operate and their interaction with private resources. There is often a tendency to overlook the significant role played by individual spending decisions and a lack of appreciation of the share of the financial burden borne by households. The first section puts the financial aspects of secondary education into perspective by introducing a matrix of financial agents and education service providers that accounts for all the resources in the Bangladeshi secondary education system. The approach is a rudimentary attempt to introduce accounting methods similar to those that have been applied in the health sector (c.f. Bangladesh National Health Accounts), which in their turn follow national accounting practices. The second section summarises the level of resources available to schools of different types, distinguishing between public and private providers.

5.1 TOTAL EXPENDITURE IN SECONDARY EDUCATION

Table 5.1 provides the broad picture of the public-private split in financial resources to secondary education, which is defined here as excluding higher secondary schools, colleges, alim or higher madrasahs, technical education and English-medium schools but including junior secondary schools.

- Each column corresponds to one of the four principal financing agents: the government's revenue and development budgets, households, and external assistance. However, note that direct budget support is classified under the government revenue budget and not as external assistance.

- Each row corresponds to the main recipients of secondary education financing: the three main types of schools, central administration and private individuals or firms. For the three school types and the administration, four categories of use are identified: salaries, non-salary costs, repairs, and investment (construction and acquisition of assets). Under the 'private individuals and firms' category, the main types of recipients implied are private tutors (for tuition services), retailers (who sell stationery and books), and individuals who transport students to schools.

The information is obtained from government documents (revised revenue budget, development budget expenditure, and external assistance) and the SSPS (private expenditure). A detailed presentation of the method used to calculate Table 5.1 is in Annex 3.

Table 5.1 National secondary education expenditure 2003/04 (Tk, millions)

Recipient / Use	Financing agent: Government revenue budget	Government development budget	Households	External assistance	Total
Government secondary schools	**1,014**	**156**	**195**	**0**	**1,366**
Salaries and allowances	828	0	0	0	828
Non-salary	61	0	195	0	257
Repairs and maintenance	110	0	0	0	110
Other investment	14	156	0	0	171
Non-government secondary schools	**9,561**	**2,913**	**3,395**	**339**	**16,185**
Salaries and allowances	9,281	130	1,647	80	11,138
Non-salary	0	125	1,584	77	1,785
Repairs and maintenance	280	8	107	5	400
Other investment	0	2,650	58	154	2,862
Dakhil madrasahs	**2,607**	**307**	**258**	**72**	**3,210**
Salaries and allowances	2,587	20	139	17	2,762
Non-salary	0	11	79	10	99
Repairs and maintenance	20	5	32	4	61
Other investment	0	272	8	8	288
Administration	**1,073**	**326**	**0**	**384**	**1,884**
Salaries and allowances	486	185	0	21	692
Non-salary	295	135	0	360	789
Repairs and maintenance	4	7	0	3	14
Other investment	287	29	0	73	389
Private individuals and firms	**214**	**912**	**15,877**	**560**	**17,563**
Total	*14,469*	*4,643*	*19,725*	*1,371*	*40,208*

Source: Figures were calculated using government documents and SSPS data (see Annex 3 for details). Secondary education in this table does not include: technical schools, English-medium non-government schools, any teaching in Classes 6-10 that took place in higher secondary schools or colleges, and alim, fazil or kamil madrasahs.

The survey collected expenditure information from households of Class 9 students only. This was projected to the total secondary education student population using information from the 2000 Bangladesh Household Income and Expenditure Survey. All private expenditure was assumed to have funded other private individuals and firms except for the amount paid in fees, which was paid directly to schools.

It was assumed that all (government and external) stipend project resources to individuals helped finance education-related expenditure. Stipend project resources to NGSS and DM (reimbursing tuition fees) were allocated across different uses according to the average distribution of their expenditure.

The total amount of resources that flowed into the secondary education sector during FY 2003/04 was estimated at Tk 40.2 billion. Private households bore almost half the costs in secondary education (49.1%), which slightly exceeds the government share of the total cost (47.5%). Chapter 8 provides further details on the breakdown of these costs. The remaining 3.4% was provided by external sources; 55% of that is through the stipend projects (three-quarters went directly to households and the remainder to schools).

More than half of all the resources was spent directly by the three types of schools. Almost 71% of their budget is allocated to salaries and allowances and 13% was allocated to non-salary expenses and repairs. The remainder was directed to construction investment[8]. The percentage of resources that was directed to construction was 12.5% in GSS, 17.7 in NGSS and 9% in DM.

5.2 SCHOOL RESOURCES

This section provides measures of the resources that flow directly into and out of schools and madrasahs for education services to students in Classes 6–10 (i.e. the first three panels in Table 5.1), excluding the investment costs for construction and acquisition of assets. All tables refer to resources for Classes 6–10 only, in other words total resource levels have been adjusted in those schools and madrasahs where primary classes are also offered. In terms of salary resources, the amounts have been adjusted by the ratio of secondary classes to all classes they teach for those teachers who also teach Classes 1-5. In terms of non-salary resources, these have been split between primary and secondary sections by the ratio of secondary to total school enrolment.

Income

Table 5.2 presents the mean income by type of school. Two types of income are distinguished: government income earmarked for salaries, and other income. The government salary subvention is calculated from the salary and allowance allotments in the case of GSS and from salary bills plus an estimate of the government festival allowance in the case of NGSS and DM. Other income includes non-salary government allotments (for GSS), student fees, the value of repair and maintenance work by the EED, and the estimated value of private donations in kind (i.e. materials) and in cash (for NGSS and DM only).

The average GSS received Tk 3.76 million, the average NGSS received Tk 1.03 million and the average DM received Tk 0.43 million. The proportion of total income made up of the government salary subvention was 69% in GSS, 61% in NGSS and 86% in DM. Excluding the salary subvention, the proportion of school income that was provided by public sources was 41% in GSS, 21% in NGSS

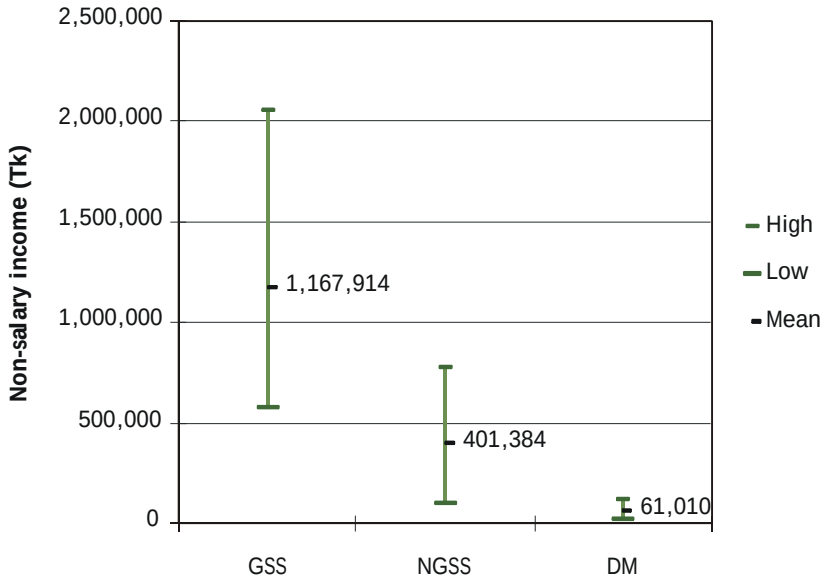
[8] The share of salary expenditure appears relatively low in Bangladesh. In India, the share of total expenditure on salaries (in both primary and secondary education) was 84 percent according to the 2005 UNESCO Global Education Digest. The slightly higher share of non-salary expenditure in Bangladesh can be ascribed to the stipend projects; however the main difference is the high share of capital expenditure (16 percent relative to 5.5 percent in India).

and 38% in DM. In other words, DM are almost as dependent on public funding as GSS. In addition, NGSS rely much more on fee income, whereas DM appear to depend on donations[9].

Table 5.2 Mean income per school, by school type (Tk)

Type of income	GSS	(%)	NGSS	(%)	DM	(%)
Government salary subvention	**2,587,794**	**69**	**624,002**	**61**	**366,481**	**86**
Non-salary income	**1,167,914**	**31**	**401,384**	**39**	**61,010**	**14**
Government/external assistance	*483,533*	*13*	*84,529*	*8*	*23,359*	*5*
Cash from stipend projects			52,305	5	15,727	4
EED			17,758	2	1,518	0
Other			14,466	1	6,114	1
Non-government	*684,381*	*18*	*316,855*	*31*	*37,651*	*9*
Fees			217,180	21	14,488	3
Own assets			41,891	4	3,157	1
Donations			32,087	3	13,256	3
Other			25,697	3	6,750	2
Total	**3,755,708**	**100**	**1,025,386**	**100**	**427,491**	**100**

Figure 5.1 Non-salary income differences across schools, by school type (Tk)



A noticeable feature of any measure is the extent of differences across units. Quite often, the variation in a measure is of as much interest as its mean. One measure of variation could be the ratio between the highest and lowest income level observed across schools. However, such a

[9] The survey collected information on non-government school and madrasah fee income from two sources: school cashbooks and household interviews. In this chapter both sources are used: the household responses are used in Section 5.1 and the cashbook evidence is used in Section 5.2. A comparison of the two sources has revealed that, despite the incentives of individual schools to misreport their income, they were remarkably close. This increases our confidence in the information contained in the cashbooks.

measure is sensitive to outliers or to data errors affecting one particular point. For this reason, the first and ninth deciles of the distribution are used as indicators of the spread of values. These are the points below and above which the most extreme 10% of observed values fall. They therefore give a more conservative measure of variation in the school population. They are identified as 'high' and 'low' in Figure 5.1, which shows the variation in non-salary income across the three types of schools.

Salary subventions aside, the best endowed GSS have about four times more income at their disposal than their least well-endowed counterparts. The corresponding ratio is eight times for NGSS and six times for DM. DM have a much lower overall income: even those with the highest income barely match the least well-endowed NGSS, while the lowest-income DM receives less than a hundredth of the highest-income GSS.

However, much of this variation is related to the large differences in school size, as GSS and NGSS are considerably bigger than DM (see Table 4.1). The comparison would therefore be more meaningful on a per student basis. Table 5.3 suggests that income per student in NGSS and DM is broadly the same, and that resources per student in GSS are approximately double those of other types of school. This is a much smaller difference than was observed in Table 5.2. However, the difference is more pronounced in the case of income other than the government salary subvention. The best endowed GSS have Tk 2,228 available to spend per student, which is more than 15 times the amount available to the least well endowed DM. This is largely the result of the much higher fees paid by students in GSS schools (see the discussion in Chapter 8).

Table 5.3 Mean income per student, by school type (Tk)

		GSS	NGSS	DM
Average	Total	4,908	2,333	2,799
	– Government salary subvention	3,305	1,535	2,426
	– Other income	1,603	798	373
High	Total	6,062	3,833	3,725
	– Government salary subvention	4,458	2,474	3,363
	– Other income	2,228	1,507	618
Low	Total	3,429	1,548	1,744
	– Government salary subvention	2,322	917	1,455
	– Other income	1,045	313	126

Note: The mean values for highest / lowest endowed schools in terms of government salary subvention and other income do not add up to the total because different schools hold the 90th and 10th percentile position for each component.

Expenditure

The amount of resources available to a school can be assessed from both the income and the expenditure side. This survey is particularly interested in the expenditure measure for at least two reasons. First, different schools allocate the resources they have available in different ways and these decisions may affect the effectiveness in the provision of educational services. Second, most of the schools in Bangladesh are private and may therefore retain some of their income as profit, which therefore cannot be considered as directly benefiting the students. Table 5.4 provides a breakdown of expenditure across salaries and other uses. For GSS and DM, mean expenditure during FY 2003/04 very closely matched mean income. Income exceeded expenditure by 5% in NGSS.

NGSS and DM are expected to contribute 10% of the total payments to teachers and other employees. Given the amount of government subvention in Table 5.2, this means that NGSS were expected to spend Tk 69,300 and DM were expected to spend Tk 40,700 on average from their own resources. The evidence suggests that the average NGSS paid well above the minimum amount expected, whereas the average DM did not pay the minimum amount expected.

Table 5.4 Mean recurrent expenditure per school, by school type (Tk)

Type of expenditure	GSS	Share of total expenditure (%)	Share of non-salary expenditure (%)	NGSS	Share of total expenditure (%)	Share of non-salary expenditure (%)	DM	Share of total expenditure (%)	Share of non-salary expenditure (%)
Salary	**2,587,794**	**70**		**785,400**	**81**		**399,806**	**93**	
Government resources	2,587,794			624,002			366,481		
School own resources				161,398			33,325		
Non-salary	**1,104,766**	**30**	**100**	**189,019**	**19**	**100**	**30,220**	**7**	**100**
Examination costs	209,521		19	36,973		20	5,267		17
Equipment / books	109,657		10	19,030		10	1,143		4
Recreation and festivals	231,551		21	12,402		7	1,220		4
Repairs	269,896		24	28,204		15	9,284		31
Furniture and fittings	36,574		3	5,647		3	2,037		7
Utilities	37,458		3	5,602		3	332		1
Stationery	9,816		1	7,144		4	1,206		4
Transport	3,790		0	7,788		4	2,113		7
Other	196,503		18	66,230		35	7,616		25
Total	**3,692,560**	**100**		**974,419**	**100**		**430,026**	**100**	

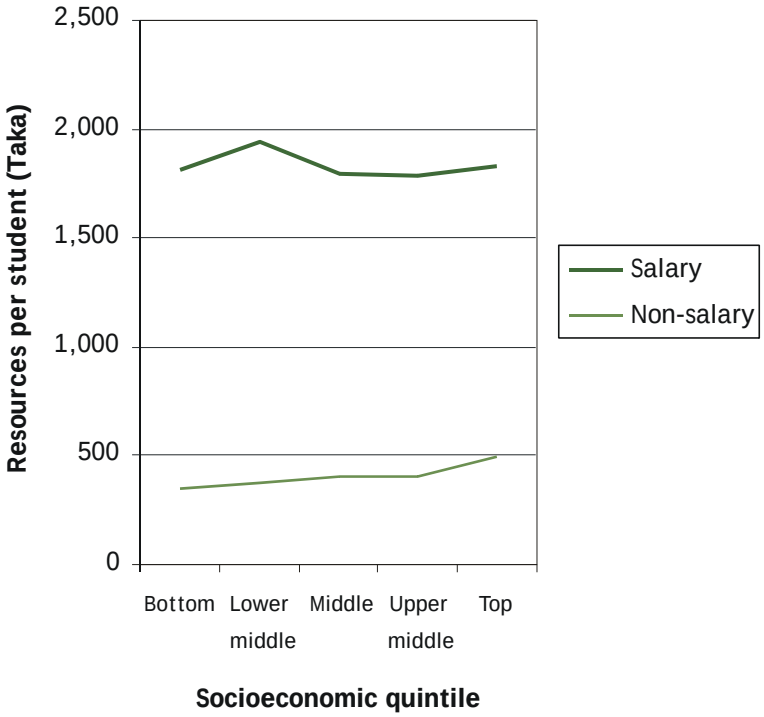
There are large differences across the three types of schools in terms of the proportion that is allocated to non-salary expenditure. This proportion is lowest in DM (7%). It is difficult to compare the distribution of total non-salary expenditure across types of schools, as their classification is less systematic in NGSS and DM and a large share of expenditure is unclassified. However, it is clear that GSS spend substantially more on recreational activities (sport, scout, cultural, and religious festivals); in absolute terms, GSS spend 200 times more than DM on recreation. In DM, the relative share of expenditure on learning materials is significantly smaller, while the share of expenditure on repairs is significantly higher than in GSS and NGSS.

For expenditure, as for income, the figures may be more usefully compared when set against the number of students per school. Table 5.5 presents mean, high and low figures for salary and non-salary expenditure per student. Again, the differences within and between different types of school are less pronounced on the basis of per student than per institution comparisons. However, there are still substantial differences in terms of the mean non-salary expenditure per student: the average spending in GSS is four times higher than in NGSS and nine times higher than in DM. Salary expenditure per student is higher in DM than in NGSS as a result of lower student–teacher ratios in DM and minimum staffing norms (see Chapter 9).

Table 5.5 Mean recurrent expenditure per student, by school type (Tk)

	GSS	NGSS	DM
Mean	**4,850**	**2,242**	**2,816**
Salary	3,305	1,848	2,636
Non-salary	1,545	394	180
High	**6,079**	**3,397**	**3,787**
Salary	4,458	2,763	3,699
Non-salary	2,183	695	367
Low	**3,483**	**1,343**	**1,819**
Salary	2,322	1,098	1,633
Non-salary	970	138	46

Figure 5.2 Resources per student by socioeconomic status (Tk)



The measure of average resources was assigned to different students according to the schools or madrasahs they attended. This was then used to assess how students benefited according to their socioeconomic status using the distribution of students across welfare quintiles, which were introduced in Table 4.4. Figure 5.2 shows that there are smaller differences than one might have expected. The poorest students receive on average the same amount of resources as their better-off counterparts. This is probably because the poorest students tend to be in DM, which have a relatively low student-teacher ratio and therefore receive a relatively higher proportion of the salary resources. However, the breakdown by salary and non-salary resources suggests that the students who belong to wealthier households benefit disproportionately by having more resources that are conducive to learning: the students in the wealthiest quintile receive 44% more non-salary resources than those in the poorest quintile.

Table 5.6 reports the average SSPS Class 9 Bangla and Mathematics score by four increasing levels of salary and non-salary expenditure per student. A weak relationship between salary expenditure and scores and a strong relationship between non-salary expenditure and scores is evident from the table. It should be noted however, that these results only show a simple association between two variables and other factors may be driving this. For example, GSS, whose students attain the highest test scores, tend to be the schools with the highest levels of non-salary expenditure. The relatively higher performance of GSS, though, may well be the result of the fact that they attract the best as well as the better-off students. Chapter 11 presents an analysis that controls for factors such as the student intake in order to assess the importance of levels of school expenditure on student performance.

Table 5.6 Mean SSPS Class 9 test results (%) by level of expenditure per student

	Bangla	Mathematics
Salary expenditure		
< Tk 1200	53	37
Tk 1200 – 1600	58	46
Tk 1600 – 2000	58	45
> Tk 2000	59	47
Non-salary expenditure		
< Tk 200	50	38
Tk 200 – 400	57	42
Tk 400 – 600	60	47
> Tk 600	65	54

6 Public expenditure

Key findings

- Overall, the rate of budget execution is very high.
- The budgeted resources reach GSS as intended. However, a comparison between the Ministry of Education budget and Ministry of Finance expenditure data shows that spending in GSS is well below budget for some lines and well above for others. The survey also found evidence of salaries paid for GSS officers in some upazilas even though there were no officers posted there at the time.
- A substantial proportion of GSS head teachers reported systemic problems in the authorisation of expenditure, such as speed payments.
- The survey could not access documents proving that the payments of salary subventions to NGSS and DM are made, as the system lacks transparency. Comparing the Monthly Pay Order (MPO) with survey evidence showed that there were 6% more teachers listed than were found at NGSS, although there was no evidence that these teachers had actually been paid.
- Over 40% of non-government institutions reported that they had never been audited by the government. However, the quality of information in audits contracted by the schools themselves is satisfactory and can serve its intended purpose.

This chapter reports on public expenditure management issues. There are two main mechanisms of accountability for Ministry of Education expenditure.

- Spending units under the Ministry of Education have a revenue budget allocation. Drawing and disbursement officers for these units prepare bills up to budget limits and present these to the relevant accounting officer for payment. The spending units then report their expenditure upwards to the DSHE.

- Accounting units under the Controller General of Accounts (CGA) are responsible for passing bills up to budget limits by issuing cheques or passing bills directly to the Bank of Bangladesh. The sub-national accounting offices deal with the sub-national spending units. There is one Chief Accounting Officer (CAO) for the Ministry of Education who deals with ministry level expenditure.

Section 6.1 addresses issues related to revenue budget management, putting data from the two sources side by side. The survey collected the CGA data and performed some simple exploratory cross-checks against the budgeted and recorded secondary education expenditure. Exhaustive checks are limited by the scope of the survey and the fact that the bulk of the expenditure (NGSS and DM subventions) is not accounted for at the local level but goes through a single accounting line. Section 6.2 reviews the development budget expenditure.

In addition, there is an audit function. Internal audits are carried out by the Directorate of Inspection and Audit (DIA) of the Ministry of Education, whose main task is to observe whether the financial recognition conditions are met by the recipients of government subventions. Occasionally, the DIA is complemented by the DSHE, which delegates supervisory tasks to officials at the division level. External audits are carried out by the Comptroller and Auditor General (C&AG). As the resources available for controls are meagre, NGSS and DM are requested to pay private firms to audit their accounts and submit the results on an annual basis. The available evidence on audits is presented in Section 6.3.

6.1 REVENUE BUDGET MANAGEMENT

According to the CGA data, the ratio of actual to budgeted expenditure in the secondary education sector was 99% during FY 2003/04. Table 6.1 presents the evidence for the major functional units related to secondary education. The most important divergences were observed in just two functional units—Secretariat and EED—and the table lists selected budget lines that accounted for the biggest share of these discrepancies.

Table 6.1 Actual vs. budgeted expenditure—revenue budget, 2003/04

Functional unit	Economic code		Budgeted (Tk millions)	Spent (Tk millions)	Discrepancy Budgeted minus actual expenditure (Tk millions)	Ratio of actual to budgeted amount (%)
2501		Secretariat	617	452	165	73
	6601	Completed Development Projects	200	113	87	56
	4821	Electricity	72	0	72	0
2505		Autonomous Bodies and Other Institutions	285	278	7	98
2531		Department of Secondary and Higher Education	505	528	–23	105
2536		Government Secondary Schools	1101	1098	3	100
2540		Grants – Non-government Secondary Schools	9281	9281	0	100
2540		Grants – Non-government Madrasahs	5086	5086	0	100
2571		Education Engineering Department	873	903	–30	103
	4501	Pay of Officers	26	42	–16	162
	4705	House Rent Allowance	14	21	–7	147
Total			*17753*	*17632*	*121*	*99*

Source: Demands for Grants and Appropriation (Non-Development) 2004-05 (budget); CGA (expenditure).

Government secondary schools

This section aims to answer the following questions. First, is the entire allotment for GSS under functional code 2536 allocated to schools? Second, what is the budget execution rate by economic code? Third, what is the evidence in cases where it is possible to look at allotments and expenditure on a school by school basis? Fourth, is it possible to check that particular types of expenditure are used for the intended purposes? The case of the pay of officers is examined as it allows a direct comparison. Finally, is there any other evidence that the system of managing expenditure in GSS is working smoothly?

The approval of the budget by Parliament signifies that the Ministry of Education and its Departments are authorised to spend. However, not all of the individual spending units appear in the budget separately. For example, the Department of Secondary and Higher Education initiates the process of allocating the approved budget of functional code 2536 across GSS long after the financial year has begun. The survey found that in the sampled schools budget allotment letters were received in the period 11-28 October, four months after the beginning of the financial year. Apart from salaries and allowances, which are paid regardless of budget limits, schools cannot start spending before that time. A revised budget is submitted during the

third quarter of the financial year, but allotment letters were not received by the sampled schools until after 26 May. About 10% of schools received the letter in June, just days before the end of FY 2003/04. This poor timing of dispatching allotment letters forces spending units to rush for implementation towards the end of the year.

The survey team obtained the central list of GSS allotments for FY 2003/04 from the DSHE. The figures were 2% higher than those recorded at the schools, but much of the difference appears due to recording errors rather than a genuine discrepancy. There were three cases of high municipal tax allotments that were not accounted for by schools.

In addition, in order to establish whether the total allocation for 2536 is shared among the 317 schools or whether some resources are diverted, Table 6.2 compares this figure with the average allotment in the sampled GSS for aggregated economic codes. This latter figure gives only an approximate estimate for the average allotment, since it is derived from a sample. The results show that the estimated average allotment per sampled GSS exceeds the expected average allotment by about 15% and indicate that the full budgeted amount is allocated to schools and is not diverted to other uses.

Table 6.2 Comparison of average school allotment with SSPS data

		Expected average allotment per GSS	Average allotment in sampled GSS	Proportional difference (%)
	Economic code	DSHE revised budget data (Tk)	SSPS data for sampled schools (Tk)	
4500	Pay of officers	113,565	196,396	73
4600	Pay of establishment	1,668,770	1,827,059	9
4700	Allowances	1,408,413	1,564,714	11
4800	Supplies and services	200,000	321,359	61
4900	Repairs	34,700	41,191	19
6800	Acquisition of assets	47,319	59,339	25
	Total	3,472,767	4,010,058	15

Table 6.3 looks in greater detail at the accounts of GSS (functional unit 2536) by individual economic code for FY 2003/04. It compares the revised budget figures with the actual expenditure data from the CGA for all GSS. Expenditure was well below the budget for certain allowances (e.g. rest and recreation, conveyance) and supply items (post, water, fuel and books). On the other hand, the budget limits were exceeded by the largest margin in three lines (pay of officers, electricity, and other allowances). The largest absolute difference was on the pay of officers (Tk 9.5 million). However, after taking account of these virements, the total expenditure matches the budget very closely: expenditure is only 0.3% lower than the budget.

A closer look was taken at the accounts of GSS for 28 upazilas. These were selected as it was possible to make a direct comparison on a budget line-by-line basis between the SSPS data and the CGA expenditure records. Out of a total of 640 budget lines in these 28 upazilas, there were seven cases where there was spending without any evidence of an allotment (all related to allowances) and another 145 cases where CGA expenditure exceeded allotments (two-thirds of those related to pay and allowances).

Table 6.3 Actual vs. budgeted expenditure—GSS

	Economic code	Budgeted expenditure (Tk, thousands)	Actual expenditure (Tk, thousands)	Proportional difference between actual and budgeted expenditure (%)
4501	Pay of officers	36,000	45,516	26
4601	Pay of establishment	529,000	533,255	1
4701	Dearness allowance	56,500	49,437	–13
4705	House rent allowance	228,000	230,534	1
4709	Rest and recreation allowance	16,500	12,966	–21
4713	Festival allowance	94,200	90,548	–4
4717	Medical allowance	32,969	32,710	–1
4721	Hill allowance	6,100	5,564	–9
4725	Washing allowance	462	392	–15
4755	Tiffin allowance	10,536	10,115	–4
4765	Conveyance allowance	850	433	–49
4795	Other allowances	350	769	120
4801	Travel expenses	2,000	1,949	–3
4804	Contingent staff	8,200	7,295	–11
4806	Rent—Office	0	355	
4810	Municipal rates and taxes	16,500	16,079	–3
4811	Land tax	4,000	3,466	–13
4815	Postage	350	151	–57
4816	Telephones / Telegram / Teleprinter	3,200	2,940	–8
4819	Water	2,800	1,875	–33
4821	Electricity	8,200	9,724	19
4822	Fuel and gas	500	422	–16
4831	Books and periodicals	3,000	2,419	–19
4852	Chemicals	5,500	5,379	–2
4854	Consumable stores	4,000	3,568	–11
4899	Other expenses	5,150	5,639	9
4906	Furniture and fixtures (repair)	6,000	5,459	–9
4911	Computers and office equipment (repair)	5,000	4,638	–7
6820	Teaching and learning material (acquisition)	8,000	7,252	–9
6821	Computers and office equipment (acquisition)	7,000	7,029	0
	Total	1,100,867	1,097,878	–0.3

The first two columns of Table 6.4 summarise the results of these comparisons. As with the evidence at the national level, total expenditure closely matches allotments in these 28 upazilas as well. The total allotments amounted to Tk 120.4 million. According to the CGA records, expenditure amounted to Tk 117.5 million (2.5% below budget), whereas, according to the expenditure data collected by the survey at the schools, expenditure amounted to Tk 117.9 million (2.1% below budget). Table 6.4 excludes the economic codes where the total level of spending was very low.

Table 6.4 Actual vs. budgeted expenditure—GSS for selected upazilas and codes

		Proportional difference between budgeted and actual expenditure		Proportional difference between CGA and SSPS expenditure data	
	Economic code	SSPS expenditure vs. allotment (%)	CGA expenditure vs. allotment (%)	Median (%)	Mean (%)
4501	Pay of officers	–24	–18	0	7
4601	Pay of establishment	2	2	0	3
4701	Dearness allowance	–8	–14	0	–3
4705	House rent allowance	1	–5	0	0
4709	Rest and recreation allowance	6	11	0	3
4713	Festival allowance	–7	–9	0	5
4717	Medical allowance	–12	–8	0	5
4755	Tiffin allowance	–7	–4	0	4
4801	Travel expenses	–26	–26	0	2
4804	Contingent staff	–5	–7	–4	–10
4810	Municipal rates and taxes	–16	9	0	5
4816	Telephones / Telegram / Teleprinter	–11	20	0	16
4821	Electricity	1	–12	0	1
4831	Books and periodicals	–11	–7	0	2
4852	Chemicals	–12	–10	0	5
4854	Consumable stores	–8	–6	0	4
4899	Other expenses	2	–1	0	–2
4906	Furniture and fixtures (repair)	–15	–18	0	–1
4911	Computers and office equipment (repair)	–9	–5	0	4
6820	Teaching and learning material (acquire)	0	2	0	2
6821	Computers and office equipment (acquire)	–5	–3	0	2
	Total	–2.1	–2.5	0	–0.4

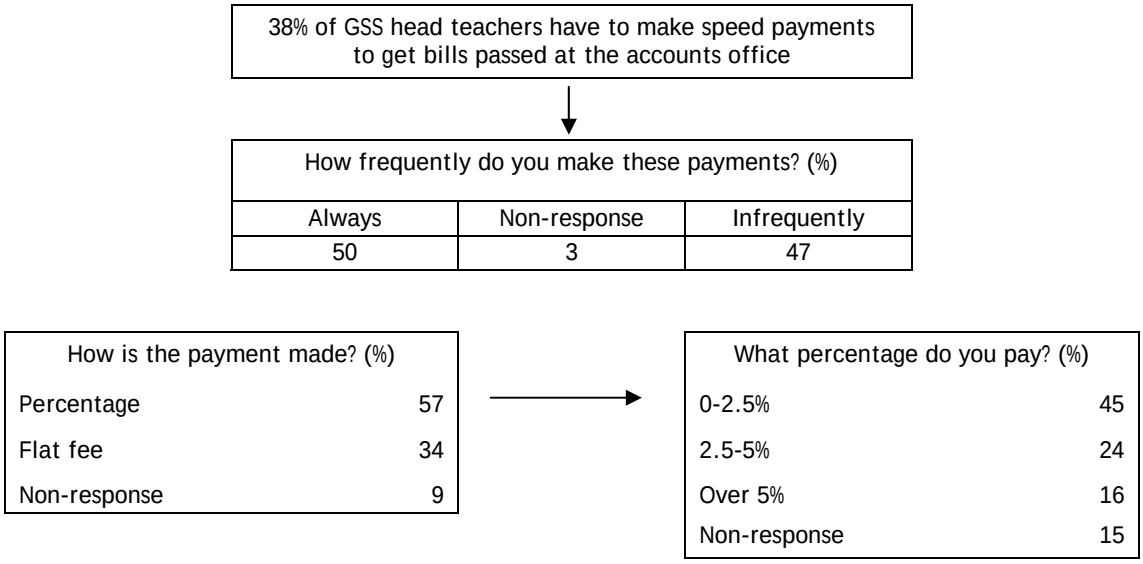
Note: The comparison is made for the records of 28 upazilas where a one-to-one correspondence between the SSPS and CGA data was feasible.

The two columns on the right of Table 6.4 show the discrepancy between the two sets of expenditure figures, the CGA data and the data based on the statements submitted by the schools to the DSHE which were also collected by the survey. This latter set of data should correspond to the data at the DSHE, although it was not possible to verify this, as the DSHE did not share its expenditure information with the survey team despite repeated requests. The two sets of expenditure accounts are not identical. This is generally considered to be because of manual bookkeeping. The evidence collected by the survey shows that each expenditure entry at the school's statement of expenditure is matched by a CGA expenditure record entry and that the reported differences in Table 6.4 are solely the result of differences in recorded amounts. The two records agree fully in fewer than 60% of cases. However, the overall discrepancy is only 0.4% of the total.

Given that the largest discrepancy in absolute terms between budgeted and actual expenditure at the national level concerned the pay of officers (budget line 4501), a further comparison checked this finding against independent information on the number of posts and vacancies for officers in the 28 upazilas. As seen in Table 6.4, the difference between the statements of expenditure and the CGA data was about six percentage points. In one upazila the expenditure in the CGA records was significantly above what would be expected for an upazila with a single officer's post. A more direct comparison between the two sets of expenditure and the allotment information showed that allotments and corresponding payments had been made to officers in six of the 28 upazilas even though there was no officer in post. The payments amounted to 12% of the total pay of officers in these upazilas.

Finally, the survey asked GSS head teachers or those acting on their behalf to report any difficulties in passing bills at the local accounting offices. Figure 6.1 summarises the evidence, which reveals difficulties for the schools' financial transactions. Almost 40% of head teachers reported that they had to make speed payments in order to get their expenditure authorised. This is a large proportion, considering the sensitivity of the question, and suggests a leakage of resources through a channel that is difficult to observe.

Figure 6.1 Problems in authorising expenditure for GSS



Non-government schools and madrasahs

By far the largest items in the revenue budget are the subventions paid to NGSS and DM. These institutions are eligible to receive a salary and allowance subsidy for a number of teaching and non-teaching posts according to rules related to the number of students (see Chapter 9 for details). Since 2004, taking over a function previously administered by BANBEIS, the DSHE has been issuing the Monthly Pay Order (MPO) for eligible NGSS and DM. The MPO includes the names of individuals who may receive this subvention, their date of birth, their job level and pay scale, and the amounts of payable salaries, allowances and deductions. A copy is sent to each school and the local bank branch. It should be stressed that the MPO is not a proof of payment; rather, it is simply a pre-requisite for any salary payments to take place: schools prepare their monthly salary bill on its basis and banks consult it to release payments to individual bank accounts on the basis of the salary bill prepared by the school.

- In order to find out whether a teacher or a non-teaching staff member was paid, it is necessary to check first the school salary bill and then that these individuals signed the acquittance register against the correct amounts.

- This information needs to be cross-checked with evidence on the precise amount that was disbursed, which requires payment records from the banks. Unlike for other revenue budget lines, the CGA data are not a useful source of information about actual payments, as they record only the advances made to the banks, which are equal to the budgeted amount for salary subventions. In addition, the CGA only registers a single transfer of money, which does not allow any linkage to specific schools or upazilas. All non-disbursed money is deposited back into the untagged deposit account for the Ministry of Education at the end of the year.

The survey team requested from the DSHE proofs of actual payments in order to compare them with the evidence on salary payments that were recorded by the survey at the school level. At the time this report was being written, this had not been possible. The difficulties that the survey team encountered in obtaining these records are a sign that the system of subvention payments to NGSS and DM needs to become more transparent. In the absence of direct proofs of payment, the analysis is restricted to drawing inference about subvention payments from the most recent MPO at the time of the survey, which was issued in April 2004.

Two questions need to be answered. The first is whether the MPO data list is comprehensive, in other words whether resources under functional unit 2540 (Non-government educational institutions) are directed to the listed educational institutions or whether there is any evidence that resources could potentially be diverted to other uses. The total amount of payable salaries and allowances (net of deductions and arrears) according to the April 2004 MPO was compared with the monthly equivalent of the total amount disbursed as advance to the banks for FY 2003/04 according to the CGA data. The MPO figures are likely to be slightly higher, as they cover salary payments towards the end of the year, which are higher than the average annual figures represented by the CGA data given the increases that take place during the year (both due to salary growth and fresh recruitment). This very rough comparison showed that the two sets of figures were generally compatible with each other (the MPO figures were 2% higher in the case of NGSS and 0.6% lower in the case of DM than the CGA data), which in turn suggests that the MPO data are probably comprehensive.

The second question is whether salary payments were made to eligible non-government educational institutions and the individuals employed therein, as listed in the April 2004 MPO. Two tests were used. First, the sample of NGSS and DM was drawn from the MPO list in order to directly observe whether the listed educational institutions exist and employ teachers and non-teaching staff. As discussed in Annex 1, from the original sample of 155 NGSS and DM, operations had ceased in one madrasah long before the survey, while in one school no Class 9 students were attending at the time of the visit. While the MPO does not constitute proof of payment, the fact

that it contained schools that had either closed or were not operating according to the rules is a cause for concern.

Second, for each NGSS, the April 2004 MPO figures on the number of teachers and payable net salaries were compared with the evidence on school employees and actual payments collected during the survey at each sampled NGSS[10]. Direct correspondence was established for 94% of teachers in the two lists. The remaining 6% in the April 2004 MPO (equivalent to 9% of the total payable amount) could not be linked to teachers listed in schools. This is partly the result of long delays in reporting changes in the payroll, as—despite what its name suggests—the MPO is actually not issued on a monthly basis but rather every three to four months on average. Interviewers had been instructed to list these errors, but only managed to record ten percent of them. A second look at the data shows that the majority of these cases that went undetected by the interviewers were teachers who were close to retirement. It must be stressed that interviewers found that only 0.1% of teachers on the salary bill were still being paid even though they were no longer employed in schools.

However, it is clear that there is scope for abuses in the system. In the absence of disbursement records from the DSHE and the banking system and especially of information on the level of non-disbursed resources returned at the end of the financial year, it is not possible to draw any conclusion about whether budget resources are diverted for uses other than payment of salaries and allowances.

6.2 DEVELOPMENT BUDGET MANAGEMENT

In order to complete the picture, this section tabulates the budgeted and actual expenditure of the eight largest development budget projects in FY 2003/04. Table 6.5 shows that the level of expenditure in stipend projects on grants in aid was well below budget (e.g. Tk 488 million below budget for FSSP) while the level of capital investment expenditure for construction projects substantially exceeded the budget (e.g. Tk 482 million above budget for the expansion of existing buildings project). Overall, there was an 11% shortfall in expenditure compared with the budget. Chapter 7 and Chapter 10 discuss in some detail issues related to the tracking of stipend and construction project resources, respectively.

[10] The analysis is slightly more complicated for madrasahs and was therefore not attempted.

Table 6.5 Actual vs. budgeted expenditure—development budget, FY 2003/04

Tk, millions		Pay	Supplies	Repairs	Grants in aid	Total, Recurrent
		4500-470	4800	4900	5900	
Female secondary stipend project	Budget	81	53	4	1,511	1,649
	Expenditure	78	67	3	1,023	1,171
Female secondary school assistance project	Budget	78	219	8	1,019	1,324
	Expenditure	84	129	2	582	797
Secondary education sector improvement project	Budget	56	267	3	287	613
	Expenditure	30	210	1	365	606
Expansion of existing buildings	Budget	0	0	0	0	0
	Expenditure	0	0	0	0	0
Reconstruction of old educational buildings	Budget	0	3	0	0	4
	Expenditure	0	2	0	0	3
Development of secondary schools	Budget	1	2	1	0	4
	Expenditure	1	1	0	0	2
Recruitment of female teachers (PROMOTE)	Budget	16	68	25	139	247
	Expenditure	12	85	3	69	169
Development of madrasahs	Budget	0	0	0	0	0
	Expenditure	0	0	0	0	0
Total	Budget	233	614	39	2,955	3,841
	Expenditure	206	494	10	2,038	2,748

Tk, millions		Investment (domestic)	Investment (external)	Total, Capital	Total	Actual vs. budgeted amount (%)
		6800-7900	6800-7900			
Female secondary stipend project	Budget	8	0	8	1,657	71
	Expenditure	7	0	7	1,177	
Female secondary school assistance project	Budget	0	37	37	1,362	60
	Expenditure	2	20	22	819	
Secondary education sector improvement project	Budget	129	563	693	1,306	71
	Expenditure	91	232	324	930	
Expansion of existing buildings	Budget	876	0	876	876	145
	Expenditure	1,268	0	1,268	1,268	
Reconstruction of old educational buildings	Budget	785	0	785	789	120
	Expenditure	947	0	947	950	
Development of secondary schools	Budget	785	0	785	789	120
	Expenditure	948	0	948	950	
Recruitment of female teachers (PROMOTE)	Budget	47	143	190	437	55
	Expenditure	8	65	73	242	
Development of madrasahs	Budget	347	0	347	347	107
	Expenditure	370	0	370	370	
Total	Budget	2,978	743	3,721	7,562	89
	Expenditure	3,641	318	3,959	6,706	

Source: Consolidated statements of expenditure from the Ministry of Education's Financial Management Unit.

6.3 AUDIT

Government audits

The frequency of government audits is very low. More than 40% of NGSS and DM had never been audited, according to respondents. Figure 6.2 reports the incidence and results by type of school. Audits regularly result in points being raised about irregularities; in the case of NGSS and DM, this happens in four out of five cases. The issues raised are in line with some of the observations made so far. For example, DM are more likely to be referred for the low pass rates in the dakhil examinations, but less likely to be questioned for misusing public funds given that so few of them are recipients of substantial public support outside the salary subvention.

The fact that almost one in four NGSS has been asked at some point to return public funds suggests commitment by the DIA to enforcing the rules of accountability despite limited resources. However, the evidence from Chapter 4 that a substantial number of schools persistently violate recognition conditions implies that the impact of this process on school operation is very limited.

Figure 6.2 Incidence and results of government audits

	GSS	NGSS	DM
When was the school last audited? (%)			
Never	14	40	45
Before 1996	16	17	19
1996-1998	18	16	20
1999-2001	7	7	10
2002-2004	14	19	6
↓			
Was any point raised? (Audited schools which answered positively, %)	67	80	81
↓			
What was the main point raised? (%)			
Teacher qualifications	5	11	11
Low SSC pass rate	0	15	34
Other recognition conditions	0	14	21
Misuse of public funds	52	32	16
Poor record keeping	30	11	7
Other	13	17	11
↓			
Was the school asked to return funds? (Accountable schools which answered positively, %)	54	53	28

Supplementary audits

As the frequency of audits is very low, NGSS and DM are obliged to pay to have their accounts audited by private firms on an annual basis. Information was collected from these audit reports

in order to compare them with the income and expenditure figures collected directly by the survey, which were presented respectively in Table 5.2 and Table 5.4. This comparison could help validate the information contained in the audit reports and provide an independent check of their usefulness for the authorities.

A few points need to be mentioned about the comparison between these two sets of figures. In 60% of the cases, the latest audit that was available at the time of the survey covered FY 2002/03. In another 30% of the cases the audited accounts referred to FY 2001/02, while the audits for the remaining 10% of schools stretch back to 1997. One therefore might have expected the audited figures to be slightly lower as the figures collected directly by the survey cover FY 2003/04.

On the other hand, a number of factors would suggest that the figures in the audited accounts might be higher than those collected directly by the survey. These figures were extracted in a summary form from the audited accounts and no effort was made to separate income and expenditure from primary or ebtedayee sections. The tables in Chapter 5 have carefully separated income and expenditure that do not refer to Classes 6-10. They also excluded income and expenditure related to construction investment, as well as a few cases of lump sum income sources that are not directly related to the education process. In addition, during the design stage of the survey it was noticed that in some schools the accounts covered a period longer than a year if this was the first time the school was using an external auditor.

Table 6.6 Comparison of NGSS and DM accounts

	NGSS		DM	
Tk, thousands	Audit figures FY 2002/03	SSPS figures FY 2003/04	Audit figures FY 2002/03	SSPS figures FY 2003/04
Income				
Government	757	731	492	384
Non-government	475	343	103	41
Total	1,232	1,074	595	424
Expenditure				
Salary	885	813	513	389
Non-salary	269	200	79	35
Total	1,155	1,013	592	424

Note: The SSPS figures do not tally fully with the income and expenditure figures in Table 5.2 and Table 5.4, as the comparison is within the sub-sample of schools and madrasahs that had audited accounts for FY 2002/03.

Table 6.6 compares the income and expenditure figures from schools whose accounts were audited for FY 2002/03 with the survey findings for FY 2003/04. The audited figures are larger by 15% in NGSS and 40% in DM. The two sets of figures are consistent with the survey data nevertheless, as the margin between income and expenditure is the same: NGSS appear to make a profit of 6% according to both sources, whereas DM break even. In terms of accounting for the income from government sources, the discrepancy is larger for DM, as would be expected since all DM have an attached ebtedayee section and the audited figures all include their respective income and expenditure.

7 Stipend programmes

Key findings

- The reduction in the number of stipend recipients that occurred as the programmes reviewed eligibility during 2002 and 2003 is reflected in the survey data. The number of students eligible for stipends via the Female Secondary Stipend Project (FSSP) fell sharply between 2002 and 2003. Over the same period, the rates of disbursement fell significantly in the two other major stipend projects, the Female Secondary School Assistance Project (FSSAP) and the Secondary Education Sector Improvement Project (SESIP).
- However, even by the time of the survey, a comparison of stipend project records and school registers revealed that 17% of students in Class 7 and 34% of students in Class 8 who had been certified by their school to be eligible had in fact failed at least one of the two principal eligibility criteria (attendance or examination score). There remain substantial problems in the implementation of stipend programme norms, although the proportion of recipients that failed to meet the necessary conditions is lower than was found in previous studies.
- Informal payments to schools of about Tk 15 per disbursement continue to occur but by a much smaller proportion of households than observed in previous assessments.

Female stipend projects were introduced on a nationwide scale in the mid-1990s to encourage females to join and complete secondary schools and to achieve gender parity in secondary education. Four projects cover the entire country except for metropolitan areas:

- Female Secondary Stipend Project (FSSP—Government of Bangladesh) covers 282 upazilas as well as DM in the upazilas where the NORAD project is operating;
- Female Secondary School Assistance Project (Phase-II) (FSSAP—IDA) in 118 rural upazilas;
- Secondary Education Sector Improvement Project (SESIP—ADB) in 53 upazilas; and
- Female Education Stipend Project (Phase II) (FESP—NORAD) in 7 upazilas.

Beneficiaries enjoy three advantages (Table 7.1). First, they do not pay tuition fees. Second, they receive a stipend that varies according to the class they are attending (increasing across classes to cover rising schooling costs in the higher classes). These are paid twice a year corresponding to performance in the first and second semester, respectively. Third, they receive one-off financial support in Classes 9 and 10 for textbooks and SSC examination fees.

Table 7.1 Structure of benefits under stipend projects (Tk)

	Class				
	6	**7**	**8**	**9**	**10**
Monthly stipend	25	30	35	60	60
One-off payments				250	250
Exemption from monthly tuition fee – GSS	10	12	12	15	15
Exemption from monthly tuition fee – NGSS and DM	15	15	15	20	20

Students have to satisfy three eligibility conditions: have minimum 75% attendance rate, achieve a minimum of 45% in either the first-term or the final examination (depending on the semester for which they are being rewarded) and remain unmarried. Schools report whether each student satisfied these criteria during a six-month period in the FSP-3 form. Students who failed any of these criteria are clearly indicated and are not recommended for a stipend. Upon receipt of the consolidated forms from the upazila, the Project Implementation Unit sends back a computerised list (FSP-B4) with the names of students certified by their schools as eligible by school and class, which is used to calculate allotments and authorise disbursements. Note that the FSP-B4 is post-dated by six months relative to the six-month period during which the conditions were evaluated. For example, the FSP-B4 form dated July-December 2003 includes students whose performance was evaluated over the January-June 2003 period. In addition, owing to delays, the payment for that period was made in mid-2004; hence students of a particular class receiving a stipend are actually rewarded for their performance in the class below.

The UPO and the local bank branch determine a disbursement day for each school. There is no standard record for Upazila Project Officers to indicate which students have been paid. Usually, the officers just place a tick next to the student's name in the FSP-B4 form. At the end of each disbursement period, the Upazila Project Officer prepares a review report (or summary sheet) summarising the resources allotted and the amounts disbursed by school and by class. In principle, there should not be any non-disbursed funds. In practice, some students were not paid—even though they had been included in the FSP-B4—because they were not present to collect the money on the day of disbursement. However, this chapter shows that many females were denied payment, despite being included in the list of eligible students, for other reasons too.

Two samples were drawn for the purposes of this chapter:

- UPO sample: before visiting the sampled schools, the survey teams visited the respective UPO and drew—for every sampled school—a random sample of five female students each from Classes 7 and 8 who had been eligible for a stipend (i.e. had been listed in the FSP-B4 form) in the most recent disbursement period (July-December 2003). The teams listed the attendance and examination score information of the sampled students from the FSP-3 form. Once at the school, the teams examined the attendance and examination registers to assess whether the eligibility criteria had been reported correctly in the FSP-3 form and therefore truly satisfied. Note that the students, who had been eligible while in Class 7 (Class 8), were attending Class 8 (Class 9) at the time of the survey.

- School sample: as mentioned in Section 3.2, the focus of the survey was on a sample of Class 9 students who were selected for a household interview. The female students in the sample were stratified according to whether they had been eligible for a stipend. Once in the household, a few key questions were made about the experience of the stipend programme, notably whether they had received the stipend. This sample also allowed an analysis of stipend programme participation and the socioeconomic status of the household.

The need for two separate samples is explained by the fact that the school sample of Class 9 students would have yielded at most three female students per school that were eligible for stipend, which would have been insufficient. The UPO sample drew 10 students per school focusing exclusively on questions regarding eligibility criteria. The two samples overlap in 64 cases of female students who were included in both the UPO and school samples. Two-thirds were DM students, as the class sizes are smaller and it was therefore much more likely for a student to be included in both samples.

A survey of this kind is not able to answer some key policy questions about the effectiveness of the stipend projects, in particular whether they have contributed to the increase in enrolment or whether there has been any effect on delaying the age of marriage. Such evaluations are technically difficult but, generally, it is accepted that stipend projects have made a very significant and lasting contribution to increasing female enrolment rates and achieving gender parity[11]. This survey helps to address remaining concerns about equity and effectiveness in project implementation.

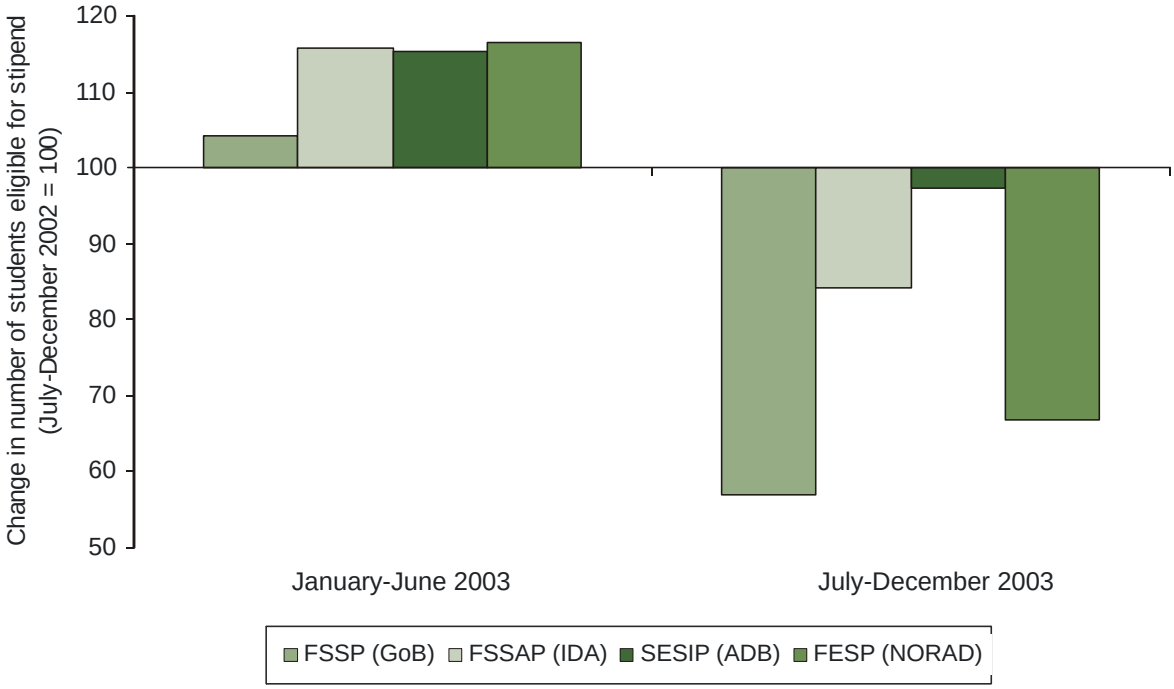
7.1 SCHOOLS

The management of stipend projects came under close scrutiny in recent years after evaluation reports of the donor-assisted projects highlighted irregular school practices, such as overstating attendance and examination performance in FSP-3 forms, inflating the number of eligible students, and charging informal participation fees. There has been a tightening of monitoring procedures in the last couple of years, although this has not taken place simultaneously in all upazilas and across projects. Figure 7.1 reports the estimated change in the number of eligible students in the two most recent disbursement periods relative to the period July-December 2002 using evidence from the summary sheets in the sampled upazilas. The stipend projects—and particularly FSSP—entered a period of adjustment, as there was a sharp decline in the number of eligible students since 2002 affecting millions of females.

Figure 7.2 shows that the proportion of allotted funds disbursed has fallen in the two major donor-assisted projects (FSSAP and SESIP), where the lists of eligible students were not as much affected as in FSSP. The adjustment between July-December 2002 and 2003 exceeded ten percentage points for these projects. This may be because these projects stepped in to cancel payments to a large number of students after the FSP-B4 forms of eligible students had been dispatched for the July-December 2003 period. In other words, it was possible for a student to be certified as eligible by her school and the Project Implementation Unit but for her payment to be eventually annulled. Table 7.2 presents the breakdown by class of the proportion of eligible students who actually received the stipend using evidence from the upazila summary sheets in the sampled upazilas.

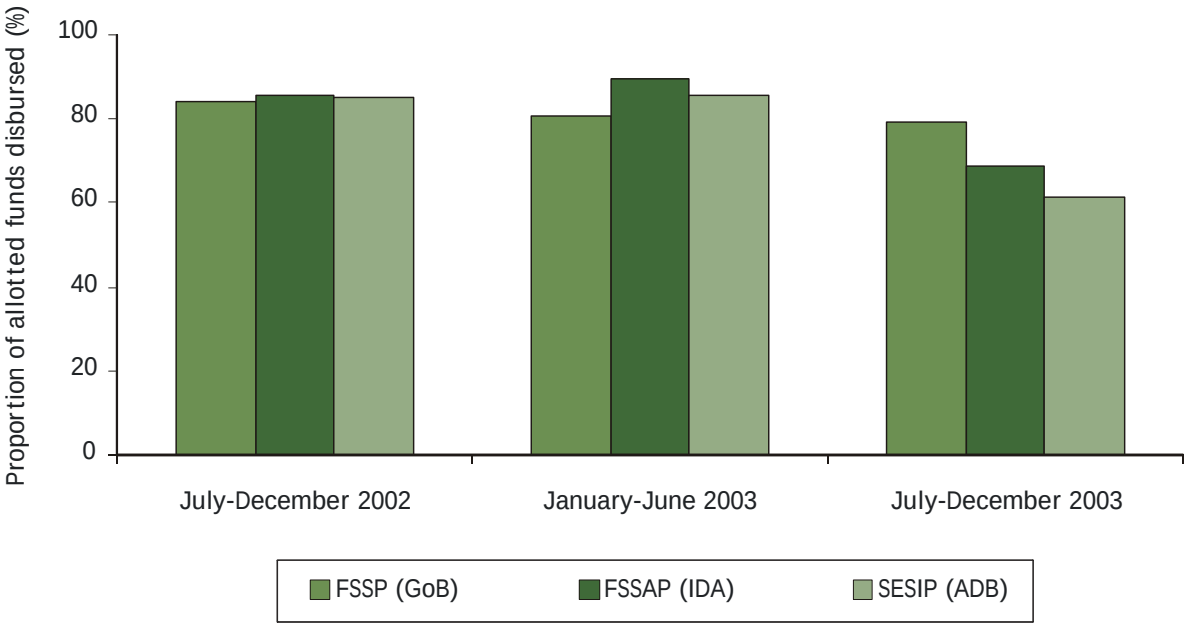
[11] For example, see SK Khandker, M Pitt and N Fuwa (2003) 'Subsidy to promote girls' secondary education: the Female Stipend Program in Bangladesh'.

Figure 7.1 Trends in number of eligible students by stipend project



Source: Summary sheets of stipend disbursement in sampled upazilas

Figure 7.2 Proportion of allotted funds disbursed by stipend project



Source: Summary sheets of stipend disbursement in sampled upazilas

Table 7.2 Mean proportion of eligible students who received stipend (%)

Disbursement period	Class	School type			Total
		GSS	NGSS	DM	
Jul - Dec 2002	6	94	93	95	94
	7	91	92	95	93
	8	93	90	93	91
	9	94	90	90	90
	10	94	82	77	81
Jan - Jun 2003	6	97	94	92	93
	7	92	85	85	85
	8	92	85	87	85
	9	92	80	85	82
	10	93	79	82	80
Jul - Dec 2003	6	88	79	77	79
	7	87	81	78	81
	8	89	78	76	77
	9	90	79	71	77
	10	91	73	78	74

Source: Summary sheets of stipend disbursement in sampled upazilas

As mentioned above, students who receive a stipend do not pay tuition fees. Instead their schools are compensated for the forgone fees by the stipend projects. This can be a significant source of income for NGSS as the proportion of female students enrolled has risen substantially in recent years. As Table 7.3 shows, this is about a fifth of total resources (excluding government salary payments) though in a tenth of DM this source provides almost half their non-salary income.

Table 7.3 Tuition fee compensation received by schools

	School type	
	NGSS	DM
Mean income to compensate for lost school fees (Tk)	52,305	15,727
Proportion of total school income in FY 2003/04 excluding government salary payments (%)	19	31
High	34	56
Low	4	7

The information on tuition fee income through the stipend projects obtained from the UPO was cross-checked with the school. Although there are numerous cases where the two amounts differ, on average schools reported receiving the same amount as that recorded in the summary sheet consulted in the Upazila Project Offices for the disbursement periods January-June and July-December 2003.

7.2 STUDENTS

Table 7.4 classifies the Class 9 female students from the school sample in terms of their history of participating in the stipend projects. Over half of Class 9 females were receiving a stipend at the time of the survey. Those students who had never received a stipend include those residing in metropolitan areas, which do not participate in the stipend programme. One-third had benefited in the past but were no longer stipend recipients. Within this sub-group, about two-thirds lost the benefit even though they had been listed as eligible on the FSP-B4 for the period July-December 2003, the last period over which female students had been assessed prior to the survey. This is consistent with the drop in the rate of disbursement observed in Table 7.2.

Table 7.4 Distribution of Class 9 females by stipend status and school type (%)

	School type			Total
	GSS	NGSS	DM	
Never received stipend	23	8	15	9
Received stipend in the past	6	12	7	11
Eligible during Jul-Dec 2003 but did not receive stipend	29	25	19	25
Currently receive a stipend	43	54	60	55

Note: The calculations were made using the school sample of Class 9 students.

Table 7.5 Distribution of Class 9 females by stipend and socioeconomic status (%)

	Socioeconomic status					Total
	Bottom quintile	Lower middle quintile	Middle quintile	Upper middle quintile	Top quintile	
Never received stipend	2	5	16	34	43	100
Received stipend in the past	3	6	17	33	41	100
Eligible during Jul-Dec 2003 but did not receive stipend	3	21	19	20	37	100
Currently receive a stipend	8	7	19	23	44	100
All female students	6	9	17	25	43	100

Note: The calculations were made using the school sample of Class 9 students.

Table 7.5, which lists the interviewed Class 9 students by their socioeconomic status, shows that these students who did not receive the stipend even though they had been considered eligible by

the stipend projects were more likely to belong to one of the three poorest quintiles. On the whole however, the distribution of stipend recipients across the different socioeconomic groups mirrored the overall consumption distribution: poorer students did not appear more likely to receive a stipend than their wealthier counterparts.

Table 7.6 reports the reasons why students were not receiving a stipend according to their parents / guardians. Almost a third of these households were not clear about the reasons. From the final column, it appears that a stricter application of the examination score criterion was invoked to deny payment to students who had already been recommended by their schools and had been originally considered eligible by the projects in the period July-December 2003. About 3% of eligible students missed the stipend because they were absent on the day of disbursement.

Table 7.6 Distribution of reasons for not receiving a stipend (%)

	Never received stipend	Received stipend in the past	Eligible during Jul-Dec 2003 but did not receive stipend
Attendance less than 75%	24	17	11
Examination score less than 45%	28	62	77
Married	0	0	0
Missed last payment	0	0	3
Newly admitted	7	9	0
Administrative problem	4	2	1
Metropolitan area	11	0	0
Don't know	26	10	8
Total	100	100	100

Note: The calculations were made using the school sample of Class 9 students.

Using the UPO sample of students from Classes 7 and 8, Table 7.7 checks whether the attendance condition was actually being satisfied using two methods.

First, it was asked whether the randomly sampled eligible students were present in their classrooms. As mentioned earlier, the award of a stipend depends on student performance during the previous semester. Therefore, observing students now is not equivalent to testing whether a student had correctly been considered eligible. However, it is still useful to measure current attendance of previously eligible students, as most of them are also going to be eligible in the following period. Note that, while any particular student may be absent on a given day, the overall proportion present is a measure of whether attendance criteria are fulfilled on average. A student who was considered eligible due to her performance during Class 7 is observed as a Class 8 student; therefore some students may drop out in the mean time. Excluding those students who had dropped out, only slightly more than half of the eligible students attended on the day when their school was visited. This approximate test reveals that in none of the three types of school was the 75% attendance criterion met on average.

Second, the figures in the actual school attendance registers were compared with the figures in the FSP-3 form, which show all eligible students to have fulfilled the attendance criterion. Some 7% (18%) of students eligible for stipend in Class 7 (Class 8) were found to fail the attendance criterion according to the registers. However, Chapter 4 has shown that the registers themselves were not reliable, as there was evidence that they inflated attendance figures as well,

particularly in DM. This would explain largely why the discrepancy between the FSP-3 and the attendance registers was lowest in DM.

Table 7.7 Compliance with attendance eligibility criterion

	Students who were eligible for stipend (%), Jul-Dec 2003							
	Class 7				Class 8			
	GSS	NGSS	DM	Total	GSS	NGSS	DM	Total
Direct observation								
(1) No longer enrolled	7	3	1	2	3	5	4	5
(2) Enrolled and present on the day of the survey	65	52	49	52	59	53	46	51
(3) Enrolled but not present on the day of the survey	28	45	50	46	38	42	51	44
Total	100	100	100	100	100	100	100	100
Attendance rate among enrolled students =(2)/[(2)+(3)]	69	54	50	53	61	56	47	54
School attendance register								
Eligible students whose attendance rate was below 75%	27	8	5	7	22	21	9	18

Note: The calculations were made using the UPO sample of students.

Table 7.8 examines whether the examination score eligibility condition was satisfied in practice. A comparison of examination scores of eligible students between the FSP-3 and the school examination register showed that 12% of those in Class 7 and 23% of those in Class 8 had scored less than 45% in examinations. In other words, they should not have been eligible for a stipend in the first place.

An audit of one of the stipend projects that took place in 28 schools, quoted in the World Bank's review of FSSAP[12], alleged that over 60% of stipend holders did not reach the minimum expected performance in examinations. The figures found by this survey are not as high, although it is still possible that the level of failure may be higher, as examination registers may themselves be inaccurate and the survey did not review actual test papers. However, it is noteworthy that despite various adjustments presented in Section 7.1 to enforce adherence to the eligibility criteria, a high number of apparently eligible students were flouting their conditions of eligibility in practice. Looking at the joint satisfaction of the two principal criteria for eligibility, it is revealed that at least 17% of students in Class 7 and 34% of students in Class 8 were not truly eligible (Table 7.9).

To summarise, two key findings have been reported so far. First, the proportion of eligible students who did not receive the stipend was high (23% for Class 9 students across all types of school during the last disbursement period). Second, the proportion of students who were found to break the conditions of eligibility in practice was also high and broadly comparable to the rate of those eligible students who did not receive the stipend. It would be plausible to assume

[12] Project Performance Assessment Report, Bangladesh Female Secondary School Assistance Project, June 2003.

that the stipend projects responded to the critical audit reports by stepping up their checks and refusing to pay students whose records were found to have been falsified. Unfortunately, this assumption cannot be tested with the results of this survey. The UPO sample indicates the students who had flouted the eligibility criteria in practice, whereas the school sample indicates the students who had been eligible but had not received the stipend – but it cannot be examined simultaneously whether those eligible students who did not receive the stipend were the ones whose records have been falsified. As mentioned in the introduction to this chapter, there were a few cases where the two samples overlapped but the number was too small to allow a rigorous test.

Table 7.8 Compliance with examination performance eligibility criterion

	Students who were eligible for stipend (%), Jul-Dec 2003							
	Class 7				Class 8			
	GSS	NGSS	DM	Total	GSS	NGSS	DM	Total
Examination score less than 45%	15	14	4	12	2	28	6	23

Note: The calculations were made using the UPO sample of students.

Table 7.9 Joint satisfaction of eligibility criteria

	Students who were eligible for stipend (%), Jul-Dec 2003							
	Class 7				Class 8			
	GSS	NGSS	DM	Total	GSS	NGSS	DM	Total
Neither criterion met	8	2	1	2	2	9	1	7
Examination score criterion not met	7	12	3	10	0	19	5	16
Attendance criterion not met	12	4	3	4	16	9	8	9
Attendance criterion not met, examination score not reported	7	2	1	1	4	3	0	2
Attendance criterion met, examination score not reported	4	11	15	12	6	3	12	8
Both criteria met	62	69	77	71	72	57	74	58
Total	100	100	100	100	100	100	100	100

Note: The calculations were made using the UPO sample of students.

Households of Class 9 female students in the school sample were asked about the extent to which their daughters were required to pay their school an informal fee in order to be able to obtain the stipend on the day of the payment. About 11% of those who received a stipend paid an average of Tk 15. The amounts are consistent with evidence also quoted in the World Bank assessment of FSSAP which stated that the range of payments is between Tk 10 and Tk 30, but the proportion of students paying was found to be drastically smaller in the SSPS.

Households were also asked what amount they received in the last disbursement, in order to assess whether this was the correct amount. Such comparisons are difficult given likely recall errors and are further complicated by the fact that the survey extended over a long period during which new disbursements had been made, as different projects have different disbursement dates.

Table 7.10 summarises the available evidence, classifying the amounts received by the time in the year when the payments were made distinguishing between the four projects. A student would expect to receive Tk 210 in the first disbursement in 2004, an amount corresponding to the last disbursement for Class 8 (Tk 35 per month). The second disbursement in the year should equal Tk 610 (Tk 60 per month plus a textbook allowance of Tk 250) which corresponds to the first payment for Class 9 students. Approximately 21% of households reported an amount in the region of Tk 210, while 70% reported an amount in the region of Tk 610. The remainder reported different amounts that cannot be classified easily.

FSSAP and FESP stand out in terms of an unambiguous relationship between the amount received and the time of the disbursement. For example, households whose daughters participated in the FSSAP that were observed after the February 2004 disbursement reported in their vast majority to have received approximately Tk 210. Those households observed after the August 2004 disbursement reported in their vast majority to have received approximately Tk 610. On the contrary, there is a higher probability that incorrect amounts were disbursed in the cases of FSSP and SESIP, although further information is needed to understand disbursements of these two projects before any conclusions can be drawn from the table.

The task of tracking whether payments were made to the correct students was hampered by the fact that neither UPO nor schools are obliged to keep a list of students who were actually paid: while the FSP-B4 lists eligible students and the aggregated sheet per disbursement lists the number of students paid in each school, the identity of those who received the payment remains unknown. The process needs to be amended to allow for a list with the names of recipients to be compiled by either the UPO or the schools.

Table 7.10 Amount received by sampled households in last disbursement (%)

Amount received / Time of disbursement	**Project**				**Total**
	FSSP	**FSSAP (IDA)**	**SESIP (ADB)**	**FESP (NORAD)**	
Households that received Tk **200-220**	20	12	62	37	21
Nov 2003 – Mar 2004	0	89	0	83	20
Apr – Jun 2004	53	0	100	17	53
Jul – Sep 2004	47	12	0	0	27
Households that received Tk **600-620**	79	71	15	0	70
Nov 2003 – Mar 2004	0	4	0	0	1
Apr – Jun 2004	36	0	100	0	24
Jul – Sep 2004	64	96	0	0	74
Households that received **other** amounts	1	17	23	63	10

Note: The calculations were made using the school sample of Class 9 students.

8 Private expenditure

Key findings

- The family of the average student in Class 9 pays Tk 4,200 for education-related expenditure over the year. Expenditure on male students is 33% higher on average, while families in rural areas spend half of what those in urban areas do.
- The stipend and tuition fee exemption covers all the educational expenditure of those female students who are at the bottom 10% in terms of overall expenditure but only one-third of the educational expenditure made by the average female student.
- GSS and NGSS charge approximately the same level of fees on an annual basis (approximately Tk 850), which is more than two times the average annual level of fees set by DM (approximately Tk 400).
- Private tutoring is the single most important private schooling expenditure. Two out of three Class 9 students pay Tk 345 on average over approximately five months every year. Given the frequency with which students use school teachers as tutors, teachers are earning on average 37% on top of their salaries from private tutoring on average. Some 94% of students receiving tutorials took lessons in Mathematics.

Chapter 5 showed that almost half of the total resources in secondary education are provided directly by private households. The first section of this chapter presents the structure of expenditure, the second section discusses fees by type of school and the final section provides some basic information on the market for private tutoring.

8.1 EXPENDITURE BY TYPE

The survey listed expenditure in seven major categories. Other costs have been grouped together. Table 8.1 shows the proportion of households of Class 9 students that incurred any expenditure of each particular type. Each type of expenditure is incurred most frequently by GSS students and least frequently by DM students. The biggest differences are observed in the cases of private tuition (related to the socioeconomic status of households), transport (related to school location) and school dress (related to the enforcement of formal rules).

Table 8.1 Households incurring different types of expenditure (%)

	School type			Total
	GSS	NGSS	DM	
Tuition and other fees	100	94	88	93
Private tuition	90	63	51	63
Transport	57	18	5	18
Stationery	100	98	93	97
Textbooks	96	89	89	89
Supplementary textbooks	91	83	81	83
Dress	74	56	23	53
Other	9	10	7	10

Table 8.2 presents the average annual private expenditure among sampled Class 9 students. The estimates include students who did not sustain these costs. Almost 40% of the total is made up of payments for private tutors. About 15% each goes on fees, stationery and textbooks. There are striking differences across types of school. The average GSS student pays at least three times more than the average NGSS student. The contrast is largest when it comes to private tuition and transport. Private tuition expenditure makes up 60% of the total for GSS students, but less than 25% in DM. The average spending per male student is 33% higher than for a female student. This is a much larger gap compared with that observed in the 2000 HIES (20%) for Class 9 students. Note that the average expenditure of female students does not include tuition fees, which are paid for by the stipend programmes.

Table 8.2 Mean annual private expenditure per student (Tk)

	Type of school			Location		Gender		Total
	GSS	NGSS	DM	Urban	Rural	Male	Female	
Tuition and other fees	910	535	264	826	438	651	449	520
Private tuition	7635	1459	515	3712	1033	2140	1308	1599
Transport	1462	144	28	515	94	261	142	183
Stationery	1053	531	407	715	490	557	527	537
Textbooks	679	581	527	640	563	601	567	579
Supplementary textbooks	650	451	371	573	417	466	442	450
Dress	411	235	104	398	182	208	238	226
Other	55	65	28	11	74	75	53	61
Total	*12855*	*4001*	*2244*	*7390*	*3290*	*4957*	*3726*	*4156*

In order to calculate the figures in the table, three sets of information were used: the evidence provided directly by households on the level of spending up to the day of the survey; supplementary questions related to the frequency of this expenditure; and additional assumptions on how expenditure is distributed across the school year. Households were interviewed between July and October 2004. For some types of expenditure it is natural to expect that expenditure would continue to be incurred until the end of the year. The total adjustment is approximately 16%[13].

Table 8.3 reports expenditure by type of student sampled. The table shows that the two key sub-groups of students (according to whether they were present when the sampling took place) differ significantly in terms of the amount of resources their households committed for their education. In the case of males, the difference is almost 25%. In the case of females, the difference exceeds 35%. This is important to keep in mind while analysing the results of the SSPS tests, which were taken only by those who were present.

Class 9 female students eligible for stipend receive Tk 970 in the year and are exempted from tuition fee payments of Tk 180-240 per year. This is enough to cover the expenditure of the poorest 10% of female students, but is only one-third of the expenditure of the average female student.

[13] For details of the assumptions used see Annex 3.3.

Table 8.3 Private expenditure by type of student sampled (Tk)

	Males present on the day of the visit	Females present on the day of the visit		Males not present on the day of the visit	Females not present on the day of the visit		Total
		Eligible for stipend	Not eligible for stipend		Eligible for stipend	Not eligible for stipend	
Tuition and other fees	756	464	547	520	368	441	520
Private tuition	2462	1559	1521	1738	1140	963	1599
Transport	285	119	236	231	125	120	183
Stationery	586	593	661	520	424	441	537
Textbooks	600	664	576	601	479	515	579
Supplementary textbooks	496	514	503	429	347	391	450
Dress	206	221	255	210	186	305	227
Other	75	60	74	74	43	40	61
Total	5465	4194	4372	4325	3111	3215	4156
High	11216	8520	7688	8841	6206	4874	8841
Low	1601	1255	1160	1540	405	867	1142

8.2 FEES

Table 8.4 shows the proportion of Class 9 students who were exempt from fees. The information was provided by the households and was collected to assess how strict different types of schools are in their fee collection efforts. DM students are the most likely to benefit from partial or full fee exemption, which is consistent with the fact that DM have the greatest reliance on public funding and the highest concentration of poor students. The second row includes only those female students who were receiving stipends and who were exempt from the payment of tuition fees. The third row includes any students who were exempt from fees as well as stipend recipients who were exempt from other fees on top of tuition fees.

Table 8.4 Class 9 students exempt from school fees (%)

	School type		
	GSS	NGSS	DM
Students exempt from all fees	0	2	10
Female stipend recipients who are exempt from tuition fees only	16	29	29
Other students exempt from some fees *	9	21	25
Students who are not exempt from any fees	75	48	36
Total	100	100	100

Note: This category includes female stipend recipients who reported to be exempt from other fees in addition to tuition fees.

Table 8.5 Proportion of fees paid by students (%)

	School type		
	GSS	NGSS	DM
Fees paid, as proportion of expected payment [1]	92	74	79
Fees paid, as proportion of maximum payment observed per school [2]	85	68	75

Note: (1) Expected payment was calculated for each student on the basis of fee rates charged by the school, frequency of payment of those rates, proportion of the school year elapsed at time of interview, and eligibility of the student for a stipend. The calculation excludes students who are exempt from all fees. (2) Maximum payment per school is the maximum amount of fees reported by any sampled household in a particular school. For each school two maxima are defined: one for students eligible for a stipend, and another for those that are not eligible. The calculation excludes students who are exempt from all fees.

Table 8.5 estimates the proportion of fees paid by households at the time of the interview relative to two measures: the fee levels charged by schools and the maximum observed level of fees paid by any of the interviewed households from each particular school. It shows that schools achieve high payment rates, especially if one considers the fact that the estimate includes students who might have been exempted from some fees. Non-government educational institutions (both NGSS and DM) achieve lower compliance than GSS.

Table 8.6 provides an overview of the types of fees charged by the different types of schools. NGSS collect almost three-quarters of their fee income from tuition and examination fees. The average tuition fee was found to be Tk 36 in NGSS and Tk 26 in DM in those institutions that were charging the respective fees. GSS set a wider menu of fees of which common room, sport, milad (religious festival), welfare and scout fees are the most common and the tiffin fee the highest. Overall, GSS and NGSS charge approximately the same level of fees on an annual basis (approximately Tk 850), which is more than twice the average annual level of fees set by DM (approximately Tk 400). Combining the evidence on fee rates in Table 8.6 and compliance rates in Table 8.5 by type of school roughly explains the average annual fees payments in Table 8.2.

8.3 PRIVATE TUTORING

Private tutoring is the highest cost item for Class 9 students. Figure 8.1 displays the average expenditure figures, focusing only on those students who actually incurred private tuition costs. Recall from Table 8.1 that on average two out of three students incur such costs. There are big differentials by gender (36%) and between urban and rural areas (170%).

The vast majority of students pay on a monthly basis. Table 8.7 shows that the average price is Tk 299 per month, although high spenders pay a price that is five times higher than that paid by low spenders. The following details provide insights about the market for private tutoring:

- About 71% of students taking private tuition use a school teacher as tutor. A rough calculation suggests that if teachers receive 71% of the total spending on private tuition (which according to Table 8.2 equals 38.5% of total private spending), then—using the estimates of total spending on salary and allowances from Table 5.1—teachers earn 37% on top of their salary from private tuition.

- The proportion of tuition taking students who seek the services of professional tutors is 42% in GSS, 30% in NGSS and 25% in DM. About 4% of students attend coaching centres and 14% have private lessons.

- About 94% of students who took private tuition took lessons in Mathematics.

- The students who take private tuition are wealthier on average but are not much more likely to be attending school frequently (Table 8.8). When Class 9 students were split into five groups in terms of the frequency with which they attended school over the period January-June 2004, those in the bottom quintile were only mildly less likely to take private lessons.

Table 8.6 Average annual fees charged by type of fee and type of school

	GSS		NGSS		DM	
Fee	Schools that charge fee (%)	Average fee (Tk)	Schools that charge fee (%)	Average fee (Tk)	Schools that charge fee (%)	Average fee (Tk)
Tuition	93	188	84	433	39	317
Examination	100	224	99	220	100	194
Agriculture	16	9	0		0	
Common room	84	13	7	20	0	
Computer	29	23	0		0	
Cultural	63	18	20	14	0	
Development	12	28	54	50	12	12
Electricity	25	11	45	24	7	8
Gardening	16	8	0		0	
Laboratory	24	13	37	20	0	
Library	53	11	66	13	13	6
Magazines	79	20	12	24	1	10
Medical	3	8	0		1	5
Milad	90	22	39	11	16	16
Mosque	29	34	0		0	
National Cadet Corps	21	19	0		0	
Poor fund/Welfare	97	10	64	10	12	5
Printing and press	66	37	11	32	1	2
Prize	15	18	0		0	
Red Crescent	53	9	0		0	
Religious festivals	37	37	0		0	
Science	7	11	0		0	
Scouts / Guides	100	16	87	13	33	8
Sports	100	45	89	29	37	14
Tiffin	68	212	3	30	0	
Other	98	91	25	67	1	30
Total		836		851		397

Note: Rows up to and including 'Other' show the mean fee demanded by all schools that charge the given fee. The 'Total' row shows the mean overall fee demanded by all schools, taking into account where they charge zero.

Figure 8.1 Annual private tuition expenditure for students taking tuition (Tk)

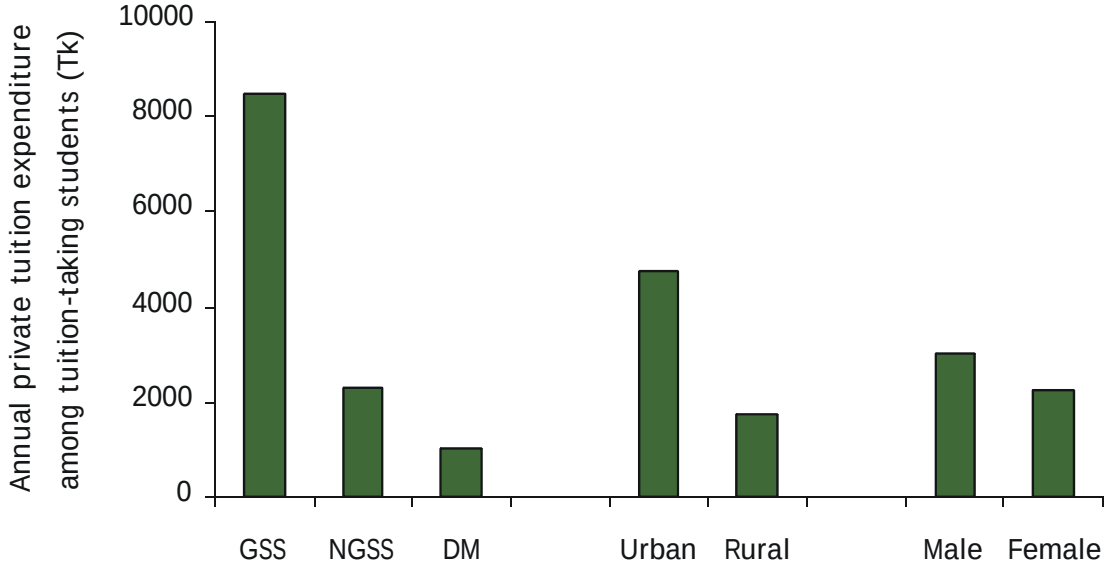


Table 8.7 Monthly private tuition rates by type of provider (Tk)

	Type of provider			Total
	School teacher	Professional tutor	Friend or relative	
Average monthly rate	318	330	206	299
High	550	700	200	500
Low	100	100	150	100

Table 8.8 Private tuition by socioeconomic status and attendance (%)

	Socioeconomic status		Attendance	
	Received private tuition	Did not receive private tuition	Received private tuition	Did not receive private tuition
Bottom quintile	5	6	17	26
Lower middle quintile	5	11	20	17
Middle quintile	13	22	21	18
Upper middle quintile	26	34	20	19
Top quintile	51	27	22	18
Total	100	100	100	100

9 Human resources

Key findings

- The vacancy rate for teaching posts in GSS (14%) is greater than the rate in NGSS (9%). The vacancy rate for non-teaching posts in GSS (47%) is eight times the rate in NGSS (6%).
- One-quarter of NGSS and three-quarters of DM do not top up the salary provided by the government, as the rules stipulate they should do.
- One-third of head teachers and almost half of all assistant teachers claimed that it is necessary to make an informal payment to ensure appointment. About two-fifths of GSS teachers believe that the transfer system is unfair, while more than two-thirds believe it is necessary to make an informal payment to receive their pension.
- Teacher absenteeism was estimated at 10%, which is eight percentage points lower than an alternative recent estimate and low when compared with other countries. The incidence of late arrivals to school was very low.
- At 34, the average student-teacher ratio is reasonable. However, this measure varies substantially between schools: some schools have more than 60 students per teacher while others have only 13.
- Teaching methods are highly traditional in all types of schools. Overall, 91% of lesson time was spent on material taken directly from the textbook.

9.1 TEACHERS AND NON-TEACHING STAFF

There are two main categories of individuals working at schools: those who fill posts paid by the government and those employed directly by the schools themselves.

In GSS, a number of posts are recognised as eligible to receive financial support from the revenue budget. There are two types of sanctioned revenue posts in GSS.

- Gazetted or Officer posts: Class I posts are held by head teachers and Class II posts are held by assistant head teachers. These are self-drawing officers, in other words they prepare their own salary bill.

- Non-gazetted or Establishment posts: Class III posts are held by teachers and clerks, whereas Class IV posts are held by other non-teaching personnel, commonly known as MLSS ('medium-level subordinate staff'). The school prepares a single salary bill for all non-gazetted officers.

It is possible for individuals who hold posts to be deputed to work in some other school or civil service position. Non-teaching staff for manual occupations may also be hired on a short-term basis through a revenue budget line for contingent staff. In principle, no one should be employed directly by GSS, although the survey identified a limited number of non-teaching staff who in fact were employed that way.

NGSS and DM are eligible for a salary and allowance subsidy for a number of teaching and non-teaching posts according to rules related to the number of students (see discussion in Chapter

5). There is no distinction between gazetted and non-gazetted posts, as these are civil service terms. Similarly, there are no deputations, as the teachers are attached to the school they are employed by. Salaries of teachers under the PROMOTE project, which aims to increase the number of female teachers in secondary schools are paid separately through the development budget. The project encouraged female teachers to apply for training in teacher training colleges. A new female teacher is hired through the project as a replacement while the holder of the post goes on training.

This chapter looks at issues of staffing and vacancies, remuneration, appointments and transfers, absenteeism, teacher qualifications and teaching quality.

Personnel

Table 9.1 shows that 90% of people employed at schools are paid by the government. However, 10% of people working in schools receive no government support at all.

Table 9.1 People employed in schools (%) by type of employment

	School type			Total
	GSS	NGSS	DM	
Sanctioned / MPO post	97.4	87.4	96.7	89.5
Employed by the school	0.3	12.5	3.3	10.3
PROMOTE project	0	0.1	0	0.1
Sanctioned at other school	0.7	0	0	0.0
Contingent staff	1.5	0	0	0.1

Table 9.2 reports the number of posts by type of school and level of post and the number vacant. It is a well-known but still surprising fact that 70% of head teacher posts and 45% of assistant head teacher posts in GSS are vacant. When combined with high levels of absenteeism for these officers that are presented below, the survey points at weak management arrangements in these schools. There are even higher vacancy rates for non-teaching staff posts in GSS. By contrast, the average duration of a vacancy is shorter in GSS despite the fact that hiring for GSS teaching posts is based on a centralised recruitment process.

The number of sanctioned posts in NGSS is determined by staffing norms currently dating from 1997. The recommended structure of teaching manpower includes a head teacher and assistant head teacher, and eight or nine assistant teachers, corresponding to the following subjects: mathematics and general science (1), social science (3), science (1), special subjects (1), religion (1), physical education (1) and computing (1, if there is a computing section). If the number of students in a class / section exceeds 60, one more teacher may be added for each additional section consisting of up to 60 students. The staggered line in Figure 9.1, below, assumes that—from a base of 300 students in a school—there should approximately be an extra teacher MPO post for every 60 students. The number of MPO posts is plotted against the enrolment for each school. One in six schools has two or more posts more than would have been expected. Almost one in three schools, on the other hand, has at least two fewer posts than expected according to the norm, which reflects the inertia in adjustments.

Table 9.2 Average number of posts and vacancies per school

		School type					
		GSS		NGSS		DM	
		Posts	Vacant	Posts	Vacant	Posts	Vacant
Head teachers		1.0	0.7	1.0	0.1		
Assistant head teachers		1.2	0.5	1.0	0.2		
Superintendents						1.0	0
Assistant superintendents						1.0	0
Assistant teachers		26.8	2.8	11.8	1.2	4.4	0.7
Assistant maulavis						2.9	0.2
All teaching posts	Number	29.0	4.0	13.7	1.2	9.4	1.0
	Proportion vacant (%)		14		9		11
Median vacancy duration (months)			16		23		34
Class III employees		2.2	1.2	1.1	0.1	1.0	0.1
Class IV employees		5.9	2.5	3.0	0.3	2.2	0.1
All non-teaching posts	Number	8.1	3.7	4.1	0.3	3.2	0.2
	Proportion vacant (%)		47		8		6

Figure 9.1 Student enrolment and teaching posts in NGSS

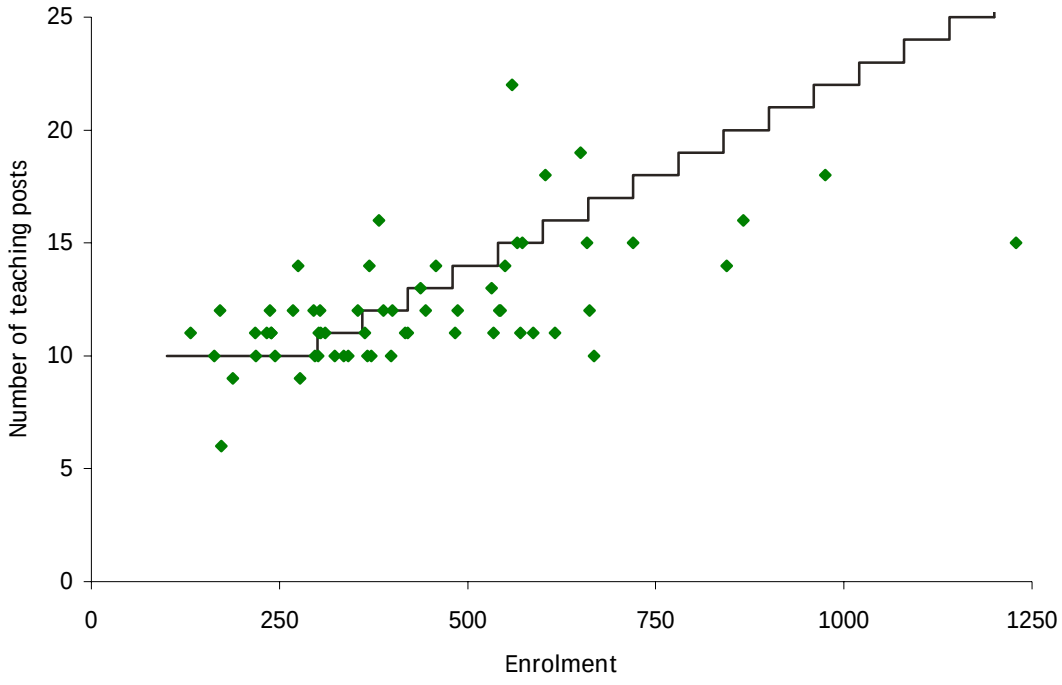


Table 9.3 reports the number of teachers and non-teaching staff employed directly by NGSS and DM. Two in three schools employ individuals directly. Of these individuals, 13% are volunteers.

Table 9.3 Persons employed directly by NGSS and DM

	School type		Total
	NGSS	DM	
Schools that employ persons directly (%)	75	26	62
Mean number of persons employed directly by the school	3.1	1.5	2.8
Teachers	2.2	1.2	2.0
Non-teaching staff	0.9	0.3	0.8
Persons employed by the school who are not paid (%)	11	26	13

Remuneration

Issues of salary payments in GSS have been discussed in Chapter 6. In NGSS and DM, teachers and non-teaching staff receive 90% of the basic salary that is paid to people holding equivalent posts in GSS. Schools are expected to pay at least the remaining 10% out of their own funds. However, in practice some schools neglect to compensate teachers accordingly. The survey revealed that almost three-quarters of all DM and 27% of NGSS fail to meet their obligations. In fact, 15% of all institutions do not pay anything on top of the government salary. Table 9.4 shows the proportion of schools that pay average contributions to the government salaries in the ranges specified.

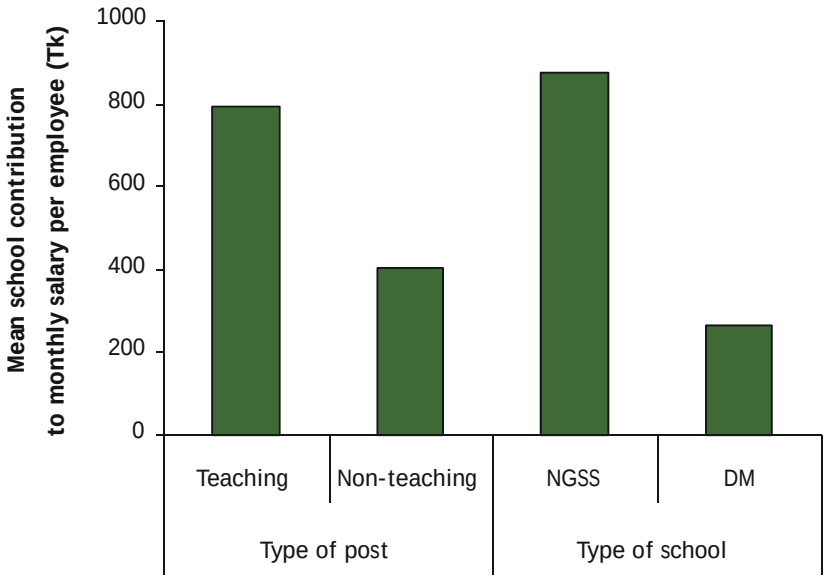
Table 9.4 Non-government contributions to salary subvention—school level

	School type		Location		Total
	NGSS	DM	Urban	Rural	
Schools (%) paying salary in addition to the government subvention in the range of:					
0-9%	27	74	16	44	40
10-19%	39	24	37	35	35
20-29%	16	2	4	13	12
30% and more	18	0	43	8	13

Note: The ratio is calculated using as denominator the government salary plus the expected 10%

Teachers receive on average almost Tk 800 by the school on top of their government salary, while non-teaching staff receive about Tk 400, according to Figure 9.2.

Figure 9.2 Mean school contribution to monthly salary per employee (Tk)



Since 2004, the government has been paying festival allowance equivalent to one-quarter of the basic salary to teachers in NGSS and DM. There are two major festivals in the year. At the time of the survey, only one festival allowance had been paid. Teachers in NGSS and DM were asked whether also the schools, as well as, the government, were offering a festival allowance. Results are reported in Table 9.5. Only a minority of schools can afford this type of allowance for their employees.

Table 9.5 School payment of festival allowances

	School type		Total
	NGSS	DM	
Schools that pay at least one festival allowance (%)	28	8	22
Teachers who received two allowances from school in school that pay it (%)	48	22	46
Average amount of festival allowances received by recipients (Tk)	2489	914	2340

Sampled teachers of Bangla and Mathematics were asked to report whether they were paid on time. Table 9.6 shows that one in five teachers is affected by delays. For these teachers, the average delay is 23 days. About 3% of the respondents had not received their salary for the month at the time of the interview.

Table 9.6 Delays in salary payments

	School type			Total
	GSS	NGSS	DM	
Teachers receiving their salaries on time (%)	96	79	80	80
Delay in salary payments (days)	13	25	16	23

It is alleged that in some schools teachers need to make speed payments monthly in order to have their salary released. This was not confirmed at an individual level, as barely 1% of

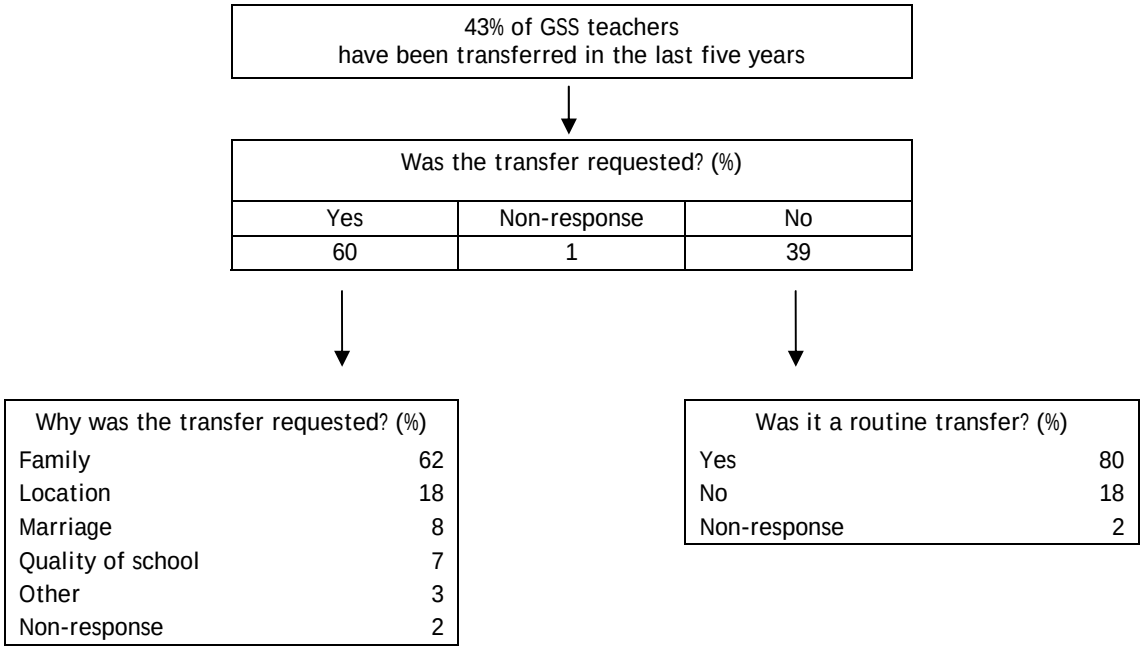
teachers interviewed reported that this was the case. On the other hand, one in five head teachers of NGSS reported difficulties in getting their salary bill paid.

Recruitment, transfers and promotions

Anecdotal evidence suggests that there are serious problems with the recruitment and transfer processes. GSS teachers can be transferred between schools and this can be an area of contention. The Minister of Education stated publicly in 2003 that the government was keen to ensure justice in the transfer policy to prevent discrimination.

The sampled GSS Class 9 teachers of Bangla and Mathematics were asked to provide a history of their career. Figure 9.3 shows that more than two in five teachers had been transferred in the last five years. These transfers were requested, usually for family reasons, by the teachers themselves in three out of five cases. Among the non-solicited transfers, 18% of teachers reported that their transfer was not routine (implying that the decision might not have been according to the rules), which is equivalent to 2% of all GSS teachers.

Figure 9.3 Distribution of government school teacher transfers



In addition, Class 9 teachers of Bangla and Mathematics and head teachers were asked their views on the system of hiring, transfers and promotions. These are reproduced in Table 9.7 and Table 9.8. There is a common perception among a large number of head teachers (particularly in GSS) and assistant teachers (particularly in NGSS) that the procedures for their appointment are not fair. An informal payment to ensure appointment is perceived to be necessary by 33% of head teachers and 47% of teachers. Among GSS teachers, 40% believe that the transfer system is unfair and 45% said teachers usually have to make an informal payment to get a transfer. Finally, more than two-thirds of GSS teachers and head teachers believe it is necessary to make an informal payment to receive their pension.

Table 9.7 Teacher views on recruitment conditions

	School type			Total
	GSS	NGSS	DM	
Head teachers promoted internally (%)	26	31	4	24
Head teachers (%) who believe that:				
the procedures followed to appoint directly an individual to the post of head teacher are not fair	46	36	26	32
individuals who are appointed directly to the post of head teacher usually have to make an informal payment	15	34	31	33
Assistant teachers (%) who believe that:				
the procedures followed to appoint directly an individual to the post of assistant teacher are not fair	15	44	37	42
individuals who are appointed directly to the post of assistant teacher usually have to make an informal payment	19	48	47	47

Table 9.8 GSS teacher views on promotion, transfers and pensions

	Post		Total
	Head teacher	Assistant teacher	
GSS head teachers (%) who believe that:			
the procedures followed to promote a teacher to the post of head teacher are not fair	30	49	46
teachers usually have to make an informal payment to get their pension	53	70	69
transfer procedures are not fair		41	
teachers usually have to make an informal payment to get transferred		45	

Absenteeism

Teachers are eligible for the following types of authorised leave: casual, maternity, and sickness. They may be absent from their school for a number of other legitimate reasons: on official duty (this is particularly the case with head teachers who are members of numerous committees), to attend pre-service or in-service training or when they have been deputed to some other school or education office.

Teacher attendance was measured in two ways:

- by observing directly whether teachers recorded in the teacher attendance register were actually present; the visits were not announced; and
- by consulting the attendance register for the period March – May 2004.

Table 9.9 Teacher absenteeism (%)

	School type			Location		Gender		Total
	GSS	NGSS	DM	Urban	Rural	Male	Female	
Absent teachers on day of visit	13	9	11	8	10	9	14	10
Head teacher / Superintendent	28	6	14	1	10	9	13	9
Assistant head teacher / Assistant superintendent	14	9	6	5	8	5	49	8
Assistant teacher	13	10	11	8	10	9	13	10
Assistant maulavi	–	–	11	11	19	11	23	11
Absenteeism (Mar – May 2004) according to school registers	14	14	12	12	14	13	18	14

Table 9.9 shows that the level of absenteeism according to the direct observation approach is 10% on average, although it is slightly higher in GSS (13 percent). The high figures for female head teachers, assistant head teachers and assistant maulavis should be treated with caution, as the number of women in these categories is very small.

According to Table 9.10 only 5 percent of these are unauthorised absences, while unauthorised absence is a far larger problem for teachers in DM (23%). Having said that, it is not possible to say with certainty whether a casual leave or an official duty was real and not used as an excuse by the head teacher. One in four absences in GSS is due to participation in short- or long-term training. Newly recruited teachers without a teaching qualification are obliged to obtain a Bachelor of Education (B.Ed.) within five years of service, otherwise they are relegated to a lower salary scale. The visit checks gave a similar estimate of absenteeism to the schools registers, which suggests that they are reasonably accurate records of teacher attendance.

Table 9.10 Reasons for teacher absenteeism by school type (%)

	GSS	NGSS	DM	Total
Casual leave	43	50	45	48
Unauthorised absence	5	8	23	11
Sick leave	5	16	6	13
Long-term training	20	10	6	9
Official duties	9	8	10	9
Maternity leave	7	3	6	4
Suspended	0	2	2	2
Other	3	2	1	2
Short-term training	4	1	1	1
Deputed to other school / educational office	4	0	0	0
Total	100	100	100	100

A World Bank study on teacher absenteeism, also based upon unannounced visits, examined teacher attendance in May-July 2003 and found an absence rate of 18%, eight percentage points higher than that observed in the SSPS[14]. Part of the difference is explained by the fact that at the time of the World Bank study visits, schools were organising examinations that accounted for 10% of assistant teacher absences. Apart from this discrepancy the findings of the two studies are similar; female teachers and schools in rural areas were found to have a higher absence rate in both studies. When considering the reasons for absence, the two studies differ in their apportioning of authorised and unauthorised absence. However, the SSPS provides a finer breakdown of reasons. The World Bank study was part of an international comparison of eight countries on staff absenteeism in schools and clinics. The other studies, which focused on primary school teachers, estimated average absenteeism rates that ranged from 11% in Peru to 25% in India and 27% in Uganda, which are all higher than in Bangladesh.

The survey methodology also attempted to measure teacher lateness. The results of direct observation were crosschecked with the head teacher and an explanation was requested for those teachers who had been recorded absent at the beginning of the day but had later reported for duty. However, the proportion of teachers who were recorded as late for work was very low (0.5%). This is at least partly because despite interviewers' efforts, it was not always possible to be at a school at the very beginning of the school day.

Qualifications

The survey distinguished three main types of teacher qualifications: academic, professional and in-service training. Recruitment standards for non-government institutions require that the minimum level for a teacher is a Bachelor level degree.

Table 9.11 Class 9 Bangla and Mathematics teachers qualifications

	School type			Total
	GSS	NGSS	DM	
Teachers with academic qualification (%)				
SSC / Dakhil	1	0	4	1
HSC / Alim	1	3	17	6
Bachelor (Pass) / Fazil	33	82	64	77
Bachelor (Hons) / Kamil	3	2	9	3
Masters	61	12	5	12
Teachers with professional qualification (%)	88	68	31	62
Teachers who have ever received in-service training (%)	70	61	19	53
Teachers who have received in-service training in classroom teaching techniques (%)	60	55	12	47
Average length in days of in-service training taken in the last five years	20	14	19	15

[14] Chaudhury N. et al. (2004) 'Roll call: teacher absence in Bangladesh', Background paper to the 2004 World Development Report.

Table 9.12 Head teacher academic and professional qualifications (%)

	School type			Total
	GSS	NGSS	DM	
Head teachers with academic qualification				
HSC / Alim	0	4	0	3
Bachelor (Pass) / Fazil	69	82	0	59
Bachelor (Hons) / Kamil	1	0	94	26
Masters	30	15	5	12
Head teachers with professional qualification	99	91	0	67
Teachers who received in-service training	89	88	41	76
Teachers who received in-service training in school management	45	49	31	44

On the whole, teachers are well qualified, but Table 9.11 shows that 3% of NGSS and 21% of DM teachers fail on this criterion. DM teachers are also much less likely to have a professional qualification or to receive in-service training. The results of Table 9.11 are based on the sample of Class 9 Bangla and Mathematics teachers and are not representative of the entire teaching force in Bangladesh, as these teachers tend to be more highly qualified. Table 9.12 shows the qualifications of head teachers. None of the superintendents of DM has a formal teaching qualification.

9.2 TEACHING QUALITY

The number of students per teacher in a school may be a proxy for teaching inputs. If the ratio is too high, teachers devote too little time to each student. On the other hand, in an environment where schools have limited flexibility to adjust their teaching force, good schools may attract a large number of students, while the total number of teachers remains constant; therefore a high student–teacher ratio may be a sign of good teaching quality. In general, a low student-teacher ratio is an indication that teaching resources may not be used efficiently. The student-teacher ratio in DM is half that in NGSS. In the worst cases of NGSS, the ratio is about 60 students per teacher, as shown in Figure 9.4.

The survey has also tried to gauge the quality of teaching using more direct measures. The remaining tables document the results. First, sampled teachers took a profile test that included questions on numeracy, literacy and non-verbal reasoning. Although the test does not measure teacher ability per se, it can potentially capture aspects of teacher skills that are difficult to observe. Table 9.13 shows that the scores behave as would be expected: for example, teachers of Mathematics have fared better in the numeracy questions, while the better-qualified teachers of GSS outperformed teachers from other schools in every category.

Figure 9.4 Student-teacher ratios

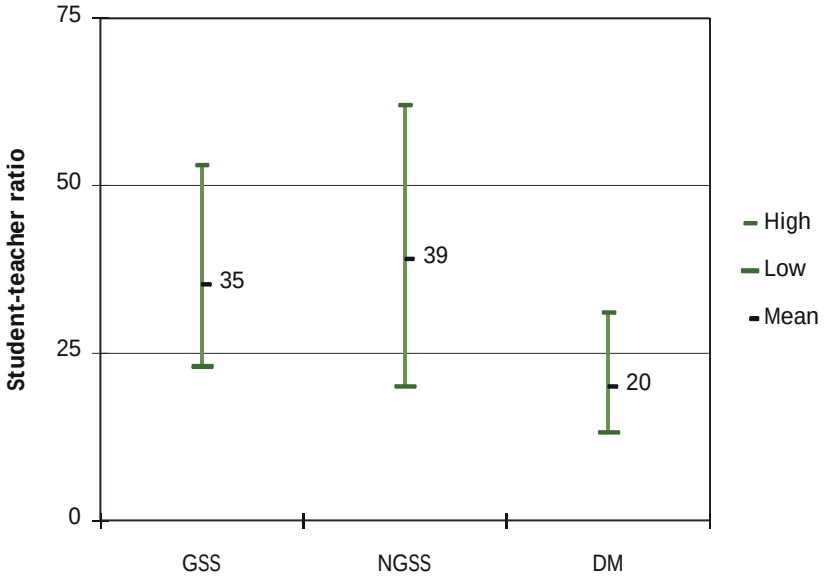


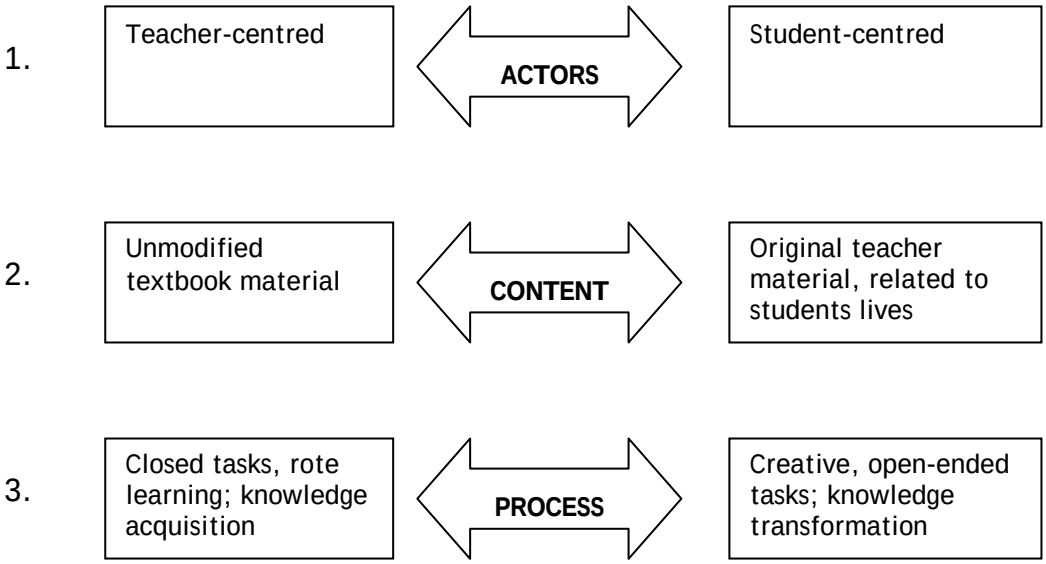
Table 9.13 Mean teacher profile scores (%)

	Teacher type			School type			Total
	Mathematics	Bangla	Other	GSS	NGSS	DM	
Numeracy	68	60	57	66	61	58	62
Literacy	68	71	60	71	68	62	67
Reasoning	45	39	29	51	33	28	38
Total	61	57	50	63	54	50	56

The second way to assess teaching quality was based on classroom observation, which consisted of two parts: general observations of the classroom itself and evaluation of a lesson using an instrument developed by the ESTEEM project. In the latter, interviewers had to assess three aspects of classroom interaction: actors, content and process. An appropriate balance of each of the three aspects of classroom interaction depends on the type of lesson and many other factors. In general, a choice of teaching methods closer to right end of the scheme depicted in Figure 9.5 is a preferred way of learning. Further details are provided in Annex 2.

Table 9.14 shows that the methods used in Bangladeshi schools are very traditional, especially in content. Only 2% of teaching time is spent on original material or material linked to the students' lives. The distribution is uniform across the three different types of school. The knowledge acquisition process is similarly traditional, as less than 10% of time is spent considering open questions and imaginative applications of material.

Figure 9.5 Three factor model of classroom interactions



In the general observations of the classroom, teachers were also rated on the level of encouragement, affection and praise shown to students. For example, across all schools teachers were only mildly encouraging and appreciative. Females were praised equally only 'to some degree'; conditions in that respect were better in GSS. Teaching quality using combinations of the above measures is one of the factors in the models used in Chapter 11 to help explain student performance in the test scores.

Table 9.14 Findings from lesson observation

	School type			Total
	GSS	NGSS	DM	
Lesson actors: teacher—Distribution of lesson time (%)				
Addressing entire class	58	66	66	66
Addressing group / pair / individual student	28	24	20	22
Off-task waiting / Out of class	14	10	14	12
Lesson content—Distribution of lesson time (%)				
Material directly out of the textbook	90	91	90	91
Conventional extension from textbook	8	7	9	8
Original material and/or linked to real life	2	2	1	2
Lesson process—Knowledge acquisition method (%)				
Limited recall / closed questions	91	94	93	94
Open questions	8	5	7	6
Imaginative applications	1	1	0	0

10 Physical conditions

Key findings

- Classroom conditions are poor in non-government institutions, particularly DM. Of all classrooms, 42% of those in NGSS and 81% of those in DM are unsuitable as the noise from adjacent classrooms could be heard because of low quality partitioning.
- The poor state of classroom repair shows that there are significant maintenance problems. Only 15% of non-government institutions benefit from government spending on repair every year and those that do receive only Tk 50,000.
- One-third of NGSS and DM benefited from construction projects of the development budget in the four years preceding the survey; however, the distribution of works across upazilas is unequal. Moreover, the effectiveness of one of the construction projects can be questioned.

To assess the quality of service provision, the survey observed the physical condition of schools and DM and recorded the presence of key facilities and equipment. This is summarised in Section 10.1. Information was also collected on construction activities and their distribution across schools. This is presented in Section 10.2. Data from individual construction projects were sought to extend the analysis but had not become available by the time this report was being completed.

10.1 DIRECT OBSERVATION

Table 10.1 reports interviewers' assessments on classroom conditions. Although subjective to a certain degree, the interviewers were given standard guidelines. Desk space is defined as the number of students that could sit comfortably at the available benches. Although on average there is more than one desk space per student, there was some variation within each category. Almost 30% of schools had less than one desk space per student, whereas the highest tenth had more than two desk spaces for each student. Rural schools are more constrained than urban schools. An important caveat is that these estimates were based on the number of students attending on the day of the survey. If all students enrolled at schools were to attend every day, 94% of classrooms would have been overcrowded (i.e. more than one student per desk space) illustrating how little spare capacity schools have.

There are significant differences between the three types of schools in the two other measures. The statistic on noise refers only to disturbance from adjacent classrooms (for example, if there are weak partitions) and not on external disruption. The information on the classroom's state of repair is based on interviewers' judgements. On both accounts, the conditions in DM are very often poor.

Table 10.2 reports on the availability of key facilities in schools. Less than 15% of schools have a telephone connection and less than one-third have a computer. Of the school types, DM are again the least well equipped; over 85% of these have no computer and over 98% have no telephone. Less than half of DM have an electricity connection and approximately one quarter do not have toilets exclusively for female students. However, due to the fact that DM tend to be smaller, the average number of students per toilet and per computer is substantially lower than in other types of school.

Table 10.1 Classroom conditions

	School type			Location		Total
	GSS	NGSS	DM	Urban	Rural	
Desk spaces						
Schools with less than one desk space per student (%)	26	30	24	22	30	29
Number of Desk spaces per student						
Average	1.8	1.9	1.7	2.0	1.9	1.9
High	2.9	3.1	3.0	3.8	3.0	3.0
Low	0.8	0.8	0.8	0.8	0.8	0.8
Noise from adjacent classrooms						
Schools with noise in 75% or more of classrooms (%)	1	30	77	15	47	42
Classrooms with noise (%)	6	42	81	29	55	52
State of repair						
Schools with over 75% of classrooms in poor state of repair (%)	1	19	59	17	32	30
Classrooms in poor state of repair (%)	4	31	68	23	43	41

Table 10.2 School facilities

	School type			Location		Total
	GSS	NGSS	DM	Urban	Rural	
Toilets						
Students per toilet	208	210	118	204	182	185
Mixed schools with toilet exclusively for females (%)	98	98	76	99	91	92
Toilets in mixed school exclusively for females (%)	50	50	40	50	40	40
Telephone						
Schools with functional line (%)	92	18	1	75	6	15
Electricity						
Schools with connection (%)	99	74	46	99	62	67
Computers						
Schools with no functional computers (%)	1	58	85	32	69	64
Number of computers	3.7	0.9	0.2	2.1	0.6	0.8
Students per computer (in schools with computers)	277	117	12	152	83	91

10.2 MAINTENANCE AND CONSTRUCTION

Public expenditure

Repair works in secondary schools are financed through the revenue budget, while the development budget funds major rehabilitation, construction of new buildings and large procurements of furniture. The Education Engineering Department (EED):

- carries full responsibility for revenue budget projects in GSS; and
- has a supervisory role for revenue budget projects in NGSS and DM, as well as for development budget projects.

Maintenance

With respect to the revenue budget, each GSS is allotted Tk 200,000-300,000 almost every year. The EED surveys these schools annually, identifies maintenance needs, approves cost estimates, issues work orders and is directly involved in the works at the school.

Only a few NGSS and DM receive revenue budget allocations for maintenance in any year and the process of selection is not based on a needs assessment process similar to the one for GSS. If the allotment is below Tk 100,000, then the resources are disbursed from the Upazila Nirbahi Officer and the EED involvement is minimal. The allotment letter allows the School Managing Committee to call a tender. The EED engineer signs off at various stages that the quality of the construction work is satisfactory and therefore the contractor can be paid.

Table 10.3 shows that 14% of schools received revenue budget grants for repair and maintenance during FY 2003/04. The average size of grants per student in GSS is more than twice that in NGSS and four times that in DM. For those that received it, the average revenue budget allotment per student was Tk 230.

Table 10.3 Incidence and volume of revenue budget maintenance grants, 2003/04

	School type			Total
	GSS	NGSS	DM	
Schools that received a revenue budget maintenance allotment in 2003/04 (%)	96	15	5	14
Average revenue budget maintenance resources per student in recipient schools in 2003/04 (Tk)	481	212	126	233
For schools receiving a revenue budget maintenance allotment, schools (%) that received an allotment of:				
Less than Tk 100,000	1	90	100	81
Tk 100,000 – Tk 299,999	67	0	0	7
More than Tk 300,000	32	10	0	12

Construction

In the last few years, five main development budget projects have provided support to secondary schools for major repairs, rehabilitation of dilapidated school buildings and

construction of new classrooms: (i) Expansion of existing buildings of selected educational institutions; (ii) Reconstruction of very old (40+ years) educational buildings; (iii) Development of government and non-government secondary schools; (iv) Development of government and non-government madrasahs; and (v) Secondary education sector improvement project (SESIP).

The survey collected information from the five projects and the local EED offices on beneficiary schools in order to assess the regional distribution of contracts and to confirm whether the allocated resources reached the sampled schools. Regarding the first question, Table 10.4 shows the proportion of schools of each type that benefited from the five projects in every sampled upazila. The table isolates those upazilas where there are at least ten schools of each type to minimise the extent to which results are affected by random events in small upazilas. There is a substantial degree of inequality. For example, in the case of the school development project, 16% of NGSS benefited on average in each upazila since the project began. However, in some upazilas no school had been a beneficiary, while in others up to 30% received resources. Overall, 50% of all NGSS in an average upazila have benefited from a project since their inception in the late 1990s. However, there are upazilas where only 22% of NGSS were beneficiaries and others where the respective proportion was 87%.

Table 10.4 Recipient schools in sampled upazilas, by project (%)

	Low	Average	High
Expansion of existing buildings of selected educational institutions (NGSS)	3	19	38
Reconstruction of very old (40+ years) educational buildings (NGSS)	6	16	29
Development of government and non-government secondary schools (NGSS)	0	16	29
Secondary education sector improvement project (SESIP) (NGSS)	0	3	9
All projects (NGSS)	22	54	87
Development of government and non-government madrasahs (DM)	6	22	47

Note: The calculations are based on the project records for the list of beneficiary schools and on the BANBEIS database for the number of NGSS and DM in each upazila. Only upazilas with at least ten schools of each type are included in these calculations.

Table 10.5 Incidence and volume of development budget works since July 2000

	School type			Total
	GSS	NGSS	DM	
Schools benefiting from a development budget construction project since July 2000 (%)	44	36	30	34
Schools where works were completed (%)	93	85	84	85
Average development budget construction resources per student in recipient schools since July 2000 (Tk)	2,661	3,374	2,825	3,230
Mean development budget construction project cost (Tk)	1,550,000	1,574,000	957,000	1,429,000

With respect to the second question, interviewers cross-checked with the school authorities the information that their school had benefited from a construction project. It was possible to confirm that works had taken place at 27 of the 29 NGSS that had been included under one of the four construction projects according to the project records. This result can be considered satisfactory considering the complexity of the tracking exercise and the fact that mistakes may occur in transferring information across sources. Table 10.5 reports on construction projects that

were ongoing at any point in the four years between July 2000 and the time of the survey. One third of schools have benefited from such projects, which is a substantial proportion.

Further analysis regarding the effectiveness of each project is hampered by the fact that the number of sampled schools benefiting from each project is too small to allow meaningful comparisons. Works in GSS and NGSS are funded by four different projects and it would be incorrect to group them together given that they are managed in different ways. However, the majority of construction works in DM are funded by the madrasah development project and this allows us to focus on this project for a more detailed inquiry. Given their relatively worse material conditions, it also makes sense to ask whether having benefited from construction works in recent years appears to be related to improvements in these madrasahs.

All DM identified as recipients in the project records confirmed that they had embarked on the works process. Three tests were used to assess aspects of quality in this project. First, superintendents were asked their opinion about the quality of the work. About 40% of superintendents in DM where the works had been completed (in absolute figures, in 5 out of 12 madrasahs) complained that they had not been satisfied by the quality of the construction work (see Figure 10.1).

Figure 10.1 Features of the madrasah development construction project

28% of dakhil madrasahs
have been included in the project
'Development of selected madrasahs'
since July 2000

↓

Have the construction works been completed? (%)

Not started yet	Yes	No
7	60	33

↓

Were you satisfied with the work of the contractor? (%)

Yes	60
No, the construction quality was poor	40

Second, DM supported by the madrasah development project were then split according to whether construction works had been completed during the five years preceding the survey. The direct observations of interviewers regarding two indicators of physical conditions, the state of repair and noise, were compared across these two groups. Surprisingly, DM in which construction works had been recently completed fared worse on both accounts: 23% of classrooms in these DM were in a good state of repair (relative to 33% in the other DM); in 86% of cases there was noise from adjacent classrooms (relative to 81% in the other DM). Note that in all sampled DM there is one classroom each for Classes 6-10.

Third, superintendents of DM where projects had been completed were also asked to provide their estimate of how much they believed the works should have cost. Overall, their cost estimate was 87% of the disbursed amounts, but the proportion varied between 80% among not satisfied superintendents and 94% among satisfied superintendents.

It is important to stress that none of the three tests is direct, as engineer assessments were beyond the scope of this survey. Moreover, the number of observations is too small to allow any firm conclusions to be drawn. However, the findings are not consistent with expectations regarding the potential effectiveness of construction projects.

Private expenditure for maintenance and construction

NGSS and DM may also receive resources for repairs and construction from private sources (Table 10.6). Almost one in six of these institutions received private contributions for repairs and construction. The major sources of funding for these contributions are the chair of the School Managing Committee and local politicians, who make up over 40% of the total. Non-government organisations are also frequent donors of repairs and construction work (18%)[15]. However, the total amounts provided are a fraction of those provided by the state budget (approximately 10%).

Table 10.6 Private contributions for maintenance and construction

	School type		Total
	NGSS	DM	
Schools that received private contributions for repairs or construction (%)	15	14	15
Average amount of private contributions per student (Tk)			
Repairs	57	53	55
Construction	36	72	41

[15] The survey has attempted to triangulate the information on these contributions directing parallel questions to the head teacher and the chair of the School Managing Committee and checking whether the information entered the non-government school's cashbooks. One of the aims was to avoid double counting private resources. Overall, about half of these donations were officially recorded by non-government schools.

11 Determinants of school performance

Key findings

- Much of the difference in performance between school types is due to their student intake, as measured by a test of innate ability and by the scores in Bangla and Mathematics tests taken by current Class 6 students. Adjusting for these factors, the advantage enjoyed by GSS over NGSS and DM largely disappears; it is even reversed in the case of the Mathematics test score.
- Gender differences also disappear when these factors are controlled for, with the single exception of the Mathematics test score among non-government school students.
- These findings underline the importance of family background and of improving primary and pre-primary education to students' performance at secondary level.
- Attendance in class is not generally related to student performance, which implies that substantial improvements need to be introduced in the quality of teaching.
- The analysis does not, on the whole, show a strong relationship between school characteristics and performance. It suggests that a shift of expenditure from salary to non-salary items might improve performance. Active parent-teacher associations are also often associated with better results.
- Good school management, including home visits to follow up on absent students, has a substantial effect on raising attendance rates.

11.1 INTRODUCTION

Chapter 4 reported the survey results on performance, providing an initial look at the factors that may influence performance. This chapter analyses the determinants of performance using regression analysis to isolate the impact of different factors, while controlling for other explanatory factors; for example, the effect of class size on secondary school achievement, controlling for student socioeconomic background. Two measures of performance are used here: achievement on the Mathematics and Bangla SSPS tests, and attendance rates of students in the first six months of the 2004 school year. To exploit the richness of the data collected through SSPS, we use the sample of students who were traced back to their households, and for whom we have detailed information on education expenditure and household socioeconomic status.

11.2 ANALYTICAL FRAMEWORK

SSPS collected information on many factors that potentially help to explain secondary school performance. These can be usefully divided into student and school level factors:

- Student level factors. These were further broken down into student and family background characteristics (student socioeconomic background, past schooling history, the Raven's Progressive Matrices score of ability) and other explanatory factors that were specific to the student's current secondary schooling experience (e.g. household spending on education). Attendance is itself included as an explanatory factor in school achievement.

- School level factors. These have been broken down into:

a. General: Location of school (rural / urban), co-education, number of grades taught, size of school, teaching time etc.

b. Financial: School expenditure broken down by type of expenditure (e.g. salary and non-salary expenditure).

c. Material: Measures of the school infrastructure (e.g. number of toilets available for students, class sizes, classroom conditions).

d. Managerial: Measures of the characteristics of the head teacher and other school support systems.

e. Teachers: Measures of average teacher characteristics in the school.

The SSPS collected a variety of measures in each of these groups in order to explore their relationship to performance. Initially different models were specified to explore the impact of different sets of explanatory factors in each of these groups. Once a number of different specifications had been explored, the results presented here were arrived at. They represent models that contain the most important factors that have been identified as affecting school performance in the research literature on education performance.

11.3 METHODOLOGY AND DATA

Econometric analysis is used to explore the importance of individual and school level factors in explaining the differences in performance reported in Chapter 4. It allows us to isolate the impact of individual factors on performance having controlled for other factors that also affect performance. Two important aspects of modelling the determinants of achievement in schools need to be accounted for in our methodology.

- Selection bias. Issues of sample selection have been found to be important when the determinants of academic achievement have been explored. Secondary school students are not randomly assigned to GSS, NGSS and DM; as a consequence, estimates of the impact of various explanatory factors on performance may be biased. We use econometric techniques to account for selection issues in this chapter.

- Clustered nature of achievement data. Students in the same school have common unobserved characteristics. This implies that simple econometric techniques will not produce the most efficient estimates of the impact of factors on achievement.

The methodology employed in this chapter is standard and is used in other countries, both developed and developing, to explore the determinants of school performance[16]. It should be noted that Chapter 4 showed that the impact of explanatory factors on the SSPS test scores differed in significance and magnitude across GSS, NGSS and DM. Separate analyses of the three school types have, therefore, been made in this chapter[17]. A detailed description of the methodology used is presented in Annex 6.

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[16] See for example EA Hanushek (1995) 'Interpreting recent research on schooling in developing countries', World Bank Research Observer 10(2), pp. 227–246; and L Wössmann (2003) 'Schooling resources, educational institutions, and student performance: the international evidence', Oxford Bulletin of Economics and Statistics 65(2), pp.117-170.

[17] Statistical tests were computed to test a pooled model against estimating separate regressions for each school type, which suggested that separate regressions were preferable.

A few other remarks are pertinent to assist with the interpretation of results. Although this is one of the largest surveys of its kind to have been carried out in a developing country, the number of schools of each type is still relatively small and a larger number of sampled schools in each category would perhaps have allowed stronger conclusions to be made on the impact of school factors. It should also be noted that the SSPS test scores measure particular aspects of academic achievement and do not cover the whole secondary school curriculum in Bangladesh. Furthermore, given the limited number of questions, only certain aspects of the Bangla and Mathematics curricula are covered. While the tests certainly provide a good proxy of performance, these limitations need to be borne in mind.

The measurement of some explanatory factors in this type of analysis is difficult and it is often the case that included factors are at best proxies for variables that are impossible to measure using quantitative cross-sectional survey techniques. The survey has made some substantial improvements in the quality of information on explanatory factors. For example, expenditure information is very accurately recorded and the linking of household information and school information is rarely done in such detail. However, there are other explanatory factors that do not lend themselves to quantitative measurement. For example, the wider education literature suggests that school management is an important aspect, which helps to explain school performance. Obtaining quantitative measures of school management is very difficult and at best only proxy information (e.g. head teacher experience and training) can be collected. In general, these difficult to quantify aspects of school performance will increase the unexplained variability in school performance, which will affect the conclusions that can be drawn from this type of analysis.

The data used for the analysis of test scores is based on the sample of students that undertook the SSPS test and whose households were also interviewed. Of the 1077 students and 219 schools the necessary information was available for 945 students and 203 schools. The results presented here are the most important findings from the econometric analysis rather than a full report of the results (which can be found in Table A5.1 – Table A5.3)[18].

11.4 SSPS TEST PERFORMANCE

Impact of student factors

Which student background factors appear to play an important role in determining student performance? The regression analysis undertaken for this report aimed to isolate the key student background factors that impacted on performance, and to explore differences in these factors across different types of schools. The full regression results are presented for GSS in Table A5.1, for NGSS in Table A5.2, and for DM in Table A5.3. This section highlights some interesting results reported in these tables using partial scatter plots to demonstrate the relationship between the SSPS scores of student achievement and individual variables, having controlled for other factors in the regression models outlined in Annex 5.

Previous chapters showed that students attending secondary school are disproportionately drawn from the wealthier groups in Bangladesh. It seems clear that household expenditure *per capita* is a significant determinant of whether a household sends their children to secondary school, but how does household expenditure *per capita* affect achievement? The results suggest that household expenditure *per capita* is generally not a significant determinant of achievement in secondary school. This is perhaps not a surprising result, given the relatively compressed income distribution amongst the households of Class 9 secondary school students in Bangladesh. Only in

[18] Table A5.6 presents summary statistics for these variables.

GSS does household expenditure appear to have a statistically significant impact on achievement in Mathematics and here the impact is small and negative.

While general household expenditure does not appear significantly to affect achievement in secondary school, the regression analysis also included annual household spending on the education of the sampled Class 9 student. Given the large differences in the levels of household education expenditure it was expected that this would have an impact on achievement. However, the results from the regression analysis show that expenditure generally has a positive impact on achievement in the three school types, but that the effect is mostly small and statistically insignificant[19]. On the same issue, the analysis also found that private tuition, which absorbs a high proportion of private household spending, had no significant impact on achievement in the models estimated for this chapter[20].

A key factor in determining performance on the SSPS tests is students' scores on the Raven's Progressive Matrices. As described in Annex 2.2, these matrices are a set of tasks designed to measure non-verbal ability or general intelligence, independent of schooling or previous learning. Figure 11.1 below shows graphically the relationship between NGSS students' Raven scores and the SSPS Mathematics test. The variable on the vertical axis is the SSPS Mathematics score for NGSS students, having controlled for all other explanatory variables included in the regression reported in Table A5.2 (column 2). The variable on the horizontal axis is the Raven score having controlled for the same set of explanatory variables[21]. The scatter plot also contains a regression line that shows the estimated relationship between the Mathematics and Raven scores[22].

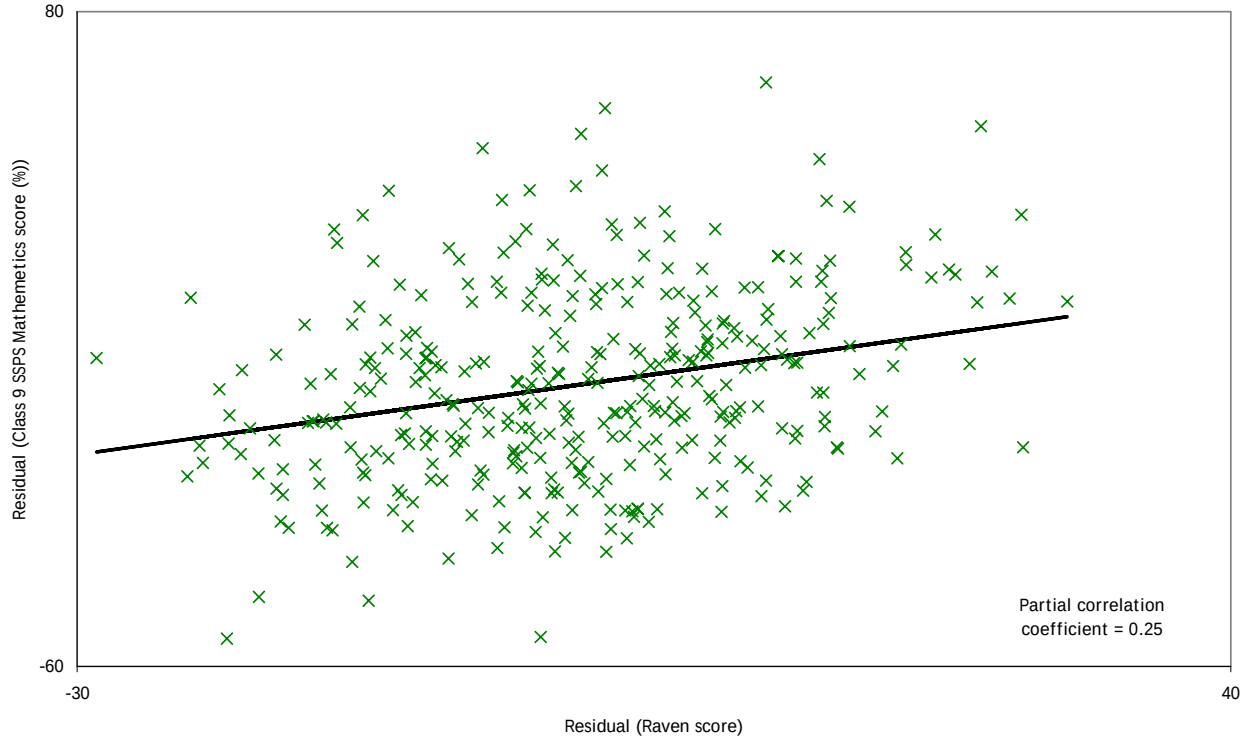
[19] Throughout the chapter statistical significance is attained by a coefficient estimate if it achieves at least a 10% significance level using conventional two-tailed tests. The actual significance levels are reported in Table A5.1 – Table A5.3.

[20] Spending on private tuition was included as an explanatory variable but this was found to have no impact on achievement. In addition, the subjects taken for private tuition were included, but this also appeared to have no impact on achievement.

[21] The variables are in fact residuals from regressions of the variable on all other explanatory variables, which explains why the variables take on positive and negative values. The value taken by any observation shows the difference between that explained by other variables in the model and the actual value of the variable for that observation. This difference, and hence the unexplained part of the variable, can be either positive or negative.

[22] The slope of the regression line shown in Figure 11.1 corresponds to the coefficient for the Raven's score in the Class 9 SSPS test score equation reported in Table A5.2 (column 2).

Figure 11.1 Mathematics test score vs. innate ability in NGSS



Note: The variable on the vertical axis is the SSPS Mathematics score for NGSS students having controlled for all other explanatory variables included in the regression reported in Table A5.2 (column 2). The variable on the horizontal axis is the Raven score having controlled for the same set of explanatory variables.

Figure 11.1 shows that there is a strong, positive and statistically significant relationship between the SSPS Mathematics test score and the Raven scores of NGSS students, suggesting that higher ability students tend to perform better at school, after controlling for other factors. While Figure 11.1 shows this relationship only for NGSS students, a similar correlation is also found for students in GSS and DM[23]. The result is also large: a ten percentage point increase in the Raven score is associated with a five percentage point increase in an NGSS student's Mathematics score. To the extent that ability measured by the Raven's score is independent of schooling, it may be affected by early childhood factors such as nutritional status and early childhood development.

In Chapter 4 the reported test scores showed that female students tended to score less well in the SSPS tests than male students. After controlling for other factors determining student performance, gender differences appear significant only for female students in NGSS on the Mathematics test score. Female NGSS students on average scored eight percentage points less than male NGSS students when other explanatory factors were controlled for (see Table A5.2). In all other schools, gender differences appeared to be insignificant[24].

[23] The results for GSS and DM are reported in Table A5.10 and Table A5.3 respectively and are statistically significant at conventional levels. The impact of the Raven score on Bangla achievement is not significant in NGSS.

[24] It should be noted that as yet no gender disaggregated achievement regressions have been estimated to see whether the determinants of achievement differ between male and female students.

The regression analysis also explored whether past schooling characteristics of the student affected secondary school performance. The number of years a student had repeated was shown to negatively affect student performance only in GSS (see Table A5.1)[25]. Each additional year of repetition was associated with a six to seven percentage point reduction in a student's Mathematics or Bangla test score. However, in the sample used, it was rare for a student to have repeated more than once over their primary and secondary schooling career. Perhaps this is an unsurprising result, given that students who repeat are those who have done poorly in school-based examinations. However, it does suggest that efforts by GSS to address poor achievement of repeaters are not effective at bringing these students up to an average level of achievement.

Although it is generally argued that attendance should have a positive impact on achievement, the simple bivariate relationships highlighted in Chapter 4 showed little correlation. The regression analysis included students' attendance rates in the first six months of 2004 as an explanatory factor. The regression results tend to confirm the lack of a relationship between attendance and achievement. Only in NGSS did attendance have a consistently positive impact on achievement, and even here the measure of attendance was only statistically significant for the Bangla test score[26].

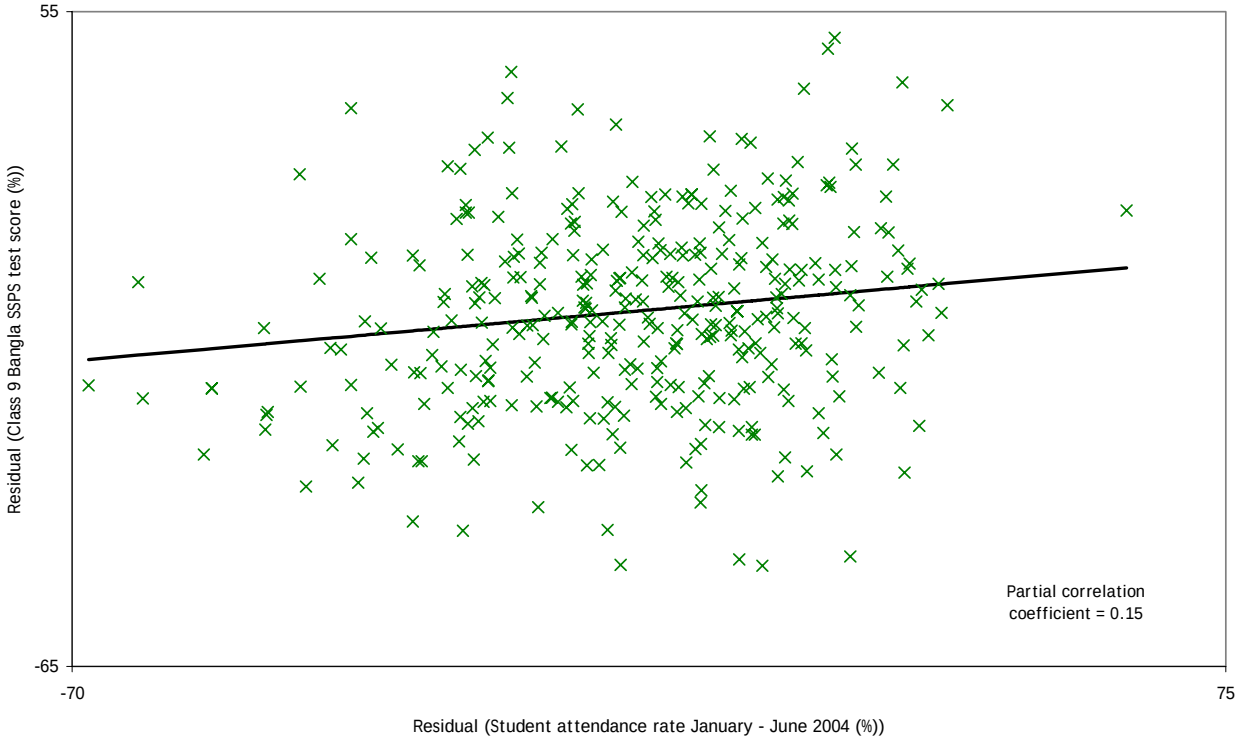
Figure 11.2 presents a partial scatter plot detailing this relationship and while it is positive and statistically significant, the impact of attendance on Bangla test scores in NGSS is small. A ten percentage point improvement in a student's attendance rate is estimated to improve test scores by only one percentage point. For NGSS students in the sample, the average attendance rate is 66%, and therefore the potential for major improvements in achievement resulting from reduced absenteeism appear slim[27]. It should be noted, however, that attendance is measured only over the first six months of the Class 9 school year and cumulative attendance over the course of a student's overall school career may be a more appropriate measure. Unfortunately, it is not possible to collect this information in a cross-sectional survey.

[25] Repetition sometimes proxies for age with those that have repeated being older than their non-repeating counterparts. However, in the results reported here age is included as a separate explanatory variable.

[26] Attendance appeared to have a negative impact on Mathematics achievement in DM when only individual characteristics are controlled for; see Table A5.3 (column 1). However, this effect is insignificant when school factors are controlled for; see Table A5.3 (column 2).

[27] The regression analysis also controls for daily teaching time at schools to make the attendance rates more comparable across schools. The number of days schools were open across the six months was also included initially but dropped as it did not make any significant difference to the results.

Figure 11.2 Bangla test score vs. student attendance in NGSS



Note: The variable on the vertical axis is the SSPS Bangla score for NGSS students having controlled for all other explanatory variables included in the regression reported in Table A5.2 (column 2). The variable on the horizontal axis is the attendance rate for January to June 2004 having controlled for the same set of explanatory variables.

Stipend holders are included in the regression analysis, making it possible to explore whether the stipend programme has an impact on student achievement measured by the SSPS test scores. Stipend holders were defined as those students that had received a stipend for the July-December 2003 stipend disbursement. This was the latest disbursement that had been made at the time of the beginning of the survey[28]. The results of the analysis here suggest that the stipend programme had a statistically significant impact only on the SSPS test scores in GSS and NGSS. The largest positive impact was found to be in the Bangla test score regression for GSS; see Table A5.1 (column 4). The combined effect of being a stipend holder, compared with being a female without the stipend implied an increase in the Bangla SSPS test score of approximately eight percentage points[29]. In NGSS, holding a stipend tends to cancel out the negative impact of being a female student when looking at Mathematics achievement but is associated with lower achievement in Bangla. Clearly, further analysis is required to understand the reasons for this[30].

Students in the science streams of GSS and NGSS tend to do significantly better than students in other streams. This effect is not confined to the Mathematics SSPS score, as science stream students also do significantly better in Bangla in these schools. The regression estimates suggest that science stream students tend to achieve scores on average that are four to ten percentage points better than students in commerce and arts streams. This result is not surprising, given

[28] See Chapter 7 for further details.

[29] This is calculated by summing the female and stipend coefficients.

[30] It should be noted, however, that these results are only indicative as the primary purpose of the results reported here was not to assess the impact of the stipend programme on achievement. In particular, issues of selection bias associated with being a stipend holder have not been pursued here.

that bright students are generally identified and streamed into science in secondary schools[31]. In DM there appears to be a disadvantage in achievement associated with being in the science stream. However, this may be because fewer students tend to be streamed in these schools.

When looking at the determinants of secondary school achievement it is important to account for students' educational background prior to the commencement of their secondary schooling. This avoids assigning educational improvement to secondary education when in fact it was a student's primary education that was the contributory factor. Ideally, a measure of a student's cognitive achievement prior to secondary schooling (e.g. a test of Class 5 cognitive achievement) should be included in the regression analysis. It is not possible to do this in a cross-sectional survey such as SSPS, as it would require testing students once at the beginning of their secondary careers, and again when they have reached Class 9. Instead, the SSPS tested Class 6 students in each of the sampled schools using similar tests to the Class 9 SSPS tests, but based on the Class 4 primary school curriculum. This measure serves as a proxy for school student intake and the level of cognitive achievement of sampled Class 9 students before entering secondary school. Figure 11.3 illustrates the relationship between this proxy measure of educational achievement and the Class 9 SSPS Mathematics test score for DM students.

Figure 11.3 Mathematics test score vs. Class 6 average score in DM

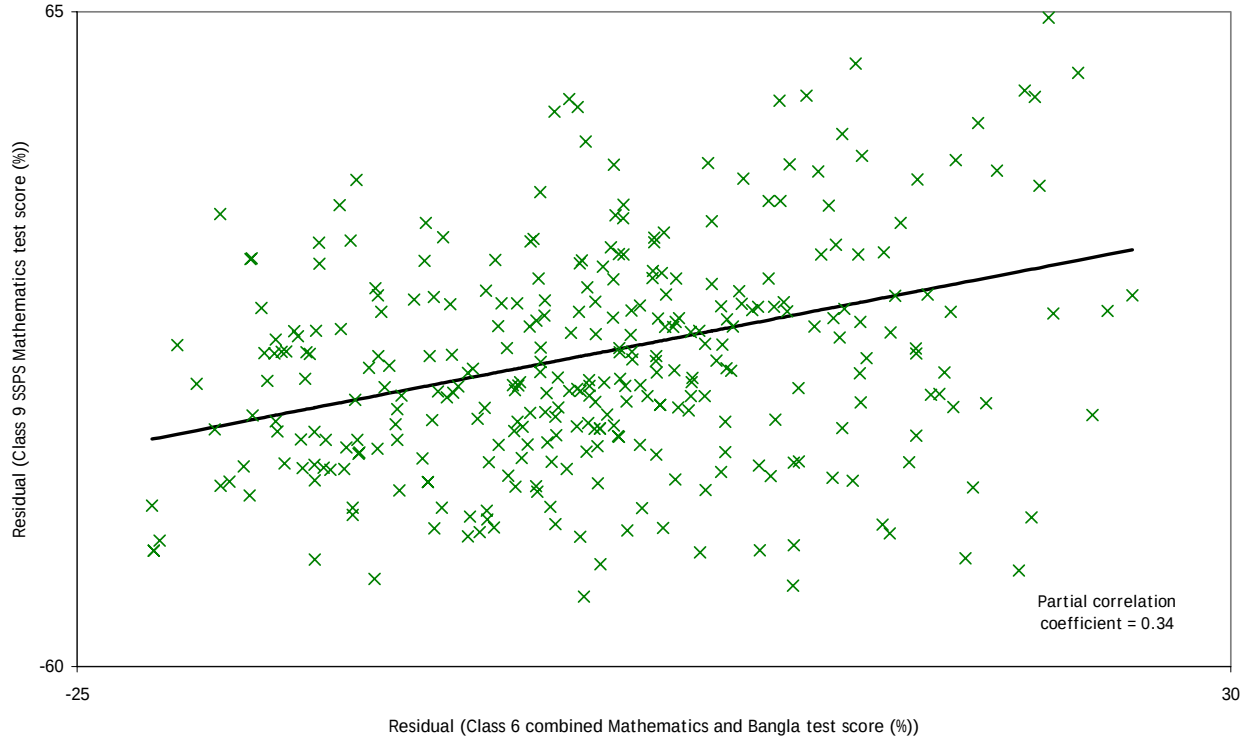


Figure 11.3 shows that the relationship between Class 9 achievement and Class 6 achievement is strong. It implies that schools with high quality intakes tend to do better than schools with poorer intakes and shows the importance of controlling for such a factor in the regression analysis. The results imply that improvements in primary and pre-primary education will have a positive impact on education performance at the secondary level and perhaps beyond.

Given the relationships highlighted in this section, what would performance differences across schools look like for students with the same abilities and characteristics as each other if they had attended alternatively GSS, NGSS or DM? The analysis in this chapter allows us to look at this

[31] No controls have been made for the potential endogeneity of this variable in the regression analysis.

by predicting the SSPS test scores of all sampled students for each school type. These results are reported in Table 11.1.

Table 11.1 Actual and predicted SSPS test scores for all students[32]

	Actual			Predicted		
	GSS	NGSS	DM	GSS	NGSS	DM
Bangla test score						
Total	73.5	55.8	47.6	59.3	60.8	53.4
Male	75.2	59.3	50.1	60.1	64.5	55.9
Female	71.8	53.6	46.4	58.6	57.7	51.4
Mathematics test score						
Total	63.2	39.8	35.5	38.5	46.0	45.7
Male	64.5	44.8	38.5	41.1	50.5	48.7
Female	61.8	36.6	33.9	36.4	42.3	43.3

Notes: The first half of the table reports the actual SSPS test scores for students attending the different types of secondary schools. These results differ from those reported in Chapter 4 because the averages in Table 11.1 are calculated using only the student sample used in this analysis. The second half of the table uses the 'individual' regression results reported in Table A5.10 – Table A5.3 to predict SSPS test scores for each type of school using all students in our sample. For example, the predicted GSS Bangla test score is calculated by using the individual Bangla regression coefficients reported in Table 11.1 to predict scores for all students in our sample (i.e. GSS, NGSS and DM students).

Table 11.1 shows that the predicted score for GSS is lower than the actual scores, which implies that if our entire sample of students (i.e. GSS, NGSS and DM students) had all attended GSS, the average test scores for these schools would have declined. This shows that a large explanatory factor for the better observed performance of GSS students compared with their NGSS and DM counterparts is family background, including prior investment in education, and not school factors. The reverse pattern between observed and predicted test scores can be seen for DM, so that if all students in the sample attend DM, average test scores are predicted to improve. DM students generally make up the poorest group of secondary school students and tend to have poorer socioeconomic background characteristics than other students. At least part of the observed poor performance of DM, then, is due to the lower socioeconomic background of their student intake in comparison with GSS and NGSS. These results are similar to research results in other developed and developing countries, which have found that a large part of student performance differentials can be explained by family background[33].

Impact of school factors

Individual student level factors have been shown to be important in determining student performance in secondary school. This section explores the impact of the five sets of school level factors determining student achievement in secondary schools, as outlined in Section 11.2.

[32] No account was made in the econometric analysis to allow for the limited range of the test score dependent variable between 0% and 100%. Therefore some predictions fell outside this range and have been excluded from the calculation of the averages in the second half of Table 11.1.

[33] See, for example, LM Nyagura and A Riddell (1993) 'Primary school achievement in English and Mathematics in Zimbabwe: a multilevel analysis', Education and Social Policy Department, World Bank.

General

A set of general characteristics of schools was included in the regression analysis in order to explore their impact on student performance. School location is often seen to be an important determinant of student performance. Urban schools sometimes have better performance than rural schools as they are better served by local infrastructure and often attract more resources (see Chapter 10). Rural NGSS schools tend to have poorer performance than urban NGSS; rural NGSS students are estimated to have Mathematics and Bangla scores 3-12 percentage points lower than urban NGSS students, although the effect is statistically significant only for the Bangla test score (Table A5.2)[34]. Conversely, the Bangla regression estimates for GSS students show that rural school students have an advantage over their urban counterparts (Table A5.1). It is interesting to note, however, that the positive effect of school location (urban location in the case of NGSS and rural location in the case of GSS) relates to a minority of students in both cases. Only 12% of NGSS students are in urban areas, and only 17% of GSS students are in rural areas.

It is often argued that large schools with many classes, sections and students are more difficult to manage, and that as a consequence students perform poorly when compared with students from smaller schools. Conversely, schools may be large because they are good schools and attract a large number of students compared with poorer performing schools. In general, school size did not appear to have a significant impact on performance in GSS and DM. NGSS students in larger schools tended to have poorer performance but the estimated effect was small; an additional 100 students lead to a one to two percentage point decline in the SSPS test scores (Table A5.2).

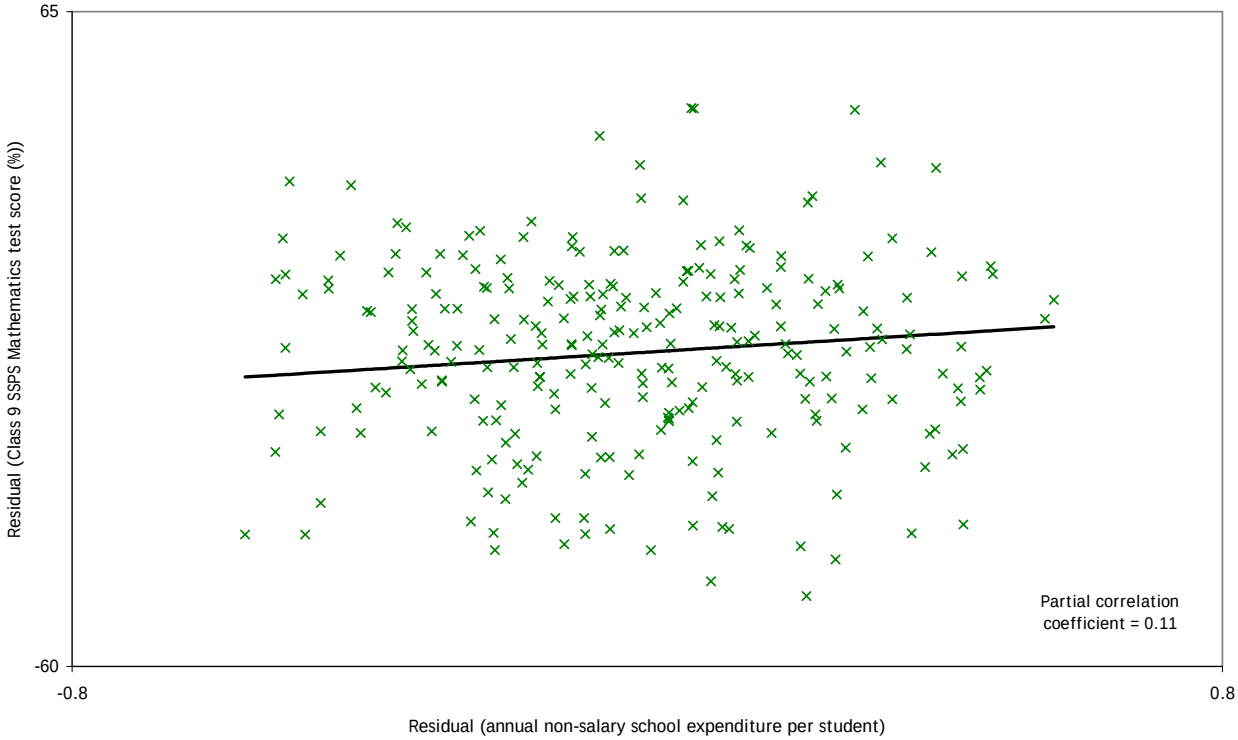
Financial

The SSPS collected extensive data on school expenditure, including the types of goods and services resources were being used for, and sources of school income (see Chapters 5–7). Many different specifications and ways of including school expenditure information were explored in the regression analysis. For the regressions reported in Annex 5 summary variables for annual school expenditure per student broken down by salary and non-salary expenditure were used. The results show that annual salary school expenditure per student actually has a negative impact on performance, although this effect is not always statistically significant. While this appears to be a peculiar result, it should be noted that the size of the effect is small. The largest negative impact of school expenditure was reported for GSS (Table A5.1), where a 10% increase in salary spending per student is estimated to reduce Mathematics SSPS test scores by 1.5 percentage points, controlling for all other explanatory factors.

Conversely, per student spending on non-salary items has a positive impact on performance although this result is generally statistically insignificant. Figure 11.4 illustrates the relationship between non-salary spending per student and Mathematics achievement in GSS.

[34] A variable for school location is not included in the DM regression models as only three madrasahs included in the analysis for this chapter were located in an urban area.

Figure 11.4 Mathematics test score vs. non-salary spending in GSS



Note: The variable on the vertical axis is the SSPS Mathematics test score for GSS students having controlled for all other explanatory variables included in the regression reported in Table A5.1 (column 4). The variable on the horizontal axis is annual non-salary school expenditure per student having controlled for the same set of variables.

While the relationship shown in Figure 11.4 is positive and statistically significant, the impact of non-salary spending on Mathematics test scores is small. A ten percentage point increase in per student spending is estimated to improve test scores by only one percentage point. However, coupled with the negative impact of per student salary spending on achievement this implies that altering the composition of school expenditure away from salary and towards non-salary spending could potentially result in significant improvements in achievement.

Material

During school visits, survey teams observed the teaching environment in the schools and the number of students being taught together in one classroom. The number of students being taught together in Class 9 tended to impact negatively on the Mathematics SSPS test score[35]. However, this effect is statistically significant only in DM where the effect is strong: an increase in average class size of ten students is estimated to reduce the SSPS Mathematics test score by six percentage points. That class sizes were observed to be very small in DM should be kept in mind when interpreting this result. In the sample of schools used for this analysis the average observed class size for Class 9 was only 12 students, so that an increase of ten students would almost double class size. While the impact of class size on the Mathematics score is insignificant

[35] It is more common in the research literature to use total enrolment divided by the number of sections in Class 9 as a measure of class size. However, the aim of including this variable in the analysis is to see whether large physical class sizes impact on performance. Given the high rates of absenteeism highlighted in this report and the common finding that sections are often taught together in schools it is argued that an observed class size measure more accurately describes physical class size.

in GSS and NGSS, it is also worth noting that the size of the estimated impact is also much smaller.

Many variables measuring the physical infrastructure were initially analysed for their impact on student achievement[36]. The level of noise from adjacent classrooms was found to have a negative impact on student achievement in NGSS and DM. However, this result had a significant impact only on the Mathematics scores in NGSS.

Managerial

It is often argued that schools that perform well have good management systems to support learning, but it can be difficult to quantify the quality of management. In common with other work in this field, characteristics of the head teacher (or senior teacher acting as head teacher) were used to explore the impact of school management on student performance. On the whole, head teacher characteristics did not play a particularly strong role in determining student achievement. Years of head teacher experience tended to have a positive but insignificant impact on student performance. Only in NGSS was the effect significant and it is estimated that an additional year of experience increased the estimated Mathematics SSPS test score by approximately half a percentage point.

In NGSS and DM the presence of a parent-teacher association has a positive impact on performance, although this is not always statistically significant. The impact of parent-teacher associations on performance is also quite large: each additional parent-teacher association meeting in NGSS is associated with a 4.5 percentage point increase in Mathematics achievement.

Teacher

Characteristics of school teachers were included in the analysis reported here to see if they had an impact on performance. No consistent effect of teacher characteristics on performance was found. A number of other teacher characteristics were initially included, but owing to their lack of significance were not included in the final analysis. However, the lack of a relationship between some of these excluded variables and achievement is of interest. Measures of supplementary payments to teachers were included in the regressions but were found not to have any significant impact on achievement. Measures of teacher absenteeism were also initially included, but again had no impact on student performance. The SSPS also observed Class 9 Mathematics and Bangla teachers to assess teaching methods and practices but again variables constructed from these assessments (e.g. the amount of time spent on imaginative or open-ended questions) had no significant impact on performance[37].

11.5 ATTENDANCE

Attendance has not proven a significant determinant of test scores. Although this was to some extent expected, given the relatively weak relationship between attendance and test scores in Table 4.23, it is still a surprising finding in view of the vast differences in attendance rates across students. Adequate attendance is nevertheless a fundamental objective for schools. This section discusses the main findings of a model explaining the determinants of Class 9 student

[36] For example, the number of students per toilet and the availability of library and laboratory facilities in the school were analysed.

[37] Sampled teachers were also given a test on literacy and numeracy and their test scores were included initially in the regression analysis. However, scores were subsequently dropped due to their insignificance. This is not a particularly surprising result since the tests were not designed to test subject knowledge or teaching proficiency but to ensure that sampled teachers had basic teacher training.

attendance averaged over the period January-June 2004. Unlike the model of the previous section, the analysis includes all sampled Class 9 students, including those who were not present in school on the day of the visit. The method used to explain attendance is ordinary least squares regression. The detailed regression results and descriptive statistics of the sample are presented in Annex 5 (Table A5.5 and Table A5.6). Two sets of characteristics enter into the analysis, individual and school characteristics.

Impact of student factors

A natural starting point to identify individual characteristics likely to be correlated with absenteeism is the list of reasons quoted by households in Table 4.11 as explaining absence during the week preceding the survey: sickness, weather, work, and preparation for examinations. It is important to stress that the absenteeism measure that the model is trying to explain is long-term whereas the cases of absence explained by the guardians are short-term and therefore more likely to be affected by chance events (e.g. weather). Two variables were used to approximate the probability of sickness: the existence of piped water supply and the level of household *per capita* consumption expenditure. They were both found insignificant, as were other variables related to household sanitation conditions.

Two further variables were used to assess the impact of student employment. The attendance of students who were working for their households on a regular basis was not affected negatively, while students in paid employment were substantially less likely to attend school. However, this latter group is very small, as fewer than 2% of all students were reported by their parents to be working outside the household. It may be that not all households truthfully declare their children's employment. An indirect indicator of the relationship between employment and school attendance may therefore be age, as older children are more likely to be employed to raise income for their families. Indeed, the attendance of 15-year old students is on average about four percentage points lower than the attendance of 14-year old students, although it should be noted that the age variable may also be capturing other factors.

Finally, examination preparation does not appear to be an important reason for low long-term attendance at Class 9. Students who took private tuition or attended coaching centres were not found to be more likely to be absent from class. The more hours GSS students spent attending private lessons, the less frequently they attended class, although this substitution effect was not statistically significant. Having said that, the main annual examination takes place in the second half of the year, while this attendance indicator covers only the first half of the year.

Other factors positively related to attendance were the amount of money spent by households on education and the number of hours spent by the student on homework. Both these factors measure the importance placed on education by the household. Distance from school was adversely affecting attendance: the average attendance of a student whose house was 4 km away from the school was 11 percentage points lower than the attendance of a student living near the school.

Finally, female students who received a stipend are substantially more likely to attend class. This is not surprising given that attendance is one of the three major conditions for receiving a stipend. In addition, it needs to be stressed that this attendance measure was calculated from the school registers. As shown in Table 4.8 the divergence between the survey headcount and the school registers was substantial and larger in the case of female students.

Impact of school factors

With reference to school factors, an interesting finding is that the type of school is not related to attendance when other factors are controlled for. Despite the fact that, according to Table

4.7, the January-June attendance record of NGSS students was much lower than that of GSS and DM students, the difference is explained away by measured factors. Higher spending per student and better classroom conditions appear to affect attendance positively, although the latter effect is not statistically significant. Schools that were open for more days are associated with higher attendance and the effect is quite strong: the difference between an NGSS in the bottom decile (12 days open each month) and an NGSS in the top decile (17.5 days open each month) translates into a ten percentage point higher average attendance rate. It may be difficult to interpret how this relation comes into effect, but what underpins it is probably the existence of poor school management arrangements.

The role of good school management is suggested by a few other variables. Although almost all schools purport to take action against student absenteeism, two particular actions seem to be related to positive results: sending a written update on performance (done in 30% of cases according to the households) and visiting the houses of absentee students (done by 12% of schools in the sample according to their head teacher). Physical punishment, a method used by 27% of schools to deter absenteeism, seems to have the opposite effect.

12 Conclusions

The Secondary Education Social Sector Performance Survey was based on a nationally representative random sample of 223 educational institutions of three types: GSS, NGSS, and DM. This is the first such survey of secondary schools in Bangladesh. It provides reliable, standardised information to answer two principal questions. First, do public resources reach secondary education facilities as intended? Second, what is the quantity and quality of services that these resources are able to deliver?

Public expenditure tracking

Public expenditure tracking surveys have been used increasingly in recent years across different countries to establish whether public funds from the centre reach frontline service facilities through several layers of bureaucracy. The design of each survey differs substantially according to the features of each country's administrative structure. An extensively quoted survey of primary education in Uganda in 1996 showed that 78% of non-salary funds in the form of grants were failing to reach schools as they were being captured at the district level by local officials. A similar study in Zambia in 2002 showed that while rule-based non-salary allocations were reaching schools, discretionary allocations by local governments were failing to reach them. Schools received only 40% of their allocations.

In the case of Bangladesh, the transfer of resources from the centre to secondary schools and DM is direct. The survey used three methods to track public resources. First, it located particular inputs on the spot, for example whether teachers on the payroll were present at the school. Second, it compared expenditure data at the school level with expenditure data from the Controller General of Accounts (CGA) for a range of functional units where direct comparisons were possible. Third, it compared weighted estimates of expenditure collected at schools with national level data.

Overall, our finding is that the public financial resources reach schools as intended. In the case of GSS, although the allotments could not be accessed directly by the survey team, there was evidence that resources provided under the government school functional code were not diverted to other uses. There was a high execution rate for the revenue budget even if there were noticeable divergences across budget lines. In the case of 28 upazilas, where it was possible to compare records line by line, no substantial discrepancies were identified with the exception of officers' salaries; these appeared to be paid in six upazilas even though the posts were unfilled. In the case of NGSS and DM, it was not possible to compare the survey evidence with proofs of payment. A comparison between the survey data and the MPO showed that there were 6% more teachers listed than those found in NGSS, although there was no evidence that any of these teachers had actually been paid.

However, some other findings raised matters of concern. First, there was evidence of mismanagement in gaining authorisation for spending. Almost 40% of teachers heading GSS stated that they had to make speed payments in order to get their bills passed. Second, 40% of NGSS in the sample had never been audited. Third, a thorough comparison of central data and school level data on expenditure is not always easy. The reporting of expenditure on government subventions to NGSS and DM in particular, which represents the vast majority of the resources that this survey was designed to track, does not lend itself at all easily to scrutiny. All expenditure is reported as a single figure to the CGA with no breakdown by school or even upazila. Fourth, the conditions upon which recognition is granted to NGSS and DM are not being monitored and schools that fail to satisfy them are not being sanctioned. Fifth, although stipend projects have been applying the rules more strictly over the last year, a large proportion of students who are eligible for stipend do not satisfy at least one of the two key conditions, attendance or school examination performance. Finally, there was evidence that works funded

by the construction projects were unevenly distributed. Moreover, although the survey cannot draw firm conclusions, the effectiveness of construction works in DM was questioned. At the same time, the share of budget that is allocated to maintenance is very small and the extent of maintenance problems encountered is very high.

Service delivery

On the second question, the survey is providing information about the factors affecting school performance in greater depth than has been previously possible in Bangladesh. It has developed and administered a learning test in Bangla and Mathematics that has several advantages. First, the results are comparable across the country; the SSC examination results, which are the most commonly referred indicator of school quality, are not comparable as different boards set different examinations in different parts of Bangladesh each year. Second, the results are comparable across schools and madrasahs, as the tests were designed on the basis of the common areas of the curriculum. Third, it was shown that the SSC pass rate is not highly correlated with school performance once we control for the quality of student intake in schools.

The survey has also collected information that is not available through the Educational Management Information System databases of BANBEIS and is uniquely able to integrate information collected from schools, teachers, students and households. The information was combined in a statistical model to determine how levels of inputs affect school and student performance.

The survey has shown that:

- The Class 9 student population comes disproportionately from wealthier households. The survey makes clear that neither the general support for secondary education nor the stipend projects in particular are directly contributing to the reduction of poverty.

- GSS perform significantly better than NGSS, which in turn have a better record than DM. However, DM tend to be under-resourced, their student population tends to have a lower socioeconomic status, and their teachers are much less likely to be trained. After controlling for these and other determining factors, the differences in performance between the three types of schools are greatly reduced.

- Attendance rates are very low. Furthermore, attendance rates calculated from school registers overstate the proportion of students who observe classes on any given day. Direct observation showed that actual attendance is 14 percentage points lower than the register-based figures and falls further by four percentage points after the tiffin break. Good school management has a substantial effect on raising attendance rates.

- Gender differences in test scores exist but are not very large despite the fact that private expenditure per male student exceeds the expenditure per female student by 35%. In fact, these differences largely disappear once we control for other factors.

- Teacher attendance is not as low as some alternative recent estimates had indicated. However, a sample of teachers observed giving lessons showed that the quality of the teaching process is poor at times even among teachers who have had extensive training. Moreover, the results of the model to explain the determinants of student performance suggest that the incidence of teacher training is not linked directly to learning outcomes. Coupled with the fact that the impact of attendance on test results is minimal, this calls for a fresh look into the programmes of teacher training to improve the efficiency of hours spent in class.

- There is large variability in test results, availability of equipment, non-salary resources, classroom state of repair, distribution of construction works, and student-teacher ratios

across NGSS and DM that the government should aim to minimise. The impact of school salary expenditure on student performance was found to be negative and significant, whereas the impact of non-salary expenditure was found to be positive and significant in some cases. This suggests that there is scope for re-allocation of resources to improve learning outcomes.

- A measure of the non-verbal reasoning ability of students is a strong predictor of test scores. In addition, the average school score in a test taken by the Class 6 students, which measures the characteristics of the school's student intake but also the school's value added, explains a substantial proportion of the differences in performance between schools. This latter finding suggests that government priorities may need to shift to interventions in early childhood and primary education.

Annex 1 Sampling

1.1 SAMPLING STRATEGY

The Social Sector Performance Survey collected information about a wide variety of entities: administrative units, schools, teachers, students and their households. Since the analysis required the estimation of many indicators for each of the units, the sample of observed units was selected with rigorous scientific procedures, so that their selection probabilities were known and documented. These conditions dictated the application of a complex multi-stage sampling design.

Each of the sampling stages generally implemented various forms of stratification, dictated by the need to observe a minimum number of units in each of various kinds of analytical importance (such as males, stipend-holding females etc.). Table A1.1 describes the strata defined for each sampling stage and the approximate sample sizes expected prior to the survey.

To obtain unbiased estimators from each of the various samples, the observed values were analysed using sampling weights (or raising factors) equal to the inverse of the selection probabilities, given below.

Districts

Dhaka and Chittagong constitute a self-represented stratum whereas another 18 districts were selected from the remaining 62 districts in the country with probability proportional to size (PPS) using the 2001 population as a measure of size. The PPS selection implicitly stratified the districts by division. The probability P(dist) of selecting district dist equals

$$P(\text{dist}) = \begin{cases} 1 & \text{for the Dhaka and Chittagong districts} \\ \dfrac{18 \cdot \text{POP(dist)}}{\sum_{i \notin \{\text{Dhaka,Chittagong}\}} \text{POP(i)}} & \text{for all other districts} \end{cases} \quad (1)$$

where POP(i) is the population of district i, according to the 2001 Census.

Upazilas

In Dhaka and Chittagong districts four upazilas were visited, selected with equal probability out of the total of 17 and 20 upazilas respectively. In each of the other 18 selected districts, one of the visited upazilas was always the sadar upazila (where the district capital is located). Up to three additional upazilas were selected with equal probability among the remaining upazilas in each district. Where districts had less than three additional upazilas, all were selected, given a total number of upazilas in the sample of 79.

Table A1.1 Outline of Secondary Education SSPS sampling strategy

Sampling Units	Stage	Domain	Strata			Number of Units Selected	Selection method		Total Sample Size
Districts	1	Bangladesh	Dhaka and Chittagong			2	Selected with certainty	2	20
			All other districts			18	Systematic sampling with probability proportional to the 2001 population	18	
Upazilas	2	Dhaka and Chittagong				4 per district	Systematic equal-probability sampling		8
		All other 18 selected districts	Sadar (district capital)			1 per district	Selected with certainty	18	71
			All other upazilas			Up to 3 per district	Systematic equal-probability sampling	53	
Secondary schools	2	All 20 selected districts	Government schools			Up to 4 per districts	Systematic equal probability sampling	68	226
	3	All 79 selected upazilas	Non-government schools			1 per upazila	Simple random sampling	79	
			Dakhil madrasahs			1 per upazila		79	
Secondary teachers	4	All selected secondary schools	Head teachers			1	Selected with certainty		~900
			Teachers of Bangla and Mathematics in Class 9			All of them			
			Other teachers with government-subsidised salaries			As many as needed to get at least 3 teachers per school	Simple random sampling		
Class 9 student households	4	All 226 selected secondary schools	Students attending on the day of test	Males		3-4 per school	Simple random sampling		~2,000
				Females	Stipend holders	2-3 per schools			
					Non-holders	1-4 per school			
			Students not attending on the day of test	Males		1-3 per school			
				Females	Stipend holders	1-2 per school			
					Non-holders	1-3 per school			

The probability P(dist,upaz) of selecting upazila upaz in district dist is given by

$$P(dist,upaz) = \begin{cases} 4/17 & \text{for Dhaka} \\ 4/20 & \text{for Chittagong} \\ P(dist) & \text{for the sadar upazila in the rest of the districts} \\ P(dist)\dfrac{nup(dist)}{NUP(dist)} & \text{for the non-sadar upazilas in the rest of the districts} \end{cases} \quad (2)$$

where P(dist) is given by formula (1), NUP(dist) is the total number of non-sadar upazilas in district dist and nup(dist) is the number of non-sadar upazilas selected in the district (nup(dist) is 3 in most of the selected districts).

Secondary schools

The selection of secondary schools was done centrally. It used three strata, with sample frames and techniques specific to each stratum.

- In each of the 20 selected districts, up to four GSS were selected by systematic equal probability sampling from the list of all GSS in these districts. Since certain districts have fewer than four GSS, the total sample size in this stratum was 68 GSS (rather than 80).
- In each of the 79 selected upazilas, one NGSS was selected by equal probability sampling from the list of all NGSS in these upazilas derived from merging the MPO and BANBEIS data.
- In each of the 79 selected upazilas, one DM was selected by equal probability sampling from the list of all DM in these upazilas derived from merging the MPO and BANBEIS data.

The probability P(dist,upaz,ssch) of selecting secondary school ssch in upazila upaz of district dist is given by

$$P(dist,upaz,ssch) = \begin{cases} P(dist)\dfrac{ngss(dist)}{NGSS(dist)} & \text{for government secondary schools} \\ \dfrac{P(dist,upaz)}{NNGSS(dist,upaz)} & \text{for non-government secondary schools} \\ \dfrac{P(dist,upaz)}{NDM(dist,upaz)} & \text{for dakhil madrassas} \end{cases} \quad (3)$$

where P(dist) and P(dist,upaz) are given by formulas (1) and (2) respectively, NGSS(dist) is the total number of GSS in the district, ngss(dist) is the number of GSS selected in the district, and NNGSS(dist,upaz) and NDM(dist,upaz) are the total numbers of NGSS and DM in the upazila.

Teachers

In the sampled schools, all head teachers present were interviewed.

In addition, all teachers of Bangla or Mathematics (TBM) in Class 9 were interviewed in all secondary schools visited. If the school had fewer than three TBM, a simple random sample of as many other teachers with Government-Subsidised Salaries (OTGS) as needed to interview three secondary school teachers in each school was taken.

The random selection of OTGS was entrusted to the interviewers, who used a special form and a random number pad for this process.

The probability P(dist,upaz,sch,subj) of selecting a teacher of subject subj in school sch in upazila upaz of district dist is given by

$$P(dist,upaz,sch,subj) = \begin{cases} P(dist,upaz,sch) & \text{for head teachers and TBM's} \\ P(dist,upaz,sch)\dfrac{notgs(dist,upaz,sch)}{NOTGS(dist,upaz,sch)} & \text{for OTGS's} \end{cases} \quad (4)$$

where P(dist,upaz,sch) is given by formula (3), NOTGS(dist,upaz,sch) is the total number of OTGS and notgs(dist,upaz,sch) is the number of OTGS interviewed in the school.

It should be noted that the sampling weights deducted from formula (4) cannot be used to draw inferences about the population of all OTGS in Bangladesh, but only about those working in schools with less than three TBM, since no OTGS was interviewed in schools with three TBM or more.

Students and their households

In secondary schools, all Class 9 students present on the day of the visit were tested. In addition, a sample of the households of some of students enrolled in Classes 9 in each of the visited schools was interviewed. The selection was entrusted to the field interviewers, who used a special form and a random number pad to apply simple random sampling selections within a variety of student groups, defined by the kind of school, and by the student's gender, receipt of stipends and attendance to the school on the day the tests were conducted.

Table A1.2 Selection rules for household sample

Criterion 1	Test	Students who took the test			Students who did not take the test			
Criterion 2	Gender	Males	Females		Males	Females		
Criterion 3	Stipend		Stipend holders	Non-holders		Stipend holders	Non -holders	Total
Non – metropolitan schools and madrasahs	Mixed	3	2	1	1	1	1	9
	Males only	4	0	0	3	0	0	7
	Females only	0	3	2	0	2	2	9
Metropolitan schools and madrasahs	Mixed	3	0	3	1	0	1	8
	Male only	4	0	0	3	0	0	7
	Females only	0	0	4	0	0	3	7

The probability P(dist,upaz,sch,sg) of selecting a household from student group sg in school sch in upazila upaz of district dist is given by

$$P(dist,upaz,sch,sg) = P(dist,upaz,sch)\frac{nsg(dist,upaz,sch)}{NSG(dist,upaz,sch)} \quad (5)$$

Where P(dist,upaz,sch) is given by formula (3), NSG(dist,upaz,sch) is the total number of students in the group and nsg(dist,upaz,sch) is the number of students selected for the household interview in the group.

Sample selections in the field

For all situations where field staff undertook the sampling of units in the field, procedures were defined to ensure that the selection was indeed random and could be cross-checked by survey managers. This was achieved through the systematic listing of sampling units in numbered order and the provision of random number pads on each questionnaire that were used to undertake the sampling following a standard procedure.

1.2 REASONS FOR NOT INTERVIEWING SAMPLED SCHOOLS

Table A1.3 lists the reasons for which any sampled facilities were not interviewed.

Table A1.3 Reasons for not interviewing sampled schools

	School type			Total
	GSS	NGSS	DM	
Sampled schools	**68**	**78**	**77**	**223**
Interviewed schools	68	76	75	219
Non-interviewed schools	0	2	2	4
School was no longer operating	0	0	1	1
School had no students in Class 9	0	1	0	1
Upgraded to alim madrasah / college	0	1	1	2

1.3 REASONS FOR NOT INTERVIEWING SAMPLED HOUSEHOLDS

As the description of the student sampling process highlighted, there were two major strata with differing probabilities as to the ease with which their households were interviewed.

- For the students who had been present on the day of the visit and took part in the test, their address details were collected directly, a fact that made determining the location of their homes relatively easy. Only 11 of these 1090 households were not interviewed, mostly because the students boarded at the school so it was not possible to interview the guardians.

- For the students who were not attending school on the day of the visit, collecting contact information was not so straightforward. In addition, a set of rules had been developed that made some of these students' households not eligible for an interview. For example, students who had changed school or dropped out of education were not interviewed because the survey focused on students associated with the sampled facilities. In total, 142 or 21% of these 677 households were not interviewed.

Table A1.4 lists the reasons for which households in the latter group were not interviewed. Three-fifths of these households were not eligible for an interview because they considered themselves as no longer enrolled in the sampled school. This was more common in non-government institutions, although there was a marked distinction between schools and madrasahs, as transfers to other schools were more common in the former group and dropouts more common in the latter.

Table A1.4 Non-interviewed sampled households of non-attending students

Reason household was not interviewed	School type			Total
	GSS	NGSS	DM	
No address given	**3**	**3**	**5**	**11**
School admitted student was fake	0	1	2	3
Nobody knew where child lived	3	2	2	7
No address given	0	0	1	1
Sampled child boards at school	**2**	**0**	**0**	**2**
Dwelling not found	**2**	**5**	**5**	**12**
Dwelling found but not the correct household	**0**	**1**	**1**	**2**
Household moved	**1**	**2**	**4**	**7**
Household found but sampled child not known	**1**	**2**	**1**	**4**
Sampled child identified but not enrolled in sampled school	**10**	**36**	**40**	**86**
Child moved to different school	1	13	5	19
Closer / more accessible	0	4	4	8
Quality	1	4	1	6
Family connection	0	2	0	2
Difficulties at sampled school	0	1	0	1
Other	0	2	0	2
Child's activity not known	1	0	1	2
Dropped out of school	7	22	34	63
Child was never enrolled at sampled school	1	1	0	2
No competent respondent	**2**	**1**	**3**	**6**
Household refused to be interviewed	**0**	**1**	**1**	**2**
Other	**1**	**3**	**1**	**5**
No reason recorded	**3**	**0**	**2**	**5**
Total	**25**	**54**	**63**	**142**

1.4 CONFIDENCE INTERVALS FOR KEY ESTIMATES

Estimates derived from samples are characterised by sampling errors. In other words, the fact that we do not obtain the information that we want from the entire population but from a random subset, means that the statistical measures of interest, such as the mean, are not calculated with perfect precision but are likely to fall within a certain range of values. Statistics

helps us in understanding what sampling errors are likely to be and standard formulas based on random sampling provide us with the solution on how to compute standard errors associated with our estimates. However, the SSPS sampling process has a complex design, which makes the estimation of standard errors and confidence intervals complex.

Bootstrapping is a non-parametric technique that allows standard errors of estimates obtained from complex surveys to be computed. The idea behind this technique is to extract many different sub-samples from the total sample (paying particular attention to the re-sampling procedures), compute the statistics for each of these sub-samples, and then calculate the standard deviation among these estimates.

The main statistical tests of interest are tests of equality of the mean of two sub-populations (e.g. by type of school) for a particular indicator. Given the time intensity of these calculations, they have only been attempted for a limited number of key estimates, which are presented in Table A1.5.

Table A1.5 Confidence intervals for selected key estimates

	School type		
	GSS	**NGSS**	**DM**
Enrolled students who belong to the top quintile of socioeconomic status (%)	70–78	29–46 *	21–38
Level of salary expenditure per student (Tk)	3124–3485	1709–2170 *	2532–2930 *
Level of non-salary expenditure per student (Tk)	1416–1675	330–457 *	133–228 *
Student-teacher ratio	33–38	34–44	18–23 *
SSPS Mathematics test score (%)	65–70	41–48 *	35–42 *
SSPS Bangla test score (%)	75–78	55–60 *	46–53 *
Annual private education expenditure (Tk)	11620–14089	3428–4575 *	1910–2577 *
Teachers with degrees (%)	86–92	69–79 *	14–26 *
Register-based attendance rate (%)	60–71	49–58 *	56–64
Headcount-based attendance rate (%)	46–62	35–46	34–46
Class 9 attendance rate, Jan-Jun 2004 (%)	58–66	48–57 *	59–67 *
Female students receiving stipend (%)	35–51	46–63 *	49–70
Teacher absenteeism rate, Mar-May 2004 (%)			

Notes: The confidence intervals have been estimated at the 5% level of significance using bootstrapping techniques. The asterisk in the NGSS column signifies that the NGSS estimate is significantly different from the GSS estimate at the 5% level of statistical significance. The asterisk in the DM column signifies that the DM estimate is significantly different from the NGSS estimate at the 5% level of statistical significance.

Annex 2 Collecting data from students and teachers

2.1 SUBJECT TESTS: BANGLA AND MATHEMATICS

In addition to volume measures, such as enrolment and attendance, school performance was measured on the basis of student tests to determine the amount of learning that accrues as a result of the educational services provided. All students in Class 9 who were present on the day of the survey were tested in Bangla and Mathematics. The decision to test Class 9—rather than use SSC examination results—was taken because the SSC results are not comparable across schools, as different Education Boards use different standards in any given year. Moreover, the survey was keen to collect additional information on the students and this would not have been easy with students who had graduated after taking the SSC. Finally, it aimed to avoid questions emphasising memorisation.

Each test consists of twelve multiple choice questions in each subject that the students completed in forty minutes. The survey team designing the tests was led by Professor Mohammed Ali Azam, a former Chairman of the National Curriculum and Textbook Board. The curricula, syllabuses and textbooks of Classes 8 and 9 in Bangla of both schools and madrasahs were analysed first. Although the curriculum objectives coincided, the Bangla syllabuses and textbooks of Classes 8 and 9 differed between schools and madrasahs.

To develop reading comprehension questions, the articles, stories and poems that were common in the Class 8 and 9 textbooks of schools and madrasahs were identified and selected as the standard. Two sets of comprehension tests comprising prose and poetry were developed.

To develop grammar questions, the syllabuses of Classes 8 and 9-10 of both schools and madrasahs were analysed. Different grammar textbooks available in the market were also consulted. The grammar topics were generally common (e.g. styles of language, uses of words and sentences, parts of speech, gender, number, tenses, comprehension, joining vowels to form a word, making compound words etc.). Two sets of questions were developed, of Class 8 and Class 9 standard respectively.

The curricula, syllabuses and textbooks of Classes 8 and 9 in Mathematics of both schools and madrasahs were analysed next. Similarly, two sets of test instruments were developed corresponding to Class 8 and Class 9 standard respectively (the latter according to what was expected to be taught in schools and madrasahs by May).

A joint meeting of four teachers (Bangla and Mathematics teachers each from a school and a madrasah) was arranged. The teachers reviewed the test instruments, gave their comments and the instruments were modified for initial piloting accordingly. The teachers were given the two sets of test instruments for each subject to conduct a class test in their schools on a small sample of students. The results were analysed further and the instruments were finalised for piloting on a large scale in a limited number of schools and madrasahs. The difficulty level of each test item was determined on the basis of the mean and standard deviation of correct answers in each item.

The final list of questions was selected so that they would produce a distribution of scores that distinguished performance across schools.

2.2 INNATE ABILITY: RAVEN'S PROGRESSIVE MATRICES

When analysing student performance, it is important to distinguish the effect of schooling from the effect of other determining factors, notably innate ability. For example, it may be that student performance in GSS is higher than in NGSS, but this may in part be due to the fact that more intelligent students are more likely to be selected into GSS. Not taking this into account would overestimate the impact on student performance of the education provided in GSS. It must be stressed that general intelligence is only one aspect of individual ability and that self-esteem, drive and energy have often been found to be stronger predictors of high performance.

There are several tests of general intelligence. The SSPS has selected the Raven's Standard Progressive Matrices Plus test for the following reasons:

- It has a sound theoretical basis, as it was developed to measure the educative ability component of general intelligence, namely the ability to make meaning out of confusion, to perceive new patterns and relationships, and to forge (largely non-verbal) constructs, which make it easy to handle complexity.

- It is the second most widely used psychological test in the world, it produces an excellent overall index of general intelligence and a huge amount of fundamental research has been carried out using the index.

- It is a culture-reduced test. In other words, it does not have culture-specific content, such as vocabulary, similarities, information, and other verbal items. It focuses instead on non-verbal tasks and its symbols are not identifiably associable with existing cultures, unlike other commonly administered tests, such as the Stanford-Binet and the Wechsler Intelligence Scales.

- Its latest version has tried to address the Flynn effect, namely the observation that scores have been increasing over the years and in all countries of the world, which is inconsistent with the perception that ability should remain relatively constant.

The tests are easy to administer. Respondents are asked to find patterns in groups of abstract objects and select the correct pattern among the options on offer. Items get progressively, more difficult requiring greater capacity to encode and analyse. There are five sets of 12 items each. Table A2.1 reports the student average scores on the Raven's Standard Progressive Matrices Plus. GSS students appear to attract higher ability students and DM below average ability students.

Table A2.1 Class 9 student innate ability measure (%)

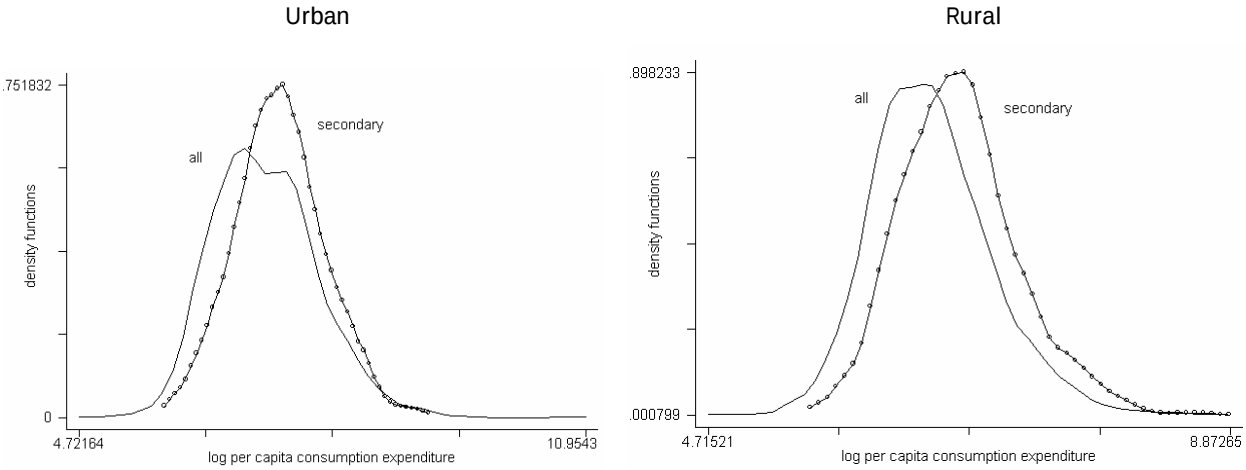
	GSS	NGSS	DM	Total
Raven's Standard Progressive Matrices Plus score	61.5	46.6	40.8	46.7

2.3 SOCIOECONOMIC STATUS

The survey aimed to assess the socioeconomic status of secondary education service users and how it related to the welfare of the entire population in Bangladesh. In order to understand whether secondary education service users are poor or wealthy on a national scale, we must be able to compare their position relative to the national distribution of basic background variables (such as parental education and housing features) and the level of household consumption (which is used to measure income poverty). The SSPS collected data only from the households of users of secondary education services, which are not representative of all people in Bangladesh, as secondary school students tend to come from better-off households.

The most recent nationally representative survey, which also collected information on users of secondary education services, is the 2000 Household and Income Expenditure Survey (HIES). According to the HIES, 18% of households in Bangladesh have children attending secondary school. The following figure shows the density distribution of household consumption according to the HIES in urban and rural areas. The consumption distribution of households with children in secondary schools lies to the right of the national consumption distribution and this suggests that secondary school students come from households that are better off than the average.

Figure A2.1 Household consumption of secondary education users



Every effort was made to maximise the comparability of the data collected in the SSPS with those of the HIES. The HIES questionnaire and data were consulted to ensure that, wherever possible, the SSPS questionnaires collected information on various socioeconomic variables and household consumption in a similar format to the HIES.

Two approaches were followed to assess and compare the socioeconomic status of students. First, the households of a sample of Class 9 students were interviewed and asked questions about their consumption expenditure levels. Second, all students who took the test were asked to report on basic characteristics of their households, such as the education of their parents, characteristics of their house (e.g. electricity connection. source of water etc.) and the ownership of selected consumer goods and land.

Direct measurement of consumption expenditure

It is possible to compute a comparable measure of household consumption if one asks the same consumption-related questions as those in the HIES. Given that the respondent has to be a household member more knowledgeable than the student and given that the cost of visiting all

households would be prohibitive, a sub-sample of Class 9 students was selected and their residences were visited. They were administered a comprehensive household questionnaire including a consumption module based on the HIES consumption module, which after aggregations and exclusions was reduced to a list of fewer than 60 of the most important expenditure items. In total information on consumption expenditure was collected for about 1600 households. By contrast, the HIES interviewed about 900 households with children enrolled either in Class 9 or Class 10.

The extent to which SSPS data are comparable with those of the HIES needs to be tested by comparing the consumption patterns and levels in the two surveys. For each household a consumption measure was calculated, containing standard components (food, housing, education, health and other non-food expenditure) that are also found in the HIES. Some lumpy and infrequent expenditure items were excluded, while consumption flows from durable items could not be estimated. All expenditure was expressed in monthly and *per capita* terms.

Table A2.2 shows that the average household consumption shares according to the HIES and the SSPS are very similar. The average monthly *per capita* consumption expenditure was estimated at Tk 1100 according to the HIES and Tk 1358 according to the SSPS. After taking into account the official monthly consumer price index inflation between 2000 and 2004 (20.7%) the consumption levels of the two surveys are compatible with each other.

Table A2.2 Household consumption expenditure shares in HIES and SSPS (%)

	HIES (2000)	SSPS (2004)		HIES (2000)	SSPS (2004)
Food grains	18.3	19.3	Cosmetics	1.8	1.6
Pulses	1.5	1.9	Washing	1.3	1.9
Fish	6.7	7.2	Transport	6.6	4.2
Eggs	0.8	1.3	Clothes	5.5	4.0
Meat	4.5	5.4	Cloth	0.5	0.7
Vegetables	4.2	4.6	Footwear	1.0	1.0
Milk and dairy	2.2	2.8	Textiles	0.7	0.6
Oils and fats	1.9	3.0	Rent	10.0	9.7
Fruit	1.8	2.1	Health (male)	1.7	2.2
Sugar and molasses	0.9	1.2	Health (female)	1.4	2.6
Spices	3.5	2.8	Education (male)	5.8	3.7
Miscellaneous food	0.7	0.8	Education (female)	4.1	3.8
Eating out	1.7	1.4	Recreation	0.3	0.2
Tobacco	2.6	1.4	Other	1.9	2.0
Fuel and lighting	6.1	6.6	Total	100	100

Judging from these results, the SSPS consumption module has been successful in capturing household consumption, despite the fact that it was considerably shorter. However, these are only average figures. In order to understand the socioeconomic status of secondary education users it is necessary to see what their distribution is relative to the national distribution.

The key cut-off points in the national distribution (for instance the tercile cut-off points that divide the population in three groups of same population size ranked according to their socioeconomic status) were calculated using the HIES data. However, since the HIES was

conducted in 2000, it is also important to understand whether the national distribution might have changed in the four years that separate the two surveys. It is essential to be aware of three potentially important factors:

The effect of the 2004 floods

The July-August 2004 floods affected almost half the country with consequent agricultural losses, damages to the infrastructure, and inflationary pressures. However, analysis of the results of questions that were specifically included in the survey to capture the potential impact of the floods, indicates that our sampled areas were only marginally affected. Although 19% of households reported that they had been flooded over an average period of seven days and despite the fact that an indicator identifying households whose income was affected by the floods in the two weeks before the survey is significantly related to consumption levels, the flood does not affect the comparison with the HIES (see also Annex 4).

The effect of economic growth between 2000 and 2004

Between 2000 and 2004 GDP growth at constant prices was 22%, which is substantial in *per capita* terms even allowing for population growth of 7% over the same period. It would be incorrect to assume that GDP growth fully translates into household consumption growth. Indeed, household survey data suggest that the two tend to grow at different rates. Between 1995-96 and 2000, according to national accounts, GDP *per capita* grew nominally by 37% and private consumption increased by 31%. According to household budget survey data, nominal *per capita* consumption grew by 15% and real *per capita* consumption grew only by 3% over the same period. In order to assess the likely impact of economic growth on consumption expenditure between 2000 and 2004, a poverty projections toolkit designed by the World Bank was used. The assumption behind the model used for these projections is that consumption changes are driven by sector performance, considering also the level of inequality prevalent in each sector as estimated from household survey data. The results suggest a 7% increase of real *per capita* consumption. Assuming that there were no changes in the level of inequality the tercile cut-off points computed in the 2000 HIES can all be increased by the same proportion.

Regional price differences and inflation

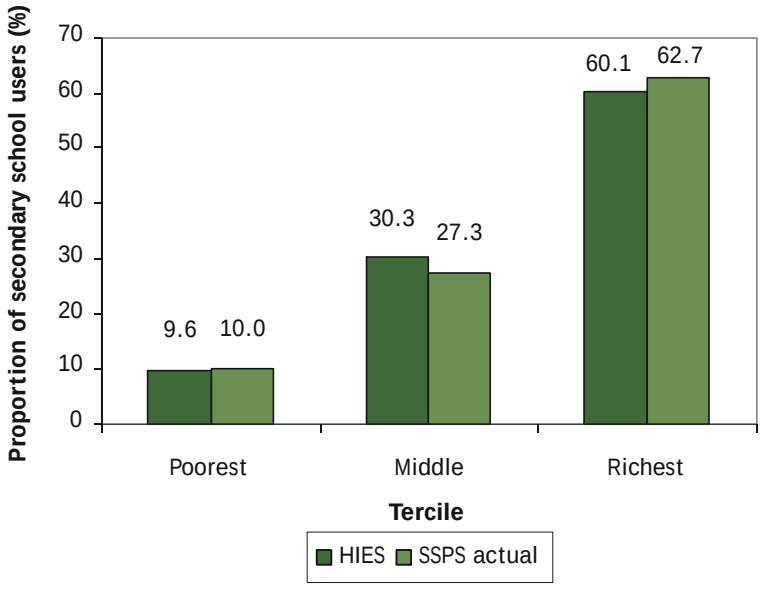
Before computing the tercile cut-off points it is important to correct nominal consumption for price differences across the country. Using information on budget shares and prices from the two surveys, a Paasche price index was computed. Regional price differences in 2000 and 2004 were very similar. It is also important to correct consumption for inflation between 2000 and 2004. Price differences between the two surveys (using the official monthly consumer price index) and a survey-based Tornqvist index for inflation were calculated. The two estimates produced very similar results: according to the official Consumer Price Index inflation prices increased by 20.7%, while according to survey based estimates the increase was 19.8%.

To summarise, in order to assess the socioeconomic status levels of users of secondary education services, the following steps were undertaken:

- tercile cut-off points were computed—and adjusted upwards by 7% to account for the effect of economic growth since 2000;
- the 2000 and 2004 *per capita* consumption expenditure levels were corrected for regional price differences; and
- the 2004 real *per capita* expenditure was expressed in 2000 prices using the survey-based inflation estimate.

The final step is to assess the proportion of users that fell in the three terciles[38]. The following figure depicts the HIES and SSPS distribution of users across the three terciles of the national consumption distribution. The SSPS, like the HIES, shows that secondary education students come from relatively better-off households than the national average. Since the data appear reliable, they are used in the analysis to compare various measures according to household consumption levels.

Figure A2.2 Consumption distribution of secondary school users, HIES vs. SSPS



Predictors of consumption expenditure

Using evidence from the HIES, it is possible to identify household characteristics that are highly correlated with the consumption level for those households with at least one child in secondary education. It concentrated on variables that could be answered comfortably by the students themselves so that these questions could be asked of all Class 9 students in order to predict the consumption of their households. In total, information on background characteristics correlated with consumption was collected from more than 10,000 students.

The extent to which the further use of student responses on consumption predictors was valid was tested in two ways. First, their distribution was compared with the corresponding distribution from the HIES. Second, their distribution was compared with the responses given by their own household respondents in the sub-sample of those households that were interviewed.

While both the mean and the distribution of the key socioeconomic variables were broadly similar in the HIES and the SSPS household survey, the same background characteristics collected from the students display substantially different values. Class 9 student responses differ from those of their parents or guardians. For example, students were more likely to report that their household owned certain assets, such as a refrigerator or a bicycle. The differences are of such a magnitude that it would not be appropriate to use the relationship established in the HIES data to predict consumption levels in the SSPS survey for the full set of Class 9 students. Table A2.3 presents selected examples of these divergences, which verify that students distorted the real socioeconomic status of their households. For example, students were significantly more likely to report that their mother was literate (76%) than the mother herself (62%). This finding casts

[38] Table 4.4 in the main text reports the results of this exercise for quintiles.

doubt on past attempts by other researchers to rely on student responses to act as proxy for the socioeconomic conditions of their households.

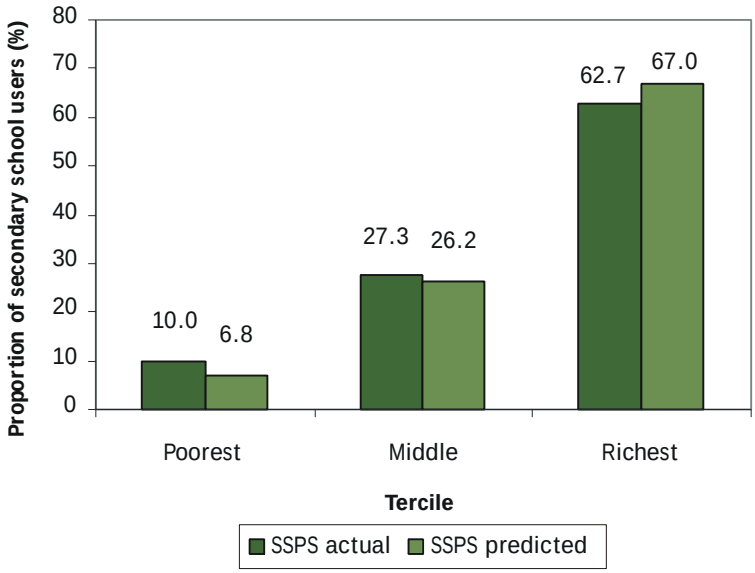
Table A2.3 Comparison of socioeconomic characteristics between HIES and SSPS

	HIES, households with secondary education students as members	SSPS, interviewed households (direct consumption measure)			SSPS, all tested students (predictors)
		All	Non attending students	Attending students	
Households:					
below lower poverty line (%)	8.5	8.3	11.8	5.2	5.9 (predicted)
below upper poverty line (%)	20.0	18.0	22.2	14.2	14.9 (predicted)
Median household size	6	6	6	6	6
Median number of rooms	3	3	2	3	NA
Houses:					
with electricity connection (%)	50.1	50.9	48.7	52.6	63.7
with brick/cement walls (%)	30.0	26.7	22.0	31.0	35.0
with cement roof (%)	13.6	10.4	8.6	11.3	15.4
Students:					
whose fathers are literate (%)	69.4	64.2	55.3	72.2	83.1
whose mothers are literate (%)	53.7	54.9	46.8	62.0	76.4
Households which own:					
Land (%)	59.4	66.8	61.1	72.2	77.1
Radio (%)	44.8	53.4	52.5	54.9	69.4
Television (%)	33.3	40.3	38.1	42.4	56.9
Fridge (%)	9.1	9.1	8.9	9.0	18.8

On the other hand, it is possible to use regression analysis to link consumption expenditure measured in the SSPS with the background characteristics collected from all the Class 9 students. The explanatory power of this model is lower than similar models using the HIES data. This supports the hypothesis that the students often did not report their household background characteristics correctly. However, as the error term of the model is normally distributed, it is still possible to estimate the socioeconomic status indicators of the tested students.

The final figure shows the estimated probability for the population of tested Class 9 students to belong in each of the respective national consumption terciles. Secondary school students appear slightly better-off than the results from the analysis of the direct consumption expenditure measure have suggested. A likely source for this difference is the fact that the interviewed households (which produced the direct consumption measure) are likely to be poorer than the households of tested students (from which the predicted consumption levels has been calculated), since the latter are drawn only from students attending on the day of the test and there is a weak positive relationship between attendance and socioeconomic status.

Figure A2.3 Consumption distribution of secondary school users, actual vs. predicted



2.4 LESSON OBSERVATION

In order to assess the quality of the teaching process, each sampled teacher was observed teaching one of their classes. The survey used a lesson observation instrument developed by the ESTEEM project. The observation schedule is like a log-book where interviewers recorded answers on three ongoing processes:

- on actors (teacher and students): how teachers and students interacted;
- on content: whether the lesson was based on the textbook or original material; and
- on process: whether the lesson developed knowledge acquisition or higher cognitive skills

Every 30 seconds, the interviewers had to tick a box in each of the three categories (actors, content, and process). In the case of actors, the interviewer had to alternate every five minutes between focusing on the teacher and two randomly pre-selected students. In more detail, the interviewers had to describe what was happening in the classroom in terms of the three processes by selecting between mutually exclusive situations:

Actors

- whether the teacher was leading the whole class together; working with a group of students; working with a pair of students; working with one student; not guiding learning (e.g. doing administrative tasks or nothing constructive); or was out of the classroom;
- whether the observed student was listening to others; talking or demonstrating at the blackboard while everyone else followed or listened to what they were doing; responding together with all others; working with a group of other children; working in a pair; working alone (e.g. in their notebook, while all others were doing the same); working directly and exclusively with the teacher; was not engaged in a learning activity; or was outside the classroom;

Content

- whether the teacher taught what is in the textbook without adding or changing anything; used examples similar to those in the textbook with only small changes (e.g. the numbers altered or the text slightly re-worded); introduced a new physical object to the lesson in order to make a point clearer; thought of ways to relate the lesson to events or things that children are familiar with from daily life;

Process

- whether the children had to keep repeating the teacher's words or examples or solved one type of problem which was predictable and regular; work on problems which have only one solution; work on problems which have more than one solution or correct answer; give their own ideas, create something unique, express their individual feelings, work on imaginative tasks etc.

The schedule recorded whether there were a variety of activities during the lessons, or one dominant style of teaching and learning going on.

A team of four resource persons who were involved in developing the ESTEEM schedule and training the ESTEEM field investigators was formed to assist with the training of the SSPS interviewers. Videos of lessons were used in the training with the aim of developing a common understanding of the concepts and thus to allow comparability of responses. A further day of practising in classrooms was arranged in Dhaka.

Annex 3 National secondary education accounts

Table 5.1 accounts for all secondary education resources that are directed to the educational institutions included in the survey (i.e. GSS, NGSS and DM) by source and service provider. Financing for non-government junior secondary schools has also been taken into account although these schools were not surveyed. The accounts exclude the following providers of secondary education:

- alim, fazil and kamil madrasahs;
- higher secondary schools and colleges;
- technical and professional schools; and
- English-medium schools.

This annex lists some of the main assumptions made to calculate the figures provided in the different cells.

3.1 REVENUE BUDGET

The CGA expenditure data for FY 2003/04 were used except for functional units 2535 (TTC), 2573 (DIA), 2577 (NAEM) and 2579 (BANBEIS) where the revised revenue budget data were used. Expenditure data on central administration were classified in three groups:

- expenditure that accrued entirely to the secondary education sector as defined above; this referred to spending by the following functional units: 2531 (DSHE), 2535 (TTC), 2573 (DIA), 2505–3441 (Scouts), 2505-3443 (Guides) and 2505-3983 (Education Week);
- expenditure that accrued to the secondary and higher secondary education sectors; this referred to spending by the following functional units: 2505-2977 (NCTB), 2505-3433 (Special grants), 2505-3447 (FREPD), 2505-3449 (NTRAMS) and 2571 (EED administration); this expenditure was allocated to the secondary education sector by 90% on the basis of the student enrolment share; and
- expenditure that accrued to the secondary, higher secondary and tertiary education sectors; this referred to spending by the following functional units: 2501 (Secretariat), 2505-3453 (Documents Collection, Research and Information Centre), 2506 (International organisations), 2577 (NAEM) and 2579 (BANBEIS); this expenditure was allocated to the secondary education sector by 80% on the basis of the student enrolment share.

In general, economic codes 4500-4700 were classified under 'Salaries and allowances' as were the grants in aid to non-government secondary educational institutions. In two cases an adjustment to the salary figure was made to take into account of cross-subsidising. First, in GSS it was estimated using SSPS data that approximately 18% of teaching is done in attached primary classes and the corresponding proportion was subtracted. Second, in the case of the madrasahs grant, it was recognised that approximately 30% goes to alim, fazil and kamil madrasahs, which are excluded from the accounts. Then it was calculated using SSPS data that 27% of the salary bill represents ebtedayee madrasah posts and was subtracted.

For lack of other documentation, the EED expenditure on repairs and maintenance were split across the three types of schools on the basis of SSPS evidence using the following ratios: 25% for GSS, 70% for NGSS and 5% for DM. In addition, the SSPS evidence suggested that at most half of

the CGA-recorded expenditure of Tk 800 million went to these types of schools; the rest was probably allocated to colleges and other educational institutions.

3.2 DEVELOPMENT BUDGET AND EXTERNAL ASSISTANCE

The Financial Management Unit (FMU) statements of expenditure data for eight development budget projects during FY 2003/04 were used. Proportions were assigned on the basis of the beneficiary schools of each type that were identified in the records of the five main construction projects:

	Proportion of works budget (%)		
	GSS	NGSS	DM
Expansion of existing buildings of selected educational institutions	0	95.0	3.5
Reconstruction of very old (40+ years) educational buildings	1.0	93.0	2.8
Development of government and non-government secondary schools	7.0	93.0	0
Development of government and non-government madrasahs	0	0	70.0
Secondary education sector improvement project	0	75.0	17.5

The rows do not add up to 100% because some of schools that benefit are not covered by the survey. For example, DM receive 70% of the entire development of madrasahs project budget; the remainder is allocated to alim, fazil and kamil madrasahs. The ratios were calculated on the basis of project records of allocations across school types.

The amounts allocated by the female stipend projects were split between stipends paid directly to students and payments equivalent to the tuition fees made to schools (the proportion was estimated from the forms collected at the UPO). Schools receive these latter payments in cash. This was distributed across the four types of uses according to the spending shares in Table 5.4, after excluding resources that were earmarked for specific uses (e.g. EED).

3.3 PRIVATE HOUSEHOLDS

Information on private expenditure was collected from households of Class 9 students and consolidated in six categories: school fees, private tuition, transport, textbooks and stationery, school dress and other. To project this information to the entire population of secondary education students, three steps were taken.

First, the survey asked households to report how much they had spent during the school year up to the point of the interview. Given that the interviews took place prior to the end of the year and households would continue to spend on particular categories, specific assumptions were made to project the spending to the end of the year using available SSPS information. For example:

- school fee payments were adjusted using information on which fees are paid monthly and considering payments to date;

- monthly private tuition rates were multiplied by the expected remaining number of months of tuition for the year as reported by households (tutoring intensifies towards the time of the final examinations);

- expenditure on stationery and transport was assumed to continue at a constant rate; and
- expenditure on textbooks and uniforms was not adjusted as these purchases are lumped at the beginning of the year.

The resulting adjustments to the figures observed at the time of the survey are summarised below by category of expenditure. The total adjustment is approximately 16%.

	Fees	**Private tutoring**	**Transport**	**Stationery**	**Textbooks, supplementary textbooks, dress and other**
Reported expenditure until interview date (Tk)	404	1262	158	450	1317
Projected expenditure until end of year (Tk)	520	1599	183	537	1317
Increase relative to reported expenditure	+29%	+27%	+16%	+19%	0

Second, the ratio of *per capita* spending across Classes 6-10 from the 2000 Household Income and Expenditure Survey:

Ratio of spending per student relative to Class 9 spending per student	**Class**				
	6	**7**	**8**	**9**	**10**
Tuition fees	0.68	0.72	0.93	1	1.41
Private tutoring	0.53	0.72	0.74	1	1.39
Transport	0.46	0.39	0.79	1	1.37
Stationery and textbooks	0.53	0.65	0.78	1	1.12
Dress	0.82	0.95	1.05	1	1.15
Other	0.72	0.61	0.40	1	2.22
Ratio of class size relative to Class 9 enrolment	1.41	1.22	1.08	1	0.79

Third, the relative class size was taken into account using the coefficients above.

Donations and income from own assets were added to the household expenditure using evidence from the cashbooks of NGSS and DM. All these private resources were pooled and distributed across the four types of uses according to the expenditure shares in Table 5.4, after excluding resources that were earmarked for specific uses (e.g. EED).

Annex 4 Assessing the flood impact on the survey

The floods that hit Bangladesh in 2004 peaked around the middle of July, just as the survey was about to begin. The fieldwork was rescheduled so that places that had been affected by the floods were not visited until at least one month after the waters had receded, in order to give communities time for life to return to normal. In fact, the first four districts to be visited had not been affected at all. In the remaining districts, a questionnaire was put together to collect additional information from the remaining 138 schools and 1232 households surveyed in the second and third phases of the survey to gauge the potential impact. Assessing the extent to which last year's particularly severe floods had affected the results of the survey is not straightforward: the analysis has to single out the effects on school operation of the particular flood and the extent that these differ from floods in an average year. There is always a concern that schools may wish to overstate the extent of damage to the interviewers in the belief that they may become eligible for assistance.

Approximately 30% of schools had to close at some point because of flooding; about 15% did so for two weeks or more. In comparison with the number of days they had been open in July 2003, flood-affected schools were closed for seven more days in July 2004. Further analysis showed that on those days when the schools were open in July, attendance in July was lower by one-third in flood-affected schools, controlling for attendance throughout the year. Although this is a very large effect, it does not substantially affect the attendance measures reported in Chapter 4. For example, Table 4.6, which is based on school registers, is averaged over eight dates throughout the year, only one of which was in July. At most, this would have knocked 0.5% off the estimates. The more crucial estimates in Table 4.8 are based on site visits that were carefully timed for the flood impact to have been minimised.

Of the households in the sample, 19% were flooded for an average of approximately seven days. Alternatively, 26% reported that their sources of income were negatively affected, mostly in agriculture. Most of these households were interviewed well after the floods and it has been estimated that only 1% of the total may still have been suffering from the impact of flood when they were interviewed. The impact on prices and food aid has been incorporated in the socioeconomic status calculations. See the discussion in Annex 2.3.

Table A4.1 Impact of flood on schools and households

On schools		On households	
Schools whose vicinity (10km) flooded (%)	44	Households whose vicinity (10km) flooded (%)	49
Duration of the flood – Mean (days)	24	Duration of the flood – Mean (days)	27
High / Most affected	36	High / Most affected	44
Low / Least affected	14	Low / Least affected	11
Schools flooded (%)	20	Households flooded (%)	19
Duration of the flood – Mean (days)	19	Duration of the flood – Mean (days)	7
High / Most affected	31	High / Most affected	20
Low / Least affected	6	Low / Least affected	1
Schools with damaged building / furniture (%)	16	Households fleeing home due to flood (%)	4
Schools with damaged equipment / records (%)	6	Households whose income was affected (%)	26

Annex 5 Detailed results of school performance models

Table A5.1 Determinants of student performance in GSS

	Mathematics		Bangla	
	Individual	**School**	**Individual**	**School**
Individual—Not specific to school choice				
Father with primary education	1.66	3.70	0.06	2.01
	(5.42)	(5.69)	(3.04)	(3.52)
Father with secondary education	1.93	1.96	3.37	2.50
	(4.48)	(4.64)	(3.56)	(3.58)
Father with higher secondary education or more	5.43	3.68	1.74	0.51
	(4.41)	(4.51)	(2.92)	(2.70)
Student not living with father	4.19	3.95	3.78	4.58
	(5.82)	(5.63)	(4.54)	(4.76)
Age	-0.94	-0.27	-0.73	0.00
	(1.52)	(1.60)	(1.12)	(1.11)
Female	1.81	3.04	-2.28	-0.47
	(3.25)	(3.62)	(3.08)	(2.93)
Ravens Progressive Matrices score	0.43	0.41	0.40	0.37
	(0.17)***	(0.18)**	(0.13)***	(0.12)***
Number of years repeated in school	-5.57	-5.58	-6.29	-6.68
	(3.26)*	(3.27)*	(2.26)***	(2.38)***
Household *per capita* expenditure (Tk; log)	-9.96*	-9.62*	-1.20	0.94
	(5.51)	(5.73)	(3.37)	(4.14)
Individual—Specific to school choice				
Student attendance rate Jan-Jun 2004 (%)	-0.10	-0.04	0.01	0.08
	(0.08)	(0.10)	(0.06)	(0.05)
Hours of private tuition per week	0.08	0.25	0.18	-0.02
	(0.18)	(0.23)	(0.14)	(0.15)
Household education expenditure on student (Tk; log)	6.20	4.43	1.83	2.15
	(2.84)**	(3.11)	(1.87)	(1.81)
Stipend recipient	1.27	1.15	8.55	8.44
	(3.74)	(3.75)	(2.74)***	(2.90)***
Science stream	6.33	6.70	4.28	4.41
	(2.13)***	(2.25)***	(2.09)**	(2.12)**
Class 6 Mathematics and Bangla average school test score	0.79	0.88	0.33	0.60
	(0.19)***	(0.25)***	(0.15)**	(0.25)**
School characteristics—General				
Rural location		3.60		11.11
		(4.52)		(3.81)***
Total school enrolment		0.003		-0.002
		(0.005)		(0.003)
Class 9 average daily teaching time		-0.05		0.03
		(0.04)		(0.05)

	Mathematics		Bangla	
	Individual	**School**	**Individual**	**School**
Single gender school		-6.69		1.09
		(3.52)*		(3.90)
School characteristics—Financial				
Annual school salary expenditure per student (Tk; log)		-14.34		-5.24
		(4.62)***		(4.72)
Annual school non-salary expenditure per student (Tk; log)		8.52		3.88
		(4.90)*		(4.03)
School characteristics—Material				
Class 9 size		-0.05		-0.04
		(0.07)		(0.05)
School characteristics—Managerial				
Head teacher years of experience as teacher		0.05		0.12
		(0.15)		(0.13)
Head teacher has received managerial training		2.89		-3.87
		(2.86)		(2.20)*
Frequency of PTA meetings		-3.86		2.11
		(5.03)		(4.47)
School characteristics—Teachers				
Average years of experience of school teachers		-0.18		-0.78
		(0.45)		(0.26)***
Proportion of school teachers with professional qualification (%)		0.10		0.20
		(0.11)		(0.09)**
Selection term	-5.15	-4.00	-2.62	-3.10
	(6.14)	(6.16)	(4.00)	(4.16)
Constant	22.54	78.39	31.67	-16.67
	65.46	82.34	42.83	66.28
Observations – students	265	265	265	265
Observations – schools	61	61	61	61
R-squared	0.51	0.54	0.49	0.55

Notes: (a) Standard errors are reported in brackets; (b) Robust standard errors, adjusted for heteroscedasticity and the school-level clustering of the data, are in parentheses; (c) One asterisk implies statistical significance at 10%, two asterisks at 5% and three asterisks at 1%; (d) Sample weights are used in estimation.

Table A5.2 Determinants of student performance in NGSS

	Mathematics		Bangla	
	Individual	**School**	**Individual**	**School**
Individual—Not specific to school choice				
Father with primary education	-0.98	-0.93	-1.32	-0.32
	(4.93)	(5.02)	(3.50)	(3.08)
Father with secondary education	2.50	3.64	6.71	6.83
	(5.71)	(5.20)	(3.21)**	(3.12)**
Father with higher secondary education or more	6.77	7.46	11.30	11.40
	(4.91)	(4.71)	(3.54)***	(3.37)***
Student not living with father	-5.98	-1.35	6.31	7.42
	(6.77)	(6.47)	(5.80)	(7.17)
Age	0.76	0.33	-1.56	-2.01
	(1.46)	(1.55)	(1.17)	(1.11)*
Female	-8.51	-8.37	-0.73	0.12
	(3.79)**	(4.04)**	(3.42)	(3.05)
Ravens Progressive Matrices score	0.51	0.49	0.44	0.38
	(0.13)***	(0.12)***	(0.11)***	(0.10)***
Number of years repeated in school	-0.75	-0.58	1.48	1.00
	(2.96)	(2.85)	(2.34)	(2.32)
Household *per capita* expenditure (Tk; log)	4.86	2.79	-0.19	-1.31
	(4.52)	(3.73)	(3.70)	(3.38)
Individual—Specific to school choice				
Student attendance rate Jan-Jun 2004 (%)	0.10	0.03	0.11	0.13
	(0.07)	(0.07)	(0.05)**	(0.05)**
Hours of private tuition per week	0.03	-0.06	-0.13	-0.04
	(0.34)	(0.28)	(0.21)	(0.22)
Household education expenditure on student (Tk; log)	-1.74	0.26	0.74	-0.37
	(2.77)	(2.79)	(2.49)	(2.97)
Stipend recipient	8.82	7.25	-4.57	-4.94
	(3.71)**	(3.55)**	(2.84)	(2.72)*
Science stream	7.51	10.44	4.93	6.85
	(3.90)*	(4.66)**	(2.97)*	(3.04)**
Class 6 Mathematics and Bangla average school test score	0.35	0.41	0.34	0.29
	(0.19)*	(0.20)**	(0.13)***	(0.18)
School characteristics—General				
Rural location		-3.30		-11.61
		(5.55)		(6.08)*
Total school enrolment		-0.01		-0.01
		(0.005)		(0.003)*
Class 9 average daily teaching time		0.09		0.04
		(0.10)		(0.09)
Single gender school		3.99		0.10
		(4.54)		(2.86)
School characteristics—Financial				
Annual school salary expenditure per student (Tk; log)		-7.68		-8.81
		(5.22)		(4.04)**

	Mathematics		Bangla	
	Individual	**School**	**Individual**	**School**
Annual school non-salary expenditure per student (Tk; log)		1.577		1.153
		(2.99)		(2.06)
School characteristics—Material				
Class 9 size		-0.07		0.04
		(0.08)		(0.06)
Class 9 classroom noise		-10.54		-2.81
		(3.46)		(2.44)
School characteristics—Managerial				
Head teacher years of experience as teacher		0.45		-0.02
		(0.20)**		(0.18)
Head teacher has received managerial training		2.65		2.28
		(3.27)		(2.32)
Frequency of PTA meetings		4.48		1.55
		(1.51) ***		(1.03)
SMC financial contribution		0.0001		-0.0001
		(0.0001)		(0.0001)*
School characteristics—Teachers				
Average years of experience of school teachers		-0.34		-0.06
		(0.40		(0.37)
Proportion of school teachers with professional qualification (%)		-0.15		0.00
		(0.09		(0.08)
Selection term	-23.94	-14.82	-5.67	5.44
	(12.92)	(15.35)	(11.88)	(12.57)
Constant	-23.68	9.72	34.96	116.66
	(42.04)	(58.00)	(32.47)	(51.82)**
Observations – students	359	359	359	359
Observations – schools	70	70	70	70
R-squared	0.25	0.35	0.31	0.36

Notes: (a) Standard errors are reported in brackets; (b) Robust standard errors, adjusted for heteroscedasticity and the school-level clustering of the data, are in parentheses; (c) One asterisk implies statistical significance at 10%, two asterisks at 5% and three asterisks at 1%; (d) Sample weights are used in estimation.

Table A5.3 Determinants of student performance in DM

	Mathematics		Bangla	
	Individual	**School**	**Individual**	**School**
Individual—Not specific to school choice				
Father with primary education	-1.44	-2.01	-8.40	-7.74
	(3.80)	(3.05)	(3.89)**	(3.26)**
Father with secondary education	-13.47	-13.11	-4.57	-8.24
	(4.19)***	(4.38)***	(4.40)	(5.30)
Father with higher secondary education or more	1.41	0.86	3.57	-0.05
	(6.05)	(6.53)	(3.33)	(3.18)
Student not living with father	-1.30	-1.93	-5.84	-9.44
	(7.68)	(7.86)	(7.41)	(7.19)
Age	0.73	0.57	-1.27	-0.83
	(1.52)	(1.24)	(1.30)	(1.28)
Female	2.10	1.63	-1.62	-5.06
	(4.49)	(4.52)	(2.99)	(3.17)
Ravens Progressive Matrices score	0.21	0.24	0.26	0.34
	(0.14)	(0.12)**	(0.16)	(0.12)***
Number of years repeated in school	-1.86	-5.59	-1.83	-2.13
	(3.18)	(4.31)	(3.36)	(3.74)
Household *per capita* expenditure (Tk; log)	1.29	1.17	0.17	1.20
	(5.25)	(4.78)	(3.86)	(3.67)
Individual—Specific to school choice				
Student attendance rate Jan-Jun 2004 (%)	-0.17	-0.08	0.00	-0.04
	(0.10)*	(0.08)	(0.07)	(0.06)
Hours of private tuition per week	-0.19	-0.25	-0.48	-0.23
	(0.32)	(0.26)	(0.29)	(0.25)
Household education expenditure on student (Tk; log)	2.19	2.56	1.26	0.47
	(2.85)	(3.14)	(2.85)	(2.92)
Stipend recipient	-2.18	-0.81	0.89	0.90
	(3.06)	(3.21)	(2.84)	(2.78)
Science stream	-2.89	-6.81	-5.34	-6.63
	(3.78)	(3.59)*	(3.42)	(3.15)**
Class 6 Mathematics and Bangla average school test score	0.71	0.77	0.54	0.53
	(0.25)***	(0.25)***	(0.15)***	(0.13)***
School characteristics—General				
Total school enrolment		-0.02		-0.004
		(0.02)		(0.02)
Class 9 average daily teaching time		-0.17		-0.01
		(0.09)*		(0.07)
Single gender school		-3.30		9.45
		(4.01)		(2.94)***
School characteristics—Financial				
Annual school salary expenditure per student (Tk; log)		-3.46		4.89
		(9.65)		(6.45)
Annual school non-salary expenditure per student (Tk; log)		2.07		4.07
		(2.61)		(1.52)***

	Mathematics		Bangla	
	Individual	**School**	**Individual**	**School**
School characteristic— Material				
Class 9 size		-0.59		-0.03
		(0.30)**		(0.18)
School characteristics—Managerial		-8.64		-2.86
Head teacher years of experience as teacher		(5.56)		(3.29)
Head teacher has received managerial training		0.32		0.30
		(0.31)		(0.21)
Frequency of PTA meetings		-2.17		2.19
		(5.25)*		(3.36)
School characteristics—Teachers		2.42		1.25
Average years of experience of school teachers		(1.26)		(0.89)
		-0.000015		-0.000004
Proportion of school teachers with professional qualification (%)		0.000035		0.000023
Selection term	12.00	0.26	7.22	0.18
	(8.79)	(0.70)	(8.78)	(0.44)
Constant	-48.09	0.07	12.95	0.18
	(40.24)	(0.27)	(28.19)	(0.19)
Observations – students	321	321	321	321
Observations – schools	72	72	72	72
R-squared	0.25	0.37	0.24	0.35

Notes: (a) Standard errors are reported in brackets; (b) Robust standard errors, adjusted for heteroscedasticity and the school-level clustering of the data, are in parentheses; (c) One asterisk implies statistical significance at 10%, two asterisks at 5% and three asterisks at 1%; (d) Sample weights are used in estimation.

Table A5.4 Student selection into the three different types of schools

	NGSS	DM
Individual characteristics—Not specific to school choice		
Father with primary education	-0.41	-0.77
	(0.54)	(0.56)
Father with secondary education	-0.71	-1.05
	(0.50)	(0.55)*
Father with higher secondary education or more	-0.82	-0.56
	(0.46)*	(0.51)
Student not living with father	0.04	-1.11
	(0.58)	(0.66)*
Age	-0.08	-0.01
	(0.17)	(0.19)
Female	-0.03	0.21
	(0.43)	(0.46)
Ravens Progressive Matrices score	-0.06	-0.07
	(0.01)***	(0.02)***
Number of years repeated in school	-0.21	-0.56
	(0.29)	(0.40)
Household *per capita* expenditure (Tk; log)	-0.96	-1.28
	(0.49)*	(0.51)**
Identifying variables in selection model		
Household has electricity	-1.10	-1.50
	(0.50)**	(0.51)***
Household owns cattle	0.91	1.49
	(0.44)**	(0.49)***
Number of household members currently in higher education	-0.59	-0.99
	(0.34)*	(0.38)***
Constant	14.15	13.67
	(3.62)***	(4.52)***
Observations	945	
Pseudo R-squared	0.13	

The table reports the results of a multinomial logit regression. Small-Hsiao test of Independence of Irrelevant Alternatives: (i) eliminating GSS: 8.26; (ii) eliminating NGSS: 8.01; (iii) eliminating DM: 12.25.

Table A5.5 Determinants of student attendance

	Coefficient (standard error)
Individual characteristics	
Father with primary education	7.22
	(3.25)**
Father with secondary education or more	3.29
	(2.77)
Mother with primary education	-0.49
	(2.66)
Mother with secondary education or more	1.27
	(3.35)
Student not living with both parents	-1.35
	(3.95)
Age	-3.67
	(1.04)***
Female	-2.58
	(2.69)
Student does work for the household	1.52
	(2.32)
Student does paid work	-11.95
	(3.87)***
Distance of student from school	-3.14
	(0.99)***
Distance of student from school – squared	0.10
	(0.04)**
Hours devoted to homework every day	3.03
	(0.64)***
Hours of private tuition every week	0.05
	(0.27)
Hours of private tuition every week x Government school student	-0.44
	(0.34)
Hours of private tuition every week x Non-government school student	-0.10
	(0.34)
Annual household expenditure on education	0.00
	(0.00)*
Household has piped water supply	-1.25
	(4.35)
Parents thought student should quit if he/she does not want to finish school	-3.14
	(2.64)
Stipend recipient	16.99
	(3.26)***
School characteristics	
School is situated in rural area	5.96
	(3.78)
Government Secondary School	-1.27
	(7.70)

	Coefficient (standard error)
Non-Government Secondary School	-4.13
	(4.95)
Number of days schools was open per month	1.94
	(0.57)***
Annual school expenditure on education per student	0.00
	(0.00)*
Schools where Class 9 classrooms were noisy	-5.00
	(3.87)
Households which received a written report by the school	4.94
	(2.94)*
Schools which had taken action against absenteeism	-5.04
	(4.94)
Schools which punished students physically due to low attendance	-6.36
	(3.79)*
Schools where teachers visited students' homes due to low attendance	9.32
	(4.00)**
Schools which imposed a fine on students with low attendance	2.61
	(2.78)
Constant	63.36
	(20.07)***
Observations	1530
R-squared	0.39

Notes: (a) Standard errors are reported in brackets; (b) Robust standard errors, adjusted for heteroscedasticity and the school-level clustering of the data, are in parentheses; (c) One asterisk implies statistical significance at 10%, two asterisks at 5% and three asterisks at 1%

Table A5.6 Descriptive statistics

Test score model	GSS		NGSS		DM	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Bangla test score (%)	70.73	19.52	55.74	19.65	48.08	19.88
Maths test score (%)	58.50	24.45	42.15	22.57	36.41	19.86
Individual – Not specific to school choice						
Father with primary education	0.11		0.12		0.15	
Father with secondary education	0.20		0.15		0.09	
Father with higher secondary education or more	0.41		0.12		0.11	
Student not living with father	0.06		0.06		0.06	
Age	13.94	1.01	14.22	1.09	14.40	1.27
Female	0.53		0.57		0.56	
Ravens Progressive Matrices score	41.32	15.58	30.59	12.03	28.47	11.73
Number of years repeated in school	0.23	0.46	0.20	0.45	0.16	0.40
Household *per capita* expenditure (in thousand Tk)	7.28	0.45	6.92	0.41	6.86	0.38
Individual – Specific to school choice						
Student attendance rate Jan-Jun 2004 (%)	65.72	18.21	66.06	22.97	75.62	17.17
Hours of private tuition per week	10.33	7.34	6.79	5.56	5.98	5.11
Total household education expenditure on student	8.91	0.78	8.09	0.69	7.84	0.52
Stipend recipient	0.26		0.33		0.35	
Science stream	0.43		0.22		0.15	
Class 6 Mathematics and Bangla average school test score	74.34	10.71	54.87	9.76	56.02	11.32
School characteristics – General						
Rural location	0.18		0.88		0.96	
Total school enrolment	940.2	586.4	529.6	337.1	358.0	102.2
Class 9 average daily teaching time	280.2	29.88	298.8	15.92	287.1	21.07
Single gender school	0.86		0.25		0.12	
School characteristics – Financial						
Annual school salary expenditure per student	8.07	0.27	7.44	0.37	7.74	0.33
Annual school non-salary expenditure per student	7.24	0.39	5.73	0.75	5.08	0.85
School characteristics – Material						
Class 9 size	44.49	20.56	31.65	18.58	12.34	7.57
Classroom affected by noise from adjacent classrooms	0.06		0.32		0.83	
School characteristics – Managerial						
Head teacher years of experience as teacher	28.04	9.03	27.59	8.61	14.73	7.58
Head teacher has received managerial training	0.46		0.50		0.37	
Frequency of PTA meetings	0.06	0.23	0.80	1.43	0.57	1.24
School Managing Committee contribution			5182	18847	9729	69639
School characteristics – Teachers						
Average years of experience of school teachers	15.35	3.87	16.08	4.80	12.08	4.06
Proportion of schools teachers professional qualification	78.33	14.49	56.80	18.44	12.43	7.85
Identifying variables in selection model						
Household has electricity	0.86		0.48		0.43	
Household owns cattle	0.24		0.56		0.67	
Number of household members currently in higher education	0.28	0.56	0.14	0.40	0.09	0.30

Attendance model	Mean	Standard deviation
Average attendance rate, Jan-Jun 2004 (%)	56.75	26.19
Individual characteristics		
Father with primary education (%)	11	
Father with secondary education or more (%)	22	
Mother with primary education (%)	23	
Mother with secondary education or more (%)	9	
Student not living with both parents (%)	10	
Age (years)	14.35	1.27
Female (%)	65	
Student does work for the household (%)	43	
Student does paid work (%)	2	
Distance of student from school (kilometres)	1.9	2.0
Hours devoted to homework every day	4.1	1.4
Hours of private tuition every week	6.2	5.9
Annual household expenditure on education (Tk)	4068	4233
Household has piped water supply (%)	5	
Parents thought student should quit if he/she does not want to finish (%)	19	
Stipend recipient (%)	32	
School characteristics		
School is situated in rural area (%)	79	
Government Secondary School (%)	4	
Non-Government Secondary School (%)	85	
Number of days schools was open per month (days)	14.7	2.9
Annual school expenditure on education per student (Tk)	2241	936
Schools where Class 9 classrooms were noisy (%)	33	
Households which received a written report by the school (%)	30	
Schools which had taken action against absenteeism (%)	97	
Schools which punished students physically for low attendance (%)	27	
Schools where teachers visited students' homes because of low attendance (%)	12	
Schools which imposed a fine on students with low attendance (%)	25	

Annex 6 Methodology of school performance model

The analysis presented in Section 11.4 estimated the determinants of student performance in the sampled secondary schools, defined as the score in the Bangla and Mathematics tests. This annex describes the main aspects of the econometric methodology used.

The analysis of the tests was complicated by the necessity to control for the non-random assignment of students to different types of schools, which may bias the estimated coefficients for the factors explaining student achievement on the tests. In order to address this problem, a generalised approach of the Heckman two-step procedure to selectivity bias correction was used[39]. The procedure utilises estimates from a multinomial logit model (MNL) rather than a probit to construct the set of selection correction terms. At first, a reduced form MNL is estimated for the j=1, 2, 3 categories to obtain the parameter estimates g_j. The predicted probabilities for each individual i = 1, ..., N for each category j are computed and defined as $P_{i1}, P_{i2}, ...P_{i4}$. The standardised z values for each individual for each category using the inverse standard normal operator are then computed. Thus: $z_{i1} = F\text{-}1(P_{i1})$, $z_{i2} = F\text{-}1(P_{i2})$, and $z_{i3} = F\text{-}1(P_{i3})$ for all i = 1, ..., N. Finally, for each category j, the following correction term is constructed:

$$\lambda_{ij} = \frac{\phi(z_{ij})}{P_{ij}} \quad \text{for i = 1, 2, ..., N and j = 1, 2, 3}$$

where f(•) denotes the probability density function for the standard normal.

These selection terms are then added to the x_i vector in the regression models estimated separately for the achievement models. A number of instruments have been used to assist in identification of the parameters of the selection effects. These need to be able to shift the probability of school choice but not the level of achievement on the Bangla and Mathematics test scores. In order for this procedure to be valid, the Independence of Irrelevant Alternatives (IIA) assumption of the MNL has to be satisfied. Tests of the IIA assumption based on the Small-Hsiao tests are reported in Annex 5 and provide evidence that the IIA assumption is not violated[40].

A further estimation issue concerning the attendance and achievement equations is the clustered nature of the data. Achievement of students within the same school will be more homogenous than achievement of students in a different school. This implies that the residuals from the estimation of a performance equation will be correlated for students within the same school. The error term in any performance equation violates two important assumptions of Ordinary Least Squares (OLS) estimation: homoscedasticity and independent error terms. If these assumptions are violated, then the OLS estimated variance-covariance matrix is incorrect and inferences based on the estimated coefficients will also be incorrect. To address this issue the

[39] The generalised model is described in L. Lee (1983) 'Generalized models with selectivity', Econometrica Vol. 51, pp.507–512. The original model outlining the original two-step procedure was J. Heckman (1979) 'Sample selection bias as a specification error', Econometrica, Vol. 47, pp.153-161. For an education application of Lee's approach, see G. Lassibille and J-P Tan (2001) 'Are private schools more efficient than public schools? Evidence from Tanzania', Education Economics, Vol. 9(2), pp.145-172.

[40] The test is described in K. Small and C. Hsiao (1985) 'Multinomial logit specification tests', International Economic Review, Vol. 26(3), pp.619-627.

variance-covariance matrix is corrected to account for the differing error structure[41]. The estimated standard errors are robust to the presence of heteroscedasticity[42].

Finally, sample weights are used in the regression analysis for estimated coefficients as the regression analysis is used as a device to summarise the characteristics of the population. As the equations being estimated are reduced-form and the regressions are descriptive rather than structural, the justification for using weights is no different to the justification for using weights to calculate means and other summary statistics from representative sample data.

[41] See H. White (1980) 'A heteroscedastic-consistent covariance matrix estimator and a direct test for heteroscedasticity', Econometrica Vol. 48.

[42] It should be noted that no adjustment to the variance covariance matrix is made to account for the inclusion of the predicted selection terms.

Annex 7 List of fieldwork team members

Quality control	Aminul Islam, Monir Hossain Bhuiyan, Sankar Chandra Banik, Kabir Azaharul Islam
Field team leaders	Mominul Hoque, Abdur Rahman, Sankar Kumer Roy, Prodip Ch. Das, Manjurul Hoque, Sabul Azad, Pingkon Ch. Das, Mizanur Rahman, Abdullah Al Mamun, Jamal Uddin, S. M. Hasan-Al-Mahmud, Jahangir Alam, Masud Rana, Golam Rabbani
Interviewers	Md. Shameem Hassan, Abul Kalam Azad, Hasidur Rahman, Alauddin, Kamal Hossain, Mahfuzur Rahman, Md. Shahidul Islam, Khalid Md. Saifullah, Projit Roy, Billal Hossain, B. M. Monir, Kawsar Hossain Khan, Rafiqul Islam, Md. Sultan Mahmud, Md. Hossain Mozumder, Nasir Uddin, Abul Hasan, Jasim Uddin, Ohiduzzaman, Mostafa Jamal, Shahin Alam, Abdur Rahim, Arifur Rahman, Kamruzzaman, Subrata Barai, Sirajul Islam, Mizanur Rahman, Bisnu Pada Biswas, Chandan Kumar Sarker, Nurul Islam, Salam Khan, Asim Ch. Mondal, Ahmed Al Munjir, Kamrul Hasan, Saykot Islam, Faruque Ahmed, Saydur Rahman, Shohel Ahmed, A. G. M. Rasheduzzaman, Rezaul Karim, Anup Kumar Ghosh, Mohammad Shahin, Tamzid Ahmed, Shafiqul Islam, Md. Firoz Khan, Md. Shariful Islam, Togammel Hoque, Ashutosh Datta, Anwarul Islam Khan, Sadekul Imam, Almas Uddin, Abul Khair, Mizanur Rahman, Masud Rabbani, Mahbubur Rahman, Anamul Hoque, Ahsan Rashid, Bayazid Hossain Woaresy, Monir Hossain, Md. Hedayet Hussain, Arifuzzaman, Mahbubur Rahman, Amiya Kumer Sarker, Alauddin Muzumder, Hasanuzzaman, Shariful Islam, Kabil Mahmud, S. M. Hasanuzzaman, Kausar Ali, Syed Wahiduzzaman, M. M. Neyamul Basar
Logistical assistants	Golam Rabbani, Abul Khair, Sagar Rahman, Masud Rana, Abul Kalam Azad, Oli, Nurul Haque, Salaudin, Billal Hossain, Delowar Hossain, Nassir Uddin

FMRP