RISE
RESEARCH ON IMPROVING SYSTEMS OF EDUCATION

WORKING PAPER
May 2017

More School or More Learning? Evidence from Learning Profiles from the Financial Inclusion Insights Data

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RISE-WP-17/012
May 2017

Oxford Policy Management
BLAVATNIK SCHOOL OF GOVERNMENT
UNIVERSITY OF OXFORD
Center for Global Development

Funded by:
UKaid from the British people
Australian Aid

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11 May 2017

Abstract: We use a unique set of nationally representative data of adults from ten developing countries and a unique measure of literacy - a direct assessment of reading - to examine the link between targets for schooling completion and goals for education. In six of the ten countries only about half or less younger adults (18 to 37) who completed primary schooling can read a few sentences without help. Our simulations show even had the Millennium Development Goal of universal primary schooling completion been achieved for these adults there was too little learning for this to produce the new SDG goal of universal literacy. For instance, in India since only 51 percent of primary school completers can read, even if the 23 percent who had not completed primary school had instead completed, almost a third of younger adults would still be unable to read. We also use the data to compare males and females and show that, although eliminating gender differences in schooling completed would produce improvements in girl's literacy, in many countries this would leave a third of women still unable to read. In nearly all countries steepening the learning profile (for all students) to the best-performing of the ten low- and lower-middle income countries would lead to greater gains for girls than achieving gender parity. Letting girls learn will require *both* eliminating gender gaps in access but also improving how much is learned while in school.

Introduction: From Schooling to Learning[1]

One of the eight Millennium Development Goals (MDGs) was the achievement of universal primary *education*. Yet the target reduced an *education* goal to a *schooling* target:

> *MDG Target 2.A: Ensure that, by 2015, children everywhere, boys and girls alike, will be able to complete a full course of primary schooling*.[2]

This elision from *education* goals to *schooling* targets is common, if not ubiquitous, in the modern global system[3]. Most global sources of internationally comparable data on education, particularly for developing countries, provide data exclusively on schooling and inputs into schooling[4]. Similarly, many countries maintain sophisticated information management systems (EMIS) but in many instances these cover almost exclusively data on enrollments and inputs and include no reference to any measure of learning[5]. This focus on schooling has led to massive expansions in schooling in nearly all countries around the world, such that nearly all children attend at least some school in the vast majority of countries and many countries have achieved universal primary schooling (or are near).

The assumption that would validate the elision of "schooling" with "education" is that something like the MDG's "full course of primary schooling" reliably yields a minimally adequate education. If schooling, nearly everywhere and always, provided the learning children need to acquire the skills, capabilities, competences, dispositions and values they need to thrive as adults then conflating education goals with schooling targets might be harmless and a focus exclusively on access and schooling attainment perhaps justified. Put another way, if the *learning profile,* the empirical relationship between schooling completed and levels of assessed skills or capabilities or learning outcomes, is strong (learning increases substantially with more schooling) and tight (learning increases for nearly all students) then schooling would be an adequate proxy for learning.

However, increasing evidence (see below) shows that in many developing countries the learning profile is neither strong—additional years of schooling are associated with very

[1] We would like to thank Deon Filmer for making this background work for the WDR 2018 possible. Also, we thank Justin Sandefur for early discussion and comments on the comparison with DHS results.

[2] http://www.un.org/millenniumgoals/education.shtml

[3] The sociologist John Meyers (Meyers et al 1977, Boli et al 1985, Meyers 1992) has argued that the massive and universal spread of government provided schooling is due, at least in part, to a global mindset in which providing *schooling* is integral to the very definition of a "modern" nation-state in the global system.

[4] Pritchett (2014) points out that in the UNESCO Institute for Statistics (UIS) data, the primary source of the UN for data on "education" there are hundreds of data series for each country and relatively complete and recent coverage for nearly all countries on schooling but very few on any direct measures of learning.

[5] Pritchett (2014) reports that in the information "report card" on education in the Indian state of Tamil Nadu there were 817 different indicators reported—not one of which was any direct measure of learning.

small learning gains—nor tight—students progress at very different rates and have very different learning even at the same grade or level of schooling.

This paper utilizes new datasets to examine the learning profiles of ten developing countries in Africa and Asia, and explore how strong, and tight, the learning profiles are across these countries. The data also allows comparisons of learning profiles for boys and girls to identify gender differences. The surveys cover a nationally representative cohort of adults in each country, and include self-reported education attainment and enumerator-assessed literacy.

The learning profiles show that in six of the ten countries, half or less of the cohort of 18 to 37-year-olds who completed primary school can read, and in three countries less than a third of primacy school completers can read. Schooling is not reliably producing even modest levels of learning.

Literacy among primary completers also varies widely between countries: in Nigeria only 19 percent of primary completers can read, while in Tanzania, 80 percent can. Thus, a common schooling goal across countries will indicate very little about the level of learning that will be achieved.

The data also allows us to decompose the hypothetical gains in literacy from two alternative scenarios. One is achieving the MDG of universal completion of primary schooling. The other is an improvement that steepens the learning profile of a low performing country to that of a higher performing country in our sample. Most countries would experience massive gains in literacy from steepening the learning profile. Uganda for example adds 35 percentage points to adult literacy by shifting its learning profile. In the majority of countries, the gains from steepening the learning profile exceed that of expanding enrollment to achieve universal primary completion.

Looking at differences by gender, we find that achieving gender parity on enrollment or learning leads to only small gains for girls in most countries, but that shifting the learning profiles for all students to those of the highest performing country among the ten datasets (Indonesia) yields the largest gains of all scenarios analyzed.

I) Financial Inclusion Insights (FII) Data for Calculating Learning Profiles

The Financial Inclusion Insights (FII) surveys are nationally representative surveys in ten low- and lower-middle-income countries per World Bank classifications. The countries covered include Bangladesh, Ghana, India, Indonesia, Kenya, Nigeria, Pakistan, Rwanda, Tanzania, and Uganda.[6] The surveys are supported by the Bill & Melinda Gates Foundation and the Consultative Group to Assist the Poor (CGAP), a think tank housed within the World Bank. In seven of the ten countries, the surveys have been running annually since 2013; in Indonesia, they have run annually since

[6] Samples sizes range from N=2,000 to N=6,000 in all countries except India, where the sample size is N=45,000

2014; and in Ghana and Rwanda, the surveys began in 2015.[7] For each country we use the 2015 data.

The objective of the surveys is to measure the uptake and use of financial products and services among the adult population in each country. In addition to these core subjects, the surveys cover a range of questions including respondent demographics, education attainment, employment (both status and type), household vulnerability, and a literacy test.

We use these surveys to extend the very small literature that uses adult data to estimate learning profiles. To date there have been two different ways of assessing student learning. Most assessments of student learning, both national and internationally comparable (e.g., PISA, TIMSS, SACMEC, PACMEC, etc.) assess all students in a given grade or of a given age, based on representative samples of in-school students. In this type of assessment, the learning profile has to be inferred—that is, each child's score is the result of their cumulative learning and hence the assessment is an age or grade snapshot of a given point of the learning profile.

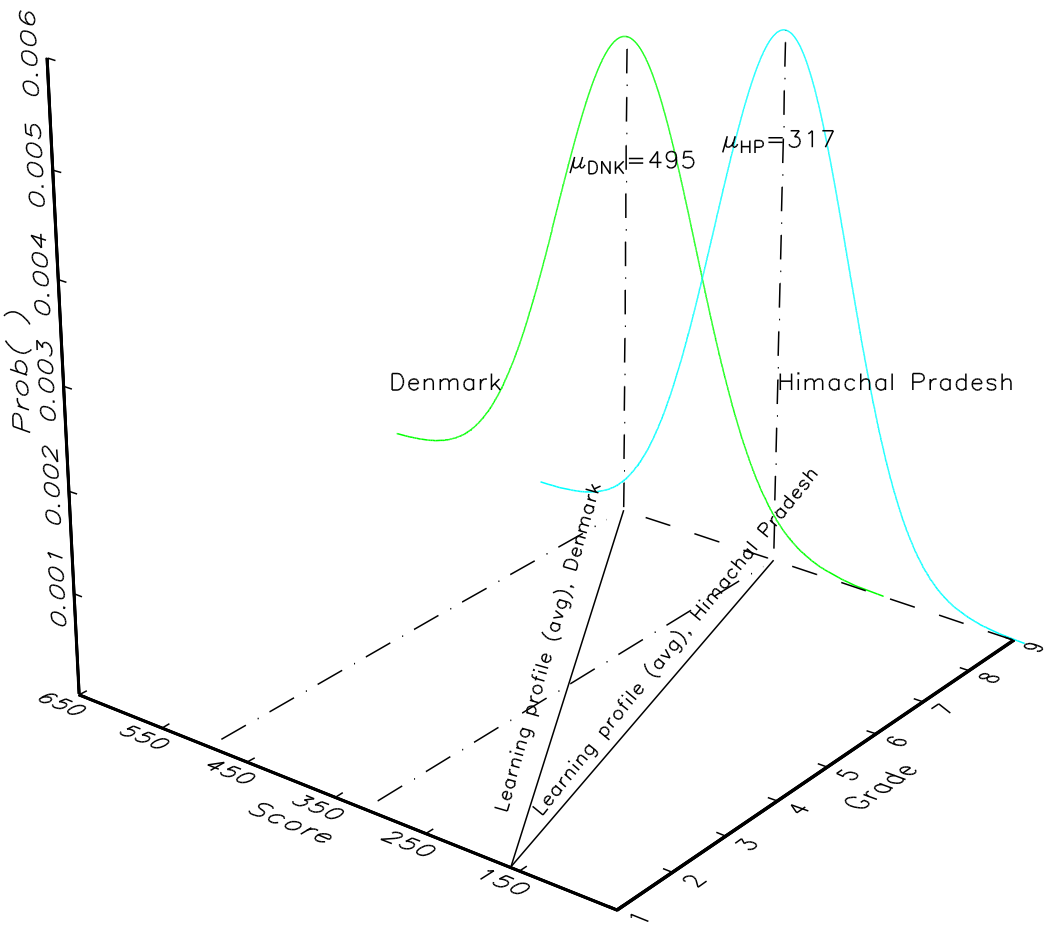
More recently the organization Pratham via ASER has pioneered the use of a single assessment instrument for all children in a broad age range based on household (not in-school) sampling and visits (Banerji, Bhattacharya and Wadwa 2013). This allows the empirical learning profile to be estimated directly by comparing the assessed skills/capabilities of children at various ages and grades, including those in and out of school.

Figure 1 illustrates the first assessment type, using the 2009 PISA reading scores for Denmark and the Indian state of Himachal Pradesh. The average PISA reading score in Denmark was 495 while in Himachal Pradesh it as 317, with a distribution of performance across youth. Assuming (for exposition) children started with the same level of reading ability, it must be the case that a learning profile across grades for each child led to the distribution of results observed at Grade 9[8]. However, assessments at a point in time (age or grade) don't reveal anything about the actual shape of the learning profile. In the graph, we assume it is linear but it could be curvi-linear (e.g. rapid progress in early years which tapers off, slow progress in early years that accelerates). The ASER results are able to go a step further to show the actual learning profile for Himachal Pradesh, as it assesses ability to read and do arithmetic for children at all ages from 6 to 14 years. ASER thus can show the shape of the learning profile for children currently of school age.

[7] More information on the surveys can be found here: http://finclusion.org/

[8] For exposition, we are being slightly inaccurate as the PISA usually samples children of age 15, whatever grade they are in, not children in grade 9.

Figure 1: The learning profile is the dynamic path of learning for each child that leads to the observed distribution of assessed skills at any point of time



Source: Author's graph using data from PISA for Denmark and PISA Plus for Himachal Pradesh

The FII data on adults represents a third option for assessing learning profiles, allowing us to estimate retrospective learning profiles for adults of varying levels of schooling completion. This approach has both advantages and disadvantages compared to the two standard approaches.

One advantage is that most assessments of learning are school based, such as PISA, and hence assess not the learning of a cohort (say, all 15-year-olds) but only that fraction of the cohort that is in school. In the 2015 PISA results, for instance, only 68 percent of 15-year-olds were included, so the PISA estimate does not accurately assess learning of all 15-year-olds, only those currently enrolled (Filmer et al., 2006).

A second advantage is adult data can estimate a descriptive learning profile across grades or levels of schooling completed, and therefore can show the shape of the

learning profile whereas most assessments of students only provide a snapshot of one point on the learning profile (as Figure 1 illustrates with PISA results). That is, if we want to know how much more a person knows or can do having completed secondary versus primary school we cannot recover that from merely testing secondary students or primary students.

A third advantage is that the FII measures literacy among adults. This is arguably better than child literacy levels (as assessed by ASER-like instruments) as it shows the literacy that adults have retained and can use in the workforce, in the home, and in society. Skills acquired but inadequately mastered and not retained are arguably less important than retained skills.

There are two disadvantages of the FII data for this purpose. One, the data has to cover a broad age range of adults in order to have sufficient sample size. We focus on the cohort of young adults aged 18 to 37. While the surveys include respondents aged 15 and above, the youngest ages have not yet had the opportunity to complete secondary school and so are not included in the analysis. The upper bound of age 37 was selected to ensure adequate sample sizes, including when the data is split by gender.[9] This means we are estimating a learning profile averaged over a fairly long period in the past.

The second limitation is that there is only one question that assesses reading, to which we turn, so the assessment is very crude and only covers one topic[10].

We stress that all three of the methods: in school assessments, in home assessments of youth, and the new use of adult assessment (here and in Pritchett and Sandefur, 2017) show very similar results. The international assessments show (for the participating countries) that many developing country students are, at the ages and grades assessed, far behind the OECD and leading East Asian countries. Also, when researchers are able to examine grade attainment and learning profiles jointly they show that deficits from learning are often not primarily driven by deficits from enrollment and grade attainment (Spaull and Taylor 2015 in Africa using SACMEC, Asadullah and Chaudhry 2013 in Bangladesh, and various ASER and UWEZO assessments).

I.A) Schooling and literacy data

To measure schooling, the FII surveys ask respondents for their highest level of education, and enumerators record responses in terms of level of schooling completed.

[9] While this cohort represents the most recent to have completed school, they are reflective of the school system from some years ago. For example, an 18-year-old who began primary school at age 5 would have started school in 2003, while a 37-year-old would have started school in 1984. This lag is unavoidable when analyzing outcomes of adults who have completed schooling.

[10] The survey instrument also included some questions on numeracy but they were structured to be extraordinarily easy. One question (in the Kenyan wave 3 instrument) was "If you have 1000 shillings and someone gives you 200 shillings how much do you have?" This doesn't really even probe ability to do multi-digit addition with carry. Another question asked if you deposited money with interest would you later have more money (not how much more, just more).

For example, answer options include, “no formal education,” “primary education not complete,” “primary education complete,” etc. Because schooling levels are recorded, rather than specific grades, a shift from one level to the next does not have a constant meaning across households or countries: shifting from “no formal education” to “primary education not complete” could indicate completion of anywhere from one to five grade levels if primary school is considered complete at Grade 6. Moreover, across countries the number of years in “primary schooling” differs.

The surveys give many possible options for post-secondary school, including vocational school, college/university, and post-graduate university. These each represent very small proportions of the populations under analysis, and thus we have grouped them into a single “some or completed tertiary school” for our analysis.

Finally, some countries’ surveys included additional answers that do not follow the same format. Some surveys included “Koranic school” as an answer option, despite this being a type of school, rather than a completion level. And all surveys recorded if respondents reported something “other” than the provided answer options, or refused to answer. In addition, some surveys included a secondary/vocational school answer option that did not delineate whether the level was a substitute for regular secondary school, or served as post-secondary education. All respondents answering “Koranic” or “other” or an unspecified vocational level were dropped from all country samples. In all surveys except Nigeria, less than five percent total gave any of these answer options; in Nigeria 8.8 percent gave these answers, mostly due to higher use of Koranic schooling.

To measure literacy, the surveys administer a unique test. At the end of each questionnaire, respondents are asked if they will consent, or not, to the use of photographs taken by the enumerators in research materials[11]. For the literacy test, respondents are asked to read the three-sentence consent form, and enumerators assess their reading ability against four categories: (4) read the informed consent form fluently without help; (3) well but had a little help; (2) struggled and had a lot of help; or (1) unable to read and asked interviewer to read. We define a respondent as “literate” if they were classified in the top two of these four categories, indicating the ability to read a few simple sentences, perhaps with a little help. We define a respondent as illiterate if they required a lot of help, indicating they lack functional literacy, and if they were unable to read at all.

While a relatively low-bar for literacy (the categories do not imply any level of understanding of the text, and there is no test for ability to write), this targets practical literacy to be used in everyday life, as expounded in international literacy definitions. For example, the OECD defines literacy as “understanding, evaluating, using and engaging with written texts to participate in society, to achieve one’s goals, and to

[11] The exact text (English translation) from the Kenyan survey instrument is: “We would like to take some photographs of you and your household. We will include some of the photographs in our reports. We might also publish some of them online on our website.”

develop one's knowledge potential" (PIAAC, 2009). The FII's use of a practical literacy test achieves the aim of testing literacy that is a means for participating in society. As another example, UNESCO defines literacy as the "ability to read and write with understanding a simple statement related to one's daily life. It involves a continuum of reading and writing skills, and often includes basic arithmetic skills."[12] The FII measure is a low-bar under this definition, as it leaves out the writing and understanding elements, as well as the optional numeracy.

It is difficult to compare how stringent different definitions of literacy are, but we do have two points of rough comparison. First, Indonesia participated in the PIAAC (Programme for the International Assessment of Adult Competencies) survey of adult literacy—but only for the city of Jakarta, which one might assume has better than average literacy. In the PIAAC assessment 56.6 percent of adults 25 to 65 with "less than upper secondary complete" were classified as "Below level 1" in literacy proficiency. In contrast in our estimates only 18 percent of those with less than secondary school complete were not literate by the FII standard. Therefore, many of those classified by our method as "literate" are in the 56 percent who are "below only level 1" in literacy proficiency by the OECD PIAAC standards. So, our standard is well below the lowest level of literacy defined in PIAAC.

Another very recent paper uses DHS data in which (only) women are asked to read a single simple sentence like "Farming is hard work" and the standard was being able to read all of the sentence (Pritchett and Sandefur 2017). Comparing women who completed primary school from the FII surveys to women who completed grade 6 from the DHS of similar age ranges shows strikingly close results, on average. The average literacy level is 50 percent for the DHS and 49 percent for the FII. Some countries are substantially different (e.g. the DHS suggest very low literacy in Ghana while the FII show Ghana as about average; the DHS suggests very high literacy in Rwanda whereas the FII is high, but lower) the correlation across the two sources is .82.

[12] http://glossary.uis.unesco.org/glossary/en/term/2090/en

Table 1: Assessed ability of women with just primary education to read a simple sentence or passage is similar between the DHS and FII data		
Country	DHS, women 25-34, highest grade was 6th, percent able to read all of a sentence	FII survey, women aged 18-37, completed primary, able to read a three-sentence passage
Nigeria	12.0%	15.4%
Uganda	54.4%	23.2%
Bangladesh	32.6%	29.5%
Pakistan	50.7%	44.2%
India	34.6%	49.0%
Kenya	65.3%	69.7%
Indonesia	75.2%	76.7%
Tanzania	86.2%	82.5%
Ghana	7.7%	47.9%
Rwanda	97.1%	77.7%
Average	51.4%	48.8%

Source: Pritchett and Sandefur (2017), and authors' calculations with FII data.

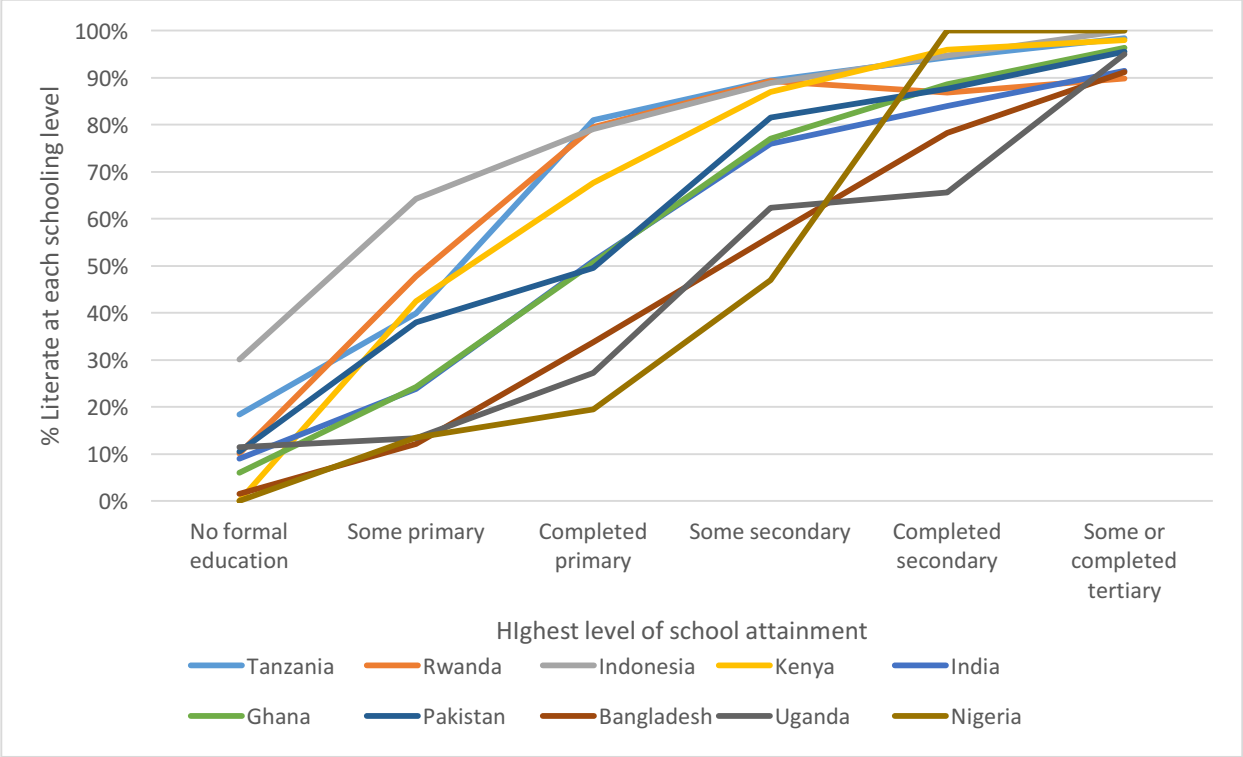
I.B) Learning profiles from the FII data

Using the FII data, we calculate learning profiles showing the average level of learning, in our case defined as literacy, for a given level of schooling. The learning profiles are descriptive, not attempting to draw causal conclusions about other factors or characteristics that drive the learning outcomes. Rather they show a simple illustration of the typical learning level of an adult who completed a certain level of schooling, thus showing the shape of the learning profile (Pritchett, 2013).

The learning profiles for the ten FII countries are shown in Figure 2. A steeper line indicates greater literacy gains across a given level of schooling while a flatter line indicates smaller literacy gains.

The first obvious fact from these learning profiles from the FII data is the variation across countries for individuals with the same reported level of schooling. Only 19 percent of adults who completed primary school in Nigeria and 27 percent in Uganda can read versus 81 percent in Tanzania or 79 percent in Indonesia. Pakistan, Ghana and India are in the middle with only about half of those who completed primary being able to read.

Figure 2: Learning is highly varied across countries and in six of the ten countries only half or less of primary completers can read



Source: Authors' calculations with the FII data.

Figure 2 also illustrates how flat some countries' learning profiles are, particularly in the early grades, and how quickly differences in learning emerge. In Kenya and Rwanda over 40 percent of those who dropped out of primary school before completion still retained some literacy into adulthood. In contrast, in Nigeria, Bangladesh and Uganda only about 13 percent of those who attended primary school but dropped out retained the ability to read. Of the ten countries, six have literacy levels among primary completers of 51 percent or below, meaning about half or more students leave primary school without functional literacy.

Table 2: Literacy at the same reported level of schooling completed varies widely across the ten FII countries, with only half of all primary school completers able to read

Country	No formal education	Some primary	Completed primary (sorted)	Some secondary	Completed secondary	Some or completed tertiary
Tanzania	18%	40%	81.1%	89%	94%	98%
Rwanda	10%	48%	80%	89%	87%	90%
Indonesia	30%[1]	64%	79.1%	89%	95%	100%
Kenya	0%	43%	67.6%	87%	96%	98%
India	9%	24%	51.1%	76%	84%	91%
Ghana	6%	24%	51%	77%	89%	96%
Pakistan	10%	38%	49.6%	82%	88%	96%
Bangladesh	1%	12%	33.9%	56%	78%	91%
Uganda	11%	13%	27.2%	62%	66%	95%
Nigeria	0%	13%	19.5%	47%	100%	100%
Unweighted median	10%	31%	51%	79%	88%	96%

1) There are only 29 individuals with "no formal education" in the Indonesia sample.

Source: Authors' calculations with FII data. "Literacy" is defined as the being able to read a three-sentence passage either "fluently without help" or "well but with a little help."

At higher levels of attainment, like secondary and tertiary, it becomes increasingly difficult to interpret the *descriptive* learning profile as a *causal* learning profile as the potential and actual role of learning-selective drop-out becomes more difficult. That is, if 100 percent of students progress from Grade 4 to Grade 5 then comparing learning of those two groups likely represents what, on average, was learned by being in 5th Grade[13]. However, if say the lowest 10 percent of learning performers drop out between Grade 4 and Grade 5 or if there is grade repetition and the lowest 10 percent of learners are not allowed to progress then the *descriptive* learning profile will show those with 5th Grade complete as more likely to read than those with only Grade 4 complete even if no child learned anything in Grade 5. This is important as it means that the *descriptive* learning profile almost certainly *overstates* the degree of learning gained from level to level. The degree to which this occurs will vary from country to country and depends on the policies on automatic promotion, the extent to which there are early examinations (e.g. primary school leavers examinations), and the extent to which voluntary drop-out is learning selective.

[13] Or at least "while" in 5th Grade as there may be learning that just comes with age.

These considerations make it all the more striking how flat the descriptive learning profiles are, even up until "some secondary" and "secondary complete." For instance, in Uganda only two thirds of adults who reported having *completed* secondary school could read and in Bangladesh only 80 percent.

These simple calculations of the descriptive learning profile show that a global goal of "completing primary school" does not convey the same extent of learning, even of mastering the very basics of reading, across countries. The same is true within countries as knowing a person completed primary school does not reliably predict whether they can read or not—in the typical country it is 50-50 that a primary school completer can read. The assumption of a strong and tight relationship between "schooling" and "learning" is just not supported by the data.

II) How much learning would be gained from achieving universal primary completion?

The variation in learning outcomes across countries, combined with the shallow learning profiles of many countries shows that achieving an exclusively schooling based goal, like MDG, would not yield consistent achievement of learning goals. But how much would be gained by increasing enrollment? To answer this question, we do a simple set of calculations to show how much learning would be gained, at observed learning profiles, by increasing enrollment to universal primary completion (UPC) on the (generous) assumption that the descriptive learning profile portrays causal learning gains.

The arithmetic behind this calculation is simple[14]. The actual literacy is just the schooling level attainment weighted sum of the likelihood an adult at each level of schooling is literate (equation 1).

$$1)\ Literacy = \sum_{g=0}^{5} \alpha_g * s_g$$

Where α_g is the share of adults 18 to 37 with level g as their highest level attained (and no schooling is 0) and s_g is the share of adults with highest schooling attainment of g who can read.

The arithmetic of the counter-factual of universal primary completion at a fixed learning profile is easy; assume that all adults with attainment less than primary (which in our notation is level 2) had the literacy levels of those with level 2.

$$2)\ Hypothetical\ \square iteracy = \sum_{g=0}^{1} \alpha_g * s_2 + \sum_{g=2}^{5} \alpha_g * s_g$$

[14] This section draws on Pritchett and Sandefur (2017).

The gain in literacy from UPC is the share in the lowest two schooling attainment categories (no school or primary incomplete) interacted with the gain in literacy from moving from those to primary complete.

$$3)\ Literacy\ gain = \sum_{g=0}^{1} \alpha_g * (s_2 - s_g)$$

Equation 3 is simple and intuitive. The gain in literacy from the counter-factual of all adults having completed primary is bigger: (a) the larger the share of adults who did not complete grade 6 (if all adults had completed primary then there would be no gain at all), and (b) the steeper the learning profile at the early years up to primary and hence the larger the gap in literacy between adults who completed primary and those who completed less schooling (if the learning profile were completely flat then there would be no gain at all).

Table 3 shows the results of the simulation of the gains from reaching UPC at existing learning profiles. On average, the gains are quite modest. Achieving the MDG for this cohort of adults would have only increased literacy in these 10 countries by an average of 8 percentage points, from 65 to 73 percent of the cohort.

Table 3: Reaching universal primary completion at existing learning profiles produces small gains towards reaching universal literacy—on average only 8 percentage point increase in literacy, leaving 25 percent unable to read

	Data on cohort of men and women, ages 18 – 37, from FII data		Calculated scenario: all who did not complete primary school are shifted to primary completion at observed literacy level	
Country	Total literacy at current levels (sorted)	% of cohort who did not complete primary school	Total literacy if universal primary completion	Gain from this shift
Uganda	40.5%	39.6%	46.1%	5.6%
Bangladesh	46.5%	30.1%	54.7%	8.3%
India	57.8%	23.5%	67.2%	9.4%
Pakistan	60.2%	31.4%	70.4%	10.1%
Rwanda	62.7%	45.8%	81.9%	19.2%
Ghana	65.6%	17.3%	71.7%	6.1%
Kenya	72.3%	23.7%	81.2%	9.0%
Nigeria	76.7%	8.2%	78.0%	1.3%
Tanzania	77.5%	14.1%	85.1%	7.5%
Indonesia	88.1%	5.4%	89.3%	1.2%
Mean	64.8%	23.9%	72.6%	7.8%
Median	64.2%	23.6%	74.8%	7.9%

Source: Authors' calculations with FII data.

There are two distinct sources of the low gains from achieving UPC.

One set of countries has a substantial proportion of the population with less than primary school but a shallow learning profile. In Bangladesh, for instance, 30 percent of the adult population completed no schooling or less than primary school. But, among those with primary school complete only a third could read. So even if none of the 30 percent could read initially, moving those 30 percent to primary completion would only produce a gain of .30*.33=10 percent. Pushing more students along a shallow profile is not sufficient to make literacy universal.

Another set of countries have small gains from the UPC counter-factual because there were few adults with less than primary complete. While Indonesia has a steep learning profile, with 80 percent of primary completers literate, only 5 percent of the population

had completed less than primary school so the gains in literacy were only 1.2 percentage points (from an already high level).

Rwanda would have gained the most from UPC: it had both a large portion who have not yet completed primary school (46 percent), and a steep learning profile in the early years of schooling. Fully 80 percent of primary school completers are literate, so the gains from this shift are substantial. It is also the outlier; its gains from shifting to UPC (19 percentage points) are nearly double the next closest country (Pakistan, at 10 percentage points). No other country would gain nearly as much from having achieved UPC.

These calculations are optimistic estimates of the achievable gains from UPC for two reasons. First, we assume that the descriptive learning profile represents *at the margin* a causal learning profile whereas, as described above, there are good reasons to believe it overstates true learning gains of advancing the children who otherwise would have dropped out, due to the selectivity effects. Second, this assumes that the descriptive learning profile could have been maintained even with large increases in the number of students. If teaching capacity and infrastructure, for instance, were not adjusted to the higher enrollments that UPC would involve then the learning profile might deteriorate[15].

III) Would more learning be gained from steepening the learning profile than achieving UPC?

We explore an alternative counterfactual: What if enrollment of the cohort of 18 to 37-year-olds stayed at current observed levels but the learning profile changed? We choose Indonesia's learning profile as the counter-factual for two reasons: it is the best among these countries but at the same time it is, by international standards, modest and hence achievable for lower income countries.

At 88 percent, Indonesia has the highest literacy rate among the cohort we analyze in the ten FII countries. In Figure 2 Indonesia's learning profile is on-par or above most other countries at every schooling level. But, while the best among this set of countries, Indonesia's learning performance is quite modest by international standards. Indonesia has participated in a number of international assessments that assess secondary school students, such as the PISA and TIMMS. The PISA, for instance, is normed so that the average OECD student is 500 and the standard deviation across OECD students is 100. On this scale in 2003 (which is relevant for our backward-looking assessment of adults) Indonesia's PISA reading score was 382, the second lowest of all participating countries in that year.

In addition, as discussed above, just Jakarta participated in the PIAAC assessment, and literacy among adults who had completed secondary school was well below the OECD

[15] Bold et al (2013) for instance show that the move to zero fees in primary school in Kenya led to parental perceptions of declining quality.

average. On the PIAAC scale adult Jakartans with complete secondary scored 205, which was well behind the OECD average of 264 for those with secondary complete and even well behind the OECD average of those with *less* than secondary complete of 231.

Moreover, in recent PISA evaluations in 2012, and the recently released 2015 results, Vietnam has shown reading results at or near OECD levels. Vietnam's 2015 PISA reading score was 487, well ahead of Indonesia's of 397. Hence, Indonesia's levels of learning are neither far-fetched for a low-income country nor a particularly ambitious standard to reach.

To see how literacy would change if other countries maintained their own schooling attainment levels but had Indonesia's learning profile, the calculation is again arithmetically simple. We take the proportion of adults who completed each level of schooling and multiply by the literacy level of Indonesians who completed that level of schooling[16]. This gives the contribution to overall literacy of this group, given the Indonesian learning profile.

$$4)\ Hypothetical\ Literacy\ at\ IDN\ profile = \sum_{g=0}^{5} \alpha_g^i * s_g^{Indonesia}$$

Changes will again be driven by two primary factors: the proportion of the cohort who completed each level of schooling, and the difference between the country's own learning profile and Indonesia's learning profile. The greater the difference between a country's learning profile and Indonesia's the bigger the gain.

$$5)\ Literacy\ gain\ at\ IDN\ profile = \sum_{g=0}^{5} \alpha_g^i * (s_g^{Indonesia} - s_g^i)$$

Table 4 shows that for countries with a shallow learning profiles (Uganda, Bangladesh, India, Pakistan, Nigeria) the gains from reaching Indonesia's learning profile are massive--several fold larger than achieving UPC. For instance, Uganda's current literacy is only 40.5 percent. Moving to Indonesia's learning profile, while keeping the same level of schooling attainment, would raise literacy to 75.2 percent; 35 percentage points more of the adult population would be literate. This is 6.1 times larger than the hypothetical gain from UPC. In Bangladesh, the gains from a steeper learning profile are three times larger than achieving UPC. These countries gain little from increasing schooling at current learning levels, but could achieve massive gains from steepening their learning profile.

[16] We assume that those with "no schooling" are unchanged by the shift in learning profile, since they would not be affected by the school system. Thus, the high proportion of literate among Indonesians with "no schooling" (with only 29 observations) has no impact on the calculations.

In other countries, the gains are smaller. As we saw above, Rwanda has a steep learning profile and large numbers with less than primary complete. Therefore, the gains from increasing the learning profile are substantial (a 6.5 percentage point gain in literacy) but only a third as large as from reaching UPC.

On average, the gains from a steeper learning profile are typically (mean) two and a half times as large as those from achieving UPC. India is the median country in terms of relative gains and would gain 14.3 percentage points from a steeper learning profile versus 9.4 from UPC.

Obviously, achieving the SDG of universal literacy for youth will require both more schooling and more learning per year of schooling.

Table 4: The average gain from shifting learning profiles is more than double that from shifting to UPC

	Data on cohort of adults ages 18 – 37 from FII data	Calculated scenario: all have Indonesia's learning profile at observed schooling levels		Comparing gains from learning profile shift to Indonesia's versus gains from UPC	
	I Total literacy at current levels (sorted)	II Total literacy at Indonesian learning levels	III Gain from shifting learning profile	IV Gain from UPC (from table 3)	V Ratio of gain from improved learning to schooling expansion to UPC (col III/ col IV)
Uganda	40.5%	75.15%	34.67%	5.64%	6.1
Bangladesh	46.5%	72.34%	25.87%	8.28%	3.1
India	57.8%	72.15%	14.31%	9.36%	1.5
Pakistan	60.2%	70.13%	9.89%	10.13%	1.0
Rwanda	62.7%	69.23%	6.49%	19.21%	0.3
Ghana	65.6%	80.51%	14.91%	6.08%	2.5
Kenya	72.3%	79.00%	6.71%	8.96%	0.7
Nigeria	76.7%	87.24%	10.54%	1.31%	8.1
Tanzania	77.5%	78.03%	0.49%	7.51%	0.1
Mean	64.8%	75.97%	13.76%	8.50%	2.6
Median	64.2%	75.15%	10.54%	8.28%	1.5

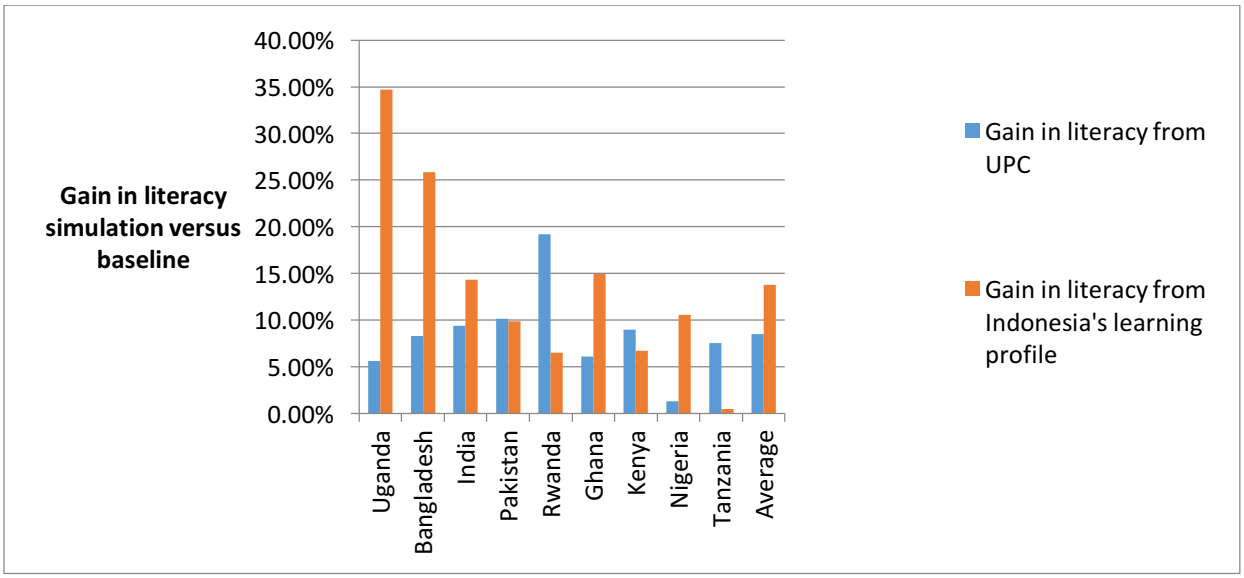
Source: Authors' calculations with FII data.

Rwanda and Ghana offer an instructive contrast. Both countries have similar literacy levels among the cohort of 18 to 37-year-olds, at 63 percent for Rwanda and 66 percent

for Ghana. Yet their schooling levels and learning profiles are very different. Literacy among primary school completers in Rwanda is 80 percent, while in Ghana it is only 51 percent. Levels of primary school completion differ as well: in Rwanda 46 percent of the cohort did not complete primary school, while in Ghana the figure is only 17 percent. Therefore, while Rwanda has the steeper learning profile it also has much lower primary completion, and Ghana has a shallower learning profile but much higher completion. The result is that Rwanda has much to gain from increasing enrollment along its existing, relatively steep learning profile, as columns IV and V indicate. Ghana, on the other hand, would gain more from steepening its learning profile, as columns III and V show.

Figures 3a and 3b summarize the results. Figure 3a compares the percentage point gains to literacy from the simulations of either achieving UPC or of achieving Indonesia's learning profile. In the countries where the learning profile is weak (e.g. countries where the literacy of primary school completers was 51 percent or less: Uganda, Bangladesh, India, Ghana and Nigeria) the gain from a steeper learning profile is much larger than achieving UPC. In the countries that already achieve relatively high literacy through schooling, the gains were larger for achieving UPC. Rwanda in particular was a country with a steep learning profile but with a substantial deficit from UPC (46 percent of the adult population in 2015 had not completed primary) and hence the gains to UPC were much larger.

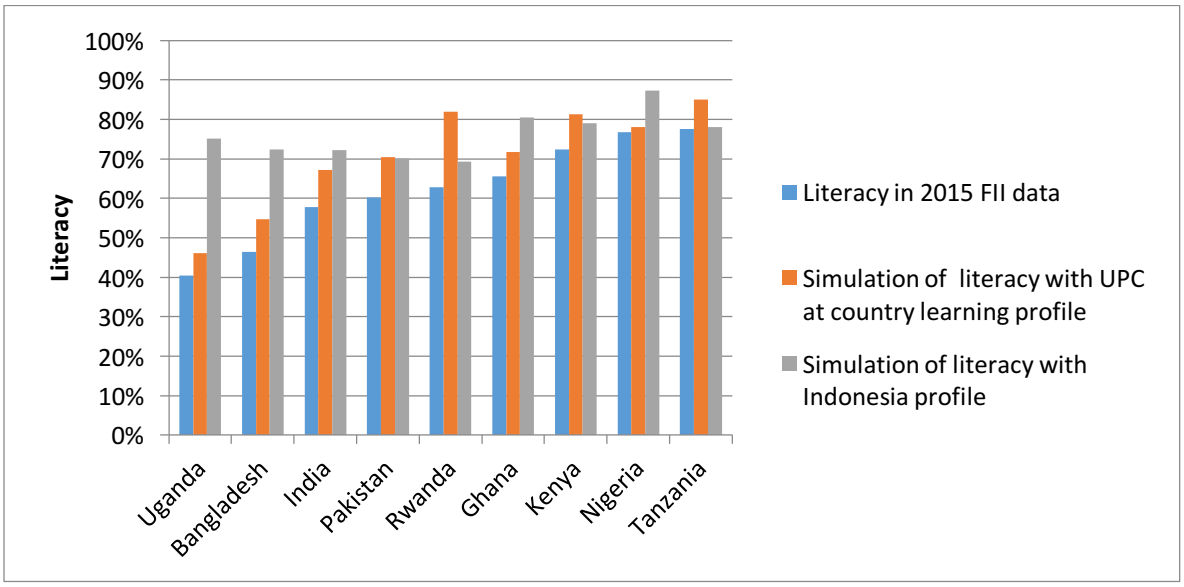
Figure 3a: The gains in literacy are typically much larger from achieving a steeper learning profile than from achieving UPC, especially in countries with a weak learning profile (Uganda, Bangladesh, India, Ghana, Nigeria)



Source: Authors' calculations with FII data

Figure 3b shows three levels of literacy: actual, that achieved with UPC and that achieved with a steeper learning profile (Indonesia's). Five countries (Uganda, Bangladesh, India, Pakistan and Ghana) would have had more than a quarter of their population illiterate even if UPC had been achieved at their existing learning profile. Obviously to reach a goal of universal literacy requires *both* more schooling and more learning per year in school.

Figure 3b: Even if countries achieve UPC they will fall far short of universal literacy, particularly for weak learning profile countries



Source: Authors' calculations with FII data

IV) How do males and females fare differently from a focus on schooling vs. learning?

The main DHS surveys only women and hence the learning profiles in Pritchett and Sandefur (2017) could not compare men's versus women's outcomes and examine the gender gaps in attainment and learning. The FII data, on the other hand, allow such comparisons. This is particularly useful given the SDG for education emphasizes gender explicitly, with a target to:

> *SDG 4.5 By 2030, eliminate gender disparities in education and ensure equal access to all levels of education and vocational training for the vulnerable…*

The previous sections showed that achieving a schooling target, such as UPC (the MDG), does not guarantee a learning outcome, such as literacy. Here, we examine how these findings differ by gender. For example, how would female literacy be affected by a goal of gender parity on enrollment? Alternatively, how would female literacy be affected if female enrollment stayed at current levels, but the female learning profile was brought in line with the male learning profile?

For this analysis, we utilize four counter-factuals. Two are the same as those analyzed in Sections 2 and 3, except we now analyze males and females separately. We calculate the effect on literacy if schooling shifts to UPC (and learning profiles stay constant), differentiating by gender, and we calculate the effect on literacy if each country's learning profile shifts to Indonesia's, the highest performer of the ten FII countries (and schooling attainment rates stay constant), differentiating by gender. To these, we add two additional counter-factuals. We examine what happens to female

literacy if girls had the same enrollment rates as boys within the same country (keeping female learning profiles constant), and what happens to female literacy if girls had the same learning profile as boys, within the same country (keeping female attainment rates constant).

Before calculating the counter-factuals, we look briefly at existing gender literacy gaps in Table 5. In all countries except Indonesia literacy is higher among males than females. (In Indonesia, the female literacy rate is 0.4 percentage points higher than males.) The median gender literacy gap is 11 percentage points, and Uganda has the highest gap at 17.6 percentage points. Thus, to achieve a learning goal, such as universal literacy, females have further to go than males in most countries.

IV.A) Gender differences in literacy gains from achieving UPC

We calculate the first counter factual by hypothetically shifting schooling attainment to UPC, so that everyone who completed less than primary is shifted to "primary completed" at observed literacy levels, and compare the effect this shift has on female versus male literacy levels. The calculations are the same as those in Section 2, now differentiated by gender.

As shown in Table 5, shifting to UPC increases literacy for both genders in all countries, but in many countries, female literacy is still very low. For females in Uganda, literacy rises to just 39 percent, and in Bangladesh female literacy is only 50 percent even *after* achieving UPC.

The differences between female gains in literacy and male gains in literacy vary, but in most cases the differences are relatively small. In Rwanda, Tanzania, and India, girls gain about 5 to 6 percentage points more than boys from increasing enrollment to UPC. In Kenya, Uganda, Pakistan, Ghana and Nigeria the results are even smaller, averaging just two percentage points more for girls than boys.

In many countries, these differences are particularly small compared with the gap in female and male literacy. In Ghana, for example, observed female literacy trails male literacy by 14 percentage points (59 percent vs. 67 percent). Achieving UPC would only reduce this gap by 1 percentage point, to 13. Other countries fare better; in Tanzania, with its steep learning profile for both genders and larger percentage of girls (than boys) who did not complete primary school, the shift to UPC would shrink the gender gap by 5 percentage points (with the result being 1 percentage point higher literacy for females than males). Tanzania is the exception rather than the rule however. In most countries, achieving UPC makes only small inroads on achieving gender parity for literacy.

IV.B) Female literacy gains from gender parity on schooling attainment

What if, rather than hypothetically shifting to UPC for both genders, we instead shift female schooling attainment to parity with male attainment levels. In other words, we calculate female literacy as though females completed primary school, completed secondary school, and attended tertiary at the same levels as males (keeping the

female learning profile at currently observed levels). That is, we eliminate entirely the gender gap in schooling attainment but not the gap in learning conditional on attainment.

The results in column V of Table 5 show that in all countries, female literacy increases if enrollment is brought in line with male enrollment levels. This indicates that alleviating the female schooling attainment gap (at all schooling levels) would lead to some literacy improvements. However, even at male grade attainment levels, female literacy is still very low in many countries. Uganda, again, fares poorest will female literacy of just 41 percent even after equalizing completion rates. Average female literacy under this counter-factual is 67 percent, just 7 percentage points higher than what is currently observed in the data.

In most countries, female literacy increases by a *smaller* amount with gender equality than with achieving UPC. Comparing columns IV and VI in Table 5 we see, for example, that literacy in Kenya increases by 6.6 percentage points when females achieve male enrollment levels, but by 10.4 percentage points when females achieve UPC. On average, achieving parity for enrollment levels increases female literacy by 6.7 percentage points, while achieving UPC increases female literacy by 8.7 percentage points.

Table 5: Gender differences when shifting schooling attainment versus learning profiles

Country		Data on cohort adults ages 18 – 37 from FII data		Increasing schooling attainment			
				To primary completion (UPC)		To gender parity	
		I. Total literacy at current levels	II. % who didn't complete primary	III. Total literacy if none and some shift to complete primary	IV. Gain from this shift	V. Literacy level for girls if they enroll at same rate as boys for all grades (but learning stays constant)	VI. Gain from this shift
Uganda	Girls	32.6%	45.7%	39.0%	6.4%	41.3%	8.7%
	Boys	50.1%	32.1%	54.0%	3.9%		
Bangladesh	Girls	43.4%	29.5%	50.4%	7.0%	47.3%	3.9%
	Boys	49.9%	30.7%	59.9%	10.0%		
India	Girls	51.1%	30.2%	63.0%	12.0%	62.3%	11.2%
	Boys	64.5%	16.9%	71.0%	6.5%		
Pakistan	Girls	53.1%	39.0%	63.8%	10.7%	64.2%	11.1%
	Boys	66.7%	24.6%	75.7%	9.0%		
Rwanda	Girls	58.8%	48.9%	81.0%	22.2%	62.9%	4.1%
	Boys	67.0%	42.4%	82.7%	15.7%		
Ghana	Girls	58.7%	20.4%	65.3%	6.6%	67.7%	8.9%
	Boys	73.0%	13.9%	78.5%	5.5%		
Kenya	Girls	69.9%	26.8%	80.2%	10.4%	76.5%	6.6%
	Boys	75.3%	19.8%	82.5%	7.2%		
Nigeria	Girls	73.2%	10.6%	74.6%	1.5%	80.0%	6.8%
	Boys	80.4%	5.6%	81.5%	1.0%		
Tanzania	Girls	75.8%	17%	85.6%	9.8%	81.0%	5.2%
	Boys	79.6%	11%	84.5%	4.8%		
Indonesia	Girls	88.3%	5%	89.2%	0.9%	88.6%	0.3%
	Boys	87.9%	6%	89.5%	1.6%		
Mean	Girls	60.5%	27.3%	69.2%	8.7%	67.2%	6.7%
	Boys	69.5%	20.3%	76.0%	6.5%		
Median	Girls	58.8%	28.2%	70.0%	8.4%	65.9%	6.7%
	Boys	70.0%	18.4%	80.0%	6.0%		

Source: Authors' calculations with FII data

IV.C) Female literacy gains from gender parity on learning profiles

For the third counter-factual, we keep schooling attainment at observed levels and calculate female literacy if females had the same learning profile as males. This examines the possibility that girls who are in school learn less than boys, by having flatter learning profiles. The implication would be that if this counterfactual brings about large changes in female literacy, then gender-specific changes to the schooling experience – so that girls who are in school learn at the same rate as boys – could reduce the gender literacy gap.

Columns III and IV of Table 6 shows the results of these calculations. Most countries have a gain of less than 3 percentage points, and three countries have a negative "gain" – meaning female literacy *decreases* when learning is brought on par with boys. Uganda is the outlier, with an increase in female literacy of 10 percentage points in this scenario.

This indicates that once girls are in school, they learn to read at roughly similar rates as boys. The gender literacy gap, then, is not primarily the result of curriculum or pedagogy that work better for one gender than the other, but rather low levels of learning across the board, and disparate enrollment rates for boys and girls. "A rising tide lifts all boats" – in order to increase girls' learning, then, the best approach may be to improve learning for all students.

IV.D) Gender differences in literacy gains from shifting learning profiles

The final counter-factual examines the "rising tide" scenario, calculating male and female literacy if the learning profiles for everyone are shifted. Specifically, we calculate male and female literacy if each country had Indonesia's learning profile (the highest performing of these ten FII countries), keeping schooling attainment at observed levels. This shift yields the largest literacy gains out of all scenarios analyzed, shown in column VI of Table 6.

Females in Uganda have massive gains in literacy from this shift – gaining 40 percentage points, more than doubling the observed literacy rate. And, Ugandan males have large gains in this scenario too, with a 28 percentage point increase in literacy. The steepening of the learning profile for all students also reduces the gender gap in Uganda from 17.6 percentage points down to just 5.8 percent.

All but two countries have similar patterns, with literacy rising for both males and females, and the gender gap shrinking as females gain more than males. On average, shifting to Indonesian learning profiles has more than double the impact on female literacy (an increase of 15.7 percentage points), than the nearest performing alternative (UPC which averages an 8.4 percentage point rise). And keep in mind Indonesia's learning profile is still weak by international standards.

Table 6*:* Gender differences when shifting schooling attainment versus learning profiles

Country		Data on cohort adults ages 18 – 37 from FII data		Shifting learning profiles			
				To national gender parity		To Indonesian levels	
		I Total literacy at current levels	II % who didn't complete primary	III Literacy level for girls if they have same learning profile as boys (but don't change enrollment rates)	IV Gain from this shift	V Total literacy if learning is at Indonesia's learning profile	VI Gain from shift to Indonesia's learning profile
Uganda	Girls	32.6%	45.7%	42.1%	9.6%	72.8%	40.2%
	Boys	50.1%	32.1%			78.6%	28.4%
Bangladesh	Girls	43.4%	29.5%	45.7%	2.3%	72.8%	29.4%
	Boys	49.9%	30.7%			72.1%	22.2%
India	Girls	51.1%	30.2%	54.0%	2.9%	65.7%	14.6%
	Boys	64.5%	16.9%			78.5%	14.0%
Pakistan	Girls	53.1%	39.0%	55.9%	2.8%	64.2%	11.2%
	Boys	66.7%	24.6%			75.4%	8.7%
Rwanda	Girls	58.8%	48.9%	63.4%	4.6%	67.8%	9.0%
	Boys	67.0%	42.4%			71.3%	4.3%
Ghana	Girls	58.7%	20.4%	64.2%	5.4%	78.0%	19.3%
	Boys	73.0%	13.9%			83.1%	10.1%
Kenya	Girls	69.9%	26.8%	67.7%	-2.2%	76.8%	6.9%
	Boys	75.3%	19.8%			81.7%	6.4%
Nigeria	Girls	73.2%	10.6%	74.0%	0.8%	85.1%	11.9%
	Boys	80.4%	5.6%			89.5%	9.0%
Tanzania	Girls	75.8%	17%	74.4%	-1.4%	74.5%	-1.3%
	Boys	79.6%	11%			82.3%	2.7%
Indonesia	Girls	88.3%	5%	87.5%	-0.8%	88.3%	NA
	Boys	87.9%	6%			87.9%	NA
Mean	Girls	60.5%	27.3%	62.9%	2.4%	74.6%	15.7%
	Boys	69.5%	20.3%			80.0%	11.8%

Source: Authors' calculations with FII data

The results of the four simulations (plus one additional comparison) are summarized in Figures 4a, 4b and 4c.

Figure 4a shows the gains in female literacy over the observed levels for each of five scenarios: (1) UPC, (2) gender parity in attainment (but not learning profile), (3) gender parity in learning profile (but not attainment), (4) gender parity in both (which is simply the male literacy level in Tables 5 and 6 and does not require a separate simulation), and (5) Indonesia's learning profile. Several findings are clear.

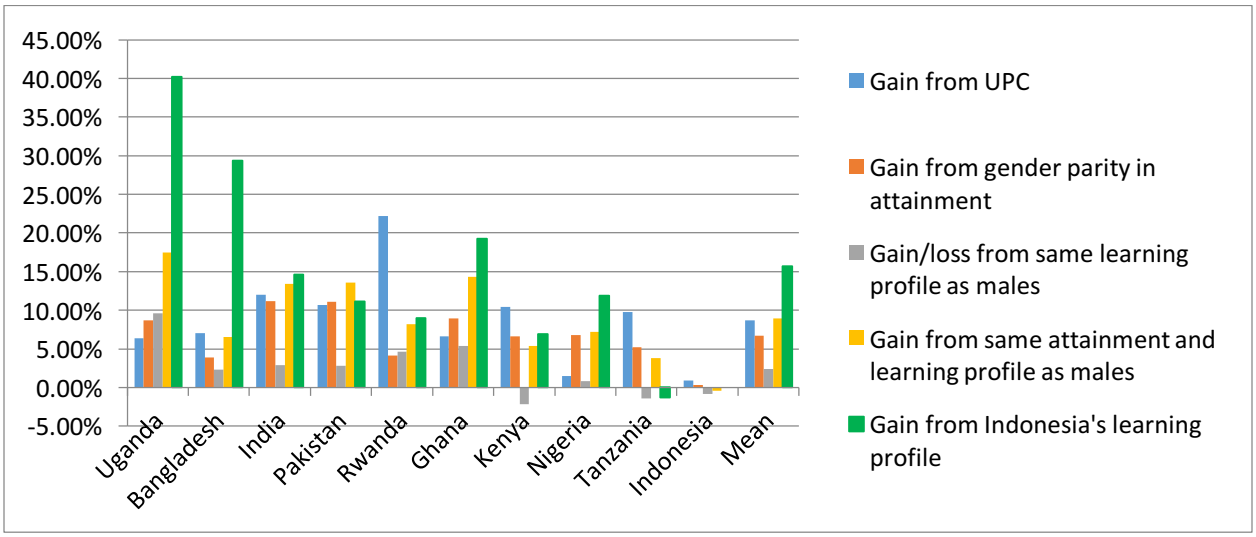
First, very little of the overall literacy gap is due to females being disadvantaged in the learning profile of reading. In three countries shifting to the male learning profile actually reduces female literacy, and in another five countries this increases female literacy by less than 5 percentage points.

Second, the gain from UPC and from achieving equality across the sexes is about the same. That is, getting both boys and girls in school at least through primary completion produces about the same magnitude of female literacy gain as just equalizing male and female attainment at all levels (without achieving UPC).

Third, in countries with weak learning profiles the gains from steepening the learning profile exceed the gains possible from merely achieving gender parity in literacy (through female parity with boys on attainment and learning profile). Only in two countries – Tanzania and Pakistan – does gender parity achieve larger gains for girls than steepening the learning profile. In some countries, such as Uganda and Bangladesh, the relative gains from steepening learning profiles are massive compared to gender parity. Averaged across the ten countries the gains to female literacy of a generally higher learning profile (Indonesia's) are 6.5 times as high as equalizing the male and female learning profile alone and nearly twice as big as eliminating the gender gap in literacy entirely.

Fourth, the results vary a lot from country to country and whether UPC, gender parity, or a steeper learning profile produces the highest results depends on the factual conditions of each country with respect to primary attainment, gender differentials and the learning profile. That the results are completely different for three East African neighbors: Uganda, Tanzania, and Rwanda suggest caution in over-generalizing about the priorities for increasing female learning.

Figure 4a: Gains to female literacy from gender parity are often smaller than either attaining UPC or than the gains from improving the learning profile for both sexes—and the gains from equalizing learning profiles with males are nearly always small



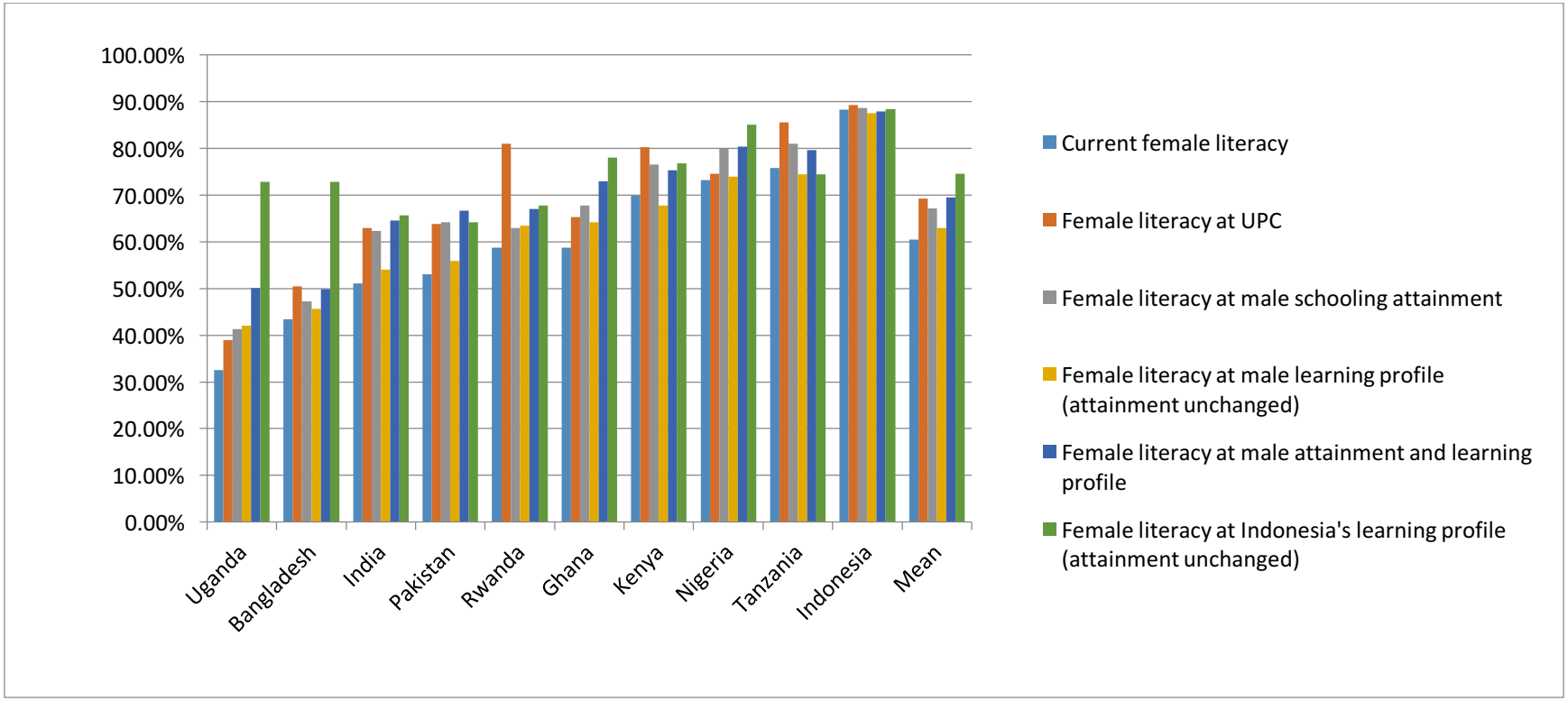
Source: Authors' calculations with FII data.

Figure 4b shows the same results but with the *levels* of literacy in each of the five scenarios rather than the gains/losses, and Figure 4c shows just the results averaged (without population weights) across the ten countries.

The most striking point in Figure 4b is that eliminating all gender gaps across these ten countries would still leave many countries with an enormous problem with female illiteracy. Even with the elimination of gender gaps only about half of women would be literate in Uganda and Bangladesh and only about two thirds of women in India and Pakistan.

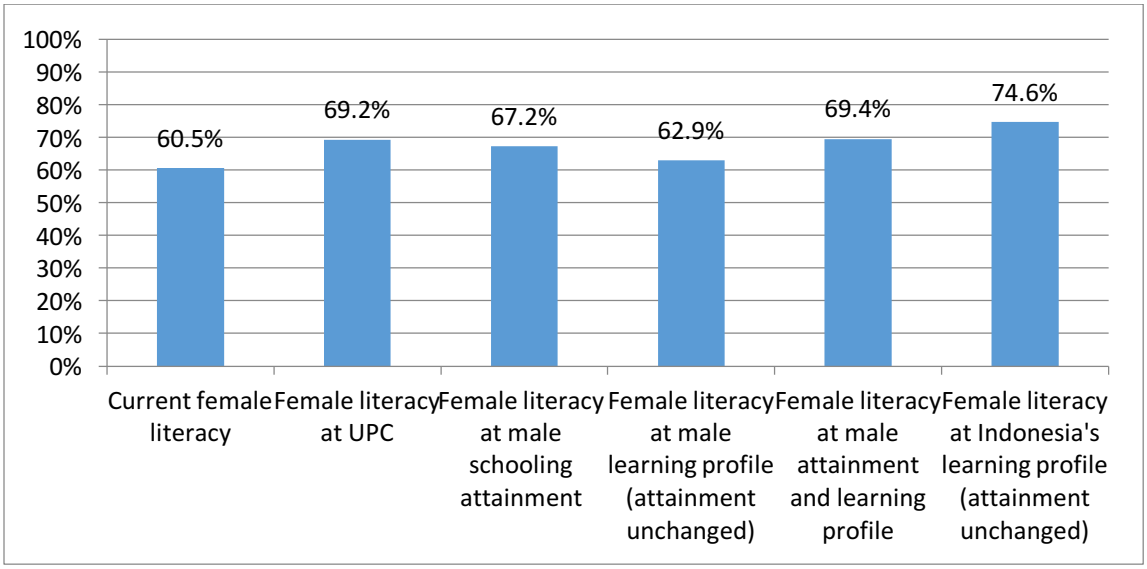
Similarly steepening the learning profile leads to substantial improvements in most countries but the learning profile can only affect those who attend school. Indonesia's female literacy in 2015 was near 90 percent but achieving their learning profile leaves India and Pakistan well short of that as female schooling attainment is so low. Clearly both are needed, in various mixes in various countries.

Figure 4b: Levels of female literacy, comparing current levels and various scenarios, shows that eliminating female illiteracy requires improved learning profiles as just eliminating gender disparity leaves almost a third of women illiterate



Source: Authors' calculations with FII data

Figure 4c: Eliminating gender gaps alone across these ten countries produces large increases in female literacy—but is well short of universal literacy—improvements in the learning profile will be needed



Source: Authors' calculations with FII data.

Conclusion

Obviously, we are not downplaying the importance of reaching universal completion of primary schooling. But *education* is the basic human right declared in the Universal Declaration of Human Rights in 1948. All subsequent international commitments to *goals* have been to *education.* Hence the SDG commitment to universal literacy is a re-affirmation of the 1948 commitment to *education* as a basic human right.

Schooling has always been seen as instrumental to the objectives of education. However, the easy elision of treating a goal of education and a target of schooling as essentially the same is dangerous when the link between schooling and the educational goals sought—and literacy is everywhere and always a learning goal of education—is not strong and tight. It is often assumed that schooling leads reliably to learning, and thus assumed that a schooling target, such as the MDG target to achieve universal primary school, will yield some minimum standard of learning to prepare children for their future.

The FII data adds to the increasing body of data showing that the assumption that schooling *is* learning is sometimes right but all too frequently wrong. Using a simple measure of functional literacy, we show that a single schooling target, such as universal primary completion, has wide variance in outcomes. Across the 10 countries with FII data, even had universal primary completion between achieved literacy rates would have still ranged from only 46 percent to 82 percent.

In addition, the data show that schooling targets such as UPC or gender parity on schooling attainment achieve only small gains for female literacy in many countries. Achieving universal primacy completion would leave female literacy at only 39 percent in Uganda, while gender parity for attainment brings female literacy to only 41 percent.

The largest gains are obtained from shifting learning profiles upward, so that all students learn more during their time in school. This kind of shift will not be achieved by measuring enrollments and counting desks. It instead requires measuring and better understanding the learning that takes place in schools, and focusing national policies, donor and government funding, and research efforts on improving the operation of the systems that provide education.

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