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Returns to secondary education

Unpacking the delivery of senior secondary schooling in Ghana

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Returns to secondary education: Unpacking the delivery of senior secondary schooling in Ghana

Pascaline Dupas and Jamie Johnston[1]

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Abstract

This grant was used to conduct a comprehensive data collection at the SHS and a subset of JHS attended by 2,054 students who are part of a larger randomized study looking at the returns to secondary schooling. At each of the schools, a total of six total survey instruments were administered, including tests of math teachers' knowledge. The goals of the study were to shed light on (1) the landscape of delivery of secondary education in rural areas and (2) the sources of heterogeneity in returns to schooling. The data collected overall paints a much more homogeneous picture of secondary schooling than expected. Although we observe differences in the school infrastructure and the characteristics of students (i.e. entering BECE scores and student behaviors) enrolling in schools of varying selectivity, overall we find few differences in the management, motivation, and effort of headmasters and math teachers across these schools. We furthermore observe a strong positive effect of enrollment in schools of all types. These findings can be interpreted as heartening in several ways. It appears that teachers and headmasters are exerting similar levels of effort and conducting similar sets of practices across all types of schools. While we acknowledge that such practices can be difficult to capture through surveys, we also find similar levels of performance on a teacher mathematics test across all schools, which is harder to fabricate. Possibly owing to the limited variation across schools in our sample, we do not find any clear relationship between student performance and our measures of school management quality. While schooling matters for learning across all types of schools, absolute levels of knowledge among SHS graduates remain low (Anamuah-Mensah, 2011). This suggests that pedagogy rather than management may be the weak link in the education production chain. The encouraging levels of motivation and management quality we detected suggests that high schools in Ghana are fertile grounds for the successful implementation of pedagogy reforms.

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Introduction

Evidence suggests that despite completion of secondary schooling, students in Ghana are not gaining basic skills important for their future success (Anamuah-Mensah, 2011), despite relatively large costs for parents (in terms of fees) and for the government (in terms of teachers' salaries primarily). Relatively little information about how the resources invested in secondary education are managed and their relationship to student outcomes currently exists. This is the case in most in low-income countries, particularly at the secondary level (Banerjee et al, 2013; Glewwe et al., 2013; Kremer & Holla, 2009).

The aim of this research study was to fill the gap in the literature by addressing the following research questions: What is the quality of secondary education delivery in Ghana, and what are its determinants? To this end, we conducted school and classroom visits, as well as administer surveys and content knowledge tests to teachers, to build a detailed dataset on primarily rural junior and senior high schools. We combine it with the results of an ongoing study estimating the returns to secondary education among the rural poor in order to understand inequities across types of school in how their resources are managed and translate into learning.

The data collected through class-level, school-level and teacher-level surveys help form a better landscape of the management of secondary education in Ghana and its quality across two particular dimensions: i) school-level management practices and ii) teacher-level factors.

A number of studies also point to the importance of school leaders for effective schooling, particularly within disadvantaged contexts (Brewer, 1993; Hallinger & Heck, 1998; Waters, Marzano & McNulty, 2003; Grissom & Loeb, 1998). While relatively little is known about the school management practices in Ghana, we conjecture that the competency of school administrators may be especially important for the success of schools lacking in resources and typically serving poorer and/or lower performing students. As part of our investigation, we address the following questions: What management practices are utilized by school leadership and which practices are correlated with higher returns for students?

A foundational claim in the general schooling literature is that teacher quality matters for student learning (Sanders & Rivers, 1996; Rockoff, 2004; Rivkin, Hanushek and Kain, 2005; Nye, Konstantopoulus & Hedges, 2004). As Banerjee et al. (2013) highlight, however, finding competent teachers, particularly at the post-primary level, is likely to be more challenging in countries where fewer individuals complete post-secondary, much less secondary education. To gain a better understanding of teaching in Ghanaian schools, we address the following questions: How well prepared are teachers to teach the required curriculum? What type of support and interactions do teachers have with school administrators? What challenges do teachers face? What is teachers' effort level?

While policymakers currently must rely on anecdotal evidence to craft appropriate education policies, this study contributes meaningfully to policy makers' efforts to improve the educational situation of disadvantaged students in Ghana and elsewhere. Indeed, the challenges facing Ghanaian schools and students are not unique and are seen in across many other disadvantaged populations.

Background

In June 2013, the Ghana Ministry of Education held its National Education Sector Annual Review (NESAR) under the theme of "Improving Teaching and Learning through Strengthening Accountability at all Levels," during which numerous challenges facing Ghana's secondary education sector were discussed. The challenges addressed included not just the lack of suitable learning facilities and adequately trained teachers, but also called for improved management practices, monitoring, and supervision on the part of school leaders, education officials, and members of the community. These issues raised by policymakers and education stakeholders are not new ones. In 2011, a report commissioned by the Office of the President similarly raised concerns around poor school management and supervision, as well as noted the deficiency in educational resources at both the Junior High School (JHS) and Senior High School (SHS) levels (Anamuah-Mensah, 2011). The report further attributed the troubling statistic that roughly 45 percent of students fail core subject tests in English, Mathematics, and Integrated Science on the West African Senior School Certificate Examination (WASSCE) to these deficits.

Both the 2011 report from the Office of the President and the GES policymakers at the 2013 NESAR conference raised additional concerns that rural schools tend to be particularly hard hit by these challenges. Evidence from IPA's GSEP *(Ghana Secondary Education Project*), an ongoing randomized evaluation examining the returns to secondary schooling for youth in rural areas, confirms this. In 2013, a GSEP survey asked several math problems to recent graduates from rural, SHSs, including this one: "A clothing store owner buys a bail of 100 used shirts for 1,200 Ghana cedis. How much will the store owner have to sell each shirt for in order to earn a profit of 600 cedis?" Despite having access to a calculator and unlimited time, and despite the fact that almost all of them can correctly divide 1,800 by 100 (when asked "how much is 1,800 divided by 100?"), only 20% of graduates were able to provide the correct answer of 18 cedis. While this is more than an 50% increase in correct answers compared to those obtained from JHS graduates (among whom the correct rates is only 12%), responses to this question and others testing students' applied math skills suggest that completing secondary schooling fails guarantee the acquisition of basic skills possibly important for success in post-secondary education and in the labor market. What are the bottlenecks at the school level?

The goal of this study was to fill the gap in knowledge regarding the management practices and quality of teaching in rural SHS throughout the country. While the Ghana Education Service (GES) collects information on the availability of resources and quality of educational infrastructure, there are few, if any, studies that have collected data on the management practices carried out by school leaders, such as how teacher presence and effort are monitored and incentivized. Likewise, little is known about the quality of the teaching force, particularly when it comes to teacher content knowledge.

Study Design

This study was built on a large randomized study called GSEP examining the returns to secondary schooling in Ghana (Dupas, Duflo, Kremer, 2015). Since 2008, the scholarship study has followed 2,054 JHS graduates who had been admitted into a SHS but could not enroll due to financial difficulties. Among them, 682 were randomly selected to receive a four-year scholarship (the "treatment") to cover all senior high school fees (as a day student – the scholarship did not cover boarding fees). Follow-up data conducted as part of the GSEP study over the past 7 years shows that the scholarship had a large impact on educational attainment. By 2015, 70% of the scholarship winners had completed senior high school, compared to 41% of the non-winners. The effect was seen throughout the distribution of initial performance – even students who had barely gained admission (in the lowest quartile of the performance on the senior high school entrance exam, the BECE) overwhelmingly took up the scholarship. Take-up of the scholarship was larger among those admitted into category A or B schools (Figure 1 Panel A, though we note we have very few such students in our sample (see Table A1 for details on the GSEP sample). [2] The effect of the scholarship on secondary education completion rate was similar across school type (SHS or Sec Tech, see Figure 1 Panel B) and across regions (Figure 1 Panel C).

The GSEP study is keeping track of youths in the study sample in order to study how this gap in educational attainment translates into gaps in later life outcomes. An in-depth, in-person follow-up survey successfully administered to 97% of the sample in the Spring/Summer 2013, included a module aimed at measuring impacts on cognitive skills. The module included reading comprehension and math problems such as the profit problem mentioned in the introduction. Results from this module, presented in Figure 2, show that scholarship recipients performed significantly better on the test than those in the control group. Interestingly, we find large cognitive gains for all categories of SHS, and surprisingly no greater impacts of attending a very selective school (category A), as shown in Figure 2 Panel A. While again this result needs to be taken with caution given the small size of the sample of students admitted to category A and B schools, this is consistent with recent findings from Ajayi (2014), who shows, using a much larger sample of students and a regression discontinuity approach, that students admitted to more selective schools demonstrate only marginal improvements in exam performance.

Yet, we see some heterogeneity in learning by school type: the effect of getting a scholarship (the gap in test score between treatment and control group) appears smaller in Sec Tech High Schools compared to Senior High Schools (Figure 2, Panel B). This may be due to the fact that the composition of majors followed are different across school types (admissions into 'agriculture science' and 'technical skills' tracks, which don't offer elective math courses, are 15% and 13% respectively in Sec Tech schools, compared to 9% and less than 1% in SHS).

[2] SHSs are classified by the Ghanaian Ministry of Education (MoE) according to a non-disclosed set of criteria ranging from categories A to D. Category A and B schools have the most competitive admissions policies, tend to be more highly resourced and are located in urban areas. They also tend to have higher tuition and boarding fees. Category C and D schools can be either regular SHS, or Technical SHSs.

The impact of the scholarship program on cognitive skills also varies by region (Panel C). The most striking regional differences are in the baseline levels however – control group youth, who all completed JHS, perform much worse in Ashanti, Brong Ahafo and Central Region than in other regions, and while accessing SHS improves learning everywhere, it does not appear to close the regional gaps.

While the GSEP study is collecting detailed information from study participants, relatively little is currently known about the schools in which scholarship recipients and non-recipients were admitted to and (when applicable) enrolled in. We therefore conducted an extensive data collection at SHS schools involved in the scholarship study, namely 172 SHS (scattered around 5 regions: Ashanti, Brong Ahafo, Central, Easter and Western) that had admitted any treatment or control students at the onset of the scholarship study (2008).

Given this sampling strategy, the set of SHSs we have data from is representative of a specific class of SHSs—JHS that poor rural youth in Ghana apply to and SHS that they get admitted in as day students. But as documented by Ajayi and Telli (2013) using a sample of enrolled SHS students, low-income students apply to less selective schools. The data in Ajayi and Telli (2013) does not speak to whether low-income students who ultimately are unable to enroll due to financial constraints (akin to those in the GSEP sample) also apply to less selective schools, but it is likely the case. If so, then our GSEP-based sample of SHS is skewed towards the less selective schools, and our analysis would understate heterogeneity across schools. In an attempt to correct this, we added 8 provincial boarding schools from the Greater Accra region for comparison purposes. It is worth keeping in mind that this still does not make our SHS sample representative of the universe of SHSs.

Because we see important heterogeneity in the level of preparedness at the end of JHS across regions, with additional funding from the JPAL Post-Primary Education Initiative, we were able to survey 162 Junior High Schools (JHS). Sampled JHSs were those where at least 5 students from the GSEP sample had sat for the BECE, thus they are all from one of the five regions involved in the GSEP study. The sample size broken down by region and school category is provided in Table 1.

The following survey instruments were administered: (1) a **headmaster survey** with each school's headmaster/mistress that collects information on the headmaster/mistress's background, as well as management practices carried out in the school. (2) A **school survey** completed by the headmaster/mistress and/or the individuals designated by the headmaster/mistress (including assistant headmasters/mistresses, record-keeping administrative staff, and school bursar's) that collects information about school resources and learning facilities, the composition of the student body, and challenges regarding student performance and student and teacher absenteeism. (3) A **teacher survey** completed with three randomly sampled core mathematics teachers that covers teachers' demographic background, credentials, and teaching practices. (4) A **teacher mathematics test** (13 items, roughly 30 minutes) completed by the three randomly sampled core mathematics teachers that tests teachers on their mathematics content knowledge as well as pedagogical content

knowledge.[3] (5) An **attendance survey** completed with two class prefects per school that asks students to report on number of classes and teacher absences in the previous week. (6) A **PTA chairperson survey** that asks about PTA (Parent Teacher Association) involvement in each school, including the financial and in-kind support provided.

Data collection activities began in June 2014 and were completed in March 2015. We intended to visit all schools in the 2013-14 academic year; however due to unforeseen delays in the field, data were collected in two rounds: 1) an initial data collection round in term 3 of the 2013-2014 academic year and 2) a mop-up data collection round in term 2 of the 2014-2015 academic year.[4] Note that we originally planned to complete the mop-up data collection in term 1 of the 2014-15 academic year, but due to a nationwide teacher strike, had to postpone to term 2.

At each of the schools, as mentioned above, up to six survey instruments were administered. Please note that we were not able to collect surveys from all respondents at the 342 schools visited. In total, 532 SHS teachers were surveyed – on average, 2.95 per SHS. We used similar survey instruments at JHSs. Because JHSs have fewer math teachers, we were able to survey only 1.5 math teachers per JHS on average.

Results

We start by presenting summary statistics for each of the types of data collected, since the raw levels for many of our variables are unknown as we are the first to collect such data. We then examine differences across school categories and regions. We then match our data to some of the scholarship study data, to try to identify which school characteristics correlate with measured returns to the scholarships observed in the GSEP study.

A. Summary statistics

In Table 2, we present selected summary statistics from all surveys. We show the mean and standard deviation for the overall sample. Because our surveys included over 100 questions, we group outcomes by categories and create standardized indices. The categories measured at the school level are: the extent of the monitoring the school reports getting from GES officials, the effort level of the headmaster, the quality of the school infrastructure, the level of financial resources for the school, teacher absenteeism, and the levels of intrinsic and extrinsic motivation of the headmaster. The categories measured at the teacher-level are: the teacher's perceived discipline level of students, teacher absenteeism, intrinsic and extrinsic motivation, as well as reported levels of interaction with

[3] While we initially planned to survey an average of 6 mathematics teachers per school, during piloting we learned that given teachers' schedules and the window of time available for surveying, it would not be feasible to survey all core mathematics teachers. As an alternative, we decided to randomly sample three math teachers from the roster of all mathematics teachers provided by the school.

[4] Challenges during the initial round of data collection included unexpected school holidays and conferences attended by headmaster/mistresses, as well as longer than anticipated travel times between schools.

the headmaster and the parents. Information on the specific variables that enter each index (and on their mean and standard deviation) is provided appendix tables A2 and A3.

Together, the summary statistics in Tables 2 and A2 reveal a number of interesting facts about the status of secondary education in Ghana overall. On the one hand, teacher absenteeism and student absenteeism and effort levels leave some room for improvement. On the other hand, headmasters appear to have in place a number of systems to deal with these issues. All headmasters report monitoring teacher absenteeism, and 80% of headmasters have a system of performance appraisal for teachers. They also meet with teachers and visit classrooms regularly. Monitoring by GES official is also non-negligible, though most of the monitoring is done at the district level. Teacher satisfaction appear high, and so do levels of intrinsic and extrinsic motivation among both headmasters and math teachers.

One of the unique features of our dataset is that we administered a math and math pedagogy test to math teachers. We find that out of 14 math questions asked on the worksheet (12 of them at the SHS-level and 2 at the JHS-level), SHS teachers were on average able to correctly answer 9.4 questions (67%) while JHS teachers could only answer 6.5 (47%). SHS teachers performance is relatively higher on pedagogical content knowledge (where they scored 70% correct) than common content knowledge (65%). We also asked teachers the profit question mentioned in the introduction, the question that had been asked from youth in the GSEP sample and for which we had found only 20% of SHS graduates able to correctly answer. We find that 70% of SHS teachers and 65% of JHS teachers were able to answer this question correctly, putting them way ahead of the students.

B. Are there systematic differences by school category (A, B, C and D)?

Table 2 also shows the means by school categories, as per the (former) GES classification. Stars indicate whether differences between categories are statistically significant at the 1, 5 and 10 percent level (***, **, * respectively). Statistically significant differences are differences that are very unlikely to be due to pure sampling variation and instead reflect systematic differences between school types.

With the important caveat that we have a limited number of category A and B schools in our sample, which is primarily rural, we find that A and B schools have better school infrastructure and are less likely to be located in very rural areas. Unsurprisingly, given the competitive nature of secondary school admissions in Ghana, A and B schools admit students with a higher BECE score on average.

Nevertheless, at the same time, we observe few differences when looking across teacher behaviors. Across all schools, teachers and headmasters report similar levels of interactions with one another and with parents and display similar levels of altruism and internal and external motivation. Category D schools do stand out in a number of domains, however. These are much smaller, rural schools, which are significantly less supervised by GES as per these schools' reports of official visits (see the details of the GES monitoring index in Table A2). Possibly as a result, headmasters at D schools have lower levels of extrinsic motivation and a significantly lower score on our effort index.

Teachers in category D schools report worse student behavior compared to all other schools (more student absenteeism, tardiness, and worse performance, as reflected in the student behavior index).

In terms of math teachers' skills, while math teachers in category A schools perform better overall than teachers in C and D schools on the math test and particularly on the more advanced SHS-level questions, no differences are observed between teachers in category B, C, and D schools. Teachers in B schools appear quite heterogeneous, as B schools have both among the best and among the worst performing teachers. But within-school heterogeneity is not specific to B schools. We show this graphically in Figure 3, which displays the raw math worksheet scores for teachers by school (Panel A). By looking at the vertical spread of the figure, one can get a sense of within-school heterogeneity. By looking at the horizontal spread, one can get a sense for how much overlap there is in teacher skills across schools. Overall, Panel A of Figure 3 reveals much greater heterogeneity in teacher level *within* school than across school. In other words, sorting of math teachers into school categories does not seem to be happening, at least not in terms of the teachers' math skills. In contrast, Panel B of Figure 3 reveals a clear difference in the distribution of scores between JHS and SHS teachers: the two groups of teachers (JHS and SHS) occupy very distinct areas of the graph, as teachers in SHS almost all outperform JHS teachers, even in D schools.

C. SHS vs. Sec Tech

As shown in Table 1, C and D schools are split between those also categorized as a technical school ("Sec Tech") and those only categorized as SHS. Table 3 displays average school characteristics by type, namely, whether the school is only an SHS or also categorized as a technical school. As is more typical of C and D schools, technical schools are more likely to be located in rural areas and lower student enrollment. Technical schools also have a smaller share of female students and a slightly smaller student-teacher ratio on average. After controlling for school category, we find no differences between mainstream SHSs and technical schools across all of the indices examined and teacher cognitive tests, with the exception that teachers at technical schools performed somewhat lower (by less than 10% of a standard deviation) on a test of IQ (as measured by performance on a Raven's matrices test).

D. Heterogeneity across Regions

Table A4 follows the same format as Table 3, but rather displays average school characteristics by region. As we have uneven representation of regions in our sample, these differences should be interpreted with caution. Nevertheless, the most striking result in this table concerns teachers' performance on the worksheet: teachers in Ashanti, Brong Ahafo and Central perform much lower than those in Eastern, Western and Greater Accra.

E. Correlates of Teacher Performance

Table 4 presents summary statistics on the math teachers surveyed in SHS schools. An extremely small share of them are female (only 7%). Only about a third have a math degree, and a third have a math education degree. Self-reported absenteeism is non-trivial, with about 10% of classes missed in the previous week. While almost all surveyed teachers teach exclusively math, we observe heterogeneity in the type of math classes taught, with only about 30% of periods taught being electives.

Table 5 examines how these teacher characteristics correlate with teacher worksheet performance. The very few female math teachers perform significantly worse on the math worksheet, possibly owing to the fact that they put forth lower effort when doing it, as per the surveyor's estimate (see column 5). IQ, as measured by performance on the Raven's matrices test, is positively correlated with performance. Completion of some post-secondary math studies is likewise correlated with performance. Neither intrinsic nor extrinsic motivation appear to matter for performance, although both correlate strongly with job satisfaction.

Given the heterogeneity in math teachers skills within school, how the teachers are allocated to classes could likely matter in terms of learning. That is, if a school fails to allocate the most proficient math teachers to the more advanced electives math courses, it may limit math performance among students, thereby creating some inefficiency.[5] We examine this in Table 6. We regress a number of measures of the teacher's time allocation on their worksheet performance, as well as other characteristics. Reassuringly, we find that those who score better on the worksheet teach a higher share of elective math classes.

In Figure 4, we look at heterogeneity across schools to understand the extent to which they follow this practice of assigning the most math proficient teachers to elective classes. We plot the distribution of the school-level correlation between a teacher performance and the share of his time spent on electives. We find relatively important heterogeneity across schools, with some schools exhibiting a negative correlation, meaning that they assign the worse performing teachers to the hardest classes. Moreover, we find that the quality of this matching between teacher skills and tasks varies substantially by school category: the higher ranked the school is, the more likely they are to have a positive match between teacher skills and task difficulty. One explanation could be because the starting levels of students in lower ranked school is lower, such that teaching electives in such schools does not require as advanced math skills. Alternatively, it could be because headmasters in D schools exhibit lower levels of effort as seen in Table 2. In particular, they perform fewer classroom visits, and may therefore be less able to identify mismatches.

In Table 7, we look at the extent to which headmaster's characteristics and efforts can predict the quality of the allocation of teachers to tasks. While we do not find that our measure of headmaster

[5] SHS elective math courses require proficiency in the Core Mathematics curriculum and cover more advanced topics including Algebra, Coordinate Geometry, Vectors and Mechanics, Logic, Trigonometry, Calculus, Matrices and Transformation, and Statistics and Probability (Ministry of Education, 2010).

effort is correlated with allocation, we observe that allocation is better in schools where there is a higher level of interaction between parents and teachers. If parent teacher meetings are mandated by headmasters, this finding could reflect headmaster management. Alternatively, if parent teacher meetings are conducted at the discretion of teachers, this may reflect proactive teachers that are able to better sort themselves into courses appropriately.

We do observe that headmasters with a graduate degree are more likely to assign higher performing teachers to elective courses. This finding may reflect a higher capacity and/or greater level of interest among more highly educated headmasters in ensuring that the teacher fit is appropriate for advanced courses. (We also observe that headmasters who did not complete a bachelor degree exhibit a higher level of allocation quality; however one must observe this statistic with caution – only 7.5 percent of headmasters in our sample did not complete a bachelor's degree. That these individuals were able to rise to a headmaster position without a degree may speak to the quality of these individuals. Roughly 50 percent of headmasters in our sample hold a graduate degree.)

F. What features of the school matter for learning?

Because the randomized assignment to scholarships in the scholarship study was stratified by SHS of admission, our SHS-level dataset allows us to test for heterogeneity in the returns to secondary education by various school traits. This analysis could help identify solutions to improve the delivery of secondary education in rural areas of the country. We employ several approaches in examining how school characteristics relate to student learning, as measured by performance on a mathematics test, as well as performance overall on both a mathematics and reading test.

First, we conduct a simple ordinary least square (OLS) regression examining how the school characteristics of the schools attended relate to control group students who did enroll in school despite not having received a scholarship. We include just control students in these models as they reflect the reality outside this study of students who manage to attend SHS despite not receiving a scholarship. Here we see that some of the school characteristics are correlated with cognitive skills (Table 8, columns 1 and 5). School infrastructure appears to be most strongly related to student learning. However, this and other correlations in this simple OLS analysis are likely reflective of higher performing students selecting into schools with better infrastructure, rather than of causal impacts of these school features.

In columns 2 and 5 of Table 8, we turn to the entire set of students, both treatment and control, and examine the simple effect of enrollment on student scores. We find that school enrollment is very important for student learning. Simply enrolling is related to performing 0.62 standard deviations higher in math and a 0.81 standard deviations overall. But again, this may not reflect a pure causal effect, as those who perform to start with may be more likely to enroll.

The GSEP study helps overcome this likely bias in the OLS analysis. As shown in columns 3 and 6 of Table 8, the randomized scholarship allows for an estimate of the causal impact of getting the scholarship on test scores. Duflo et al. (2015) show that young adults who were offered a SHS scholarship starting in 2008/2009 performed, by the summer 2013, 0.13 standard deviations higher

on a mathematics test and 0.16 standard deviations higher overall on both the mathematics test and an oral language test. Since we know from Figure 1 that the gap in actual SHS completion between treatment and control group was just around 30 percentage points (70% vs. 40%), the intention-to-treat estimate corresponds to a "treatment on the treated" (ToT) of 0.43 standard deviations. This is smaller than the 0.62 std. dev. estimated in the OLS, as expected, but still very large.

Finally, to identify which characteristics of the schools causally yield a larger impact of the scholarship on learning, in columns 4 and 8 of Table 8 we add characteristics of the school to which students were initially placed and their interactions with the treatment. When we do so, the estimated effect of the scholarships treatment barely changes (from 0.13 to 0.12 for the math score, and 0.16 to 10.17 overall), suggesting that gaining financial access to enrollment is what makes the biggest difference, regardless of school characteristics. Some of the non-interacted school characteristics seem to matter, which indicates that certain school characteristics are correlated with selection of higher performing students, again suggesting, unsurprisingly, that an OLS analysis is biased. The coefficient of interests are those on the interaction terms between school characteristics and the treatment. Here we find that the organization level of the teachers as well as their level of extrinsic motivation does matter for learning, but headmaster effort does not. Surprisingly, schools with higher financial resources yield lower learning – this could be due to a greater mismatch in those schools for the fairly low-income youth in the GSEP sample (Ajayi, 2012).

It is worth highlighting that we are conservatively examining the school of placement rather than school actually attended (because we do not know the counterfactual schools that non-enrolled students would have attended). By doing so, we are attributing the wrong SHS characteristics to those who enrolled to another SHS, which may attenuate our estimates of the effects of school characteristics. Just over 36% of those in the control group who enrolled in SHS went to a school other than the one they had been placed in by CSSPS. For enrolled students in the treatment group the rate is lower, at 10.5%.[6] At the same time, these findings still point strongly to the importance of SHS attendance - schooling matters for student learning regardless of where a student goes.

Conclusion

Academics and policymakers have long linked education with numerous beneficial outcomes both for individuals, as well as society in general, making education one of the core public services provided by governments worldwide. But economic growth has been limited in many poor countries over the last three decades despite impressive gains in years of schooling, suggesting that low school quality is a major constraint on growth (Hanushek and Woessman, 2012). Inequality in the way resources are distributed across schools and disparities in access to quality education are also a concern for the widening of social inequality (United Nations, 2013).

[6] Both of these rates of non-compliance with assigned SHS placement are much lower than the average non-compliance rates in the country, estimated at over 40% (Ajayi, 2014). This could be because students who have financial difficulties to enroll are those least able to afford switching to a school further away.

Little research to date has focused on ways to improve school quality, however, in particular at the secondary level. By providing evidence on the efficiency of the delivery of secondary education in rural areas, and its determinants, this study is a first step in understanding the resources and conditions of schools attended by students with limited economic means in Ghana. Although we observe differences in the school infrastructure and the characteristics of students (i.e. entering BECE scores and student behaviors) enrolling in schools of varying selectivity, overall we find few differences in the management, motivation, and effort of headmasters and math teachers across these schools. We furthermore observe a strong positive effect of enrollment in schools of all types. These findings can be interpreted as heartening in several ways. It appears that teachers and headmasters are exerting similar levels of effort and conducting similar sets of practices across all types of schools. While we acknowledge that such practices can be difficult to capture through surveys, we also find similar levels of performance on the teacher mathematics test across all schools, which is harder to fabricate. Possibly owing to the limited variation across schools in our sample, we do not find any clear relationship between student performance and our measures of school management quality. While schooling matters for learning across all types of schools, absolute levels of knowledge among SHS graduates remain low (Anamuah-Mensah, 2011). This suggests that pedagogy rather than management may be the weak link in the education production chain. The encouraging levels of motivation and management quality we detected suggests that high schools in Ghana are fertile grounds for the successful implementation of pedagogy reforms.

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