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Factors affecting early grade educational attainment: Evidence from South Sudan

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Abstract

Decades of conflict have left a majority of the South Sudanese population lacking basic educational skills. Using data from newly enrolled first graders in BRAC Non-Formal Schools, this study explores the current level of basic education in the country and models its determinants. Results suggest that most of the students lack the base to begin first grade schooling while modelling its determinants show strong signs of gender and socioeconomic disparity. To achieve parity and meet the target of quality primary education for all, greater attention needs to be paid towards the inclusion of female students and those from lower-socioeconomic backgrounds.

Keywords: education; development; literacy; educational policy; EGRA; EGMA; South Sudan; BRAC

1.0 Introduction

The youngest nation in the world, the Republic of South Sudan (RSS) has been burdened with a prolonged history of civil war and political dissonance, as recently as 2013, 2014 and 2016. The intermittent wars have left tens of thousands dead and the number of displaced upwards of nearly two million.[1] As a result, the country now ranks the lowest in the world in terms of its economic, social and development indicators (Shimeles and Verdier-Chouchane, 2016).[2] While 50% of the population live below the poverty line, the average life expectancy is only 56 years. Similarly, a third of the children are stunted while maternal and neonatal mortality are among the highest in the world (UNICEF, 2015). The cumulative effects these factors have greatly diminished access to basic services such as education, leaving the predominantly young population without even rudimentary literacy (Brown, 2006; The World Bank, 2015).[3]

While one of the primary instigators of the war that led to the South becoming independent from North Sudan was the imposition of a hegemonic culture through the education system in a very diverse country, there has been limited improvement in the education sector (Breidlid, 2010).[4] Acute budget constraints led to the suspension of recruitment and training of new teachers while existing teachers typically receive remuneration below their official grade rates (Etim, 2015). This led to the

[1]Juba, being the capital of the country, is traditionally the epicenter of all strife (Brown, 2006; UNHCR, 2017), subsequently spilling over into neighboring regions such as Torit and Yei. These wars often result in large numbers displaced. Once the violence subsides, the displaced return or settle permanently in the new locations if the likelihood of violence is lower compared to their places of origin.

[2]The RSS has a population of 12.5 million, half of whom are below 18. The country highly diverse in terms of ethnic, religious, language and socio-economic status. The largest 10 ethnic groups form about 80 per cent of the population. The average family size is high (8 members) and close to 85% of household heads have never been to school (Brown, 2006; UNICEF, 2016).

[3]Of the 12.5 million South Sudanese citizens, more than half are below the age of 18 while 72% are below 30 (World Health Organization, 2012).

[4]Education is the least funded sectors by the government. Government expenditure on education was only 0.8% of GDP in 2011 (Shimeles and Verdier-Chouchane, 2016)

current body of educators, only 2% of whom are certified while the majority (70%) hold only primary education degrees (Brophy, 2003).

Post-conflict influx of refugees and insufficient infrastructural capacity to absorb them led to a student-classroom ratio of 134:1 (MoEST 2015b). An education census from 2015 suggests the net enrolment in primary schools to be 43.5%, indicating that less than half of eligible students are actually enrolled (UNICEF, 2016). Among students who do enrol at the primary level, only 60% complete the first two years while less than 2% graduate to the secondary level (Brophy, 2003). Lastly, gender inequality in education in South Sudan has reached perilous proportions. While only one in four teachers is a woman, only 1 in 3.5 pupils in the primary level is a girl and this ratio increases manifold in higher grades (Sommers, 2002). For instance, the GESS (2014) reports that while poverty is among the key drivers in the lack of education, a number of non-financial barriers (related to socio-cultural practices) to education apply only to girls, resulting in only 8% of women being literate (Ministry of General Education and Instruction (MGEI), 2012).[5] It therefore not surprising that results from standardized assessments such as the Early Grade Reading Assessment (EGRA) and Early Grade Mathematics Assessment (EGMA) in different grades fall considerably below its continental neighbours in East and West Africa (Davidson and Hobbs, 2013; Lucas et al., 2014; Piper et al., 2016).

In an effort to strengthen the faltering system, the Government of the Republic of South Sudan(GRSS) has taken steps to establish a comprehensive education system (MoEST, 2015a). For instance, an Alternative Education System (AES) has been parallelly established to complement the formal stream, providing a second chance to over-aged children to access basic education. Non-government and international organizations (NGOs) have been instrumental in shouldering the government initiatives to achieve the desired goals (MoEST, 2015a).These efforts led to a significant increase in the number of schools across the country. The number of pre-primary schools has risen by 28%, 80% of which are operated by non-government

[5]Using a cross-country panel data, Klasen and Lamanna (2009) report that countries that suffer from gender gaps in education and employment (mostly pronounced for Arabic speaking countries in the Middle East and Africa), can lose between 0.9 to 1.7 percentage points in economic growth.

entities (MoEST, 2015b). Despite the improvement, the education system in South Sudan still ranks as the lowest in the world (Kaye, 2014).

In line with the government efforts, BRAC has been working in South Sudan in the fields of education, in addition to health, youth empowerment and agriculture, over the past decade. BRAC Education Program currently operates approximately 620 schools with nearly 18,600 students across 15 counties in five states: Central Equatoria, Western Equatoria, Eastern Equatoria, Lakes and Jonglei. These schools typically follow the Community Girls Schools (CGS) curriculum, adopted under the Alternative Education System. Given the success in the recent past, BRAC is gearing to scale-up its primary education efforts in South Sudan, with a particular focus on the returning refugees.

Studies exploring the dynamics in the education sector from South Sudan are limited. Using descriptive statistics, Vinogradova (2014) report significant shortcomings when administering the EGRA to 522 Primary Grade II students. Nearly a quarter of the students received zero points in letter recognition sub-component while 88% were unable to sound a single letter correctly. Montrose (2016), benchmarking Primary Grade III students across 25 schools in South Sudan in EGRA (in English and 5 additional local languages) and EGMA using descriptive statistics conclude that poor scores are largely derived from high student teacher ratios and poor teaching practices by poorly or untrained teachers. The study however suggests that the distribution of the EGRA, irrespective of the language, are much more skewed towards zero than the EGMA (Montrose, 2016).

Using data from recently enrolled first graders in BRAC schools from the Juba, Torit and Yei districts, this study attempts to fill the void in two steps: first, the current landscape of the students' educational standing in basic English and mathematics skills has been explored via the EGRA and EGMA. Next, we examine how individual and household level attributes such as gender, prior schooling, socioeconomic status and parental education affect these scores using a two-part model. The first models the determinants of the likelihood of scoring any points in each of the two exams while the second investigates how these factors affect how high the students score.

The paper is arranged as follows: Section 2 described the South Sudan context. Section 3 discussed the project background, data and empirical strategy. Section 4 describes the descriptive statistics, balancing properties and outcomes of the models. Section 5 discusses the results and concludes.

2.0 Data and methods

2.1 Data and variables

The data used in this study was collected as a baseline for an experiment designed to encourage performance among first grade students in three counties (Juba, Torit and Yei) in South Sudan between July and August in 2015. Information was collected from 2415 students across 112 BRAC schools aged between 6 and 11; all of whom recently enrolled in Grade P1. It is worthwhile to note that BRAC schools differ from others in the area (including public schools), in that they purposefully target students from lower socioeconomic backgrounds. Priority is given to children who are orphans, first generation learners, living with extended families or have dropped out. Lastly, as girls' are generally marginalized, BRAC school administrators maintain a ratio of 60 to 40 between girls and boys.

Information from the students were collected in two parts. The first was the administration of the age appropriate EGRA followed by the EGMA.[6] In line with BRAC Schools' language of instruction and as prescribed by the GRSS, both the tests were administered in English though supplementary instructions were provided in the local languages. The EGRA test comprised of first, a stimulus with 100 letters which the students with appropriate knowledge would be able to sound out within 60 seconds, approximately 50 unfamiliar three-letter words to be pronounced within 60 seconds, and two oral passages (consisting of approximately 60 words) to read out, following each with a set of three to five questions. The allotted time in the first passage was 60 seconds, followed by 180 seconds in the second. The EGMA

[6]The tools, created by RTI International with financial assistance from the USAID and the World Bank, were designed to provide a static status of the student's abilities.

similarly contained four sub-sections. The first presented students with 100 circles to be counted in 60 seconds. The second exercise required a number of figures presented to be identified. The third presented students with pairs of numbers, the larger of which was to be identified, while students had to identify missing numbers in the last.

Following the test, both individual and household level information were collected from the students. Individual level details included demographics (age, gender), education history (previous school attendance) and details on various household level socioeconomic indicators. This includes whether the child has access to non-school related books in their respective homes, literacy of their parents and a composite asset index expressed as tertiles obtained from a principal component analysis.[7]

2.2 Empirical strategy

While this study models the determinants of the scores achieved in the EGRA and EGMA, the analysis is restricted to the first subset of the two components: number of letters correctly pronounced per minute and the number of shapes correctly identified per minute. This decision is primarily data driven in that, the range of scores achieved in the latter sections are limited (see Table 1).

Factors affecting the scores are analysed using a two-part model. The first involves the likelihood of scoring any points(Y) using the following logit specification:

$$Y_i = \frac{e^{X_i'\beta_1+\theta_i'\beta_2}}{1+e^{X_i'\beta_1+\theta_i'\beta_2}} \qquad i = 1,2,3...n \tag{1}$$

where X_i' denotes the individual level characteristics (demographics, previous education and additional reading material) for student i . The vector of household characteristics for the same individual (parental education, socioeconomic status

[7]The index composed of durable assets such as radios, mobile telephones, television, refrigerator, bicycle/motorcycle, vehicles or boats. Additional household level information were also collected on whether the students' house has electricity or a toilet

and location) are represented by $\theta_i^{'}$. Marginal effects of the model are presented to ease interpretation.
Thereafter, the drivers of log-linear scores (Y) are estimated using the OLS specification:

$$Y_i = \alpha_i + X_i^{'}\delta_1 + \theta_i^{'}\delta_2 + \epsilon_i \qquad i = 1, 2, 3...n \qquad (2)$$

For brevity, we use the same notations as equation (1). All analysis is done in STATA version 13.0.

3.0 Results

3.1 Descriptive statistics

Table 1 shows the mean points scored by students in the EGRA and the EGMA. The outcomes are presented first for the pooled sample followed by a disaggregation by gender. Grades from four components of the EGRA test are presented: letter recognition/naming (letters recognized/named per minute), unfamiliar word pronunciation (words pronounced per minute), reading fluency (words read per minute) and reading comprehension (percentage of questions correctly answered). For the EGMA, the table reports four scores: counting items (numbers per minute), number identification (numbers per minute), number discrimination (scored out of 10) and the identification of missing numbers (scored out of 10). Lastly, the table also reports on the percent of students who score zero in each subcomponent of the tests.

Table 1 goes here

Panel Panel A reports the outcomes of the EGRA. Students recognize and pronounce 8.25 letters per minute on average, though 69% are unable to identify a single letter (see Supplementary Figure 1 for the distribution of the score). An average student is unable to pronounce a single unknown three-letter word (0.37 words per minute; 98% respondents score zero). A similar pattern follows for the reading fluency (mean of 0.66, 98% scored no points) and reading comprehension

(0.82% questions answered correctly on average with 99% of respondents unable to answer a single question). In all cases, male students scored higher than their female counterparts.

Panel B shows means of the four components of the EGMA. Students in general perform better in this test than they do in EGRA. In the counting talk, students can count 57 numbers per minute. Less than 1% of the students score zero in the module. In the number identification task, students can recognize 9.5 numbers per minute while 1 in 10 students are unable to identify a single number. An average student scores 5.6 out of 10 while performing number discrimination exercises (less than 1% are unable to answer a single question correctly. Lastly, the average score is lower when identifying missing numbers in a given sequence (2.7 of 10) and approximately 2% of the students score zero. Similar to the EGRA, male students on average score higher in each of the subcomponents of the EGMA.

Table 2 presents individual and household level attributes of the students. The average age of a student is approximately 9 years while male students are underrepresented (41% versus 59% female). Approximately 40% of the students have attended pre-school prior to joining the Primary Grade I. As the primary language spoken in the three areas is Juba Arabic, it is not surprising that only 14% of the students speak English, the language spoken in BRAC schools. Nearly a third of the students (28%) have non-school related books at home. Students with at least one parent who can read and write represent 68% of the sample. The students are uniformly distributed socioeconomically across the three asset tertiles. Lastly, the largest proportion of the students are surveyed in Torit (41%) followed by Yei (31%) and Juba (28%).

Table 2 goes here

Overall, descriptive statistics suggest the students perform much better in the mathematics tests with a considerably lower proportion of students with zero score in comparison to English ones, the male students taking lead in each case.

3.2 Determinants of EGRA and EGMA scores

3.2.1 Factors affecting the likelihood of scoring any points

Table 3 reports marginal effects from a probit model examining factors affecting whether a student scores any points in the EGRA (Column 1) and EGMA (Column 3). Several points of note emerge from this analysis. In the EGRA test, a student who is one year older is 4.5% more likely to score at least one point with a corresponding increase of 7.3 percentage points higher for male students. Similarly, attending pre-school increases this likelihood by 4.7 percentage points. Expectedly, students who speak English at home are more likely (2.6 percentage points) to score higher in the EGRA. Not surprisingly however, students in the highest socioeconomic strata are 5.1 percentage points more likely gain any points in contrast to the lowest. Factors such as the availability of additional reading material at home or parents' education do not appear to affect whether any points are scored.

As less than 1% of the students score zero in the EGMA, we find limited variation in the effects the various individual and household level characteristics have.

Table 3 goes here

Overall, a number of factors, both at the individual and household level, affect the scores attained in the EGRA. As a majority of students manage to score at least one point in the EGMA, our model is unable to character specific effects influencing the outcome.

3.2.2 Determinants of EGRA and EGMA scores

Table 4 presents coefficients of an OLS model exploring the drivers of scores achieved by students in the EGRA and the EMGA among students who scored at least a single point. Students who are one year older are likely to score 6.5% higher while the male students are likely to score 13.9 percentage points higher points than girls (Column 1). Students who also speak English at home are likely to score 7.1 percentage points

higher. Attributes such as whether the student attended pre-school, has additional reading material at home or parents' education do not play a role once the student has crossed the zero-score threshold.

Table 4 goes here

As for the EGMA score (Column 3), students who are one year older are likely to score 11.3% higher. Much like the EGRA, male students are likely to score 12.3 percentage points more. Unlike the EGRA, students attending pre-school or having additional reading material at home positively affects the score (6.9 and 10.3 percentage points respectively). Lastly, students belonging to the highest socioeconomic strata are expected to score 4.8 percentage points higher.

Overall we find that while individual characteristics such as the students' age and gender play a significant role in determining the EGRA scores, household level characteristics play an additional role in driving the EGMA scores.

4.0 Discussion and Concluding remarks

South Sudan's educational infrastructure has been warped by decades of internal conflict and political strife. The influx of returning refugees has further intensified the pressure on the vulnerable system. Under the aegis of government efforts, a number of international organizations have been working to address these weaknesses. To the best of our knowledge, this paper is the first to assess the determinants of educational standing among newly enrolled first grade students using primary data from 113 BRAC schools with 2415 students in South Sudan. Drawing on data from the Early Grade Reading Assessment (EGRA) and the Early Grade Mathematical Assessment (EGMA), we assess how individual, household and geographic differentials affect test scores. The tests implemented have been customized for the specific context in which it was administered such that the cohort of interest should be able to perform had they received the requisite instruction well.

Our findings are largely in line with previous evidence from the region, espe-

cially in terms of the scores achieved and the determining factors of these scores (Montrose, 2016; Vinogradova, 2014). While students on average performed modestly in the first (simplest) component of the respective assessments, the majority in general were unable to answer single question correctly in the latter parts. These trends are most pronounced for the EGRA. The disappointing outcomes, however, are not unexpected. For instance, majority of the students do not speak English at home and EGRA was administered in English primarily to facilitate the understanding of where the new students stood given the language of instruction at BRAC schools is English which is also the officially acknowledged language of instruction in many government schools (Hammond, 2013).

We next model how individual and household level characteristics affect the scores attained using a two-part model where we first assess the determinants of scoring any points followed by the drivers of how high the students score. Determinants for both the reading and mathematics components are generally comparable, though magnitudes in the latter are smaller. First, we find age and gender play an important role in determining the scores attained. While age and experience may be considered linear in nature and increase incrementally, the fact that male students score higher indicates a much larger problem of gender inequality. This is indeed confirmed by recent evidences from South Sudan. Jack et al. (2012) for instance suggest that families are dis-incentivised from investing in girls' education as they are considered an economic burden. Among others, this results in a high prevalence of child marriages, in essence, shifting the "burden" from her own family to that of her husband's. Students who attended pre-school are found to score higher on both tests. While a language barrier precludes a student from performing well in the reading test, understandably this was not found to be a problem for mathematics test. Surprisingly, the benefits of having access to non-school related books are restricted to the mathematics scores. Students from a higher socioeconomic status are likely to score higher in both tests.

While there is some overlap in the determinants of whether a student overcomes the zero-score threshold versus how much they score once it is crossed, the magnitudes of effects vary. For instance, in the EGRA, the magnitudes of the latter are much

more pronounced. More specifically, the gender differentials favor male students nearly twice as much once the students score even a single point. This suggests that at the lower levels of the scores, the girls are much more similar to boys. Likely driven by male child biases, boys on average score much higher than their female counterparts. Similarly, all students appear to have some basic knowledge of the English letters. However, we find students who speak English are likely to belong to the higher spectrum of the scores. Lastly, there is a distinct difference when it comes to the socioeconomic status. While belonging to a higher socioeconomic stratum does not play a role in whether the student scores a single point, but plays a significant role in determining how high the scores achieved are. This alludes to the understandable scenario where more affluent parents are able to dedicate greater resources in educating their children.

This study is not without limitations. First, results from the models are not generalizable given the endogeneity of enrolment. However, given the burgeoning number of non-formal schools being operated by NGOs (BRAC for instance operates more than 620 schools), this may well be more generalizable than we stipulate. Second, absenteeism among students is a considerable issue. For instance, among the classes surveyed in this study, on average, nearly a third of the students were absent on the day of the survey. Given the absence of a further follow-up to collect the absent students' information, our results are potentially biased. It is likely that had students who are absent on a more regular basis may have drawn the averages further down. Lastly, a number of unobservable characteristics, beyond what was measured here, may have affected the outcomes.

Notwithstanding these limitations and the fact that this study has been conducted in the framework of a larger research programme assessing the efficacy of a group versus individual incentive scheme to improve performance, the study suggests some ways forward to realize the government's goal of achieving universal primary education. First, considering most students did not attend any pre-primary or early childhood education, school curriculum needs to be able to accommodate the gap. Incorporating a minimum of one year pre-primary education into the universal primary education curricula has several advantages. In addition to achieving a better

outcome at the primary level, early childhood education also produces large socio-economic returns, especially for disadvantaged children (Heckman, 1999, Eurydice network, 2009). Further, returns to education is larger for those who start at their early stage of development than later years as young children's cognitive ability and behaviour are more malleable compared to adults (Connelly, 2008). On a national scale, empirical evidence suggests that countries with gender inequality in access to education can severely curtail economic growth in the medium to long term (Klasen and Lamanna, 2009). On a similar note, efforts need to be dedicated to reconciling the language barrier, that is, the local Juba-Arabic and English. Second, gender equity in education should be prioritized. While suggestions in achieving this parity are beyond the scope of this study, consequences of this inequality are well documented in the literature(Borooah, 2004; Nour, 2011). As the school systems develop, it is important to provide access to non-academic books to nurture a broader point of view. Lastly, greater attention needs to be devoted to children from lower socioeconomic backgrounds as these are the students most likely to slip through the gaps.

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References

Borooah, V.K., 2004. Gender bias among children in India in their diet and immunisation against disease. Soc. Sci. Med. 58, 1719–1731.

Breidlid, A., 2010. Sudanese images of the other: Education and conflict in Sudan. Comp. Educ. Rev. 54, 555–575.

Brophy, M., 2003. Progress to universal primary education in southern Sudan: a short country case study; Background paper for the Education for all global monitoring report 2003/4: gender and education for all: the leap to equality; 2003.

Brown, T., 2006. South Sudan education emergency (No. FMR Education Supplement).

Davidson, M., Hobbs, J., 2013. Delivering reading intervention to the poorest children: The case of Liberia and EGRA-Plus, a primary grade reading assessment and intervention. Int. J. Educ. Dev. 33, 283–293. doi:10.1016/j.ijedudev.2012.09.005

Etim, L., 2015. The urgency of education in South Sudan [WWW Document]. USAID . URL https://blog.usaid.gov/2015/03/the-urgency-of-education-in-south-sudan/ (accessed 7.8.16).

Girls Education South Sudan (GESS), 2014. Baseline survey of households (No. 2), Research Brief. Juba.

Jack, A. El, 2012. "Education Is My Mother and Father": The "Invisible" Women of Sudan. Refug. Canada's J. Refug. 27.

Kaye, M., 2014. In South Sudan, survey shows education is number one priority [WWW Document]. Available from: https://goo.gl/AX9ihh

Klasen, S., Lamanna, F., 2009. The Impact of Gender Inequality in Education and Employment on Economic Growth: New Evidence for a Panel of Countries. Fem. Econ. 15, 91–132. doi:10.1080/13545700902893106

Lucas, A.M., McEwan, P.J., Ngware, M., Oketch, M., 2014. Improving early-grade literacy in East Africa: Experimental evidence from Kenya and Uganda. J. Policy Anal. Manag. 33, 950–976. doi:10.1002/pam.21782

Ministry of General Education and Instruction (MGEI), 2012. General education strategic plan, 2012-2017. Promoting learning for all. Juba.

MoEST, 2015a. Education for All 2015 National Review Report: South Sudan. South Sudan.

MoEST, 2015b. Education statistics for the Republic of South Sudan. South Sudan.

Montrose, 2016. South Sudan early grade reading and mathematics assessment report. Juba.

Nour, N.M., 2011. Health Consequences of Child Marriage in Africa. Emerg. Infect. Dis. 12. doi:http://dx.doi.org/10.3201/eid1211.060510

Piper, B., Zuilkowski, S.S., Ong'ele, S., 2016. Implementing Mother Tongue Instruction in the Real World: Results from a Medium-Scale Randomized Controlled Trial in Kenya. Comp. Educ. Rev. 60, 776–807. doi:10.1086/688493

Secretariat of Education New Sudan, 2003. Education Statistics 2000-2002.

Shimeles, A., Verdier-Chouchane, A., 2016. The key role of education in reducing poverty in South Sudan. African Dev. Rev. 28, 162–176.

Sommers, M., 2002. Children, education and war: Reaching education for all (No. 1), World Bank CPR Unit Working Paper Series. Washington D.C. The World Bank, 2015. World Development Indicators. Washing DC. doi:10.1596/978- 1-4648-0163-1

UNHCR, 2017. South Sudan Situation - Regional Overview [WWW Document].

UNHCR Inf. Shar. Portal. URL http://data.unhcr.org/SouthSudan/regional.php (accessed 7.4.17).

UNICEF, 2016. Basic education and gender equality [WWW Document]. URL http://www.unicef.org/southsudan/education.html

UNICEF, 2015. UNICEF South Sudan Annual Report. Juba.

Vinogradova, E., 2014. South Sudan teacher education program (SSTEP). Early grade reading assessment report. Juba.

World Health Organization, 2012. World health statistics: A snapshot of global health. Geneva.

Tables

Table 1: Means of outcomes

	Pooled			Male			Female		
	Mean	Standard Deviation	Zero Score(%)	Mean	Standard Deviation	Zero Score(%)	Mean	Standard Deviation	Zero Score(%)
Panel A: EGRA Scores									
Letter recognition(Letters per minute)	8.25	16.48	68.80	9.82	17.27	64.34	7.15	15.82	71.93
Unfamiliar word pronunciation (Words per minute)	0.37	3.07	97.80	0.48	3.49	97.37	0.29	2.73	98.04
Reading fluency (words per minute)	0.66	6.70	98.67	0.95	8.83	98.48	0.45	4.67	98.81
Reading comprehension (% answered correctly)	0.82	8.43	98.84	1.05	9.63	98.59	0.66	7.49	99.02
Panel B: EGMA Scores									
Counting	57.24	29.47	0.62	60.79	29.23	0.30	54.77	29.38	0.84
Number identification (numbers per minute)	9.54	8.98	10.85	10.52	8.09	7.98	8.85	9.50	12.84
Number discrimination (maximum achievable score 10)	5.63	2.74	0.77	5.87	2.74	6.16	5.46	2.73	8.77
Identification of missing number (maximum achievable score 10)	2.68	2.34	1.99	2.86	2.35	17.68	2.55	2.32	21.40
Observations		*2415*			*990*			*1425*	

Notes: Table shows means of scores attained by students in the Early Grade Reading and Early Grade Mathematics Assessment tests. Columns (1) through (3) represent aggregated scores while Columns (4) through (9) distinguish between the genders of the respondents. The data is generated from 1st grade students attending BRAC schools in the Juba, Yei and Torit districts of South Sudan.

Table 2: Summary of control variables

Variables	Mean	Standard Deviation
Student Characteristics		
Age	8.99	1.71
Male (1/0)	0.41	0.49
Student attended pre-school(1/0)	0.40	0.49
Student has any additional books at home to read (1/0)	0.28	0.45
Student speaks the same language at home as they do at home (1/0)	0.14	0.35
Household Characteristics		
Either one of the parents can read/write (1/0)	0.68	0.47
Asset tertiles:		
First (1/0)	0.34	0.47
Second (1/0)	0.33	0.47
Third (1/0)	0.33	0.47
Location		
Juba	0.28	0.45
Yei	0.31	0.46
Torit	0.41	0.49
Observations	*2415*	

Notes: Table shows summary of individual and household level characteristics of respondents. Underlined categories are used as reference categories in the regression models. The data is generated from 1st grade students attending BRAC schools in the Juba, Yei and Torit districts of South Sudan.

Table 3: Factors affecting the likelihood of scoring any points

Variables	Letter identification [EGRA]		Number identification [EGMA]	
	Coefficient	Standard Error	Coefficient	Standard Error
	(1)	(2)	(3)	(4)
Student Characteristics				
Age (in years)	0.045***	0.01	-0.001	0.01
Male (1/0)	0.073***	0.02	0.006	0.01
Student attended pre-school(1/0)	0.047**	0.02	-0.003	0.01
Student has any additional books at home to read (1/0)	0.016	0.02	0.002	0.01
Student speaks the same language at home as they do at home (1/0)	0.026	0.04	0.000	0.01
Household Characteristics				
Either one of the parents can read/write (1/0)	-0.011	0.03	0.006	0.01
Asset tertiles:				
Second (1/0)	0.027	0.02	0.000	0.01
Third (1/0)	0.051**	0.02	0.041*	0.01
Location				
Juba	0.025	0.02	0.000	0.04
Yei	-0.077***	0.02	-0.001	0.24
Observations	*2415*			

*Notes: Table provides marginal effects from a logit specification, modelling the determinants of scoring more than zero while identifying letters and numbers per minute. The data is generated from 1st grade students attending BRAC schools in the Juba, Yei and Torit districts of South Sudan. * p<0.1; ** p<0.05; *** p<0.01.*

Table 4: Determinants of EGRA and EGMA scores

Variables Variables	Letter identification [EGRA]		Number identification [EGMA]	
	Coefficient	Standard Error	Coefficient	Standard Error
	(1)	(2)	(3)	(4)
Student Characteristics				
Age (in years)	0.065***	0.02	0.113***	0.01
Male (1/0)	0.139**	0.06	0.123***	0.03
Student attended pre-school(1/0)	0.085	0.06	0.069**	0.03
Student has any additional books at home to read (1/0)	0.006	0.07	0.103***	0.03
Student speaks the same language at home as they do at home (1/0)	0.071**	0.02	0.005	0.04
Household Characteristics				
Either one of the parents can read/write (1/0)	0.066	0.07	0.04	0.03
Asset tertiles:				
Second (1/0)	-0.074	0.08	-0.043	0.04
Third (1/0)	-0.014	0.07	0.048**	0.04
Location				
Juba	-0.126*	0.07	0.016	0.04
Yei	-0.262***	0.08	0.199***	0.04
Observations	*753*		*2400*	

*Notes: Table shows coefficients from OLS models assessing the determinants of points scored while identifying letters and numbers per minute. The sample is restricted to students who have scored greater than zero. The data is generated from 1st grade students attending BRAC schools in the Juba, Yei and Torit districts of South Sudan. * p<0.1; ** p<0.05; *** p<0.01.*

Supplementary Graphics

Figure 1: Distribution of scores from the first subset of EGRA and EGMA tests