



Tanzania

DATA MUST SPEAK

Unpacking Factors Influencing School Performance in Mainland Tanzania

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Correspondence should be addressed to:

United Nations Children's Fund
UNICEF Innocenti – Global Office of Research and Foresight
Via degli Alfani, 58
50121, Florence, Italy

researchpublications@unicef.org
www.unicef-irc.org

@UNICEFInnocenti on Twitter, LinkedIn, Facebook, Instagram and YouTube

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DATA MUST SPEAK

**Unpacking Factors
Influencing School Performance
in Mainland Tanzania**

Ministry of Education, Science and Technology of Tanzania
The President's Office Regional and Local Administration of Tanzania
UNICEF Tanzania
UNICEF Innocenti – Global Office of Research and Foresight



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Executive summary



Executive summary

The Ministry of Education, Science and Technology (MoEST) and the President’s Office Regional and Local Administration (PO-RALG) of Tanzania have developed a five-year Education Sector Development Plan (ESDP) with the goal of improving the quality and relevance of education. The government has integrated the strengthening the coordination of the Education Management Information System (EMIS) into the achievement this goal. This way, data access and utilization can be improved and key government actors can develop, implement and monitor evidence-based policies, plans and strategies to improve education (Tanzania, MoEST 2022).

The Data Must Speak (DMS) positive deviance research is a collaboration between MoEST, PO-RALG, UNICEF Innocenti – Global Office of Research and Foresight and UNICEF Tanzania. In its first stage, the DMS research analyses existing national education data sets to understand what factors are associated with school performance in Mainland Tanzania. This analysis is a critical first step in supporting the MoEST and PO-RALG’s objective of monitoring existing policies and developing innovative solutions to improve primary education using evidence.

This report summarizes the results of this analysis, which leveraged EMIS and Primary School Leaving Examination (PSLE) data.



Key findings



Girls are more likely than boys to stay in school, but score lower on the PSLE, especially in science and mathematics. The gender gaps in grade promotion rates and PSLE performance persisted between 2017 and 2022, suggesting that gender norms may be influencing teaching and learning that occurs in the classroom and affecting which pupils remain in school and for how long.



Pupils who live further away from school, especially those in rural areas, are less likely to be promoted to the next grade and score lower on the PSLE. Pupils in rural areas live further away from school in comparison to pupils from urban areas (2.04 km versus 1.68 km).



Having a teacher who has completed at least upper secondary education is positively associated with pupil performance on the PSLE. This finding supports proposed revisions by MoEST to the 2014 Education and Training Policy (ETP) to increase teacher qualification requirements and related strategies for upskilling existing teachers.



Permanent contract teachers were more likely to promote pupils to the next grade compared with part-time teachers, especially in urban schools. However, overall learning outcomes were not substantially different in schools with more permanent contract teachers.



Teacher gender was associated with PSLE performance in different ways. An increase in the proportion of male teachers in a school was positively associated with boys' performance. For girls, this relationship varied by subject and school location. Notably, girls in rural schools achieved higher promotion rates and PSLE scores when their schools had a higher proportion of female teachers. While further research is needed to understand how and why teacher gender affects pupil learning, these trends suggest that gender norms and expectations may play a role.



Higher pupil-teacher ratios had strong negative associations with both promotion rates and PSLE performance. The pupil-teacher ratio varies widely across regions and, even within regions, across schools. For example, on average, urban schools in Kilimanjaro Region have 33 pupils per teacher, while urban schools in Katavi have 103 pupils per teacher.



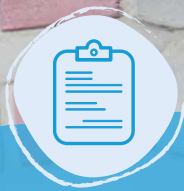
Increasing the number of textbooks per pupil for the three core subjects, English, Mathematics and Kiswahili, was associated with improved grade-level promotion and PSLE scores. Textbook availability remains low and unequal in Mainland Tanzania, usually with at least two pupils sharing one textbook. A significant number of pupils from Standard 3 to Standard 7 did not have access to English, Mathematics or Kiswahili books at their schools.



Physical school infrastructure, such as sufficient seats for pupils, access to sanitation facilities and more classroom availability were all positively associated with keeping pupils in school and with PSLE performance.

This first stage of the DMS research identified important insights that offer implications for education policy and suggest areas for further research in Tanzania. Future stages will complement this analysis by identifying 'positive deviant' schools and undertaking primary qualitative data collection to learn which behaviours and practices used in these schools may be making a difference to improve learning.





1. Introduction

Introduction

The Ministry of Education, Science and Technology (MoEST) and the President’s Office – Regional Administration and Local Government (PO-RALG) of Tanzania are committed to improving the quality and relevance of basic education in Mainland Tanzania by ensuring equitable access and participation and improved learning outcomes. To reach these goals, MoEST is also interested in enhancing data usage and access in the country so that education departments and institutions can develop, implement and monitor evidence-based policies, plans and strategies for primary education (Tanzania, MoEST 2022). For Tanzania, producing evidence to identify effective strategies for improving the country’s education is an important goal.

The Data Must Speak (DMS) positive deviance research is an innovative collaboration between MoEST, PO-RALG and the United Nations Children’s Fund (UNICEF) that aims to identify and scale local solutions already working in Tanzanian schools. The ‘positive deviance’ methodology is rooted in the premise that there are individuals in every community whose behaviours and practices help them find better solutions to the same problems their peers face, despite operating in similar circumstances (Herington and Van De Fliert 2018, as cited in Lévano et al. 2022). This research extends the positive deviance methodology to the education sector in Tanzania, and aims to understand why some schools are performing better than their peers even when operating in similar

conditions and with equivalent access to resources.

The DMS research includes four in-country stages and leverages various methodologies. In **Stage 1**, secondary data are analysed using quantitative methods to understand what factors correlate with school performance in Mainland Tanzania. **Stage 2** builds on Stage 1 to identify positive deviant schools. In **Stage 3**, primary qualitative data will be collected from positive deviant schools and a control group of schools to understand how positive deviant schools differ from their peers and what behaviours and practices they use to achieve higher performance. Finally, **Stage 4** will identify concrete levers and incentives at the system, policy, school and community levels to scale the identified positive deviant behaviours and practices in other schools to improve learning.

This report summarizes key findings from the quantitative analysis in Stage 1 of the research, and is divided into six sections. Section 1 introduces the report, section 2 provides a brief overview of the education context in Mainland Tanzania, section 3 details the methodology, data use and limitations of this analysis and section 4 provides descriptive statistics of the key indicators of school performance in Mainland Tanzania. Section 5 then discusses the key results from this analysis, and Section 6 concludes by identifying policy implications and proposing emerging policy areas for further exploration.

Figure 1: Stages of the DMS positive deviance research



Stage 1

Analysis of resources and context associated with school performance
(Quantitative research)



Stage 2

Identification of positive deviant schools and school typology
(Positive deviance)



Stage 3

Understanding school-level positive deviant behaviours/practices
(Behavioural sciences)



Stage 4

Investigating levers for optimum scale
(Participatory implementation research & scaling science)



2. Tanzanian education context



Tanzanian education context

Education in Mainland Tanzania is overseen by two government ministries. MoEST is responsible for national education policy and planning (Tanzania, MoEST n.d.), while PO-RALG ensures the implementation of policies and oversees school operations.

The management, administration and supervision of schools under PO-RALG is decentralized, with day-to-day school management and education provision overseen by LGAs at the ward, district and regional levels. Ward education officers (WEOs) serve as front-line monitors of education who visit schools and assess pupils. However, their level of activities

vary considerably between districts. WEOs report to district education officers (DEOs), who are responsible for the implementation of education policies and projects in their district and, in turn, report to regional education officers (REOs) (Cilliers and Oza 2020). REOs coordinate policy implementation at the regional level (Tanzania, PO-RALG n.d.).

Most schools in Tanzania are government-owned. As of 2022, only 11 per cent of primary schools and 24 per cent of secondary schools were private (Tanzania, MoEST 2022). The education system as of September 2023 is depicted in Table 1.

Table 1: Education system in Mainland Tanzania

Education level	Grade	Age	Assessments and examinations
Pre-primary	Pre-primary (2 years)	5-6	
Primary	Standard 1	7	
	Standard 2	8	Standard Two National Assessment (STNA) Early Grade Reading Assessment and Early Grade Mathematics Assessment (not national)
	Standard 3	9	
	Standard 4	10	Standard Four National Assessment (SFNA)
	Standard 5	11	
	Standard 6	12	
	Standard 7	13	Primary School Leaving Examination (PSLE)*
Lower secondary (O level)	Form 1	14	
	Form 2	15	Form Two National Assessment
	Form 3	16	
	Form 4	17	Ordinary-level Certificate of Secondary Education Examination*
Upper secondary (A level)	Form 5	18	
	Form 6	19	National examination for the Advanced Certificate of Secondary Education

Source: 2023 revisions to the 2014 ETP (Tanzania, MoEST 2023).

Notes: This table depicts the education system prior to the 2023 revision of the 2014 ETP. Compulsory education at the time of writing this report is indicated in yellow.

*Assessment is high-stakes for pupils' advancement in their academic studies.

Assessments and examinations occur at different stages to monitor children's learning and facilitate progress through primary, secondary and higher education. In primary education, the Standard Two National Assessment (STNA) (also called the 3Rs National Assessment) and the Standard Four National Assessment (SFNA) are expected to provide feedback on the quality of curriculum delivery and skills acquired by pupils in these respective grades. The Primary School Leaving Examination (PSLE) that occurs in Standard 7 is considered a high-stakes, standardized national examination. It enables the government to select Form 1 entrants for its secondary schools.¹



2.1 Policy initiatives and key education challenges

The government of Tanzania has undergone several policy reforms to improve access to and quality of education. In 2013, the Big Results Now in Education (BRNEd) initiative was launched, with the core aim of improving numeracy and literacy skills in early grades by focusing on the 3Rs (Reading, wRiting, and aRithmetic). As part of BRNEd, a curriculum reform introduced in 2015 shifted 80 per cent of instructional time in Standard 1 and Standard 2 to focus on the 3Rs rather than numerous subjects, and all literacy instruction to focus on Kiswahili rather than English. English would only be introduced to pupils in Standard 3 and, in line with Tanzania's language of instruction policy, would become the language of instruction when pupils enter secondary school. The curriculum reform also established that Standard 3 to Standard 7 should further enhance the learning of the 3Rs while enabling pupils to acquire lifelong learning skills through different subjects such as social studies, vocational skills, Kiswahili, mathematics, science and technology, civic and moral education, English and optional subjects (French and Arabic) (Tanzania, MoEST 2019; Tanzania, National Examinations Council 2018; Rodriguez-Segura and Mbiti 2022).

The curriculum reform under BRNEd more than doubled the chances of pupils reaching Standard 2 with math proficiency and increased the chance of pupils reaching Kiswahili proficiency by 71 per cent (Rodriguez-Segura and Mbiti 2022). However, progress since then has been modest. On average, Standard 2 pupils read about 27 words correctly per minute in 2021 compared with 24 words per minute in 2015, which is far below the benchmark of 45 words per minute (Tanzania, National Examinations Council 2022).

In addition to BRNEd, in 2016, Tanzania also introduced the Fee-Free Basic Education Policy (FBEP) to expand equitable access to basic education. The FBEP made Standard 1 to Form 4 fee-free for all pupils, and in 2022, the government extended FBEP to include the two years of upper secondary education. Despite primary and secondary education being fee-free, as of September 2023, only primary education remained compulsory in Tanzania.

Since the introduction of the FBEP, net enrolment rates in primary schools have increased substantially, from 84 per cent in 2016 to 95.3 per cent in 2020 (Tanzania, MoEST 2021). Yet in 2020, an estimated 3.2 million school-age children were out of primary school, 1.2 million of whom had never attended school. Almost 25 per cent of pupils dropped out at primary level or did not transition to lower secondary school (Tanzania, MoEST 2021).

Furthermore, the boost in enrolment has created pressure on the education system to increase the number of qualified teachers, classrooms and water, sanitation and hygiene facilities, and the availability of teaching and learning materials. The government has responded by constructing 1,080 new primary schools and 474 new secondary schools over the past 10 years. PO-RALG, which oversees the hiring, deployment and payment of teachers (UNESCO 2017), has been working to address teacher shortages. Nevertheless, there is an estimated deficit of over 130,000 primary teachers, with heavy reliance on volunteer teachers across the school system (Tanzania, MoEST 2021).

¹ The STNA is a sample-based assessment, whereas the SFNA and PSLE are nationally implemented census-based assessments.



Box 1

The Big Results Now in Education initiatives

The 2013 BRNEd was composed of nine government-led initiatives that aimed to adopt learning-oriented education reforms and improve accountability measures derived from high-stakes examinations and learning assessments (Todd and Attfield 2017).

The initiatives included: ranking all government schools according to their PSLE or Certificate of Secondary Education Examination scores and disseminating the information; adding the STNA under the 3Rs program with randomly selected schools and implementing teacher training aligned with the 3Rs (RISE Country Research Team – Tanzania 2019).

Many studies have discussed the successes and challenges of the BRNEd initiatives. A major topic of debate is around the enhanced focus on pupil

learning measured by high-stakes examinations. For example, school rankings increased average PSLE scores by almost 20 per cent for schools in the bottom decile compared with schools ranked in the middle six deciles. However, two fewer pupils sat for the PSLE in bottom ranked schools (Cilliers, Mbiti and Zeitlin 2021). This could suggest that pupils were being discouraged from sitting for the examination as a mechanism for improving performance.

Evidence suggests that the curriculum reform Standards 1 and 2 improved basic literacy and numeracy skills, but that teachers receiving teacher training did not necessarily help improve pupils' learning (Rodriguez-Segura and Mbiti 2022). This could mean that there is still space to improve the teacher training in how to teach the 3Rs.



Tanzania's education system is at an important juncture in its history. It is marked by policies resulting in rapid progress in access to education and curriculum reform that have improved early grade foundational literacy and numeracy. Nevertheless, education for all is still far from being achieved, and there are crucial challenges to overcome to enable all pupils to acquire basic skills.

To address the current challenges in education, the Government of Tanzania, through MoEST, has been reviewing and updating the 2014 ETP and the national curriculum for basic education. Once ratified, the new policy and curriculum are anticipated to be rolled out over the course of four years.

Significant changes to the education system have been proposed in the new draft policy. These include:



1. Changing the length and structure of education. These changes would result in one year of pre-primary education (instead of two), six years of primary education (instead of seven), maintaining four years of lower secondary education and having pupils advance to either two years of upper secondary education or three years of vocational education. This proposal also includes adding at least three years of higher education after secondary education.



2. Making 10 years of education compulsory in Tanzania. Currently, only primary education is compulsory. The new policy will guarantee that six years of primary and four years of lower secondary education are compulsory and that all years of primary and secondary education (including upper secondary) remain fee-free for pupils.



3. Adding a vocational pathway to complement the existing academic pathway at the upper secondary level and providing opportunities for pupils to move between these paths so that more learners are ultimately able to access later stages of education, including

higher education. Pathways offered to pupils will depend on their academic strengths and preferences. The government hopes to improve completion, promotion and transition rates into secondary, vocational and higher education.



4. Adapting the high-stakes nature of the PSLE to a lower-stakes national assessment that monitors learning progress but does not impede children's advancement to secondary school.

The new policy is also likely to include a change to the entry requirement for pre-service teachers, accompanied by a process for upskilling existing teachers through the Teacher Continuous Professional Development framework.

Finally, the government is interested in leveraging education technology (EdTech) to increase efficiency in the provision of education and teacher training (Tanzania, MoEST 2023). To date, EdTech has been utilized to address issues with school resources, such as textbooks. The Tanzania Institute of Education, which is responsible for publishing, printing and distributing textbooks to all government schools, developed a digital platform which has an e-version of all published books available online. In late 2022, the government distributed tablets to over 185,000 government primary school teachers and nearly 90,000 secondary school teachers, which included free internet access to enable access to the Institute of Education's e-content (Daily News 2022).



3. Methodology and data



Methodology and data



3.1 Research questions and analysis strategy

Stage 1 of the DMS research leverages quantitative data analysis to answer the following research questions, which were prioritized in collaboration with MoEST, PO-RALG and various education stakeholders:

- 1. What resources and contextual factors are associated with keeping children in school for longer in Tanzania?**
- 2. What resources and contextual factors are associated with improving children's learning?**

To answer these questions using existing national administrative and examination data sets, two different measures of school performance were identified:

- 1. Promotion rates**, representing the ability of schools to keep children enrolled and progressing within the education system.² Specifically, schools' grade-level promotion rates from Standard 1 to Standard 6 were calculated.
- 2. PSLE scores**, representing pupil learning outcomes at the end of the primary education cycle.

Three separate indicators were constructed for the analysis:

- the sum of schools' yearly average PSLE scores in four of the five subjects: science, mathematics, Kiswahili and English (maximum score of 200)
- the sum of schools' yearly average PSLE scores in science and mathematics subjects only (maximum score of 100)
- the sum of schools' yearly average PSLE scores in Kiswahili and English subjects only (maximum score of 100)

Further details on how each of these four performance variables were constructed can be found in Appendix C.

Multivariate regression analysis was conducted to estimate the factors associated with school performance represented by the indicators above.

The objective of the multivariate model was to estimate the relationship between dependent variables (promotion rates and PSLE scores) and various independent variables (school characteristics represented as precisely as possible). The model analysed the relationships of many independent variables with the dependent variables at the same time.

² Careful data analysis showed that promotion rates were considerably lower than 100 per cent in specific grades, contrary to the existing automatic promotion policy stipulated in the 2014 ETP, therefore making this a relevant education indicator in Tanzania.

All independent variables included in the analysis were calculated either at the relevant grade level – Standards 1 to 6 in the promotion rate model and Standard 7 in the PSLE scores models – where relevant and available, or at the school level and refer to the characteristics of either learners, teachers or schools. Independent variables were chosen based on their relevance to the research questions and ongoing country policy priorities, their variability and other important data considerations, such as co-linearity.

The following equation is a simplified version of the econometric model:

$$Y_{ijkm} = \beta_0 + \beta_1 P_{ijkm} + \beta_2 T_{ik} + \beta_3 I_{ik} + \beta_4 O_{ijkm} + \beta_5 S_i + \beta_6 G_m + \beta_7 Y_k + \varepsilon$$

where Y_{ijkm} represents performance in school i , for pupils of gender j (male or female), in year k and in grade m as measured by promotion rates or the average scores in PSLE examination in mathematics, science or language subjects. Promotion rates include Standard 1 through 6, while PSLE exam scores include Standard 7.

P_{ijkm} represents a set of independent variables depicting average pupil characteristics in school i , for pupils of gender j (male or female), in year k and in grade m .

T_{ik} are a set of variables representing average teacher characteristics in school i for year k .

I_{ik} and O_{ijkm} are a group of variables that represent availability of certain infrastructure items at the school i at year k and other inputs from school i for pupil of gender j at year k and grade m .

Since there could be unobserved factors in the database that do not vary or vary only slightly over time and are associated with performance (such as socioeconomic factors), school fixed effects (FE) are included in the econometric models to take these into account. Year FE were also included to control for trends in school performance

which are uniquely associated with time and, when appropriate, grade FE were included to take into consideration the cycle of dropout/ repetitions in the education system.

S_i are unobserved time-invariant heterogeneities across each school i (school FE). G_m are unobserved time-invariant heterogeneities across grades when using promotion rates as the school performance indicator (grade FE). Finally, Y_k are unobserved time-invariant heterogeneities across each year k , three years ranging from 2019 to 2021 (year FE).

3.2 Data and sample



The analysis drew upon Tanzania's four most recent years (2019–2022) of EMIS data and five years (2017–2021) of PSLE results for Standard 7 pupils. Tanzania's EMIS contains a comprehensive list of information for every school in the country, which includes number of pupils enrolled in a specific grade by gender, number of repeaters in a grade by gender, school location and context, teacher characteristics, pupil characteristics, school infrastructure and other inputs, including learning materials. It is collected annually by PO-RALG and maintained at the national level by MoEST.

The PSLE data set, managed by the National Examinations Council of Tanzania, contains school-level average exam scores for each of the five subjects (social studies, mathematics, science, English and Kiswahili) disaggregated by pupil gender. The annual data from these two sources were merged via the EMIS's unique school identification and the National Examinations Council's unique school codes. These two departments have different unique school codes in their data sets but also make available the equivalent codes from the alternate department.

While the descriptive statistics for the PSLE results are available for all years, for consistency and comparison with the promotion rates regression models, the regression models using PSLE results examined the equivalent time frame and only draw upon the period of 2019 to 2021.

The number of schools in the EMIS data sets ranged from 16,212 government schools in 2019 to 17,181 government schools in 2022 (for a total of 17,791 to 19,261 schools, respectively, when including private schools). 16,145 government schools ultimately had data for all four years, 240 schools only had data for three years and 323 schools only had data for two years. Therefore, promotion rates were calculated for 16,708 unique schools. Around 50 schools did not have information on pupil, teacher or school characteristics available and were not a part of the final sample. The final EMIS sample consisted of 16,653 schools with promotion rates for six grades calculated separately by gender, totalling 547,662 observations. Schools where promotion rates were over 120 per cent (a total of 5 per cent of cases) were also not considered for the analysis.

The number of schools in the PSLE data sets ranges from 15,694 government schools in 2019 to 16,139 government schools in 2021 (including private schools, the totals are 16,823 and 17,572 respectively). Therefore, not all schools from EMIS have PSLE information. In total, 15,673 government schools had all three years of PSLE scores, 240 had two years of data and 239 had a single year of data. Less than 30 schools did not have information on schools' characteristics from EMIS. The final sample for the PSLE analysis includes 16,152 schools with PSLE scores for Standard 7 boys and girls calculated separately, totalling 93,895 observations.



3.3 Limitations

Stage 1 of the DMS research has limitations that are important to consider while interpreting the results.

Firstly, the associations between school performance and school characteristics represent correlations and do not represent a causal relationship. For example, the analysis shows that PSLE performance is higher when a higher proportion of teachers in a school have an academic diploma or above. However, this does not necessarily mean that hiring or

retaining teachers with this characteristic will improve exam performance as an isolated policy. Instead, it could be that schools with teachers with higher education levels also have more continuous professional development for teachers. Some of these issues are addressed by incorporating school FE into the regression, but the presented results are still not causal and must be considered in tandem with other similar research and available analyses. Future stages of this research will also aim to bolster the findings of this first phase.

Secondly, the available data captures information on some, but not all, factors that influence pupil performance. Other observed or unobserved factors, such as the family or socioeconomic characteristics of the pupils, or the different behaviours and practices of school stakeholders, may also influence exam performance or the likelihood of being promoted to the next grade, but are not captured in the data. Inclusion of school FE in the model accounts for some of these unobservable factors but is unlikely to capture all potentially relevant factors. While the data models used provide valuable insights, they do not fully explain the determinants of pupil performance. In Stage 3 of this research, additional primary data will be collected to complement this analysis and obtain deeper insights into the determinants of school performance. Other limitations are described in Appendix C.

Despite these limitations, this analysis offers a unique opportunity to use existing data sets, comprising one of the largest samples in education research in Tanzania in recent years, to understand the current state of the education system and to make meaningful and contextualized recommendations for education policy in the country.



4. Descriptive statistics: Primary School Leaving Examination results and promotion rates

Descriptive statistics: Primary School Leaving Examination results and promotion rates

While this section presents some government and private school comparisons, it focuses mostly on government schools, which as of 2022 represent 89 per cent of primary schools in Mainland Tanzania and are the priority for this analysis. Of these, 14 per cent of government primary schools were urban and 75 per cent were rural. The remaining 11 per cent of schools were private schools, most of which were in urban locations. Except for Dar es Salaam, most districts were predominantly rural and comprised of government schools (see Figure 14 in Appendix B).



4.1 Primary School Leaving Examination performance

Over the last five years, participation of Standard 7 pupils in the PSLE has been nearly universal, with over 98 per cent of pupils sitting the exam. However, boys from rural schools were the least engaged group,³ and their participation has been declining: only 97 per cent sat for the PSLE in 2022 compared with 99 per cent in 2017 (see Figure 15 in Appendix B). In some regions, these declines were even larger. For example, Katavi had the largest decline in participation from boys attending rural schools, from 99 per cent in 2017 to 89 per cent in 2021. This could be a picture of the secondary effects of the ranking of schools in the PSLE, where pupils from low-ranking schools are being discouraged to sit for the examination (Cilliers, Mbiti and Zeitlin 2021).

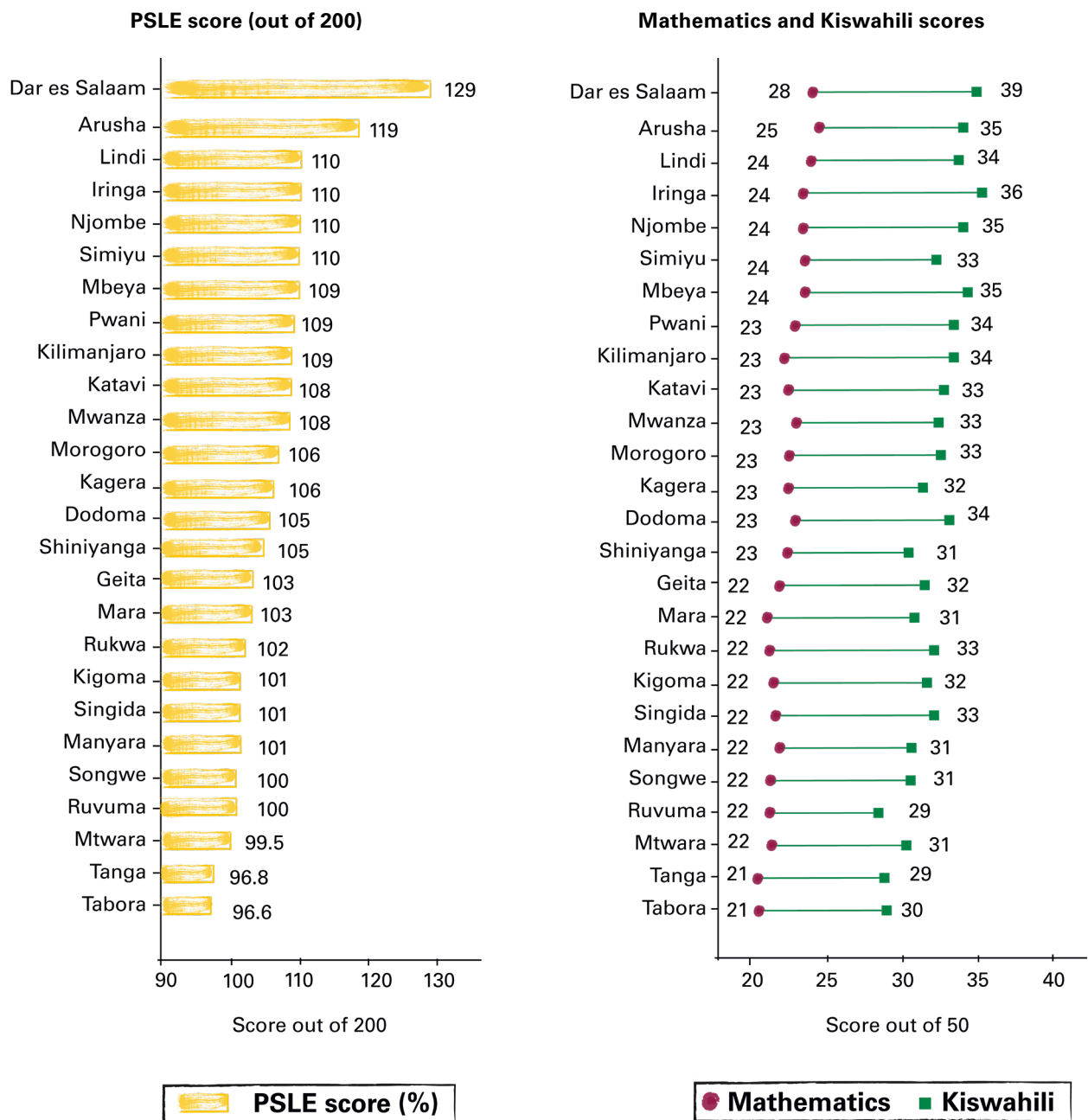
While participation is high, PSLE performance remains low, with the average score in 2021 being 107 out of 200 points⁴ or just over half of the questions scored correctly. In addition, there are significant regional differences in performance (Figure 2). In 2021, Dar es Salaam achieved the highest average PSLE scores, outperforming Tabora, the lowest performing region, by almost 33 points.

Performance is lowest in mathematics, with pupils scoring under half of the questions correctly (23 out of 50 points). Only half of all primary schools in the country reached an average score of at least 23 points out of 50 and schools' performance varies little between regions (standard deviation of 3.9). Even Dar es Salaam, the best-ranking region in the four selected PSLE subjects in 2021, scored just over half of the mathematics questions correctly (28 out of 50). This could mean that pupils' difficulty in acquiring numeracy skills is linked to something more systematic, such as the curriculum and instructional time in class. It could also suggest that there is low cohesion of examination to what is taught in the curriculum (Atuhurra and Kaffenberger 2022).

³ Differences across groups were statistically significant.

⁴ As discussed in section 3.3, this analysis focuses on Kiswahili, English, mathematics and science scores. Each subject is scored out of 50 points, with a global maximum score of 200 points.

Figure 2: Average PSLE scores by region (2021)



Source: PSLE, Tanzania, National Examinations Council. Calculations made by authors, representing a weighted average of school. Weight is enrolment of Standard 7 by school.

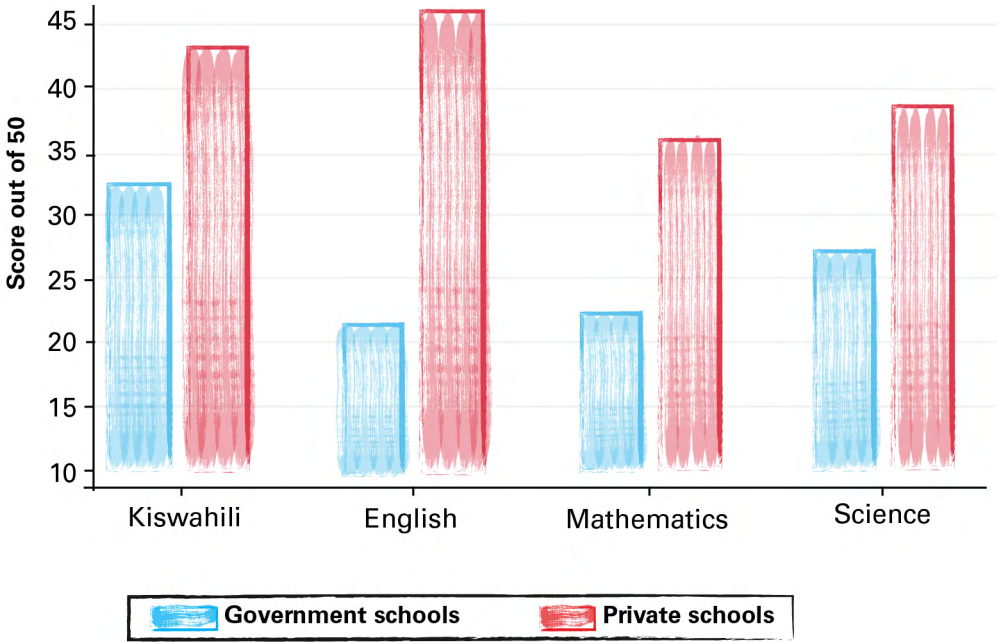
Pupils from private schools consistently outperform pupils from government schools on the PSLE. On average, across the four subjects, private school pupils outperformed government school pupils by 56 points (163 versus 107 out of 200 points). Performance differences were most stark in English, where private school pupils scored twice as many points as their government school peers (see Figure 3). As of 2021, private schools were mostly located in wealthier locations. Over 75 per cent of private schools are in areas in the fourth or fifth quintile of wealth, indicating that they are more likely to take in wealthier pupils (author’s analysis using the Relative Wealth Index from Data for Good at Meta (n.d.)). The gap in English performance between private and government school pupils may have equity implications, as Tanzania’s language of instruction policy indicates that pupils who continue to secondary education will be taught in English as the language of instruction, rather than Kiswahili (Tanzania, MoEST 2023). This suggests that government school pupils who transition to secondary

school start at a significant disadvantage compared with their private school peers who are likely to come from wealthier backgrounds. Pupils from both government and private schools perform poorly in mathematics (23 and 36 out of 50 points, respectively).

Government school pupils’ performance in English and science has improved since 2017, but scores in mathematics and Kiswahili have remained almost the same (Figure 4). These findings could reflect similar evidence suggesting a stagnation in literacy and numeracy outcomes since the curriculum reform introduced in 2015.

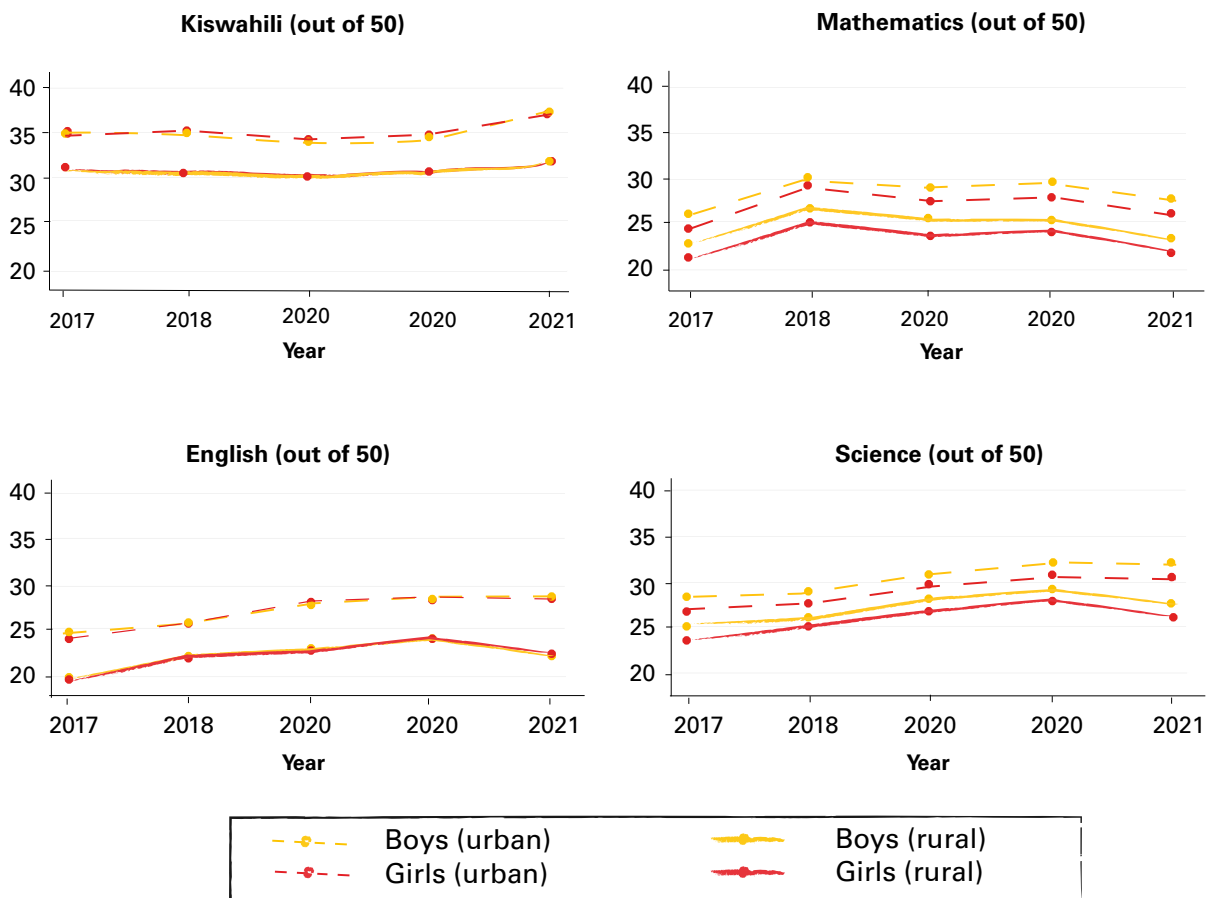
Girls and boys in government schools perform similarly in language subjects, but gender differences appear when comparing performance in mathematics and science. Girls from rural schools were the lowest performers in science and mathematics subjects.

Figure 3: Average PSLE scores by school type (2021)



Source: PSLE, Tanzania, National Examinations Council. Calculations made by authors, representing a weighted average of school. Weight is enrolment of Standard 7 by school.

Figure 4: Average PSLE scores in government schools for boys and girls by subject and locality



Source: PSLE, Tanzania, National Examinations Council. Calculation made by authors, representing a weighted average of school. Weight is enrolment of Standard 7 by school.

4.2 Promotion rates

The 2014 ETP in Tanzania indicates that schools are supposed to automatically promote pupils from one grade to the next (Tanzania, MoEST 2023). **However, average school promotion rates at the national level are less than 100 per cent and have been declining since 2019. In 2021, the national promotion rate for government schools**

was just 87.6 per cent. On average, girls were more likely to be promoted to the next grade than boys. This is consistent across the different grades and, generally, different years. Pupils from rural schools were less likely to be promoted to the next grade than pupils in urban schools (Table 2).

Table 2: Promotion rates in government schools

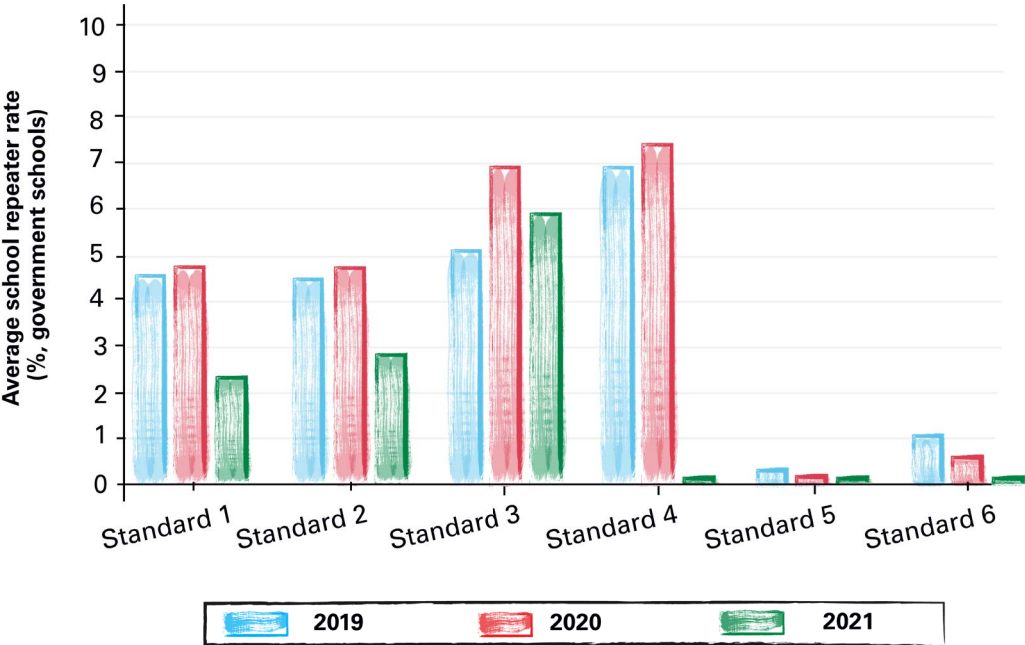
Promotion rate by category (% , weighted average)	2019	2020	2021
National	91.5%	88.9%	87.6%
Girls	91.6%	90.4%	89.1%
Boys	89.3%	87.4%	86.1%
Rural	89.5%	87.7%	85.9%
Urban	93.9%	93.3%	93.6%

Source: EMIS. Calculations made by authors, representing a weighted average of school grade-level average promotion rates. Weight is schools’ grade-level enrolment. Schools with promotion rates higher than 120 per cent were not included in the sample.

Grade repetition rates in Tanzania averaged from 4 per cent to almost 8 per cent, depending on the grade and the year (Figure 5). This, combined with the average school promotion rates, suggests that Tanzania’s automatic promotion is not fully implemented

by schools. For example, comparing Tanzania to Ghana, another country with an automatic promotion policy, Ghanaian repetition rates are as low as 2 to 3 per cent and promotion rates range between 95 and 98 per cent (UNICEF 2020).

Figure 5: Average school repetition rate in government schools (%)

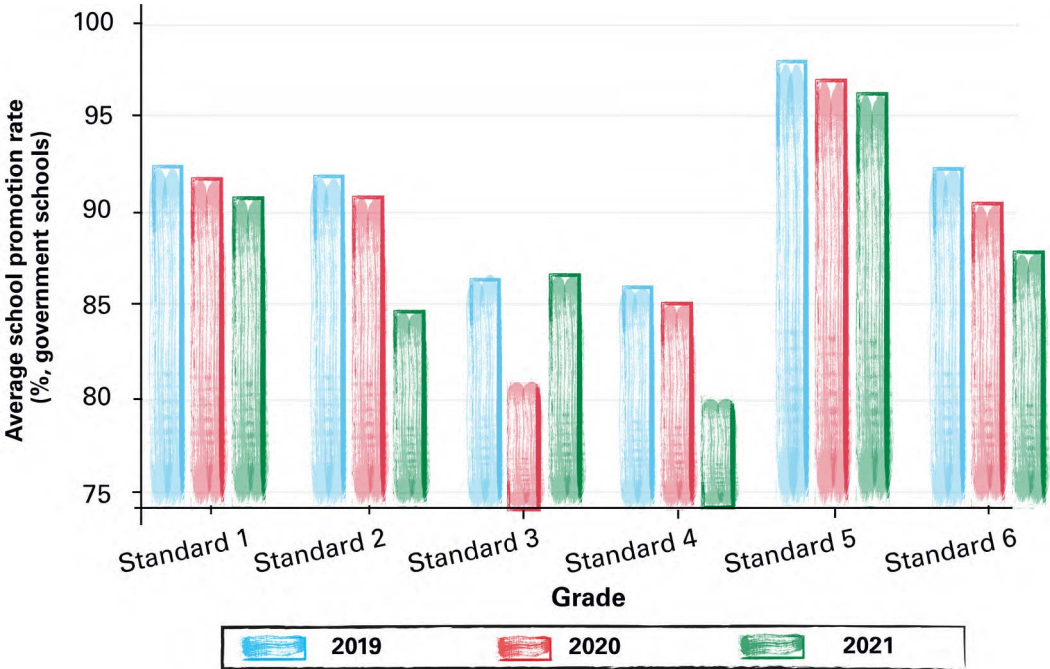


Source: EMIS. Calculations made by authors, representing a weighted average of schools’ grade-level average repetition rates. The weight is schools’ enrolment for each grade level. Schools with promotion rates higher than 120 per cent were not included in the sample.

There is wide variation in promotion and repetition rates across grade levels, often coinciding with the timing of the SFNA in Standard 4 (Figure 6). This could imply that pupils are held back in Standard 3 because they are not ready to sit for the Standard 4 assessment, or that they are held back in Standard 4 because they have failed the assessment.

Standard 6 average promotion rates were also low (around 90 per cent) and coupled with low repetition rates of 1 per cent. This suggests that up to 9 per cent of pupils may be dropping out of primary education before the Standard 7 PSLE, either because of a lack of interest or opportunity in pursuing a higher diploma.

Figure 6: Average school promotion rate in government schools (%)



Source: EMIS. Calculations made by authors, representing a weighted average of schools’ grade-level average promotion rates. The weight is schools’ enrolment for each grade level. Schools with promotion rates higher than 120 per cent were not included in the sample.





5. Findings on determinants of government primary school performance



Findings on determinants of government primary school performance

This section explores various pupil, teacher and school characteristics and their relationship with government primary school performance based on available data from 2019–2021. The regression output tables are included in Appendix A and robustness checks are presented in Appendix D.



5.1 Pupil characteristics



Pupil gender

Girls were more likely than boys to be promoted to the next grade (by 2.7 percentage points on average), both in urban and rural areas, even when school locality and other characteristics were controlled for. Girls being more likely to continue their education could partly be a result of more boys entering the labour market early. In 2016–2017, 15 per cent of boys that dropped out of school cited economic activity as the reason, compared with 9 per cent of girls (PO-RALG 2018).

However, girls' overall performance on the PSLE remains lower than that of their male peers, with the gender gap being higher in rural schools. While there were no statistical differences between boys' and girls' scores in language subjects, girls performed worse than boys in both science and mathematics. This is consistent with evidence from other countries participating in the DMS research in sub-Saharan Africa, showing that girls' performance in science and mathematics lags behind that of their male peers in countries such as Ghana (UNICEF Innocenti, Ghana Ministry of Education and UNICEF Ghana 2023),

Zambia (UNICEF Innocenti, Ministry of Education Zambia and UNICEF Zambia, 2023) and Togo (UNICEF Innocenti, Togo, Ministry of Primary, Secondary, Technical and Artisanal Education and UNICEF Togo 2023). This finding suggests that gender biases or gender norms may be playing a role in classrooms for these subjects. A recent study in Tanzania identified biases in teachers' opinions on girls' willingness and ability to learn science subjects (Raphael, Kwayu and Mwalongo 2022). Further research is needed to understand gender biases in the classroom.



Home to school distance

Pupils from rural areas generally live further away from school than pupils from urban areas (2.04 km versus 1.68 km). These figures vary across regions in the country. For example, pupils in rural Katavi live almost 2.7 km away from their schools, while pupils in rural Kilimanjaro live less than 1.6 km away from their schools (Figure 7). In addition to learning quality, distance influences parents' decisions on their child's primary school, with little additional consideration of class sizes or infrastructure quality (Solomon and Zeitlin 2019). Greater distances can also be a major reason for pupil dropout, especially at younger ages (Tanzania, MoEST, UNESCO and UNICEF 2018).

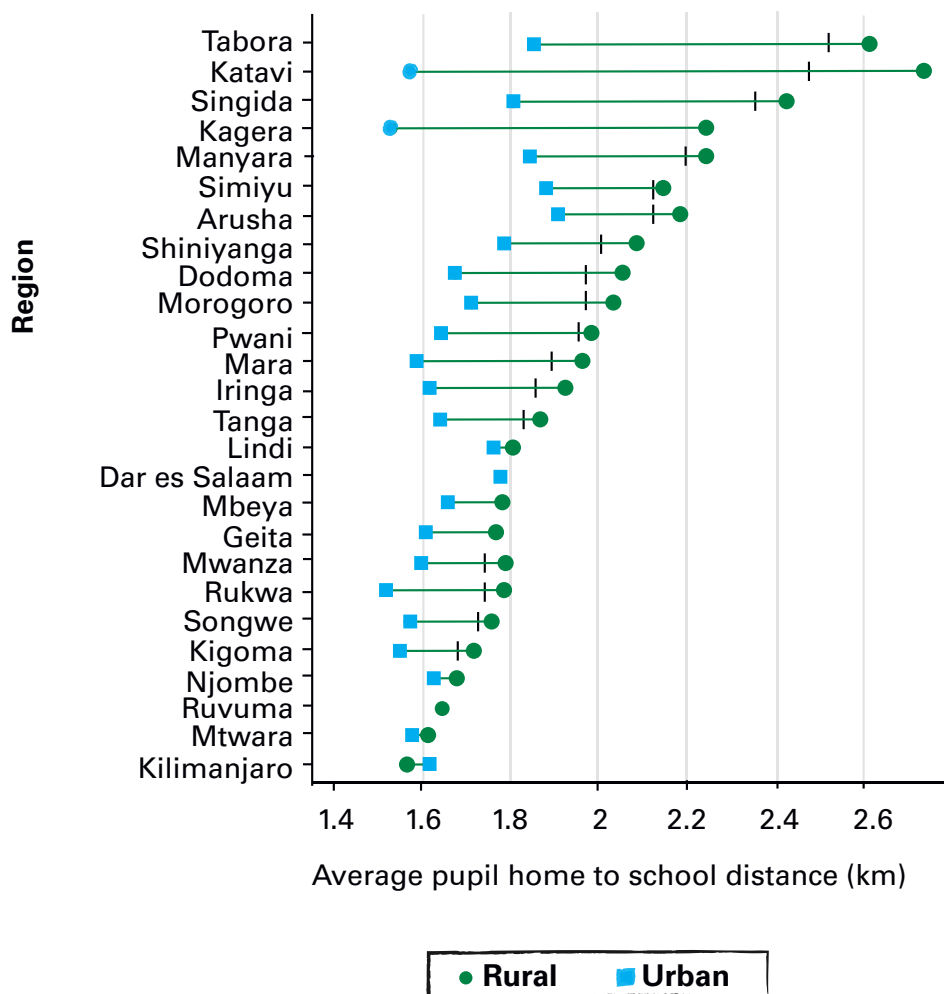
Schools in rural areas that were further away from pupils' homes had lower promotion rates and achieved lower PSLE scores. An extra kilometre of distance between schools and pupils' homes in rural areas was associated with a 0.75 percentage

point reduction in the proportion of pupils progressing to the next grade and a 0.44 point reduction in average PSLE scores. For schools in urban areas, longer distances between pupils' homes was associated with a higher proportion of pupils progressing to the next grade. There is supporting evidence that willingness to send children to schools further

away to achieve better scores is higher in urban areas than rural areas in Tanzania (Solomon and Zeitlin 2019).

Unfortunately, other pupil characteristics such as socioeconomic status and pupil disability were not available for this analysis.

Figure 7: Average home to school distance for pupils in government schools by region and locality (km, 2021)



Source: EMIS. Calculations made by authors, representing a weighted average of school grade-level average by location. Weight is enrolment of grade by school.

Note: The horizontal lines are illustrative of the gap between urban and rural areas in a region. The small vertical lines indicate the regional average. Dar es Salaam has only urban schools.



5.2 Teacher characteristics



Teacher contract and qualifications

There are two minimum requirements to become a teacher in a government school in Tanzania. The first is to complete a teacher training course at a higher education institution or an accredited course. The second is a minimum academic requirement of a “pass” in lower secondary school.⁵

Almost all government primary school teachers are permanent contract teachers (98.2 per cent) and nearly all have completed the required training course (99.1 per cent). Urban schools have slightly more permanent contract teachers and teachers that have completed the training course compared with rural schools (see Table 8 in Appendix B). On average, 97 per cent of schools’ staff have completed at least lower secondary (the minimum academic requirement) and 3 per cent of teachers either only have the primary school leaving certificate or have acquired other academic diplomas. Although voluntary teachers are relied upon in Tanzanian schools, they are not specifically identified in the database and therefore not explicitly considered in this analysis.

Schools with more permanent contract teachers were more likely to promote pupils to the next grade (by 3.2 percentage points), especially urban schools. However, overall learning outcomes were not substantially different in schools with more permanent contract teachers.

A higher proportion of teachers with the required teacher training course was not correlated with higher promotion rates but was positively associated

with pupil performance on the PSLE, especially in urban schools. The means the teacher training course could plausibly be contributing towards improving teaching and subsequently pupils’ learning, or that teachers that completed the training course were already those with higher motivation and ability. Additional research would be required to unpack this result.

Teachers’ level of education was not associated with promotion rates. In Tanzania, possessing an academic diploma is equivalent to completing upper secondary education, which is above the minimum academic requirement to become a primary school teacher. Only about 1 in 4 government school teachers (26.4 per cent) have an academic diploma or above. On average, urban schools have a higher proportion of teachers with an academic diploma than rural schools (35.8 per cent versus 24.6 per cent, respectively).

In rural schools, teachers possessing an academic diploma or above was strongly associated with PSLE scores both in science, technology, engineering and mathematics (STEM) (1.7 out of 100) and language subjects (0.9 out of 100). In urban schools, teachers possessing an academic diploma was not associated with PSLE scores. With most schools in Tanzania being rural and most teachers working in such schools, these findings support current policy revisions to increase teacher minimum requirements and upskilling teachers.



Teacher gender

As of 2021, schools’ staff was composed, on average, of 42 per cent female and 58 per cent male teachers. Female teachers were more likely to work in urban schools,

⁵ Teachers with a lower secondary school qualification are known as Grade A teachers. Teachers with only a primary leaving certificate are known as Grade B teachers.

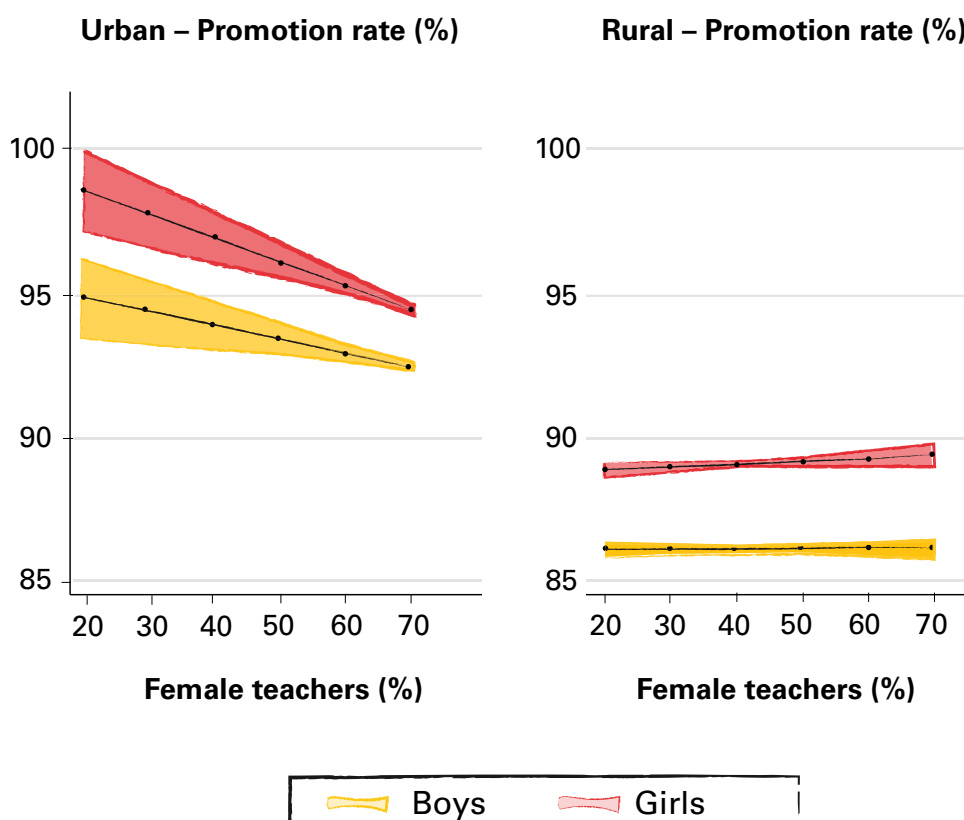
where they comprise 61 per cent of staff, compared with rural schools, where only 38 per cent of teachers were female. Compared with their male counterparts, female teachers were almost 10 percentage points less likely to have an academic diploma or above (17.7 versus 27.8 per cent), were less likely to have completed the required teacher training course (98.9 versus 99.1 per cent), but were only slightly more likely to have permanent contracts (99.0 versus 98.8 per cent).⁶

These differences were consistent across rural and urban areas.

In rural schools, higher proportions of female teachers are moderately positively associated with girls' promotion rates and PSLE scores in all subjects⁷ (Figure 8 and Figure 9). While boys' promotion rates did not significantly vary by teacher gender, boys' performance on the PSLE was negatively associated with a higher proportion of female teachers in all subjects.

In urban schools, higher proportions of female teachers were associated with lower promotion rates and PSLE scores for both girls and boys (Figure 8 and Figure 9).

Figure 8: Simulation of the association between proportion of female teachers and pupil promotion rates by pupil gender and locality (%)

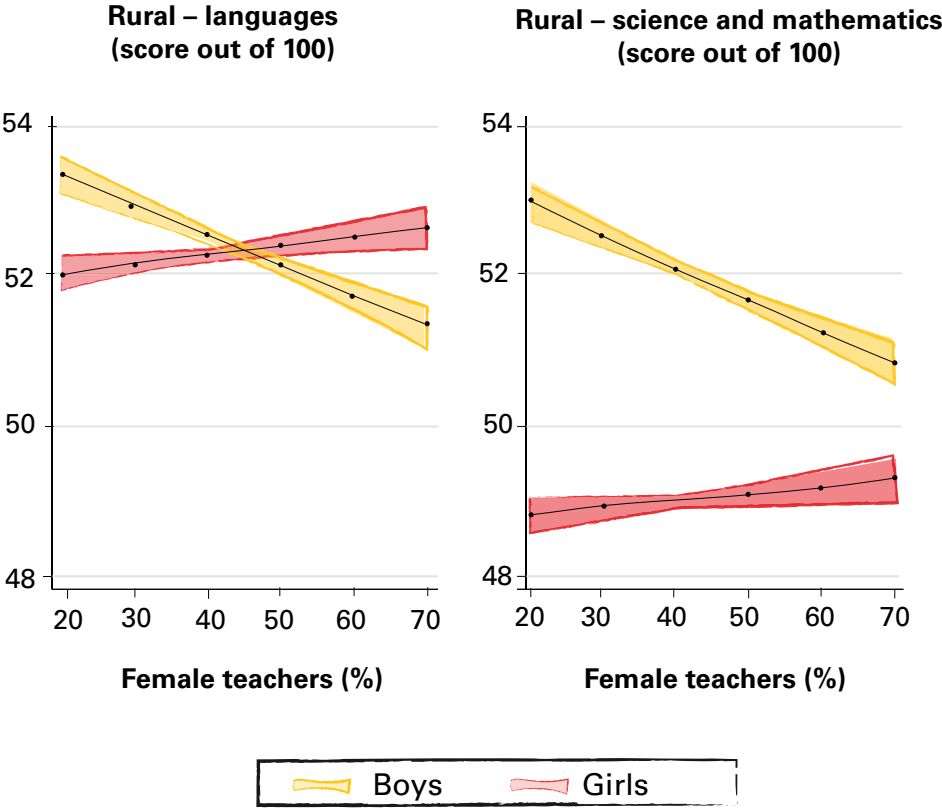


Source: EMIS 2019/22. Calculations made by authors, representing a weighted average of school. Weight is grade enrolment by school. Simulated effect using margins of regression coefficient. Note: Painted areas indicate 95 per cent confidence intervals.

⁶ Differences in all three characteristics reported are statistically significant at a 95 per cent confidence level.

⁷ Positive coefficient in the interaction term in all PSLE specifications.

Figure 9: Simulation of the association between proportion of female teachers and PSLE scores in rural school by subject and pupil gender



Source: PSLE 2019–21, Tanzania, National Examinations Council, and EMIS 2019–21. Calculations made by authors, representing a weighted average of school. Weight is enrolment in Standard 7 by school. Simulated effect using margins of regression coefficient.

These relationships should not be interpreted as causal, as other factors including teacher allocation practices and other unobservable characteristics may also be contributing. Further studies are needed to shed light on these gender dynamics and their possible determinants.

5.3 School resources



Textbooks per pupil

The curriculum for Standards 1 and 2 focuses on the 3Rs, while from Standard 3 onwards, pupils transition to other subjects (Kiswahili, English, mathematics, geography, history, civics and science). The Institute of Education has the mandate to develop and produce textbooks, as well as evaluate and approve all learning and teaching materials intended to be used in government schools

(World Bank 2021; Tanzania, Institute of Education 2021). The analysis examines availability of three subject textbooks aligned with literacy and numeracy skills acquisition and tested on the PSLE (Mathematics, English and Kiswahili).

Subject textbook availability in Tanzania remains low, with over two pupils sharing subject textbooks in almost all subjects and grades (Table 3). This contrasts with the government’s intent of providing one

textbook for each subject for every pupil, affirmed in the 2023 revisions to the 2014 ETP (Tanzania, MoEST 2023). The number of textbooks per pupil in Standard 5 was particularly low, especially in Kiswahili, where the equivalent of almost five pupils share one textbook. The availability of reading textbooks in Standard 1 was higher than the availability of textbooks for any other subject in any other grade, which is in line with Tanzania’s priority to improve foundational literacy in early grades.

Table 3: Average textbooks per pupils available by selected subjects and grade in government schools (2021)

Subject	Standard 1	Standard 2	Standard 3	Standard 4	Standard 5	Standard 6	Standard 7
Writing	0.46	0.45	-	-	-	-	-
Arithmetic	0.44	0.45	-	-	-	-	-
Reading	0.62	0.51	-	-	-	-	-
Kiswahili	-	-	0.31	0.45	0.21	0.29	0.54
Mathematics	-	-	0.32	0.45	0.22	0.29	0.54
English	-	-	0.34	0.46	0.29	0.29	0.54
Average textbooks per pupil (average sum of three subjects specified)	1.3	1.3	0.9	1.3	0.8	0.8	1.5

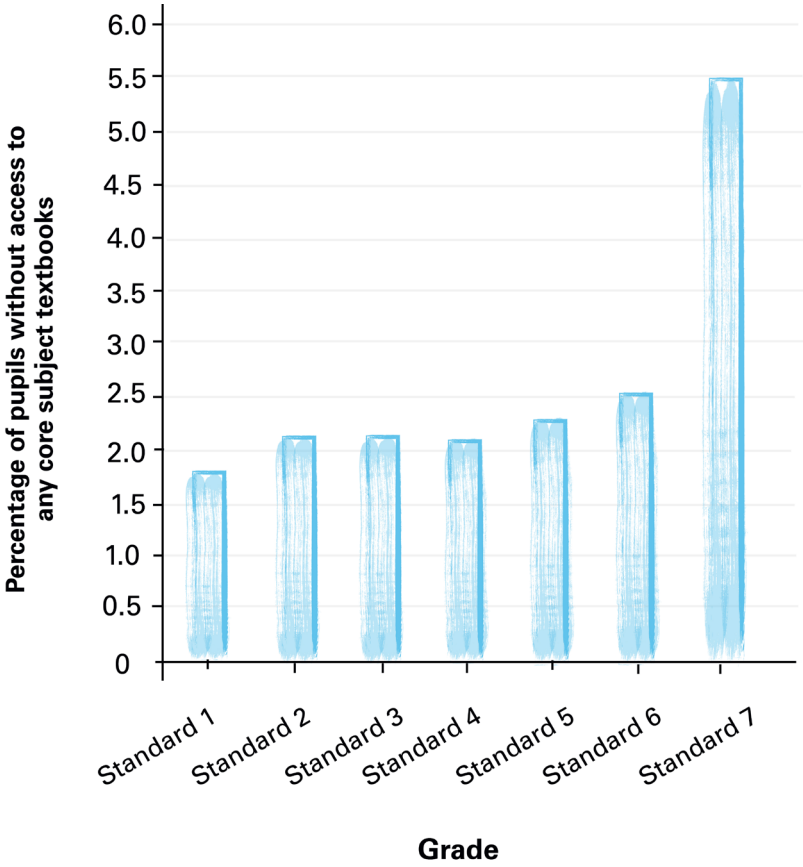
Source: EMIS. Calculations made by authors, representing a weighted average of school grade average. Weight is enrolment of grade by school.

Note: When the number of textbooks per pupil for a given subject is one, a pupil has a textbook for themselves. When the indicator is lower than 0.5, there is less than one textbook for every two pupils, and when the indicator is close to 0.2, there is only one textbook for every five pupils. The sum of textbooks per pupil across the three subjects represents how many of the three grade-level subject textbooks a pupil would have to themselves.

Allocation of textbooks could be improved, particularly in Standards 1 and 2. For example, while 2.2 per cent of Standard 1 pupils did not have access to any reading textbooks at their school, over 4.1 per cent had access to 1.5 reading textbooks. From Standards 3 to 7, meanwhile, general scarcity

of textbooks seemed to persist. A number of pupils (between 2 and 5.5 per cent) across Standards 3 to 7 did not have access to English, mathematics or Kiswahili textbooks at their schools (Figure 10). This rate was highest in Standard 7 when pupils sit for the PSLE.

Figure 10: Pupils with no mathematics, English or Kiswahili textbooks by grade in government schools (2021)



Source: EMIS. Calculations made by authors, representing a weighted average of school grade average. Weight is enrolment of grade by school.

Increasing the number of textbooks per pupil for the three core subjects is associated with higher promotion rates and PSLE scores.

For each one-book increase in the textbook to pupil ratio, schools’ is associated with an increase in average promotion rates by 3.2 percentage points. The positive relationship between textbooks and promotion rates is stronger in rural schools (3.3 percentage point increase per book) than urban schools (2.3 percentage point increase per book). For PSLE scores, every one-book increase per pupil is associated with a 1.3 point higher score out of 200. The association of textbooks on learning outcomes is again higher in rural schools (1.5 point increase per textbook) versus urban schools (0.5 point increase per textbook). The relationship is also stronger for scores in science and mathematics.



Pupil-teacher ratio

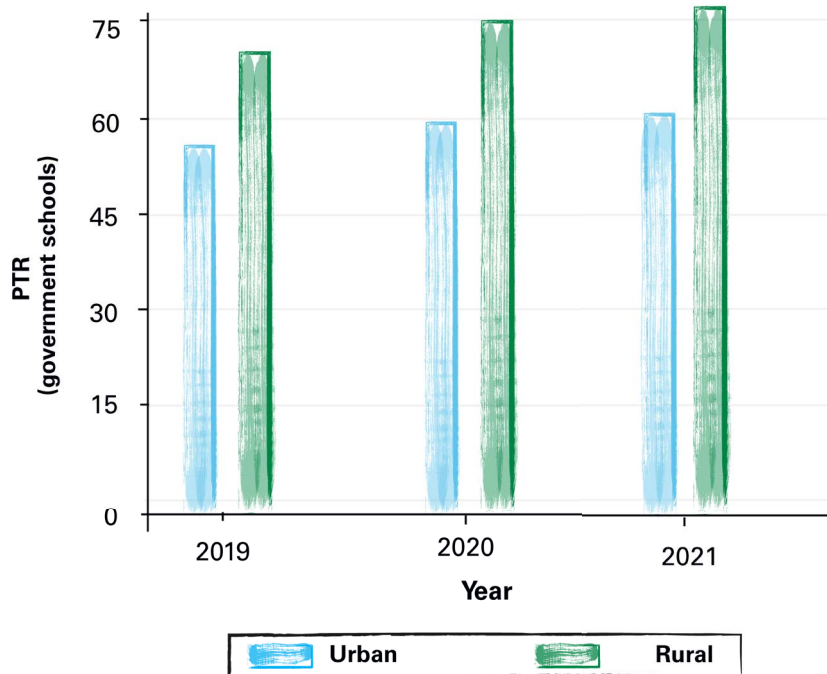
Higher pupil-teacher ratios (PTRs) were strongly associated with lower promotion rates and PSLE scores. This is consistent with evidence from other countries participating in the DMS positive deviance research, including Côte d’Ivoire (UNICEF Innocenti, Ministry of Education and Literacy of Côte d’Ivoire and UNICEF Côte d’Ivoire 2023) Togo, (UNICEF Innocenti, Togo, Ministry of Primary, Secondary, Technical and Artisanal Education and UNICEF Togo 2023) Ghana (UNICEF Innocenti,

Ghana Ministry of Education and UNICEF Ghana 2023) and Madagascar (UNICEF Innocenti, Ministry of Education of Madagascar and UNICEF Madagascar), which show negative correlations of high PTRs and school performance.

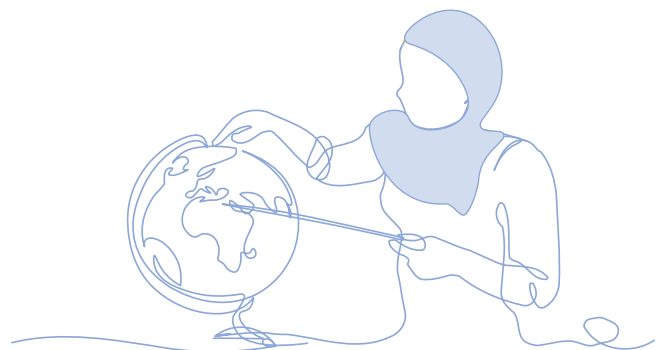
In Tanzania, the average PTR in government primary schools remains high, at 73 pupils per teacher. The government’s 2021/2022–2025/2026 ESDP indicates a

target to reach a PTR in primary schools of 46.6 pupils per teacher. However, as of 2021, half of government schools in Tanzania had over 60 pupils per teacher, and at least 20 per cent of schools had over 80 pupils per teacher (Figure 16 in Appendix B). PTRs have also increased between 2019 and 2021, from 71 to 77 pupils per teacher in rural schools and from 55 to 61 pupils per teacher in urban schools (Figure 11).⁸

Figure 11: PTR in government primary schools by locality and year

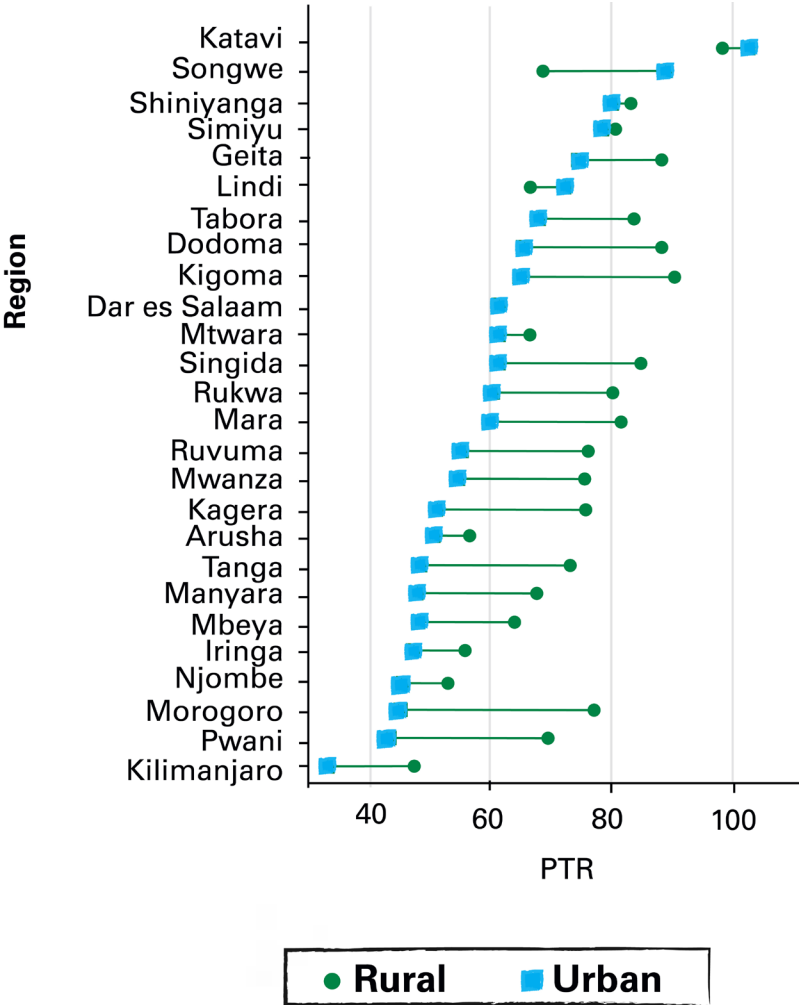


Source: EMIS 2019–21. Calculations made by authors, representing a weighted average of school. Weight is enrolment by school.



⁸ Differences between 2019 and 2021 are statistically significant at a 95 per cent confidence level.

Figure 12: Average PTR in rural and urban government schools by region (2021)



Source: EMIS 2021. Calculations made by authors, representing a weighted average of school. Weight is enrolment by school.

PTR varies widely across regions, localities and schools. Kilimanjaro Region has the lowest PTR in the country, with 33 and 48 pupils per teacher in urban and rural schools, respectively. Schools in Katavi Region, meanwhile, have average PTRs as high as 103 and 98 pupils per teacher in urban and rural schools, respectively, which is considerably further away from the target indicated in the ESDP (Figure 12).

Variations in PTR suggest that reallocation of teachers within regions could improve equity. For example, Morogoro Region has

the largest gap in PTR between urban and rural schools and could consider reallocating some urban teachers to rural schools. This could lower rural schools’ PTR and bring the education system closer to the target of 46.6 pupils per teacher. Evidence from teacher allocation research in Zambia has suggested that in some cases, intraregional teacher transfers can be the fastest way to equalize learning conditions across schools, especially for disadvantaged schools in rural areas. Recommendations also include empowering local authorities to oversee these transitions (Kabir 2023).⁹

⁹ UNICEF Innocenti’s [Teachers for All \(T4A\) research](#) aims to expand the evidence base on teacher deployment in 13 African countries.

Improving the allocation of the existing teacher workforce in government primary schools could support lowering the national average PTR to 63 pupils per teacher. This decrease in the national PTR average would be associated with 0.73 percentage point increase in promotion rates, equivalent to an additional 68,685 pupils being promoted from one grade to the next, and an average 0.57 point increase (out of 200) on the PSLE.

While improving equitable allocation of the existing teaching workforce could help lower the national PTR, recruiting more teachers will be necessary for the government to achieve its PTR target by 2025/2026. Increasing the number of teachers is a key policy priority. Through PO-RALG, the government has developed a teacher allocation algorithm to support the equitable deployment of teachers based on demand (Foreign, Commonwealth & Development Office 2021). These could be important steps in improving education quality in Tanzania.



Desks per pupil and classroom to pupil ratio

On average, government primary schools had the equivalent of 1.6 desks for every two pupils, meeting the 2025/2026 target of having one desk for every two pupils (Tanzania, Ministry of Finance and Planning 2021). However, national averages mask variance between schools within regions, as well as across regions (see Figure 17 in Appendix B). For example, overall desk availability in Kilimanjaro Region is one of the highest in the country – one desk per pupil on average. Yet, 1.4 per cent of pupils in this region are enrolled in schools where there are no desks available. At the same time, the region of Katavi has considerably lower desk availability (one desk for every two pupils, on average) but distributes its resources more equitably than Kilimanjaro, with only 0.6 per cent of pupils enrolled in schools without any desks.

Desk availability is positively associated with keeping pupils in school and higher PSLE performance. On average, if pupils had an entire desk to themselves, average school promotion rates could increase by 0.14 percentage points, which represents over 13,000 extra pupils progressing to the next grade. Similarly, PSLE scores could increase by 0.1 points out of 200 if each pupil had an entire desk to themselves.

This is especially true in urban schools, where classrooms are more likely to be overcrowded (classroom to pupil ratio is 1:122 in urban schools compared with 1:107 in rural schools). **At the same time, classroom to pupil ratio is negatively associated with promotion rates and PSLE scores, especially in rural areas.**



School meals

In Tanzania, school meal provision is not a national policy, and the first National School Feeding Guidelines was launched in 2021 (Global Communities 2021). The guidelines indicate that Local Government Authorities (LGAs) develop plans for the provision of school meals or School Management Committees solicit parental or community contributions to manage the school meal provision.

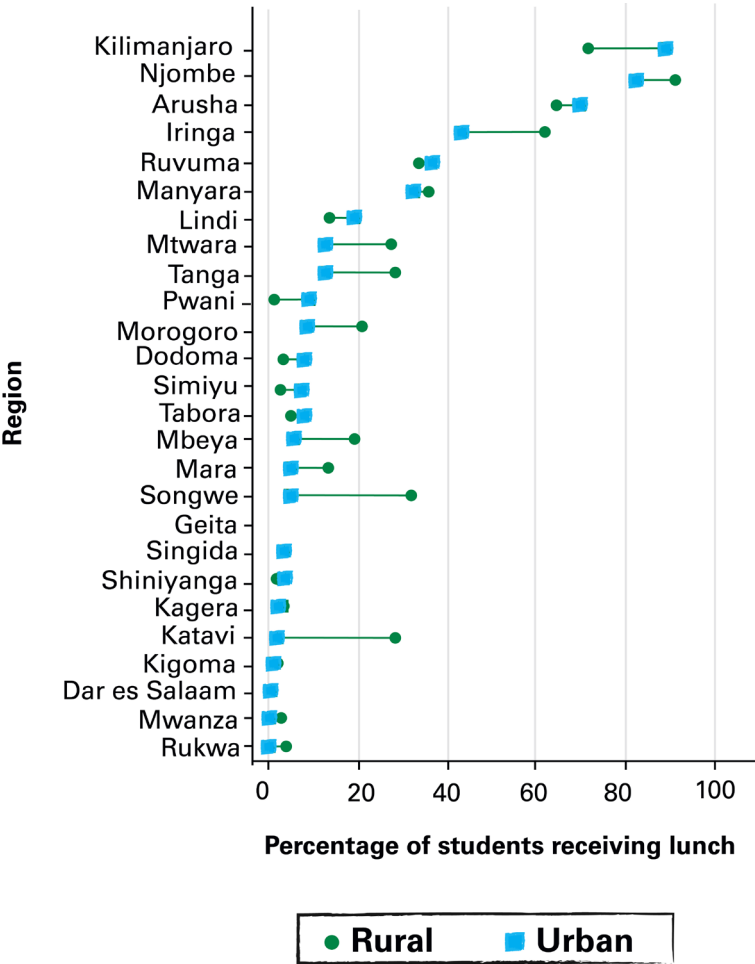
Coverage of school meals in Tanzania remained low, with just over one in four government schools providing lunch or breakfast (see Figure 18 in Appendix B). Furthermore, schools that provided meals did not necessarily feed all their pupils. On average, in schools with meal provision, only 16 per cent of rural school pupils and 11 per cent of urban school pupils received lunch. **Schools in more affluent regions, such as Kilimanjaro, fed 74 per cent of pupils on average, while less affluent regions, such as Kagera, provided meals to less than 3 per cent of pupils (Figure 13).¹⁰**

Such differences may reflect the ability of parents from richer areas to contribute more to support school feeding than parents from poorer regions. The regional disparities could also be explained by farmers donating more food in rural areas, or parental preference that children eat at home rather than at school in urban areas due to home to school proximity.

Both the provision of lunch and breakfast were negatively associated with promotion rates, especially in rural schools, and were not correlated with PSLE outcomes.

This means that schools with a greater proportion of children receiving school meals had lower promotion rates and no difference in learning outcomes compared with schools where fewer children received meal support. The negative relationship with promotion rates could be due to lower performing schools being specifically targeted to receive more school meal support, or because meal provision is concentrated in more affluent regions, hence children can eat at home, and therefore meals are not important factors in them remaining in school. It could also be due to the quality and quantity of school meals.

Figure 13: Pupils receiving lunch in government schools by region and locality (% , 2021)



Source: EMIS 2019–21. Calculations made by authors, representing a weighted average of school. Weight is enrolment by school.

¹⁰ Affluence defined by GDP per capita (Tanzania, National Bureau of Statistics 2019)

Additionally, since not all pupils are fed in schools that provide meals, it is unclear whether the individual pupils who receive meals are correctly targeted or how other aspects, such as school attendance or well-being, are affected (FFE III Endline Evaluation Brief 2022). Further research around school meal provision in Tanzania will be key to better understand these dynamics.



Teacher housing

Teacher housing was positively associated with promotion rates in urban schools but negatively associated with promotion rates in rural schools. In urban areas, teacher housing was available in almost 70 per cent of schools, while in rural areas they were available in 82 per cent of schools. In both localities, teacher housing was not associated with improved PSLE scores. These results could be partly because of the quality of teacher housing near the schools, especially in rural areas. Previous evidence from Tanzania suggests there are cases of

inadequate or low quality of teacher housing, which causes teachers to be absent from school and to lack punctuality, or that even when teacher housing is available, it is not able to accommodate all teachers at the school (Han and Peirola 2021).



Pit latrine availability

Pit latrine availability is positively associated with keeping children in school in both rural and urban schools and with improving PSLE scores in rural schools. On average, for every 100 pupils, there were two pit latrines in rural schools and 1.5 pit latrines in urban schools. Girls typically have greater availability of pit latrines than boys. Low latrine availability can create long queues and, consequentially, pupils can miss their classes. Poor sanitation can also have long-term effects on children that can continue when they become adults (World Bank 2022).



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6. Policy implications and areas for further exploration

Policy implications and areas for further exploration

This report presented results from Stage 1 of the DMS research in Mainland Tanzania. These results can serve as valuable evidence for policymakers, practitioners and researchers, especially amid Tanzania's ongoing national policy and curriculum review. The following policy implications and areas for further exploration have emerged from the results of this analysis:



Improving the availability and equitable distribution of textbooks

The positive association between pupil textbooks and education outcomes suggests that increasing the availability of books may improve pupil retention and learning in Tanzania. Core subject textbooks were not available for between 2 to 5 per cent of pupils. Given the existing shortages of subject textbooks and the Institute of Education's mandate to provide these to schools, it may be helpful for the Government of Tanzania to identify the main bottlenecks to increasing the textbook per pupil ratio and strategies for overcoming these. Prioritization of rural areas or science and mathematics subjects, which were associated with the largest improvements in promotion rates and PSLE scores, could also be considered.

Large differences in textbook per pupil ratios across regions, schools and grades suggest that there is a need to improve the equitable distribution of subject textbooks. If additional books cannot be disbursed in the short term, some of these inequities could be addressed by reallocating books between schools, with a focus on Standards

5, 6 and 3, where textbook availability is particularly low. Additionally, it may be worth considering strategies to help teachers and schools to increasingly access and effectively utilize subject books electronically through the Learning Management Service website developed by the Institute of Education, which has a repository containing PDF versions of all published books.

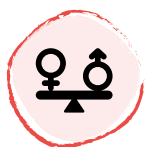


Hiring more teachers and deploying them with intention

Higher PTRs were associated with lower education outcomes, yet PTRs in Tanzania remain extremely high. Increasing the total number of teachers in the primary education system could be key to keeping pupils in school for longer and improving learning outcomes. When planning the deployment of teachers, PO-RALG may want to consider prioritizing regions with the largest shortages. In the short term, reallocation of teachers from urban to rural areas within the same regions could be explored.

Teachers' academic qualifications are positively correlated with learning outcomes, especially in rural schools, which supports proposed policy revisions related to teacher qualifications and related upskilling (Tanzania, MoEST 2023). As Tanzania considers how to strengthen the deployment of teachers, it would be interesting to consider deploying teachers with higher academic qualifications to rural areas, where there was a higher correlation between qualifications and education outcomes.

An even more targeted approach could be to allocate such teachers to schools where learning outcomes are particularly low, especially in science and mathematics.



Gender norms and expectations may be affecting teaching and learning in classrooms

There is some evidence that there is lower probability of boys staying in primary school compared with girls. However, while girls stayed in school for longer, they perform

lower on the PSLE, especially in science and mathematics. There is also evidence of differences in learning performance for boys and girls depending on the gender of their schools' teachers. These differences by gender (of both teachers and pupils) suggest the prevalence of gender norms in communities and within schools, which may influence how long children remain in school and how teachers and learners interact with each other.

MoEST may consider policies to provide gender-responsive training to teachers and review existing curricula, including teaching and learning materials, for gender inclusivity. Stage 3 of the DMS research will also aim to investigate what school-level behaviours and practices may underlie these differences.



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7. Appendices





Appendix A: Regression output tables

Table 4: Promotion rates regression outputs

	(1)	(2)	(3)	(4)
	National	National	Urban	Rural
Girls	2.704***	3.031***	4.415***	2.563***
Percentage of female teachers	-0.347	0.005	-4.720**	0.134
Girls X percentage of female teachers	-	-0.707***	-3.521***	0.850***
School distance to LGA (km)	-0.018**	-0.018**	-0.001	-0.019**
Average pupil home distance to school (km)	-0.615***	-0.614***	0.603**	-0.745***
Percentage of pupils who receive lunch (by gender)	-0.004**	-0.004**	-0.002	-0.006***
Percentage of pupils who receive breakfast (by gender)	-0.001	-0.001	-0.004	-0.001
Percentage of pupils who are at risk and receive government support	0.062***	0.062***	0.054***	0.066***
Seats per pupil at school	0.897***	0.897***	1.550***	0.769***
PTR	-0.072***	-0.072***	-0.103***	-0.068***
Pupil to class ratio	-0.008***	-0.008***	-0.003	-0.009***
Percentage of teachers with a diploma or above	-0.171	-0.171	0.990	-0.218
Percentage of teachers with a permanent contract	3.021***	3.021***	7.271**	2.233*
Percentage of teachers who have completed a teacher training course	-0.034	-0.035	-0.793	0.091
Books per pupil (0 to 3)	3.174***	3.174***	2.347***	3.348***
Pits per 100 pupils	0.274***	0.277***	0.299***	0.292***
School has a library	-0.222	-0.223	0.022	-0.427
School has a special girls' room	-0.423**	-0.424**	-0.688*	-0.220
School has a teacher office	-0.615***	-0.615***	0.044	-0.811***
School has teacher housing	-0.204	-0.204	0.732*	-0.566*
School has a kitchen	0.042	0.042	0.077	0.021
Grade FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Constant	Yes	Yes	Yes	Yes
R-squared	0.295	0.295	0.266	0.289
Observation	547,662	547,662	86,110	461,552
Unique schools	16,653	16,653	2,619	14,033

*** p<0.01, ** p<0.05, * p<0.1

Note: Pupils who are at risk are likely to be those with disabilities, or with multiple vulnerabilities or who experience discrimination. Government support can take the forms of protection, transportation and food support.

Table 5: Full PSLE regression outputs

	Raw scores (out of 200)			Standardized scores		
	(1)	(2)	(3)	(4)	(5)	(6)
	National	Urban	Rural	National	Urban	Rural
Girls	-6.898***	-7.041***	-7.539***	-0.340***	-0.347***	-0.372***
Percentage of female teachers	-7.897***	-11.969***	-8.280***	-0.389***	-0.590***	-0.408***
Girls X percentage of female teachers	7.959***	6.452***	10.437***	0.392***	0.318***	0.514***
School distance to LGA (km)	-0.009	-0.022	-0.011	-0.000	-0.001	-0.001
Average pupil home distance to school (km)	-0.371**	0.278	-0.443**	-0.018**	0.014	-0.022**
Percentage of pupils who receive lunch (by gender)	0.001	0.006	-0.001	0.000	0.000	-0.000
Percentage of pupils who receive breakfast (by gender)	-0.000	-0.001	-0.001	-0.000	-0.000	-0.000
Percentage of pupils who are at risk and receive government support	0.012	0.030	0.012	0.001	0.001	0.001
Seats per pupil at school	0.635**	1.009*	0.590**	0.031**	0.050*	0.029**
PTR	-0.057***	-0.079***	-0.055***	-0.003***	-0.004***	-0.003***
Pupil to class ratio	-0.006*	0.003	-0.008**	-0.000*	0.000	-0.000**
Percentage of teachers with a diploma or above	2.061***	1.701	2.596***	0.102***	0.084	0.128***
Percentage of teachers with a permanent contract	-1.362	-6.690	-1.314	-0.067	-0.330	-0.065
Percentage of teachers who have completed a teacher training course	1.304	6.445**	0.502	0.064	0.318**	0.025
Books per pupil (0 to 3)	1.319***	0.444*	1.518***	0.065***	0.022*	0.075***
Pit latrines per 100 pupils	0.110	0.082	0.147*	0.005	0.004	0.007*
School has a library	-0.246	0.702	-0.768*	-0.012	0.035	-0.038*
School has a special girls' room	-0.049	-0.177	0.222	-0.002	-0.009	0.011
School has a teacher office	0.509*	0.981*	0.347	0.025*	0.048*	0.017
School has teacher housing	-0.368	-0.501	-0.432	-0.018	-0.025	-0.021
School has a kitchen	-0.193	-1.723**	0.148	-0.010	-0.085**	0.007
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
School FE	Yes	Yes	Yes	Yes	Yes	Yes
Constant	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.656	0.744	0.618	0.656	0.744	0.618
Observation	93,895	14,426	79,469	93,895	14,426	79,469
Schools	16,123	2,526	13,596	16,123	2,526	13,596

*** p<0.01, ** p<0.05, * p<0.1

Note: Pupils who are at risk are likely to be those with disabilities, or with multiple vulnerabilities or who experience discrimination. Government support can take the forms of protection, transportation and food support.

Table 6: Raw PSLE scores by language and STEM subjects regression output

	Language scores (out of 100)		STEM scores (out of 100)		Language scores (out of 100)		STEM scores (out of 100)	
	(1)	(2)	(3)	(4)	(5)	(6)		
Girls	National	National	Urban	Rural	Urban	Rural		
Percentage of female teachers	-2.015***	-4.883***	-1.802***	-2.357***	-5.240***	-5.183***		
Girls X percentage of female teachers	-3.802***	-4.094***	-5.448***	-4.016***	-6.522***	-4.264***		
School distance to LGA (km)	3.991***	3.968***	2.899***	5.244***	3.553***	5.193***		
Average pupil home distance to school (km)	-0.005	-0.004	-0.007	-0.006	-0.015	-0.005		
Percentage of pupils who receive lunch (by gender)	-0.223**	-0.147*	0.000	-0.233**	0.278	-0.210**		
Percentage of pupils who receive breakfast (by gender)	-0.000	0.001	0.001	-0.001	0.005	-0.000		
Percentage of pupils who are at risk and receive government support	-0.001	0.000	-0.001	-0.001	0.001	-0.000		
Seats per pupil at school	0.006	0.007	0.013	0.006	0.017	0.007		
PTR	0.282**	0.352***	0.524*	0.244*	0.485*	0.346**		
Pupil to class ratio	-0.030***	-0.027***	-0.034***	-0.030***	-0.045***	-0.024***		
Percentage of teachers with a diploma or above	-0.003*	-0.003*	-0.001	-0.004*	0.004	-0.005**		
Percentage of teachers with a permanent contract	0.679**	1.382***	0.687	0.914**	1.015	1.682***		
Percentage of teachers who have completed a teacher training course	-0.450	-0.912	-2.055	-0.554	-4.634*	-0.760		
Books per pupil (0 to 3)	0.917*	0.386	2.587*	0.649	3.858**	-0.147		
Pit latrines per 100 pupils	0.634***	0.685***	0.169	0.741***	0.275**	0.777***		
School has a library	0.042	0.068*	0.012	0.065	0.070	0.082*		
School has a special girls' room	-0.163	-0.083	0.047	-0.321	0.655*	-0.447*		
School has a teacher office	0.018	-0.067	-0.122	0.183	-0.054	0.039		
School has teacher housing	0.202	0.307**	0.402*	0.146	0.579**	0.201		
School has a kitchen	-0.198	-0.170	-0.289	-0.220	-0.213	-0.212		
Year FE	-0.090	-0.103	-0.858**	0.075	-0.864**	0.073		
School FE	Yes	Yes	Yes	Yes	Yes	Yes		
Constant	Yes	Yes	Yes	Yes	Yes	Yes		
R-squared	0.652	0.640	0.744	0.612	0.719	0.607		
Observation	93,895	93,895	14,426	79,469	14,426	79,469		
Schools	16,123	16,123	2,526	13,596	2,526	13,596		

*** p<0.01, ** p<0.05, * p<0.1

Note: Pupils who are at risk are likely to be those with disabilities, or with multiple vulnerabilities or who experience discrimination. Government support can take the forms of protection, transportation and food support.

Table 7: Standardized PSLE scores by language and STEM subjects regression output (standard deviation)

	Language scores		STEM scores		Language scores		STEM scores	
	(1)	(2)	(3)	(4)	(5)	(6)		
Girls	National	National	Urban	Rural	Urban	Rural		
Percentage of female teachers	-0.150***	-0.398***	-0.134***	-0.175***	-0.427***	-0.423***		
Girls X percentage of female teachers	-0.282***	-0.334***	-0.405***	-0.298***	-0.532***	-0.348***		
School distance to LGA (km)	0.296***	0.324***	0.215***	0.390***	0.290***	0.423***		
Average pupil home distance to school (km)	-0.000	-0.000	-0.001	-0.000	-0.001	-0.000		
Percentage of pupils who receive lunch (by gender)	-0.017**	-0.012*	0.000	-0.017**	0.023	-0.017**		
Percentage of pupils who receive breakfast (by gender)/w	-0.000	0.000	0.000	-0.000	0.000	-0.000		
Percentage of pupils who are at risk and receive government support	-0.000	0.000	0.000	-0.000	0.000	-0.000		
Seats per pupil at school	0.000	0.001	0.001	0.000	0.001	0.001		
PTR	0.021**	0.029***	0.039*	0.018*	0.040*	0.028**		
Pupil to class ratio	-0.002***	-0.002***	-0.003***	-0.002***	-0.004***	-0.002***		
Percentage of teachers with a diploma or above	-0.000*	-0.000*	-0.000	-0.000*	0.000	-0.000**		
Percentage of teachers with a permanent contract	0.050**	0.113***	0.051	0.068**	0.083	0.137***		
Percentage of teachers who have completed a teacher training course	-0.033	-0.074	-0.153	-0.041	-0.378*	-0.062		
Books per pupil (0 to 3)	0.068*	0.031	0.192*	0.048	0.315**	-0.012		
Pit latrines per 100 pupils	0.047***	0.056***	0.013	0.055***	0.022**	0.063***		
School has a library	0.003	0.006*	0.001	0.005	0.006	0.007*		
School has a special girls' room	-0.012	-0.007	0.003	-0.024	0.053*	-0.036*		
School has a teacher office	0.001	-0.005	-0.009	0.014	-0.004	0.003		
School has teacher housing	0.015	0.025**	0.030*	0.011	0.047**	0.016		
School has a kitchen	-0.015	-0.014	-0.021	-0.016	-0.017	-0.017		
Year FE	-0.007	-0.008	-0.064**	0.006	-0.070**	0.006		
School FE	Yes	Yes	Yes	Yes	Yes	Yes		
Constant	Yes	Yes	Yes	Yes	Yes	Yes		
R-squared	0.652	0.640	0.744	0.612	0.719	0.607		
Observation	93,895	93,895	14,426	79,469	14,426	79,469		
Schools	16,123	16,123	2,526	13,596	2,526	13,596		

*** p<0.01, ** p<0.05, * p<0.1

Note: Pupils who are at risk are likely to be those with disabilities, or with multiple vulnerabilities or who experience discrimination. Government support can take the forms of protection, transportation and food support.



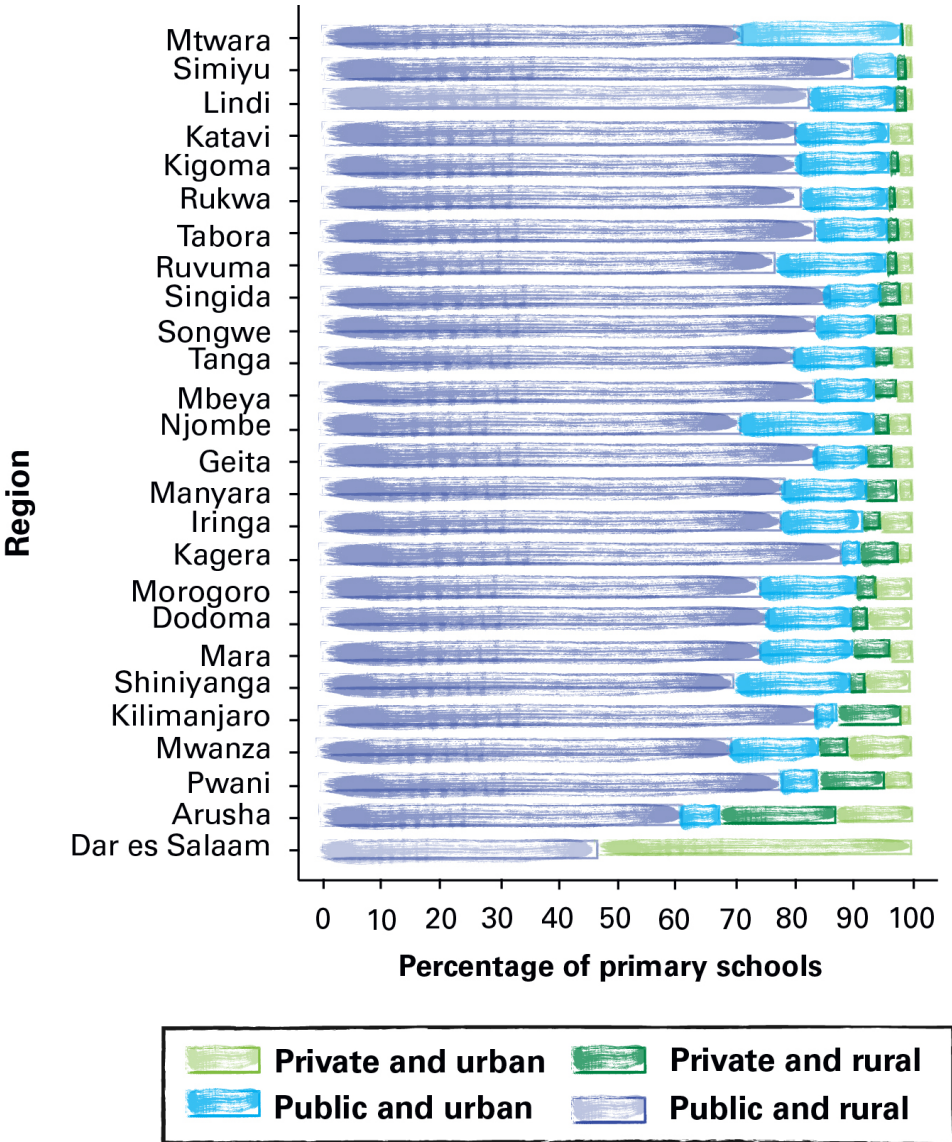
Appendix B: Descriptive statistics on key variables

Table 8: Descriptive statistics (2021, government schools)

Variables	National	Rural	Urban	Girls	Boys
Promotion rate (%)	87.6	85.92	93.6	89.04	86.16
Repetition rate (%)	3.12	3.48	1.56	3.12	3
Standard 7 pupils who sat for the PSLE (%)	98.04	97.8	98.64	98.64	97.32
Total PSLE score (max 300)	153.72	149.52	166.8	150.96	156.6
Kiswahili score (max 50)	32.28	31.32	35.64	32.4	32.28
Mathematics score (max 50)	21.48	21.12	22.8	21.48	21.6
English score (max 50)	22.44	21.96	24.24	21.72	23.28
Science score (max 50)	27.36	26.64	29.64	26.64	28.2
Pupil characteristics					
Pupils who are at risk and receive government support (%)	1.56	1.8	0.84	1.56	1.56
Home to school distance (km)	1.92	2.04	1.68	1.92	1.92
Female pupils (%)	50.4	50.4	50.5	-	-
Teacher characteristics					
Teachers with permanent contracts (%)	98.16	98.04	98.88		
Teachers with a diploma or above (%)	26.4	24.6	35.76		
Female teachers (%)	41.76	38.04	61.32		
Teachers who have completed a teacher training course (%)	99.12	99	99.6		
School characteristics					
Distance to LGA (Km)	39.24	47.04	12.12	-	-
Pupils who receive lunch (%)	30.6	33	22.56	30.36	30.84
Pupils who receive breakfast (%)	26.88	31.56	10.44	26.64	27.12
PTR	72.96	76.56	60.72	-	-
Books per pupil (0 to 3)	1.08	1.08	1.2	-	-
Seats per pupil	0.84	0.84	0.84	-	-
Classroom to pupil ratio	110.76	107.52	122.04	-	-
Pit latrines per 100 pupils	1.8	1.92	1.56	1.92	1.8
School has a special girls' room (%)	17.16	16.8	18	-	-
School has an administrative block (%)	12.12	10.2	18.72	-	-
School has a kitchen (%)	12.96	13.56	11.16	-	-
School has a library (%)	11.52	11.04	13.2	-	-
School has teacher housing (%)	79.56	83.4	66	-	-
School has a teacher office (%)	74.52	77.88	62.4	-	-

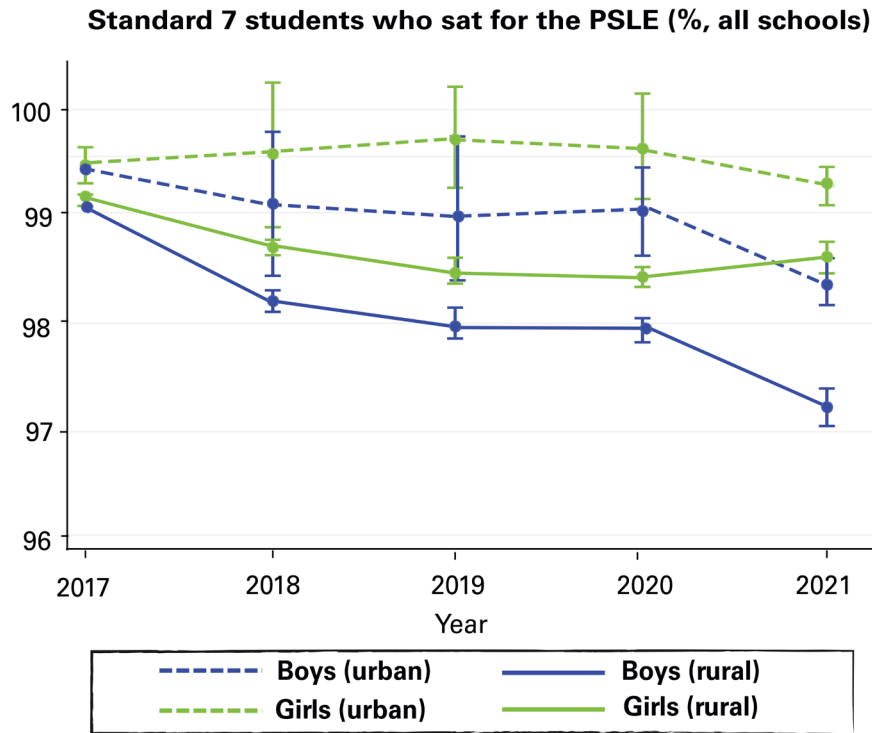
Note: Table represents average of school averages. Except for teacher characteristics, all other indicators are weighted by pupil enrolment to indicate the average pupil experience in Tanzania. When available, pupil grade and gender enrolment were used as weights. Pupils who are at risk are likely to be those with disabilities, or with multiple vulnerabilities or who experience discrimination. Government support can take the forms of protection, transportation and food support.

Figure 14: School location and type by region (2022)



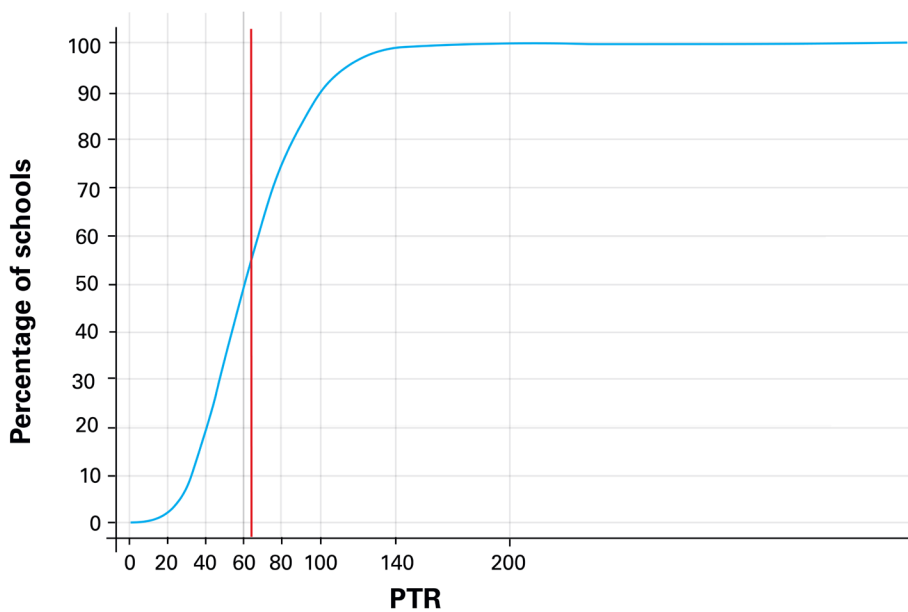
Source: EMIS. Calculations made by authors.

Figure 15: Pupil participation in the PSLE



Source: EMIS and PSLE. Calculations made by authors, representing a weighted average of school average. Weight is enrolment of Standard 7 by school. Vertical bars indicate 95 per cent confidence interval.

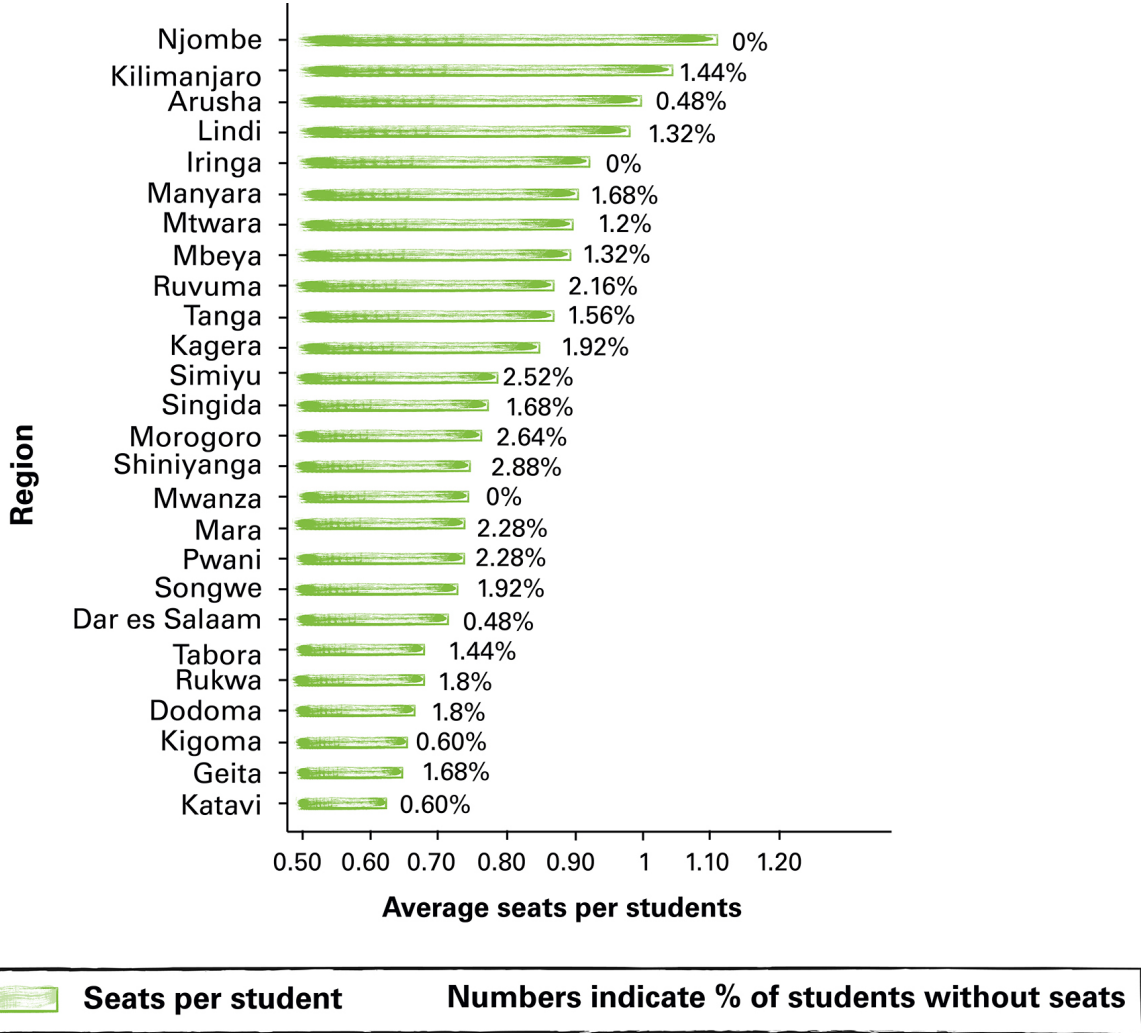
Figure 16: Distribution of PTR (2021)



Note: Vertical line indicates average.

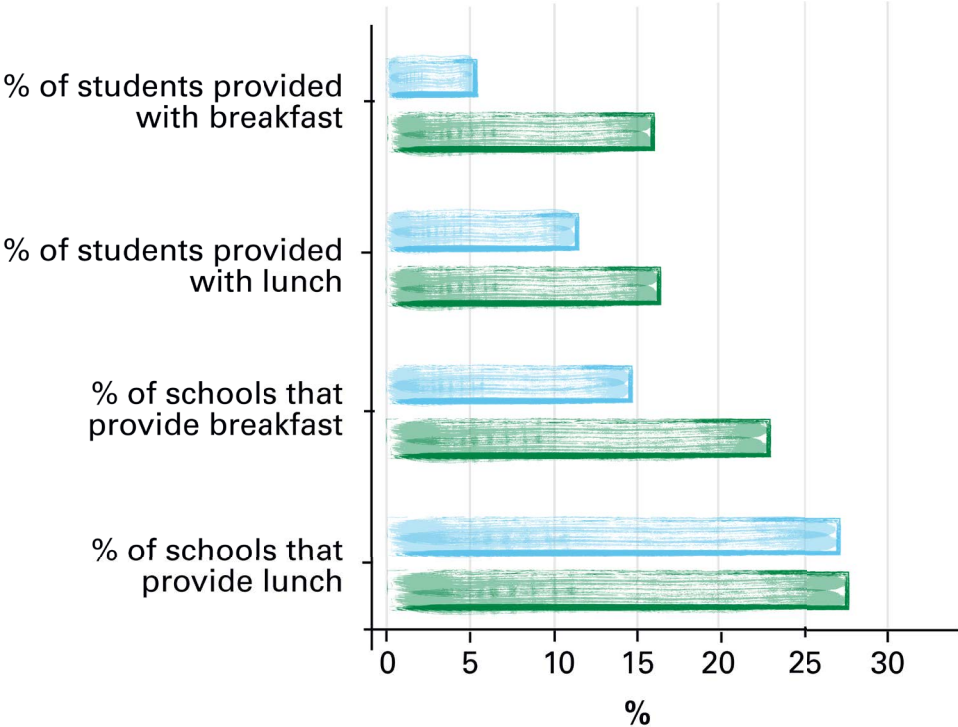
Source: EMIS. Calculations made by authors, representing the distribution of PTR in all schools in Tanzania.

Figure 17: Seats per pupil and percentage of pupils without any seats in school by region in government schools (2021)



Source: EMIS. Calculations made by authors, representing a weighted average of school average. Weight is enrolment by school.
 Note: Numbers indicate the percentage of pupils that study in schools where there are no available seats in each region.

Figure 18: Provision of breakfast and lunch in schools by location in government schools (2021)



Source: EMIS . Calculations made by authors. Percentage of pupils represents a weighted average of school average. Weight is enrolment by school.



Appendix C: Details of school performance variables

The four school performance variables discussed in section 3.1. were constructed as follows:

Grade promotion rates, which corresponds to the percentage of pupils in a grade that moved on to the next grade in the subsequent school year, were calculated by following cohorts of pupils. For example, pupils that were in Standard 1 in 2019 should have been in Standard 2 in 2020, so the promotion rate for Standard 1 in 2019 was the number of children enrolled in Standard 2 in 2020 minus the repeaters in Standard 2 in 2020 divided by the number of Standard 1 pupils enrolled in 2019. Therefore, pupils that were not promoted either repeated their initial grade the next school year or dropped out. Because of the granularity of the data available, promotion rates were calculated for girls and for boys separately, allowing a gender lens to be incorporated into the analysis. With the

available data, three years of promotion rates were calculated, spanning the period of 2019 until 2021 from Standard 1 to Standard 6 for boys and for girls separately.

One limitation to this performance variable is that, although promotion rates allow a granular view of all grade and gender performance, information on pupil transfers (in and out of a grade) is not available. This means that some pupils who the analysis considers as dropouts or new grade entrants could have transferred schools. In some instances, this could render promotion rates higher than 100 per cent. The main hypothesis to sustain the use of promotion rates in the analysis is that school transfers are not so common and that variation in promotion rates captures actual performance. Schools with promotion rates higher than 120 per cent were not included in the regression analysis.

PSLE scores were grouped by subject total scores. Although the PSLE has a total of five subjects and scores for each subject range from 0 to 50, in this analysis, the focus is on four subjects only: Kiswahili, English, mathematics and science. These were grouped in three different ways. The former two were grouped as a generic category named 'language subjects', and the latter two were grouped as another category named STEM subjects. Finally,

both of these categories were combined to represent a total PSLE score. Therefore, the maximum score is 100 in both language subjects (Kiswahili and English sections) and STEM subjects (mathematics and science) is each 100, while the maximum total PSLE of the four subjects analysed is 200. Due to the granularity of the data, PSLE scores were also analysed separately by gender.

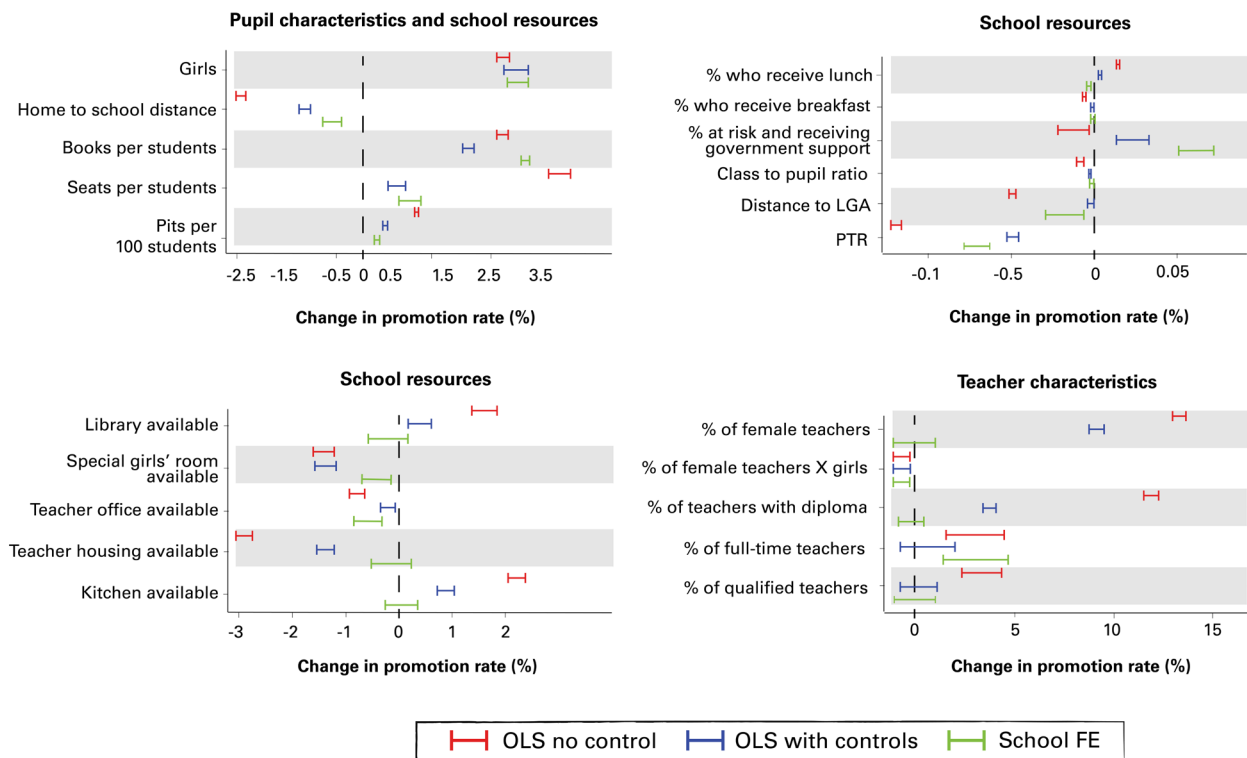


Appendix D: Stability of coefficients from regression models

As an extra step to ensure the reliability of the results discussed in this report, the stability of coefficients using the grade promotion rates and the total PSLE scores was assessed. This exercise was done by running three models: firstly, an ordinary least squares (OLS) estimator without any control variables (red); secondly, an OLS

estimator with all control variables (blue); and finally, an OLS estimator with FE and control variables (green). The results tables in Appendix A show an OLS estimator with FE. The graphs below provide the other specifications to show the effects of introducing more controls into the models.

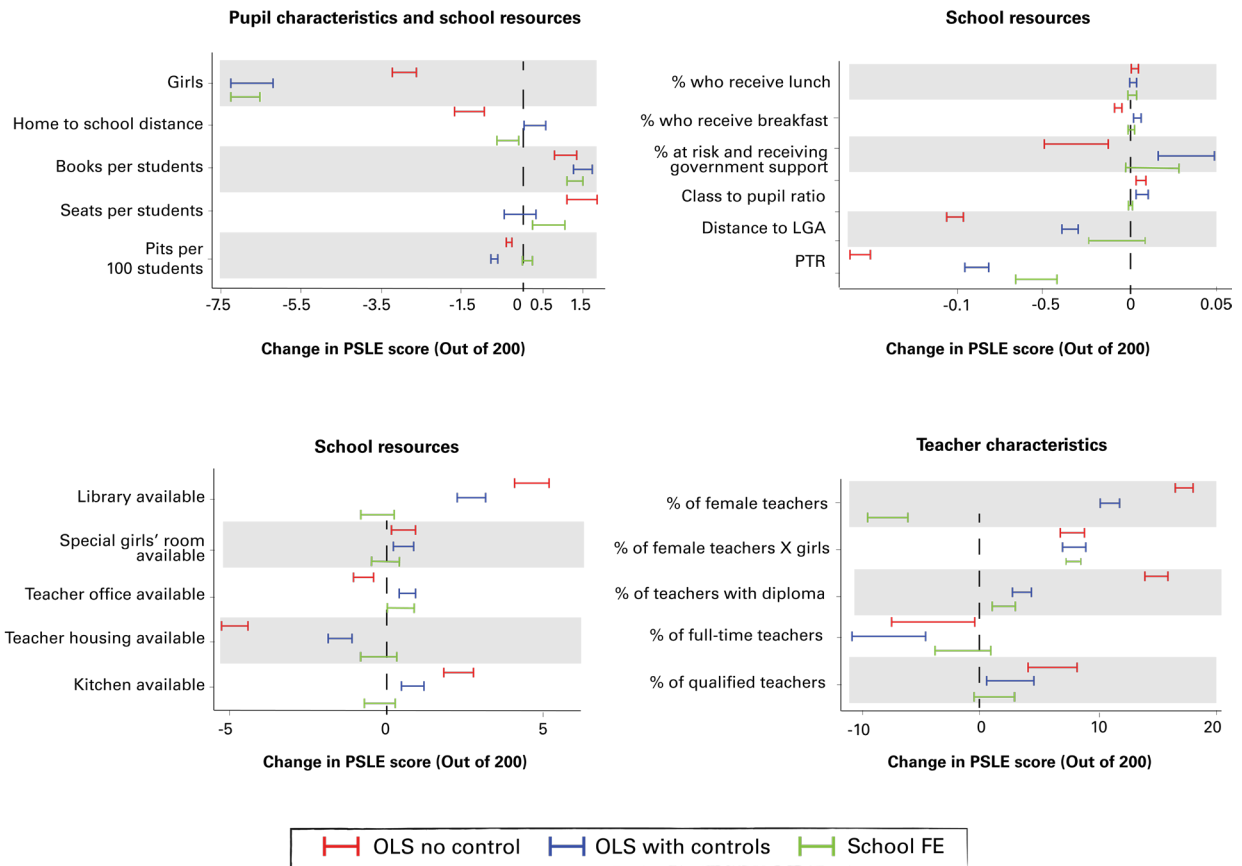
Figure 19: Stability of coefficients in models for promotion rates in government schools



Source: EMIS. Calculations made by authors. Weighted by grade enrolment.

Note: OLS with no controls and with controls include grade and year FE, but do not include school FE.

Figure 20: Stability of coefficients in models for PSLE scores in government schools



Source: EMIS and Tanzania, National Examinations Council. Calculations made by authors. Weighted by grade enrolment.

Note: OLS with no controls and with controls include grade and year FE, but do not include school FE.

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For more information

United Nations Children's Fund
UNICEF Innocenti – Global Office of Research and Foresight
Via degli Alfani, 58
50121, Florence, Italy

researchpublications@unicef.org
www.unicef-irc.org

@UNICEFInnocenti on Twitter, LinkedIn, Facebook, Instagram and YouTube
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