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# Africa Region

## Education Service Delivery in Nigeria

### Results of 2013 Service Delivery Indicator Survey

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GHNDR and GEDDR

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## EXECUTIVE SUMMARY

The Service Delivery Indicators provide a set of metrics for benchmarking service delivery performance in education and health. The overall objective of the indicators is to gauge the quality of service delivery in primary education and basic health services and track performance. The indicators enable governments and service providers to identify gaps and track progress over time and across countries. It is envisaged that the broad availability, high public awareness and a persistent focus on the indicators will mobilize policymakers, citizens, service providers, donors and other stakeholders for action to improve the quality of services and ultimately to improve development outcomes.

This report presents the findings from the implementation of the Service Delivery Indicators in the Education sector in Nigeria in 2013. Survey implementation was preceded by extensive consultation with Government and key stakeholders on survey design, sampling, and adaptation of survey instruments. Pre-testing of the survey instruments, enumerator training, and field-work took place in 2013.

Information was collected from 760 primary schools, 2,400 teachers (for skills assessment), 5,700 teachers (for absence rate) and 6,600 pupils in four states in Nigeria: Anambra, Bauchi, Ekiti, and Niger. The results provide a snapshot of the quality of service delivery and the physical environment within which services are delivered in public primary schools. The survey provides information on three levels of service delivery: measures of (i) teacher effort; (ii) teacher knowledge and ability; and (iii) the availability of key inputs, such as textbooks, basic teaching equipment and infrastructure (e.g. sanitation, quality of lighting, etc.).

### **Teacher effort: what providers do?**

On average, 13.7 percent of providers were found to be absent from school. Of those at school, about a fifth (19.1 percent) were not in the class teaching. While at school, teachers spent on average about 20.7 percent of the time on non-teaching activities. Combining the absence from school and the classroom with the time engaged in non-teaching activities, the results indicate that teachers spend less than 3/4 of the scheduled teaching time on actual teaching activities. It is worth noting that over 86 percent of teachers were absent with management approval, suggesting: (i) management weakness and a sub-optimal allocation of paid staff time; (ii) absence is within the power of management to influence, and (iii) absence is amenable to action in the short run.

### **Teacher ability: what providers know?**

The results indicate that the number of teachers is not the biggest challenge facing Nigeria's education sector, but the fact that many of the teachers lack the necessary skills. The average score on the English and mathematics assessment, among English and mathematics teachers, was 32.9 percent, with only 3.7 percent of the teachers managing to obtain a score of at least 80 percent on these assessments. Pupils cannot learn more from their teachers than what the teachers know, and, therefore, teachers' technical competences, or better yet, lack thereof, severely constrain learning outcomes in Nigeria.

### **Availability of key inputs: what providers have to work with?**

The pupil-teacher ratio averaged 21.6 pupils per teacher, well within expected standards. However, significant gaps existed in the availability of inputs at the frontline. Only 18.5 percent of schools had the minimum infrastructure. Most striking was the absence of functional, improved and accessible toilets: only 38.3 percent of all primary schools surveyed had accessible and 27.4 percent had clean toilets. Only half (54.8 percent) of the schools had the minimum teaching materials while only 38.2 percent of the pupils had a mathematics or English textbook.

### **Variation across states**

There was a large variation across states. Those from the southern parts of Nigeria performed better in education than states in northern Nigeria. With the exception of infrastructure, Anambra and Ekiti (both in the South) performed well on teacher effort (absence from class of 10 percent or less) and availability of key inputs (at least 79 percent availability of teaching equipment, for example). In contrast, absence from class was 48 percent in Bauchi and 20 percent in Niger (both in the North), while less than 30 percent of schools had the minimum teaching equipment in Bauchi and 46 percent in Niger.

### **Does Ownership Matter?**

Private schools nearly consistently performed better than public schools across all indicators. Absence from school in public schools was more than double the absence rate among private school teachers: 16.9 versus 5.5 percent. Private school teachers were also more likely to be in class and, thus, spent more of their time in class on teaching activities than public school teachers did: 22.8 versus 9.5 percent. The results suggest that private schools seem to be able to elicit greater effort on the part of teachers. On a typical day, pupils in private schools learned 1 hour 13 minutes more than pupils in public schools. Over a period of a school term, this translates into 22 additional days of learning in a private school compared to public schools.

While the performance of private schools was better than public schools on input availability and competency, it was still generally poor. Availability of infrastructure was three times higher in private schools. Yet, only 36.6 percent of private schools had the minimum combination of infrastructure. The same applied to teacher competency, where the average assessment score was 10.1 percentage points higher in private schools, yet it was only a disappointing 40.4 percent.

The state-level and private-public comparisons show significant variation within each indicator, implying that there are some teachers who are indeed functioning at a high level of competence and productivity. This suggests that, even within the existing institutional environment, it is possible to improve teacher performance and learning outcomes in the short run.

In conclusion, the results indicate that even though the number of teachers serving the population needs attention, it is not the most pressing challenge facing the sector. Poor management of teachers and lack of necessary skills are the major hurdles for quality learning. Significant gaps in input availability, such as sanitation services, are also revealed. This suggests that a focus on management, incentives, and accountability to address gaps in provider knowledge and effort is required along with efforts to increase the amount of inputs available at schools.



### **How Nigeria compares to other SDI countries**

In the area of teacher effort, both school absence rate and classroom absence rate are the lowest compared to the other countries where SDI was implemented, 16.9 percent and 22.8 percent respectively, only Tanzania, 2014 has a lower school absence rate, 15.3 percent. Similarly, teaching time is the second highest, 3 hours 10 minutes, after Senegal and Togo, 3 hours 15 minutes. Minimum knowledge among teachers is quite low (2.4 percent), with only Togo and Mozambique scoring lower (0.9 and 0.3 respectively) (Table 3 and Table 16).

Nigeria's pupil-teacher ratio is among the lowest (22:1), along with Mozambique, compared to the other countries. The percentage of pupils with textbooks is significantly worse than other countries (33.7 percent) with only Uganda and Tanzania, 2014 scoring lower (6.0 and 25.9 percent respectively). Infrastructure availability is only 13.4 percent, once again, the lowest.

**Table 1. Service Delivery Education Indicators at-a-Glance: Public-Private and Urban-Rural<sup>1</sup>**

	All	Public	Private	Percent Difference (%)	Urban Public	Rural Public	Percent Difference (%)
Minimum knowledge (% teachers)	3.7	2.4	7.7	-69.4***	2.8	2.3	21.2 **
Test score (out of 100)	32.9	30.5	40.4	-24.5***	37.8	29.1	30.1***
School absence rate (% teachers)	13.7	16.9	5.5	207.5***	10.7	18.7	-42.9***
Classroom absence rate (% teachers)	19.1	22.8	9.5	140.9***	14.8	25.1	-40.9***
Time spent teaching per day	3h 26min	3h 10min	4h 23min	-27.7***	3h 36min	3h 05min	16.6**
<i>Scheduled teaching day</i>	<i>4h 53min</i>	<i>4h 44min</i>	<i>5h 24min</i>	<i>-12.3***</i>	<i>4h 52min</i>	<i>4h 43min</i>	<i>3.4***</i>
Observed pupil-teacher ratio	21.6	21.5	22.1	-2.5	27.3	20.4	34.1***
Textbook availability (% pupils)	38.2	33.7	54.6	-38.3***	54.9	29.3	87.4***
Minimum equipment availability (% classrooms)	54.8	48.2	78.3	-38.4***	51.8	47.5	8.9
Minimum infrastructure availability (% schools)	18.5	13.4	36.6	-63.4***	26.7	10.8	147.8**

Notes: The results are based on observations from 2,434 teachers in 760 schools. The difference column refers to the percent difference between public and private relative to private. The second difference column refers to the percent difference between urban public and rural public relative to rural public. Level of significance: \*\*\* p < 0.01; \*\* p < 0.05; \* p < 0.1.

<sup>1</sup> This information is duplicated in Table C 1 in the annex for ease of reference.

**Table 2. Service Delivery Education Indicators at-a-Glance: Variation across states<sup>2</sup>**

	<b>All</b>	<b>Anambra</b>	<b>Bauchi</b>	<b>Ekiti</b>	<b>Niger</b>
Minimum knowledge (% teachers)	3.7	7.9	1.3	6.5	1.7
Test score (out of 100)	32.9	46.1	27.1	45.5	23.6
School absence rate (%teachers)	13.7	3.9	27.2	6.8	17.3
Classroom absence rate (% teachers)	19.1	5.9	47.5	10.3	19.8
Time spent teaching per day	3h 26min	4h 37min	1h 33min	4h 29min	3h 30min
<i>Scheduled teaching day</i>	<i>4h 53 min</i>	<i>5h 28min</i>	<i>3h 55min</i>	<i>5h 31 min</i>	<i>4h 56min</i>
Observed pupil-teacher ratio	21.6	20.5	22.2	15.4	24.3
Textbook availability (% pupils)	38.2	66.4	11.1	70.9	26.1
Minimum equipment availability (% classrooms)	54.8	83.4	28.8	78.7	45.5
Minimum infrastructure availability (%schools)	18.5	34.5	6.1	31.4	12.0

<sup>2</sup> For a breakdown of the education indicators for each state by ownership and location, see Table C 8 - Table C 11 in the annex.

**Table 3. SDI- At-a-glance**

<b>Public schools only</b>	<b>Nigeria<sup>a</sup> 2013</b>	<b>Average SDI</b>	<b>Kenya 2012</b>	<b>Mozambique 2014</b>	<b>Senegal 2011</b>	<b>Tanzania 2014</b>	<b>Tanzania 2011</b>	<b>Togo 2013</b>	<b>Uganda 2013</b>
<b>Teacher Ability</b>									
Minimum knowledge (% teachers)	2.4	<b>12.7</b>	34.8	0.3	Not Comparable	15.6	Not Comparable	0.9	10.1
Test score (out of 100)	30.5	<b>42.0</b>	55.6	26.9	Not Comparable	46.6	Not Comparable	33.9	43.3
<b>Teacher Effort</b>									
School absence rate (% teachers)	16.9	<b>20.1</b>	15.2	44.8	18.0	15.3	23.0	22.6	29.9
Classroom absence rate (% teachers)	22.8	<b>42.1</b>	47.3	56.2	29.0	46.7	53.0	39.3	56.9
<i>Scheduled teaching time</i>	<i>4h 44min</i>	<b>5h 31min</b>	<i>5h 31min</i>	<i>4h 17min</i>	<i>4h 36min</i>	<i>5h 54min</i>	<i>5h 12min</i>	<i>5h 28min</i>	<i>7h 13min</i>
Time spent teaching per day	3h 10min	<b>2h 53min</b>	2h 30min	1h 41 min	3h 15min	2h 57min	2h 04min	3h 15min	2h 56min
<b>Availability of Inputs</b>									
Observed pupil-teacher ratio	21.5	<b>42.1</b>	39.3	21.4	34.0	40.6	74.0	31.4	53.9
Textbook availability (% pupils)	33.7	<b>37.2</b>	44.5	68.1	Not Comparable	25.9	Not Comparable	76.0	6.0
Equipment availability (% classrooms)	48.2	<b>57.8</b>	74.3	76.8	Not Comparable	62.4	Not Comparable	24.3	79.5
Minimum infrastructure availability (% schools)	13.4	<b>36.2</b>	60.2	29.1	Not Comparable	36.0	Not Comparable	14.4	57.2
<b>Pupil Learning</b>									
Language and mathematics test score (out of 100)	25.1	<b>45.4</b>	69.4	20.8	Not Comparable	49.2	Not Comparable	38.1	45.3
Language test score (out of 100)	23.3	<b>44.8</b>	72.5	18.7	Not Comparable	47.9	Not Comparable	36.9	43.4
Mathematics test score (out of 100)	28.2	<b>45.2</b>	57.4	25.1	Not Comparable	57.5	Not Comparable	41.3	41.7

Notes: a. Values for Nigeria are the weighted average of the four states surveyed, namely Anambra, Bauchi, Ekiti, and Niger.

b. These numbers reflect the updated SDI methodology. More information can be found on [www.SDIndicators.org](http://www.SDIndicators.org).

c. Full definitions of indicators in Annex C.

## I. INTRODUCTION

Nigeria's vision 20:2020 aims to put Nigeria among the top 20 global economies by 2020. Despite the country's decent GDP growth of at least six percent per annum since 2008, two fundamental questions have to be asked concerning the country's economic aspirations: "Does Nigeria have the pre-requisite human resources to become one of the top 20 global economies?"; and "Has the country been investing in human development to produce workers capable of competing in the global economy and meeting the demands of a vibrant private sector?"

This is pertinent because empirical evidence shows that increased level of human capital stock was a major contributing factor to the economic development of countries with which Nigeria seeks to compete. (Benhabib and Spiegel 1994, Wang and Yao 2003). With adult literacy rates of at least 90 percent among the BRICS countries in 2010, for example, human capital in these competing countries is indeed very high.

Yet evidence from household surveys shows that Nigeria has a long way to go in building a healthy and highly skilled workforce. Adult literacy in Nigeria was estimated at 61 percent in 2010. This is not changing for the future generation as only 61 percent of grade three pupils tested in 2010/11 could read and write (NBS, 2012), while gross enrollment in secondary education is just 44 percent (WDI, 2012).

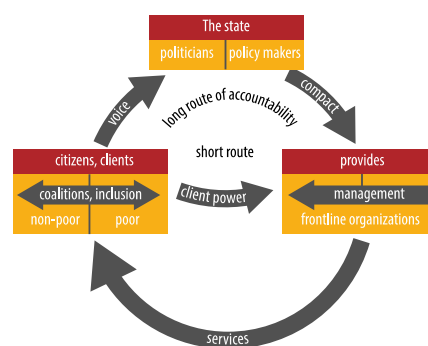
These poor human development outcomes partly reflect a weak link between public expenditure and outcomes. While a funding gap exists, more could have been achieved with existing resources. There have been significant increases in funding for education in Nigeria, boosted by the creation of the Universal Basic Education Intervention Fund in 2005 and the Virtual Poverty Fund in 2006, but as the household surveys show, learning outcomes remain low. This suggests that increased funding by itself is clearly not a panacea. Rather, improved efficiency in service delivery sectors is required for Nigeria to attain the human capital required to achieve its long term economic aspirations. This in turn requires a more targeted focus on results and accountability in spending in the education and health sectors, in particular, and service provision sectors in general.

This report presents the findings from the implementation of the first Service Delivery Indicator (SDI) survey in Nigeria. A unique feature of the SDI survey is that it looks at the production of education services at the frontline. The production of education services requires three dimensions of service delivery: (i) providers who exert the necessary effort in applying their knowledge and skills; (ii) providers who are skilled; and (iii) the availability of key inputs such as equipment and infrastructure. Successful service delivery requires that all these elements are present in the same school and at the same time. While many data sources provide information on the average availability of these elements across the education sector, the SDI survey allows for the assessment of how these elements come together to produce quality education services in the same place at the same time.

## Box 1. Analytical Underpinnings

Service delivery outcomes are determined by the relationships of accountability between policymakers, service providers, and citizens (Figure 1, World Bank 2004). Human development outcomes are the result of the interaction between various actors in the multi-step service delivery system, and depend on the characteristics and behavior of individuals and households. While delivery of quality education is contingent foremost on what happens in classrooms, a combination of several basic elements have to be present in order for quality services to be accessible and produced by teachers at the frontline, which depend on the overall service delivery system and supply chain. Adequate financing, infrastructure, human resources, material, and equipment need to be made available, while the institutions and governance structure provide incentives for the service providers to perform.

**Figure 1. Relationships of accountability between citizens, service providers, and policymakers**



### Service Delivery Production Function

Consider a service delivery production function,  $f$ , which maps physical inputs,  $x$ , the effort put in by the service provider,  $e$ , as well as his/her type (or knowledge),  $\theta$ , to deliver quality services into individual level outcomes,  $y$ . The effort variable,  $e$ , could be thought of as multidimensional and, thus, include effort (broadly defined) of other actors in the service delivery system. We can think of this type as the characteristic (knowledge) of the individuals who are selected for a specific task. Of course, as noted above, outcomes of this production process are not just affected by the service delivery unit, but also by the actions and behaviors of households, which we denote by  $\varepsilon$ . We can therefore write:

$$y = f(x, e, \theta) + \varepsilon$$

To assess the quality of services provided, one should ideally measure  $f(x, e, \theta)$ . Of course, it is notoriously difficult to measure all the arguments that enter the production, and would involve a huge data collection effort. A more feasible approach is, therefore, to focus instead on proxies of the arguments which, to a first-order approximation, have the largest effects.

### Indicator Categories and the Selection Criteria

There are a host of data sets available in education. To a large extent, these data sets measure inputs and outcomes/outputs in the service delivery process, mostly from a household perspective. While providing a wealth of information, existing data sources (like Living Standards Measurement Survey (LSMS), Welfare Monitoring Surveys (WMS), and Core Welfare Indicators Questionnaire Survey (CWIQ)) cover only a sub-sample of countries and are, in many cases, outdated.

### Box 1. Analytical Underpinnings (cont'd)

The proposed choice of indicators takes its starting point from the recent literature on the economics of education and service delivery, more generally. Overall, this literature stresses the importance of provider behavior and competence in the delivery of health and education services (as opposed to water and sanitation services and housing that rely on very different service delivery models). Conditional on service providers exerting effort, there is also some evidence that the provision of physical resources and infrastructure has important effects on the quality of service delivery.

The somewhat weak relationship between resources and outcomes documented in the literature has been associated with deficiencies in the incentive structure of school and education systems. Indeed, most service delivery systems in developing countries present frontline providers with a set of incentives that negate the impact of pure resource-based policies. Therefore, while resources alone appear to have a limited impact on the quality of education and health in developing countries, it is possible inputs are complementary to changes in incentives, so coupling improvements in both may have large and significant impacts (Hanushek, 2006). As noted by Duflo, Dupas, and Kremer (2011), the fact that budgets have not kept pace with enrollment, leading to large pupil-teacher ratios, overstretched physical infrastructure, and insufficient number of textbooks, etc., is problematic. However, simply increasing the level of resources might not address the quality deficit in education and health without also taking providers' incentives into account.

SDI proposes three sets of indicators: (i) provider effort; (ii) knowledge of service providers and (iii) availability of key infrastructure and inputs at the frontline service provider level. Providing countries with detailed and comparable data on these important dimensions of service delivery is one of the main innovations of the Service Delivery Indicators.

Additional considerations in the selection of indicators are (i) quantitative (to avoid problems of perception biases that limit both cross-country and longitudinal comparisons), (ii) ordinal in nature (to allow within and cross-country comparisons); (iii) robust (in the sense that the methodology used to construct the indicators can be verified and replicated); (iv) actionable; and (v) cost effective to collect.

**Table 4. Education indicators**

---

**Teacher Effort**

School absence rate

Classroom absence rate

Time spent teaching per day

**Teacher Knowledge and Ability**

Minimum knowledge in mathematics

Minimum knowledge in English

Minimum knowledge in pedagogy

**Availability of Inputs**

Minimum infrastructure availability

Minimum equipment availability

Share of pupils with textbooks

Observed pupil-teacher ratio

---

## **Box 2. The Service Delivery Indicators (SDI) Program**

A significant share of public spending on education is transformed to produce good schooling outcomes at schools. Understanding what takes place at these frontline service provision centers is the starting point in establishing where the relationship between public expenditure and outcomes is weak within the service delivery chain. Knowing whether spending is translating into inputs that teachers have to work with (e.g., textbooks in schools), or how much work effort is exerted by teachers (e.g., how likely are they to come to work), and their competency would reveal the weak links in the service delivery chain. Reliable and complete information on these measures is lacking, in general.

To date, there is no robust, standardized set of indicators to measure the quality of services as experienced by the citizen in Africa. Existing indicators tend to be fragmented and focus either on final outcomes or inputs, rather than on the underlying systems that help generate the outcomes or make use of the inputs. In fact, no set of indicators is available for measuring constraints associated with service delivery and the behavior of frontline providers, both of which have a direct impact on the quality of services that citizens are able to access. Without consistent and accurate information on the quality of services, it is difficult for citizens or politicians (the principal) to assess how service providers (the agent) are performing and to take corrective action.

The SDI provides a set of metrics to benchmark the performance of schools and health clinics in Africa. The Indicators can be used to track progress within and across countries over time, and aim to enhance active monitoring of service delivery to increase public accountability and good governance. Ultimately, the goal of this effort is to help policymakers, citizens, service providers, donors, and other stakeholders enhance the quality of services and improve development outcomes.

The perspective adopted by the Indicators is that of citizens accessing a service. The Indicators can thus be viewed as a service delivery report card on education and health care. However, instead of using citizens' perceptions to assess performance, the Indicators assemble objective and quantitative information from a survey of frontline service delivery units, using modules from the Public Expenditure Tracking Survey (PETS), Quantitative Service Delivery Survey (QSDS), and Staff Absence Survey (SAS).

The literature points to the importance of the functioning of schools and more generally, the quality of service delivery. The service delivery literature is, however, clear that, conditional on providers being appropriately skilled and exerting the necessary effort, increased resource flows for health can indeed have beneficial education outcomes.

The SDI initiative is a partnership of the World Bank, the African Economic Research Consortium (AERC), and the African Development Bank to develop and institutionalize the collection of a set of indicators that would gauge the quality of service delivery within and across countries and over time. The ultimate goal is to sharply increase accountability for service delivery across Africa, by offering important advocacy tools for citizens, governments, and donors alike; to work toward the end goal of achieving rapid improvements in the responsiveness and effectiveness of service delivery.

More information on the SDI survey instruments and data, and more generally on the SDI initiative can be found at: [www.SDIndicators.org](http://www.SDIndicators.org) and [www.worldbank.org/SDI](http://www.worldbank.org/SDI), or by contacting [SDI@worldbank.org](mailto:SDI@worldbank.org).



## II. METHODOLOGY AND IMPLEMENTATION

The Indicators draw information from a stratified random sample of 760 public and private schools and provide a representative snapshot of the learning environment in both public and private schools. The details on the sampling procedure are in Annex A. The SDI education survey in Nigeria was implemented as part of the dialogue with the Government of Nigeria on improving public expenditure management and spending for results. As part of this process, the World Bank and other partners supported the Government of Nigeria's efforts to undertake an education sector Public Expenditure Tracking and Service Delivery Survey. A validation process took place in Nigeria and involved consultations with Government on survey design and process, pre-testing, and adaptation of survey instruments. Survey training and field work took place in 2013.

Table 5 provides details of the sample for the Service Delivery Indicators. In total, 760 primary schools were surveyed, including 2,434 primary school teacher skills assessments, absence rates among 5,754 teachers, and 760 grade four lessons observed. In addition, learning outcomes were measured for 6,644 grade four pupils. The results presented here reflect weighted means using sampling weight.

**Table 5. Education SDI sample in Nigeria**

Variable	Sample	
	Total	Share of Total
Ownership		
Public	478	62.9
Private	282	37.1
Location		
Rural	474	62.4
Urban	286	37.6
Urban public	131	27.4
Rural public	347	72.6
Teachers	5,754	
Pupils	6,644	

Note: Different weights were applied where the unit of analysis was facilities and where unit of analysis was teachers or pupils.

### Survey Instruments and Survey Implementation

The survey used a sector-specific questionnaire (Table 6) with all modules administered at the school level. The questionnaires built on previous similar questionnaires based on international good practice for PETS, QSDS, SAS, and observational surveys.

**Table 6. Education SDI survey instrument**

Module	Description
<b>Module 1:</b> School Information	Administered to the head of the school to collect information about school type, facilities, school governance, pupil numbers and school hours. Includes direct observations of school infrastructure by enumerators.
<b>Module 2a:</b> Teacher Absence & Info	Administered to head teacher and individual teachers to obtain a list of all school teachers, to measure teacher absence and to collect information about teacher characteristics.
<b>Module 2b:</b> Teacher Absence & Info	Unannounced visit to the school to assess absence rate.
<b>Module 3:</b> School Finances	Administered to the head teacher to collect information about school finances.
<b>Module 4:</b> Classroom Observation	An observation module to assess teaching activities and classroom conditions.
<b>Module 5:</b> Pupil Assessment	A test of pupils to have a measure of pupil learning outcomes in mathematics and language in grade four.
<b>Module 6:</b> Teacher Assessment	A test of teachers covering mathematics and language subject knowledge and teaching skills.

### III. RESULTS

#### A. Teacher effort

The indicators relating to teacher effort (*School absence rate*, *Classroom absence rate* and *Time spent teaching per day*) are presented in Table 7 and Figure 4.

**Table 7. Teacher Effort**

	All	Public	Private	Percent Difference (%)	Urban Public	Rural Public	Percent Difference (%)
School absence rate (% teachers)	13.7	16.9	5.5	207.5***	10.7	18.7	-42.9***
Classroom absence rate (% teachers)	19.1	22.8	9.5	140.9***	14.8	25.1	-40.9***
Time spent teaching per day	3h 26min	3h 10min	4h 23min	-27.7***	3h 36min	3h 05min	16.6**
<i>Scheduled teaching time per day</i> <sup>3</sup>	4h 53min	4h 44min	5h 24min	-12.3***	4h 52min	4h 43min	3.4***

Note: The results are based on observations from 5,754 teachers in 760 schools. See Table C 6 for more detail on the differences in means between private and public (urban and rural) schools.

#### *School absence rate*

##### **Methodological Note**

School absence rate is measured as the share of teachers who are absent from school at the time of an unannounced visit. It is measured in the following way: During the first announced visit, a maximum of ten teachers are randomly selected from the list of all teachers (excludes volunteer and part time teachers) who are on the school roster. The whereabouts of these ten teachers are then verified in the second, unannounced, visit. Teachers found anywhere on the school premises are marked as present.

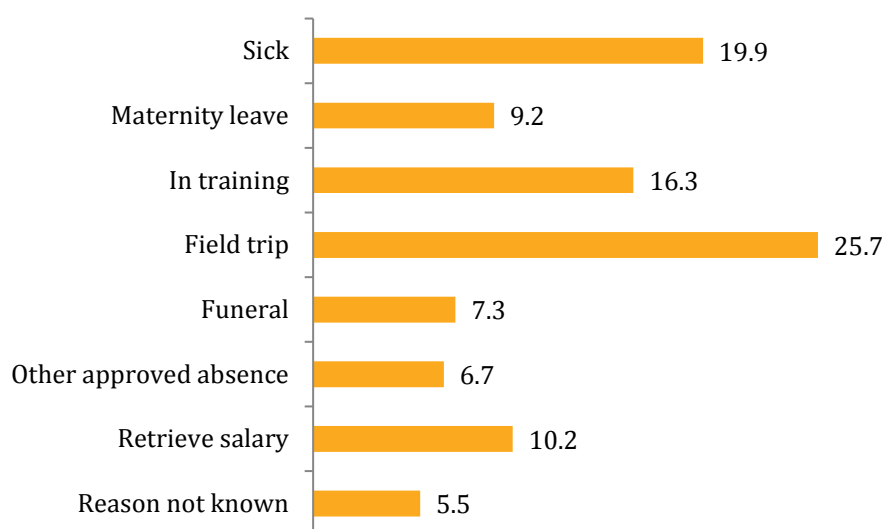
*School absence rate* at the national level is relatively low (Figure 4) compared to other SDI countries (Table 3). The results are uniform across public urban and rural schools, but not across public and private providers. Private schools present with significantly lower school absence rates. When looking at absence from the school by state, the results are heterogeneous (Table C 6). While Anambra and Ekiti had levels of teacher absence at less than 10 percent, Niger and Bauchi had more than twice as much. For each state results regarding private versus public absence showed similar patterns, with the exception of Ekiti, where public school teachers had lower levels of school absence, compared to private school teachers. Regarding urban and rural, results are again heterogeneous. While the levels are similar between urban and rural for Ekiti and Niger, rural schools have higher absence rates in Bauchi and Anambra as compared to rural ones.

<sup>3</sup> *Scheduled teaching time per day* is not an SDI indicator; it is reported in the table for comparison purposes.

Table C 7 reports simple correlations to explore how teacher absence is related to teacher characteristics.<sup>4</sup> (Table C 8 to Table C 11 show the correlations broken down by state). Age, gender, seniority, experience, and level of education have some predictive power: female teachers, older teachers, teachers with more seniority, and those with more education were significantly less likely to be absent.<sup>5</sup>

More than 80 percent of the absence was management-approved, bringing into question how well the time of teachers was being managed by the school leadership. Field trips, training, and retrieving salaries accounted for half of the absence rate (Figure 2). While individually these are valid, too much and poorly managed excused absences add up to a third of classrooms being unattended (see later section). This represents a large inefficiency as a significant amount of staff time is lost, but still paid for.

**Figure 2. Reasons for absence (percent)**



### *Classroom absence rate*

#### **Methodological Note**

Classroom absence rate is measured as the share of teachers not in the classroom at the time of an unannounced visit. The indicator is constructed in the same way as the school absence rate indicator, with the exception that the numerator now is the number of teachers who are either absent from school, or present at school but absent from the classroom.

Comparing *school absence rate* and *classroom absence rate*, the latter appears to be the bigger problem. There are small differences between urban and rural schools in classroom absence rates. There are, however, large differences in classroom absence between private and public schools. A public school teacher is almost 14 percentage points, or twice, as likely to be absent from the classroom than a private school teacher (Table 7). There was significant variation in classroom absence across schools; specifically, across the four states, about two thirds teachers are in class teaching. However, a full one third of these teachers are either not in class or are in class, but not teaching (Figure 3). When comparing states (Figure C 1), it is apparent that the average is being

<sup>4</sup> The correlations are based on simple bivariate regressions of the absence indicators on each of the reported correlates and a constant.

<sup>5</sup> For a more formal analysis of which factors predict absence rate from school and classrooms, see Filmer et al., *The missing link. Why increasing resources alone will not amount to higher learning in Sub-Saharan Africa*. Unpublished manuscript, (2014).

negatively affected by Bauchi, where almost one out of two teachers are not in class or in class, but not teaching.

As shown in Table C 6, Niger presents a similar pattern to the aggregate estimates. In Bauchi, however, the main leakage in terms of teacher time actually takes place inside the school. While school absence was 27 percent, once at the school, 48 percent of teachers were absent from the classroom. Bauchi clearly stands out when compared to the other states in both levels and patterns of absence. For instance, rural teachers were more likely to be absent from the classroom than their urban counterparts. Three out of 10 teachers were found outside the classroom or outside the school in urban public schools compared to five out of 10 in rural schools. Finally, in Ekiti, while class absence rates were relatively low, the survey found again that private sector teachers were more likely to be absent from class.

Table C 7, column two, shows the correlates of *classroom absence*. In sum, younger, male teachers with less education, training, and experience were significantly more likely to be absent.<sup>6</sup> Absence rates were also more likely among teachers who taught higher grades.

#### *Time spent teaching per day*

##### **Methodological Note**

Time spent teaching per day reflects the typical time that teachers spend teaching on an average day. This indicator combines data from the staff roster module (used to measure absence rate), the classroom observation module, and reported teaching hours. The teaching time is adjusted for the time teachers are absent from the classroom, on average, and for the time the teacher teaches while in classroom based on classroom observations. While inside the classroom distinction is made between teaching and non-teaching activities.

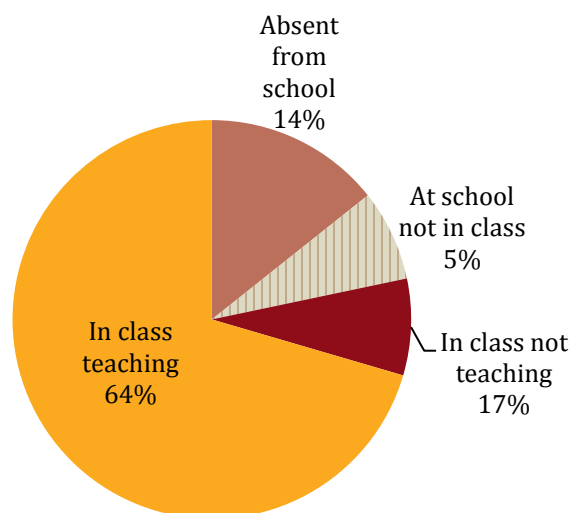
Teaching is defined very broadly, including actively interacting with pupils, correcting or grading pupil's work, asking questions, testing, using the blackboard or having pupils working on a specific task, drilling or memorization. Non-teaching activities include working on private matters, maintaining discipline in class or doing nothing and thus leaving pupils not paying attention.

This indicator measures the amount of time a teacher spends teaching during a normal day. The scheduled teaching time for grade four pupils is 4 hours 53 minutes in Nigeria (taking into account break times) (Table 7). It was found that teachers taught for less than two thirds of the scheduled time. Figure 3 shows how teachers use the teaching time allocated to them on a regular day.<sup>7</sup> The main leakage comes from teachers being absent from school. Across states, the percentage of time devoted to teaching ranges from 91 percent in Anambra, to 89 percent in Ekiti, to 82 percent in Niger and 59 percent in Bauchi (Table C 13). The scheduled time teaching is lower in Bauchi and Niger compared to Anambra and Ekiti.

<sup>6</sup> For a more formal analysis of which factors predict absence rate from school and class, see Filmer et al., *The missing link. Why increasing resources alone will not amount to higher learning in Sub-Sahara Africa*. Unpublished manuscript, (2014).

<sup>7</sup> For the figures we only take into account the sample of schools where all the components of the teacher time per day are not missing.

**Figure 3. Composition of teaching time spent per day**



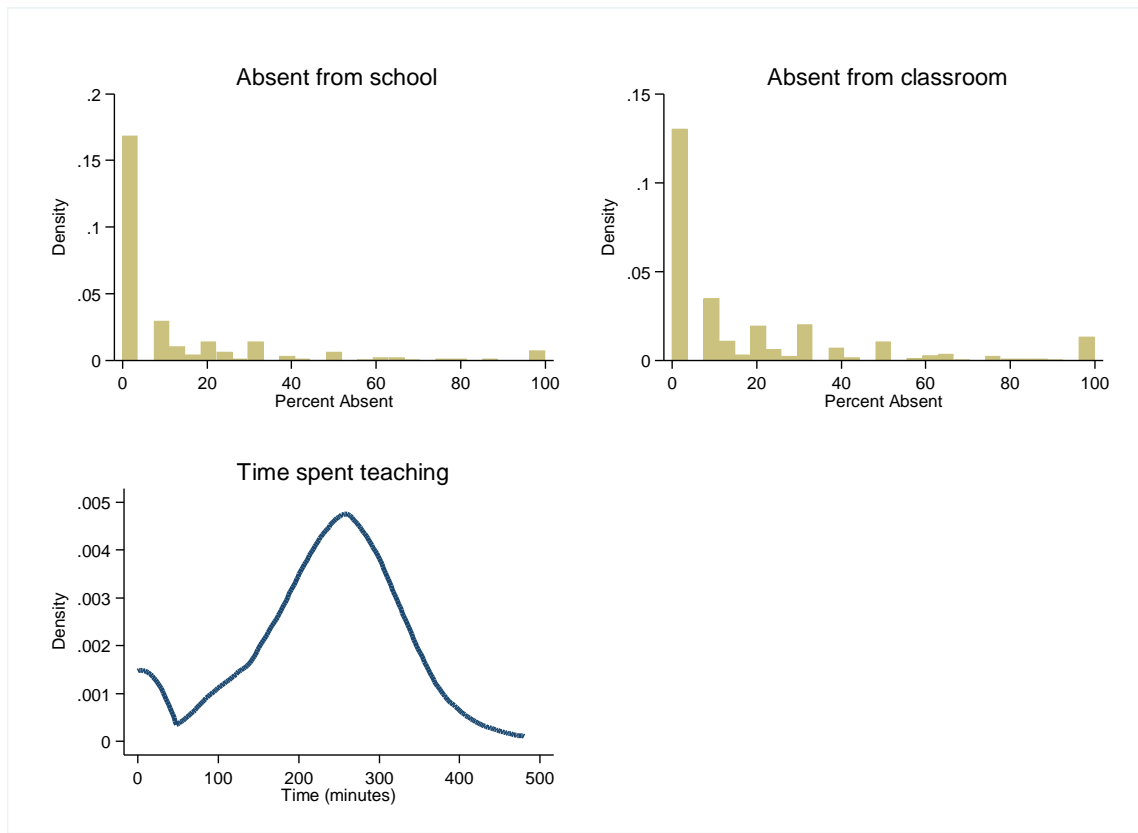
*Note:* Teachers *Absent from school* and those *At school, not in class* are added up and measured by the indicator *Absence from class*, 21.5 (Table 7).

Table C 12 also shows that there is a difference between public and private schools and the difference is dependent on the state. In all states, except Bauchi, private schools have longer scheduled teaching time per day (Table C 13). In total, about 23 percent of classrooms were orphaned<sup>8</sup> (more than twice as many in public than in private schools) (Table C 12). Public rural schools present the highest percentage of orphaned classrooms (28 percent), 10 percentage points higher than urban schools. When looking at the data disaggregated by state (Table C 13), Anambra and Ekiti present relatively lower levels of orphaned classrooms (5.9 percent and 7.4 percent, respectively). In the case of Bauchi and Niger the numbers are substantially higher (49 percent and 22 percent, respectively). In both cases, while there are no significant differences between urban or rural schools, private schools are more likely to have lower levels of orphaned classrooms, though it is not statistically significant in the case of Bauchi.

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<sup>8</sup> This is measured by inspecting the school premises, counting the number of classrooms with pupils, and recording whether a teacher is present in the classroom or not. The share of orphaned classrooms is then calculated by dividing the number of classrooms with pupils but no teacher by the total number of classrooms that contained pupils.

**Figure 4. Distribution of the effort indicators<sup>9</sup>**



## **B. Teacher competence**

### *Minimum knowledge*

#### **Methodological Note**

Minimum knowledge is measured as the percentage of teachers who can master the curriculum they taught. It is based on a mathematics and language tests covering the primary curriculum administered at the school level and is calculated as the percentage of teachers who score more than 80% on the language and mathematics portion of the test. The test is given to all mathematics or language teachers that taught 3rd grade last year or 4th grade in the year the survey was conducted.

The objective of the teacher test is to examine whether teachers have the basic reading and writing skills of English teachers and arithmetic skills of mathematics teachers that lower primary pupils need to have to progress further with their education. This is interpreted as the *minimum knowledge*

<sup>9</sup> Definition of “density”: In probability theory, a probability density function (PDF), or density of a continuous random variable, is a function that describes the relative likelihood for this random variable to take on a given value. The probability of the random variable falling within a particular range of values is given by the integral of this variable’s density over that range—that is, it is given by the area under the density function but above the horizontal axis and between the lowest and greatest values of the range. The probability density function is nonnegative everywhere, and its integral over the entire space is equal to one.”([http://en.wikipedia.org/wiki/Probability\\_density\\_function](http://en.wikipedia.org/wiki/Probability_density_function)).

required for the teacher to be effective. Note that the test was validated against the Nigerian primary curriculum, as well as 12 other Sub-Saharan curricula.<sup>10</sup>

### Box 3. Assessment of teacher knowledge

Teachers were assessed for their mastery of the primary school level English and mathematics curriculum, on one hand, and teaching skills, on the other. To test for teacher knowledge in mathematics and English, teachers were given an indirect test. The test involved asking teachers to mark standardized tasks done by a pupil and suggest a correct answer whenever they indicated the pupil gave the wrong answer. Thus, they were assessed on their ability to identify and suggest a correct answer. The pupil tasks that teachers were asked to mark covered various topics, giving a complete picture of the assessed teachers' mastery of the curriculum.

The test for teaching skills asked teachers to perform tasks they are expected to do to enhance pupil learning, like preparing a lesson plan, evaluating pupils, and tracking progress in pupil performance. For example, teachers were presented with a short story about accidents and asked to prepare a lesson on the reasons road accidents happen and the consequences. Among other things, they were then asked to i) specify the learning objectives of the lesson; ii) suggest questions they would ask to determine that pupils understood the lesson and can apply what they have learnt; and iii) write points of arguments for group activities. To test their ability to compare and evaluate pupil performance, teachers were presented with compositions written by two pupils and asked to identify the strengths and weaknesses of each pupil.

Content knowledge among teachers was extremely low. In fact, less than four (3.7) percent of teachers scored more than 80 percent on the test (Table 8 and Table C 14). While there is a significant percent difference (69 percent) between public and private school teachers, levels of content knowledge are disappointingly low in both sectors (2.4 percent versus 7.7 percent). When looking at the data by state (Table C 15), there is also a high degree of heterogeneity. In Anambra and Ekiti, about seven to eight percent of teachers score above 80 percent on the mathematics and English tests, while in Bauchi and Niger less than two percent score at that level.

Table 8 details the average score on the test and shows the sensitivity of the *Minimum knowledge* indicator to different cut-offs (i.e. requiring a score of 100 percent, 90 percent, and 70 percent). The results are sensitive to the choice of threshold, with less than one percent (0.6) of the teachers viewed as having minimum knowledge when the indicator is calculated as more than 90 percent on the English and mathematics test, and 10.5 percent of the teachers are viewed as having minimum knowledge when the threshold is 70 percent. The average score on content knowledge was 32.9 percent indicating that pedagogy among teachers is especially weak. Table C 15 sheds further light on the minimum knowledge indicator.

There is wide variation in the distribution of the test variables (Figure 5), especially for pedagogical knowledge which is low among teachers with the maximum score, collapsed at the school level, standing at 60 percent.

Again, the results show high heterogeneity among states (Table C 15). While in Anambra and Ekiti, the range goes from one to two percent (cut-off value at 90 percent) to 20 percent (cut-off value at 70 percent). In Bauchi and Niger, the range goes from less than one percent (cut-off value at 90 percent) to five percent (cut-off value at 70 percent).

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<sup>10</sup> See "Teaching Standards and Curriculum Review", prepared as background document for the SDI by David Johnson, Andrew Cunningham, and Rachel Dowling.



**Table 8. Teacher assessment**

	All	Public	Private	Percent Difference (%)	Urban Public	Rural Public	Percent Difference (%)
Minimum knowledge (% teachers)	3.7	2.4	7.7	-69.4***	2.8	2.3	21.2
<i>Average score</i>							
English, mathematics, pedagogy ( <i>out of 100</i> )	32.9	30.5	40.4	-24.5***	37.8	29.1	30.1***
English and mathematics ( <i>out of 100</i> )	43.6	41.0	51.2	-19.9***	49.2	39.5	24.7***
<i>Difference in thresholds</i>							
Minimum knowledge: 100%	0.1	0.0	0.4	-91.2	0.2	0.0	n/a
Minimum knowledge: 90%	0.6	0.3	1.3	-74.5*	0.6	0.3	124.2
Minimum knowledge: 80%	3.7	2.4	7.7	-69.4***	2.8	2.3	131.3**
Minimum knowledge: 70%	10.5	8.1	17.8	-54.7***	15.5	6.7	131.3**
Observations	1345	777	568		166	611	

Note: The results are based on observations from 2,434 teachers in 760 schools (2,001 teachers either teach English or both English and mathematics and 2,010 teachers teach either mathematics or both English and mathematics. See Table C 14 and Table C 15 for more detailed breakdown and differences in means between private and public (urban and rural) schools. "n/a" means not applicable. Level of significance: \*\*\* p < 0.01; \*\* p < 0.05; p < 0.1.

## C. Test scores

### Methodological Note

Test score is measured as the overall score of a language, mathematics and pedagogy tests covering the primary curriculum administered at the school level to all mathematics and language teachers that taught 3<sup>rd</sup> grade last year or 4th grade in the year the survey was conducted.

### English

Table 9 presents the average score on the English section of the test, as well as a detailed analysis of particular questions. The average score on the English section was 46.3 percent indicating that teachers master less than half of the subject matter in the lower primary curriculum. Across states (Table C 16), in Anambra and Ekiti, teachers averaged between 54 – 59 percent on the English section compared to about 40 percent in Bauchi and Niger.

It is noticeable that in the public sector, teachers in urban schools outperformed rural school teachers on every section of the test (Table 9). Across states, however, the results differ. In Anambra (Table C 16), there is no statistical significant difference between private and public school teachers, with private school teachers scoring slightly higher than public school teachers. The same is true for Ekiti for all exercises, except the composition task, in which Ekiti public teachers outperformed private teachers. In Bauchi, private teachers scored consistently above public ones except for the cloze task in which Bauchi public school teachers scored better than private ones. Finally, in Niger, private school teachers outsourced public ones in all tasks of the exam.

**Table 9. Teacher English assessment**

(Out of 100)	All	Public	Private	Percent Difference (%)	Urban Public	Rural Public	Percent Difference (%)
<b>English (complete test)</b>	<b>46.3</b>	<b>44.0</b>	<b>52.8</b>	<b>-16.6***</b>	<b>49.8</b>	<b>42.9</b>	<b>15.9**</b>
Grammar	60.5	57.8	68.1	-15.2***	65.3	56.4	15.8***
Cloze task	35.8	33.9	41.1	-17.4***	37.8	33.2	13.9**
Composition	19.7	17.2	27.2	-37.0***	26.3	15.5	70.2***
Observations	1,345	777	568		166	611	

Note: Level of significance: \*\*\* p < 0.01; \*\* p < 0.05; \* p < 0.1.

### *Mathematics*

Table 10 and Table C 17 present the average score on the mathematics section of the test, as well as a detailed analysis of particular questions. The average score on the mathematics section was 36.8 percent. Again, private school teachers outperformed public school teachers, both overall (a significant difference of more than 10 percentage points) and on all individual questions. In the public sector, teachers in urban schools also tend to perform better than teachers in rural schools, with differences ranging from two percentage points to almost 20 points. As in the English test, teachers in Anambra and Ekiti outperformed teachers in Bauchi and Niger with significant differences across states (Table C 17).

Looking at the details of the test (Table 10), between 14-39 percent of teachers could not perform fairly simple tasks (all part of the grade four pupils' curriculum), such as subtracting double digit numbers. On more complicated tasks, less than 15 percent of teachers can compare fractions with different denominators. Again, as shown in Table C 17, while in Anambra and Bauchi, there are no significant differences between public and private school teachers, in Ekiti and Niger, there are differences. Ekiti public school teachers outperform private school teachers in almost every task, while in Niger, it is the reverse.

**Table 10. Teacher mathematics assessment**

(Out of 100)	All	Public	Private	Percent Difference (%)	Urban Public	Rural Public	Percent Difference (%)
<b>Mathematics (complete test)</b>	<b>36.8</b>	<b>34.2</b>	<b>44.8</b>	<b>-23.6***</b>	<b>46.8</b>	<b>32.0</b>	<b>46.4***</b>
Adding double digit numbers	86.1	84.5	91.7	-7.9**	86.7	83.8	3.5
Subtracting double digit numbers	61.1	58.6	68.5	-14.4**	71.0	56.3	26.2**
Adding triple digit numbers	71.8	70.0	77.1	-9.2**	80.1	68.1	17.7**
Multiplying two digit numbers	52.3	49.4	60.8	-18.6***	64.9	46.5	39.7***
Adding decimals	26.9	23.8	36.2	-34.5***	37.7	21.1	78.7***
Comparing fractions	13.3	12.2	16.7	-26.8**	22.5	10.4	117.0***
Time (reading a clock)	29.0	25.6	39.3	-35.0***	30.4	24.6	23.5
Interpreting a Venn diagram	32.5	29.9	40.6	-26.3***	47.7	26.8	78.3***
Interpreting data on a graph	16.2	13.5	24.5	-44.8***	22.5	11.9	88.9**
Square root (no remainder)	46.2	42.5	57.1	-25.5***	65.3	38.2	71.2***
Subtraction of numbers with decimals	41.3	38.6	49.4	-22.0***	58.2	34.8	67.3***
Division of fractions	16.8	15.4	21.0	-26.9**	24.2	13.7	77.2***
One variable algebra	12.9	11.4	17.6	-35.4**	18.0	10.1	78.4**

Note: Level of significance: \*\*\* p < 0.01; \*\* p < 0.05; \* p < 0.1.

### *Pedagogy*

The overall score on the pedagogy section was 15.3 percent with little difference between basic and more advanced questions (Table 11). That is, on average, teachers only managed about 1/6 of the tasks on the pedagogic test. Pedagogical skills were weaker in public schools, as well as in schools located in rural areas. Table C 18 provides a breakdown of the pedagogy results by state. The low scores on the pedagogy section, combined with the performance on the curriculum content, imply that teachers know little more than their pupils and what they know, they cannot teach adequately.

**Table 11. Teacher pedagogy assessment**

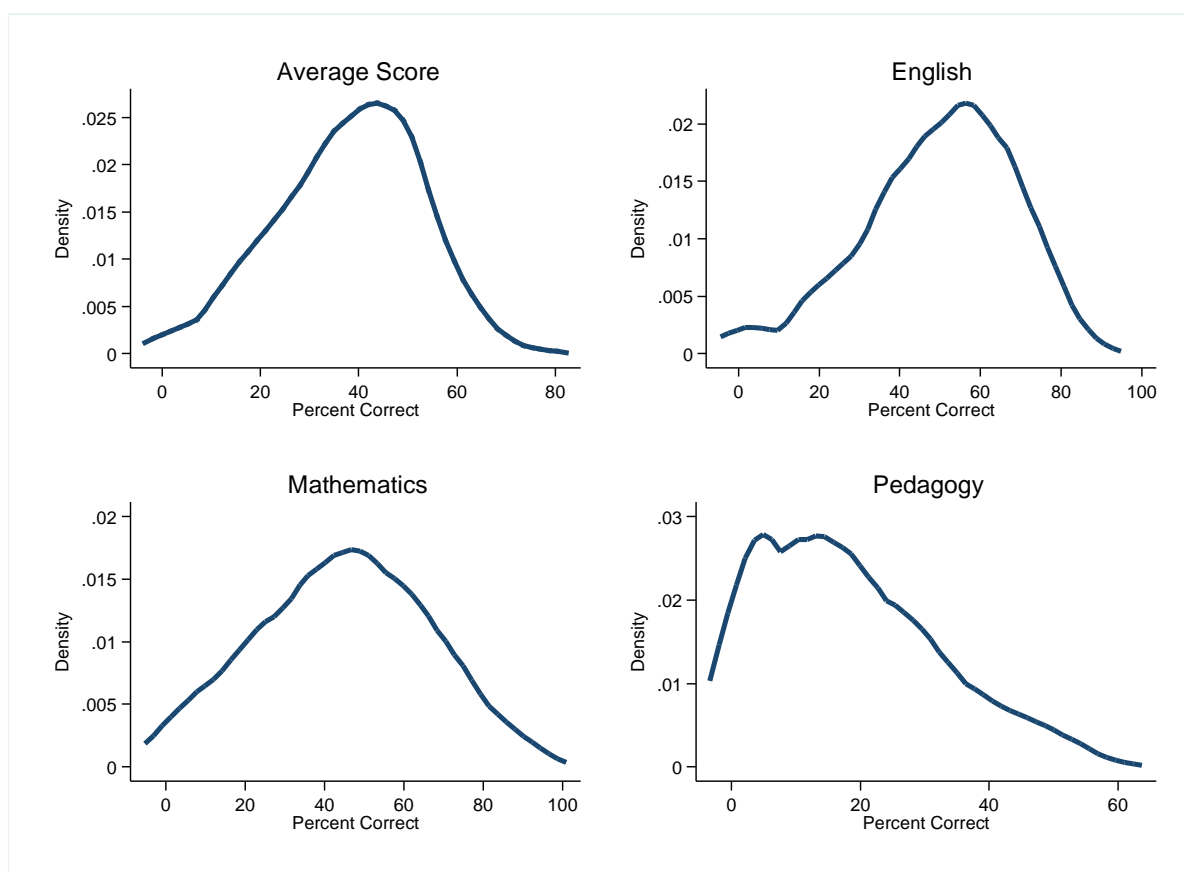
(Out of 100)	All	Public	Private	Percent Difference (%)	Urban Public	Rural Public	Percent Difference (%)
<b>Pedagogy (complete test)</b>	<b>15.3</b>	<b>13.0</b>	<b>22.3</b>	<b>-41.8***</b>	<b>19.7</b>	<b>11.7</b>	<b>68.7***</b>
Basic pedagogy section	14.4	12.0	21.7	-44.5***	18.9	10.7	75.9***
Advanced pedagogy section	16.4	14.1	23.1	-38.8***	20.8	12.9	61.7***
Preparing a lesson plan	17.5	15.2	24.5	-37.9***	21.1	14.1	49.9**
Assessing children's abilities	19.0	15.8	30.0	-47.3***	21.3	14.1	51.1**
Evaluating pupils' progress	5.8	5.1	8.1	-37.0***	12.5	3.7	240.4**

Note: Level of significance: \*\*\* p < 0.01; \*\* p < 0.05; \* p < 0.1.

## Correlates of teacher knowledge

Table C 19 presents correlates of teacher knowledge and teacher characteristics (Table C 20 - Table C 23). When pooling the observations across states, we observe that the teachers more likely to have higher scores were: older teachers, women, more experienced teachers, those who taught higher grades, and those who had more education and training. Similarly, teachers who did not have permanent contracts were more likely to have higher scores.<sup>11</sup> More information on teacher characteristics are presented in Table C 24 - Table C 28 in the annex.

**Figure 5. Distribution of the teacher test scores**



## D. Availability of inputs

The indicators *minimum infrastructure availability*, *minimum resource availability*, *share of pupils with textbooks*, and *observed pupil-teacher ratio* were all constructed using data collected through visual inspections of a grade four classroom and the school premises in each primary school. Below we discuss each indicator in some more detail. Table 12 summarizes the findings.

<sup>11</sup> For a more formal assessment of this relationship please see Filmer et al., *The missing link. Why increasing resources alone will not amount to higher learning in Sub-Saharan Africa*. Unpublished manuscript, (2014).

**Table 12. School indicators**

	All	Public	Private	Percent Difference (%)	Urban Public	Rural Public	Percent Difference (%)
<b>Minimum equipment availability (% classrooms)</b>	<b>54.8</b>	<b>48.2</b>	<b>78.3</b>	<b>-38.4***</b>	<b>51.8</b>	<b>47.5</b>	<b>8.9</b>
Pupils with pens/pencils (% pupils)	86.2	84.1	93.8	-10.3***	83.3	84.2	-1.1
Pupils with notebook/paper (% pupils)	38.2	33.7	54.6	-38.3***	54.9	29.3	87.4***
Have black board (% schools)	95.2	94.8	96.4	-1.7	100.0	93.8	6.6***
Chalk (% schools)	90.8	89.4	95.7	-6.5**	98.7	87.6	12.7**
Sufficient contrast to read board (% schools)	88.7	87.7	92.3	-5.0*	87.3	87.8	-0.5
<b>Minimum infrastructure availability (% schools)</b>	<b>18.5</b>	<b>13.4</b>	<b>36.6</b>	<b>-63.4***</b>	<b>26.7</b>	<b>10.8</b>	<b>147.8**</b>
Visibility (% schools)	81.7	80.5	86.0	-6.5*	82.2	80.1	2.5
Toilet clean (% schools)	27.4	20.3	51.9	-61.0***	35.9	18.1	97.7***
Toilet private (% schools)	44.4	38.2	65.7	-41.9***	57.3	35.6	61.1***
Toilet accessible (% schools)	38.3	31.1	62.6	-50.4***	46.2	29.1	58.87***
Toilet functioning, accessible (% schools)	19.4	14.1	39.6	-64.4***	22.5	11.6	94.0**
<b>Observed pupil-teacher ratio</b>	<b>21.6</b>	<b>21.5</b>	<b>22.1</b>	<b>-2.5</b>	<b>27.3</b>	<b>20.4</b>	<b>34.1***</b>
<b>Textbook availability (% pupils)</b>	<b>38.2</b>	<b>33.7</b>	<b>54.6</b>	<b>-38.3***</b>	<b>54.9</b>	<b>29.3</b>	<b>87.4***</b>
Textbook availability (% pupils) (mathematics)	33.6	29.3	50.2	-41.8***	45.2	25.4	77.9**
Textbook availability (% pupils) (English)	38.1	33.8	53.1	-36.3***	42.2	31.8	33.0

Note: Level of significance: \*\*\* p < 0.01; \*\* p < 0.05; \* p < 0.1.

### *Minimum infrastructure availability*

#### **Methodological Note**

*Minimum infrastructure availability* is a binary indicator capturing the availability of: (i) functioning toilets and (ii) classroom visibility. Functioning toilets is defined as whether toilets were functioning, accessible, clean and private (enclosed and with gender separation) as verified by an enumerator. To verify classroom visibility we randomly selected one 4th grade classroom in which the enumerator placed a printout on the board and checked whether it was possible to read the printout from the back of the classroom.

*Share of pupils with textbooks* reflects the typical ratio in pupil to textbooks in a 4th grade classroom. It is measured as the number of pupils with the relevant textbooks (language or mathematics conditional on which randomly selected class is observed) in one randomly selected 4th grade class and divided by the number of pupils in that classroom.

*Observed pupil-teacher ratio* reflects the typical ratio of pupils to teachers in a 4th grade classroom. It is measured as the number of pupils in one randomly selected 4th grade class at the school.

Lack of proper infrastructure is evidenced in the sample. When looking at functioning toilets, it was observed that less than half of the toilets in the schools are clean (27.4 percent), private (44.4 percent), or accessible (38.3 percent) (Table 12).

When disaggregating the sample by state (Table C 29), we find that schools in Anambra, in particular, have higher percentages on all sub-indicators, with one in every two toilets being clean and accessible and over 70 percent being private. Private schools in Anambra scored better than public ones in having clean and accessible toilets. Ekiti schools came second in terms of toilet cleanliness and accessibility with a score close to 40 percent. Bauchi and Niger, again, lag far behind with the binding constraint being the cleanliness of the toilets (13 percent and 19 percent, respectively). Private schools in these two states outsourced public ones in all subcomponents.

Table 12 reports the *share of pupils with textbooks* broken down by subject area (English and mathematics). Overall, only 33.6 percent of pupils have the mathematics textbook and 38.1 percent, the English one. In public schools, there are significantly fewer pupils with the proper textbook. The distribution of textbooks is clearly bi-modal (Figure 6). On one extreme, in 10 percent of the schools, pupils did not have to share textbooks. At the other extreme, less than one in five pupils had a textbook (roughly five percent of schools).

The *observed pupil-teacher ratio* stood at 21.6. There were no significant differences between private and public schools, with public school classes (at 21.5) having almost the same ratio as private school classes (at 22.1). Urban schools tended to have larger class sizes (27.3) compared to rural schools (20.4) but the numbers in urban schools were lower relative to similar countries in the regions for which we had comparable data. More importantly, there is large variation in the pupil-teacher ratios across Nigerian schools, with some teachers having to teach 50 pupils or more while others have just a couple of pupils. It is also noteworthy that by using administrative enrollment, the average pupil-teacher ratio of 39 percent for grade four suggests either inflated enrollment numbers, serious pupils' absence rate, or dropout.

When looking at state data (Table C 29), all states had relatively low levels of pupil-teacher ratios with Ekiti having the lowest level at 15 and Niger having the highest ratio with 24. Private schools had more pupils per classroom than public schools in Anambra and Bauchi, while the opposite was true in Ekiti. Private and public schools had similar pupil-teacher ratios in Niger. Urban schools tended to have higher ratios than rural ones.

### *Minimum equipment availability*

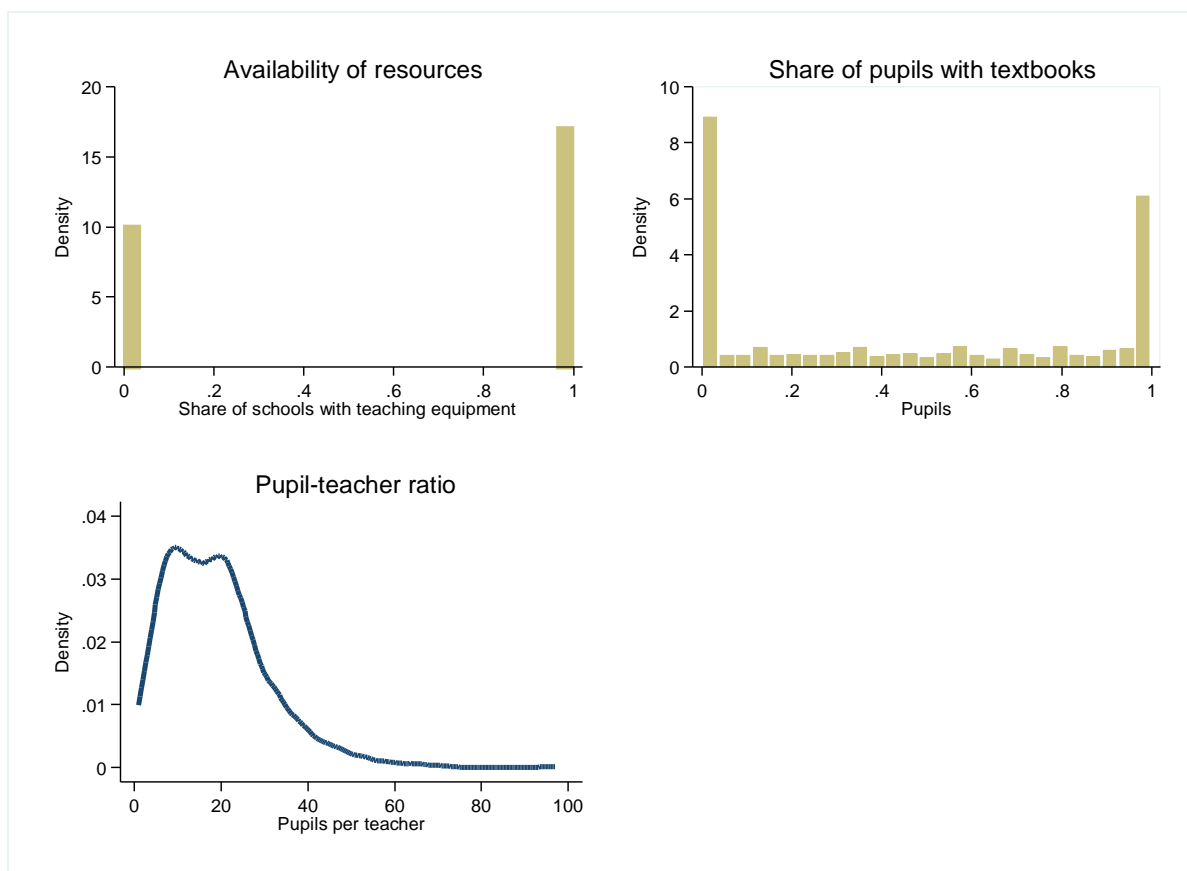
#### **Methodological Note**

*Minimum equipment availability* is a binary indicator capturing the availability of: (i) functioning blackboard and chalk and (ii) pens, pencils and exercise books in 4<sup>th</sup> grade classrooms. In one randomly selected 4th grade classroom in the school the enumerator assessed if there was a functioning blackboard by looking at whether text written on the blackboard could be read at the front and back of the classroom, and whether there was chalk available to write on the blackboard. We considered that the classroom met the minimum requirement of pens, pencils and exercise books if both the share of pupils with pen or pencils and the share of pupils with exercise books were above 90%.

The mean outcome for all but one sub-indicator was high in both public and private schools, and there was little variation (Figure 6). The main constraint, as shown in Table 12, was that only 38.2 percent of pupils had exercise books (or paper) to write on while in class. Private schools had better access to teaching resources compared to public schools. Regarding exercise books, the difference is 22 percentage points. Thus, overall, the lack of teaching equipment (blackboard, chalk, and pens or pencils for pupils) did not appear to be a binding constraint for providing high quality teaching in most schools.

When looking across states in regards to the *minimum equipment availability* indicator (Table C 29), Anambra and Ekiti performed better than Bauchi and Niger. Both states averaged above 90 percent on each sub-indicator, except in Ekiti where the pupils with pencils/pens sub indicator was 87 percent, and presented no significant difference between private and public or urban and rural. Bauchi and Niger also performed well, with no significant difference between public and private or urban and rural. Bauchi scored between 74 percent and 92 percent on all sub-indicators while Niger scored between 83 percent and 96 percent.

**Figure 6. Distribution of the input indicators**



## IV. Assessment of pupil learning

The overall results for the English and mathematics scores are reported in Table 13 and Table C 30. Overall, pupils answered 32.2 percent of questions on the test correctly.<sup>12</sup> The average score in English was 31.4 percent and the average score in mathematics was 31.9 percent. The average score on the non-verbal reasoning part was 50.2 percent. Anambra (Table C 31) lead the ranking of the highest average score with 59.4 percent, followed by Ekiti (Table C 33) with 54 percent, then Niger (Table C 34) with 23 percent, and finally, Bauchi (Table C 32) with 19.8 percent.

**Table 13. Pupil performance metrics**

(Out of 100)	All	Public	Private	Percent Difference (%)	Urban Public	Rural Public	Percent Difference (%)
<b>Overall pupil test score</b>	<b>32.2</b>	<b>25.1</b>	<b>61.0</b>	<b>-58.9***</b>	<b>39.7</b>	<b>22.1</b>	<b>80.2***</b>
<b>Literacy score</b>	<b>31.4</b>	<b>23.3</b>	<b>64.1</b>	<b>-63.6***</b>	<b>40.1</b>	<b>19.8</b>	<b>102.1***</b>
Read letter	57.7	50.1	88.1	-43.1***	72.1	45.5	58.4***
Identify basic words	29.6	20.9	64.7	-67.8***	38.8	17.1	126.6***
Read simple sentence	26.2	18.4	57.5	-68.0***	27.9	16.4	69.7***
Read paragraph	11.7	5.8	35.2	-83.5***	15.2	3.9	293.8***
Reading comprehension score	15.8	9.5	41.5	-77.2***	21.4	7.0	205.1***
<b>Numeracy score</b>	<b>31.9</b>	<b>28.2</b>	<b>46.8</b>	<b>-39.8***</b>	<b>34.7</b>	<b>26.8</b>	<b>29.6***</b>
Single-digit addition	56.8	51.2	79.0	-35.2***	68.4	47.7	43.5***
Double-digit addition	35.6	29.6	60.0	-50.7***	46.2	26.1	77.1***
Single-digit subtraction	50.2	45.1	70.7	-36.2***	55.0	43.1	27.6***
Double-digit subtraction	22.4	18.3	38.8	-52.9***	23.1	17.3	33.6**
Single-digit multiplication	21.7	17.7	38.0	-53.5***	21.8	16.8	29.5**
Double-digit multiplication	4.4	3.0	10.1	-70.6***	1.3	3.3	-61.6*
Single-digit division	21.1	17.7	34.7	-48.9***	14.2	18.5	-22.9**
<b>Non-verbal reasoning score</b>	<b>50.2</b>	<b>47.7</b>	<b>60.0</b>	<b>-20.4***</b>	<b>53.5</b>	<b>46.6</b>	<b>14.9***</b>

Note: The results are based on 6,644 pupils in 760 schools. Level of significance: \*\*\* p < 0.01; \*\* p < 0.05; \* p < 0.1.

Figure 7 reveals the distribution in pupil test scores, which clearly shows that pupils in private schools outperformed those in public schools. In all components that make up the overall test scores, pupils in public schools have scores that are consistently skewed toward the lower end while the scores for private school pupils are skewed toward the upper end (Figure 7).

Looking at Table 13 and Table C 30, scores in private schools were significantly higher than in public, both in English and mathematics (64.1 and 46.8 percent, respectively). Non-verbal reasoning ability was also twelve percentage points higher, giving some indication that there may be some selection on ability into private schools (though these results have to be interpreted with caution as non-verbal reasoning may not necessarily be immutable by schooling). While the mean score is an important statistic, it is also an estimate that by itself is not easy to interpret. Table C 35 and Table C 40 depict a breakdown of the results. Less than half of the pupils manage the simplest tasks (i.e., recognize a simple word) (Table C 35). Moreover, less than 30 (26.2) percent can read all 10 words of a sentence correctly and only 11.7 percent can read all words in a simple paragraph. Given this, it is not surprising that only 15.8 percent of the pupils could answer a factual question about the text and a question about the meaning of the passage. Again the results differed substantially by state. While almost 92 percent of pupils in Anambra (Table C 36) can read a letter, that number could be as low as

<sup>12</sup> The total score is calculated by weighting the English and mathematics section equally.



34 percent in Bauchi (Table C 37). Pupils in private schools outperformed those in public ones in all states.

#### **Box 4: Background on the SDI pupil assessment**

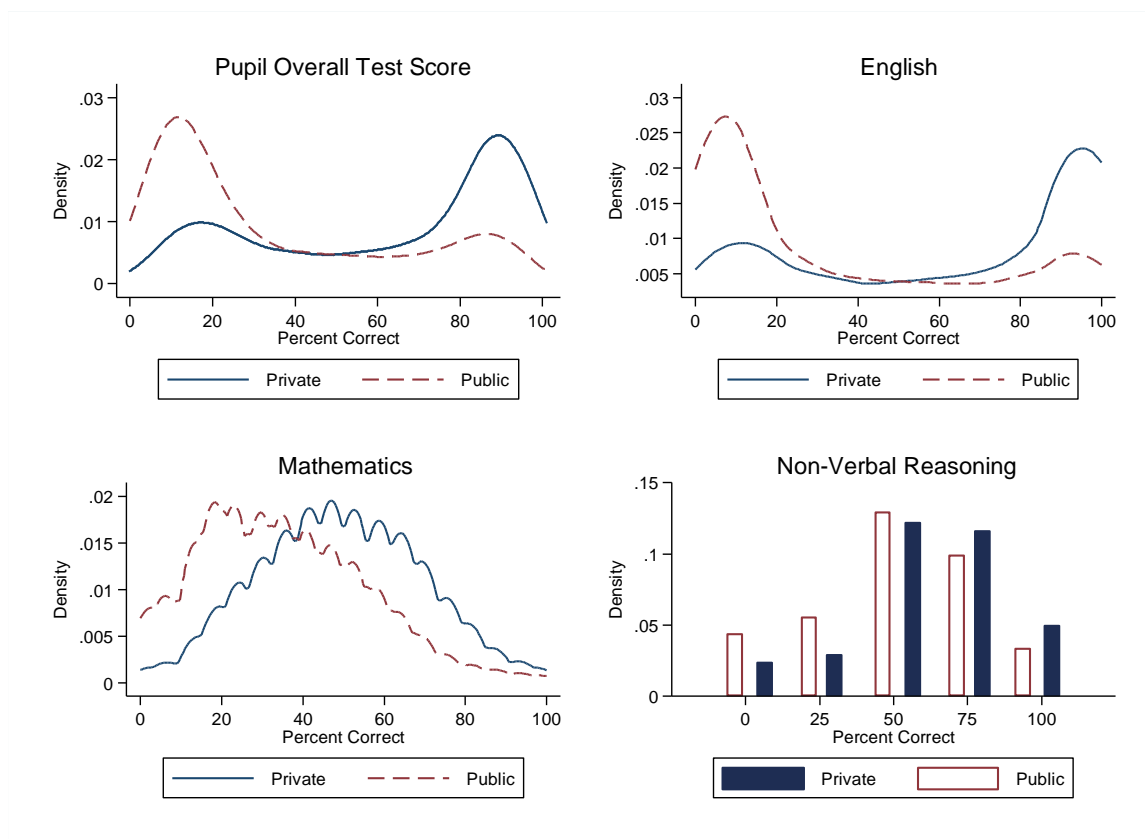
It is instructive to think of the Service Delivery Indicators as measuring key inputs, with a focus on what teachers do and know, in an education production function. These inputs are actionable and they are collected using objective and observational methods at the school level. The outcome in such an education production function is pupil learning achievement. While learning outcomes capture both school-specific inputs (e.g., the quality and effort exerted by the teachers) and various child-specific factors (e.g., innate ability) and household-specific factors (e.g., the demand for education), and thus provide, at best, reduced form evidence on service provision, it is still an important measure to identify gaps and to track progress in the sector. Moreover, while the Service Delivery Indicators measure inputs -- and learning outcomes are not part of the Indicators -- in the final instance we should be interested in inputs not in and of themselves, but only in as far as they deliver the outcomes we care about. Therefore, as part of the collection of the Service Delivery Indicators in each country, learning outcomes are measured for grade four pupils.

The objective of the pupil assessment was to measure basic reading, writing, and arithmetic skills. The test was designed by experts in international pedagogy and based on a review of primary curriculum materials from 13 African countries (For details on the design of the test, see Johnson, Cunningham and Dowling (2012) "Draft Final Report, Teaching Standards and Curriculum Review"). The pupil assessment also measured nonverbal reasoning skills on the basis of Raven's matrices, a standard IQ measure that is designed to be valid across different cultures. This measure complements the pupil test scores in language and mathematics and can be used as a rough measure to control for innate pupil ability when comparing outcomes across different schools. Thus, the pupil assessment consisted of three parts: language, mathematics and non-verbal reasoning (NVR).

The test, using material up to the grade three level was administered to grade four pupils. The reason for choosing pupils in grade four is threefold. First, there is scant information on achievement in lower grades. SACMEQ, for example, tests pupils in grades six. Uwezo is a recent initiative that aims to provide information on pupils' learning irrespective of whether they are enrolled in school or not and tests all children under the age of 16 on grade two material. While this initiative has provided very interesting results, it is not possible to link pupil achievement to school level data, since the survey is done at the household level. Second, the sample of children in school becomes more and more self-selective as one goes higher up due to high drop-out rates. Finally, there is growing evidence that cognitive ability is most malleable at younger ages. It is therefore especially important to get a snapshot of pupil learning and the quality of teaching provided at younger ages.

The test was designed as a one-on-one test with enumerators reading out instructions to pupils in their mother tongue. This was done to build up a differentiated picture of pupils' cognitive skills; i.e. oral one-to-one testing allows us to evaluate whether a child can solve a mathematics problem even when his/her reading ability is so low that he/she would not be able to attempt the problem independently. The language test consisted of a number of different tasks ranging from testing knowledge of the alphabet, to word recognition, to a more challenging reading comprehension test. Altogether, the test included six tasks. The mathematics test also consisted of a number of different tasks ranging from identifying and sequencing numbers, to addition of one- to three-digit numbers, to one- and two-digit subtraction, to single digit multiplication and divisions. The mathematics test included six tasks and a total of 17 questions. The non-verbal reasoning section consisted of four questions.

**Figure 7. Pupil evaluation distribution by section and school ownership**



On the mathematics side (Table C 40), scores are on average low and vary significantly by state. Half of the pupils did not feel comfortable with single digit number operations, and struggled when it came to double and triple digit operations. Only 4.4 percent could multiply double digits and only 12.0 percent could divide double digits. It is also notable that pupils struggled with questions that required number operations as part of a problem-solving task.

Overall, there is high heterogeneity across states. While Anambra and Ekiti (Table C 41 and Table C 43, respectively) are on the 30-36 percent range, Bauchi and Niger (Table C 42 and Table C 44, respectively) present very poor results, with an average below 18 percent. In Bauchi (Table C 42), only 17.9 percent of pupils can order numbers and, in Niger (Table C 44), less than half of the pupils could add single digits. Even for Anambra and Ekiti (Table C 41 and Table C 43, respectively), the scores reveal important areas of the lower primary curriculum that pupils in grade four have not yet mastered, number recognition was extremely low, 0.7 percent in Anambra and 1.5 percent in Ekiti. The complete 9x9 multiplication table is intended to be taught by grade three; simple division is also in the curriculum. It does not speak well of the match between curriculum goals and pupil achievement that only 21.7 percent and 21.1 percent of the pupils in the sample, respectively, are able to do single digit multiplication and division – tasks taught in grade three – when tested halfway through grade four (Table C 40).

Urban boys and urban girls scored better overall (47.6 percent and 50.5 percent, respectively) than rural boys and rural girls (26.2 percent and 30.3 percent, respectively) (Table 14). The difference between urban boys and urban girls and between rural boys and rural girls is not significant. This performance gap is even larger when comparing scores in the English section. Urban boys and girls (48.7 percent and 52.4 percent, respectively) score nearly two times higher than rural boys and girls

(24.2 percent and 29.4 percent, respectively). Looking at the breakdown of gender and school ownership (Table 15) girls in private schools have the highest scores (63.7 percent) followed by boys in private schools (58.4 percent). This trend continues in the public sector, where girls outperform boys, as well (26.1 percent and 24.4 percent, respectively).

**Table 14. Pupil assessment: gender and location breakdowns**

(Out of 100)	All	Urban boys	Rural boys	Percent Difference (%)	Urban girls	Percent Difference (%)	Rural girls	Percent Difference (%)	Percent Difference (%)
<b>Overall</b>	32.2	47.6	26.2	82.1***	50.5	-5.7	30.3	-13.6***	66.9***
<b>English</b>	31.4	48.7	24.2	100.1***	52.4	-7.1	29.4	-17.2***	78.3***
<b>Mathematics</b>	31.9	40.0	29.5	35.4***	40.6	-1.4	29.9	-1.4	35.4***
<b>Non-verbal reasoning</b>	50.2	58.0	48.2	20.1***	53.9	7.6	49.2	-1.8	9.6*

Note: The results are based on 6,644 pupils in 760 schools. The difference in the first column is between urban and rural boys relative to rural boys; the second difference is between urban boys and urban girls relative to urban girls; the third difference is between urban boys and rural girls relative to rural girls; and the final difference compares urban to rural girls relative to rural girls. Level of significance: \*\*\* p < 0.01; \*\* p < 0.05; \* p < 0.1.

**Table 15. Pupil assessment: gender and school ownership breakdowns**

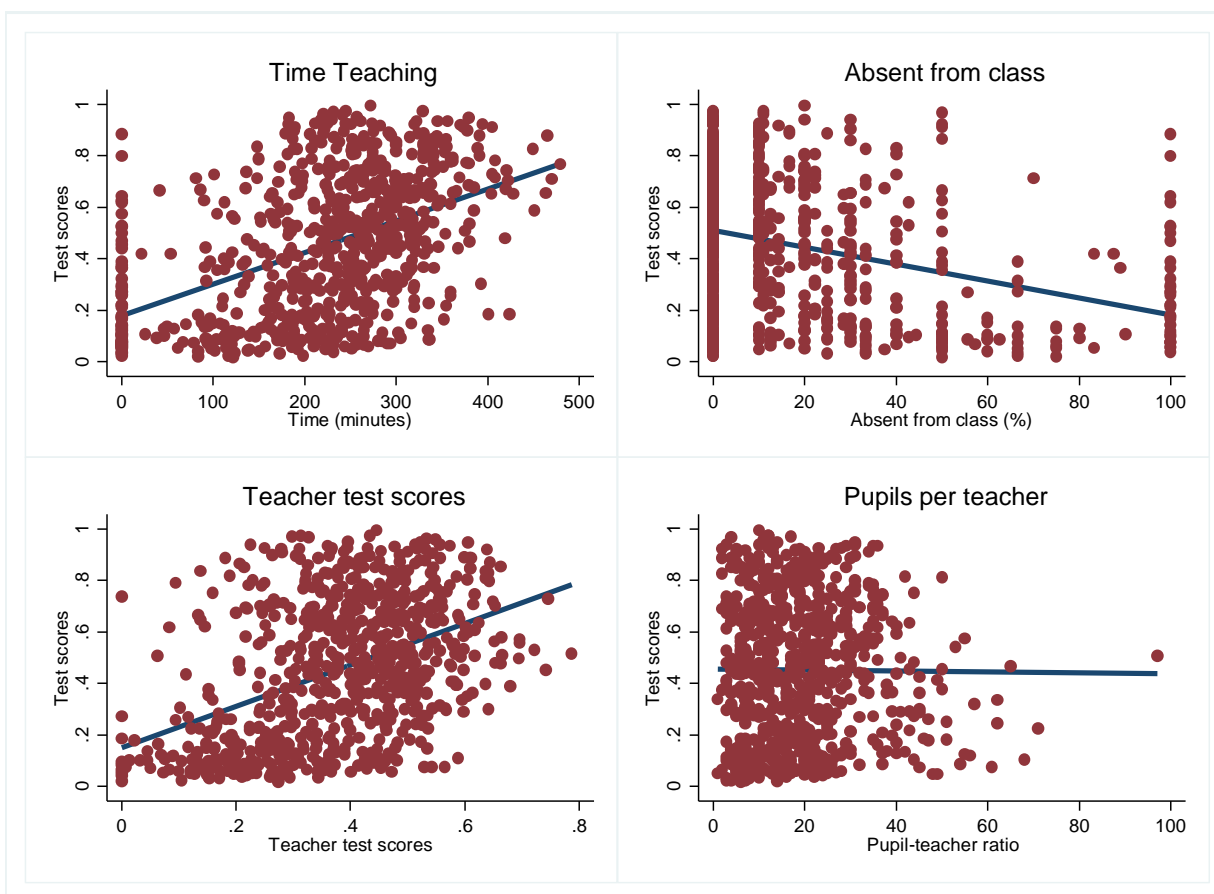
(Out of 100)	All	Public boys	Private boys	Percent Difference (%)	Public girls	Percent Difference (%)	Private girls	Percent Difference (%)	Percent Difference (%)
<b>Overall</b>	32.2	24.4	58.4	139.5***	26.1	-8.4***	63.7	-6.5	144.5***
<b>English</b>	31.4	22.3	61.0	173.7***	24.7	-9.1***	67.2	-9.8*	171.8***
<b>Mathematics</b>	31.9	28.7	45.2	57.9***	27.5	-6.4**	48.3	4.3	75.8***
<b>Non-verbal reasoning</b>	50.2	48.0	60.3	25.6***	47.4	1.0	59.7	1.4	26.0***

Note: The results are based on 6,644 pupils in 760 schools. The difference in the first column is between public and private boys relative to private boys; the second difference is between public boys and public girls relative to public girls; the third difference is between public boys and private girls relative to private girls; and the final difference compares public to private girls relative to private girls. Level of significance: \*\*\* p < 0.01; \*\* p < 0.05; \* p < 0.1.

## Correlations between indicators and outcomes

The Service Delivery Indicators are measuring key inputs, with an emphasis on what teachers do and know, in an education production function, and the outcome of this function is pupil learning achievement. With outcome data in education, we can also check whether our input measures are in some ways related to outcomes. Of course, these are mere correlations that do not prove causality. Nevertheless, the focus on SDI only makes sense if they answer the question of how to improve outcomes. Therefore, it is interesting to examine how the Service Delivery Indicators correlate with educational achievement. The patterns in the data remain broadly the same. As depicted in Figure 8, absence rates are negatively correlated with pupil test scores. Similarly, the more time teachers spend teaching and the higher their assessment scores, the better pupils perform on their tests. There appears to be no relationship between class size and test scores. For more information on the correlations between SDI and pupil test scores, see Table C 45 - Table C 49 in the annex.

**Figure 8. Correlations between indicators and learning (pupil test scores)**



Note: The graphs show the scatter plots (dots) and the predicted OLS relationship (solid line) for various indicators and pupil test scores in public schools.

## **V. Comparison of SDI results across countries**

In the area of teacher effort, both school absence rate and classroom absence rate are the lowest compared to the other countries where SDI was implemented, 16.9 percent and 22.8 percent respectively, only Tanzania, 2014 has a lower school absence rate, 15.3 percent. Similarly, teaching time is the second highest, 3 hours 10 minutes, after Senegal and Togo, 3 hours 15 minutes. Minimum knowledge among teachers is quite low (2.4 percent), with only Togo and Mozambique scoring lower (0.9 and 0.3 respectively) (Table 3 and Table 16).

Nigeria's pupil-teacher ratio is among the lowest (22:1), along with Mozambique, compared to the other countries. The percentage of pupils with textbooks is significantly worse than other countries (33.7 percent) with only Uganda and Tanzania, 2014 scoring lower (6.0 and 25.9 percent respectively). Infrastructure availability is only 13.4 percent, once again, the lowest.

## **VI. What does this mean for Nigeria?**

Almost every report on Nigeria's economic prospects calls for improvements in the effectiveness of Nigeria's education system. Today about 36 million pupils are of primary school-going age and that cohort will account for half of the next decade's youth bulge. Whether that cohort is educated or not will determine whether Nigeria will experience the education dividend required for Vision 20:2020, Nigeria's blueprint for economic and human development. Education is one of the single most powerful predictors of social mobility. Quality of education will also determine if the promise of 20:2020 will be shared by the 46 percent of the population who lives below the national poverty line (World Development Indicators, World Bank).

There is a disconnect between Nigeria's spending on education and learning outcomes. While there may be some shortfalls in education spending, the gaps in performance can be only partly explained by a lack of resources. The SDI results point to three gaps, which require urgent action: teacher knowledge, time spent teaching, and absence from the classroom.

Furthermore, the results should not be viewed narrowly as a criticism of teachers, but as a snapshot of the state of the education system as a whole, reflecting management weaknesses, undue non-teaching tasks imposed on teachers, amongst others. Over time, as the impact of reforms is tracked through repeated surveys in the country, the indicators will allow for tracking of efforts to improve service delivery systems.

Finally, improvements in service quality in Nigeria can be accelerated through focused investments on reforms to incentives given to providers, and in the skills of providers to ensure that inputs and skills come together at the same time and in the same place. This will be critical to ensure that Nigeria's gains in human development outcomes continue beyond 2015, bringing the country closer to achieving the promises set out in Vision 20:2020.

**Table 16. SDI-At-a glance**

<b>Public schools only</b>	<b>Nigeria<sup>a</sup> 2013</b>	<b>Average SDI</b>	<b>Kenya 2012</b>	<b>Mozambique 2014</b>	<b>Senegal 2011</b>	<b>Tanzania 2014</b>	<b>Tanzania 2011</b>	<b>Togo 2013</b>	<b>Uganda 2013</b>
<b>Teacher Ability</b>									
Minimum knowledge (% teachers )	2.4	<b>12.7</b>	34.8	0.3	Not Comparable	15.6	Not Comparable	0.9	10.1
Test score (out of 100)	30.5	<b>42.0</b>	55.6	26.9	Not Comparable	46.6	Not Comparable	33.9	43.3
<b>Teacher Effort</b>									
School absence rate (% teachers)	16.9	<b>20.1</b>	15.2	44.8	18.0	15.3	23.0	22.6	29.9
Classroom absence rate (% teachers)	22.8	<b>42.1</b>	47.3	56.2	29.0	46.7	53.0	39.3	56.9
<i>Scheduled teaching time</i>	<i>4h 44min</i>	<b>5h 31min</b>	<i>5h 31min</i>	<i>4h 17min</i>	<i>4h 36min</i>	<i>5h 54min</i>	<i>5h 12min</i>	<i>5h 28min</i>	<i>7h 13min</i>
Time spent teaching per day	3h 10min	<b>2h 53min</b>	2h 30min	1h 41 min	3h 15min	2h 57min	2h 04min	3h 15min	2h 56min
<b>Availability of Inputs</b>									
Observed pupil-teacher ratio	21.6	<b>42.1</b>	39.3	21.4	34.0	40.6	74.0	31.4	53.9
Textbook availability (% pupils)	33.7	<b>37.2</b>	44.5	68.1	Not Comparable	25.9	Not Comparable	76.0	6.0
Equipment availability (% classrooms)	48.2	<b>57.8</b>	74.3	76.8	Not Comparable	62.4	Not Comparable	24.3	79.5
Minimum infrastructure availability (% schools)	13.4	<b>36.2</b>	60.2	29.1	Not Comparable	36.0	Not Comparable	14.4	57.2
<b>Pupil Learning</b>									
Language and mathematics test score (out of 100)	25.1	<b>45.4</b>	69.4	20.8	Not Comparable	49.2	Not Comparable	38.1	45.3
Language test score (out of 100)	23.3	<b>44.8</b>	72.5	18.7	Not Comparable	47.9	Not Comparable	36.9	43.4
Mathematics test score (out of 100)	28.2	<b>45.2</b>	57.4	25.1	Not Comparable	57.5	Not Comparable	41.3	41.7

Notes: a. Values for Nigeria are the weighted average of the four states surveyed, namely Anambra, Bauchi, Ekiti, and Niger.

b. These numbers reflect the updated SDI methodology. More information can be found on [www.SDIIndicators.org](http://www.SDIIndicators.org).

c. Full definitions of indicators in Annex C.

## **VII. ANNEXES**

**Annex A. Sampling strategy**

**Annex B. Definition of indicators**

**Annex C. Additional Results**

## ANNEX A. SAMPLING STRATEGY

The sampling strategy was designed aiming to produce state representative estimates and estimating a proportion with an absolute error of three percentage points for a variable proportion of 0.5 (i.e., has highest variance) with 95 percent degree of confidence per state (equal number used for state).

The strata were constructed according to ownership, urban/rural, and socioeconomic poverty status. The allocation was made in proportion to size for each sub-stratum within public and private. Within strata, simple random sampling was used. Finally, replacement schools were preselected, with a predetermined replacement order within strata.

A total of 190 schools were sampled from each state and the distribution per states by school type is shown in Table A 1. The sample comes from four states in Nigeria: Anambra, Bauchi, Ekiti, and Niger.

The target population in the education survey is all public primary-level school children. Since parts of the school questionnaire were administered to teachers and pupils at the grade four level, all public schools with at least one grade four class formed the sampling frame. The sample frame was created using the list of public schools from UBEC (Universal Basic Education Commission) and private schools from states.

**Table A 1. Sample distribution**

	Urban	Rural	Semi-urban	Public	NGO/FBO	Private for profit	Community
<b>Anambra</b>	30	114	37	113	18	45	14
<b>Bauchi</b>	25	145	20	115	21	45	6
<b>Ekiti</b>	36	101	53	113	2	75	0
<b>Niger</b>	55	111	24	116	9	65	0
<b>Total</b>	<b>155</b>	<b>471</b>	<b>130</b>	<b>457</b>	<b>50</b>	<b>230</b>	<b>20</b>



## ANNEX B. DEFINITION OF INDICATORS

<b>School absence rate</b>	
Share of a maximum of 10 randomly selected teachers absent from school during an unannounced visit	It is measured as the share of teachers who are absent from school at a time of an unannounced visit. It is measured in the following way: During the first announced visit, a maximum of ten teachers are randomly selected from the list of all teachers (excludes volunteer and part time teachers) who are on the school roster. The whereabouts of these ten teachers are then verified in the second, unannounced, visit. Teachers found anywhere on the school premises are marked as present.
<b>Classroom absence rate</b>	
Share of teachers who are present in the classroom during scheduled teaching hours as observed during an unannounced visit	The indicator is measured as the share of teachers not in the classroom at the time of an unannounced visit. The indicator is constructed in the same way as school absence rate indicator, with the exception that the numerator now is the number of teachers who are either absent from school, or present at school but absent from the classroom.
<b>Time spent teaching per day</b>	
Amount of time a teacher spends teaching during a school day	<p>This indicator reflects the typical time that teachers spends teaching on an average day. This indicator combines data from the staff roster module (used to measure absence rate), the classroom observation module, and reported teaching hours. The teaching time is adjusted for the time teachers are absent from the classroom, on average, and for the time the teacher teaches while in classrooms based on classroom observations. While inside the classroom distinction is made between teaching and non-teaching activities.</p> <p>Teaching is defined very broadly, including actively interacting with students, correcting or grading student's work, asking questions, testing, using the blackboard or having students working on a specific task, drilling or memorization. Non-teaching activities includes working on private matters, maintaining discipline in class or doing nothing and thus leaving students not paying attention.</p>
<b>Minimum knowledge</b>	
Share of teachers with minimum knowledge	It is measured as the percentage of teachers who can master the curriculum they taught. It is based on a mathematics and language tests covering the primary curriculum administered at the school and is calculated as the percentage of teacher who score more than 80% on the language and mathematics portion of the test. The test is given to all mathematics or language teachers that taught 3rd grade last year or 4th grade in the year the survey was conducted.
Test score	It is measured as the overall score of a mathematics, language and pedagogy tests covering the primary curriculum administered at the school level to all mathematics and language teachers that taught 3 <sup>rd</sup> grade last year or 4th grade in the year the survey was conducted.

<b>Minimum infrastructure availability</b>	
Unweighted average of the proportion of schools with the following available: functioning electricity and sanitation	It is a binary indicator capturing availability of: (i) functioning toilets and (ii) classroom visibility. Functioning toilets is defined as whether toilets were functioning, accessible, clean and private (enclosed and with gender separation) as verified by an enumerator. To verify classroom visibility we randomly select one 4th grade classroom in which the enumerator places a printout on the board and checks whether it was possible to read the printout from the back of the classroom
<b>Minimum equipment availability</b>	
Unweighted average of the proportion of schools with the following available: functioning blackboard with chalk, pens or pencils, and notebooks or paper	It is a binary indicator capturing availability of: (i) functioning blackboard and chalk and (ii) pens, pencils and exercise books <sup>9</sup> in 4 <sup>th</sup> grade classrooms. In one randomly selected 4th grade classroom in the school the enumerator assessed if there was a functioning blackboard by looking at whether text written on the blackboard could be read at the front and back of the classroom, and whether there was chalk available to write on the blackboard. We considered that the classroom meet the minimum requirement of pens, pencils and exercise books if both the share of students with pen or pencils and the share of students with exercise books are above 90%.
<b>Share of pupils with textbooks</b>	
Number of mathematics and language books used in a grade four classroom divided by the number of pupils present in the classroom	The indicator reflect the typical ratio in student to textbooks in the 4th grade classroom. It is measured as the number of students with the relevant textbooks (mathematic or language conditional on which randomly selected class is observed) in one randomly selected 4th grade class and divided by the number of students in that classroom.
<b>Observed pupil-teacher ratio</b>	
Average number of grade four pupils per grade four teacher	This indicator reflects the typical ratio in pupils to teachers in the 4th grade classroom. It is measured as the number of students in one randomly selected 4th grade class at the school.

## ANNEX C. ADDITIONAL RESULTS

**Table C 1. SDI At-A-Glance**

	All	Public	Private	Percent Difference (%)	Urban Public	Rural Public	Percent Difference (%)
School absence rate (% teachers)	13.7	16.9	5.5	207.5***	10.7	18.7	-42.9***
Classroom absence rate (% teachers)	19.1	22.8	9.5	140.9***	14.8	25.1	-40.9***
Minimum knowledge (% teachers)	3.7	2.4	7.7	-69.4***	2.8	2.3	21.2
Time spent teaching per day	3h 26min	3h 10min	4h 23min	-27.7***	3h 36min	3h 05min	16.6*
Minimum equipment availability (% classrooms)	54.8	48.2	78.3	-38.4***	51.8	47.5	8.9
Minimum infrastructure availability (% schools)	18.5	13.4	36.6	-63.4***	26.7	10.8	147.8**
Observed pupil-teacher ratio	21.6	21.5	22.1	-2.5	27.3	20.4	34.1***
Textbook availability (% pupils)	38.2	33.7	54.6	-38.3***	54.9	29.3	87.4***
Observations	760	458	302		67	391	

Note: Level of significance: \*\*\* p < 0.01; \*\* p < 0.05; \* p < 0.1.

**Table C 2. SDI at-a-glance – Anambra**

	All	Public	Private	Percent Difference (%)	Urban Public	Rural Public	Percent Difference (%)
School absence rate (% teachers)	3.9	5.4	2.4	121.2***	3.1	6.4	-51.6**
Classroom absence rate (% teachers)	5.9	7.5	4.3	76.6***	3.3	9.4	-64.7***
Minimum knowledge (% teachers)	7.9	4.1	12.5	-66.9**	1.2	5.3	-77.7**
Time spent teaching per day	4h 37min	4h 21min	4h 57min	-11.9***	4h 19min	4h 22min	-1.0
Minimum equipment availability (% classrooms)	83.4	79.7	88.2	-9.7	76.3	81.0	-5.7
Minimum infrastructure availability (% schools)	34.5	32.4	37.2	-12.9	36.5	30.8	18.5
Observed pupil-teacher ratio	20.5	19.6	21.8	-10.3	22.4	18.5	21.4**
Textbook availability (% pupils)	66.4	71.6	59.6	20.0**	82.0	67.4	21.6*
Observations	190	113	77		18	95	

Note: Level of significance: \*\*\* p < 0.01; \*\* p < 0.05; \* p < 0.1.

**Table C 3. SDI at-a-glance – Bauchi**

	All	Public	Private	Percent Difference (%)	Urban Public	Rural Public	Percent Difference (%)
School absence rate (% teachers)	27.2	30.3	15.1	101.6***	2.0	33.4	-94.0***
Classroom absence rate (% teachers)	47.5	51.0	33.6	51.7***	28.9	53.4	-45.8**
Minimum knowledge (% teachers)	1.3	1.3	1.5	-11.8	0.0	1.4	-100.0
Time spent teaching per day	1h 33min	1h 27min	2h 13min	-34.8***	1h 21min	2h 27min	-7.3
Minimum equipment availability (% classrooms)	28.8	23.3	63.7	-63.5***	22.2	23.4	-5.0
Minimum infrastructure availability (% schools)	6.1	3.5	22.5	-84.5***	0.0	3.7	-100.0*
Observed pupil-teacher ratio	22.2	21.1	29.1	-27.5**	29.9	20.4	46.4*
Textbook availability (% pupils)	11.1	7.7	34.1	-77.4***	18.1	6.9	162.6*
Observations	190	116	74		7	109	

Note: Level of significance: \*\*\* p < 0.01; \*\* p < 0.05; \* p < 0.1.

**Table C 4. SDI at-a-glance – Ekiti**

	All	Public	Private	Percent Difference (%)	Urban Public	Rural Public	Percent Difference (%)
School absence rate (% teachers)	6.8	5.7	9.8	-41.7***	5.7	5.7	0.8
Classroom absence rate (% teachers)	10.3	9.6	12.3	-21.5	10.7	9.0	18.0
Minimum knowledge (% teachers)	6.5	6.5	6.3	2.8	7.5	6.0	24.7
Time spent teaching per day	4h 29min	4h 21min	4h 54min	-11.2**	4h 15min	4h 25min	-23.8
Minimum equipment availability (% classrooms)	78.7	81.6	68.6	19.1*	78.9	83.0	-4.9
Minimum infrastructure availability (% schools)	31.4	32.4	28.0	15.7	50.1	23.6	112.5**
Observed pupil-teacher ratio	15.4	16.6	11.3	46.6***	18.7	15.5	21.1
Textbook availability (% pupils)	70.9	75.8	53.7	41.0***	87.6	69.8	25.5**
Observations	190	113	77		29	84	

Note: Level of significance: \*\*\* p < 0.01; \*\* p < 0.05; \* p < 0.1.

**Table C 5. SDI at-a-glance – Niger**

	All	Public	Private	Percent Difference (%)	Urban Public	Rural Public	Percent Difference (%)
School absence rate (% teachers)	17.3	19.9	4.6	331.6***	20.0	19.9	0.5
Classroom absence rate (% teachers)	19.8	22.5	6.8	231.5***	21.9	22.6	-3.0
Minimum knowledge (% teachers)	1.7	0.9	5.6	-84.0**	1.3	0.8	58.3
Time spent teaching per day	3h 30min	3h 24min	4h 12min	-19.0***	3h 12min	3h 26min	-6.5
Minimum equipment availability (% classrooms)	45.5	41.1	73.5	-44.1***	17.2	44.6	-61.5**
Minimum infrastructure availability (% schools)	12.0	6.0	50.3	-88.1***	7.6	5.8	31.4
Observed pupil-teacher ratio	24.3	24.3	24.3	-0.2	38.1	22.2	71.6***
Textbook availability (% pupils)	26.1	21.1	58.5	-63.9***	15.9	21.9	-27.3
Observations	190	116	74		13	103	

Note: The number is large because we are dividing by a fraction. Level of significance: \*\*\* p < 0.01; \*\* p < 0.05; \* p < 0.1.

**Table C 6. Teacher effort indicators (by state)**

	All	Public	Private	Percent Difference (%)	Urban Public	Rural Public	Percent Difference (%)
<b>ANAMBRA<sup>a</sup></b>							
School absence rate (% teachers)	3.9	5.4	2.4	121.2***	3.1	6.4	-51.6**
Classroom absence rate (% teachers)	5.9	7.5	4.3	76.6***	3.3	9.4	-64.7***
Time spent teaching per day	4h 37min	4h 21min	4h 57min	-11.9***	4h 19min	4h 22min	-1.0
<i>Scheduled lesson time per day</i>	<i>5h 28 min</i>	<i>5h 13min</i>	<i>5h 47min</i>	<i>-9.7***</i>	<i>4h 55min</i>	<i>5h 20min</i>	<i>-7.7***</i>
<b>BAUCHI<sup>b</sup></b>							
School absence rate (% teachers)	27.2	30.3	15.1	101.6***	2.0	33.4	-94.0***
Classroom absence rate (% teachers)	47.5	51.0	33.6	51.7***	28.9	53.4	-45.8**
Time spent teaching per day	1h 33min	1h 27min	2h 13min	-34.8***	1h 21min	1h 27min	-7.3
<i>Scheduled lesson time per day</i>	<i>3h 55min</i>	<i>3h 56min</i>	<i>3h50min</i>	<i>2.9</i>	<i>4h 04min</i>	<i>3h 56min</i>	<i>3.5</i>
<b>EKITI<sup>c</sup></b>							
School absence rate (% teachers)	6.8	5.7	9.8	-41.7***	5.7	5.7	0.8
Classroom absence rate (% teachers)	10.3	9.6	12.3	-21.5	10.7	9.0	18.0
Time spent teaching per day	4h 29min	4h 21min	4h 54min	-11.2***	4h 15min	4h 25min	-3.8
<i>Scheduled lesson time per day</i>	<i>5h 31min</i>	<i>5h 19min</i>	<i>6h 11min</i>	<i>-14.0***</i>	<i>5h 17min</i>	<i>5h 21min</i>	<i>-1.1</i>
<b>NIGER<sup>d</sup></b>							
School absence rate (% teachers)	17.3	19.9	4.6	331.6***	20.0	19.9	0.5
Classroom absence rate (% teachers)	19.8	22.5	6.8	231.5***	21.9	22.6	-3.0
Time spent teaching per day	3h 30min	3h 24min	4h 12min	-19.0***	3h 12min	3h 26min	-6.5
<i>Scheduled lesson time per day</i>	<i>4h 56min</i>	<i>4h 53min</i>	<i>5h 14min</i>	<i>-6.5***</i>	<i>4h 46min</i>	<i>4h 55min</i>	<i>-2.8</i>

Notes:

<sup>a</sup> Results based on observations from 1,564 teachers in 190 schools.

<sup>b</sup> Results based on observations from 174 teachers in 190 schools.

<sup>c</sup> Results based on observations from 1,592 teachers in 190 schools.

<sup>d</sup> Results based on observations from 1,424 teachers in 190 schools.

**Table C 7. Correlates of teacher effort**

	<b>Correlate with School absence rate</b>	<b>Correlate with Classroom absence rate</b>
Age	-0.005*** 0.001	-0.007*** 0.001
Female	-0.076*** 0.020	-0.144*** 0.023
Experience (years taught)	-0.005*** 0.001	-0.007*** 0.001
Highest grade taught	0.008** 0.003	0.013*** 0.004
Education completed	-0.051*** 0.014	-0.062*** 0.016
Teacher training	-0.033*** 0.007	-0.048*** 0.008
Permanent contract	-0.028 0.049	-0.022 0.053
Seniority	-0.030** 0.012	-0.004 0.015
Born in district	-0.039 0.025	-0.019 0.027
Observations	5,754	5,754

*Note:* The correlations are based on a regression of absence from school or classroom separately on each of the reported correlates and a constant. The regression uses sampling weights. Level of significance: \*\*\*  $p < 0.01$ ; \*\*  $p < 0.05$ ; \*  $p < 0.1$ . For definitions of the regressors, see Table C 24.

**Table C 8. Correlates of teacher effort – Anambra**

	Correlate with School absence rate	Correlate with Classroom absence rate
Age	-0.001	-0.002*
	0.001	0.001
Female	-0.098	-0.094
	0.067	0.067
Experience (years taught)	-0.002**	-0.002**
	0.001	0.001
Highest grade taught	0.006**	0.006*
	0.003	0.003
Education completed	-0.030**	-0.034**
	0.012	0.014
Teacher training	-0.020***	-0.023***
	0.007	0.007
Permanent contract	-0.006	-0.020
	0.026	0.033
Seniority	-0.016	-0.025
	0.018	0.021
Born in district	-0.032*	-0.045**
	0.017	0.021
Observations	1,564	1,564

*Note:* The correlations are based on a regression of absence from school or classroom separately on each of the reported correlates and a constant. The regression uses sampling weights. Level of significance: \*\*\* p < 0.01; \*\* p < 0.05; \* p < 0.1. For definitions of the regressors, see Table C 24.



**Table C 9. Correlates of teacher effort – Bauchi**

	Correlate with School absence rate	Correlate with Classroom absence rate
Age	-0.003 0.003	-0.005 0.004
Female	0.151* 0.085	0.097 0.081
Experience (years taught)	-0.005* 0.003	-0.007* 0.004
Highest grade taught	-0.014 0.012	-0.030** 0.014
Education completed	-0.023 0.043	-0.068 0.051
Teacher training	-0.078 0.050	0.017 0.063
Permanent contract	0.004 0.112	-0.060 0.122
Seniority	-0.056*** 0.021	-0.056** 0.028
Born in district	-0.092 0.058	-0.068 0.060
Observations	1,174	1,174

*Note:* The correlations are based on a regression of absence from school or classroom separately on each of the reported correlates and a constant. The regression uses sampling weights. Level of significance: \*\*\* p < 0.01; \*\* p < 0.05; \* p < 0.1. For definitions of the regressors, see Table C 24.

**Table C 10. Correlates of teacher effort – Ekiti**

	<b>Correlate with School absence rate</b>	<b>Correlate with Classroom absence rate</b>
Age	-0.001	-0.002*
	0.001	0.001
Female	0.008	-0.018
	0.018	0.029
Experience (years taught)	-0.001	-0.002**
	0.001	0.001
Highest grade taught	-0.007	-0.005
	0.004	0.005
Education completed	0.011	0.019*
	0.010	0.011
Teacher training	0.005	0.008
	0.009	0.011
Permanent contract	-0.089	-0.072
	0.083	0.084
Seniority	-0.008	-0.007
	0.013	0.016
Born in district	0.005	0.016
	0.018	0.022
Observations	1,592	1,592

*Note:* The correlations are based on a regression of absence from school or classroom separately on each of the reported correlates and a constant. The regression uses sampling weights. Level of significance: \*\*\*  $p < 0.01$ ; \*\*  $p < 0.05$ ; \*  $p < 0.1$ . For definitions of the regressors, see Table C 24.

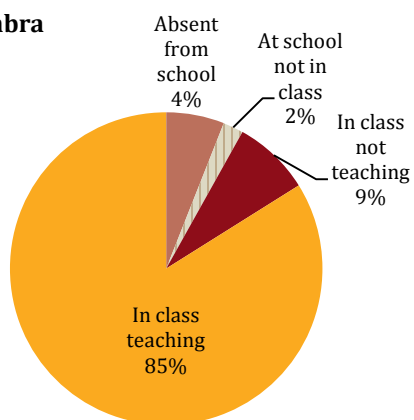
**Table C 11. Correlates of teacher effort – Niger**

	Correlate with School absence rate	Correlate with Classroom absence rate
Age	-0.005**	-0.003
	0.002	0.002
Female	-0.007	-0.023
	0.033	0.036
Experience (years taught)	-0.005**	-0.005*
	0.002	0.002
Highest grade taught	0.003	0.004
	0.009	0.010
Education completed	-0.045**	-0.039*
	0.022	0.023
Teacher training	0.009	-0.005
	0.026	0.027
Permanent contract	-0.071	-0.048
	0.100	0.102
Seniority	-0.065***	-0.045*
	0.022	0.024
Born in district	-0.201***	-0.226***
	0.064	0.063
Observations	1,424	1,424

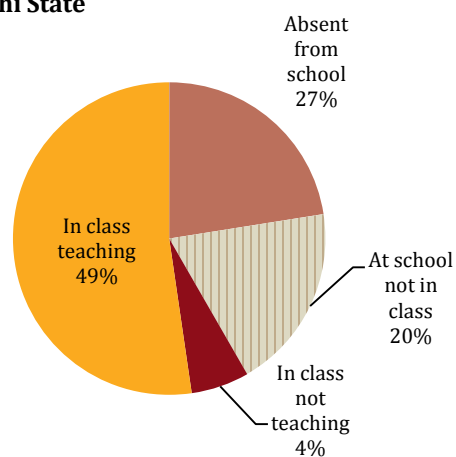
*Note:* The correlations are based on a regression of absence from school or classroom separately on each of the reported correlates and a constant. The regression uses sampling weights. Level of significance: \*\*\* p < 0.01; \*\* p < 0.05; \* p < 0.1. For definitions of the regressors, see Table C 24.

**Figure C 1. Composition of teaching time spent per day (by state)**

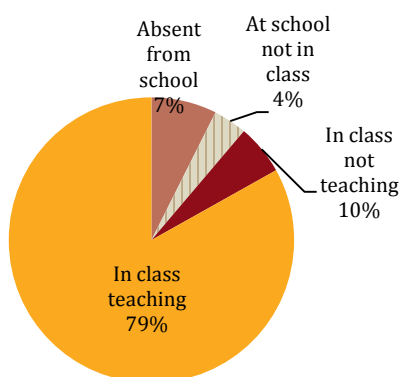
**Anambra**



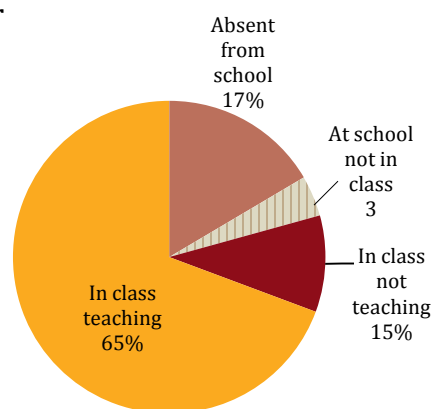
**Bauchi State**



**Ekiti**



**Niger**



**Table C 12. Teacher effort, auxiliary information**

	All	Public	Private	Percent Difference (%)	Urban Public	Rural Public	Percent Difference (%)
School absence rate (% teachers)	13.7	16.9	5.5	207.5***	10.7	18.7	-42.9***
Classroom absence rate (% teachers)	19.1	22.8	9.5	140.9***	14.8	25.1	-40.9***
Time spent teaching per day	3h 26min	3h 10min	4h 23min	-27.7***	3h 36min	3h 05min	16.6*
<i>Auxiliary information</i>							
Proportion of lesson spent teaching	79.3	77.6	85.2	-8.9***	82.4	76.7	7.6*
Scheduled teaching day	4h 53min	4h 44min	5h 24min	-12.3***	4h 52min	4h 43min	3.4***
Classrooms with pupils but no teacher	22.7	26.2	11.5	126.8***	17.4	27.5	-36.6**
Observations	760	458	302		67	391	
Note: Level of significance: *** p < 0.01; ** p < 0.05; * p < 0.1.							

**Table C 13. Teacher effort, auxiliary information (by state)**

	All	Public	Private	Percent Difference (%)	Urban Public	Rural Public	Percent Difference (%)
<b>ANAMBRA</b>							
School absence rate (% teachers)	3.9	5.4	2.4	121.2***	3.1	6.4	-51.6**
Classroom absence rate (% teachers)	2.1	2.3	1.9	21.2	0.2	3.2	-92.5***
Time spent teaching per day	4h 37min	4h 21min	4h 57min	-251.9	4h 19min	4h 22min	-241.0
<i>Auxiliary information</i>							
Proportion of lesson spent teaching	90.9	91.6	90.0	1.8	87.7	93.1	-5.8
Scheduled teaching day	5h 28min	5h 13min	5h 46min	-309.7	4h 55min	5h 20min	-307.7
Classrooms with pupils but no teacher	5.9	6.8	4.9	39.6	2.7	7.6	-65.1*
<b>BAUCHI</b>							
School absence rate (% teachers)	27.2	30.3	15.1	101.6***	2.0	33.4	-94.0***
Classroom absence rate (% teachers)	27.8	29.7	21.9	35.8	27.5	30.0	-8.6
Time spent teaching per day	1h 33min	1h 27min	2h 13min	-34.8***	1h 21min	1h 27min	-7.3
<i>Auxiliary information</i>							
Proportion of lesson spent teaching	59.4	57.0	74.2	-23.2**	57.5	57.0	0.8
Scheduled teaching day	3h 55min	3h 56min	3h 50min	2.9	4h 04min	3h 56min	3.5
Classrooms with pupils but no teacher	49.4	51.3	36.5	40.7*	67.2	50.1	34.2*
<b>EKITI</b>							
School absence rate (% teachers)	6.8	5.7	9.8	-41.7***	5.7	5.7	0.8
Classroom absence rate (% teachers)	3.8	4.2	2.8	51.0	5.2	3.6	47.4
Time spent teaching per day	4h 29min	4h 21min	4h 54min	-11.2***	4h 15min	4h 25min	-3.8
<i>Auxiliary information</i>							
Proportion of lesson spent teaching	89.2	89.6	87.9	1.9	88.9	90.0	-1.2
Scheduled teaching day	5h 31min	5h 19min	6h 11min	-14.0***	5h 17min	5h 21min	-1.1
Classrooms with pupils but no teacher	7.4	7.3	7.7	-5.3	0.7	9.6	-92.8***
<b>NIGER</b>							
School absence rate (% teachers)	17.3	19.9	4.6	331.6***	20.0	19.9	0.5
Classroom absence rate (% teachers)	3.0	3.2	2.3	41.8	2.5	3.4	-28.3
Time spent teaching per day	3h 30min	3h 24min	4h 12min	-19.0***	3h 12min	3h 26min	-6.5
<i>Auxiliary information</i>							
Proportion of lesson spent teaching	81.7	81.8	81.2	0.8	81.3	81.9	-0.7
Scheduled teaching day	4h 56min	4h 53min	5h 14min	-6.5***	4h 46min	4h 54min	-2.8
Classrooms with pupils but no teacher	21.7	23.0	13.5	71.2**	17.0	23.8	-28.6

Note: Level of significance: \*\*\* p < 0.01; \*\* p < 0.05; \* p < 0.1.

**Table C 14. Teacher assessment**

	All	Public	Private	Percent Difference (%)	Urban Public	Rural Public	Percent Difference (%)
Minimum knowledge (% teachers)	3.7	2.4	7.7	-69.4***	2.8	2.3	21.2
<i>Average score on test</i>							
English, mathematics and pedagogy (out of 100)	32.9	30.5	40.4	-24.5***	37.8	29.1	30.1***
English and mathematics (out of 100)	43.6	41.0	51.2	-19.9***	49.2	39.5	24.7***
<i>Difference in thresholds</i>							
Minimum knowledge: 100% (% teachers)	0.1	0.0	0.4	-91.2	0.2	0.0	n/a
Minimum knowledge: 90% (% teachers)	0.7	0.3	1.3	-74.5**	0.6	0.3	124.2
Minimum knowledge: 80% (% teachers)	3.7	2.4	7.7	-69.4***	2.8	2.3	21.2
Minimum knowledge: 70% (% teachers)	10.5	8.1	17.8	-54.7***	15.5	6.7	131.3**

Note: Level of significance: \*\*\* p < 0.01; \*\* p < 0.05; \* p < 0.1.

**Table C 15. Teacher assessment (by state)**

	All	Public	Private	Percent Difference (%)	Urban Public	Rural Public	Percent Difference (%)
<b>ANAMBRA</b>							
Minimum knowledge (% teachers)	7.9	4.1	12.5	-66.9**	1.2	5.3	-77.7**
<i>Average score on test</i>							
English, mathematics and pedagogy (out of 100)	46.1	45.4	47.0	-3.4	46.2	45.1	2.5
English and mathematics (out of 100)	56.4	55.6	57.4	-3.1	55.3	55.8	-0.9
<i>Difference in thresholds</i>							
Minimum knowledge: 100% (% teachers)	0.0	0.0	0.0	n/a	0.0	0.0	n/a
Minimum knowledge: 90% (% teachers)	0.3	0.6	0.0	n/a	0.0	0.8	-100.0
Minimum knowledge: 80% (% teachers)	7.9	4.1	12.5	-66.9**	1.2	5.3	-77.7**
Minimum knowledge: 70% (% teachers)	19.7	15.9	24.3	-34.3*	16.2	15.8	2.6
<b>BAUCHI</b>							
Minimum knowledge (of teachers)	1.3	1.3	1.5	-11.8	0.0	1.4	-100.0
<i>Average score on test</i>							
English, mathematics and pedagogy (out of 100)	27.1	25.9	32.5	-20.3**	30.8	25.6	20.4
English and mathematics (out of 100)	39.0	37.9	44.2	-14.3	50.0	37.1	35.0**
<i>Difference in thresholds</i>							
Minimum knowledge: 100% (% teachers)	0.1	0.0	0.5	-100.0	0.0	0.0	n/a
Minimum knowledge: 90% (% teachers)	0.2	0.0	0.8	-100.0	0.0	0.0	n/a
Minimum knowledge: 80% (% teachers)	1.3	1.3	1.5	-11.8	0.0	1.4	-100.0
Minimum knowledge: 70% (% teachers)	5.1	4.1	9.4	-56.3	0.0	4.4	-100.0***
<b>EKITI</b>							
Minimum knowledge (% teachers)	6.5	6.5	6.3	2.8	7.5	6.0	24.7
<i>Average score on test</i>							
English, mathematics and pedagogy (out of 100)	45.5	46.1	43.9	4.9	48.6	45.0	8.0*
English and mathematics (out of 100)	57.8	59.1	54.0	9.5**	61.2	58.2	5.2
<i>Difference in thresholds</i>							
Minimum knowledge: 100% (% teachers)	0.1	0.0	0.5	-100.0	0.0	0.0	n/a
Minimum knowledge: 90% (% teachers)	1.7	1.4	2.6	-45.8	1.5	1.4	11.7
Minimum knowledge: 80% (% teachers)	6.5	6.5	6.3	2.8	7.5	6.0	24.7
Minimum knowledge: 70% (% teachers)	20.0	21.6	15.3	41.4	26.0	19.7	32.0
<b>NIGER</b>							
Minimum knowledge (% teachers)	1.7	0.9	5.6	-84.0**	1.3	0.8	58.3
<i>Average score on test</i>							
English, mathematics and pedagogy (out of 100)	23.6	21.6	33.4	-35.5***	23.1	21.3	8.6
English and mathematics (out of 100)	32.6	30.0	44.7	-32.8***	32.4	29.7	9.2
<i>Difference in thresholds</i>							
Minimum knowledge: 100% (% teachers)	0.2	0.1	0.9	-89.5	0.7	0.0	n/a
Minimum knowledge: 90% (% teachers)	0.6	0.1	3.2	-97.2**	0.7	0.0	n/a
Minimum knowledge: 80% (% teachers)	1.7	0.9	5.6	-84.0**	1.3	0.8	58.3
Minimum knowledge: 70% (% teachers)	5.0	2.8	15.6	-82.1***	12.0	1.4	789.3

Note: <sup>a</sup> The number is large because we are dividing by a fraction. Level of significance: \*\*\* p < 0.01; \*\* p < 0.05; \* p < 0.1



**Table C 16. Teacher English assessment (by state)**

(Out of 100)	All	Public	Private	Percent Difference (%)	Urban Public	Rural Public	Percent Difference (%)
<b>ANAMBRA</b>							
<b>English (complete test)</b>	<b>59.1</b>	<b>58.0</b>	<b>60.5</b>	<b>-4.2</b>	<b>57.2</b>	<b>58.3</b>	<b>-1.9</b>
Grammar task	75.1	75.0	75.3	-0.4	75.4	74.8	0.7
Cloze task	46.9	44.7	49.5	-9.7	43.4	45.3	-4.2
Composition task	33.4	33.7	33.1	1.9	27.1	36.3	-25.5**
<b>BAUCHI</b>							
<b>English (complete test)</b>	<b>39.4</b>	<b>39.0</b>	<b>41.3</b>	<b>-5.6</b>	<b>44.4</b>	<b>38.7</b>	<b>14.8</b>
Grammar task	51.3	50.1	57.4	-12.7	55.7	49.8	11.9
Cloze task	31.2	31.7	29.1	9.0	35.6	31.4	13.1
Composition task	10.0	8.9	15.3	-41.6*	29.0	7.8	273.2
<b>EKITI</b>							
<b>English (complete test)</b>	<b>54.1</b>	<b>53.9</b>	<b>54.6</b>	<b>-1.4</b>	<b>55.9</b>	<b>53.0</b>	<b>5.5</b>
Grammar task	72.7	72.9	72.2	1.0	76.6	71.3	7.4**
Cloze task	39.5	38.8	41.4	-6.2	39.3	38.6	1.8
Composition task	28.5	29.5	25.5	15.8	32.3	28.4	13.6
<b>NIGER</b>							
<b>English (complete test)</b>	<b>37.4</b>	<b>35.9</b>	<b>44.3</b>	<b>-18.9**</b>	<b>33.7</b>	<b>36.2</b>	<b>-6.9</b>
Grammar task	49.8	47.8	58.9	-18.8**	40.8	48.7	-16.2
Cloze task	28.4	27.5	32.7	-15.9	28.8	27.3	5.4
Composition task	12.2	9.3	25.7	-63.8***	16.6	8.4	97.7

Note: Level of significance: \*\*\* p < 0.01; \*\* p < 0.05; \* p < 0.1.

**Table C 17. Teacher mathematics assessment (selected examples)**

(Out of 100)	All	Public	Private	Percent Difference (%)	Urban Public	Rural Public	Percent Difference (%)
<b>ANAMBRA</b>							
<b>Mathematics (complete test)</b>	<b>47.9</b>	<b>47.1</b>	<b>48.8</b>	<b>-3.6</b>	<b>47.0</b>	<b>47.1</b>	<b>-0.3</b>
Adding double digit numbers	95.2	96.1	94.2	2.0	94.8	96.6	-1.9
Subtracting double digits	73.8	71.1	77.1	-7.7	76.0	69.2	9.9
Adding triple digit numbers	79.9	80.8	78.8	2.5	86.3	78.6	9.7
Multiplying two digit numbers	67.9	63.7	73.1	-12.9*	63.1	63.9	-1.1
Adding decimals	41.2	41.1	41.3	-0.4	36.9	42.8	-13.8
Comparing fractions	20.4	22.3	18.2	22.7	25.8	20.9	23.6
Time (reading a clock)	40.7	33.8	49.1	-31.2***	34.8	33.4	4.2
Interpreting data on a graph	23.8	21.6	26.6	-18.9	22.1	21.4	3.0
Square root (no remainder)	64.1	65.0	62.9	3.3	64.9	65.1	-0.4
Subtraction of decimal numbers	53.3	53.1	53.4	-0.6	49.5	54.5	-9.2
Division of fractions	28.0	29.8	25.8	15.7	24.5	31.9	-23.1
One variable algebra	14.1	13.4	14.8	-9.1	17.8	11.7	52.4
<b>BAUCHI</b>							
<b>Mathematics (complete test)</b>	<b>31.9</b>	<b>30.0</b>	<b>42.8</b>	<b>-29.8***</b>	<b>43.5</b>	<b>29.3</b>	<b>48.6</b>
Adding double digit numbers	86.6	86.6	86.8	-0.2	82.4	86.9	-5.2
Subtracting double digits	56.2	54.5	64.2	-15.2	82.4	52.7	56.4**
Adding triple digit numbers	71.0	71.5	68.9	3.8	76.4	71.1	7.4
Multiplying two digit numbers	43.7	42.8	47.8	-10.6	76.4	40.5	88.4**
Adding decimals	20.4	17.0	36.6	-53.7**	17.9	16.9	5.7
Comparing fractions	10.8	10.3	13.4	-22.7	16.8	10.0	69.0
Time (reading a clock)	23.9	21.9	33.1	-34.0	11.9	22.5	-24.2
Interpreting data on a graph	9.7	7.6	22.0	-65.6***	0.0	8.0	-100.0***
Square root (no remainder)	43.6	40.3	58.8	-31.4**	82.1	37.5	118.8***
Subtraction of decimal numbers	38.5	34.2	58.5	-41.5***	76.4	31.4	143.3***
Division of fractions	10.4	9.3	15.6	-40.4	11.9	9.1	30.6
One variable algebra	10.0	8.7	16.0	-45.6	0.0	9.3	-100.0***
<b>EKITI</b>							
<b>Mathematics (complete test)</b>	<b>57.8</b>	<b>61.0</b>	<b>48.7</b>	<b>25.3***</b>	<b>65.5</b>	<b>59.2</b>	<b>10.7*</b>
Adding double digit numbers	95.9	96.9	92.6	4.7	94.2	98.1	-3.9
Subtracting double digits	81.1	83.8	73.2	14.5*	83.7	83.8	-0.2
Adding triple digit numbers	85.6	87.0	81.5	6.7	86.5	87.2	-0.8
Multiplying two digit numbers	76.1	79.5	65.8	20.7**	75.3	81.3	-7.4
Adding decimals	45.1	46.3	41.6	11.3	44.6	47.0	-5.1
Comparing fractions	20.9	22.1	17.3	27.5	29.8	19.0	56.6*
Time (reading a clock)	47.5	52.9	31.3	68.9***	60.2	49.7	21.2
Interpreting data on a graph	33.8	35.8	28.1	27.4	42.9	32.9	30.6*
Square root (no remainder)	74.1	78.2	61.8	26.6**	79.7	77.6	2.7
Subtraction of decimal numbers	69.8	75.1	53.7	40.0***	80.8	72.7	11.2
Division of fractions	42.2	48.2	24.2	99.4***	56.0	44.8	25.0
One variable algebra	37.5	39.7	30.8	28.9	46.0	37.0	24.3
<b>NIGER</b>							
<b>Mathematics (complete test)</b>	<b>21.9</b>	<b>19.8</b>	<b>33.5</b>	<b>-41.0***</b>	<b>27.3</b>	<b>18.8</b>	<b>45.1**</b>
Adding double digit numbers	68.0	63.7	88.1	-27.7	70.2	62.7	11.9
Subtracting double digits	48.0	46.7	53.8	-13.1	50.2	46.2	8.7
Adding triple digit numbers	60.8	57.0	78.8	-27.6***	70.2	55.0	27.8
Multiplying two digit numbers	38.9	37.2	47.1	-21.1	52.8	34.7	52.1
Adding decimals	14.8	13.1	23.3	-43.8*	40.8	8.7	367.5**
Comparing fractions	6.0	4.3	15.4	-72.0**	12.4	3.3	274.2
Time (reading a clock)	17.5	14.5	32.2	-55.1***	8.0	15.5	-48.6
Interpreting data on a graph	7.2	5.1	18.6	-72.4***	10.6	4.5	135.5
Square root (no remainder)	23.8	20.1	41.7	-51.9***	46.2	16.0	188.8**
Subtraction of decimal numbers	23.1	21.5	30.8	-30.3	39.3	18.7	110.5
Division of fractions	3.8	1.4	15.3	-91.2***	1.3	1.4	-3.1
One variable algebra	4.2	1.8	16.0	-89.0***	1.3	1.8	-28.3

Note: Level of significance: \*\*\* p < 0.01; \*\* p < 0.05; \* p < 0.1.

**Table C 18. Teacher pedagogy assessment (by state)**

(Out of 100)	All	Public	Private	Percent Difference (%)	Urban Public	Rural Public	Percent Difference (%)
<b>ANAMBRA</b>							
<b>Pedagogy (complete test)</b>	<b>25.6</b>	<b>25.1</b>	<b>26.3</b>	<b>-4.4</b>	<b>28.2</b>	<b>23.9</b>	<b>17.9</b>
Basic pedagogy	26.6	26.4	26.8	-1.4	28.5	25.6	11.3
Advanced pedagogy	24.5	23.5	25.6	-8.2	27.8	21.9	27.0*
Preparing a lesson plan	27.6	27.3	28.0	-2.5	29.9	26.3	13.9
Assessing children's abilities	34.8	33.3	36.6	-9.0	36.2	32.2	12.5
Evaluating pupils' progress	9.4	9.5	9.3	2.3	13.9	7.7	80.2
<b>BAUCHI</b>							
<b>Pedagogy (complete test)</b>	<b>9.8</b>	<b>8.2</b>	<b>16.9</b>	<b>-51.5***</b>	<b>6.1</b>	<b>8.4</b>	<b>-27.0</b>
Basic pedagogy	8.1	6.5	15.8	-59.2***	4.5	6.6	-31.7
Advanced pedagogy	11.7	10.3	18.2	-43.6***	8.0	10.4	-23.5
Preparing a lesson plan	12.0	10.5	19.1	-45.1***	4.5	10.9	-58.6***
Assessing children's abilities	10.5	7.7	23.6	-67.3***	0.0	8.2	-100.0***
Evaluating pupils' progress	2.9	2.9	3.3	-12.0	17.6	1.9	826.6**
<b>EKITI</b>							
<b>Pedagogy (complete test)</b>	<b>22.8</b>	<b>21.9</b>	<b>25.6</b>	<b>-14.3*</b>	<b>26.2</b>	<b>20.0</b>	<b>31.0***</b>
Basic pedagogy	22.7	21.7	25.9	-16.2*	26.4	19.6	34.8**
Advanced pedagogy	23.0	22.2	25.2	-12.1	26.0	20.5	26.8**
Preparing a lesson plan	24.4	23.0	28.6	-19.5**	28.6	20.6	38.7***
Assessing children's abilities	27.0	26.6	28.1	-5.3	29.9	25.2	18.8
Evaluating pupils' progress	13.7	13.4	14.7	-9.1	15.8	12.4	27.7
<b>NIGER</b>							
<b>Pedagogy (complete test)</b>	<b>9.9</b>	<b>8.2</b>	<b>18.1</b>	<b>-54.5***</b>	<b>11.6</b>	<b>7.7</b>	<b>50.6</b>
Basic pedagogy	8.1	6.6	15.2	-56.2***	8.9	6.3	41.4
Advanced pedagogy	12.1	10.1	21.5	-53.1***	14.8	9.4	57.8
Preparing a lesson plan	12.5	10.9	20.5	-47.2***	13.0	10.5	23.9
Assessing children's abilities	10.4	7.8	22.5	-65.2***	13.0	7.0	84.5
Evaluating pupils' progress	2.6	1.8	6.4	-71.0***	6.2	1.2	431.8

Note: Level of significance: \*\*\* p < 0.01; \*\* p < 0.05; \* p < 0.1.

**Table C 19. Correlates of teacher knowledge**

	Correlates with:					
	Total score	English test score	English <sup>a</sup> (80 percent)	Mathematics test score	Mathematics <sup>b</sup> (80 percent)	Pedagogy test score
Age	0.002*** (0.001)	0.002*** (0.001)	0.001 (0.001)	0.003*** (0.001)	0.002** (0.001)	0.002*** (0.001)
Female	0.111*** (0.012)	0.123*** (0.015)	0.047*** (0.013)	0.118*** (0.016)	0.099*** (0.016)	0.083*** (0.011)
Experience	0.002*** (0.001)	0.002** (0.001)	0.001 (0.001)	0.002*** (0.001)	0.002* (0.001)	0.001** (0.001)
Highest grade taught	0.009*** (0.003)	0.006 (0.005)	0.013** (0.005)	0.018*** (0.005)	0.016*** (0.005)	0.010*** (0.003)
Education completed	0.056*** (0.006)	0.066*** (0.008)	0.032*** (0.006)	0.064*** (0.010)	0.053*** (0.010)	0.039*** (0.006)
Teacher training	0.035*** (0.004)	0.034*** (0.005)	0.015*** (0.004)	0.041*** (0.006)	0.029*** (0.006)	0.025*** (0.004)
Permanent contract	-0.077*** (0.014)	-0.086*** (0.017)	-0.051** (0.021)	-0.061*** (0.020)	-0.044* (0.024)	-0.074*** (0.015)
Seniority	-0.022*** (0.005)	-0.030*** (0.006)	-0.010* (0.005)	-0.023*** (0.006)	-0.029*** (0.005)	-0.018*** (0.004)
Observations	1,678	1,157	1,157	1,174	1,174	1,678

Note: The correlations are based on regressions of various measures of teacher knowledge. The regression uses sampling weights. For definitions of the regressors, see Table C 24. Robust standard errors in parentheses, clustered at the village level. <sup>a</sup> Full definition of variable: "Share of teachers who scored above 80 percent on the English test", <sup>b</sup> Full definition of variable: "Share of teachers who scored above 80 percent on the mathematics test". Level of significance: \*\*\* p < 0.01; \*\* p < 0.05; \* p < 0.1.

**Table C 20. Correlates of teacher knowledge – Anambra**

	Correlates with:					
	Total score	English test score	English <sup>a</sup> (80 percent)	Mathematics test score	Mathematics <sup>b</sup> (80 percent)	Pedagogy test score
Age	-0.000 (0.001)	-0.001 (0.001)	-0.001 (0.001)	0.000 (0.001)	-0.002 (0.002)	-0.001 (0.001)
Female	0.016 (0.019)	0.041* (0.025)	0.023 (0.040)	-0.020 (0.032)	-0.082 (0.068)	0.031 (0.026)
Experience	0.000 (0.001)	-0.001 (0.001)	-0.001 (0.001)	0.001 (0.001)	0.000 (0.001)	0.000 (0.001)
Highest grade taught	0.023*** (0.004)	0.018*** (0.005)	0.033*** (0.012)	0.033*** (0.007)	0.022* (0.013)	0.021*** (0.005)
Education completed	0.019** (0.009)	0.018* (0.009)	0.015 (0.016)	0.033** (0.013)	0.038 (0.025)	0.014 (0.014)
Teacher training	0.012* (0.006)	0.013* (0.007)	0.015 (0.010)	0.007 (0.009)	0.012 (0.015)	0.016* (0.009)
Permanent contract	-0.011 (0.018)	-0.033* (0.019)	-0.033 (0.035)	0.024 (0.026)	-0.037 (0.039)	-0.018 (0.028)
Seniority	0.001 (0.008)	-0.006 (0.010)	-0.008 (0.018)	0.014 (0.011)	-0.016 (0.022)	0.002 (0.012)
Observations	698	685	685	685	690	706

Note: The correlations are based on regressions of various measures of teacher knowledge. The regression uses sampling weights. For definitions of the regressors, see Table C 24. Robust standard errors in parentheses, clustered at the village level. <sup>a</sup> Full definition of variable: “Share of teachers who scored above 80 percent on the English test”, <sup>b</sup> Full definition of variable: “Share of teachers who scored above 80 percent on the mathematics test”. Level of significance: \*\*\* p < 0.01; \*\* p < 0.05; \* p < 0.1.

**Table C 21. Correlates of teacher knowledge – Bauchi**

	Correlates with:					
	Total score	English test score	English <sup>a</sup> (80 percent)	Mathematics test score	Mathematics <sup>b</sup> (80 percent)	Pedagogy test score
Age	-0.001 (0.001)	0.000 (0.002)	-0.000 (0.001)	-0.003** (0.001)	0.000 (0.001)	-0.001 (0.001)
Female	-0.024 (0.019)	-0.027 (0.032)	-0.045** (0.018)	-0.079** (0.031)	-0.006 (0.014)	-0.024 (0.019)
Experience	-0.001 (0.001)	-0.001 (0.002)	0.000 (0.001)	-0.004** (0.002)	-0.000 (0.001)	-0.001 (0.001)
Highest grade taught	-0.006 (0.006)	-0.006 (0.010)	0.005 (0.007)	-0.012 (0.011)	0.001 (0.003)	-0.006 (0.006)
Education completed	0.018** (0.008)	0.041*** (0.015)	0.021*** (0.007)	0.022 (0.015)	0.018** (0.008)	0.018** (0.008)
Teacher training	0.015* (0.008)	0.020* (0.012)	0.015** (0.006)	0.007 (0.012)	0.010** (0.004)	0.015* (0.008)
Permanent contract	-0.055** (0.023)	-0.048* (0.027)	0.032* (0.019)	-0.077* (0.041)	-0.029 (0.019)	-0.055** (0.023)
Seniority	-0.000 (0.007)	-0.005 (0.010)	-0.001 (0.004)	-0.003 (0.009)	-0.008 (0.007)	-0.000 (0.007)
Observations	429	319	319	318	318	494

Note: The correlations are based on regressions of various measures of teacher knowledge. The regression uses sampling weights. For definitions of the regressors, see Table C 24. Robust standard errors in parentheses, clustered at the village level. <sup>a</sup> Full definition of variable: "Share of teachers who scored above 80 percent on the English test", <sup>b</sup> Full definition of variable: "Share of teachers who scored above 80 percent on the mathematics test". Level of significance: \*\*\* p < 0.01; \*\* p < 0.05; \* p < 0.1.

**Table C 22. Correlates of teacher knowledge – Ekiti**

	Correlates with:					
	Total score	English test score	English <sup>a</sup> (80 percent)	Mathematics test score	Mathematics <sup>b</sup> (80 percent)	Pedagogy test score
Age	0.000 (0.001)	-0.001 (0.001)	-0.001 (0.001)	0.002** (0.001)	0.003 (0.002)	-0.000 (0.001)
Female	0.002 (0.014)	0.036* (0.019)	0.018 (0.021)	0.002 (0.021)	0.058 (0.048)	-0.033* (0.019)
Experience	-0.000 (0.001)	-0.001 (0.001)	-0.001 (0.001)	0.002* (0.001)	0.001 (0.002)	-0.000 (0.001)
Highest grade taught	0.022*** (0.004)	0.008 (0.007)	0.014 (0.010)	0.038*** (0.007)	0.048*** (0.014)	0.024*** (0.006)
Education completed	0.013 (0.010)	0.026* (0.015)	0.016 (0.022)	0.028 (0.018)	0.010 (0.041)	-0.000 (0.016)
Teacher training	0.005 (0.006)	0.005 (0.007)	-0.007 (0.010)	0.021** (0.010)	-0.012 (0.021)	-0.004 (0.006)
Permanent contract	0.037** (0.016)	0.002 (0.023)	-0.017 (0.026)	0.119*** (0.027)	0.201*** (0.047)	0.004 (0.020)
Seniority	-0.003 (0.006)	-0.017** (0.008)	-0.008 (0.013)	0.012 (0.011)	0.013 (0.019)	0.003 (0.006)
Observations	608	319	319	318	318	494

Note: The correlations are based on regressions of various measures of teacher knowledge. The regression uses sampling weights. For definitions of the regressors, see Table C 24. Robust standard errors in parentheses, clustered at the village level. <sup>a</sup> Full definition of variable: “Share of teachers who scored above 80 percent on the English test”, <sup>b</sup> Full definition of variable: “Share of teachers who scored above 80 percent on the mathematics test”. Level of significance: \*\*\* p < 0.01; \*\* p < 0.05; \* p < 0.1.

**Table C 23. Correlates of teacher knowledge – Niger**

	Correlates with:					
	Total score	English test score	English <sup>a</sup> (80 percent)	Mathematics test score	Mathematics <sup>b</sup> (80 percent)	Pedagogy test score
Age	-0.002** (0.001)	-0.002 (0.001)	-0.000 (0.001)	-0.003** (0.001)	-0.002** (0.001)	-0.001* (0.001)
Female	-0.019 (0.017)	-0.008 (0.032)	-0.009 (0.016)	-0.019 (0.028)	0.004 (0.015)	-0.001 (0.012)
Experience	-0.002** (0.001)	-0.002 (0.002)	-0.000 (0.001)	-0.003** (0.002)	-0.002* (0.001)	-0.002*** (0.001)
Highest grade taught	0.008 (0.005)	0.006 (0.009)	0.004 (0.009)	0.012 (0.008)	0.003 (0.004)	0.009** (0.004)
Education completed	0.016* (0.009)	0.031** (0.012)	0.016* (0.008)	0.002 (0.015)	0.012 (0.011)	0.013** (0.006)
Teacher training	0.011** (0.005)	0.007 (0.009)	0.000 (0.003)	0.013 (0.009)	0.011** (0.005)	0.009** (0.004)
Permanent contract	-0.090*** (0.026)	-0.073* (0.041)	-0.051 (0.031)	-0.138*** (0.040)	-0.090** (0.035)	-0.074*** (0.020)
Seniority	0.000 (0.006)	-0.009 (0.010)	0.005 (0.008)	0.007 (0.009)	-0.008* (0.005)	-0.005 (0.004)
Observations	548	425	425	437	437	619

Note: The correlations are based on regressions of various measures of teacher knowledge. The regression uses sampling weights. For definitions of the regressors, see Table C 24. Robust standard errors in parentheses, clustered at the village level. <sup>a</sup> Full definition of variable: "Share of teachers who scored above 80 percent on the English test", <sup>b</sup> Full definition of variable: "Share of teachers who scored above 80 percent on the mathematics test". Level of significance: \*\*\* p < 0.01; \*\* p < 0.05; \* p < 0.1.



**Table C 24. Teacher characteristics**

	All	Public	Private	Percent Difference (%)	Urban Public	Rural Public	Percent Difference (%)
Age	37.7	40.0	31.9	25.5***	42.7	39.3	8.8***
Female	59.9	53.4	77.2	-30.8***	78.7	46.7	68.7***
Experience	12.4	14.6	6.7	118.3***	17.2	13.9	23.9***
Education completed	2.7	2.7	2.7	-2.5***	2.9	2.6	11.8***
University degree	78.2	78.8	76.6	2.8	95.3	74.4	28.2***
Training certificate	89.9	91.7	84.9	8.1***	97.6	90.1	8.2***
Contract teacher	22.5	5.0	69.6	-92.8***	2.1	5.8	-64.9***
Permanent contract	99.6	99.5	100.0	-0.5***	100.0	99.3	0.7***
Head Teacher	6.8	8.0	3.7	116.9***	2.9	9.4	-69.5***
Born in district	63.6	69.0	49.0	40.8***	57.4	72.0	-20.3***
Seniority	-4.1	-3.8	-4.7	-18.1***	-3.9	-3.8	3.0***

Note: Results based on observations from 7,405 teachers in 760 schools. Difference is differences in means between private and public schools. Level of significance: \*\*\* p < 0.01; \*\* p < 0.05; \* p < 0.1.

Definition of regressors:

- "Experience" denotes the number of years the teacher has been teaching.
- "Education completed" is an ordinal variable coded as 0 if the teacher has no education, 1 if the teacher has completed primary education, 2 if the teacher has completed secondary education, 3 if the teacher has a diploma/certificate, 4 if the teacher has a university bachelor degree, and 5 if the teacher has a master's degree.
- "Teacher training" is an ordinal variable coded as 0 if the teacher has no training, 1 if the teacher has an Early Childhood Education certificate, 2 if the teacher has a primary 1 certificate, 3 if the teacher has a primary 2 certificate, 4 if the teacher has a diploma in teaching, and 5 if the teacher has a university degree in education. Other categories such as special needs education are excluded.
- "Permanent contract" is set to 1 if the teacher has a permanent contract and 0 otherwise.
- "Seniority" is an ordinal variable coded as 1 if the teacher is a volunteer, 2 if the teacher is a paid contract teacher, 3 if the teacher is a permanent (government teacher), 4 if the teacher is a senior teacher, 5 if the teacher is the deputy head teacher, 6 if the teacher is the head teacher/principal and 7 if the teacher is the owner/director of the school.
- "Born in the district" is a dummy set to 1 if the teacher is born in the same district as the school where he/she works and 0 otherwise

**Table C 25. Teacher characteristics – Anambra**

	All	Public	Private	Percent Difference (%)	Urban Public	Rural Public	Percent Difference (%)
Age	40.9	47.7	33.7	41.3***	50.0	46.7	7.1***
Female	96.5	96.7	96.2	0.5	98.5	95.9	2.7**
Experience	14.6	21.0	8.0	163.2***	25.2	19.2	31.0***
Education completed	2.8	2.9	2.7	7.5***	3.0	2.9	3.7***
Training certificate	90.6	97.1	83.9	15.7***	99.6	96.0	3.7***
Permanent contract	99.8	99.6	100.0	-0.4**	100.0	99.4	0.6**
Seniority	-4.4	-4.1	-4.8	-15.1***	-4.0	-4.1	-2.7***
Born in district	48.7	48.1	49.4	-2.6	32.9	54.5	-39.6***

Note: Results based on observations from 1,564 teachers in 190 schools. Difference is differences in means between private and public schools. Level of significance: \*\*\* p < 0.01; \*\* p < 0.05; \* p < 0.1. For definitions of the regressors, see Table C 24.

**Table C 26. Teacher characteristics – Bauchi**

	All	Public	Private	Percent Difference (%)	Urban Public	Rural Public	Percent Difference (%)
Age	35.8	37.0	31.2	18.5***	36.5	37.1	-1.6
Female	25.2	23.6	31.3	-24.8**	44.6	21.2	110.4**
Experience	10.0	10.9	6.7	63.1***	10.5	10.9	-4.3
Education completed	2.7	2.6	2.8	-7.4***	2.5	2.6	-4.6
Training certificate	90.3	91.6	85.4	7.3**	100.0	90.7	10.3***
Permanent contract	100.0	100.0	100.0	0.0	100.0	100.0	0.0
Seniority	-3.8	-3.6	-4.6	-21.7***	-3.6	-3.6	2.3
Born in district	77.8	78.9	73.6	7.2	73.9	79.5	-6.9

Note: Results based on observations from 1,174 teachers in 190 schools. Difference is differences in means between private and public schools. Level of significance: \*\*\* p < 0.01; \*\* p < 0.05; \* p < 0.1. For definitions of the regressors, see Table C 24.

**Table C 27. Teacher characteristics – Ekiti**

	All	Public	Private	Percent Difference (%)	Urban Public	Rural Public	Percent Difference (%)
Age	40.4	44.3	28.8	54.0***	44.8	44.0	1.7
Female	81.6	81.2	82.7	-1.7	91.6	75.7	20.9***
Experience	13.1	16.1	4.2	283.5***	16.6	15.8	4.8
Education completed	2.8	2.9	2.7	7.2***	2.9	2.9	1.4
Training certificate	93.8	99.4	77.3	28.7***	100.0	99.1	0.9***
Permanent contract	99.3	99.0	100.0	-1.0***	100.0	98.5	1.5***
Seniority	-4.1	-3.9	-4.7	-16.7	-3.9	-3.9	0.2
Born in district	55.1	54.3	57.5	-5.6	50.1	56.6	-11.4

Note: Results based on observations from 1,592 teachers in 190 schools. Difference is differences in means between private and public schools. Level of significance: \*\*\* p < 0.01; \*\* p < 0.05; \* p < 0.1. For definitions of the regressors, see Table C 24.

**Table C 28. Teacher characteristics – Niger**

	All	Public	Private	Percent Difference (%)	Urban Public	Rural Public	Percent Difference (%)
Age	35.5	36.6	30.3	20.9***	37.6	36.4	3.4
Female	44.0	40.2	63.6	-36.8***	66.1	34.5	91.3***
Experience	11.7	13.0	5.6	131.4***	13.6	12.9	5.7
Education completed	2.5	2.5	2.7	-8.2***	2.9	2.4	21.5***
Training certificate	87.9	87.4	90.4	-3.4	94.3	85.8	9.9*
Permanent contract	99.5	99.4	100.0	-0.7**	100.0	99.2	0.8**
Seniority	-3.9	-3.8	-4.5	-15.1***	-3.9	-3.8	3.5***
Born in district	69.8	77.5	30.5	153.6***	73.7	78.3	-5.9

Note: Results based on observations from 1,592 teachers in 190 schools. Difference is differences in means between private and public schools. Level of significance: \*\*\* p < 0.01; \*\* p < 0.05; \* p < 0.1. For definitions of the regressors, see Table C 24.

**Table C 29. School auxiliary information (by state)**

(Percent)	All	Public	Private	Percent Difference (%)	Urban Public	Rural Public	Percent Difference (%)
<b>ANAMBRA</b>							
<i>Minimum equipment availability</i>							
Pupils with pencils/pens (% pupils)	96.4	96.9	95.8	1.1	93.5	98.2	-4.8
Pupils with notebook/paper (% pupils)	98.5	98.0	99.1	-1.1	99.3	97.5	1.8
Have black board (% classrooms)	96.6	95.8	97.7	-1.9	100.0	94.2	6.2*
Chalk (% classrooms)	97.0	97.3	96.5	0.8	100.0	96.2	3.9
Sufficient contrast to read board (% classrooms)	92.8	90.5	95.8	-5.6	91.4	90.1	1.5
<i>Minimum infrastructure availability</i>							
Visibility (% schools)	87.9	88.5	87.2	1.5	82.6	90.8	-9.0
Toilet clean (% schools)	50.3	46.5	54.6	-14.9	40.6	47.7	-14.8
Toilet private (% schools)	74.6	78.7	69.7	12.9	85.4	77.3	10.4
Toilet accessible (% schools)	55.5	48.2	63.8	-24.5**	60.1	45.7	31.5
Observed Pupil-teacher ratio	20.5	19.6	21.8	-10.3	22.4	18.5	21.4**
<i>Textbook availability (% pupils)</i>							
Pupils with mathematics textbook (% pupils)	60.5	65.3	55.7	17.3	86.4	56.6	52.5***
Pupils with English textbook (% pupils)	65.4	73.0	55.1	32.6***	75.5	71.9	5.0
<b>BAUCHI</b>							
<i>Minimum equipment availability</i>							
Pupils with pencils/pens (% pupils)	75.6	73.5	88.7	-17.7***	72.2	73.6	-2.0
Pupils with notebook/paper (% pupils)	79.3	77.7	89.6	-13.3**	70.6	78.2	-9.8
Have black board (% classrooms)	91.9	92.3	89.5	3.2	100.0	91.7	9.1***
Chalk (% classrooms)	77.0	75.1	89.4	-16.1*	88.8	74.0	20.0
Sufficient contrast to read board (% classrooms)	85.1	84.9	86.2	-1.5	66.8	86.3	-22.6
<i>Minimum infrastructure availability</i>							
Visibility (% schools)	78.9	78.8	79.8	-1.2	55.8	80.5	-30.7
Toilet clean (% schools)	12.5	8.7	37.3	-76.6***	0.0	9.3	-100.0***
Toilet private (% schools)	31.1	28.1	51.3	-45.4**	57.3	26.0	120.5
Toilet accessible (% schools)	34.0	30.4	57.6	-47.0***	33.6	30.2	11.3
<i>Observed Pupil-teacher ratio</i>							
Observed Pupil-teacher ratio	22.2	21.1	29.1	-27.5**	29.9	20.4	46.4*
<i>Textbook availability (% pupils)</i>							
Pupils with mathematics textbook (% pupils)	11.1	6.5	41.6	-84.5***	20.0	5.1	294.8*
Pupils with English textbook (% pupils)	15.8	13.3	29.5	-55.0**	32.5	11.2	190.9

Note: Level of significance: \*\*\* p < 0.01; \*\* p < 0.05; \* p < 0.1.

**Table C 29. School auxiliary information (by state) (cont'd)**

(Percent)	All	Public	Private	Percent Difference (%)	Urban Public	Rural Public	Percent Difference (%)
<b>EKITI</b>							
<i>Minimum equipment availability</i>							
Pupils with pencils/pens (% pupils)	92.2	92.1	92.4	-0.4	87.4	94.4	-7.5
Pupils with notebook/paper (% pupils)	96.4	97.3	93.2	4.4*	98.4	96.8	1.6
Have black board (% classrooms)	97.3	98.1	94.4	4.0	100.0	97.2	2.9
Chalk (% classrooms)	98.0	98.7	95.5	3.4	100.0	98.1	1.9
Sufficient contrast to read board (% classrooms)	92.6	95.0	84.3	12.6*	96.2	94.3	2.0
<i>Minimum infrastructure availability</i>							
Visibility (% schools)	88.9	91.1	80.8	12.8*	92.4	90.5	2.0
Toilet clean (% schools)	39.3	38.7	41.0	-5.5	48.3	35.4	36.7
Toilet private (% schools)	51.5	54.7	42.3	29.6*	65.5	51.0	28.6
Toilet accessible (% schools)	43.9	44.5	42.2	5.3	65.6	37.0	77.2***
<i>Observed Pupil-teacher ratio</i>	15.4	16.6	11.3	46.6***	18.7	15.5	21.1
<i>Textbook availability (% pupils)</i>							
Pupils with mathematics textbook (% pupils)	65.6	70.7	48.5	45.8***	84.5	63.2	33.6**
Pupils with English textbook (% pupils)	60.1	60.7	57.6	5.3	61.1	60.5	1.1
<b>NIGER</b>							
<i>Minimum equipment availability</i>							
Pupils with pencils/pens (% pupils)	84.7	83.2	93.8	-11.2***	74.8	84.5	-11.5
Pupils with notebook/paper (% pupils)	86.0	85.3	90.7	-5.9	82.1	85.8	-4.4
Have black board (% classrooms)	95.7	95.0	100.0	-5.0**	100.0	94.3	6.0**
Chalk (% classrooms)	93.6	92.9	98.3	-5.5	100.0	91.8	8.9**
Sufficient contrast to read board (% classrooms)	87.0	86.0	93.9	-8.4	83.6	86.3	-3.2
<i>Minimum infrastructure availability</i>							
Visibility (% schools)	77.0	74.7	91.2	-18.0***	82.7	73.6	12.5
Toilet clean (% schools)	19.1	12.4	64.1	-80.6***	39.8	9.5	320.9**
Toilet private (% schools)	31.9	24.1	83.4	-71.1***	30.6	23.4	30.8
Toilet accessible (% schools)	28.1	20.7	77.5	-73.4***	24.1	20.3	18.3
<i>Observed Pupil-teacher ratio</i>	24.3	24.3	24.3	-0.2	38.1	22.2	71.6***
<i>Textbook availability (% pupils)</i>							
Pupils with mathematics textbook (% pupils)	24.7	21.5	47.8	-55.0***	15.0	23.0	-34.6
Pupils with English textbook (% pupils)	27.5	21.1	62.2	-66.0***	10.0	23.5	-57.3**

Note: Level of significance: \*\*\* p < 0.01; \*\* p < 0.05; \* p < 0.1.

**Table C 30. Pupil performance**

(Out of 100)	All	Public	Private	Percent Difference (%)	Urban Public	Rural Public	Percent Difference (%)
English and mathematics test scores	32.2	25.1	61.0	-58.9***	39.7	22.1	80.2***
English test score	31.4	23.3	64.1	-63.6***	40.1	19.8	102.1***
Mathematics test score	31.9	28.2	46.8	-39.8***	34.7	26.8	29.6***
Non-verbal reasoning test scores	50.2	47.7	60.0	-20.4***	53.5	46.6	14.9*
Observations	760	478	282		131	347	

Note: The results are based on observations from 6,644 pupils in 760 schools (3,996 pupils in public and 2,648 pupils in private schools). Level of significance: \*\*\* p < 0.01; \*\* p < 0.05; \* p < 0.1.

**Table C 31. Pupil performance – Anambra**

(Out of 100)	All	Public	Private	Percent Difference (%)	Urban Public	Rural Public	Percent Difference (%)
English and mathematics test scores	59.4	52.7	67.7	-22.2***	57.0	50.6	12.5**
English test score	62.6	55.0	71.8	-23.4***	60.2	52.6	14.4**
Mathematics test score	44.4	40.4	49.2	-17.9***	41.4	39.9	3.8
Non-verbal reasoning test scores	59.2	56.4	62.5	-9.7***	57.2	56.0	2.1
Observations	190	127	63		40	87	

Note: The results are based on observations from 1,701 pupils in 190 schools (1,139 pupils in public and 562 pupils in private schools). Level of significance: \*\*\* p < 0.01; \*\* p < 0.05; \* p < 0.1.

**Table C 32. Pupil performance – Bauchi**

(Out of 100)	All	Public	Private	Percent Difference (%)	Urban Public	Rural Public	Percent Difference (%)
English and mathematics test scores	19.8	16.6	40.9	-59.3***	33.6	15.4	118.4***
English test score	17.0	13.4	40.7	-67.1***	33.1	12.0	176.2***
Mathematics test score	25.5	23.8	37.0	-35.7***	30.2	23.3	29.8***
Non-verbal reasoning test scores	52.9	51.5	61.6	-16.4***	59.151.0	15.9*	14.9***
Observations	190	122	68		16	106	

Note: The results are based on observations from 1,693 pupils in 190 schools (1,051 pupils in public and 642 pupils in private schools). Level of significance: \*\*\* p < 0.01; \*\* p < 0.05; \* p < 0.1.

**Table C 33. Pupil performance – Ekiti**

(Out of 100)	All	Public	Private	Percent Difference (%)	Urban Public	Rural Public	Percent Difference (%)
English and mathematics test scores	54.0	50.8	70.9	-28.4***	55.3	48.2	14.9***
English test score	55.0	51.2	75.3	-32.1***	57.1	47.7	19.7***
Mathematics test score	48.0	46.9	54.2	-13.5***	45.7	47.6	-4.0
Non-verbal reasoning test scores	58.9	60.1	52.4	14.6***	60.3	59.9	0.7
Observations	190	113	77		50	60	

Note: The results are based on observations from 1,579 pupils in 190 schools (995 pupils in public and 584 pupils in private schools). Level of significance: \*\*\* p < 0.01; \*\* p < 0.05; \* p < 0.1.

**Table C 34. Pupil performance – Niger**

(Out of 100)	All	Public	Private	Percent Difference (%)	Urban Public	Rural Public	Percent Difference (%)
English and mathematics test scores	23.0	17.1	62.6	-72.6***	22.8	16.0	41.8*
English test score	21.4	14.7	66.0	-77.7***	20.8	13.5	54.2*
Mathematics test score	26.8	23.6	48.4	-51.3***	26.5	23.0	15.2
Non-verbal reasoning test scores	41.2	39.0	56.1	-30.5***	45.7	37.6	21.3*
Observations	190	116	74		22	94	

Note: The results are based on observations from 1,671 pupils in 190 schools (998 pupils in public and 673 pupils in private schools). Level of significance: \*\*\* p < 0.01; \*\* p < 0.05; \* p < 0.1.

**Table C 35. Pupil performance on the English test**

(% pupils)	All	Public	Private	Percent Difference (%)	Urban Public	Rural Public	Percent Difference (%)
<i>Pupils who can:</i>							
Read a letter	57.7	50.1	88.1	-43.1***	72.1	45.5	58.4***
Basic vocabulary	29.6	20.9	64.7	-67.8***	38.8	17.1	126.6***
Read a sentence	26.2	18.4	57.5	-68.0***	27.9	16.4	69.7***
Read a paragraph	11.7	5.8	35.2	-83.5***	15.2	3.9	293.8**
Answer comprehension questions	15.8	9.5	41.5	-77.2***	21.4	7.0	205.1***
Observations	760	478	282		131	347	

Note: The results are based on observations from 6,644 pupils in 760 schools (4,183 pupils in public and 2,461 pupils in private schools). Level of significance: \*\*\* p < 0.01; \*\* p < 0.05; \* p < 0.1



**Table C 36. Pupil performance on the English test – Anambra**

(% pupils)	All	Public	Private	Percent Difference (%)	Urban Public	Rural Public	Percent Difference (%)
<i>Pupils who can:</i>							
Read a letter	91.8	89.9	94.1	-4.5***	88.7	90.5	-2.0
Read a word	60.4	52.2	70.4	-25.9***	57.3	49.8	15.1
Read a sentence	51.5	44.2	60.4	-26.7***	49.0	42.0	16.8
Read a paragraph	30.1	21.0	41.2	-48.9***	25.6	18.9	35.3
Answer comprehension questions	37.2	28.6	47.7	-40.0***	35.0	25.6	36.9***
Observations	190	127	63		40	87	

Note: The results are based on observations from 1,701 pupils in 190 schools (1,139 pupils in public and 562 pupils in private schools). Level of significance: \*\*\* p < 0.01; \*\* p < 0.05; \* p < 0.1.

**Table C 37. Pupil performance on the English test – Bauchi**

(% pupils)	All	Public	Private	Percent Difference (%)	Urban Public	Rural Public	Percent Difference (%)
<i>Pupils who can:</i>							
Read a letter	34.3	29.2	67.9	-57.0***	68.8	26.3	161.9***
Read a word	15.4	11.3	42.5	-73.3***	35.6	9.5	274.4***
Read a sentence	16.9	14.1	35.4	-60.2***	19.6	13.7	43.2
Read a paragraph	3.1	1.3	14.9	-91.1***	14.8	0.3	4,330.1***
Answer comprehension questions	5.3	3.3	19.1	-83.0***	20.3	2.0	918.8***
Observations	190	122	68		16	106	

Note: The results are based on observations from 1,693 pupils in 190 schools (1,051 pupils in public and 642 pupils in private schools). Level of significance: \*\*\* p < 0.01; \*\* p < 0.05; \* p < 0.1.

**Table C 38. Pupil performance on the English test – Ekiti**

(% pupils)	All	Public	Private	Percent Difference (%)	Urban Public	Rural Public	Percent Difference (%)
<i>Pupils who can:</i>							
Read a letter	87.8	86.7	96.6	-7.3***	90.9	84.3	7.9**
Read a word	52.0	48.0	73.3	-34.6***	51.8	45.7	13.3
Read a sentence	43.3	37.3	75.0	-50.4***	39.4	36.0	9.6
Read a paragraph	19.6	15.3	42.7	-64.3***	16.9	14.3	18.5
Answer comprehension questions	31.7	27.2	55.1	-50.6***	31.4	24.8	26.5*
Observations	190	113	77		50	60	

Note: The results are based on observations from 1,579 pupils in 190 schools (995 pupils in public and 584 pupils in private schools). Level of significance: \*\*\* p < 0.01; \*\* p < 0.05; \* p < 0.1.

**Table C 39. Pupil performance on the English test – Niger**

(% pupils)	All	Public	Private	Percent Difference (%)	Urban Public	Rural Public	Percent Difference (%)
<i>Pupils who can:</i>							
Read a letter	52.0	46.0	92.3	-50.2***	53.1	44.6	19.0
Read a word	19.8	12.3	70.3	-82.6***	21.3	10.5	102.8*
Read a sentence	16.5	9.1	65.8	-86.2***	11.1	8.7	26.7
Read a paragraph	7.1	2.3	39.0	-94.1***	7.6	1.3	497.8
Answer comprehension questions	9.6	4.3	44.8	-90.5***	7.8	3.6	115.9
Observations	190	116	74		22	94	

Note: The results are based on observations from 1,671 pupils in 190 schools (998 pupils in public and 673 pupils in private schools). Level of significance: \*\*\* p < 0.01; \*\* p < 0.05; \* p < 0.1.

**Table C 40. Pupil performance on mathematics test**

(Out of 100)	All	Public	Private	Percent Difference (%)	Urban Public	Rural Public	Percent Difference (%)
Number recognition	9.4	11.2	2.3	400.0***	6.7	12.2	-45.3**
Ordering numbers	26.0	20.0	50.2	-60.3***	29.2	18.0	61.8**
Addition (single digits)	56.8	51.2	79.0	-35.2***	68.4	47.7	43.5***
Addition (double digits)	35.6	29.6	60.0	-50.7***	46.2	26.1	77.1**
Addition (triple digits)	27.2	20.3	54.9	-63.0***	32.2	17.9	80.5***
Subtraction (single digits)	50.2	45.1	70.7	-36.2***	55.0	43.1	27.6***
Subtraction (double digits)	22.4	18.3	38.8	-52.9***	23.1	17.3	33.6**
Multiplication (single digits)	21.7	17.7	38.0	-53.5***	21.8	16.8	29.5**
Multiplication (double digits)	4.4	3.0	10.1	-70.6***	1.3	3.3	-61.6*
Multiplication (triple digits)	3.0	1.9	7.3	-73.4***	0.8	2.2	-63.5***
Division (single digits)	21.1	17.7	34.7	-48.9***	14.2	18.5	-22.9**
Division (double digits)	12.0	9.2	23.5	-60.8***	7.1	9.6	-25.9*
Division (analytical)	11.4	9.4	19.5	-51.8***	7.5	9.8	-23.1
Multiplication (problem solving)	4.0	2.7	9.1	-69.8***	3.6	2.6	38.8
Complete sequence	13.9	11.1	24.8	-55.1***	11.6	11.1	4.5
Observations	760	478	282		131	347	

*Note:* The results are based on observations from 6,644 pupils in 760 schools (3,996 pupils in public and 2,648 pupils in private schools). Level of significance: \*\*\* p < 0.01; \*\* p < 0.05; \* p < 0.1.

**Table C 41. Pupil performance on mathematics test – Anambra**

(Out of 100)	All	Public	Private	Percent Difference (%)	Urban Public	Rural Public	Percent Difference (%)
Number recognition	0.7	0.8	0.5	64.1	0.2	1.1	-86.4**
Ordering numbers	44.3	36.5	53.7	-32.0***	36.7	36.4	0.6
Addition (single digits)	79.5	77.5	82.0	-5.5*	77.3	77.6	-0.4
Addition (double digits)	58.0	51.9	65.3	-20.6***	59.3	48.4	22.4**
Addition (triple digits)	50.1	42.4	59.4	-28.6***	46.5	40.5	14.9
Subtraction (single digits)	70.4	69.4	71.6	-3.0	70.9	68.7	3.1
Subtraction (double digits)	33.5	27.8	40.5	-31.5***	30.5	26.5	15.0
Multiplication (single digits)	29.4	24.6	35.3	-30.2***	24.7	24.6	0.4
Multiplication (double digits)	5.1	1.5	9.4	-84.5***	0.2	2.1	-88.2**
Multiplication (triple digits)	3.5	1.0	6.4	-84.0***	0.7	1.2	-40.6
Division (single digits)	29.6	22.2	38.6	-42.4***	21.9	22.4	-2.1
Division (double digits)	19.4	12.6	27.7	-54.4***	10.2	13.8	-26.0
Division (analytical)	12.8	9.0	17.5	-48.7***	7.9	9.5	-17.3
Multiplication (problem solving)	6.5	2.6	11.3	-76.9***	4.1	1.9	115.6
Complete sequence	21.1	14.4	29.3	-50.9***	14.8	14.2	4.1
Observations	190	127	63		40	87	

Note: The results are based on observations from 1,701 pupils in 190 schools (1,139 pupils in public and 562 pupils in private schools). Level of significance: \*\*\* p < 0.01; \*\* p < 0.05; \* p < 0.1.

**Table C 42. Pupil performance on mathematics test – Bauchi**

(Out of 100)	All	Public	Private	Percent Difference (%)	Urban Public	Rural Public	Percent Difference (%)
Number recognition	16.0	17.7	4.5	292.9***	4.4	18.7	-76.6***
Ordering numbers	17.9	15.9	31.5	-49.6***	13.8	16.1	-14.2
Addition (single digits)	44.3	41.4	63.8	-35.1***	59.8	40.0	49.6**
Addition (double digits)	24.1	22.3	36.1	-38.4***	40.8	20.9	95.6***
Addition (triple digits)	16.2	14.7	26.6	-44.8***	21.3	14.2	49.8
Subtraction (single digits)	42.7	40.2	58.9	-31.7***	43.8	40.0	9.7
Subtraction (double digits)	19.0	17.9	26.5	-32.5***	9.9	18.5	-46.5**
Multiplication (single digits)	15.6	13.8	27.9	-50.7***	14.2	13.7	3.0
Multiplication (double digits)	5.1	4.6	8.3	-44.3**	5.5	4.5	22.2
Multiplication (triple digits)	2.2	1.9	4.4	-56.9**	0.0	2.0	-100.0***
Division (single digits)	23.4	23.0	26.0	-11.4	2.5	24.6	-90.0***
Division (double digits)	10.8	10.3	14.3	-27.8*	0.0	11.1	-1000.0***
Division (analytical)	15.7	14.0	27.4	-49.0***	8.3	14.4	-42.2
Multiplication (problem solving)	2.2	1.6	6.6	-76.7***	8.6	1.0	745.2*
Complete sequence	16.7	15.0	27.9	-46.4***	32.3	13.7	136.4**
Observations	190	122	68		16	106	

Note: Results based on observations from 1,693 pupils in 190 schools (1,051 pupils in public and 642 pupils in private schools). Level of significance: \*\*\* p < 0.01; \*\* p < 0.05; \* p < 0.1.

**Table C 43. Pupil performance on mathematics test – Ekiti**

(Out of 100)	All	Public	Private	Percent Difference (%)	Urban Public	Rural Public	Percent Difference (%)
Number recognition	1.5	1.2	3.0	-58.7**	1.2	1.2	0.6
Ordering numbers	52.3	48.8	70.6	-30.8***	57.3	43.9	30.7***
Addition (single digits)	85.4	84.4	90.7	-7.0***	86.4	83.3	3.7
Addition (double digits)	64.5	61.7	79.4	-22.3***	65.6	59.5	10.3
Addition (triple digits)	54.8	51.2	73.5	-30.2***	52.0	50.8	2.5
Subtraction (single digits)	75.1	74.0	80.9	-8.6**	67.3	77.9	-13.6**
Subtraction (double digits)	41.8	40.4	49.7	-18.7***	38.2	41.6	-8.0
Multiplication (single digits)	48.3	46.4	58.3	-20.5***	42.4	48.7	-12.9
Multiplication (double digits)	8.1	6.1	18.5	-66.9***	2.2	8.4	-74.5***
Multiplication (triple digits)	6.7	5.3	14.1	-62.4***	2.8	6.8	-58.7**
Division (single digits)	32.8	31.8	38.3	-17.0**	27.3	34.4	-20.7*
Division (double digits)	22.9	22.3	25.8	-13.5	15.1	26.5	-43.0***
Division (analytical)	14.2	13.5	17.6	-23.3*	11.0	15.0	-26.3
Multiplication (problem solving)	11.8	11.5	13.2	-12.8	6.4	14.5	-55.7***
Complete sequence	20.3	19.2	26.3	-27.0**	15.5	21.3	-27.5
Observations	190	113	77		50	60	

Note: Results based on observations from 1,579 pupils in 190 schools (995 pupils in public and 584 pupils in private schools). Level of significance: \*\*\* p < 0.01; \*\* p < 0.05; \* p < 0.1.

**Table C 44. Pupil performance on mathematics test – Niger**

(Out of 100)	All	Public	Private	Percent Difference (%)	Urban Public	Rural Public	Percent Difference (%)
Number recognition	10.5	11.6	3.5	236.1***	14.5	11.0	31.2
Ordering numbers	16.9	11.4	53.6	-78.7***	15.8	10.6	50.0
Addition (single digits)	48.4	43.3	83.1	-47.9***	56.6	40.7	39.3**
Addition (double digits)	26.7	21.1	64.8	-67.5***	30.0	19.3	55.1
Addition (triple digits)	17.8	10.8	65.0	-83.4***	16.9	9.6	75.7
Subtraction (single digits)	40.0	34.6	76.1	-54.5***	42.2	33.2	27.4
Subtraction (double digits)	14.8	10.6	43.0	-75.4***	15.4	9.6	59.7
Multiplication (single digits)	16.6	12.2	45.8	-73.3***	12.4	12.2	1.2
Multiplication (double digits)	2.6	1.4	10.5	-86.5***	0.0	1.7	-97.9***
Multiplication (triple digits)	2.6	1.6	9.4	-83.5***	0.2	1.8	-91.4***
Division (single digits)	12.0	8.7	33.6	-74.0***	6.8	9.1	-25.0
Division (double digits)	6.7	4.3	22.7	-81.2***	3.7	4.4	-15.5
Division (analytical)	6.4	4.8	17.1	-71.7***	5.3	4.7	12.0
Multiplication (problem solving)	2.4	1.9	5.9	-68.3***	0.0	2.2	-98.4***
Complete sequence	6.2	5.1	13.4	-62.0***	0.2	6.1	-96.8***
Observations	190	116	74		22	94	

Note: Results based on observations from 1,671 pupils in 190 schools (998 pupils in public and 673 pupils in private schools). Level of significance: \*\*\* p < 0.01; \*\* p < 0.05; \* p < 0.1.

**Table C 45. Correlations between pupil test scores and the Service Delivery Indicators**

	School absence rate	Classroom absence rate	Time spent teaching per day	Share of teachers with minimum knowledge	Teacher test score (English and mathematics)	Teacher test score (English, mathematics, pedagogy)	Minimum equipment availability	Minimum infrastructure availability	Observed pupil-teacher ratio	Share of pupils with textbooks
<b>Panel A</b>										
All	-0.285***	-0.299***	0.165***	0.548***	0.654***	0.925***	0.197***	0.277***	-0.003***	0.369***
	0.031	0.030	0.056	0.085	0.043	0.049	0.020	0.024	0.000	0.022
Observations	732	732	714	750	750	750	760	760	760	760
<b>Panel B</b>										
Public schools	-0.176***	-0.191***	0.154***	0.429***	0.527***	0.740***	0.141***	0.242***	-0.002***	0.310***
	0.028	0.029	0.054	0.095	0.042	0.049	0.019	0.029	0.000	0.021
Observations	458	458	440	470	470	470	478	478	478	478

Note: Each cell represent a regression where test score is regressed on the indicator noted in the column and a constant. The regression uses sampling weights. Panel A is all schools. Panel B is public schools, controlling for rural-urban location. Weighted robust standard errors in parenthesis. *Time spent teaching per day* is measured in hours. Level of significance: \*\*\* p < 0.01; \*\* p < 0.05; \* p < 0.1.



**Table C 46. Correlations between pupil test scores and the Service Delivery Indicators – Anambra**

	School absence rate	Classroom absence rate	Time spent teaching per day	Share of teachers with minimum knowledge	Teacher test score (English and mathematics)	Teacher test score (English, mathematics, pedagogy)	Minimum equipment availability	Minimum infrastructure availability	Observed pupil-teacher ratio	Share of pupils with textbooks
<b>Panel A</b>										
All	-0.228***	-0.268***	0.076	0.212**	0.195	0.357**	0.050	0.080***	-0.002***	0.015
	0.064	0.062	0.078	0.091	0.135	0.140	0.037	0.028	0.001	0.037
Observations	188	188	187	190	190	190	190	190	190	185
<b>Panel B</b>										
Public schools	-0.131**	-0.158***	-0.006	0.047	0.153	0.228*	0.049	0.082***	-0.001*	0.008
	0.055	0.054	0.071	0.062	0.114	0.133	0.032	0.030	0.001	0.035
Observations	125	125	126	127	127	127	127	127	127	125

Note: Each cell represent a regression where test score is regressed on the indicator noted in the column and a constant. The regression uses sampling weights. Panel A is all schools. Panel B is public schools, controlling for rural-urban location. Weighted robust standard errors in parenthesis. *Time spent teaching per day* is measured in hours. Level of significance: \*\*\* p < 0.01; \*\* p < 0.05; \* p < 0.1.

**Table C 47. Correlations between pupil test scores and the Service Delivery Indicators – Bauchi**

	School absence rate	Classroom absence rate	Time spent teaching per day	Share of teachers with minimum knowledge	Teacher test score (English and mathematics)	Teacher test score (English, mathematics, pedagogy)	Minimum equipment availability	Minimum infrastructure availability	Observed pupil-teacher ratio	Share of pupils with textbooks
<b>Panel A</b>										
All	-0.022	-0.002	-0.073	0.119	0.205***	0.302***	0.120***	0.174**	-0.001***	0.435***
	0.029	0.033	0.107	0.172	0.071	0.101	0.031	0.083	0.000	0.073
Observations	174	174	148	188	188	188	190	190	190	187
<b>Panel B</b>										
Public schools	0.007	0.027	-0.058	-0.005	0.147**	0.172*	0.065*	-0.024	-0.001***	0.314***
	0.029	0.032	0.121	0.131	0.071	0.097	0.033	0.039	0.000	0.089
Observations	113	113	86	120	120	120	122	122	122	121

Note: Each cell represent a regression where test score is regressed on the indicator noted in the column and a constant. The regression uses sampling weights. Panel A is all schools. Panel B is public schools, controlling for rural-urban location. Weighted robust standard errors in parenthesis. *Time spent teaching per day* is measured in hours. Level of significance: \*\*\* p < 0.01; \*\* p < 0.05; \* p < 0.1.

**Table C 48. Correlations between pupil test scores and the Service Delivery Indicators – Ekiti**

	School absence rate	Classroom absence rate	Time spent teaching per day	Share of teachers with minimum knowledge	Teacher test score (English and mathematics)	Teacher test score (English, mathematics, pedagogy)	Minimum equipment availability	Minimum infrastructure availability	Observed pupil-teacher ratio	Share of pupils with textbooks
<b>Panel A</b>										
All	-0.103	-0.121	0.188	0.018	-0.299**	-0.243	-0.014	-0.015	-0.005	0.046
	0.095	0.080	0.125	0.088	0.129	0.152	0.038	0.038	0.003	0.053
Observations	183	183	190	187	187	187	190	190	190	188
<b>Panel B</b>										
Public schools	-0.197**	-0.201**	0.405**	0.065	-0.099	-0.062	0.010	-0.006	-0.002	0.083
	0.092	0.082	0.166	0.100	0.194	0.214	0.048	0.046	0.004	0.074
Observations	107	107	113	112	112	112	113	113	113	112

Note: Each cell represent a regression where test score is regressed on the indicator noted in the column and a constant. The regression uses sampling weights. Panel A is all schools. Panel B is public schools, controlling for rural-urban location. Weighted robust standard errors in parenthesis. *Time spent teaching per day* is measured in hours. Level of significance: \*\*\* p < 0.01; \*\* p < 0.05; \* p < 0.1.

**Table C 49. Correlations between pupil test scores and the Service Delivery Indicators – Niger**

	School absence rate	Classroom absence rate	Time spent teaching per day	Share of teachers with minimum knowledge	Teacher test score (English and mathematics)	Teacher test score (English, mathematics, pedagogy)	Minimum equipment availability	Minimum infrastructure availability	Observed pupil-teacher ratio	Share of pupils with textbooks
<b>Panel A</b>										
All	-0.205***	-0.244***	-0.061	0.798***	0.376***	0.573***	0.068**	0.386***	-0.002***	0.297***
	0.043	0.046	0.074	0.171	0.072	0.108	0.028	0.052	0.000	0.058
Observations	187	187	189	185	185	185	190	190	190	180
<b>Panel B</b>										
Public schools	-0.078**	-0.105***	0.006	0.208	0.101*	0.123	-0.004	0.263***	-0.001***	0.092*
	0.035	0.037	0.051	0.260	0.060	0.086	0.023	0.082	0.000	0.048
Observations	113	113	115	111	111	111	116	116	116	109

Note: Each cell represent a regression where test score is regressed on the indicator noted in the column and a constant. The regression uses sampling weights. Panel A is all schools. Panel B is public schools, controlling for rural-urban location. Weighted robust standard errors in parenthesis. *Time spent teaching per day* is measured in hours. Level of significance: \*\*\* p < 0.01; \*\* p < 0.05; \* p < 0.1.

**Table C 50. SDI- at-a- glance (All schools)**

All schools	Nigeria <sup>a</sup> 2013	Average SDI	Kenya 2012	Mozambique+ 2014	Senegal+ 2011	Tanzania 2014	Tanzania+ 2011	Togo 2013	Uganda 2013
<b>Teacher Ability</b>									
Minimum knowledge (% teachers)	3.7	<b>14.6</b>	40.4	0.3	Not Comparable	15.6	Not Comparable	1.6	11.7
Test score (out of 100)	32.9	<b>43.0</b>	57.1	26.9	Not Comparable	46.5	Not Comparable	35.6	42.7
<b>Teacher Effort</b>									
School absence rate (% teachers)	13.7	<b>18.6</b>	14.1	44.8	18.0	15.0	23.0	20.5	26.0
Classroom absence rate (% teachers)	19.1	<b>39.8</b>	42.1	56.2	29.0	46.6	53.0	35.8	52.8
<i>Scheduled teaching time</i>	<i>4h 53min</i>	<i><b>5h 34min</b></i>	<i>5h 37min</i>	<i>4h 17min</i>	<i>4h 36min</i>	<i>5h 54min</i>	<i>5h 12min</i>	<i>5h 29min</i>	<i>7h 18min</i>
Time spent teaching per day	3h 26min	<b>3h 02min</b>	2h 49min	1h 41 min	3h 15min	2h 59min	2h 04min	3h 29min	3h 18min
<b>Availability of Inputs</b>									
Observed pupil-teacher ratio	21.6	<b>40.4</b>	35.2	21.4	34.0	40.5	74.0	29.7	47.9
Textbook availability (% pupils)	38.2	<b>37.1</b>	48.0	68.1	Not Comparable	25.9	Not Comparable	68.5	5.0
Minimum equipment availability (% classrooms)	54.8	<b>60.5</b>	78.8	76.8	Not Comparable	62.0	Not Comparable	26.4	80.6
Minimum infrastructure availability(% schools)	18.5	<b>38.1</b>	59.5	29.1	Not Comparable	36.6	Not Comparable	22.3	53.7
<b>Pupil Learning</b>									
Language and mathematics test score (out of 100)	32.2	<b>49.6</b>	72.0	20.8	Not Comparable	49.5	Not Comparable	45.7	48.6
Language test score (out of 100)	31.4	<b>49.5</b>	75.4	18.7	Not Comparable	48.2	Not Comparable	45.5	47.1
Mathematics test score (out of 100)	31.9	<b>47.3</b>	59.0	25.1	Not Comparable	57.6	Not Comparable	44.6	43.4

Notes: a. Values for Nigeria are the weighted average of the four states surveyed, namely Anambra, Bauchi, Ekiti, and Niger.

b. These numbers reflect the updated SDI methodology. More information can be found on [www.SDIndicators.org](http://www.SDIndicators.org).

c. Full definitions of indicators in Annex C.

d. In Mozambique, Senegal, and Tanzania 2011 (round 1) only public schools were surveyed.

**Table C 51. SDI-At-a-glance (private schools only)**

Private schools only	Nigeria <sup>a</sup> 2013	Average SDI	Kenya 2012	Mozambique+ 2014	Senegal+ 2011	Tanzania 2014	Tanzania+ 2011	Togo 2013	Uganda 2013
<b>Teacher Ability</b>									
Minimum knowledge (% teachers)	7.7	<b>19.8</b>	52.6	Not Comparable	Not Comparable	20.8	Not Comparable	3.1	14.7
Test score (out of 100)	40.4	<b>45.3</b>	60.4	Not Comparable	Not Comparable	45.5	Not Comparable	39.0	41.5
<b>Teacher Effort</b>									
School absence rate (% teachers)	5.5	<b>10.8</b>	11.4	Not Comparable	Not Comparable	6.7	Not Comparable	16.1	14.2
Classroom absence rate (% teachers)	9.5	<b>29.9</b>	29.3	Not Comparable	Not Comparable	41.8	Not Comparable	28.4	40.5
<i>Scheduled teaching time</i>	<i>5h 24min</i>	<i><b>6h 04min</b></i>	<i>5h 55min</i>	<i>Not Comparable</i>	<i>Not Comparable</i>	<i>5h 54min</i>	<i>Not Comparable</i>	<i>5h 33min</i>	<i>7h 33min</i>
Time spent teaching per day	4h 23min	<b>4h 07min</b>	3h 44min	Not Comparable	Not Comparable	4h 19min	Not Comparable	3h 43min	4h 27min
<b>Availability of Inputs</b>									
Observed pupil-teacher ratio	22.1	<b>27.4</b>	22.9	Not Comparable	Not Comparable	37.0	Not Comparable	26.2	28.9
Textbook availability (% pupils)	54.6	<b>38.3</b>	58.6	Not Comparable	Not Comparable	23.9	Not Comparable	52.6	1.9
Minimum equipment availability (% classrooms)	78.3	<b>62.8</b>	92.1	Not Comparable	Not Comparable	28.8	Not Comparable	30.8	84.0
Minimum infrastructure availability (% schools)	36.6	<b>51.9</b>	57.5	Not Comparable	Not Comparable	83.4	Not Comparable	39.2	42.9
<b>Pupil Learning</b>									
Language and mathematics test score (out of 100)	61.0	<b>73.9</b>	85.6	Not Comparable	Not Comparable	87.2	Not Comparable	65.2	70.3
Language test score (out of 100)	64.1	<b>76.8</b>	90.4	Not Comparable	Not Comparable	90.8	Not Comparable	67.8	71.0
Mathematics test score (out of 100)	46.8	<b>58.8</b>	67.3	Not Comparable	Not Comparable	71.9	Not Comparable	53.3	54.6

Notes: a. Values for Nigeria are the weighted average of the four states surveyed, namely Anambra, Bauchi, Ekiti, and Niger.

b. These numbers reflect the updated SDI methodology. More information can be found on [www.SDIndicators.org](http://www.SDIndicators.org).

c. Full definitions of indicators in Annex C.

d. In Mozambique, Senegal, and Tanzania 2011 (round 1) only public schools were surveyed.

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