RISE

RESEARCH ON IMPROVING SYSTEMS OF EDUCATION

WORKING PAPER
July 2017

School Management and Public-Private Partnerships in Uganda

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RISE-WP-17/013

Funded by:
UKaid from the British people
Australian Aid

Oxford Policy Management
Blavatnik School of Government
University of Oxford
Center for Global Development

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July 2017

Abstract

Can the quality of school management explain differences in student test scores? In this paper, I present the first internationally benchmarked estimates of school management quality in Africa (based on the "World Management Survey"). The level and distribution of management quality is similar to that found in other low and middle-income countries (India and Brazil). I combine this data with individual student panel data, and demonstrate that differences in school management quality matter for student value-added - a standard deviation difference in management is associated with a 0.06 standard deviation difference in test scores. Finally, I contribute to understanding the role of the private sector in education in a low-income setting. Contrary to common perception, I find no difference between the quality of school management in government, private, or public-private partnership (PPP) schools (despite the higher level of autonomy available to them). An exception is an internationally-owned chain of PPP schools, which are as well managed as schools in the UK.

JEL Codes: I25, I28, L33, M50, O15

Keywords: Education, Management, School Quality, Uganda, Private Schools, Public-Private Partnerships, NGO

1 Introduction

Can the quality of school management explain differences in student test scores? School productivity varies substantially both within and between countries, and this matters. Theory and evidence suggest that it is the skills and knowledge acquired that lead to higher earnings, not just the amount of time spent in school (Hanushek, 2013; Hanushek et al., 2015). In this paper, I first ask how much the quality of school management matters for student outcomes. I then consider whether differences in management quality explain differences in the performance of government and private schools, and finally look at what factors explain variation in management quality. I find that school management quality does indeed matter for productivity, as measured by student value-added; however, there are no differences on average in management quality between government and private schools, leaving the private school premium unexplained. An important exception is a UK-owned chain of public-private partnership (PPP schools), which are substantially better managed than average, and this difference in management quality explains their performance advantage. Few other factors reliably predict management quality.

This paper is connected to three sets of literature. First, there are now hundreds of studies looking at the relationships between educational inputs and school productivity. Studies typically find that spending on traditional inputs such as books and infrastructure explain little of the variation in school productivity. Instead the most important interventions for improving school quality are around pedagogy and governance (Glewwe and Muralidharan, 2015). This includes studies looking at bundled packages of management support (Fryer, 2017; Blimpo et al., 2015; Tavares, 2015; Lassibille, 2014; Beasley and Huillery, 2014), as well as studies focused on specific sub-components of school management, such as monitoring (de Hoyos et al., 2015), teacher management (Duflo et al., 2015; Muralidharan and Sundararaman, 2011; Atherton and Kingdon, 2010), and tailoring teaching to the right level of individual students (Pritchett and Beatty, 2015; Duflo et al., 2011; Banerjee et al., 2011).

A second set of literature looks at the "New Empirical Economics of Management," demonstrating links between new measures of management practices and productivity in a variety of sectors, including manufacturing, retail, healthcare, and education (Bloom et al., 2014). Better managed manufacturing firms have higher levels of sales, sales growth, profitability, and a lower chance of exit (Bloom et al., 2012b). Management quality can explain the productivity gap between US multinationals in Europe and non-US multinationals (Bloom et al., 2012b). Better managed hospitals have lower mortality rates, and this measure of management quality responds positively to competition (Bloom et al., 2016a). In schools there is a positive correlation between measured management quality and school average test scores in seven different countries (Bloom et al., 2015).

Third, several papers seek to identify the sources of differences in productivity between regular government schools and schools given increased autonomy under different public-private partnership arrangements, known as Charter schools in the US and Academies in the UK (Dobbie and Fryer, 2013; Angrist et al., 2013; Eyles et al., 2016). Whilst these studies do suggest that providing operational autonomy to schools can improve performance, this is within a context of a broadly functional education system that provides clear objectives and accountability for schools. Greater autonomy may not produce the same results if schools are not held accountable for their performance. Cross-country studies looking at changes in the level of school autonomy have found that increases in school autonomy lead to better performance in high income countries, but worse performance in low-income countries (Hanushek et al., 2013; Contreras, 2015). Whilst "autonomous government schools" seem to be better managed than average in OECD countries, there are no comparable estimates from developing countries.[1]

In this paper, I provide the first estimates of school management quality from sub-Saharan Africa using a version of the "World Management Survey". Schools in my nationally representative sample of Ugandan secondary schools score on average

[1] Bloom et al. (2015) do look at private aided schools in India, finding them no better performing than regular government schools. This should not be surprising however, as these schools have much less autonomy than charter schools or academies. Their teachers are recruited and paid by a central government Education Service Commission rather than by the school, and resemble regular government schools much more than private schools (Kingdon, 2007).

2.0 points on a 1 - 5 scale, placing them above India and slightly below Brazil. I then demonstrate that management quality matters for results for student performance in high-stakes tests, using a lagged dependent variable dynamic OLS value-added framework, controlling for student prior attainment and school characteristics. This marks a methodological improvement upon previous work that looks at raw correlations between management quality and school average test scores.

I find that despite having more autonomy, private schools and PPP schools are no better managed than government schools. An exception is a chain of international PPP schools (run by the UK education NGO 'PEAS') that have a strong internal performance management framework with high stakes for head teachers. These schools are substantially (more than 1 standard deviation) better managed than average, and perform commensurately better in terms of student value-added.

Finally, conceiving of management as a technology (Bloom et al., 2016b), I contribute to the literature on technology adoption in developing countries, looking at what factors correlate with better management practices. Schools with greater autonomy and in geographical areas with a greater supply of skilled workers have better management practices, but other head teacher and school factors are not correlated with better practice.

2 Empirical Approach

2.1 Measuring School Management

I measure school management quality using an adapted version of the Bloom et al. (2015) and Lemos & Scur (2016) school management surveys.[2] Open-ended interviews are carried out, with responses scored against a descriptive rubric on a 1-5 scale for 20 question topics. These topics are grouped into four main areas; target-setting, monitoring, operations (planning and leading teaching), and people (teacher) management.

[2] Full details of changes made to the instrument are included in Annex 2. The full Uganda survey instrument is included in Annex 3.

- *Operations* (planning and leading teaching): this covers the leadership of teaching in a school, the use of differentiated teaching for a range of students, how schools use data and assessment to guide practice, and how education best-practices are adapted;
- *Monitoring*: this includes how the school tracks and monitors performance; whether there are systems and processes in place to identify and fix problems; and how stakeholders are involved in ongoing quality improvement (students, teachers, community);
- *Target setting*: this includes how school targets are linked to student outcomes; specific targets for departments and teachers, how appropriate the targets are; and
- *People*: how teachers are recruited, managed, supported and retained.

Each of the 20 scores depends on a series of individual questions that help build up an overall description of the concept being measured. This approach combines a rich open-ended discussion of management practices allowing for probing and clarification where necessary, with a quantitative framework to allow for comparison between schools. Scoring inevitably still depends on a subjective judgment by individual interviewers, and so substantial time needs to be taken in training enumerators, discussing in detail the level descriptors, and calibrating scores across interviewers across a range of practice interviews.[3]

2.2 Management and Student Performance

In order to look at the relationship between school management and student performance, I estimate a student learning production function following Todd and Wolpin (2003), in which student achievement T is conceived of as a function of their ability A, and all present and past family inputs F, and school inputs S.

$$T = f(A + F + S) \quad (1)$$

[3] Interviews were double-scored in training, with a correlation of above 0.9 between scores from different enumerators.

Management quality enters this framework as one of the school "inputs" as a form of intangible capital that affects the productivity of labour and capital, can be invested in, and can depreciate. Equation (1) can then be re-written such that the partial derivative of test scores with respect to school characteristics is a function of management capital M, non-management labour L, capital K, and an efficiency term α.

$$dT/dS = f(\alpha, L, K, M) \quad (2)$$

In practice, estimation of (1) is impeded by the lack of measures of student ability and the full history of family and school inputs. A common solution is the estimation of a lagged dependent variable, dynamic OLS 'value-added' specification, in which a student's prior test score serves as a composite proxy variable for both their unobserved ability and all observed and unobserved prior home and school inputs, which allows for the estimation of the marginal effects of contemporaneous inputs.

Here then test score T of student i at school s at time t is related to their own lagged performance, student characteristics X_i, school characteristics S_s, and school management quality M_s. Some of these school characteristics (specifically average socioeconomic status of students and school fees) proxy both for family inputs and school inputs. I assume that management quality is persistent and unchanging across the three years for which there is test score data.

$$T_{ist} = \alpha + \beta^1 T_{ist-1} + \beta^2 M_s + \beta^3 X_i + \beta^4 S_s + u_{ist} \quad (3)$$

In principal, these estimates may be biased due to non-random sorting of students to schools and unobserved student heterogeneity that may be correlated with both dependent and independent variables. In this data as I only have measurements from two time points I am unable to both estimate models that include both student fixed effects and a dynamic component controlling directly for prior performance. In practice, however the size of this bias has been demonstrated to be small. Using simulated data Guarino et al. (2015) demonstrate that 'naïve' dynamic OLS models are more robust than other more complex non-experimental estimators in recovering

relatively accurate teacher effects. Using real data various studies have shown that simple value-added models can recover good approximations to experimentally identified parameters. Several studies compare lottery estimates of school effects with observational value-added estimates using the same data, finding very similar results (Abdulkadiroğlu et al., 2011; Angrist et al.; 2013; Deming, 2014). Focused on teachers, several studies find that observational value-added estimates of teacher effects in one year of a study are unbiased predictors of experimentally obtained value-added estimates of teacher effects from a different year, in which students were assigned to teacher classrooms randomly in the second year (Kane and Staiger, 2008; Kane et al., 2013). Similar results are found with quasi-experimental estimates based on teachers switching schools (Chetty et al., 2014). Finally, observational value-added estimates of the effect of private schools in Andhra Pradesh, India (Singh, 2015), very similar to experimental estimates from the same context and point in time (Muralidharan and Sundararaman, 2015).

An important concern in the Ugandan context is whether there are differential rates of dropouts between better and worse managed schools. It may be that better managed schools are successful primarily at encouraging under-performing students to leave. I argue that this is unlikely – schools are typically funded on a per-pupil basis either directly through fees or through per-student government subsidy, giving them a strong incentive not to cut enrolment. Further, parents and the media judge schools primarily on the absolute number of top grades (Division 1) achieved, and so schools are not penalized if they have a high number of low scoring candidates. I can also test this concern directly with the data on dropouts.

2.3 Does Management Explain the Effect of Private Schools?

In order to explore the role that management plays in explaining the effect of different school types (public/private/public-private partnership), I follow the approach of Imai et al. (2010) within the framework of a Linear Structural Equation Model. Concretely, I test whether the effect of school type on learning is mediated by management quality. The direct effect of school type on learning is captured in β^4 in equation (3), in which I control for the effect of management. The indirect or

'mediation' effect of school type on learning is captured by the product of the coefficient of management on learning β^2 in equation (3), and the coefficient of school type on management quality, ε^1 in equation (4) below.

$$M_s = \alpha_2 + \varepsilon^1 S_s + v_{ist} \quad (4)$$

The total effect is then the sum of the direct effect and the indirect effect. Identification of the mediation effect relies upon the assumption that the correlation between the residuals of the two equations is zero. I then estimate a 'sensitivity parameter' ρ as the size of correlation that would be necessary for the true effect to be zero.

$$\rho = corr(u_{ist}, v_{ist}) \quad (5)$$

2.4 What Explains Management?

Finally, going beyond school type I look for other factors that might explain variation in management quality. Starting with the accountability framework laid out in the 2004 World Development Report, we can think of two possible routes of accountability for public service providers that might lead to improved school management: a) the long route of accountability from citizens through the state then down to service providers, or b) the short direct route through consumer or user pressure on providers.

With regards to top-down accountability we observe little variation across schools - students from all schools take the same common entrance and exit examinations. Government schools are subject to a very weak, process-focused inspections regime. One part of this relationship where we do observe variation is the degree of autonomy that schools are provided with, a common focus of studies on school performance. Here I do have measures of school autonomy and can test the correlation between this measure and school management.

With bottom-up accountability, the responsiveness of school management (and value-added performance) to parent/customer demand depends on how we view the school choice decision. If parents are seriously interested in quality and value-added, then we might think of competition as driving up standards. In this case the model outlined in Bloom et al (2015), in which management is a technology that affects the productivity of inputs (capital and labour), provides several intuitive predictions. Management increases performance, but also there is likely to be (i) a positive effect of competition on management, (ii) a positive effect of firm age on management, as the result of a survival/selection process in which poorly managed firms are more likely to go out of business and close (and therefore not reach old age), and (iii) that management is increasing in the local supply of skills (as the cost of hiring good teachers is reduced). An alternative theory is one in which parents care primarily about school reputation. When schools are also able to select their pupils (as they are in this context), competition can lead to segregation by ability, and no actual increase in school performance measured as value-added (MacLeod and Urquiola, 2015).

I test these predictions in the specification below, in which management *M* is estimated as a function of school characteristics *S*, head teacher characteristics *HT*, and community characteristics *C* (including the number of nearby schools per capita, the distance to a National Teacher Training College, and the quality of schooling in the sub-county 13 years ago).

$$M_s = \alpha + \beta^1 S_s + \beta^2 HT_h + \beta^3 C_c + u_{ist} \quad (6)$$

3 The School System in Uganda

Uganda introduced free universal primary schooling in 1997, and free secondary schooling in 2007. Enrolment rates have risen accordingly - the net enrolment rate at primary level is now above 90 percent, but the primary completion rate is only around 54 percent, and the secondary rates are lower; around 23 percent net enrolment and 29 percent junior secondary completion (2013, World Bank WDI). The official age of school entry is 6 years old (median age currently in the first grade is 7 years old in 2012 survey data[4]), and there are seven grades of primary school (P1-P7), followed by four years of lower secondary (S1-S4) and two years of senior secondary (S5-S6).

The Uganda National Examinations Board (UNEB) administers exams at the end of the last year of primary school (Grade 7) to pupils in both public and private schools [the Primary Leaving Exam (PLE)]. It is a requirement to pass this exam in order to progress to secondary school. Of 627,000 students enrolled in the last grade of primary (P7) in 2014, 586,000 (93 percent) registered and sat the PLE, and 517,000 (82 percent) passed. Students take exams in four subjects; English, math, science, and social studies. Within each subject a score is given between 1 and 9, in which a score of 1 to 2 is a Distinction, 3 to 6 is a Credit, 7 to 8 is a Pass, and 9 a Fail. UNEB reported 909 cases of exam malpractice in 2015 (cheating by collusion, external assistance, or impersonation), down from 1,344 cases in 2014.

At secondary school, Ordinary Level exams [Uganda Certificate of Education (UCE)] are taken after four years in a minimum of eight subjects, and Advanced Level exams taken after two further years in three subjects. The UCE comprises six mandatory subjects administered in English; these are mathematics, English language, biology, chemistry, physics, and a choice of either geography, history, or religious education. The two final optional subjects can include cultural subjects (such as music); technical subjects (such as carpentry); or other subjects such as accounting, business, and computer science. As for PLE scores, UCE scores are

[4] 2011-12 Third wave of the Uganda National Panel Survey

given for each subject between 1 and 9, where a 1 to 2 is a Distinction and a 9 is a Fail.

There are 1,007 government secondary schools and 1,785 private secondary schools, of which some from both sector are part of the free Universal Secondary Education (USE) programme. Government schools have on average nearly twice as many students as private schools. Table 1 shows summary statistics.

Teacher recruitment is managed centrally for public schools. Schools submit vacancies to the Ministry of Education, who then allocate teachers to schools. Teachers are paid directly into their bank account by the Ministry of Public Service, making it difficult for schools to vary pay according to performance. In the private sector teachers are paid substantially lower wages and schools follow their own recruitment procedures (Ugandan Ministry of Education and Sport and UNESCO - IIEP Pôle de Dakar, 2014). Government teacher starting salaries according to the Public Service Payscale are 511,000 Ugandan Shillings (UGX), approximately $150 per month. Data is not available for private sector teachers, but across all occupations, median monthly wages were 330,000 UGX ($100) in the public sector and 99,000 UGX ($30) in the private sector for those in paid employment aged 14 to 64 in the 2012/13 National Household Survey (Uganda Bureau of Statistics, 2014).

Free Universal Secondary Education (USE) Programme

The USE programme offers free places at registered schools for eligible pupils. Most government schools are registered for USE, with the exception of a minority of elite schools that opt out. Due to the limited number of government secondary schools when the programme was introduced, private schools were also made eligible to register as part of a public-private partnership (PPP) in sub-counties either in which there were no participating public secondary schools, where those government schools were over-crowded, or where pupils must travel very long distances to reach the closest government school. This policy is borne out in the 2013 EMIS data – 91 percent of sub-counties with no free USE government school have a PPP school, compared to only 52 percent of sub-counties that do have a free USE government school. To qualify, schools must be registered, certified, charge low fees [defined as

75,000 UGX ($22) or less], and meet a set of criteria including having adequate infrastructure, a board of governors, and sufficient qualified teaching staff. Partnering private schools also become eligible to receive other support from the government including the provision of textbooks and other teaching materials.

For students to be eligible, they must have a score of 28 or better in their PLE exam, corresponding to an average passing grade in each of the four tested subjects. In our sample, 6 percent of students at government USE schools and 8 percent of students at private USE (PPP) schools had actually failed to meet this threshold. The majority of students enrolled are funded through USE.

Government schools are entitled to 41,000 UGX ($12) per term per student (in addition to other transfers to schools including teacher salaries), and PPP schools to 47,000 UGX ($14) per term per student, on condition that they do not charge any other non-boarding fees. In practice, despite transfers from government and fees being prohibited for USE students, parents still report substantial fees paid to both government and PPP schools. Median reported annual household spending on school fees per child at secondary school was 360,000 UGX ($107) for PPP schools and 150,000 UGX ($44) at government schools (this includes registration fees and contributions to school development funds). Similar amounts are spent on books and uniforms in government and private schools.

Participating schools have control over the student selection process; they may enroll as many students as they want, and can continue to enroll non-USE students (private students) for whom fees may be charged. Many schools, both government and private, operate more demanding PLE entrance criteria than the official minimum score of 28.

Roll-out of the USE programme amongst private schools was randomized, allowing for a high-quality estimate of the impact on private schools of accessing this public funding. Private schools that obtained public USE funding experienced greater enrolment growth, improved student performance (on low-stakes tests), but also more selection of better performing students at entrance. Despite the official

eligibility requirements, there was no effect of USE registration on school governance arrangements (Barrera-Osorio et al., 2015).

4 Data

I compile data from our own 2016 management survey, with school characteristics taken from the 2015 Ark School Survey, official test score data for 2015 from the Uganda Examinations Board (UNEB), and further contextual data on schools from the 2013 Education Management Information System (EMIS), and the national population census in 2014 and 2002. Table 2 shows a summary of test scores and management scores by school type, and Table 3 presents full summary statistics across all data sources.

Management Survey

The management survey was carried out with a stratified random sample of 200 schools from the 2015 Ark School Survey, plus the 19 international public-private partnership schools. The sample includes 82 regular government schools, 7 elite government schools (not part of the free secondary education programme, high fee-charging, high socioeconomic status students), 62 public-private partnership (PPP) schools, and 48 fully private schools.

The survey was carried out in January 2016 by telephone from a call centre in Kampala, from a nationally representative sample of 305 schools (stratified by ownership and district), from which an overall response rate of 65 percent was obtained (199 schools). A list of school leader phone numbers was provided by the Ministry of Education. Twenty-nine percent of these numbers failed to connect or were not answered. Only 6 percent refused to participate in the survey. This response rate is substantially higher than that found in other countries, from a high of 58 percent in Brazil to just 8 percent in the UK). A linear probability model (LPM), probit, and logit model all show that none of the main school characteristics[5] from the

[5] The characteristics tested are the number of students, average socioeconomic status of students, years of operation, location, average fees, head teacher experience and qualifications, teacher qualifications, and school type.

first-round survey are correlated with the probability of response for the second-round management survey (Table A2).

Interviews lasted between 60 and 90 minutes. Around 10 percent of interviews were double-scored by a research manager, with an average variation in double-marked overall scores of 0.1 - 0.2 points. Surveys benefit from being “double-blinded” in the sense that interviewers are not influenced by their physical impressions of the school or knowledge of school performance, and respondents were not aware of the rubric against which they were being graded. Telephone surveys have been demonstrated in other contexts to generate data that is statistically indistinguishable from in-person interviewing (Garlick et al., 2016; Bloom et al., 2012a).

We also asked a set of standard questions on school autonomy taken from the OECD PISA survey. Head teachers are asked who has the main responsibility for deciding on budget allocations, selecting teachers for hire, setting teacher salaries, deciding who to admit, which courses to offer, the content of courses, and which textbooks to use. Where the head teacher, school owner, or governing board are primarily responsible, this is coded as the school having autonomy over that area, whereas where the Ministry of Education is primarily responsible the school is coded as not autonomous. In line with our expectations, private schools and PPP schools have a similar level of autonomy, which is greater than the autonomy of regular government schools. On budget autonomy, almost all private schools and the majority of government schools claim to have school level autonomy. On salaries and hiring, almost all private schools report having autonomy, compared with 70 percent of government schools. Private schools are also more likely to report autonomy on admissions, course choice, and textbook choice. On course content only around a quarter of schools, whether public or private report having autonomy, with content most commonly being determined by the Ministry of Education.

Ark School Survey

The Ark School Survey was carried out in 2015 with a nationally representative sample stratified across Uganda’s four regions and across school type (public and private). Ten districts were sampled from each of the Central, Western, and Eastern

regions, and six from the less populated Northern region. For each district, ten schools were randomly sampled, of which four were government schools and six were private schools.

Public schools are on average larger than private schools, though PPP schools are closer in size to public schools as they receive a government subsidy per pupil place. Schools of all types report charging tuition (and other) fees, despite this not being officially permitted for government schools and PPP schools. Of the fully private schools, around half are non-profit. Ninety-five percent of schools use academic selection criteria. The majority of schools (55 percent) are religious. The majority of government schools are in rural areas, with private schools and PPP schools more prevalent in urban and peri-urban areas.

Average socioeconomic status of students is estimated with a household asset survey administered to students in the fourth grade of secondary school (S4) following Filmer and Pritchett (2001). This data is not linked to individual test score results as those students had already left the school, but instead gives an estimate of school-average socioeconomic status. Students are private schools are 0.15 standard deviations higher than average socioeconomic status.

Head teachers and teachers have fewer years of experience in private schools than in government schools, and are less likely to have higher qualifications, in line with private schools in general paying lower salaries and having lower job security than in the public sector.

Test Score Data

Students take national standardized tests at the end of primary (PLE) and then again at the end of junior secondary school (UCE). Prior to 2015, this data was not digitised and centrally stored. In 2015, the Ark School Survey visited schools and collected UCE scores directly from school paper records for a sample of schools in 2014 and 2013. In addition, the linked PLE score (from 2009 or 2010) for each student was obtained from school records. From 2015, the UNEB provided a full

national set of individual student UCE results, linked to their individual PLE result. This gives a total sample of 43,156 students across three years from 218 schools.

Students sit UCE exams in eight (or more) subjects. Their final classification is based on an average point score across their eight best subjects. Points are awarded based on the percentage mark in exams, with 1 point as the best possible score corresponding a mark of 80 to 100 percent on the exam, and 9 points being the worst possible score, corresponding to a mark of 0 to 39 percent. Our main outcome variable is the aggregate point score across eight subjects (inverted so that positive coefficients mean a better result, and standardized so that the mean is zero and the standard deviation is one, to allow for easier interpretation of estimated coefficients).

PLE scores are scored in a similar manner from 1 to 9 points for each of the four individual subjects (English, math, science, and social studies). For the prior test score variable, again, I take the aggregate points score across these four subjects, invert it and standardise it.

School Markets

In order to understand the factors that affect management quality, I assemble a series of additional contextual variables about the markets that schools operate in. First, I measure competition as the total number of schools (taken from the 2013 EMIS) per capita (from the 2014 census) within a sub-county. There are 2,792 secondary schools nationally and 1,382 sub-counties, giving an average of two schools per sub-county. In our sample, the median school is in a sub-county that has three schools in total. Second, school age in years is taken from our school survey. All government junior secondary school teachers must have at least a qualification from one of these colleges or a university. Third, I use two measures of the local supply of skills, the distance from each school to a National Teacher College (NTC) is calculated based on the shortest distance between their GPS coordinates, and the local child literacy and enrolment rates are calculated from self-reports of literacy from the 2002 census for all children aged 5 to 18 years.

5 Results

5.1 Management Scores

On average schools in our nationally representative sample of Ugandan secondary schools score 2.0 points on the 1 to 5 scale, placing them above India and very slightly below Brazil, a result that seems plausible, despite some adaptations to our survey instrument. Schools tend to perform worse than manufacturing and retail firms in other contexts - the highest performing average school management score is the UK at 2.9 (Bloom et al., 2015). The distribution of schools in Uganda is roughly symmetrical, with very few schools in Uganda scoring above a 3, which is similar to the distribution in India, but notably different to that in Brazil where despite low average management scores, there is an upper tail of high performance.

Management scores do not vary systematically for government, private, and PPP schools for either the aggregate score or any of the sub-components. Elite government schools (those not in the USE scheme) do score 0.4 points higher, and more dramatically a chain of internationally-owned PPP schools score 1 point (2 standard deviations) higher.[6] The difference in overall management quality between elite government schools and others is present in their operations management (teaching quality control), target setting, and monitoring, but they are not better than average on teacher management. There is also substantial variation in management quality within school types. This variation is greatest for the international PPP schools, which is possibly explained by them being substantially newer than other schools (average of 3 years old). Table 4 presents average management scores for other school characteristics.

I had expected to find that private schools would score more highly than government schools at least on people or teacher management, due to the explanation for greater efficiency in the private sector in similar contexts so frequently being due to

[6] This finding is supported by a separate study into the same school chain (EPRC 2016) that found substantially greater evidence of schools having a vision and providing performance reviews and feedback to teachers, in the international PPP schools than in domestic PPP schools (Table 13).

greater accountability for teachers. Looking at individual items with the overall people/teacher management score, private schools do in fact score better than public schools on hiring and recruitment, but no better in the other items (attracting talent, rewarding and promoting high performers, and dealing with poor performers).

5.2 Management and Student Performance

There is a clear positive correlation between school management and student performance. On average, a school with a 1 standard deviation higher management score is associated with a 0.05 standard deviation higher average UCE test score, after controlling for prior test scores, sex, and school characteristics such as: location, average student socioeconomic status, school size, and fees (Table 5).

Estimates for other countries (Bloom et al., 2015) are based on school-average test scores rather than individual student test scores, so we need to make an adjustment to allow for a direct comparison with our student-level estimates. Collapsing individual student test scores to school-averages reduces the standard deviation across units by around half. When scores are then standardised (to z-scores), ‘effects’ on school-average scores are therefore roughly twice as large as ‘effects’ on individual student scores. In order to adjust for this to allow a comparison between my estimates on student data with earlier results on school data, I make an adjustment based on the within-school standard deviation of test scores.

For countries in the Bloom et al. (2015) sample, I make use of 2012 PISA data, first standardising student test scores, then collapsing the data to school-averages, and then calculating the standard deviation in school-average test scores. These vary slightly across countries but remain close to 0.5 in both the PISA data and in our Uganda data. Table 6 presents the original and adjusted estimates of the effect of management on student performance from the six countries studied in Bloom et al. (2015) alongside our estimate for Uganda.

Breaking down the management index by the four main components (Table 7) suggests that operations, target-setting, and people management (but not

monitoring) are independently correlated with student performance. These results are similar to those in the international study, where people management has the largest relationship with performance followed by target-setting, monitoring, and operations, though there is no priori reason why the sub-components of management should have equal weight in systems with different binding constraints to improved performance. I also test the effect of a collection of five management sub-indicators highlighted by Dobbie and Fryer (2013) as components of success. This 'Dobbie-Fryer index' of sub-indicators is significantly correlated with performance after controlling for school characteristics, but with a smaller magnitude than our overall measure of management.

I test for a range of interactions of management quality with student and school characteristics, finding little evidence for heterogeneous effects. One hypothesis is that better managed schools might put more attention on high potential students, as Ugandan media focus discussion of schools on the proportion of candidates achieving the top ('Division 1') grade. However, there is no difference in the overall effect of management by prior test score or by student gender. A refinement of this hypothesis is that any focus on high potential students might be expressed only through the 'target-setting' sub-component of management. Anecdotally from the qualitative survey answers, some schools do have explicit targets for the number of top 'Division 1' scores obtained. Here I do find a positive and significant interaction between the effect of target-setting and prior test score on performance. This pattern is visible in a step-wise regression with individual dummy variables for each prior test score point, the coefficients of which are plotted in Figure 6.

Looking at school characteristics interactions of management with ownership, location, size, average socioeconomic status, and level of fees are all statistically insignificant. The one statistically significant interaction is with the drop-out rate between S3 and the final S4 exam, implicitly a selection effect rather than a treatment effect, that is greater in better managed schools. One explanation for this could be that better managed schools might encourage students not to take the final exam if they are not expected to do well. The effect of management remains of similar magnitude when excluding specific types of schools (such as elite government and international NGO schools).

6 Robustness

An obvious concern is that better managed schools may be perform better for other reasons besides management. Here I include controls for student prior test score, student socioeconomic status, and school fees, all of which reduce but do not eliminate the coefficient on management, suggesting that is some selection bias in the effects of management on test scores before controlling for student intake. The value-added specification assumes that prior test scores account for unobserved student ability, as well as all past inputs, both home and school. However, as these prior test scores come four years before the final test score, we ideally need separate measures of home inputs between the two tests in order to estimate the marginal effect of schools. The best I can do here is assume that student socioeconomic status and average school fees paid can serve as a proxy for family inputs. I don't have any measurements at the classroom or teacher-level, though the hypothesized effect of management on performance should work through improved teaching at the classroom level through better support and accountability for classroom teachers.

Selection on Unobservables

In Table 8 below, I implement the Altonji et al. (2005)/Oster (2016) bounding exercise, which estimates the amount of selection δ on unobservables that would be necessary for the estimated coefficient of management $\hat{\beta}$ on student test scores to be zero. The selection parameter δ is expressed relative to (as a percentage of) the degree of selection on observables. A selection parameter δ of 1 is suggested as a heuristic cut-off point – so we assume that selection on unobservables is likely to be not greater than selection on observables, given that covariates are typically selected purposively in order to account for as much of the variation in the dependent variable as possible. In our case this assumption seems reasonable, as a student's lagged test score alone accounts for more than 50 percent of the variation in test scores. The bottom two rows indicate that if we thought that achieving an R_2 of 1 was realistic, then selection on unobservables would only have to be 57 percent of the amount of selection on observables for a $\hat{\beta}$of zero to be possible. However, assuming that an R_2 of 1 is realistic given immutable noise is a demanding hurdle -

Oster (2016) finds that only 10 percent of results published in the top four journals over the previous five years pass this hurdle. A more achievable benchmark for R_{max} is 1.3 x the R-squared achieved in the most complete specification $\tilde{R}$. In this case, our result 'passes' this test, in that selection on unobservables would have to be greater (1.46x) than selection on observables for the coefficient on management to actually be 0.

Dropouts

Dropouts between the start of secondary and the final examination are an important concern. The value-added specification will produce consistent estimates only if dropouts are caused only by time-invariant student characteristics. The overall decrease in the size of the cohort that started S1 in 2011 and entered S4 in 2014 is 16 percent (Table 11). First, I argue that dropouts are most likely due to student-specific demand-side factors rather than being related to school quality. Of people who completed one of the first three grades of secondary school but did not take the UCE exam, 69 percent reported that they left school due to trouble paying fees. Just 1 percent reported leaving due to poor academic progress (Uganda National Panel Survey wave 3, 2012).

Common approaches to dealing with bias caused by attrition include Heckman selection models and inverse probability weighting of observations, which can produce unbiased estimates if 'selection' or attrition is caused by observable individual characteristics. As our student-level sample only includes those who have taken the UCE exam, I do not have data on students that did drop out, so I can't estimate the probability of attrition within the sample. As an approximation however, I can look at the national distribution of PLE scores by gender, and estimate the probability of individual dropout based on the relative proportions of each score by sex for the pre-secondary entry PLE results and the PLE results of those taking the secondary certificate in our sample. As I do not have a credible instrument (a variable that causes selection, but not the outcome) I do not estimate the Heckman selection model, but instead apply inverse probability weighting. Relying on the full distribution of PLE scores rather than the distribution of PLE scores for students that

have already started secondary school relies upon the assumption that this distribution is not substantially different. I argue that this is a reasonable assumption, as the PLE is optional and costly, and is typically taken only by students who do intend to progress to secondary school, for which it is a requirement. Weighting observations by their inverse probability does not substantially affect the coefficient on management.

A final check is looking at the correlation between the reported number of dropouts between S3 and the final S4 exam at the school-level, for which I do have data, and the school management score. There is no systematic relationship between this school-level measure of dropouts and school management. In our sample, this rate of dropout between students in S3 and those taking the UCE exam at the end of S4 is 21 percent, above the overall national rate of reported dropout from students enrolled in S1 in 2011 to those enrolled in S4 in 2014 was 16 percent, down from a higher dropout rate in previous years.

Test Score Measurement

Another concern here is our measurement of the dependent variable (UCE test scores), and whether any flaws in official test results as proxies for student learning is correlated with any of our independent variables. If a better managed school was only better at preparing students for exams without them actually learning any more, results for the effect of management on performance would be biased upwards. One check available for this is a question asked of Head Teachers about the amount of exam preparation carried out in schools. Controlling for exam preparation makes no difference to the coefficient of management on performance. Any 'classical' measurement error in prior test scores will lead just to attenuation of the effect of these prior test scores on secondary scores.

I also test alternative scaling of the test score measure. Using an ordinal logit across test grades produces similar results to the linear approximation used in the main specifications.

Management Index

The main management index I use is a weighted average of the 20 sub-areas of management, first taking the average of sub-areas for each of the four main sub-components, and then taking the average of these four sub-components. The relationship between management and student performance is robust to aggregating the individual question areas of management in different ways, either by simple averaging across all 20, or by principal components analysis.

6.1 Does Management Explain the effect of Private Schools?

Although school management varies substantially, there are few differences on average between major types of schools. Unlike in OECD countries where 'autonomous government schools' (here referred to as PPP schools) score highest on management, in the two developing countries for which there is data (previously India, and now here Uganda) there is little difference in management score between most public, private, or public-private partnership schools. In Uganda, there are two exceptions; first a small number of selective elite government schools with high fees and wealthy students, that are on average 0.4 points better managed than other government schools, and second a chain of internationally-owned non-profit PPP schools, which score 1.1 points better than average.

Elite government schools are substantially better resourced than average, which might explain their advantage (despite this holding after controlling for student SES and school fees). International PPP schools on the other hand have primarily the same level of resources as local PPP schools. One plausible explanation for this better performance is the notion of technology transfer from the international owners of the chain from the UK to Uganda [in line with findings that subsidiary manufacturing firms of multinational companies perform better than domestically owned firms (Bloom et al., 2014 and Bloom et al., 2012b)].

This is likely supported by the existence of an effective within-network accountability system, based on a rigorous modern inspections regime that combines official

examinations data (Hanushek and Raymond, 2005 and Hanushek et al., 2013) with subjective performance assessment (Hussain, 2015). Anecdotally, the supervision model for the international school chain includes detailed targets for a range of performance indicators, high-stakes accountability for head teachers with the removal of those under-performing and promotion of those successful, and ongoing support and challenge throughout the year. Unfortunately, I don't have the necessary variation in this study to test this hypothesis.

In Table 12, I estimate the correlation between school type and student value-added. Column (1) presents raw test scores (without lagged test score), before sequentially adding controls. The final column (4) includes management score. Here, as expected, none of the school type coefficients change, except the international PPP schools, which loses statistical significance.

Following the approach to causal mediation outlined by (Imai et al., 2010), I can subject this finding to a sensitivity analysis. Although this framework confirms the finding that the entire effect of international PPP schools is mediated by management, a sensitivity analysis shows that the effect is not robust to substantial correlation between the error terms from the test score and the management regression. The threshold value ρ at which the mediation effect would be zero is just 0.069.

6.2 What Explains Management?

First, I test whether management varies with the degree of autonomy afforded to schools. The average (mean) autonomy score across these 6 categories is positively but insignificantly correlated with school management scores, with large standard errors (Table 14). It should also be noted that none of the autonomy measures are statistically significantly correlated with student performance.

Focusing just on autonomy over hiring and firing decisions (a common subject of studies looking at the role of the private sector), the average of these two components is also insignificantly correlated with overall school management, but is correlated with the 'people management' component of the overall management

score. Schools with autonomy over staffing do score higher. The R-squared of staffing autonomy as an explanatory factor for people management quality is 0.15, suggesting that our people management score captures greater variation than the simple binary indicator of autonomy (Table 12).

Second, looking at the competition variables, I find that only school age is robustly correlated with management (after controlling for other school characteristics).

We are left with a puzzle – that despite better management practices improving school performance at little extra cost, most schools do not adopt them. Some clues are provided by the literature on technology adoption in developing countries, which identifies a number of possible constraints to adoption (Foster and Rosenzweig, 2010 and Jack 2011). The informational constraint seems particularly important in this context – it may simply be that most school leaders are not aware of what good modern management practices are, and how they can be applied in schools. One piece of evidence for this hypothesis is the very low correlation (0.145) between head teachers' self-assessment of the quality of management in their school with our measure. Neither do these self-assessments of school management do not correlate with student performance. Another possibly important constraint is on the supply-side – where there is little widespread provision by either market or state of management training in this context for school leaders.

7 Conclusion

This paper adds to a growing literature on the importance of management for school performance. I present the first internationally comparable measure of school management quality from sub-Saharan Africa, placing the management quality of Ugandan schools in international context. Management matters for school performance, measured by growth in individual student test scores (or "value-added"). Further, though there is some level of higher spending which can lead to better management (as demonstrated by the better performance of elite government schools), amongst non-elite schools there is little correlation between school fees or other school resources and management performance, showing that in principle better management can be a low-cost strategy for improving learning outcomes. School management is not significantly better in private or autonomous schools.

I find few variables that matter for explaining variation in school management. School autonomy may provide the opportunity for better management, but it is not sufficient by itself. An international PPP chain does manage to achieve substantially better management quality and correspondingly improved student test scores, which I argue is due to a better top-down accountability and performance management system, though I do not have the variation in the data to test this hypothesis. Future research could usefully address this question of how to improve school management at scale, and the role that performance management systems and school inspections can play.

Acknowledgements

I am grateful for helpful comments from Andy McKay, Iftikhar Hussain, Justin Sandefur, Clare Leaver, Abhijeet Singh, Giordano Mion, Shqiponja Telhaj, colleagues at the Center for Global Development and University of Sussex seminars, and participants at the 2016 RISE and NEUDC conferences. Data for this paper was generously provided by the Uganda National Examinations Board (UNEB) and Ark. I am also grateful for financial support from the DFID-funded RISE project and the ESRC. Phil Elks and Sabina Morley at Ark led the design and implementation of the Ark school survey, carried out pre-testing of the World Management Survey schools instrument in Uganda, worked on the adaptation of the WMS instrument, and provided substantial comments.

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Figure 1: Map of School Locations

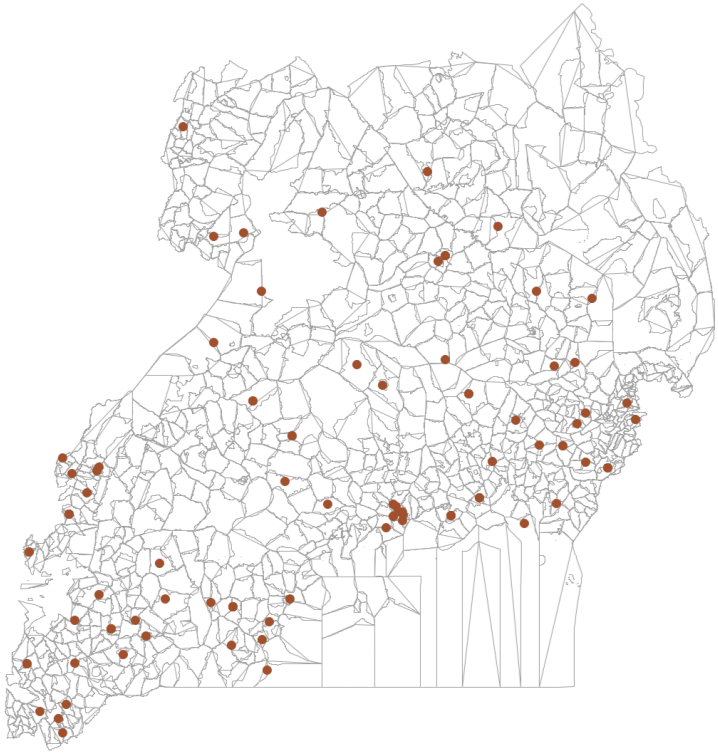
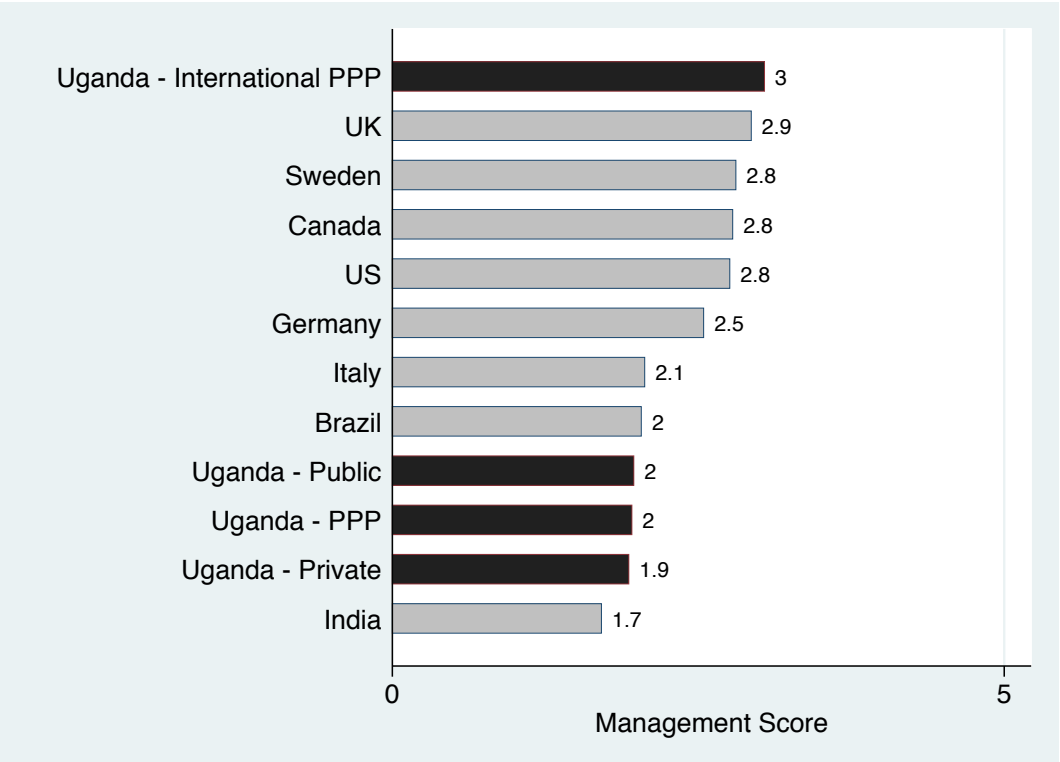
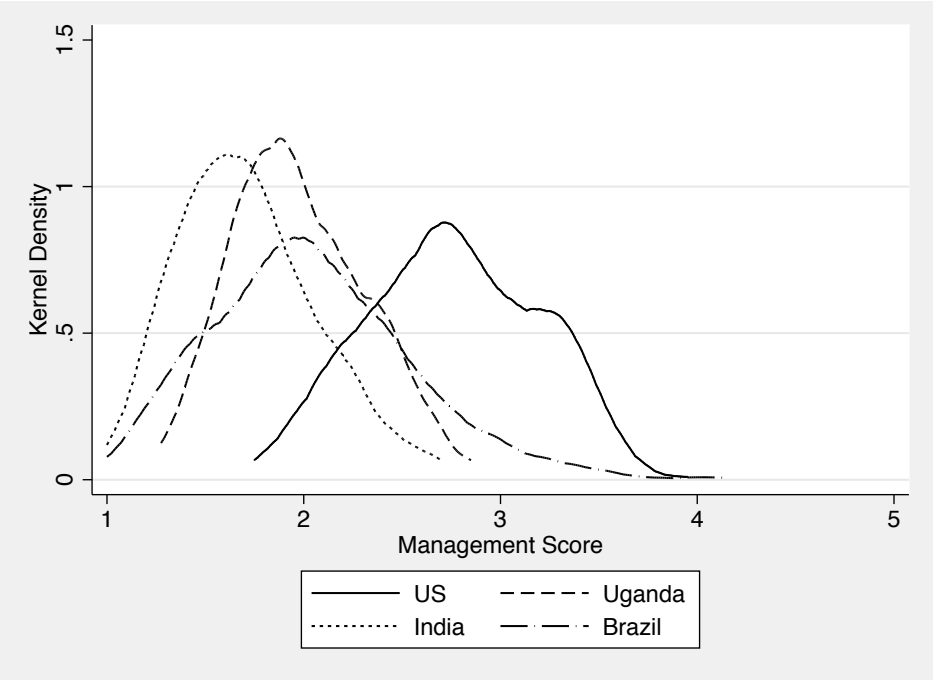


Figure 2: Average Management Score by Country and School Type



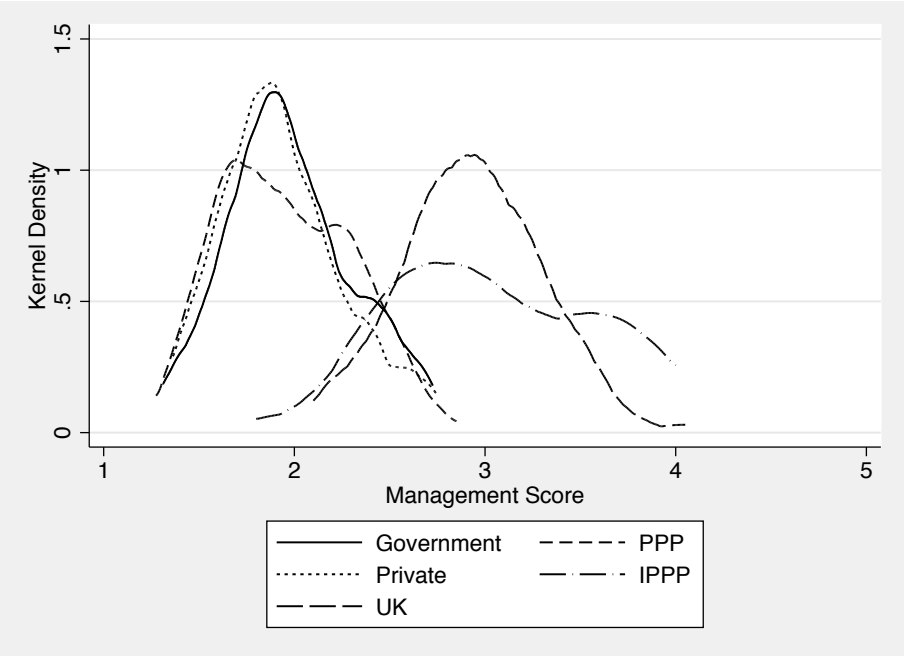
Notes: Scores from Uganda are from my survey, scores for other countries from Bloom et al. (2015)

Figure 3: Distribution of School Management Scores within Countries



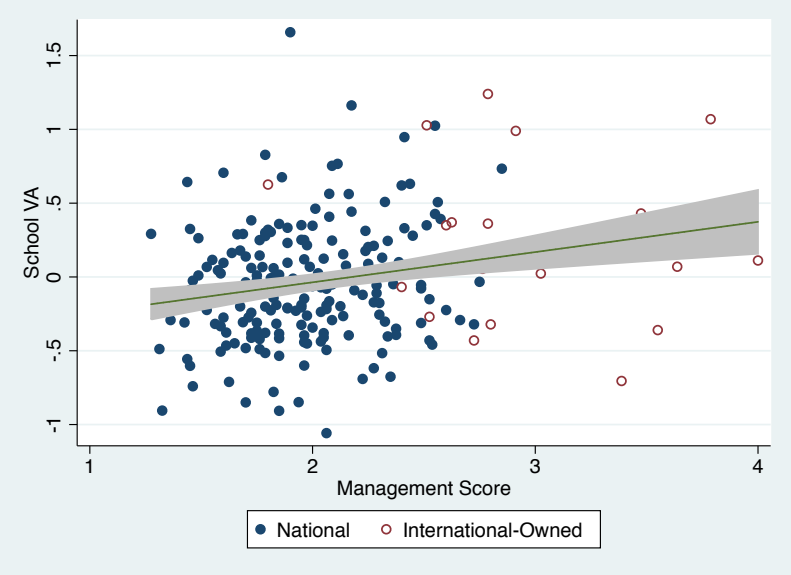
Notes: Scores for US, India, and Brazil are taken from Bloom et al. (2015)

Figure 4: Distribution of School Management Scores by School Type



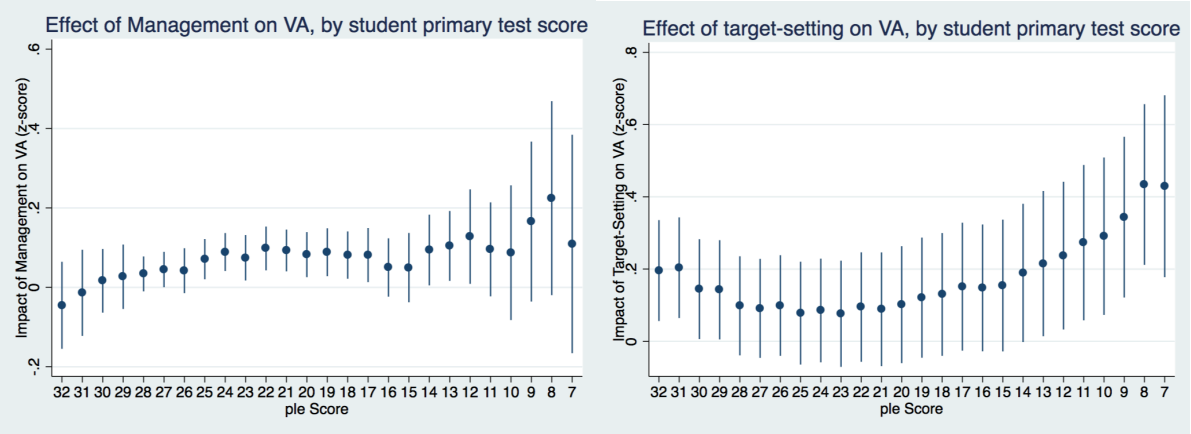
Notes: The distribution of management quality is presented here by school type. The distributions for public, private, and PPP schools all overlap, only elite government (omitted) and international PPP schools (IPPP) performing substantially better. Scores for UK schools are overlayed from Bloom et al.

Figure 5: Management and School Value-added



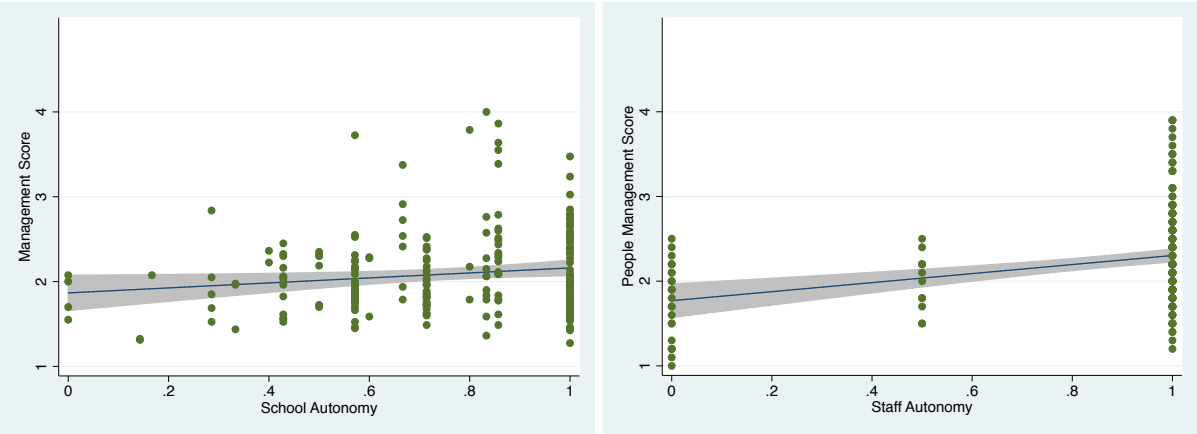
Notes: School VA is calculated as the simple school mean of residuals from a student growth regression, including controls for student prior test score, sex, and year.

Figure 6: Heterogeneous effects of management & target-setting by prior test score



Notes: Effect sizes estimated for each possible prior test score (PLE) with a piecewise regression, entering the interaction of each individual PLE score as a dummy variable multiplied by the school management score. Regressions control for school characteristics, with standard errors clustered.

Figure 7: Management Score and School Autonomy



Notes: Bivariate correlations between measures of autonomy and management show a weakly positive correlation for overall management (on the left) and a stronger correlation for staff/people autonomy and staff/people management (on the right).

Table 1: School Characteristics (all schools)

School Type	Number of Schools	Average School Size (Pupils)	Total Pupils	Percent Pupils Female	Household Spending on Fees
Government	886	583	516,156	0.46	93,000
Elite Government	121	820	99,177	0.55	270,000
PPP	664	479	317,975	0.48	172,500
Private	1,114	284	316,162	0.52	360,000
International PPP	28	362	10,136	0.45	-
Total	2,813	448	1,259,606	0.48	223,875

Notes: Data on household spending on fees is taken from the Uganda National Panel Survey Wave 3 2011/12. Data for the international PPP schools are provided by the NGO 'Peas'. All other data is from the 2013 EMIS.

Table 2: School Characteristics (Survey Sample Summary)

School Type	Final Exam	VA	Management
Government	-0.12	-0.07	2.0
Elite Government	1.03	0.32	2.4
PPP	-0.16	-0.01	2.0
Private	0.25	0.12	1.9
International PPP	0.09	0.1	3.0
Total	0	0	2.1

Notes: Both final exam scores and value-added scores are first standardised at the individual student level by year, before taking means across all students in each school type.

Table 3: School Characteristics (Survey Sample Detail)

	Gov	Elite Gov	PPP	Private	IPPP	All	N
Number of Schools	82	7	62	48	24	223	223
Management							
Aggregate Score	2.0	2.4	2.0	1.9	3.0	2.1	223
- Operations	2.0	2.4	1.9	2.0	3.3	2.1	223
- Monitoring	2.1	2.4	2.0	1.9	3.0	2.1	223
- Target-Setting	1.7	2.4	1.8	1.6	2.7	1.8	223
- People	2.1	2.2	2.1	2.1	3.1	2.2	223
Test Scores & Students							
Value-Added (z-score)	-0.07	0.32	-0.01	0.12	0.10	0.00	
UCE (z-score)	-0.12	1.03	-0.16	0.25	0.09	0.00	
Total Students	11,741	1,583	6,118	3,353	1,085	23,880	
Mean Students (2015)	563	552	427	281	510	458	223
SES Index (z-score)	-0.39	1.46	-0.07	0.26	-0.37	-0.09	210
Dropout Rate (S3-UCE, percent)	0.20	0.22	0.23	0.20	0.34	0.21	205
School Characteristics							
Total Fees* (UGX)	72	109	79	114	107	88	223
percent Religious	0.66	0.86	0.60	0.46	0.00	0.53	223
percent Rural	0.83	0.57	0.55	0.48	1.00	0.69	223
Km to Kampala	211	180	193	167	192	193	223
percent Heads with postgrad	0.39	1.00	0.18	0.13	.	0.25	223
Head Experience (Years)	10	19	9	7	.	9	197
Teacher Experience (Years)	7	10	6	6	.	7	199
Autonomy							
Admissions	0.71	0.86	0.89	1.00	1.00	0.86	211
Staff	0.69	0.50	0.98	0.98	1.00	0.86	223
Academic	0.45	0.53	0.57	0.63	0.64	0.54	208
All (Mean)	0.62	0.67	0.81	0.85	0.86	0.75	223
School Market							
Schools per capita**	1.4	2.4	1.7	1.9	0.8	1.6	214
School Age (years)	27	44	16	11	3	18	216
Distance to NTC (mean Km)	98	112	84	88	94	92	223
2002 Child Literacy Rate**	0.45	0.53	0.46	0.46	0.46	0.46	199

Notes: Management scores and school autonomy scores are from our WMS-style management survey. Test scores are from UNEB for 2015 and the Ark School Survey for 2014 and 2013. School characteristics are from the Ark School Survey. School Market variables are from the EMIS, census, and Ark School Survey. * Total fees comprise tuition fees plus fees for extra classes, uniforms, lunch, & 'other'. ** These school market variables are presented at the sub-county level.

Table 4: Management quality by school characteristic

	Schools	Management (Mean)	Management (SD)
School type			
Government (USE)	82	2.0	0.32
Elite Government (Not USE)	7	2.4	0.24
PPP (Private USE)	62	2.0	0.34
Private (Not USE)	48	1.9	0.32
International PPP (USE)	19	3.1	0.59
School location			
Kampala	4	2.24	0.31
Other Urban	22	2.10	0.34
Rural	173	1.95	0.33
Religious Orientation			
Not religious	95	2.2	0.62
Anglican/Protestant	61	1.9	0.32
Catholic	47	2.0	0.35
Other	11	1.9	0.34
Selective Entrance			
No Selection	11	2.0	0.66
Academic Selection	204	2.1	0.48
Profit			
Not for Profit	163	2.1	0.52
For Profit	50	2.0	0.35
Head teacher qualifications			
Postgraduate	56	2.0	0.37
Graduate/ Bachelor's degree	142	2.0	0.32
Head teacher's employment			
No other job	187	2.1	0.51
HT has 2nd job	28	1.8	0.22

Table 5: Regression of Student Test Scores on School Management

	(1)	(2)	(3)	(4)
Management (Z-Score)	0.244***	0.083***	0.046**	0.050**
	(0.074)	(0.027)	(0.020)	(0.025)
Year FE	Yes	Yes	Yes	Yes
Prior Test Score		Yes	Yes	Yes
Location Controls			Yes	Yes
School Controls			Yes	Yes
School Type				Yes
N (Students)	41,818	41,818	41,818	41,818
N (Schools)	210	210	210	210
N (Years)	3	3	3	3
R-squared	0.031	0.528	0.562	0.571

Notes: Std. Err. adjusted for 210 school clusters. School controls include size (number of students), fees, & student socioeconomic status. Location controls include sub-region fixed effects, dummy variables for Kampala/Urban/Rural, and a linear distance from Kampala measured in Km.
* p<0.1, ** p<0.05, *** p<0.01

Table 6: International Regressions of Student Test Scores on Management

	All (excl. Ug)	Bra	Can	Ind	Swe	US	UK	Ug
	Score	Score	Score	Score	Score	Score	VA	VA
Mgmt (z-score)	0.23***	0.10**	0.61	0.50**	0.24	0.17**	0.88**	
	(0.044)	(0.050)	(0.368)	(0.243)	(0.206)	(0.080)	(0.369)	
School SD	0.49	0.59	0.47	0.49	0.54	0.51	0.50	0.46
Adj Effect Size	0.12***	0.06**	0.28	0.24**	0.13	0.08**	0.45**	0.05**
School controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pupil controls		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1002	472	77	152	82	133	78	210

Notes: Bloom et al (2015) estimate effects of management on school average performance (standardized to mean 0, standard deviation 1). In order to render these estimates comparable with our estimates on individual student performance, we make an adjustment for the standard deviation of school-average test scores (calculated from 2012 PISA for non-Uganda countries). The adjusted effect size is therefore an estimate from these studies for the effect of management on individual student performance.

Table 7: Regression of Student Test Scores on Management Sub-Components

	(1)	(2)	(3)	(4)	(5)
Management (Z-Score)	0.050**				
	(0.025)				
Operations (Z-Score)		0.047*			
		(0.027)			
Targets (Z-Score)			0.049**		
			(0.024)		
Monitoring (Z-Score)				0.011	
				(0.019)	
People (Z-Score)					0.044*
					(0.023)
School Controls	Yes	Yes	Yes	Yes	Yes
N (Students)	41,818	41,818	41,818	41,818	41,818
N (Schools)	210	210	210	210	210
N (Years)	3	3	3	3	3
R-squared	0.571	0.570	0.571	0.570	0.571

Notes: Std. Err. adjusted for 210 school clusters. The overall management index is the mean of the four subcomponents, each separately standardized and entered independently here. School controls include number of students, fee rates, ownership, student socioeconomic status, location, and 'noise controls' or enumerator * p<0.1, ** p<0.05, *** p<0.01

Table 8: Altonji et al (2005) / Oster (2016) sensitivity analysis

Model with Controls	
$\tilde{\beta}$	0.054
$\tilde{R}$	0.566
Model without controls	
$\dot{\beta}$	0.172
$\dot{R}$	0.023
Sensitivity Parameters:	
$\delta(R_{max} = 1, \quad \widehat{\beta} = 0)$	0.57
$\delta(R_{max} = \tilde{R}\times 1.3, \quad \widehat{\beta} = 0)$	1.46

Notes: The sensitivity parameter δ is estimated as a function of the coefficient of management on student value-added β and the r-squared R in two models; with and without the full set of control variables.

Table 9: Secondary School Enrolment and Dropout Rate

Year	S1	S2	S3	S4	S1 to S4 Dropout Rate	S3 to S4 Dropout Rate
2008	291,797					
2009	296,400	280,026				
2010	324,487	277,345	256,385			
2011	320,273	279,267	230,989	222,226	24%	13%
2012		296,297	259,003	216,754	27%	6%
2013			284,919	250,274	23%	3%
2014				268,253	16%	6%

Notes: Data from the Uganda Bureau of Statistics 2015 Statistical Abstract. Implied drop-out rates are estimated by comparing the total size of each cohort as they progress through time and grades.

Table 10: Regression of Test Scores on School Type

	(1)	(2)	(3)	(4)
Elite Government	1.402***	0.477***	0.519***	0.495***
	(0.191)	(0.170)	(0.141)	(0.143)
Private	0.394***	0.187***	0.250***	0.253***
	(0.136)	(0.057)	(0.060)	(0.067)
Private PPP	-0.104	0.056	0.129***	0.132***
	(0.117)	(0.054)	(0.039)	(0.047)
International PPP	0.153	0.183**	0.213*	0.087
	(0.155)	(0.093)	(0.109)	(0.128)
SES (Z-score)			0.129***	0.119***
			(0.042)	(0.037)
Size (Students: z-score)			0.069***	0.069***
			(0.026)	(0.024)
Fees (Z-Score)			0.033	0.035
			(0.023)	(0.023)
Management (Z-Score)				0.055*
				(0.029)
Autonomy Score				0.004
				(0.021)
Leadership Score				0.006
				(0.019)
Lagged Dep Var		Yes	Yes	Yes
Location Controls			Yes	Yes
N (Students)	41,818	41,818	41,818	41,818
N (Schools)	210	210	210	210
N (Years)	3	3	3	3
R-squared	0.126	0.539	0.568	0.569

Std. Err. adjusted for 210 school clusters. School controls include size, fees, & student socioeconomic status. Location controls include sub-region fixed effects, dummy variables for Kampala/Urban/Rural, and a linear distance from Kampala measured in Km.

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

Table 11: Mediation Regression of Test Scores on International PPP Schools (Mediated by Management Quality)

	(1)	(2)
ACME (Management)	0.161***	0.183***
	(0.033)	(0.036)
Direct Effect (IPPP)	-0.013	-0.099**
	(0.039)	(0.039)
Total Effect	0.148***	0.085***
	(0.213)	(0.022)
Controls		Yes
Obs. (Students)	40,186	40,186
Obs. (Schools)	210	210
% of Tot Effect mediated	1.088	2.153
H0: ACME=0	0.000	0.000
Threshold ρ at which ACME = 0	0.083	0.069

Notes: The 'Average Causal Mediation Effect' (ACME) is the product of the coefficient of management on test scores, and international PPP (IPPP) schools on management. The direct effect is the coefficient of IPPP schools directly on test scores. The total effect is the sum of the mediation effect and the direct effect. The last row reports the threshold value of the unobservable ρ correlation, above which the true ACME would be zero.

Table 12: Regression of School Management on School Autonomy

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
							Dep Var: People Management	
Mean autonomy	0.197*	0.148						
	(0.118)	(0.110)						
Academic autonomy			0.052	0.026				
			(0.078)	(0.066)				
Staff autonomy					0.125	0.130	0.466***	0.448***
					(0.087)	(0.083)	(0.098)	(0.102)
School Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
School Type		Yes		Yes		Yes		Yes
N	210	210	195	195	210	210	210	210
r2	0.058	0.347	0.045	0.354	0.055	0.349	0.156	0.299

Notes: Mean autonomy is the average of 7 indicator (dummy) variables for whether the school has autonomy over admissions, budgets, hiring, salaries, content, courses, and textbooks. Academic autonomy is the average of the autonomy indicators for content, courses, and textbooks. Staffing autonomy is the average of autonomy indicator (dummy) variables for whether a school has autonomy over hiring and salary decisions. School controls include number of pupils, socioeconomic status, region, urban location, and survey enumerator.
* p<0.1, ** p<0.05, *** p<0.01

Table 13: Regression of Management Quality on Market Competition

	(1)	(2)	(3)	(4)	(5)
Private Dummy	-0.160***	-0.201***	-0.159***	-0.153***	-0.140**
	(0.061)	(0.075)	(0.059)	(0.057)	(0.058)
Schools per capita (Z-Score)	-0.006				
	(0.019)				
School: Pop Ratio x Private	0.051				
	(0.035)				
School Age in Years (Z-Score)		-0.104*			
		(0.056)			
School Age x Private		0.212***			
		(0.073)			
Distance to NTC (Z-Score)			0.043		
			(0.042)		
Distance to NTC x Private			0.025		
			(0.053)		
2002 Literacy Rate (Z-Score)				0.159**	
				(0.079)	
2002 Literacy x Private				-0.027	
				(0.104)	
2002 Enrolment Rate (Z-Score)					0.219*
					(0.121)
2002 Enrolment x Private					-0.193
					(0.159)
School Controls	Yes	Yes	Yes	Yes	Yes
N	207	203	210	190	190
r2	0.078	0.125	0.083	0.093	0.089

Notes: Schools per capita is defined as the number of schools from the 2013 EMIS system per number of population from the 2014 census. School age is taken from our survey. Distance to a National Teacher College (NTC) is the minimum distance from a school to one of the 7 NTCs. 2002 literacy and enrolment rates are calculated at the sub-county level from the 2002 census for children aged between 5 and 18. School controls include number of pupils, socioeconomic status, region, and urban location. * p<0.1, ** p<0.05, *** p<0.01

Appendix 1: Additional Tables

Table A 1: Score by Individual Management Item

	Elite Gov (Non-USE)	Government (USE)	PPP (USE)	Private (Non-USE)	Foreign PPP (USE)	All Schools
Operations						
1.Planning	2.6	2.3	2.1	2.3	3.6	2.4
2. Leading teaching	2.2	2.0	1.9	2.1	3.4	2.1
3.Personalisation	2.5	1.8	1.8	1.8	3.2	2.0
4. Assessments & data	2.4	1.9	1.8	1.8	3.1	2.0
5. Adopting best practice	2.5	2.0	2.0	2.0	3.2	2.1
Monitoring						
6. Identifying problems	2.5	2.2	2.1	1.9	2.7	2.2
7. Performance tracking	2.4	2.0	1.9	1.9	3.4	2.1
Targets						
8. Target balance	2.6	1.8	1.9	1.8	3.0	2.0
9. Target Stretch	2.2	1.6	1.6	1.5	2.5	1.7
10.Accountability	2.3	1.7	1.8	1.7	2.7	1.9
People						
11. Hiring teachers	1.9	1.9	2.4	2.4	3.2	2.3
12. Attracting teachers	2.8	2.2	2.2	2.2	3.4	2.3
13. Rewarding teachers	2.1	2.2	2.3	2.1	2.6	2.3
14. Promoting teachers	2.1	1.9	1.7	1.9	3.1	2.0
15. Poor performers	2.3	2.2	2.0	2.1	3.3	2.3
Leadership & Ops						
16.Vision	2.6	2.2	2.0	2.2	3.0	2.2
17.Budgeting	2.6	2.4	2.2	2.0	3.0	2.3

Notes: This table shows average scores by school type for each of the individual sub-component questions that make up the overall aggregate management index.

Table A 2: School Leadership & Management in PPP Schools

		None	Limited	Good	N
Evidence of school vision & mission	Foreign		4	7	11
	Domestic	6	5	5	17
Evidence of performance reviews & feedback	Foreign			11	11
	Domestic	3	6	8	17

Source: Economic Policy Research Centre (EPRC), 2016

Table A 3: Regression of Student Test Scores on School Management (Comparison of OLS and Random Effects Multi-level model)

	OLS	OLS	RE	RE
	(1)	(2)	(3)	(4)
Management (Z-Score)	0.085***	0.059**	0.062***	0.059**
	(0.027)	(0.027)	(0.087)	(0.027)
Year FE	Yes	Yes		Yes
Prior Test Score	Yes	Yes	Yes	Yes
Location Controls		Yes		Yes
School Controls		Yes		Yes
School Type		Yes		Yes
N (Students)	41,818	41,818	43,156	41,818
N (Schools)	210	210	223	210
N (Years)	3	3	3	3
R-squared	0.529	0.569	0.529	0.569

Std. Err. adjusted for 210 school clusters. School controls include size, fees, & student socioeconomic status. Location controls include sub-region fixed effects and dummy variables for Kampala/Urban/Rural. * p<0.1, ** p<0.05, *** p<0.01

Table A 4: Regression of Individual Subject Test Scores on Management

	Eng	Mat	Che	Phy	Bio	His	Geo	Hum
Management (Z-Score)	0.051***	0.024	0.008	0.028	0.049**	-0.001	0.015	0.028
	(0.019)	(0.022)	(0.024)	(0.022)	(0.023)	(0.032)	(0.027)	(0.027)
School Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	42,779	42,745	42,708	42,669	42,657	19,808	19,961	18,890
N_clust	223	223	223	223	223	204	204	203
R-squared	0.512	0.440	0.341	0.421	0.477	0.415	0.469	0.473
Dep var Mean	7.2	6.7	8.2	8.2	7.8	6.7	6.8	6.8
Dep var St Dev	1.7	1.8	1.3	1.3	1.4	2.2	1.7	1.7

Std. Err. adjusted for 210 school clusters. School controls include size, fees, & student socioeconomic status. Location controls include sub-region fixed effects and dummy variables for Kampala/Urban/Rural. * p<0.1, ** p<0.05, *** p<0.01

Table A 5: Regression of Student Test Scores on the Dobbie-Fryer Index

	VA	VA	VA	VA
Dobbie-Fryer Index (Z-Score)	0.051***	0.041*		
	(0.018)	(0.022)		
Management Index (Z-Score)			0.064***	0.054**
			(0.020)	(0.022)
School Controls	No	Yes	No	Yes
N (Students)	43,570	43,570	43,570	43,570
N (Schools)	223	223	223	223
R-squared	0.521	0.566	0.522	0.566

Notes: The “Dobbie-Fryer index” is our best approximation to the 5 key practices included in their actual index, taken from our school management survey. These include the sub-questions on data-driven teaching, the adoption of best practices, personalization of teaching, and leadership).
* p<0.1, ** p<0.05, *** p<0.01

Table A 6: Heterogeneous effects of Management on Student Value-Added, by Student Characteristics

	(1)	(2)	(3)	(4)	(5)
Management (Z-Score)	0.066**	0.120*	0.051**		
	(0.030)	(0.071)	(0.024)		
Female x Mgmt	-0.014				
	(0.018)				
PLE x Mgmt		0.003			
		(0.002)			
PLE Division 1 x Mgmt			0.062		
			(0.046)		
Targets (Z-Score)				0.161***	0.057**
				(0.061)	(0.024)
PLE x Targets				0.008**	
				(0.004)	
PLE Division 1 x Targets					0.020
					(0.020)
School Controls	Yes	Yes	Yes	Yes	Yes
N (Students)	41,818	41,818	41,818	41,818	41,818
N (Schools)	210	210	210	210	210
N (Years)	3	3	3	3	3
R-squared	0.569	0.569	0.569	0.569	0.569

Std. Err. adjusted for 210 school clusters. PLE is a continuous variable with an aggregate points score ranging from 4 to 28. PLE Division 1 is a dummy variable for whether the student obtained the top grade in their primary exam. The positive coefficient on the interaction of PLE scores with Targets indicates that the effect of secondary school target-setting practice is greater for students with better expected test scores (based on their primary test score). School controls include number of students, fee rates, ownership, student socioeconomic status, location, and 'noise controls' or enumerator * p<0.1, ** p<0.05, *** p<0.01

Table A 7: Heterogeneous effects of Management on Student Value-Added, by School Characteristics

	(1)	(2)	(3)	(4)	(5)	(6)
Management (Z-Score)	0.064**	0.062**	0.060**	0.067***	0.062**	0.070***
	(0.028)	(0.027)	(0.026)	(0.025)	(0.026)	(0.025)
Urban x Mgmt	-0.070					
	(0.073)					
Students x Mgmt		-0.010				
		(0.033)				
SES x Mgmt			0.045			
			(0.030)			
Dropout rate (Z-Score)				0.038		
				(0.025)		
Dropouts x Mgmt				0.080***		
				(0.028)		
Tuition Fees x Mgmt					0.023	
					(0.034)	
School Age x Mgmt						0.036
						(0.032)
School Controls	Yes	Yes	Yes	Yes	Yes	Yes
N (Students)	41,818	41,818	41,818	40,067	41,818	39,781
N (Schools)	210	210	210	205	210	203
N (Years)	3	3	3	3	3	3
R-squared	0.569	0.569	0.569	0.558	0.569	0.561

Std. Err. adjusted for 210 school clusters. Urban and Peri-Urban are dummy variables. School controls include number of students, fee rates, ownership, student socioeconomic status, location, and 'noise controls' or survey enumerator * p<0.1, ** p<0.05, *** p<0.01

Table A 8: Selection regression of Choice to Participate in the Management Survey on School Characteristics

	OLS	Probit	Logit
Number of Students (2015)	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)
Socioeconomic Status	-0.036	-0.092	-0.148
	(0.038)	(0.096)	(0.155)
Urban (Dummy)	-0.055	-0.143	-0.229
	(0.088)	(0.224)	(0.360)
Average Fees	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)
Head teacher Experience (yrs)	0.000	0.001	0.002
	(0.004)	(0.011)	(0.018)
1 Postgrad / 0 Grad	0.059	0.167	0.256
	(0.065)	(0.170)	(0.273)
Sub-Region FE	YES	YES	YES
N	324	324	324
r2	0.023		

Note: None of the 11 sub-Region dummies are statistically significant in any of the specifications. * p<0.1, ** p<0.05, *** p<0.01

Appendix 2: Edits to original World Management Survey

The original World Management Survey schools instrument includes a rubric with level descriptors for 1 (worst), 3, and 5 (best). The approach proposed by Lemos and Scur (2016) designed specifically for developing countries includes both a horizontal and vertical expansion of the tool, with level descriptors for half point levels at the bottom end of the scale (1, 1.5, 2, 2.5, 3, 4, 5) in order to capture variation in countries where scores are clustered at the lower end of scale, and including 3 separate sub-areas within each of the 20 question areas. During our piloting, we decided to expand the original rubric to include level descriptors for each of the levels 1 - 5, and to allow enumerators to score 0.5 points where they felt that responses fell between the two level descriptions, rather than describing explicitly what the 0.5 points were in the rubric. We also opted to maintain the shorter set of 20 areas rather than expanding to 60, on the grounds that any possible sacrifice in precision here could be outweighed by preventing respondent fatigue. During pre-testing and piloting we also opted to further simplify the original list of 20 areas to a combined and shortened list of 11 areas, to reduce excessive duplication and repetition of questioning and to limit the length of time required from a school head teacher. These changes are summarised in Table A 9 below. Our full survey instrument with the rubric of level descriptors is included at Appendix 3.

Table A 9: Summary of Changes to Original World Management Survey

Original WMS	Adapted Uganda Instrument	Rationale for changes
A. Operations		
Standardisation of Instructional Planning	Original category retained	Original categories retained. New category added to capture important school management role missing from original survey
Personalisation of Instruction and Learning		
Data-Driven Planning		
Adopting Educational Best Practices		
	Instructional Leadership (New category)	
B. Monitoring		
Continuous Improvement	Original category retained	One category retained unchanged, the remaining four categories combined into one. In pre-testing, we found that these questions/categories were very repetitive and overlapping and combined aspects of the categories into questions within a single category
Performance Tracking	Categories combined	
Performance Review		
Performance Dialogue		
Consequence Management		
C. Target Setting		
Target Balance	Categories combined	One category retained unchanged. Two categories combined into one where there is overlap. Some aspects of target interconnection were not relevant in this context – for example there are no district or national targets with which school targets could be interconnected. Two categories omitted. In pre-testing, we found that these questions/categories were very repetitive providing little new information
Target Interconnection		
Target Stretch	Original category retained	
Target Time Horizon	Categories omitted	
Target Clarity & Comparability		
D. People Management		
	Recruitment (new category)	Category added from Lemos & Scur (2016)
Rewarding High Performers	Original category retained	
Fixing Poor Performers		
Promoting High Performers	Categories combined	Categories combined due to overlap and repetition in questions.
Continuing Professional Development		
Retaining High Performers		
Attracting High Performers	Original category retained	

Appendix 3: Survey Instrument: World Management Survey, Uganda Adaptation, January 2016

1. Basic school details

School name		**Ark code**	
Interviewee name		**Interviewee position**	
Interviewee email			

2. Main Management Survey Questions

Area	Topic	Uganda questions	Scoring rubric
1. Operations	**WMS 1: planning of teaching and the curriculum** *Tests how well materials and practices are standardised and aligned in order to be capable of*	• How do you ensure that all teachers cover all the curriculum topics? • Do teachers make lesson plans or schemes of work? • Are these schemes or plans fixed at the start of term or do they	1: **No clear planning processes** or protocols exist; little verification or follow up is done to ensure consistency across classrooms
			2: Schemes of work prepared by all teachers and checked at beginning of term; likely to be some lessons plans in place; **no flexibility** to meet student needs; **little monitoring** throughout the term
			3: School has defined process for developing schemes of work and lesson plans; they are prepared by all teachers and checked at beginning of term; they have **some flexibility** to meet student needs; **monitoring is only adequate** (i.e. a few times throughout term)
			4: Teachers are encouraged to **adapt** some lesson plans throughout the term and there frequent monitoring through different means (i.e. lesson observations, checking student books)

Area	Topic	Uganda questions	Scoring rubric
	moving students through learning pathways over time	change throughout the year? • How do you keep track of what teachers are doing in the classrooms?	5: School has a defined process for developing schemes of work; All teachers are encouraged to continually adapt their lesson plans, based on student performance; there's a regular dialogue with teacher and senior management about lesson content/curriculum coverage.
2. Operations	**WMS New: Leading quality teaching** *Tests the extent to which school leaders take an active role in leading the quality of teaching and learning*	• Do you or a member of your senior team observe lessons? • How often? • What would you expect to see when observing lessons? • How would you support a teacher to improve after observing their lesson?	1: **Very limited lesson observations** take place; focus is on compliance (e.g. curriculum coverage or behaviour) rather than quality of pedagogy.
			2: Head teacher and Leadership team observes teachers in an **ad-hoc, unstructured** way; some feedback may be provided
			3: Head teacher and Leadership team observes teachers in a **structured** way (such as weekly); **feedback and support** is provided to help majority of teachers improve.
			4: School leader **sets expectations** for teaching practice; leadership **regularly observes** teachers in a structured way; feedback and support is provided, which can help teachers to improve
			5: School leader sets high quality expectations for teaching practice; leadership regularly observes teachers in a structured way; clear feedback and support is provided to help all teachers to improve
3. Operations	**WMS 2: Personalisation of instruction and learning** *Tests for*	• How do your teachers make sure that all students including those that may be struggling have	1: Teachers lead learning with very **low involvement of students,** there is **little or no** identification of diverse student needs. Booster classes are for all students, not targeted.
			2: There are **some 'add-on' strategies** put in place to support struggling students, such as targeted booster classes or remedial lessons, (rather than embedded within lessons). **Limited active participation** of students in lessons.

Area	Topic	Uganda questions	Scoring rubric
	flexibility in teaching methods and student involvement ensuring all individuals can master the learning objectives	understood the lesson? • How do teachers ensure that students actively participate in their learning? • Are there any remedial classes or support for students outside lessons? • Are remedial lessons for all, or only for lower performing students?	3: There are remedial lessons, and **some evidence of in-class strategies** to make sure all students are learning in classroom and **actively participating** (maybe through group work, continuous assessment)
			4: There are a range **of techniques** used to differentiate instruction and promote active participation in learning, and ensure that lessons are appropriate for a range of student groups within in the class.
			5: Emphasis is placed on personalization of instruction based on student needs; school encourages student involvement and participation in classrooms; school provides information and connects students and parents to resources to support learning.
4. Operations	**WMS 3: Assessments and data driven planning** *Tests if the school uses assessment to verify learning outcomes at critical stages, making data*	• What type of information on each individual student's ability is available to teachers at the beginning of the academic year? • How do you track the progress of each student throughout the year?	1: **Little or no effor**t is made to provide new teachers with information about students as they move through the school; no culture of reviewing student data throughout the year.
			2: Schools track **some performance data** about students, but it is **not frequent** (perhaps only at the end of the year or term), data is often not easy to use and it is often high level (i.e. pass or fail)
			3: Schools may understand the importance of tracking student performance as they move through school, but they do not have consistent processes in place. **Some data** available throughout the year but not easy to interpret or understand, and **will sometimes inform teaching practice** (i.e. re-teaching a topic)
			4: **Data is used regularly to guide planning and teaching** (not just the typical BoT, MoT and EoT exams); Data is used to understand areas of strength and weakness, and **teaching is adapted** on the basis of this information.

Area	Topic	Uganda questions	Scoring rubric
	easily available and adapting student strategies accordingly	• How is data used by teachers?	5: Students progress is managed in an integrated and proactive manner, supported by formative assessments tightly linked to expectations; data is widely available and easy to use
5. Operations	**WMS 4: Adopting education best practices** *Tests how well the school incorporates teaching best practices and the sharing of these resources into the classroom*	• How do teachers learn about new education best-practices? • How do you encourage the teachers to incorporate new teaching practices into the classroom? • How are these learnings shared across the school?	1: **Teachers do not go on courses** and there is no convincing explanation of how teachers are encouraged to improve.
			2: Teachers go on training courses (i.e. SESMAT, government refresher courses, etc.), or the school actively tries to take forward new approaches, but **no clear system for sharing or monitoring** improved practices.
			3: Teachers go on training courses, learn from other high performing schools, or are encouraged to adopt new techniques. There is a **proper system for them to share** the learnings of the training with their colleagues and some monitoring afterwards.
			4: Teachers **use a range of techniques** to find out about best practice, share with colleagues in the school, with regular monitoring by the DoS/HT (to ensure they're using the training). Some **culture of learning and sharing** best practices amongst the staff
			5: Teachers go on training, share with colleagues, are followed up on, and get additional school based training from HT/DOS. Strong culture of learning and sharing amongst the staff; leadership encourage staff to collaborate, sometimes beyond the school, and share best practices.
6. Monitoring	**WMS 5: Identifying and responding to problems** *Tests attitudes towards continuous improvement*	• When you have a problem in the school, how do you come to know about them? For example, if student attendance falls one week?	1: Exposing and solving problems (for the school, individual students and teachers) is **unstructured**; **no improvements** are made to the process to stop problems happening again.
			2: There is not a clear and consistent process for identifying and solving problems. School leaders sometimes involve a range of people and put in place a considered solution, but other problems are **not treated in a structured wa**y.
			3: There is an **established way** of exposing and solving problems, but not always at an early stage; resolution of the problem involves most of the appropriate staff groups.

Area	Topic	Uganda questions	Scoring rubric
		• What steps do you take to fix them and how do you ensure they don't happen again? (maybe ask for an example of when something went wrong and what they did?)	4: There is a **structured** process for solving a problem; appropriate people are involved and school leaders are **proactive** to find and expose problems; mechanisms are in place to **learn the lessons** from problems that have arisen.
			5: Exposing and solving problems in a structured way is integral to individual's responsibilities, and resolution involves all appropriate people; resolution of problems is performed as part of regular management processes.
7. Monitoring	**WMS 6,7 and 8: Performance tracking, review and dialogue**	• What kind of things do you measure to track school performance?	1: Measures tracked do not indicate if overall objectives are met; performance is **reviewed infrequently** or in an **un-meaningful** way; the right data is not available.
			2: **Some** useful performance indicators are tracked, including on students' academic performance. Indicators are, based on accurate but **limited data**; reviews are confined to the senior management and can be superficial, without stimulating any action.

Area	Topic	Uganda questions	Scoring rubric
	Tests whether school performance is measured, reviewed and discussed and followed up with the right frequency, and to a high quality	How often are these measured? • Are these recorded in a strategic plan or school development plan? • Do you have meetings to review progress against the indicators? • Tell me about these meetings – who goes, and how do you agree follow up actions? • How do you review school performance with parents and the community?	3: Performance indicators are tracked and **reviewed formally** using appropriate data (such as 4-5 targets, tracked at least termly); limited formal documentation; review is predominantly by the senior management, and **sometimes focus on identifying the cause** of the problem or problem solving.
			4: Performance indicators are **regularly tracked**, and reviews **involve a range of relevant staff**. They are clearly documented and made visible to key stakeholders for example, the community. Attempts are made to use review meetings to **solve problems**.
			5: Performance is continuously tracked, both formally and informally, using good quality management tools. Results are communicated to all staff; meetings are used to solve problems and provide feedback
8. Target setting	**WMS 10 and 12: Balance of targets/metrics**	• Do you have any targets? • Are your targets linked to student	1: Performance targets are **very loosely defined** or not defined at all.
			2: Performance targets for the school exist but are **high level**: usually confined to number of Division 1 grades in the school, or not linked directly to outcomes (such as attendance or enrolment)

Area	Topic	Uganda questions	Scoring rubric
	Tests whether the system tracks meaningful targets tied to student outcomes and whether this is approach is rational and appropriate	outcomes? • Can you tell me about any specific goals for departments or teachers? • Can you tell me about any specific goals for students? S1-S3, and S4?	3: Performance metrics and targets are defined for the **school and teachers,** based on student results. S4 students should also have individual targets.
			4: Performance metrics are defined for the school and teachers based on student results. Targets are in place for **all students**, including those in S1-S3. Targets are based on **good data** about **on-going student performance**, such as robust end of term tests.
			5: Performance measures are defined for all, and they include measures of student outcomes and other important factors linked to outcomes (i.e. attendance). When they are combined, specific short-term targets are designed to meet long term goals.
9. Target setting	**WMS 13: Target Stretch** *Tests whether targets are appropriately difficult to achieve*	• Do you usually meet your targets? • How do you decide how difficult to make your targets? • Do you feel that all the department/areas have targets that are just as hard? Or would some areas/departments get easier targets?	1: Goals are either **too easy or impossible** to achieve; at least in part because they are set with little teacher involvement or no use of data.
			2: Some targets are put in place based on consideration of a **limited range of relevant data**, such as looking at ability of current cohort and previous year's results. **No benchmarking**.
			3: Some carefully considered and **clear targets** in place, taking into account **some evidence**; targets dictated by head teacher, with **little buy-in** from teachers and **limited external benchmarking.**
			4: Targets are in place, based on a **range of evidence**, including **some external benchmarks**. Targets are **adapted** for different parts of the school (for example, in particular subjects or for particular student cohorts), rather than a 'one-size fits all' approach.
			5: Targets are genuinely demanding whilst still realistic for all parts of the organisation; goals are set in consultation with senior staff, and consider external benchmarks where appropriate.

Area	Topic	Uganda questions	Scoring rubric
10. Leadership	**WMS 22: Clearly defined accountability** *Tests whether school leaders are accountable for delivery of student outcomes*	• Who is responsible for delivering the schools' targets? • What would happen if that person did not meet the targets? • How would you respond to a complaint from a parent about their child's lessons?	1: School leaders feel accountable for **minimal targets** or not at all, **without individual or school level consequences** for good or bad performance; school leaders have **very limited sense of personal responsibilit**y, rather seeing the whole team as accountable for performance.
			2: School leaders feel accountable for performance; there are **some consequences** for good and bad performance, but they may **not be clear** or consistently applied. Limited sense of personal responsibility.
			3: School leaders feel accountable for student outcomes, and there are some school-level and individual **consequences** for good and bad performance. School leaders are clear that **they are ultimately accountable** for reaching some minimal targets.
			4: School leaders feel accountable for a **range of outcomes**, with **clearly defined consequences** for good and bad performance.
			5: School leaders feel accountable for all elements of school performance (i.e. quality, equity, operations and cost effectiveness), with clearly defined consequences for good and bad performance. Leaders take clear personal responsibility for meeting the outcomes.
11. People management	**WMS 18: Recruiting staff** *Tests how well the school identifies and targets needed teaching, and other capacity in the school, and how they find the right teachers*	• Who decides how many and which teachers (full- time regular members of staff) to hire? • Where do you seek out and find teachers? • What criteria do you use to hire teachers?	1: The school has **very limited or no control** over recruitment of staff (teachers are assigned to the school). Or, there is discrimination in the recruitment process
			2: The school has **some control** over recruitment, but there is **no standard process.**
			3: The school **controls the number and which individual teachers** are hired, and has an **interview process** for new teachers, but the criteria are based **primarily on experience/qualifications** rather than on proven teaching ability or knowledge.
			4: The school controls the number of teachers that are hired and has a **clear interview** process, which sometimes or **occasionally goes beyond just interview**.
			5: The school has a clear recruitment process including direct testing of teachers on their teaching ability and subject knowledge (e.g. by a lesson observation).

Area	Topic	Uganda questions	Scoring rubric
12. People management	**WMS 20: Attracting talent** *Tests how strong the teacher value proposition is to work in the individual school*	• What are the benefits of working at your school? • Why would a very good teacher want to work at your school, rather than another one? • Are these benefits communicated to teachers?	1. There are **no particular benefits** to working at this school. The head teacher cannot articulate why a teacher would choose to work in their school
			2. There are **no or limited formal benefits** (good pay, etc.), but the school offer **some informal benefits** such as a nice atmosphere.
			3: There are **some formal benefits** associated with working at this school. The head teacher can **articulate a clear reason** why a teacher would choose their school, and make some efforts to communicate this to teachers.
			4. The school offers a **range of benefits** for working at the school, which is **clearly communicated**.
			5: The school offers a wide range of reasons and benefits of why a teacher would choose their school (for example, pay, development, meals and housing), Teachers are clearly told about these benefits, and there are opportunities for feedback from teachers.
13. People management	**WMS 15: Rewarding high performance** *Tests whether good teacher performance is rewarded proportionately*	• How do you know who your best teachers are? • What criteria do you use and how often do you identify these teachers? • What types of rewards are given to teachers for good performance? Any monetary or non-monetary rewards?	1: There is **no teacher evaluation** system. Teachers are paid and rewarded in the same way no matter how well they teach.
			2: There is no formal teacher evaluation system, but good performance is **sometimes rewarded**.
			3: There is a **basic teacher evaluation system** that rewards good performance (with extra payment and/or other benefits). Reward is typically based on a **simple calculation** about high UCE scores, such as number of distinctions.
			4: There is a teacher evaluation system that rewards good performance, at least termly. There is some kind of process for evaluating teachers **throughout the year** that **goes beyond exam scores**, and some consideration is given to ensure the reward system is **fair** for teachers across different grades and subjects.
			5: There is a structured, ongoing teacher evaluation system throughout the year that rewards good performance. Rewards are awarded as a consequence of well-defined and monitored individual achievements (such as good class test scores)

Area	Topic	Uganda questions	Scoring rubric
14. People Management	**WMS 17: Promoting high performers** *Tests whether staff promotions and career progression are based on performance*	• What types of career and teacher development opportunities are provided? • How do you decide who goes on which courses? • How do you make decisions about promotion/progression of teachers within the school? • If you had a DOS vacancy, how would you decide which teacher gets the job?	1: Teachers are promoted primarily on the basis of **tenure** (e.g. years of service). Development opportunities **rarely available** beyond free government courses
			2: Teachers are usually promoted on the basis of tenure, but **sometimes on performance**. Development opportunities are **sometimes available** but these are usually government/NGO run courses.
			3: Teachers are **usually promoted** on the basis of performance. In addition to government courses, the **school provides career development** opportunities (i.e. school running their own CPD sessions) but teaches are often chosen based on non-performance related factors.
			4: Teachers are promoted on the **basis of performance**, and development opportunities are actively encouraged and **made available for good performers**.
			5: The school actively identifies, develops and promotes its top performing staff members with a clear career path for progression

Area	Topic	Uganda questions	Scoring rubric
15. People management	**WMS 16: Removing poor performers** *Tests whether the school is able to deal with underperformers - both in terms of teachers struggling with teaching and non-compliance (i.e. poor attendance)*	• How do you know who are the teachers who are not doing so well (the worst teachers)? • What would you do if you had a teacher who was trying hard but struggling to teach well? • What would you do if you had a teacher who was lazy and not committed to their job? • Have you ever removed a teacher for poor performance?	1: There is **no structured way** of monitoring performance of teachers. Poor quality teaching/ poor attendance is not addressed or inconsistently addressed. Poor performers are **rarely removed** from their positions
			2: Poor teaching/poor attendance is **sometimes addressed,** but rarely in a structured way (for example, teachers are given a letter giving notice to improve, but aren't given support). There is no disciplinary process for poor attendance. **Firing a poor teacher is hard** for the head teacher and therefore rarely happens.
			3: Poor teaching is addressed, but typically through a **limited range of methods** (e.g. coaching). There is a **process to address low attendance**. Firing a poor teacher is usually hard and therefore rarely happens.
			4: Poor teaching is addressed, and often through **range of targeted interventions** (e.g. team teaching, extra CPD training, performance appraisals). **Poor performers are sometimes** but not always moved out of the school when weaknesses cannot be overcome.
			5: Repeated poor teaching is consistently and systematically addressed through a range of targeted interventions (e.g. team teaching, extra CPD training, performance appraisals). Poor performers are moved out of the school when weaknesses cannot be overcome.

Area	Topic	Uganda questions	Scoring rubric
16. Leadership	**WMS 21: Leadership vision** *Tests whether school leaders have an understanding of the broader set of challenges that the school, system and key actors face and the right mind-set to address them*	• What is the school's vision for the next 5 years? • Who is involve deciding the vision? • How do teachers, staff and others involved in the school matters know and understand this vision? • Do you use the vision to influence the everyday life of the school?	1: The school has **no clear vision**, or one defined **without much collaboration** from teacher/parent/student/community. The school leader does not or cannot articulate a clear focus on building an environment conducive to learning.
			2: The school has a vision statement, focused primarily on **one aspect of schooling** such as exam. Teachers/parents/students/community have a weak understanding of the vision.
			3: School has **defined a vision** that focuses on improvement in student outcomes, **beyond just exam results**, and usually defined with **limited stakeholder collaboration**. School leaders may focus on the quality of the overall school environment, but often in response to specific issues.
			4: School has defined a vision that focuses on improvement in student outcomes, beyond just exam results. **Teachers and parents are involved** in defining this vision, which is somewhat responsive to local needs.
			5: School leaders define and broadly communicate a shared vision and purpose for the school that focuses on improving student learning and outcomes beyond just exam results. Vision and purpose is built upon a keen understanding of student and community needs, and defined collaboratively with a wide range of stakeholders. The school leader proactively builds environment conducive to learning.
17. Budget	**WMS New: Budgeting** *Tests whether the school has processes for planning, monitoring and adjusting their budgets*	• Do you prepare a budget for the school? • How do you plan the spending of your budget? • How do you make sure you don't overspend or underspend each year?	1: **No clear process** for preparing or monitoring budgets.
			2: **Some process** for preparing budgets with some link to school needs, **monitoring is limited** throughout the year
			3: **Clear process** for preparing budgets, some monitoring throughout the year, some **possibility to reforecas**t to cover over/underspends.
			4: Clear process for preparing budgets, monitoring throughout the year; **different scenarios** planned for.
			5: Clear process for preparing budgets; different scenarios planned for (increase/decrease in income); budget regularly reviewed by senior leadership; process for reforecasting; effectively managed to avoid overspend

3. Organisational questions

Ask these questions after the main World Management Survey questions.

Topic	Question
1. Head teacher absenteeism	1.1 *Do you have a second job*? (Yes or No)
2. Fees *What school fees do you charge for DAY students per term for*:	2.1 Regular Tuition (UGX)
	2.2 Remedial or booster classes (UGX)
	2.3 Uniform (UGX)
	2.4 School lunch (UGX)
	2.5 Other out of pocket expenses (UGX)
	2.6 Total (UGX)
3. Admissions	3.1 *Do you use academic criteria to select students for admissions*? (Yes or No)
4. Head teacher time *On average throughout the school year, what percentage of time in your role as a principal do you spend on the following tasks at school* (Rough estimates are sufficient. Please write a number in each row. Write 0 (zero) if none. Please ensure that responses add up to 100 percent.):	4.1 **Administrative and leadership tasks and meetings** (including human resource/personnel issues, regulations, reports, school budget, preparing timetables and class composition, strategic planning, leadership and management activities, responding to requests from district, regional, state, or national education officials
	4.2 **Curriculum and teaching related tasks and meetings** (Including developing curriculum, teaching, classroom observations, student evaluation, mentoring teachers, teacher professional development)
	4.3 **Student interactions** (including counselling and conversations outside structured learning activities, discipline)
	4.4 **Income related activities** (school fee collection, fundraising, obtaining government capitation grant, etc.)
	4.5 **Other**
5. Autonomy *In your school, who has main authority for*: (1 = Head teacher. 2 = Owner / Director. 3 = Ministry of Education. 4 = School Governing Board. 5 = Teachers. 6 = Other)	a. Admissions criteria
	b. Deciding which courses are offered;
	c. Determining subject content;
	d. Choosing which textbooks are used;
	e. Selecting teachers for hire;
	f. Establishing teachers' starting salaries; and
	g. Deciding on budget allocations within the school.

Topic	Question
6. Ownership	6.1 *Is the school for profit or not for profit*? (P or N)
	6.2 Does the school have a religious affiliation? 1=Not religious 2=Pentecostal 3=Catholic 4=Hindu 5=Jesuit 6=Seventh Day Adventist 7=Mormon 8=Muslim 9=Protestant 10=other
	6.3 If yes, do you receive any funding from the church/mosque? (Yes or No)
	6.4 What proportion of your school budget is this? (1-100%)
7. Human Resources	7.1 Percentage of teachers who are union members (1-100%)
	7.2 Average classroom teaching hours per day by teachers (No. of hours)
	7.3 Percentage of teachers who have left the school in the past 12 months (% teachers)
8. Exam prep	8.1 What percentage of time do S4 students spend practising exam questions?
9. Self-evaluation	9.1 How well managed do you think the rest of the school is on a scale of 1-10, where 1 is worst, 10 is best practice and 5 is average? (1-10)

4. Post interview questions

Fill in these questions yourself after the interview has finished

Question	Answer options
Interview duration (mins)	No. of minutes
Interviewee willingness to reveal information	1: Very reluctant to provide more than basic information 3: Provides all basic info & some more confidential information 5: Totally willing to provide any information about the school
Interviewee knowledge of management practices	1: Some knowledge of their school and no knowledge of its daily operations 3: Expert knowledge of his school, and some knowledge of its daily operations 5: Expert knowledge about his school and its daily operations

Interviewee patience	1: Little patience – wants to run the interview as quickly as possible. I felt heavy time pressure 3: Some patience – willing to provide richness to answers but also time constrained. I felt moderate time pressure 5: Lot of patience – willing to talk for as long as required. I felt no time pressure